

SAFE STREETS FOR ALL



MEADOWLANDS ACTION PLAN FOR SAFETY
(MAP4S)

MEADOWLANDS ACTION PLAN FOR SAFETY (MAP4S)

DRAFT FINAL PLAN

October 2025



ACRONYMS

AADT	Annual Average Daily Traffic	MCC	Meadowlands Chamber of Commerce
ACS	American Community Survey	MDTP	Meadowlands District Transportation Plan
ADA	Americans with Disabilities Act	MP	Milepost
ATP	Active Transportation Plan	MUTCD	Manual on Uniform Traffic Control Devices
BSIP	Bureau of Safety Improvement Programs	NB	Northbound
CDC	Centers for Disease Control and Prevention	NHFN	National Highway Freight Network
CR	County Route	NJ DCA	New Jersey Department of Community Affairs
CRF	Crash Reduction Factor	NJAN	New Jersey Access Network
CT	Census Tract	NJBWC	New Jersey Bike Walk Coalition
DHS	Department of Health (or Health and Human) Services	NJDCA	New Jersey Department of Community Affairs
DIA	Demographic Impact Assessment	NJDEP	New Jersey Department of Environmental Protection
DOT	Department of Transportation	NJDOE	New Jersey Department of Education
DPW	Department of Public Works	NJDOT	New Jersey Department of Transportation
EB	Eastbound	NJSEA	New Jersey Sports and Exposition Authority
EJ	Environmental Justice	NJSP	New Jersey State Police
EJSCREEN	Environmental Justice Screening and Mapping Tool	NJTA	New Jersey Turnpike Authority
EMS	Emergency Medical Services	NJTPA	North Jersey Transportation Planning Authority
EMT	Emergency Medical Technicians	NOAA	National Oceanic and Atmospheric Administration
EPA	Environmental Protection Agency	PATH	Port Authority Trans-Hudson
EPI	Equivalent Possible Injury	PD	Police Department
ETC Explorer	Equitable Transportation Community Explorer	QR	Quick Response
FEMA	Federal Emergency Management Agency	ROW	Right-of-Way
FHWA	Federal Highway Administration	SAT	Safety Assessment Tool
FSI	Fatal and Serious Injury	SCP	Safe Corridor Program
FSSNJ	Families for Safe Streets New Jersey	SLD	Straight Line Diagram
GHG	Greenhouse Gases	SRTS	Safe Routes to School
GPS	Global Positioning System	SS4A	Safe Streets and Roads for All
HH	Household	STEAP	Screening Tool for Equity Analysis of Projects
HIN	High-Injury Network	STF	Safety Task Force
HPMS	Highway Performance Monitoring System	SUV	Sport Utility Vehicle
HRN	High-Risk Network	TMA	Transportation Management Agency
ITS	Intelligent Transportation Systems	USDOT	United States Department of Transportation
LE	Life Expectancy	VPD	Vehicles Per Day
LEP	Limited English Proficiency	VRU	Vulnerable Road User
MAP4S	Meadowlands Action Plan for Safety	VZNJA	Vision Zero New Jersey Alliance
MASSTR	Meadowlands Adaptive Signal System for Traffic Reduction		

EXECUTIVE SUMMARY

The Meadowlands Action Plan for Safety (MAP4S) is the first roadway safety improvement plan for the Hackensack Meadowlands District (the District). Portions of 14 municipalities in Hudson and Bergen Counties lie within the District. MAP4S aims to create a comprehensive safety framework to enhance multimodal roadway safety, with a particular focus on vulnerable road users such as pedestrians, bicyclists, people with disabilities, transit riders, and older adults. The New Jersey Sports and Exposition Authority (NJSEA) is leading this initiative, supported by a grant from the United States Department of Transportation's (USDOT's) Safe Streets and Roads for All (SS4A) program. The SS4A program supports regional, local, and tribal initiatives to develop safety action plans and implement projects aimed at eliminating roadway fatalities.



MAP4S has set a target year of 2040 for the elimination of fatal and serious injury crashes (FSI crashes), aligning with the State of New Jersey's broader Target Zero Commission, signed into law by Governor Phil Murphy in January 2025.

The 30.3 square miles of the Meadowlands District are characterized by urban and wetlands areas with significant industrial and transportation infrastructure. Per the United States Census Bureau's American Community Survey (ACS) 2021 estimates, approximately 36,000 people live in the District. Key regional destinations located within the District include the Meadowland's Sports Complex, which encompasses MetLife Stadium, Meadowlands Arena, the Meadowlands Racetrack and the American Dream shopping and entertainment complex. Additionally, NJ TRANSIT's Secaucus Junction train station, and Teterboro Airport lie within the District. The District's transportation network includes 237 miles of state, county, and municipal roads, 10 rail lines serving NJ TRANSIT and Amtrak, and numerous local and regional bus routes.

*For more information about the District's population and demographics, refer to **Section 2** of the plan. For more information about the District's land use and environmental character and its transportation network, refer to **Sections 3 and 4**.*

Project Need and Context

Notable increases in vehicle crashes throughout the District prompted the NJSEA to initiate MAP4S. From 2017 to 2021, Fatal and Serious Injury (FSI) crashes occurring in the Meadowlands District rose sharply and increased annually, nearly quadrupling from eight in 2017 to 31 in 2021 and outpacing statewide trends of FSI crashes increasing annually during the same period.

Other findings from an analysis of 10,023 crashes from 2017 to 2021 include:

- Pedestrian crashes made up approximately 23 percent of all FSI crashes in the District (including nine fatalities, the most of any crash type), an overrepresentation considering they comprised less than one percent of all crashes in the District.
- State and county roads experienced the greatest number of FSI crashes in the Meadowlands District. These roads typically include Freeways/Expressways, Arterials, and Collector roads, with the capability to carry the highest volumes of vehicles among all roadway types.
- Statistically speaking, Secaucus experienced more crashes than any municipality in the District, while East Rutherford and Teterboro had the highest number of fatal crashes.
- Crashes involving semi-trailers and other heavy vehicles (including buses and vans) make up approximately 21 percent of all crashes in the District—more than double the statewide average of 10 percent—an overrepresentation likely due to the presence of warehousing and distribution centers in the Meadowlands.

*For more information on the crash analyses conducted for MAP4S, refer to **Section 5** of the plan.*

Understanding Community Needs: Demographics and Outreach

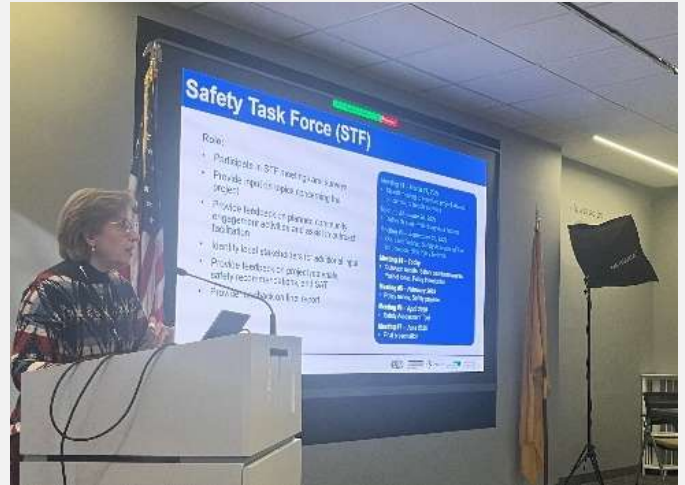
The District is home to diverse communities with concentrations of vulnerable populations, including zero-vehicle households and low-income households. These groups often face disproportionate risks from roadway crashes, highlighting the need for safety improvements that benefit all people.¹

Findings from the demographic analysis within the District include:

- Jersey City and North Bergen have more than 18 percent zero-vehicle households, an overrepresentation when compared to the rest of the District. This percentage indicates potential reliance on transit, walking, or biking.
- Census tracts within Jersey City, Kearny, Moonachie, North Bergen, and South Hackensack have concentrations of vulnerable populations that will benefit from roadway safety improvements.
- An extensive outreach program also provided an understanding of community needs by gathering input on roadway safety issues and opportunities directly from the public as well as project stakeholders. Outreach efforts that helped guide MAP4S development included an online survey, an interactive map where users could pinpoint location-specific issues, five community “pop-up” events, two stakeholders focus group meetings, and one survey sent to the mayors of the 14 District municipalities to solicit their input on roadway safety. In addition, a Safety Task Force (STF) met seven times throughout MAP4S development to collaboratively provide input on plan work products and identify and address safety concerns. The STF will continue to meet beyond plan adoption.

Overall, the outreach effort was effective in identifying community concerns related to aggressive driving, speeding, the need for safer, more connected multimodal infrastructure, complete streets, pedestrian safety, and improved transit connections.

For more information about MAP4S community engagement, refer to **Section 7** of the plan.



Dr. Nadereh Moini, NJSEA Chief of Transportation and MAP4S Project Manager, presenting at the December 2024 STF meeting.



MAP4S public engagement at Rutherford National Night Out on August 20, 2024.

¹ https://www.roadsafety.unc.edu/wp-content/uploads/2021/12/R31_Brief.pdf

Understanding Risk: Network Screening

To effectively target location-specific safety improvements, a data-driven approach was used to identify roadway segments with the highest injury severity and crash risk. This involved analyzing crash history in relation to the Meadowlands District's roadways to identify localized peaks in crash severity using an Equivalent Possible Injury (EPI) score. EPI scoring weights crashes by severity to quantify and rank roadway segments within a study area. Locations with a higher score indicate a history of more severe crashes and a need for safety improvements.

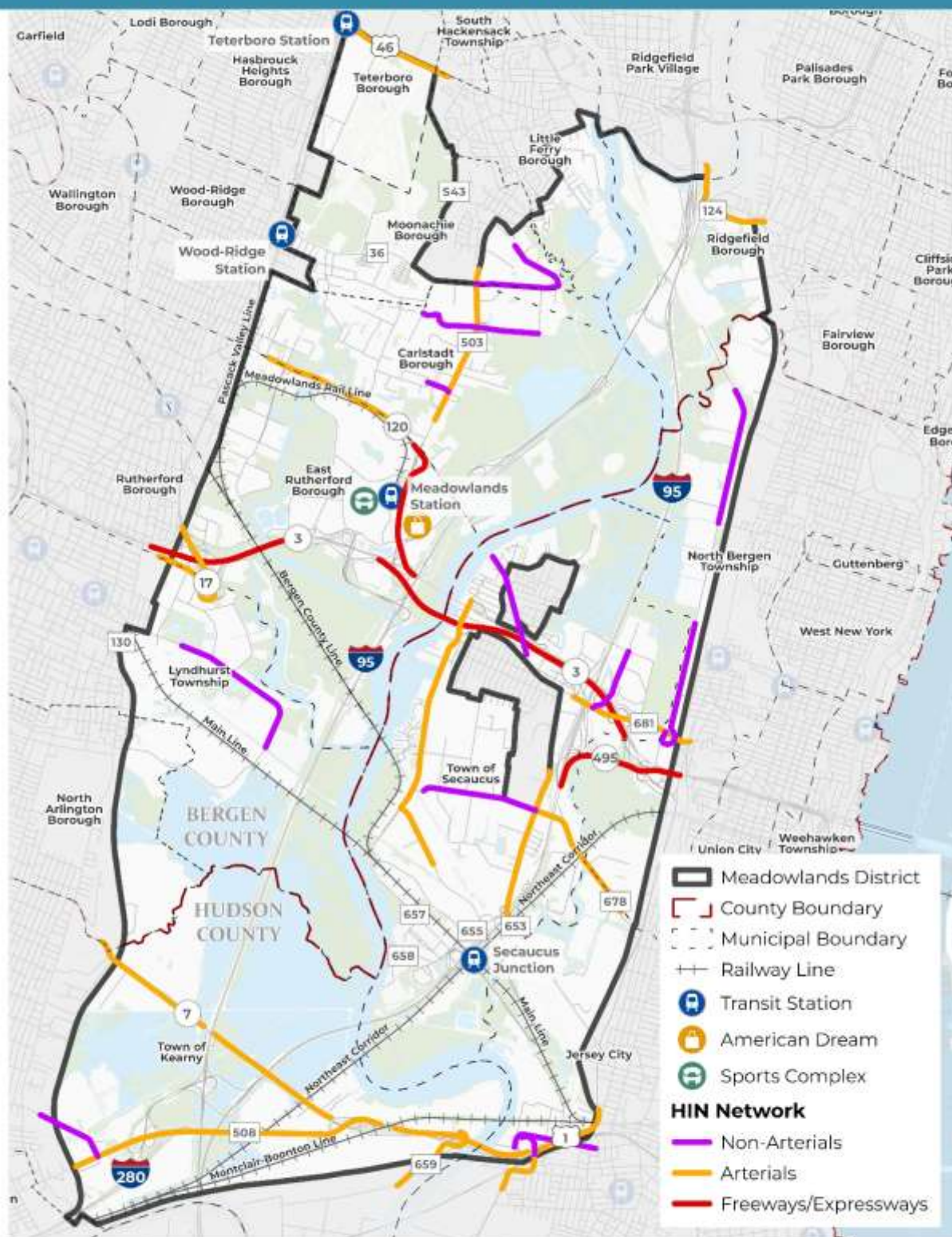
Two networks were identified using the EPI scores, a High Injury Network (HIN) and a High-Risk Network (HRN):

- The **High-Injury Network (HIN)** consists of roadway segments where there is a higher concentration of fatal and injury crashes than the rest of the segments within the District. The MAP4S HIN includes 35 segments with the highest crash histories – and therefore highest EPI scores – across three roadway categories: Freeways/Expressways (5 segments), Arterials (17 segments), and Collectors/Local Roads (13 segments). **The HIN segments total approximately 29 miles or 22 percent of District roadway mileage while comprising approximately 64 percent of the total EPI score for all network roadways.** Once identified, HIN segments were prioritized based on a weighted scoring system that considered EPI scores, the presence of high-risk roadway features, demographic data of surrounding communities, and public input received about HIN segments to create a list of project locations for safety improvements.
- The **High-Risk Network (HRN)** is a group of roadway sub-segments in the Meadowlands District that are distinct in terms of crash outcomes; they experience a greater frequency and severity of crashes than the rest of the District's roadway network. The HRN is used to identify "high-risk" roadway features. These high-risk features are more likely to be found at locations within the HRN than throughout the entirety of the District as a whole, indicating correlation between the roadway features and the risk of increased crash frequency and severity. By identifying high-risk features in this manner, targeted improvements can be recommended to address risk, even at locations without a crash history. This approach is proactive, addressing systemic risk *before* crashes occur. In the District, the following roadway features were identified as high-risk: 1) three or more travel lanes; 2) roadway widths ≥ 40 feet; 3) posted speed limits ≥ 35 mph; 4) AADT $\geq 10,000$ vehicles per day (VPD); 5) Minor Arterials, Other Principal Arterials, and Other Freeway/Expressways functional classifications; 6) sub-segments with at least one signalized intersection; 7) designated freight routes; and 8) presence of one or more bus stops within 50' of a sub-segment. **While the HRN comprises 15 percent of the District's total roadway miles, it captures over half – 56 percent – of the network's total EPI score.**

For more information on the roadway safety analyses, including development of the HIN and HRN, refer to Section 6 of the plan.



HIGH INJURY NETWORK (HIN)



Meadowlands Action Plan for Safety (MAP4S)

Sources: NJDEP, NJSEA, NJDOT, Crashes 2017-2021

0 0.5 1 Miles



From Analysis to Action

MAP4S aims to enhance multimodal roadway safety, particularly for vulnerable road users, through a comprehensive framework grounded in the **five "Es"** of roadway safety:

- **Engineering:** Designing and implementing safety-focused infrastructure like crosswalks, sidewalks, bike lanes, and traffic signal upgrades.
- **Enforcement:** Leveraging law enforcement to reduce behaviors that increase risk such as speeding, double parking, or disobeying traffic signals.
- **Education:** Raising awareness and encouraging safe travel through targeted community outreach programs.
- **Emergency Response:** Responding to crashes to improve post-crash recovery while enhancing preparedness, communication, and coordination of emergency responders.
- **Equity:** Improving access to roadway safety improvements in underserved communities.

Individual safety countermeasures for each of the 5 E's were developed as a resource to identify proven strategies to holistically address roadway safety. These countermeasures can be considered by decision makers and implemented, either individually or in combination for greater impact.

Beyond individual countermeasures, more targeted strategies were also developed to address safety at particular locations within the District, or, through policy and/or programmatic means. As stated below, these strategies include both Safety Improvement Projects (under the Engineering category) and Policy Recommendations (under the Enforcement, Education, Emergency Response, and Equity categories).

- **Safety Improvement Projects** were developed for 20 prioritized HIN roadway segments, excluding roadways segments under the jurisdiction of the New Jersey Department of Transportation (NJDOT) or the New Jersey Turnpike Authority (NJTA). While the projects were developed in response to specific corridor conditions and crash history, common features include:
 - High-visibility crosswalks and ADA-compliant curb ramps
 - Traffic signal upgrades to MUTCD standards (12" lenses, push buttons) with reflective backplate borders
 - Sidewalk installation to close gaps
 - Lighting enhancements, especially at underpasses and intersections
 - Speed feedback signs
 - Edge lines and roadway markings intended to define travel lanes and lane assignments
 - Bus stop improvements including shelters, sidewalk connections, and marked crossings near stops
 - Establishing road diets by reducing lane's widths and constructing bike lanes in each direction, or a center turn lane.
 - Bike facilities where feasible
 - Intersection upgrades: roundabouts, signal timing changes, and lane reassignments



Retroreflective borders on signal backplates



Pedestrian Hybrid Beacon (PHB) on Washington Avenue (County Route 503) in Carlstadt

- **Policy Recommendations:** An assessment of policies and best practices from peer organizations informed the development of non-infrastructure policy actions for the District. Fourteen strategies, prioritized based on their potential impacts and implementation timeline, included actions related to:
 - Agency Partnerships and Collaboration
 - Annual Reporting and Evaluation
 - Vision Zero Progress Monitoring
 - Healthcare Coordination
 - Municipal Complete Streets Policies
 - Access Management Policies
 - Families for Safer Streets
 - Slow Streets
 - Rapid Response / Quick Build
 - Public Outreach
 - Engagement with Historically Disadvantaged Areas
 - Targeted Enforcement for Speeding
 - Demographic Impact Assessment (DIA)
 - Roadway and Vehicle Safety

*For more details on the specific MAP4S safety strategies, refer to **Section 9** of the plan.*

Safety Planning and Assessment

To support safety planning, performance, and tracking, a custom Safety Assessment Tool (SAT) was developed to provide stakeholders with a tool that facilitates safety planning in areas not covered under MAP4S or enhancing safety project developments in their jurisdictions. The SAT is an interactive platform developed as a legacy product to support data-driven roadway safety planning. It enables the NJSEA as well as municipal planners, engineers, and decision makers to access and evaluate crash data, view the safety countermeasures developed for MAP4S, view and/or input safety improvement projects within the District, and track project performance over time. Regular updates and maintenance of the SAT are anticipated to maintain functionality and effectiveness.

Specifically, the SAT aims to:

- **Enable data access and geolocation** of crash and equity data
- **Support safety analysis** through interactive visualizations and mapping tools
- **Guide planning and decision-making** by linking crash data with appropriate safety countermeasures
- **Track project implementation and outcomes** using pre- and post-evaluation tools
- **Maintain a centralized resource** for safety projects and strategies aligned with MAP4S goals

Next Steps

MAP4S serves as a transparent, inclusive, and adaptable safety framework—grounded in data analyses, community input, and proven practices—that addresses immediate safety concerns while supporting long-term multimodal safety improvements throughout the Meadowlands District.

Measuring plan progress will be crucial to advance the NJSEA's commitment to safety beyond MAP4S adoption. To that end, several performance metrics have been identified to help the NJSEA and District constituents track progress towards zero FSI crashes by 2040. The STF will continue meeting to support safety initiatives, help advance safety projects and policies, and monitor plan performance. The NJSEA will also release an annual report to document progress and update actions as needed.

*For more detail on MAP4S performance metrics, refer to **Section 10** of the plan.*

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1 INTRODUCTION

The **Meadowlands Action Plan for Safety (MAP4S)** is the first safety plan for the Hackensack Meadowlands District, encompassing parts of 14 municipalities in Hudson and Bergen Counties, New Jersey. MAP4S aims to create a comprehensive safety framework to enhance multimodal transportation safety, with a particular focus on underserved communities and vulnerable road users. **The ultimate goal of MAP4S is to eliminate all crashes resulting in fatalities or serious injuries in the Meadowlands District by 2040.**

Recent transportation trends, such as the growth of e-commerce, home deliveries, hybrid work, and micromobility,² have underscored a need for safe roadways and multimodal connections to better serve the needs of all travelers. The Meadowlands District's higher roadway crash fatality statistic compared to the state average highlights this necessity. The New Jersey Sports and Exposition Authority (NJSEA), tasked with mitigating the adverse impacts of new development projects, has seized an opportunity to assess the roadway safety implications of current transportation trends and land use development patterns and develop a plan to mitigate and eliminate crashes that result in serious injuries and fatalities.

The main objective of MAP4S is to develop a comprehensive safety framework to enhance multimodal roadway safety within the Meadowlands District. Key components of this effort include analyzing historic crash data, establishing a Safety Task Force (STF), conducting community outreach, developing and prioritizing safety improvement projects, recommending safety policy changes, and promoting the Vision Zero initiative, which is principally focused on eliminating roadway deaths and serious injuries.

To inform the development of MAP4S, the project team first reviewed and summarized transportation and safety-related documents in New Jersey, the Meadowlands area, and local jurisdictions, as well as national best practices, resources, and requirements for Safe Streets & Roads for All (SS4A). The goal of this effort is to understand the types of safety policies, programs, practices, and projects already in place that transfer knowledge, inform, and enhance the development of the MAP4S. The team then collected and evaluated detailed data, summarized in the following areas:

- Population and Equity Analysis
- Land Use and Environmental Analysis
- Existing Transportation Network
- Crash Data
- Network Screening / High-Injury Network (HIN)
- Outreach Findings
- Trend analysis and pattern recognition

MAP4S is funded through a grant from the United States Department of Transportation's (USDOT's) **SS4A** program, which supports regional, local, and Tribal initiatives aimed at preventing roadway deaths and serious injuries.

² Defined by the Federal Highway Administration (FHWA) as "small, low-speed, human- or electric-powered transportation device, including bicycles, scooters, electric-assist bicycles, electric scooters (e-scooters), and other small, lightweight, wheeled conveyances."

2 POPULATION AND DEMOGRAPHIC ANALYSIS

Safety planning is ultimately about people, the end users of all roadway networks. It is therefore critical to understand population and demographic factors when undertaking an evaluation of roadway safety and planning safe conditions for the traveling public, in this case, the over 110,000 people residing in the 14 constituent municipalities and 23 census tracts (CTs) that are within and/or intersect with the Meadowlands District. Several CTs within the District are considered disadvantaged by one or more demographic resources summarized in this chapter.

Consistent with the New Jersey 2020 Strategic Highway Safety Plan, the NJSEA considers equity to be an important consideration in developing MAP4S because, historically, roadway crashes disproportionately impact members of environmental justice (EJ or equity) communities. The USDOT states the following:

Since 2015, the annual number of [roadway] fatalities has exceeded 35,000, with millions more injured – sometimes permanently – each year. Traffic crashes are a leading cause of death for teenagers in America, and disproportionately impact people who are Black, American Indian, and live in rural communities. We face a crisis on our roadways; it is both unacceptable and solvable.³

It is therefore important to identify vulnerable communities within and adjacent to the Meadowlands District to better address systemic inequities of the local, county, and State transportation network. Population data and equity metrics specific to each census tract that transects the District were sourced from the following resources.⁴ For inactive resources, the links below provide references about the tools.

- **Population count and number of households (HHs):**
 - <https://data.census.gov/table/DECENNIALDP2020.DP1?q=160XX00US0473420>
 - Decennial Census DP1, Profile of General Population and Housing
 - Given in quantitative measure
- **Limited English Proficiency (LEP):**
 - <https://19january2021snapshot.epa.gov/ejscreen.html>
 - EPA EJ Screening Tool (EJSCREEN)
 - Given in percentage
- **Life Expectancy (LE):**
 - <https://www.cdc.gov/nchs/data-visualization/life-expectancy/>
 - Downloaded data table from the CDC
 - Given in age
- **Zero-Vehicle HHs & Mean Travel Time to Work:**
 - <https://eelp.law.harvard.edu/wp-content/uploads/2024/02/ETCE-User-Guide-2.16.pdf>
 - ETC Explorer, DOT Index Version 5.3
 - Zero-vehicle HHs given in percentage; mean travel time given in minutes of duration
- **Justice40 Initiative:**
 - <https://www.transportation.gov/sites/dot.gov/files/2023-05/Justice40%20Fact%20Sheetupdated.pdf> (Link is deactivated)
 - <https://eelp.law.harvard.edu/wp-content/uploads/2024/02/ETCE-User-Guide-2.16.pdf>
 - Communities that are disadvantaged according to Justice40 Initiative criteria
 - “Yes” or “No” on whether each CT is labeled as “Disadvantaged”
- **North Jersey Transportation Planning Authority’s (NJTPA’s) Demographic Analysis Tool:**
 - <https://demographics-resources-njtpa.hub.arcgis.com/pages/demographic-analysis-tool>

³ <https://www.transit.dot.gov/sites/dot.gov/files/2022-02/USDOT-National-Roadway-Safety-Strategy.pdf>

⁴ EJSCREEN, ETC Explorer, Justice40, and STEAP are all unavailable/inactive as of 2025 but were available when the analyses were completed in 2024.

- Composite score, based on eleven equity factors (education, low income, minority race, and more as defined in Section 2.2.2) ranked from 0 to 4
- Ranges in value from 0 (least disadvantaged) to 44 (most disadvantaged)
- **Federal Highway Administration's (FHWA's) Screening Tool for Equity Analysis of Projects (STEAP):**
 - [https://connect.ncdot.gov/resources/PROTECT2023-US74/Documents/Attachment%203%20-%20FHWA%20Screening%20Tool%20for%20Equity%20of%20Projects%20\(STEAP\)%20-%20A.pdf](https://connect.ncdot.gov/resources/PROTECT2023-US74/Documents/Attachment%203%20-%20FHWA%20Screening%20Tool%20for%20Equity%20of%20Projects%20(STEAP)%20-%20A.pdf) (Link is deactivated)
 - Based on factors including transportation insecurity, social vulnerability, environmental burden, and more
 - Downloaded "dot_disadvantaged_layer_v3"
 - "Yes" or "No" on whether each CT is labeled as "Disadvantaged"

2.1 Population and Demographic Data

From the perspective of population and household (HH) size, Table 1 summarizes data for each CT within and adjacent to the District. CTs highlighted below have an average HH size of 3.0 or more. These CTs are located on the eastern, southeastern, and southwestern fringes of the District which are indicative of more developed, densely populated environments. Only two of these highlighted CTs (148.02 and 1.01) are labeled by Justice40 as being disadvantaged. Justice40 is summarized in Section 2.2.1.

Table 1: Population and Household Data by CT within and adjacent to the District
(Source: U.S. Census Bureau, 2020 Decennial Census)

	Tract #	MCD(s)	County	Pop. (#)	HH (#)	Avg. HH Size	Flagged by Justice40 as Disadvantaged ? (Y/N)
Meadowland District Census Tracts (<2 acres within Study Area)	50	Carlstadt	Bergen	6,372	2,429	2.6	No
	69	Jersey City	Hudson	99	32	3.1	No
	120.01	E. Rutherford	Bergen	6,326	2,812	2.2	No
	127	Kearny	Hudson	6,009	1,940	3.1	No
	146	North Bergen	Hudson	4,228	1,389	3.0	No
	148.02	North Bergen	Hudson	1,095	358	3.1	Yes
	198	Secaucus	Hudson	7,080	2,778	2.5	No
	199	Secaucus	Hudson	5,542	2,428	2.3	No
	201	Secaucus	Hudson	4,256	1,809	2.4	No
	292	Little Ferry	Bergen	6,754	2,484	2.7	No
	311	Lyndhurst	Bergen	6,652	2,809	2.4	No
	361	Teterboro/S. Hackensack	Bergen	2,675	921	2.9	No
	362	Moonachie/S. Hackensack	Bergen	3,133	1,120	2.8	Yes
	381	N. Arlington	Bergen	5,837	2,374	2.5	No
	452	Ridgefield	Bergen	2,989	1,097	2.7	No
Meadowland District Census Tracts (with >2 acres within Study Area)	514	Rutherford	Bergen	4,989	1,808	2.8	No
	1.01	Jersey City	Hudson	2,554	847	3.0	Yes
	9.02	Jersey City	Hudson	6,778	2,917	2.3	Yes
	17.01	Jersey City	Hudson	5,237	1,888	2.8	Yes
	128	Kearny	Hudson	4,829	1,731	2.8	Yes
	147	North Bergen	Hudson	4,880	1,658	2.9	Yes
	148.01	North Bergen	Hudson	5,234	2,055	2.5	Yes
	182	Fairview	Bergen	7,043	2,424	2.9	Yes

2.1.1 Limited English Proficiency (LEP)

Accounting for LEP population is important for outreach and policy development. A map of the share of LEP population by CT is shown in Figure 1. The following municipalities within the District have been identified as communities that have an overrepresentation of LEP population with respect to the rest of the District, that is, an LEP share of more than 10 percent (**bolded more than 20 percent**):

- **Jersey City**
- **North Bergen**
- Little Ferry
- Teterboro
- South Hackensack
- Moonachie
- North Arlington
- Ridgefield

2.1.2 Life Expectancy (LE)

A map of the average life expectancy age by CT is shown in Figure 2. The average age data is unavailable for some CTs. Based on the LE data presented in Table 2, the following municipalities within the District have been identified as communities with an average life expectancy of less than 80 years of age. **Communities with the lowest life expectancy, at 76 years of age, are bolded below.**

- **South Hackensack**
- **Moonachie**
- Carlstadt
- North Bergen
- Secaucus
- Little Ferry
- Rutherford

2.1.3 Zero-Vehicle Households

Zero-vehicle HHs tend to use modes of transportation, such as walking, biking, and transit first-/last-mile connections, that are more vulnerable to Fatality and Serious Injury crashes. A map of zero-vehicle HH share by CT is shown in Figure 3. The following municipalities within the District have been identified as communities that have an overrepresentation of zero-vehicle HHs with respect to the rest of the District, that is, a zero-vehicle HH share of more than 18 percent:

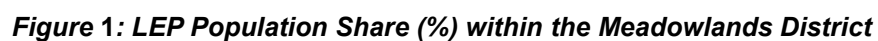
- Jersey City
- North Bergen

Note: Further analysis would be required to correlate areas of high zero-vehicle ownership with areas of high walkability and bikeability scores and good transit service to assess transportation gaps.

2.1.4 Mean Travel Time to Work

The Meadowlands District, especially the southern end of Secaucus, is a major regional employment destination for those working in warehousing, distribution, and manufacturing. The District may be a destination for residents of equity communities who have lengthy commutes. While US Census data does not aggregate commute time by CT destination (i.e., by location of employment), travel time to work is surveyed by CT of residence and can indicate whether commute length averages present hardship for a particular place of workforce residence. A map of the average commute time to work by CT of residence is shown in Figure 4. The following municipalities within the District are identified as communities with average commute times of more than 35 minutes (**communities with average commute times of 40 minutes are bolded**):

- **Secaucus**
- North Arlington
- Rutherford



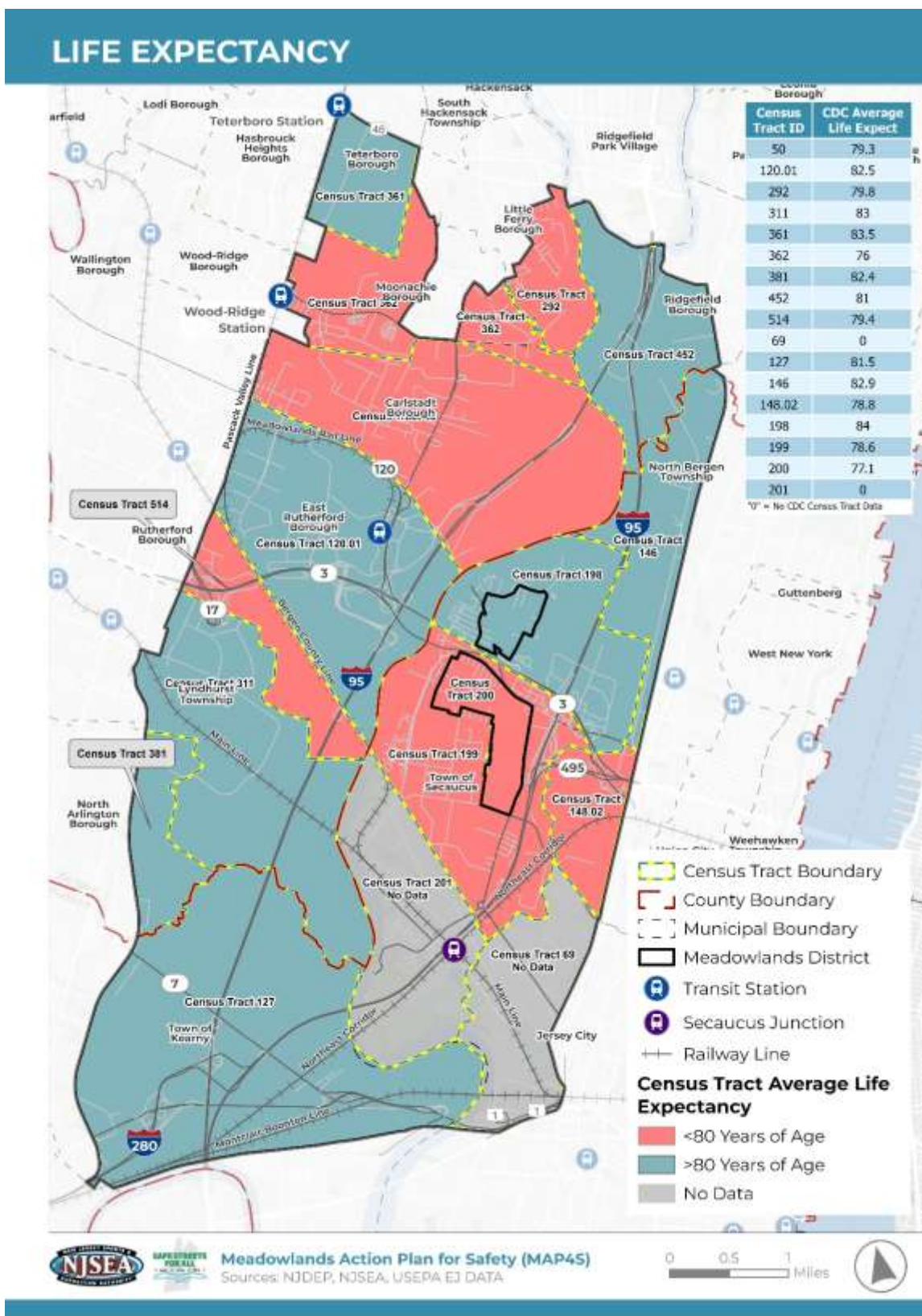


Figure 2: Life Expectancy (Years of Age) within the Meadowlands District



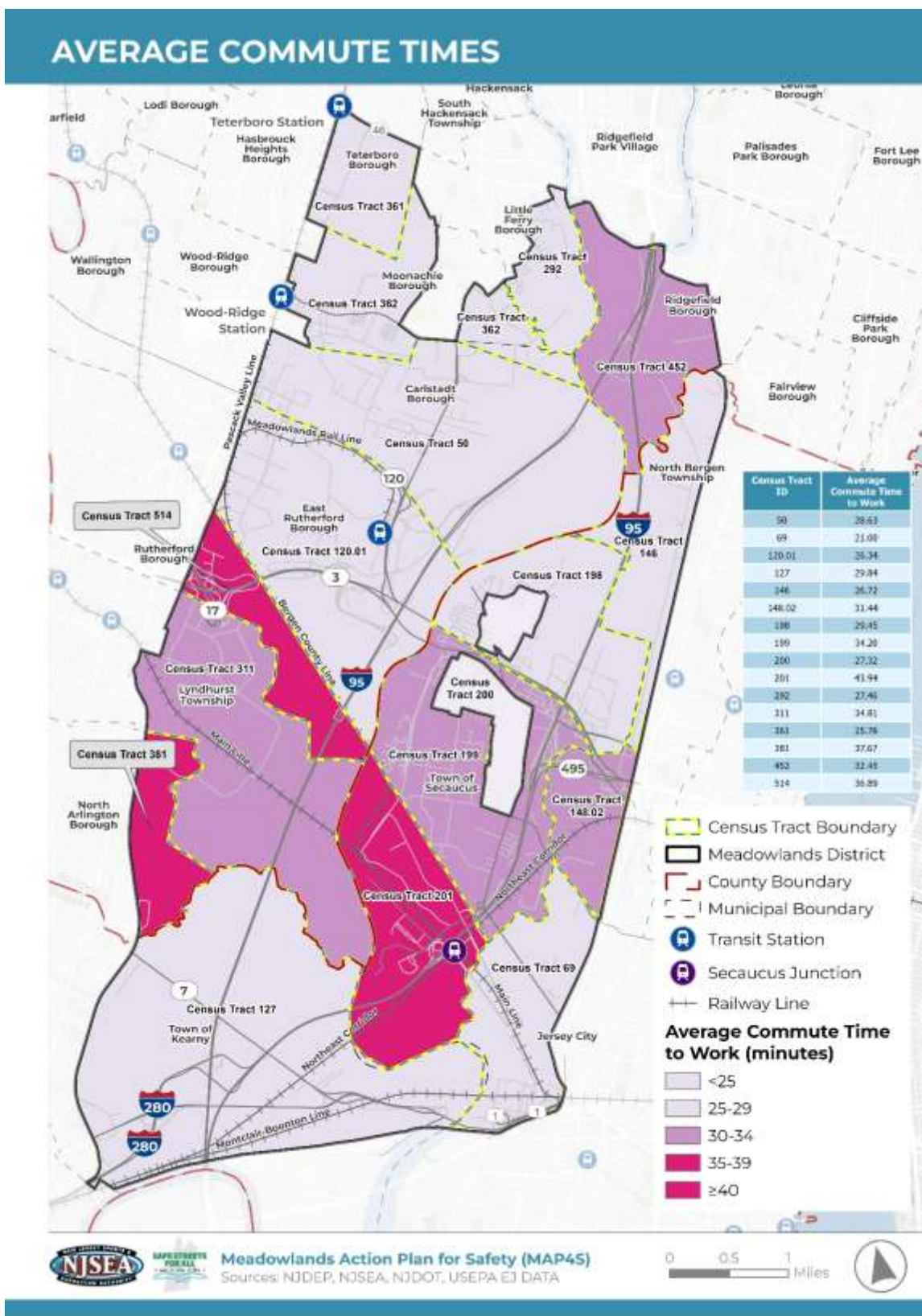


Figure 4: Average Commute Times (Minutes) within the Meadowlands District

2.2 Equity Analysis

The following existing resources (existing at the time of analysis) were used and compared to further identify underserved populations in the District that may be more disproportionately impacted by roadway crashes.

2.2.1 Justice40 Initiative

The Justice40 Initiative is a program from the United States Council on Environmental Quality that seeks to highlight disadvantaged communities considering the following criteria: climate change, energy, health, housing, legacy pollution, transportation, water/wastewater, and workforce development data. Based on data for the aforementioned factors, the following municipalities were labeled as disadvantaged by the Justice40 Initiative (as depicted in Figure 5) with numerous associated equity metrics noted above the 90th percentile, signifying an overrepresentation of populations experiencing historic transportation disinvestment.

- North Bergen
- Moonachie
- South Hackensack
- Kearny (District adjacent)
- Jersey City (District adjacent)

2.2.2 NJTPA Demographic Analysis Tool

The NJTPA has developed a Demographic Analysis Tool to assist agencies and consultants in identifying populations traditionally underserved by transportation in the North Jersey region. The Demographic Analysis Tool evaluates eleven metrics using five-year data from the American Community Survey (ACS). It calculates the standard deviation for census tract percentages across these metrics within the NJTPA region. Data is then categorized into five groups: very below average (score of 0), below average (score of 1), average (score of 2), above average (score of 3), and very above average (score of 4). The average category includes tracts within half a standard deviation of the regional mean, while the other categories extend one full standard deviation beyond the average. Census tracts are assigned scores based on their category for each factor, and a composite score is calculated by summing the scores from all 11 factors, resulting in a total score ranging from 0 to 44.

1. minority populations
2. low-income households
3. individuals with limited English proficiency
4. individuals with disabilities
5. children under age 5
6. children aged 5-17
7. seniors over age 65
8. foreign-born residents
9. females
10. households without vehicles
11. individuals without a high school diploma

The following municipalities within the District were identified as having a composite score of 26 (these and other composite score values are illustrated in Figure 6), which is indicative of above-average equity metrics corresponding to underserved/disadvantaged communities:

- Moonachie
- South Hackensack
- Ridgefield

2.2.3 FHWA Screening Tool for Equity Analysis of Projects (STEAP)

The FHWA's STEAP is described by USDOT as an "interactive mapping tool that allows rapid screening of potential project locations anywhere in the United States." Source data evaluated for the purposes of labeling a CT as "disadvantaged" include the following: transportation insecurity, health vulnerability, environmental burden, social vulnerability, and climate/disaster risk burden. While this tool is typically used at the project planning level, the screening tool does show a more exclusionary measure of labeling CTs as "disadvantaged" than the Justice40 Initiative. Therefore, no CTs within the District had equity measures at a threshold to warrant labeling CTs as "disadvantaged." However, the following municipalities had CTs neighboring the District boundary (see Figure 7) labeled as "disadvantaged:"

- Kearny
- North Bergen

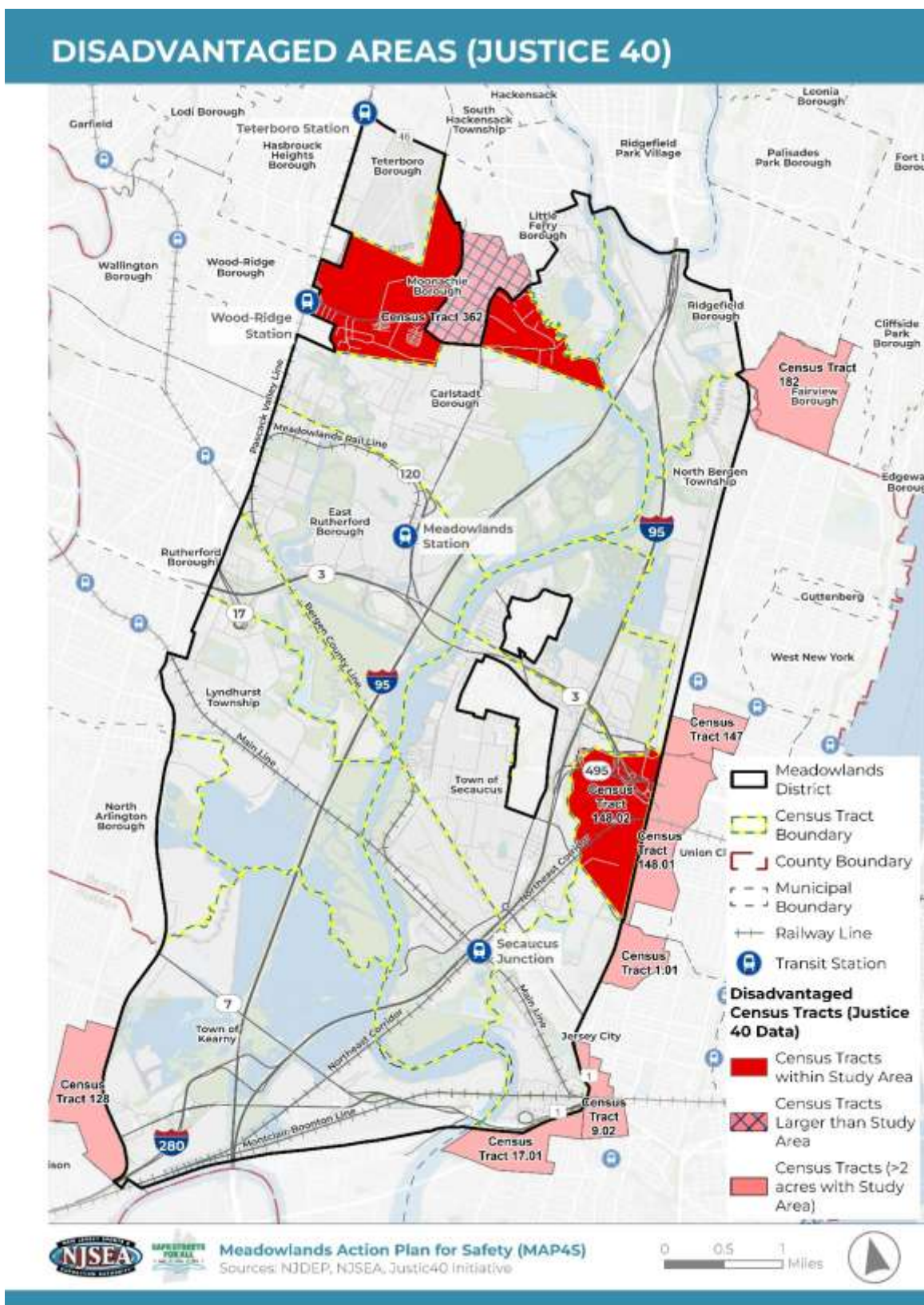


Figure 5: Disadvantaged Areas (Justice40) within and adjacent to the Meadowlands District



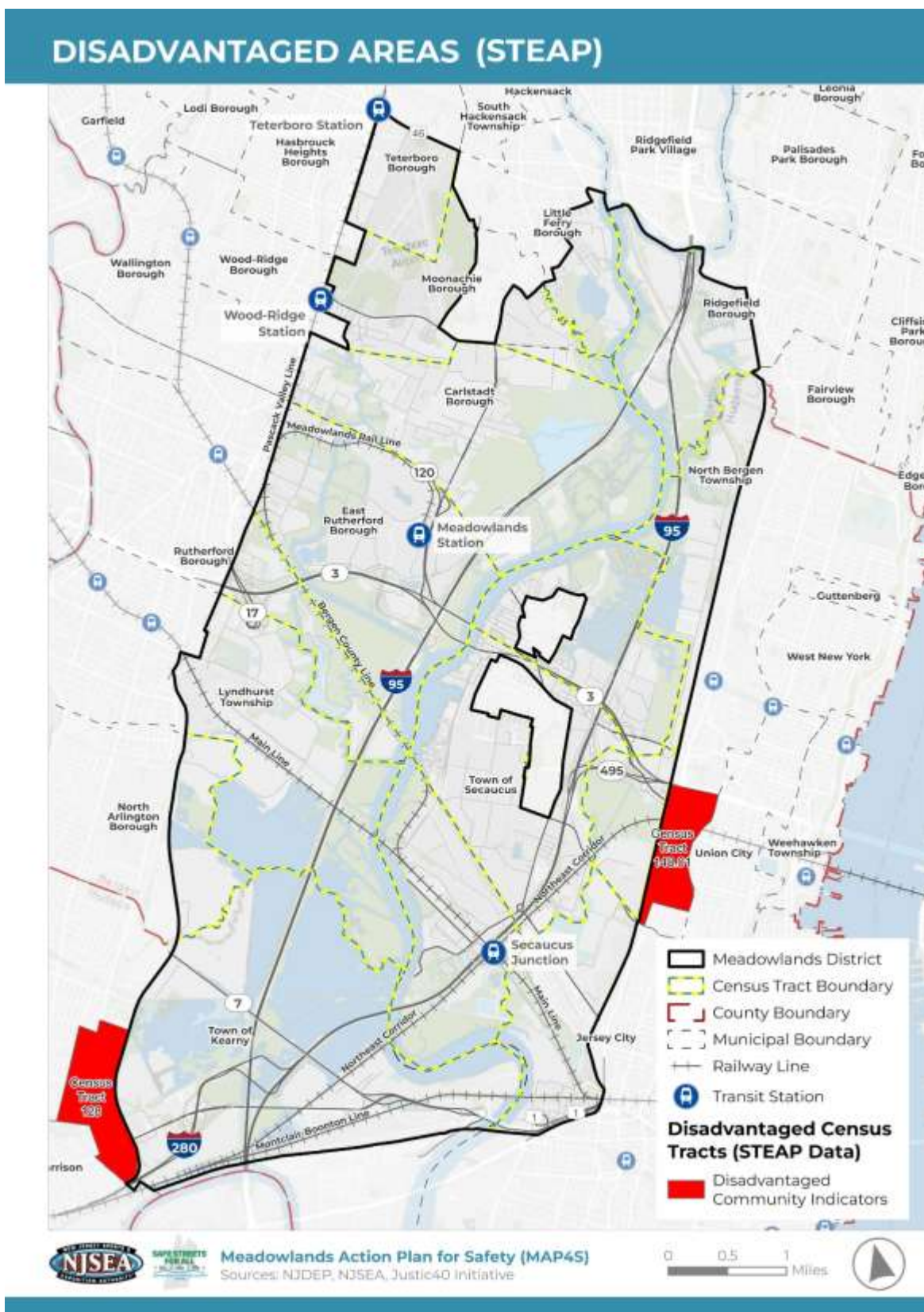


Figure 7: Disadvantaged Areas (STEAP) Adjacent to the Meadowlands District

2.3 Equity Summary

Population and demographic data as well as outputs from the three analytical tools – Justice40, NJTPA's Demographic Analysis Tool, and STEAP – are summarized by CT in Table 2 below.

As shown, 19 of the 23 CTs (83 percent) within and surrounding the District have at least one metric of a disadvantaged population (highlighted cells), including:

- Limited English Proficiency (LEP) populations of above 10 percent
- life expectancies (LE) below 80 years of age
- zero-vehicle HH populations of above 18 percent
- mean commute travel times of above 35 minutes
- communities flagged as being disadvantaged by Justice40 or STEAP
- communities with average equity factors that are “above average” (score of 26 or greater) according to the NJTPA's Demographic Analysis Tool

Table 2: Population and Equity Data by CT within and adjacent to the Meadowlands District
(Source: U.S. Census Bureau, EPA, CDC, DOT, & NJTPA)

	Tract #	Minor Civil Division (MCD)	County	Pop. (#)	HH (#)	LEP (%)	Avg. LE (Age)	Zero-Veh. HH (%)	Mean Travel Time (min)	Justice 40 (Y/N)	NJTPA Comp. Score	STEAP (Y/N)
Meadowland District Census Tracts (<2 acres within Study Area)	50	Carlstadt	Bergen	6,372	2,429	6%	79.3	8%	28.6	No	17	No
	69	Jersey City	Hudson	99	32	66%	N/A	47%	21.0	No	22	No
	120.01	E. Rutherford	Bergen	6,326	2,812	4%	82.5	10%	26.3	No	23	No
	127	Kearny	Hudson	6,009	1,940	9%	81.5	14%	29.8	No	22	No
	146	North Bergen	Hudson	4,228	1,389	11%	82.9	14%	26.7	No	25	No
	148.02	North Bergen	Hudson	1,095	358	23%	78.8	34%	31.4	Yes	23	No
	198	Secaucus	Hudson	7,080	2,778	6%	84	8%	29.5	No	20	No
	199	Secaucus	Hudson	5,542	2,428	10%	78.6	3%	34.2	No	24	No
	201	Secaucus	Hudson	4,256	1,809	8%	N/A	3%	43.9	No	20	No
	292	Little Ferry	Bergen	6,754	2,484	11%	79.8	3%	27.5	No	22	No
	311	Lyndhurst	Bergen	6,652	2,809	4%	83	4%	34.8	No	18	No
	361	Teterboro/S. Hackensack	Bergen	2,675	921	12%	83.5	9%	25.8	No	24	No
	362	Moonachie / S. Hackensack	Bergen	3,133	1,120	17%	76	6%	29.4	Yes	26	No
	381	N. Arlington	Bergen	5,837	2,374	11%	82.4	3%	37.7	No	20	No
	452	Ridgefield	Bergen	2,989	1,097	16%	81	4%	32.4	No	26	No
	514	Rutherford	Bergen	4,989	1,808	3%	79.4	6%	36.9	No	21	No

	Tract #	Minor Civil Division (MCD)	County	Pop. (#)	HH (#)	LEP (%)	Avg. LE (Age)	Zero-Veh. HH (%)	Mean Travel Time (min)	Justice 40 (Y/N)	NJTPA Comp. Score	STEAP (Y/N)
District-Adjacent Census Tracts (w/ >2 acres in Study Area)	1.01	Jersey City	Hudson	2,554	847	4%	N/A	9%	30.6	Yes	20	No
	9.02	Jersey City	Hudson	6,778	2,917	22%	77.8	44%	39.8	Yes	29	No
	17.01	Jersey City	Hudson	5,237	1,888	5%	79.3	34%	35.5	Yes	25	No
	128	Kearny	Hudson	4,829	1,731	15%	79.3	13%	31.8	Yes	25	Yes
	147	North Bergen	Hudson	4,880	1,658	10%	85.7	14%	29.5	Yes	28	No
	148.01	North Bergen	Hudson	5,234	2,055	19%	78.8	26%	26.8	Yes	28	Yes
	182	Fairview	Bergen	7,043	2,424	20%	80.6	16%	32.3	Yes	24	No

Counting these metrics by CT, the following municipalities had a total of **three or more** equity metrics, signifying a disadvantaged community:

- **Within the District:**
 - Moonachie: CT 362
 - North Bergen: CT 148.02
 - South Hackensack: CT 362
- **Adjacent to the District:**
 - Jersey City: CT 9.02 and 17.01
 - Kearny: CT 128
 - North Bergen: CT 148.01

A map of these census tracts is shown on the following page (Figure 8). Note that CTs may extend beyond the limits of the Meadowlands District but, for display purposes, are cut off at the District boundary; additionally, a portion of CT 198 is not depicted as it is not part of the District.

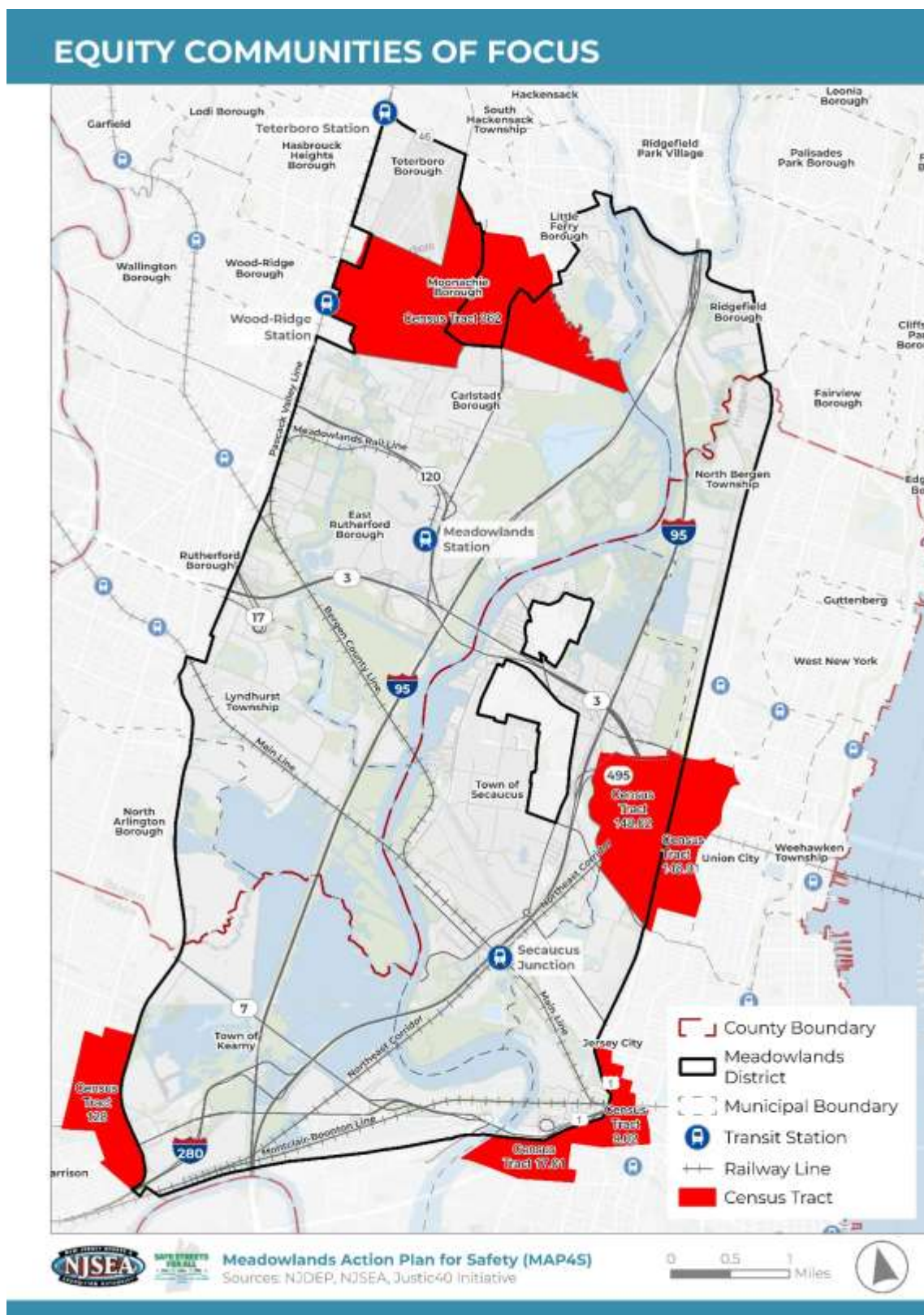


Figure 8: Equity Communities of Focus within/near the Meadowlands District

2.4 Takeaways

- Evaluating demographics and identifying where underserved communities live is important in safety planning since, historically, roadway crashes have disproportionately impacted members of environmental justice (EJ or equity) communities.
- Several equity metrics and tools were considered to evaluate the demographic characteristics of the Meadowlands population, including existing resources such as Justice40, NJTPA's Demographic Analysis Tool, and the FHWA's STEAP.
- The following municipalities had a total of three or more equity metrics, signifying disadvantaged communities:
 - **Within the District:**
 - Moonachie: CT 362
 - North Bergen: CT 148.02
 - South Hackensack: CT 362
 - **Adjacent to the District:**
 - Jersey City: CT 9.02 and 17.01
 - Kearny: CT 128
 - North Bergen: CT 148.01

3 LAND USE AND ENVIRONMENTAL ANALYSIS

3.1 Land Use and Key Destinations

Land uses influence transportation safety because different types of land uses generate and/or attract different types of modes and trips based on their location, density, and context. For example, an office building in a sprawling suburban setting attracts mainly vehicular trips at defined times on weekdays (generally morning and evening peak periods), whereas a park in a more compact urban community may attract walking or biking trips throughout the day and on weekends. Understanding modes and trips associated with land uses can therefore help to strategize safety improvements suited to the context, such as reduced posted speed limits in residential areas, school zone signage, or traffic calming treatments near schools.

3.1.1 Existing Land Uses

Table 3 and Table 4 show the land use breakdown within the Meadowlands District, with the predominant land uses consisting of **urban** and **wetland** areas. More specifically, these land uses comprise:

- **Industrial land uses** representative of the warehousing and manufacturing pervasive within the District
- **Transportation/Communication/Utilities** given the vehicular, rail, and utility infrastructure present in the District
- **Tidal Waters** due to the presence of the Hackensack River and connecting wetlands and tributaries

Figure 9 spatially displays land uses throughout the District. With respect to the HIN, the land use context is predominantly Urban–Commercial/Industrial in nature. However, some segments of the HIN, such as NJ 495 and West Side Avenue, lie near wetlands. As wetlands are environmentally sensitive and prone to flooding, transportation infrastructure in their vicinity are often designed with additional resilience measures to increase safety and functionality under adverse conditions. Engineering safety improvements on these corridors should therefore consider resilient components, including bioswales/biofilters and increased height or utility/conduit protection for Intelligent Transportation Systems (ITS) solutions. All data presented in this section is from the New Jersey Department of Environmental Protection (NJDEP) and the New Jersey Department of Community Affairs (DCA).

Table 3: General Land Uses within the District (alphabetical) (Source: NJDEP & NJDCA)

General Land Use (2015)	Acres	Percentage
Agriculture	0.0	0.0%
Barren Land	1651.9	7.6%
Forest	1196.5	5.5%
Urban	10845.3	49.7%
Water	4043.1	18.5%
Wetlands	4078.9	18.7%
Grand Total	21815.8	100.0%

Table 4: Specific Land Uses within the District (alphabetical) (Source: NJDEP & NJDCA)

Specific Land Use (2015)	Acres	Percentage
Altered Lands	1366.2	6.3%
Commercial	994.4	4.6%
Industrial	3400.0	15.6%
Lakes	826.3	3.8%
Old Field	604.8	2.8%
Other Urban	1221.0	5.6%
Phragmites Dominate Wetlands	2730.5	12.5%
Recreational/Cultural/Educational	680.9	3.1%
Residential	1241.9	5.7%
Saline Marsh	727.6	3.3%
Tidal Waters	3100.4	14.2%
Transportation/Communication/Utilities	3180.0	14.6%
Other	1741.8	8.0%
Grand Total	21815.8	100%

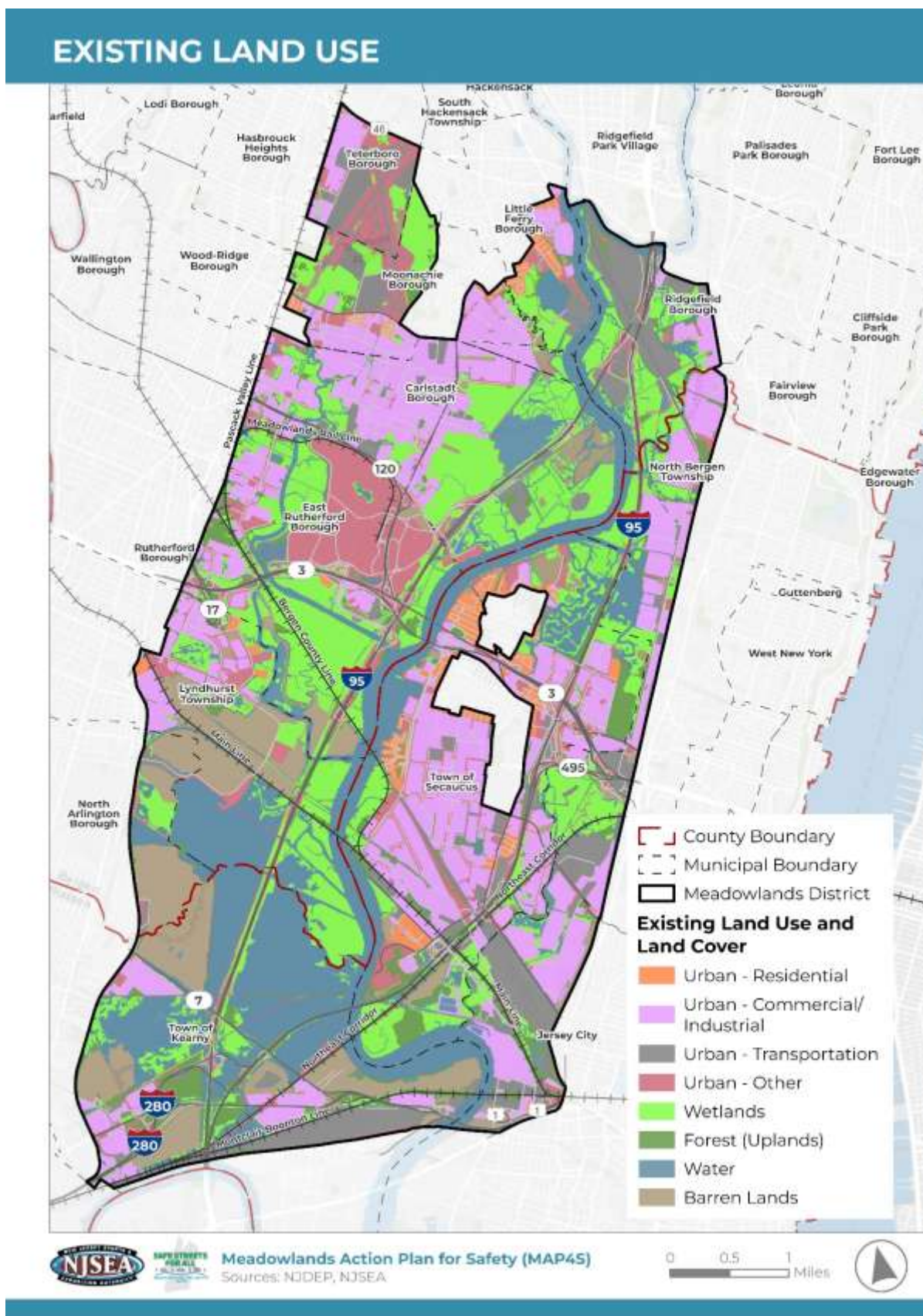


Figure 9: Existing Land Use within the Meadowlands District

3.1.2 Key Destinations/Activity/Job Centers

Within the District, the following facilities are notable destinations and/or trip generators (Figure 10). HIN corridors (See Section 6.4) that provide immediate access to these destinations include US 46, NJ 120, NJ 3, Paterson Plank Road, and Meadowlands Parkway.

- Teterboro Airport
- Meadowlands Racetrack
- MetLife Stadium
- American Dream
- Sky Harbor Marina
- Hilltop Park
- Lyndhurst Community School
- Secaucus Recreation Center
- Secaucus Middle and High Schools
- Great Oaks Legacy Charter School
- Buchmuller Park
- Secaucus Public Library
- Hudson Regional Hospital
- Secaucus Junction
- Laurel Hill Park
- High Tech High School
- Harmon Cove Station Park-and-Ride
- Vince Lombardi Park-and-Ride
- North Bergen Park-and-Ride
- Hudson Regional Hospital

3.2 Environmental Considerations

Safety countermeasures planned for the Meadowlands District should consider flood resilience, considering that the District is located in low-lying areas prone to flooding. As shown in Figure 11 and Figure 12, most of the District is particularly susceptible to sea level rise and flooding. These conditions should therefore be considered when planning engineering safety improvements along all segments of the HIN.

Data sources for these figures include the Federal Emergency Management Agency (FEMA), the National Oceanic and Atmospheric Administration (NOAA), and NJDEP.

3.3 Takeaways

- Safety improvements on HIN segments, including US 46, NJ 120, NJ 3, Paterson Plank Road, and Meadowlands Parkway, located within the vicinity of key District destinations, should include strategies and countermeasures that prioritize travel for vulnerable road users to improve land use access and multimodal mobility.
- Since much of the District is characterized by waterways/wetlands and virtually all of the District is within low-lying flood hazard zones, safety improvements for all HIN segments should consider long-term impacts associated with flooding and sea level rise.

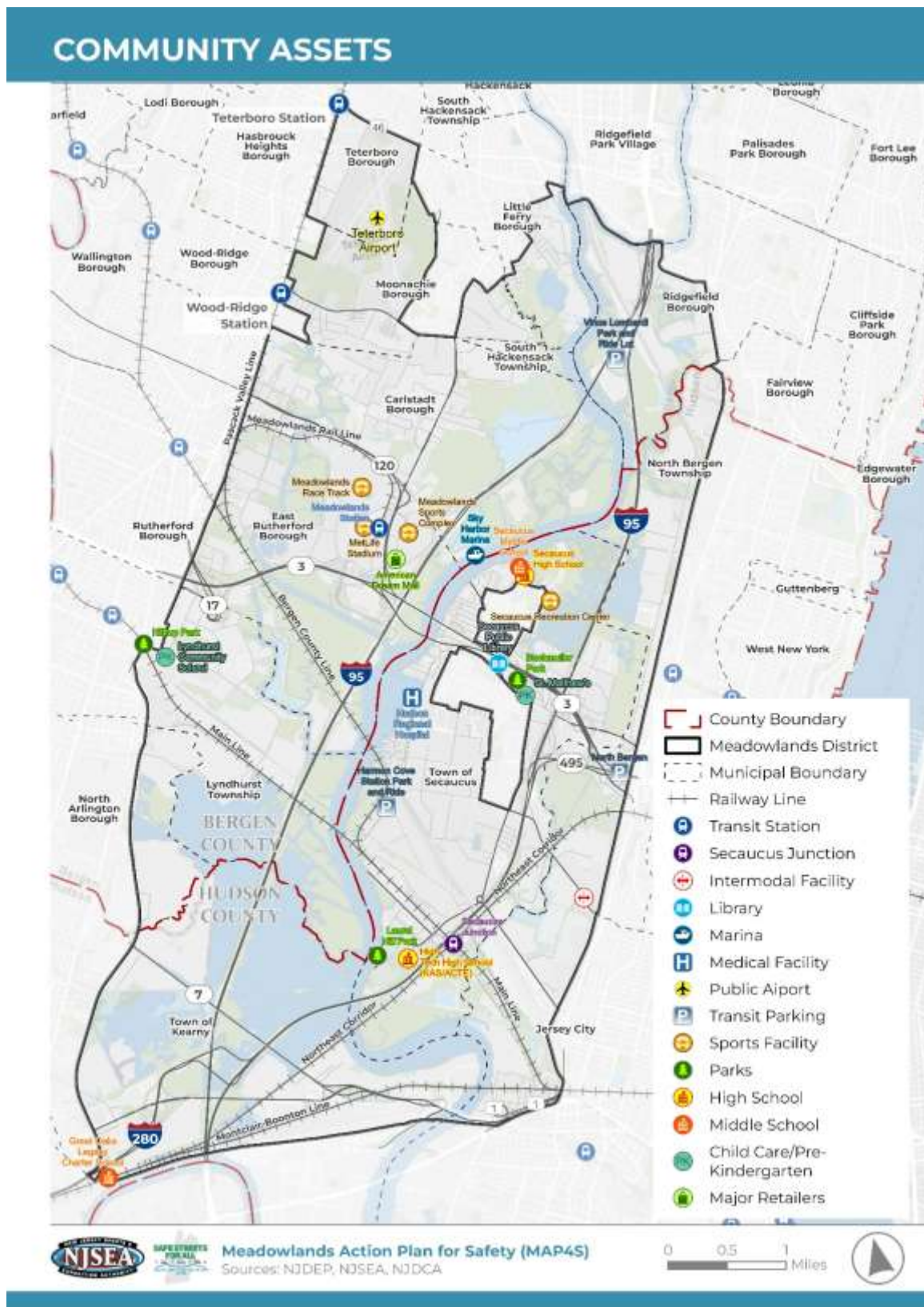


Figure 10: Community Assets within the Meadowlands District

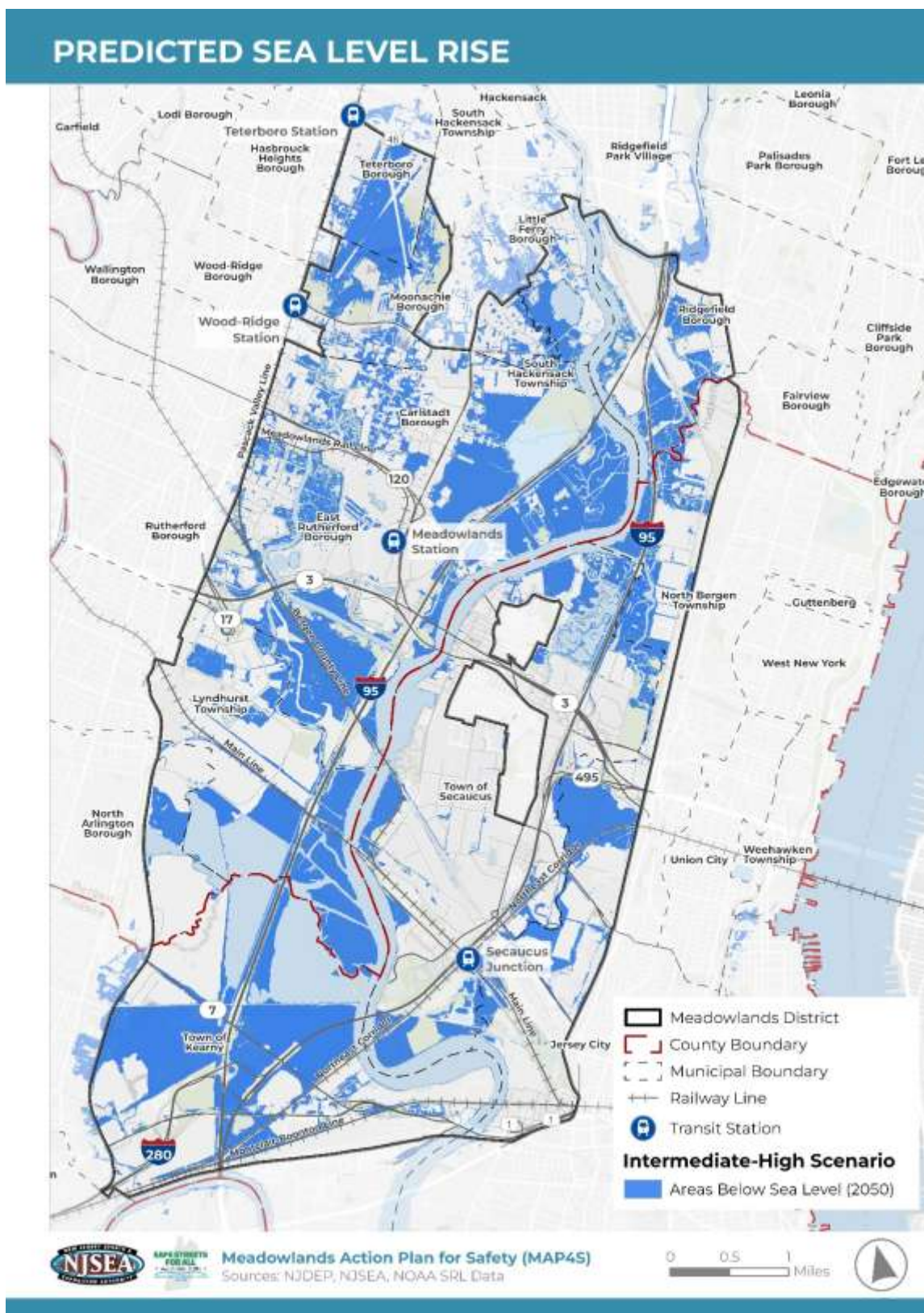


Figure 11: Predicted Sea Level Rise (2050) within the Meadowlands District

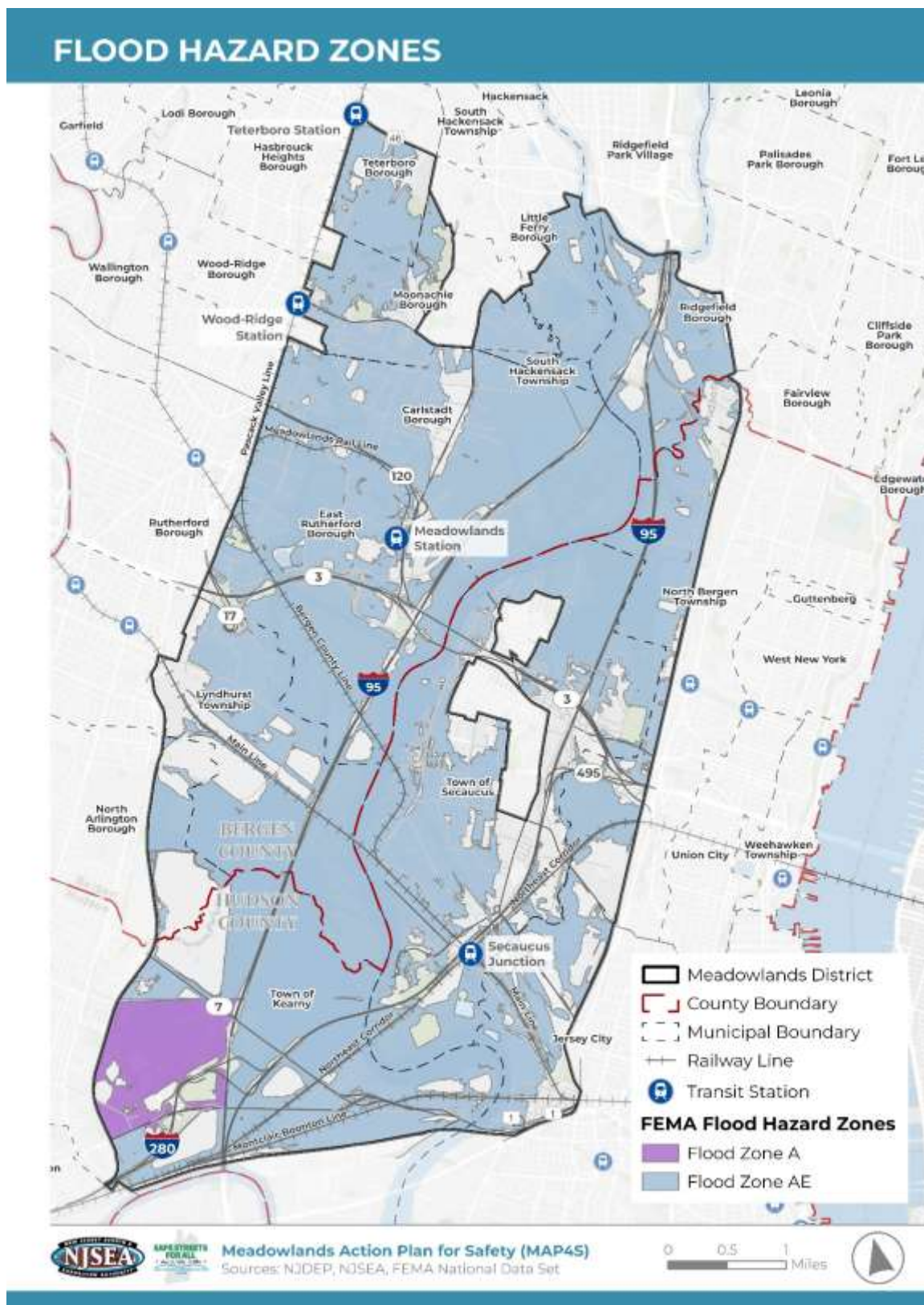


Figure 12: Flood Hazard Zones within the Meadowlands District

4 TRANSPORTATION NETWORK

The Meadowlands District has a variety of transportation facilities serving its diverse land uses and providing critical regional connections as well as connections to local destinations such as Teterboro Airport, Laurel Hill Park, MetLife Stadium, the Meadowlands Racetrack, and American Dream. The District's roadway, active transportation facilities (for walking/biking/scootering), and transit networks are summarized herein.

4.1 Roadway Network

4.1.1 Roadway Functional Classification and Geometric Characteristics

The Meadowlands District has 237 miles of state, county, and municipal roads. Roadways are classified based on their function and according to the character of service that they provide.

Meadowlands District roadways consist of the following roadway types:

Interstates: These are major, limited-access highways that are part of the interstate highway system. They provide the highest level of mobility and the highest speeds over the longest uninterrupted distance. Interstate access is limited to cars, buses, and light and heavy trucks; pedestrian and cyclist access is prohibited. In the Meadowlands, the 43 miles of interstates include:

- I-280 at 5.2 miles, providing connections to points east and west. Its eastern terminus is located at the Kearny Toll Plaza, Exit 15W of the I-95/NJ Turnpike western spur in the southwest part of the District.
- I-95/NJ Turnpike is the main interstate route in the Meadowlands, at 37.8 miles long, providing connections to points north and south.

Other Freeways and Expressways: Like interstates, freeways and expressways are designed to maximize regional mobility with multiple directional travel lanes typically separated by a median or physical barrier. Access and egress are limited to on- and off-ramps. Abutting land uses are typically not directly served by the roadway. In the Meadowlands, the 17 miles of freeways and expressways include:

- NJ 3 runs east-west through the Meadowlands at 11.8 miles, providing connections to points west and east to Hudson County and New York via the Lincoln Tunnel.
- NJ 120 runs north-south at three miles, connecting NJ 3, the Meadowlands Sports Complex, American Dream, and NJ 17.
- NJ 495 runs east-west for about two miles, providing connections to I-95/NJ Turnpike eastern spur, NJ 3, US Route 1&9 (Tonnel Avenue), and the Lincoln Tunnel.

Principal Arterials: These roadways serve major activity centers of metropolitan areas, carrying high traffic volumes over potentially long trips. The 12 miles of principal arterials in the Meadowlands include:

- NJ 17 is located on the western edge of the District, at the Rutherford-Lyndhurst border, providing connections to NJ 3.
- US 46 in Teterboro travels east-west at the northern border of the Meadowlands District.
- NJ 120 transitions from a freeway/expressway to a principal arterial west of Gotham Parkway.
- Washington Avenue/CR 503 transitions from NJ 120 at the Paterson Plank Road ramps and travels north to Moonachie Avenue/Empire Boulevard.

Minor Arterials: These are routes that connect to neighboring municipalities, provide intra-community connectivity, and may carry bus routes. The 18 miles of minor arterials include streets such as Meadowlands Parkway, Secaucus Road/CR 678, Newark-Jersey City Turnpike/CR 508, Paterson Plank Road/CR 681, and Moonachie Avenue.

Major Collectors: These typically represent a mix of county roads and local roads that channel higher traffic volumes between local roads and the arterial network. The eight miles of major collectors include Central Boulevard, Commerce Boulevard, Empire Boulevard, Gotham Parkway, Murray Hill Parkway, Polito Avenue, and Secaucus Road.

Minor Collectors: Similar in function to major collectors, these are shorter in length and have higher connecting driveway densities, slower speed limits, and lower annual average traffic volumes. In the Meadowlands District, minor collectors account for seven miles of the roadway network, which are shown in pink on the Roadway Functional Classifications in the Meadowlands District Map in Figure 13, mainly concentrated in Lyndhurst and Secaucus.

Local Roads: These are neighborhood roads or streets that provide connections between residences and local destinations or regional roadways. At 132 miles, most streets in the Meadowlands District are local roads under municipal jurisdiction. They are shown in gray on the Roadway Functional Classifications in the Meadowlands District Map in Figure 13.

Table 5 summarizes Roadway Functional Classifications by number of lanes, pavement width in feet, and posted speed in miles per hour (mph).

Table 5: Geometric & Operational Characteristics by Functional Classification
(Source: NJDOT Straight Line Diagrams (SLD))

Classification	# of Lanes (Range)	# of Lanes (Mode)	Pavement Width (Range)	Pavement Width (Mode)	Posted Speed (Range)	Posted Speed (Mode)
Freeways & Expressways	2-6	2/3/4	24-48 feet	24/36/48 feet	40-55 mph	50/55 mph
Principal Arterials	2-4	2	14-50 feet	24 feet	25-50 mph	40 mph
Minor Arterials	2-4	2/4	14-60 feet	24/36 feet	25-40 mph	25 mph
Major Collectors	2-4	2	14-50 feet	48 feet	15-35 mph	25/35 mph
Minor Collectors	2-4	2	24-48 feet	24/28 feet	25 mph	25 mph
Local Roads	2	2	14-48 feet	24 feet	25 mph	25 mph

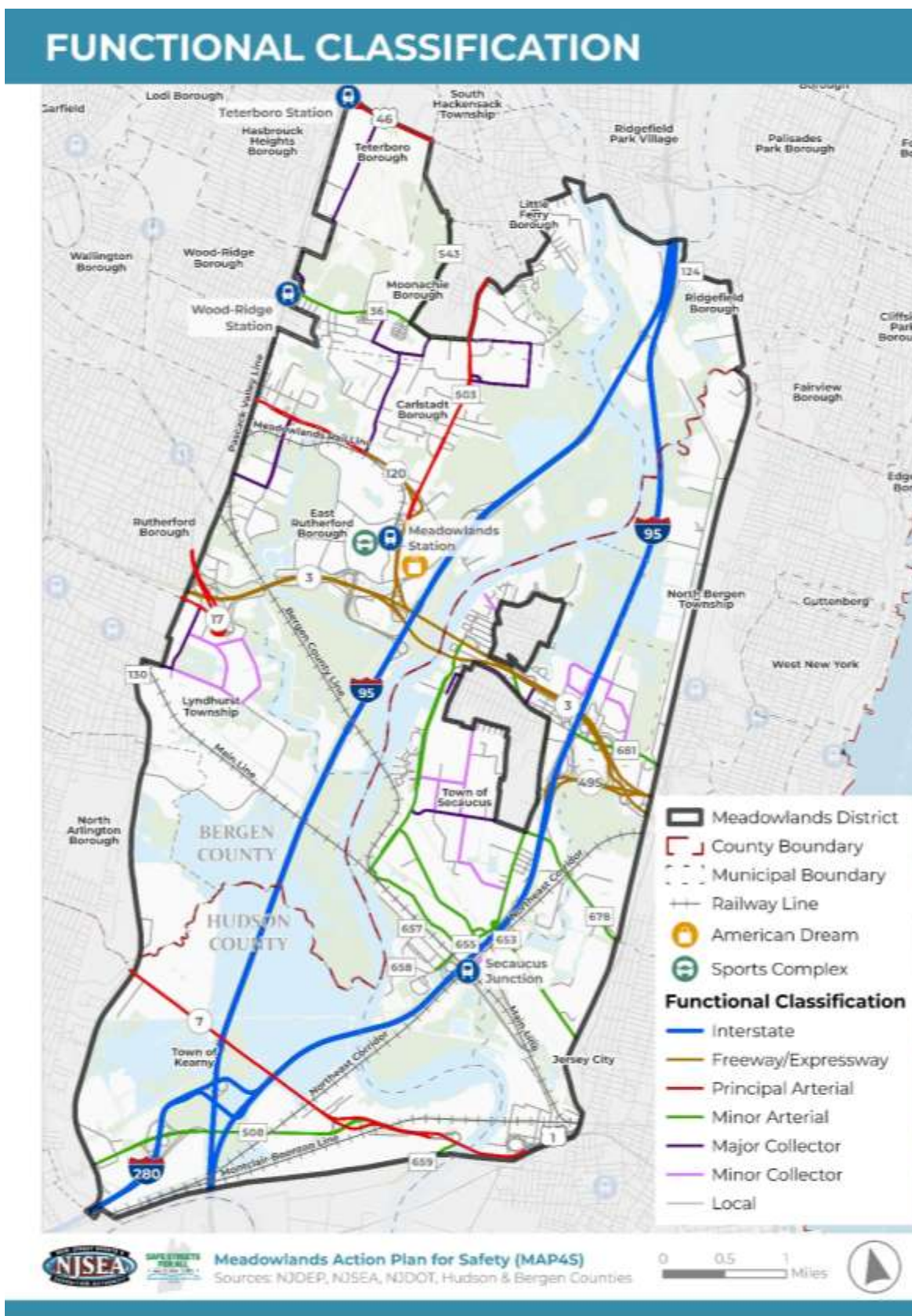
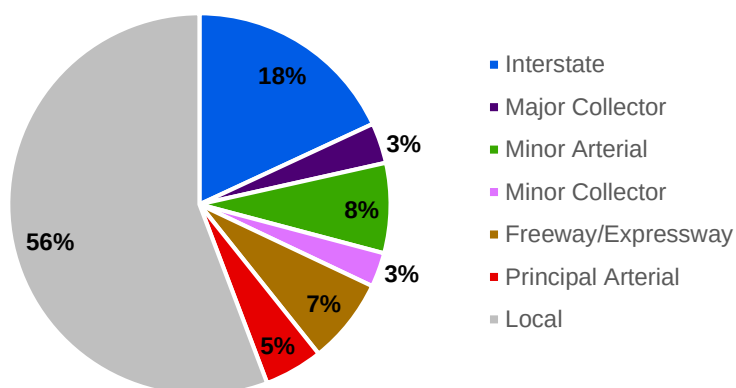


Figure 13: Functional Classification in the Meadowlands District

Table 6: Functional Classification by Mileage (Source: NJDOT SLD)

Functional Classification	FHWA Code	Miles	Percent
Interstates (excluded from safety analysis)	1	43	18%
Freeway/Expressway	2	17	7%
Principal Arterial	3	12	5%
Minor Arterial	4	18	8%
Major Collector	5	8	3%
Minor Collector	6	7	3%
Local	7	132	56%
Grand Total		237	100%

Roadway Functional Classification

**Figure 14: Roadway Functional Classification by Percent of Mileage (Source: NJDOT SLD)****Table 7: Roadway Jurisdiction by Mileage (Source: NJDOT SLD)**

Roadway Jurisdiction	Miles
Municipal	75
State	60
Highway Authority	58
County	18
Private	18
Other	8
Grand Total	237

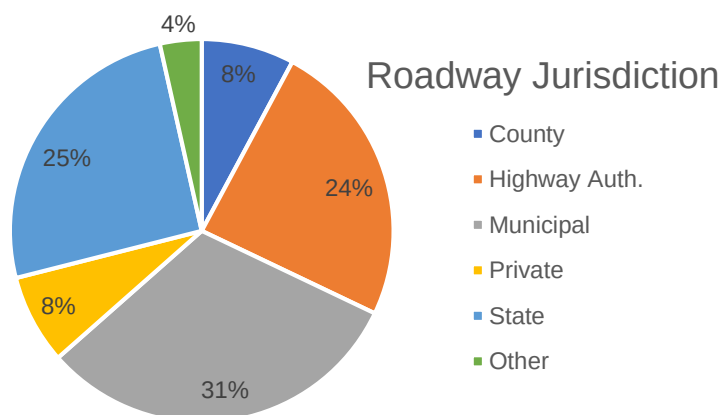


Figure 15: Roadway Jurisdiction by Percentage (Source: NJDOT SLD)

4.1.2 Intersection Density & Control Type

The Meadowlands District roadway network has 974 intersections within its boundary. Of these, 821 intersections (84 percent) are unsignalized.

The following table summarizes intersections by 0.1-mile roadway sub-segments. For example, the first row of Table 8 indicates no intersection per sub-segment, categorized by intersection control, i.e.:

- 1,380 sub-segments do not have a signalized intersection.
- 928 sub-segments do not have an unsignalized intersection.
- 818 sub-segments do not have an intersection (either signalized or unsignalized).

By the same token, rows two through six indicate the number of intersections per sub-segment, also categorized by intersection control, such as the second row of Table 8 depicting:

- 123 sub-segments have one signalized intersection.
- 417 sub-segments have one unsignalized intersection.
- 498 sub-segments have one signalized and unsignalized intersection.

Table 8: Intersections by Type per 0.1-mile Roadway Sub-Segment (Source: NJDOT SLD)

Intersections within each 0.1 Mile Sub-Segment	Sub-Segments with X number of Signalized Intersections		Sub-Segments with X number of Unsignalized Intersections		Sub-Segments with X number of Intersections (Signalized and Unsignalized)	
0*	1380	90.9%	928	61.1%	818	53.9%
1	123	8.1%	417	27.5%	498	32.8%
2	15	1.0%	132	8.7%	150	9.9%
3	0	0.0%	28	1.8%	36	2.4%
4	0	0.0%	9	0.6%	12	0.8%
5	0	0.0%	4	0.3%	4	0.3%
Grand Total	1,518	100%	1,518	100%	1,518	100%

* Note: Zero means there are no intersections of a certain type located on these segments.

4.1.3 Number of Intersection Approaches

Intersection approaches refer to the number of road sub-segments or “legs” that meet at an intersection. More approaches increase the complexity of an intersection, leading to more conflict points where vehicles, pedestrians, and cyclists can potentially collide. For example, a four-way intersection has more conflict points than a three-way intersection. Additionally, the severity of crashes can be influenced by the angles at which vehicles collide and their speeds.

Per Table 9, most (54 percent) network sub-segments do not have an intersection approach. 27 percent of network sub-segments have three to four intersection approaches, followed by nine percent with five to seven approaches.

Table 9: Intersection Approaches per 0.1-mile Sub-Segment (Source: NJDOT SLD)

Intersection Approaches per 0.1 Mile Sub-Segment	Total	
0	819	54.0%
1-2	77	5.1%
3-4	414	27.3%
5-7	137	9.0%
8-10	48	3.2%
11+	23	1.5%
Grand Total	1,518	100%

4.1.4 Volumes

Annual Average Daily Traffic for Roads Above Local Functional Classification

Annual Average Daily Traffic (AADT) vehicular volumes were tabulated for the Meadowlands District using the NJDOT’s SLD data. Generally, freeways/expressways carry the highest volumes, with most roadway mileage carrying more than 90,000 vehicles per day. Arterials generally carry 90,000 vehicles per day or fewer, and collectors generally carry 15,000 vehicles per day or fewer.⁵

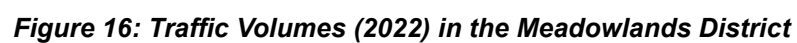
The following table summarizes AADT by functional classification, excluding interstates and local roads. Interstates are not being evaluated as part of MAP4S, and volume data for local roads is very limited, hence, they are excluded from the table below. Most roadway mileage for freeways/expressways, arterials, and collectors – approximately 22 miles – carries volumes at or fewer than 5,000 vehicles per day. Only about 10 miles of roadway carry volumes more than 90,000 vehicles per day.

Table 10: AADT Volumes (2022) by Functional Classification (Source: NJDOT SLD)

AADT	Freeway/ Expressway (Miles)	Principal Arterial (Miles)	Minor Arterial (Miles)	Major Collector (Miles)	Minor Collector (Miles)	Total (Miles)
<=5,000	7.2	3.1	3.8	4.4	3.2	21.7
<=15,000	0.7	0.1	5.4	3.7	3.2	13.2
<=30,000	2.7	3.2	6.1	0.1	0.0	12.1
<=90,000	2.1	1.2	2.1	0.0	0.0	5.5
<=155,000	4.1	0.1	0.0	0.0	0.0	4.3
Grand Total	17	8	17	8	6	57

⁵ Source: NJDOT SLD data

AADT volumes are graphically depicted in the following map using the same volume categories that appear in Table 10. The roadways that carry the highest volumes include NJ 3, NJ 17, NJ 120 between the Meadowlands Sports Complex and American Dream, NJ 495, and Newark-Jersey City Turnpike/CR 508.



Mode Split

Travel by multiple modes of transportation is possible in the Meadowlands District, but the majority of trips – 85 percent – are made by vehicles, including passenger vehicles (80 percent of all trips) and trucks (five percent of all trips). This aligns with and is influenced by vehicle-oriented land uses like malls, big box stores, and distribution centers, many of which are dispersed due to wetlands and conservation areas that preclude dense development.

Public transit trips, mainly served by NJ TRANSIT buses, make up eight percent of all trips, while on-demand services account for four percent of all trips.

Active transportation trips – walking and biking – make up only three percent of all trips in the Meadowlands District.

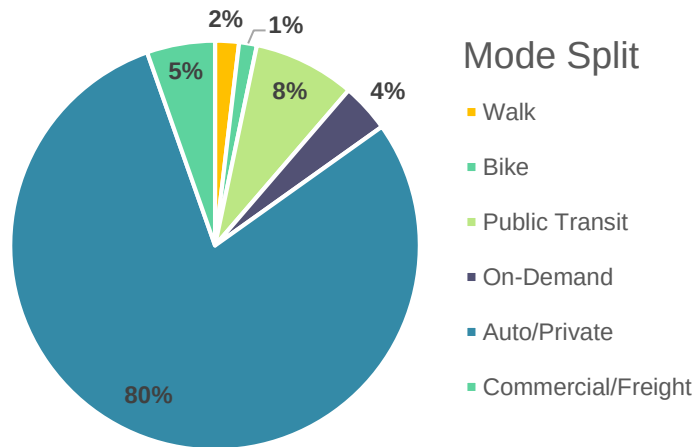


Figure 17: Mode Split in the Meadowlands District (Source: Replica, 2023)

The maps on the following pages show where trips by mode are concentrated in the Meadowlands District.

Walking/Biking Trips

Most walking/biking trips (Figure 18 and Figure 19) are concentrated in:

- Carlstadt centered on Gotham Parkway
- Jersey City along County Road/CR 653, Secaucus Road/CR 678, and St. Paul's Avenue
- North Bergen along West Side Avenue
- Secaucus at Harmon Meadow and the warehousing district between I-95/NJ Turnpike and Meadowlands Parkway
- Teterboro along Industrial Avenue

Transit Trips

Most transit trips (Figure 20) are concentrated in/along:

- NJ 3 and NJ 495, driven by commuter trips to/from points east of the Meadowlands District, including and especially New York City
- NJ 120 in East Rutherford and Carlstadt
- Gotham Parkway and Washington Avenue/CR 503 in Carlstadt serving warehouses in that area
- Valley Brook Avenue, Polito Avenue, and Wall Street in Lyndhurst, just south of the NJ 17 interchange

- Harmon Meadow and the warehousing district between I-95/NJ Turnpike and Meadowlands Parkway in Secaucus

Passenger Vehicle Trips

Passenger vehicle trips (Figure 21) are concentrated along higher functional class roadways, including freeways/expressways and arterials. These include:

- NJ 3
- NJ 7
- NJ 17
- US 46
- NJ 120
- NJ 495
- Newark-Jersey City Turnpike/CR 508
- Secaucus Road/CR 678

Freight/Truck Trips

In support of goods movement, most freight/truck trips (22) are concentrated along major roadways like NJ 3 or Newark-Jersey City Turnpike/CR 508 and at/near warehousing and distribution centers in Carlstadt, Jersey City, and Secaucus.



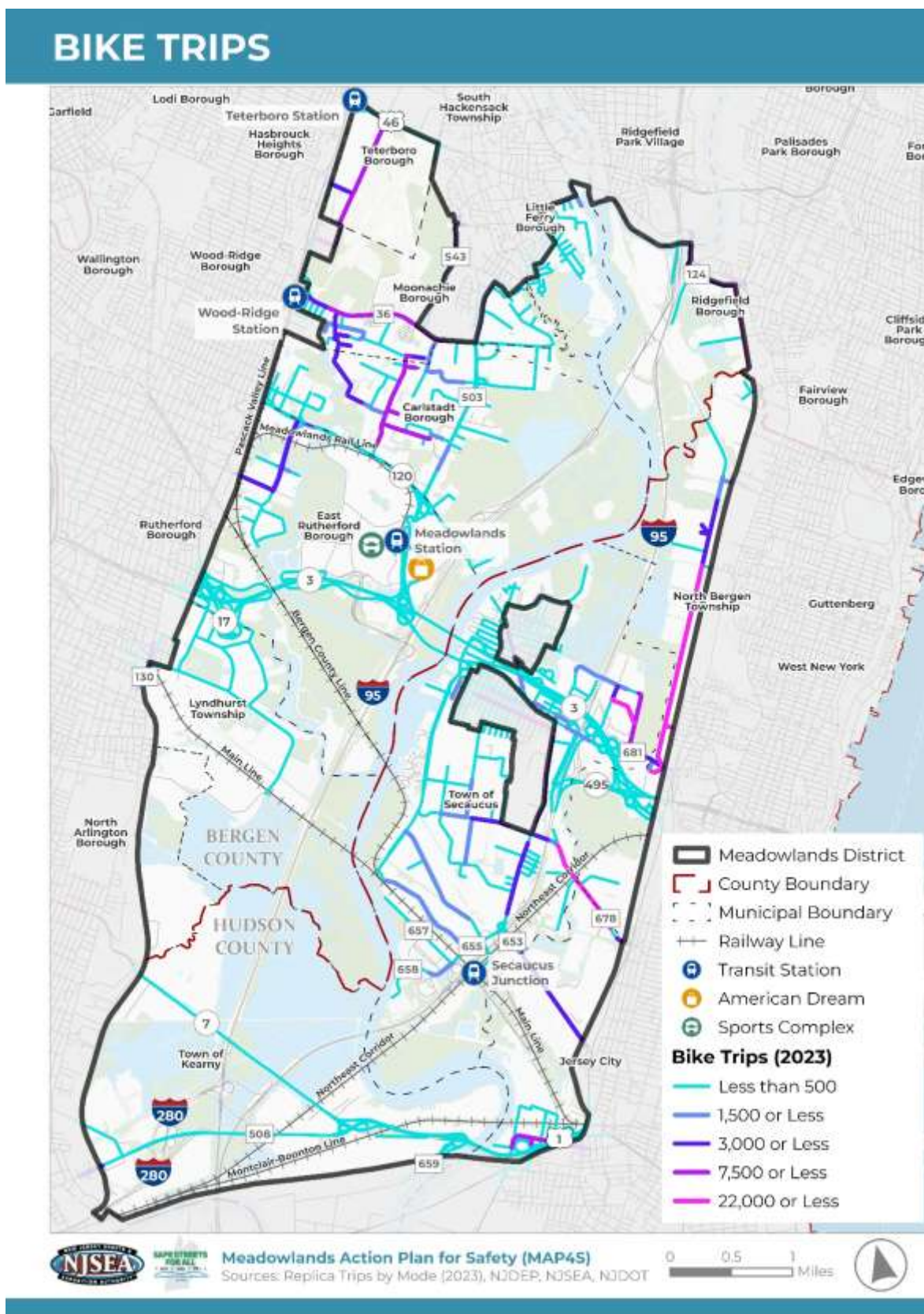
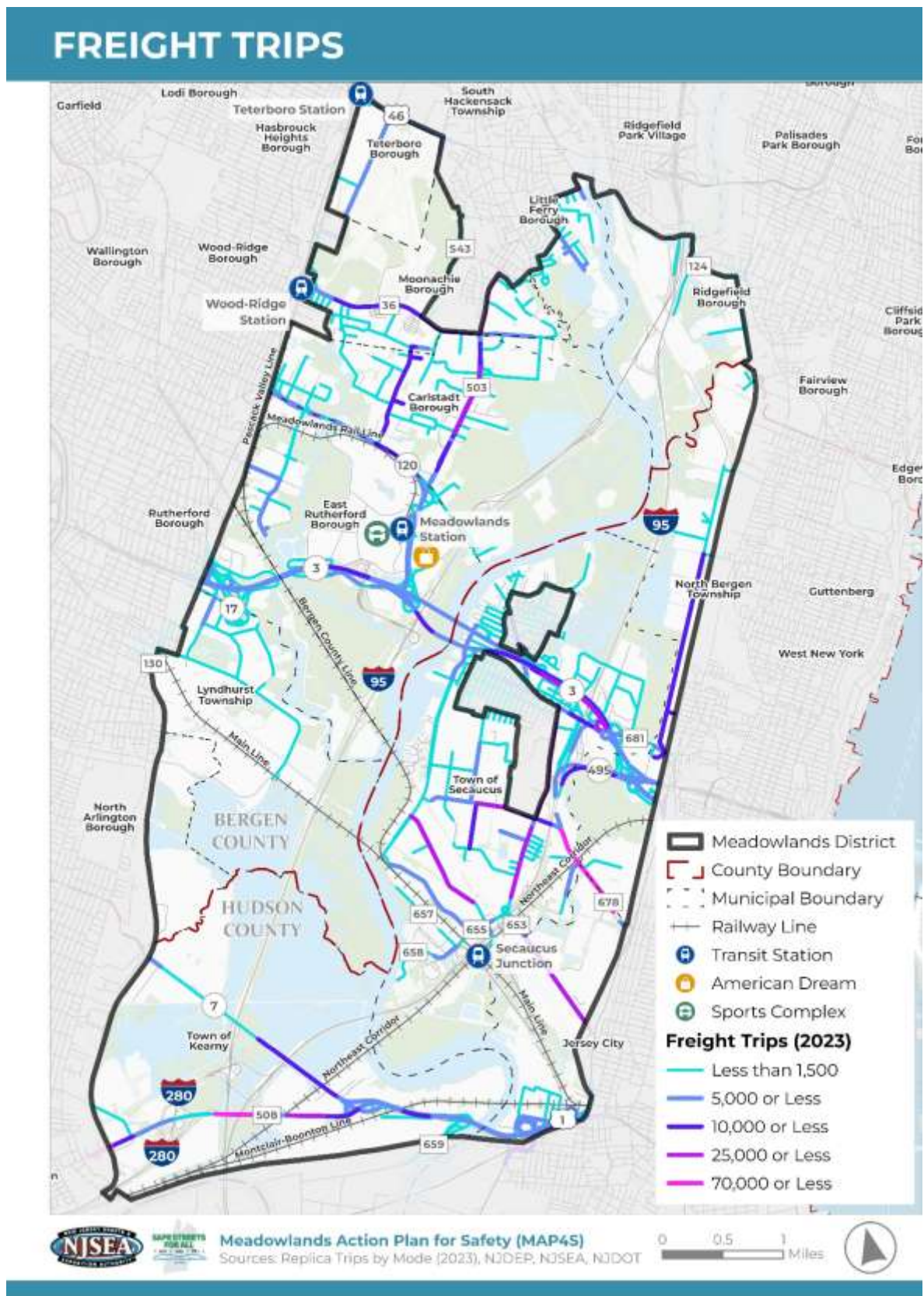


Figure 19: Bike Trips in the Meadowlands District







4.1.5 Speed Limits

Posted Speed Limits

Based on mileage, most roadways in the Meadowlands District have a posted speed limit of 25 mph or below. Most collector roadways have posted speeds at or below 25 mph, given their geometric and operational characteristics (previously summarized in Section 4.1.1). Roadways with posted speed limits of 40 mph or higher are the next most common. These include mainly arterials and freeways/expressways.

Table 11 and Figure 23 summarize and depict posted speed limits in four categories by functional classification. The greatest mileage is highlighted for each functional classification. Local roads are omitted due to limited data availability. Posted speed limits are also shown on the map following the table.

Table 11: Posted Speed Limits by Roadway Functional Classification (Source: NJDOT SLD)

Posted Speed Limits	Total Mileage	Freeway & Expressway Miles	Principal Arterial Miles	Minor Arterial Miles	Major Collector Miles	Minor Collector Miles
25 mph or below	22.0	1.0	0.5	9.4	4.7	6.4
30-35 mph	6.2	0.2	0.7	3.8	1.5	0.0
40 mph	7.6	1.4	3.8	2.4	0.0	0.0
45 mph and above	9.6	7.2	0.5	0.3	1.6	0.0
Grand Total	45	10	6	16	8	6



Operating Speeds

Operating speed data reflects actual speeds at which vehicles travel. This data was collected from Replica, which provides operating speed per network link, averaged over the course of a year for 2023. The operating speed data, provided by Replica, measures the 66th percentile speed during off-peak hours, meaning that 66 percent of vehicles traveled at or below this speed on a given road segment during non-busy times when drivers can generally operate in non-congested conditions at speeds of their choosing. Replica uses GPS data to calculate the average speeds of vehicles on different road segments. Table 12 below summarizes the speed ranges by roadway functional classifications, and Figure 24 depicts operating speeds graphically. During off-peak hours, operating speeds correlated with the typical design speed by functional classification.

Table 12: Operating Speeds (66th Percentile) by Functional Classification (Miles) (Source: Replica, 2023)

Operating Speeds (66th Percentile)	Roadway Network Miles					
	Freeway/ Expressway	Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Grand Total
8-20 mph	0	0	0.7	0.7	3.0	4.3
21-25 mph	0	0	2.3	5.8	1.9	10.0
26-35 mph	0.3	3.2	11.2	1.6	0.6	16.9
36-40 mph	4.6	5.6	2.7	0	0	12.9
46-62 mph	12.0	2.1	0.4	0	0	14.6
Grand Total	16.9	11.0	17.3	8.1	5.4	58.6

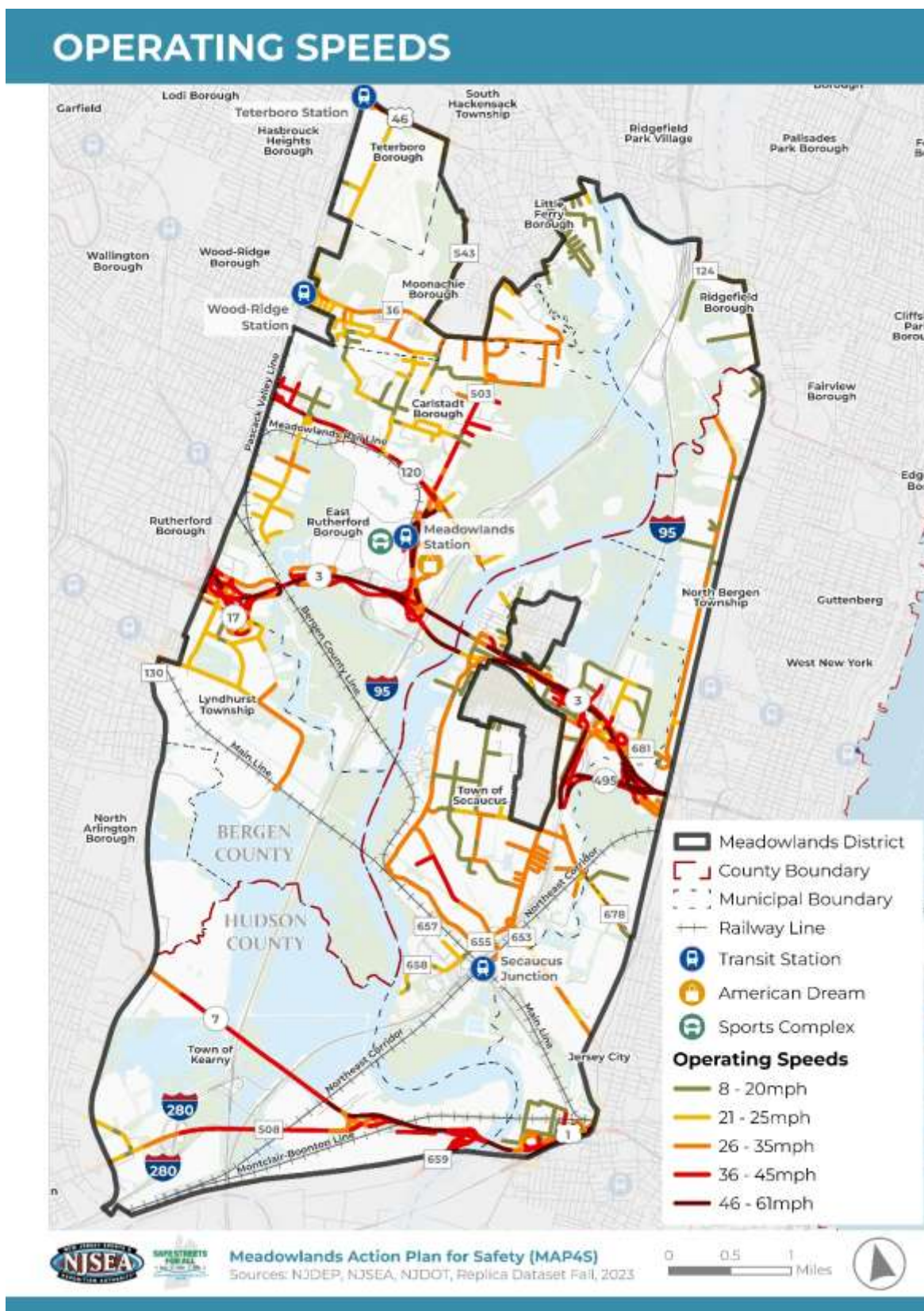


Figure 24: Operating Speeds based on 66th Percentile in the Meadowlands District

4.1.6 Freight

Freight Routes

Not all roads are able to accommodate freight traffic due to either regulation or geometric constraints, such as roadway width or height obstructions. Roadways that are intended for truck use make up the National Highway Freight Network (NHFN), which is comprised mainly of interstates, and the New Jersey Access Network (NJAN), which is comprised mainly of state and county roads. Table 13 indicates the mileage of each network in the Meadowlands District. As depicted in Figure 25, the 43 miles of NHFN roadways include I-95/NJ Turnpike and I-280. The 36 miles of NJAN roadways include state routes such as NJ 3, NJ 7, NJ 17, NJ 120, and NJ 495, as well as county routes such as Washington Avenue/CR 503 and Newark-Jersey City Turnpike/CR 508.

Table 13: Freight Routes by Mileage in the Meadowlands District (Source: NJDOT)

Freight Routes	Miles
National Highway Freight Network (NHFN)	43
NJ Access Network (NJAN)	36

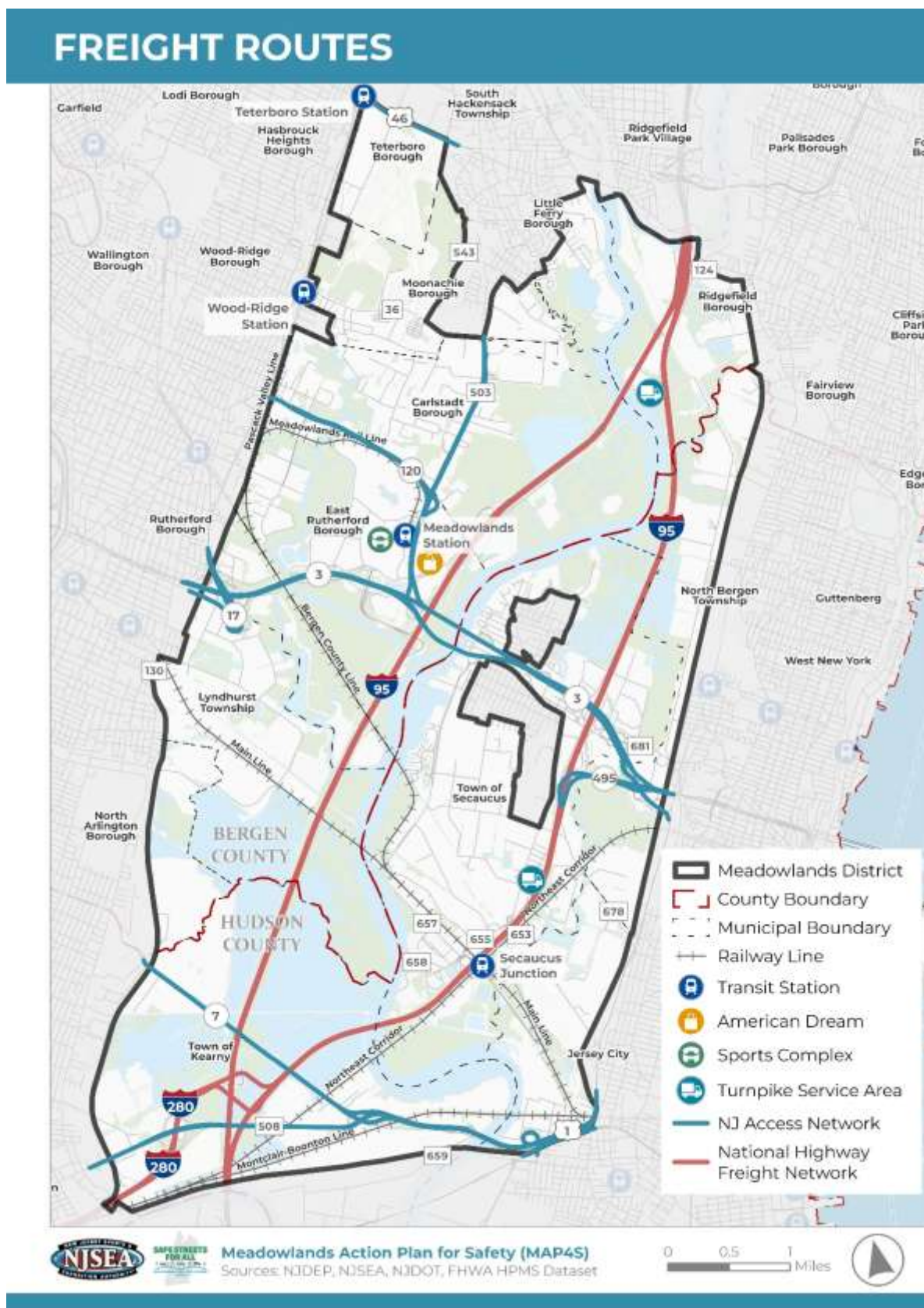


Figure 25: Freight Routes in the Meadowlands District

Truck Volumes

Truck volume data for 2022 was collected through the FHWA's Highway Performance Monitoring System (HPMS), which provides AADT single-unit and combination truck volumes, excluding all interstates, as they are not within the scope of this project. Figure 26 shows the overall truck AADT volumes on roadways in the Meadowlands District.

Truck volumes are generally heaviest along NJ 3 and portions of NJ 495, with trips of up to 15,000 trucks daily. High truck volumes are also observed along NJ 495 between I-95/NJ Turnpike, NJ 120 near the Meadowlands Sports Complex and American Dream, NJ 3 between NJ 495 and I-95/NJ Turnpike, Washington Avenue/CR 503 north of Paterson Plank Road, NJ 17, and NJ 7 on either side of the Witt Penn Bridge (near Fish House Road and St. Paul's Avenue on the west and east sides of the Hackensack River, respectively).

Moderate truck activity occurs along Paterson Plank Road/NJ 120 west of Washington Avenue/CR 503 and near the Secaucus/Jersey City border along County Road/CR 653, County Avenue/CR 653, and Secaucus Road/CR 678.

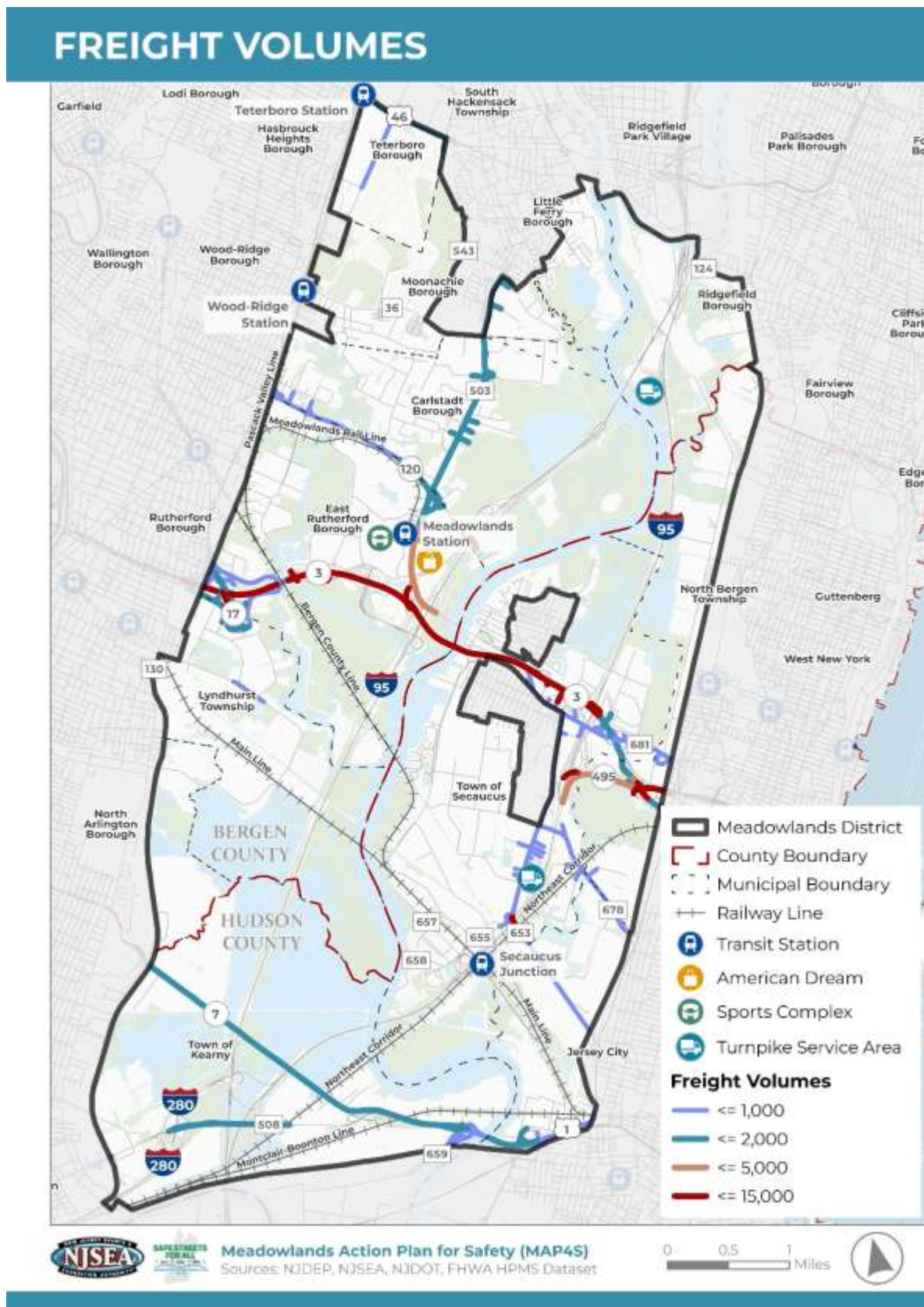


Figure 26: Freight Volumes in the Meadowlands District

4.1.7 Takeaways

- Local roads are the predominant road functional class in the Meadowlands District.
- 85 percent of all trips in the District are made by vehicles, including passenger vehicles (80 percent of all trips) and heavy vehicles (five percent of all trips).
- Generally, higher functional classification roadways, such as freeways/expressways or principal arterials, have higher volumes and posted and operating speeds, which can increase safety risk.
- Active transportation trips (walking/biking) generally occur near activity and job centers or at/near transit service (bus routes, rail stations), e.g., Carlstadt centered on Gotham Parkway, Jersey City along County Road/CR 653, Secaucus Road/CR 678, and St. Paul's Avenue, West Side Avenue in North Bergen, Harmon Meadow, and Industrial Avenue in Teterboro. These roads are featured on the High-Injury Network.
- Truck activity is mainly concentrated along NJAN roadways like NJ 3 or Newark-Jersey City Turnpike/CR 508 and at/near warehousing and distribution centers in Carlstadt, Jersey City, and Secaucus. Roughly 48 percent (14.1 miles) of the HIN segments are designated freight routes on the NJAN.

4.2 Active Transportation Network

Active Transportation refers to non-motorized, human-powered mobility such as walking or biking. An active transportation network, therefore, includes facilities that support walking or biking, such as sidewalks, bike lanes, trails, or shared-use paths. Facilities like sidewalks or bike lanes are generally implemented “on-street,” whereas facilities like trails or shared-use paths are typically implemented “off-street.” A map showing all the active transportation facilities in the Meadowlands District can be seen in Figure 27.



4.2.1 On-street Active Transportation Facilities

Existing on-street active transportation facilities in the Meadowlands District include sidewalks⁶ on roadways mainly under county or local jurisdiction, and approximately 2.5 miles of bike lanes at the following locations:

Protected Cycle Track: There is a 0.25-mile two-way protected bike lane (“cycle track”) along Meadowlands Parkway between the eastbound NJ 3 ramps and Harmon Plaza. This facility runs on the west side of Meadowlands Parkway and is separated (“protected”) from the southbound travel lanes by raised concrete barriers and delineator posts. Figure 28 shows the cycle track.



Figure 28: Two-way Protected Cycle Track on Meadowlands Parkway (Secaucus)

Standard Bike Lanes: Painted bike lanes appear in two locations:

- **Lyndhurst:** along Valley Brook Avenue between Polito Avenue and Chubb Avenue, and along Chubb Avenue between Valley Brook Avenue and Wall Street West. The bike lanes also include painted walking lanes. Figure 29 shows the painted lanes. There is an effort underway to construct a protected pedestrian and cyclist’s pathway between Richard Dekorte Park and Chubb Avenue in Valley Brook Avenue. This pathway will continue between Chubb Avenue and Clay Avenue in Valley Brook Avenue by constructing a separate color-coded pedestrian and cyclist pathway.
- **East Rutherford:** along E. Union Avenue between Dubois Street near the District’s western border and along Murray Hill Parkway between E. Union Avenue and eastbound Paterson Plank Road/NJ 120 ramps. Figure 30 shows the painted lanes.

⁶ The NJSEA may be pursuing a District-wide sidewalk inventory as part of a separate effort in the future.



Figure 30: Striped Bike Lane on Murray Hill Parkway/E. Union Avenue (East Rutherford)



Figure 29: Painted Bicycle & Pedestrian Lanes on Chubb Avenue/Valley Brook Avenue (Lyndhurst)

4.2.2 Off-street Active Transportation Facilities

Existing off-street active transportation facilities in the Meadowlands District include trails that originate at and/or provide connections to Richard W. DeKorte Park in Lyndhurst. These include the Transco Trail, the Marsh Discovery Trail, and the Saw Mill Creek Trail. With limited connections to roadways or major activity centers, these trails are mainly used for recreation.

4.2.3 Future Active Transportation Projects

Hackensack Greenway

The Hackensack Greenway is a proposed 18-mile linear path planned for the east side of the Hackensack River between the Bayonne Bridge in Bayonne and the Mill Creek Marsh Trail in Secaucus. The Hackensack Greenway plan, prepared by the Hudson County Division of Planning and adopted by the Hudson County Planning Board in February 2022, divides the planned alignment into 17 sections numbered from south to north. Of the sections in the Meadowlands District, most are planned as off-street paths except for one section along

Van Keuren Avenue between Duffield Avenue to the west and a former rail right-of-way (ROW)/access road to the east and a second section along Meadowlands Parkway between Castle Road to the south and Hudson Regional Hospital to the north. The Greenway plan considers both short- and long-term opportunities for implementation and will likely be constructed in phases over time.

The Greenway

The Greenway, formerly known as the Essex-Hudson Greenway, will be a nine-mile shared-use path connecting eight municipalities in Essex and Hudson Counties: Montclair, Glen Ridge, Bloomfield, Belleville, Newark, Kearny, Secaucus, and Jersey City. The Greenway will follow the ROW of a former rail line. The NJDEP acquired the ROW from Norfolk Southern in 2022. In the Meadowlands District, the Greenway will run between the vicinity of Gunnell Oval in Kearny and Laurel Hill Park in Secaucus. The Greenway will share an alignment with the Hackensack River Greenway between Laurel Hill Park and Van Keuren Avenue in Jersey City. The first sections of the Greenway will be open to the public in late 2025/early 2026.

NJTPA Regional Active Transportation Plan

The NJTPA's Regional Active Transportation Plan⁷, completed in 2023, while conceptual, provides a blueprint for creating safe, comfortable, and connected networks for walking and biking across the NJTPA region. Based on information from the NJTPA, the proposed network includes sections of CR 503 (Washington Avenue and Moonachie Road) in the northern part of the District, parts of CR 508 in Kearny in the southern part of the District, and a section of Paterson Plank Road in Secaucus. This segment connects to existing bike lanes on Meadowlands Parkway and Hackensack Greenway.

4.2.4 Active Transportation Generators

The Meadowlands District contains nine schools, four childcare centers, and one public library, which tend to generate more active trips (walking, biking) than other destinations. Most of these places are located within Secaucus, with a few others located near the western side of the District.

Table 14 and the following map (Figure 31) show the percentage of trips in each census block group that are made on foot, by bike, or by transit, using pie charts that are proportional in size to the sum of trips within the block groups. Transit trips are included because many trips to/from transit are made on foot or by bike. For context, the charts on the map are shown with the active transportation generators in the District. This data is sourced from Replica's trips by mode for the year 2023.

As can be seen on the map, walking has the highest share of active transportation trips within all census block groups. The block groups in Secaucus have the greatest number of active transportation trips as well as the highest percentage of people making trips by transit, followed by trips on foot and by bike. This could be attributed to the significant size of Town's land area surrounded by the District and the presence of bus and rail transit as well as compact, walkable, mixed-use neighborhoods in Secaucus.

Table 14: Walk/Bike/Public Transit Mode Splits by Census Block Groups (Source: Replica, 2023)

Census Block Group	Municipality	Walk Trips	Bike Trips	Transit Trips	Grand Total
340170198001	Secaucus	7,469	1,176	3,985	12,630
340030120013	East Rutherford	3,967	500	1,705	6,172
340170199002	Secaucus	4,269	452	2,788	7,509
340030050005	Carlstadt	2,423	233	1,082	3,738
340170127004	Kearny	2,258	314	657	3,229
340030361001	Teterboro	1,959	147	481	2,587

⁷North Jersey Transportation Planning Authority (NJTPA) Website, https://www.njtpa.org/NJTPA/media/Documents/Planning/Regional-Programs/Studies/Regional%20Active%20Transportation%20Plan/NJTPA_ATP_Final_Plan_FINAL.pdf, June 2023, accessed February 2025.

Census Block Group	Municipality	Walk Trips	Bike Trips	Transit Trips	Grand Total
340170201001	Secaucus	1,731	258	1,366	3,355
340030311004	Lyndhurst	1,949	87	754	2,790
340170200004	Secaucus	2,189	203	1,128	3,520
340170146002	North Bergen	2,055	153	1,034	3,242
340170199003	Secaucus	1,408	190	997	2,595
340030452002	Ridgefield	1,174	151	710	2,035
340030362001	Moonachie	1,312	72	484	1,868
340170148021	North Bergen	2,355	182	748	3,285
340170199001	Secaucus	1,705	143	486	2,334
340030362002	Moonachie	1,170	94	326	1,590
340030514001	Rutherford	859	79	267	1,205
340030292001	Little Ferry	836	58	124	1,018
340030381006	North Arlington	492	38	168	698
340170069001	Jersey City	465	47	181	693
340170200003	Secaucus	809	37	77	923
340170200001	Secaucus	522	22	63	607
340170200002	Secaucus	396	18	65	479
		43,772	4,654	19,676	68,102



4.2.5 Takeaways

- Active transportation facilities support walking, biking, and scooter trips and create safer conditions for all roadway users. The District's roadway network is limited to only 2.5 miles of on-street bike/scooter facilities and is missing sidewalks in many areas.
- Data reveals demand areas for walking and biking trips in Secaucus, particularly at/near business districts, shopping, schools, and transit (particularly Secaucus Junction). Most of these destinations lack connecting bike facilities, which may contribute to auto dependency and lead to unsafe conditions for those not driving or who don't own a car.
- If/when implemented, the Greenway, Hackensack Greenway, and Regional Active Transportation facilities will serve as viable and safe off-street connections for people choosing to walk, bike, or scoot. Given their length and breadth and the connections they will provide, these facilities have the potential to serve more than recreational trips.
- There is potential to improve access to transit and employment and activity centers by providing safe, multimodal connections for those choosing to walk, bike, or scoot within the Meadowlands District.

4.3 Transit Network

4.3.1 NJ TRANSIT Bus Service

NJ TRANSIT provides service throughout the Meadowlands District via several bus routes that mainly serve Secaucus, North Bergen, Carlstadt, East Rutherford, and Lyndhurst, based on service coverage and bus stops. NJ TRANSIT has 229 bus stops in the Meadowlands District, with most serving more developed/urbanized areas (Table 15). The following table summarizes key roadways served by NJ TRANSIT buses (excluding interstates) as well as the number of bus stops per municipality. The table is ranked by the number of bus stops. Roadways with segments included in the District HIN are shown in blue. More discussion on the HIN is in Section 6.4.

Table 15: NJ TRANSIT Bus Service by Municipality in Meadowlands District (Source: NJ TRANSIT)

Municipality	Key Roads with Bus Service (not exhaustive)	Bus Stops
Secaucus	American Way; Castle Avenue; County Avenue/CR 653 ; Enterprise Avenue N/S; Meadowlands Parkway ; NJ 3; NJ 495; Park Plaza Drive; Paterson Plank Road/CR 681 ; Seaview Drive ; Secaucus Road	115
North Bergen	West Side Avenue	29
Carlstadt	Central Boulevard; Commerce Boulevard; Gotham Parkway; Paterson Plank Road/NJ 120 ; Washington Avenue/CR 503	27
East Rutherford	E. Union Avenue; Murray Hill Parkway; Paterson Plank Road/NJ 120 ; Meadowlands Sports Complex/American Dream	14
Lyndhurst	Chubb Avenue; Clay Avenue; Polito Avenue; Valley Brook Avenue ; Wall Street	13
Moonachie	Caesar Place; Moonachie Avenue; W. Commercial Avenue	11
Teterboro	Industrial Avenue; US 46	6
Rutherford	NJ 17; Veterans Boulevard	4
Jersey City	County Road/CR 653; Secaucus Road/CR 678	4
Ridgefield	Hendricks Causeway ; Vince Lombardi Service Area	3
South Hackensack	Central Boulevard; Empire Boulevard	1
Road names in blue have segments in the District High-Injury Network (HIN).		

4.3.2 NJ TRANSIT Rail Service

Several NJ TRANSIT rail lines pass through the Meadowlands District, including the BetMGM Meadowlands Rail Line, Main-Bergen Lines, Montclair-Boonton Line, North Jersey Coast Line, Northeast Corridor, and Pascack Valley Line. There are three rail stations within the District: Secaucus Junction, Teterboro Station, and the

Meadowlands Sports Complex Station. Secaucus Junction is served every day by multiple rail lines on two levels, while the Meadowlands Sports Complex Station is operational for events at MetLife Stadium. Kingsland Station, Rutherford Station, and Wood Ridge Station are located just outside the western border of the Meadowlands District. As it relates to roadway access and safety, Secaucus Junction is accessible by multiple modes of transportation.

- **Auto Access:** Secaucus Junction is accessible by cars, rideshare, taxis, and other auto-based modes via Seaview Drive south of Paul Amico Way. Passenger pick-up/drop-off occurs on North Road, along the north side of the station, at ground level. The station parking is located on the north side of I-95/NJ Turnpike eastern spur off Paul Amico Way. Pedestrians can travel between parking and the station via North Road.
- **Bus Access:** Buses access Secaucus Junction via Seaview Drive. Passenger service occurs at sawtooth bays on the south side of the station at ground level.
- **Pedestrian/Bicyclist Access:** Sidewalks are only present north of the station along North Road, Paul Amico Way, and Seaview Drive, north of North Road. On-street facilities for bicyclists are not present near Secaucus Junction.

Meadowlands Sports Complex Station is not directly accessible by roadways in the District. It is meant for event access via Secaucus Junction.

4.3.3 EZ Ride Shuttle Service

EZ Ride Shuttles provide service in the area via two routes:

1. **Route 232:** Kearny Avenue Line Shuttle – This shuttle connects to the Harrison Port Authority Trans-Hudson Corporation (PATH) station via Ridge Road and Kearny Avenue to Garden Terrace in North Arlington. It operates during morning and evening peak hours and stops only at NJ TRANSIT bus stops located along its route. The shuttle makes seven stops from North Arlington to the PATH Station and six stops from the PATH station to North Arlington. Ridge Road at Garden Terrace is the only stop within the Meadowlands District.
2. **Route 555:** Rutherford-Lyndhurst Shuttle – This shuttle connects the Kingsland Train Station in Lyndhurst with the Rutherford Train Station, making ten stops on the morning route and nine stops on the evening route.



4.3.4 Takeaways

- The District is served by multiple NJ TRANSIT bus routes, the majority in Secaucus, as well as the three train stations, Secaucus Junction, Teterboro Station, and Meadowlands Sports Complex Station.
- There are limited active transportation connections to transit, especially first- and last-mile connections. A lack of safe and complete walking or biking facilities near transit may contribute to roadway safety issues and greater auto dependency.

5 CRASH DATA

5.1 Crash Data Overview

Crash data forms the cornerstone of the roadway safety analyses conducted for MAP4S. Data was gathered for each municipality within the Meadowlands District from 2017 to 2021, the most recent five full years with complete and reliable data when the analyses were conducted. After collecting, the data was refined to the study network using ArcGIS, focusing on crashes within a 0.1-mile buffer outside the Meadowlands District border (to account for potential locational error) and excluding any crashes occurring on interstates. These crashes were then mapped onto roadways within the District using latitude and longitude coordinates provided with the crash data. **This analysis identified 10,023 crashes in the District during the five-year period.** Since the study period includes 2020, the crash data reflects the impacts of the COVID-19 pandemic, which reduced roadway volumes and overall crash numbers.

To ensure comprehensive coverage of the District's roadway network, crash data were collected from two sources: NJDOT's Safety Voyager and Numetric. These sources were utilized together to leverage their strengths.

- **Safety Voyager**, NJDOT's official crash data source, provides geolocated crashes vetted through NJDOT's review processes. This data was used to determine fundamental elements such as crash date and time, latitude and longitude, severity, crash type, and lighting conditions.
- **Numetric** offers a broader array of crash data elements, including those not available from Safety Voyager, such as pre-crash actions, traffic control devices present, driver physical condition (drug and alcohol usage), and vehicle type.

To integrate the two datasets, crash data from Safety Voyager and Numetric were linked using crash Document Locator Numbers (DLNs)⁸. These DLNs facilitated the combination of the datasets in Microsoft Excel, resulting in a single, comprehensive crash database.

Data cleaning was performed on fatal and serious injury (FSI) crashes to ensure accurate geolocation of the most severe incidents. This process involved requesting NJTR-1 Crash Investigation Reports from each of the 14 municipal police departments in the District. Additionally, non-geocoded FSI crashes that occurred in constituent municipalities were reviewed to determine if they occurred within the Meadowlands District. In total, 110 crash reports were requested, and 43 were received. Table 16 summarizes the crash requests by municipality.

Table 16: Crash Reports Requested and Received by Municipality (Source: NJDOT Safety Voyager 2017-2021)

Municipality	Crashes Reports Requested	Crashes Reports Received
Carlstadt Boro	9	0
East Rutherford Boro	23	0
Jersey City	7	0
Kearny Town	14	12
Lyndhurst Twp	9	9
Moonachie Boro	1	1
North Bergen Twp	11	3
Ridgefield Boro	1	0
Rutherford Boro	9	0

⁸ DLNs are a unique code assigned to each crash by NJDOT, similar to case numbers that can be used to track crashes in NJDOT's crash database.

Municipality	Crashes Reports Requested	Crashes Reports Received
Secaucus Town	20	18
Teterboro Boro	6	0
Total	110	43

5.2 Crash Analysis

5.2.1 Crashes by Year and Severity

Crashes for the most recent five years for which complete data is available (2017-2021) are shown in Table 17. Crashes fluctuated over the study period, with a large decrease in total crashes in 2020 due to a decrease in traffic during the COVID-19 pandemic. FSI crashes roughly quadrupled over the study period⁹, from eight in 2017 to 31 in 2021. **The increase in FSI crashes within the Meadowlands District outpaces the rest of New Jersey, which experienced a similar trend – FSI crashes approximately doubled statewide – over the same period.**

Table 17: Crashes by Year and Severity (Source: NJDOT Safety Voyager 2017-2021)

Year	No Apparent Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury	Fatal Injury	Total
2017	1,549	330	53	5	3	1,940
2018	1,788	360	50	12	3	2,213
2019	1,864	284	159	17	3	2,327
2020	1,215	215	100	15	7	1,552
2021	1,576	245	139	28	3	1,991
Total	7,992	1,434	501	77	19	10,023

Vulnerable Road User¹⁰ (VRU) crashes within the District over the study period are displayed in Table 18. **VRU crashes are overrepresented in FSI crashes in the District. VRU crashes comprise only 1.1 percent of all crashes in the District but make up roughly 25 percent of FSI crashes and over half of fatal crashes.**

Table 18: Pedestrian and Bicycle Crashes by Severity (Source: NJDOT Safety Voyager 2017-2021)

Severity Rating Code	Total Crashes	Pedestrian	Bicyclist	VRU Percentage of Crashes
Fatal	19	9	1	52.6%
Serious Injury	77	13	1	18.2%
Minor Injury	501	26	14	8.0%
Possible Injury	1,434	31	11	2.9%
No Apparent Injury	7,992	5	6	0.1%
Total	10,023	84	33	1.2%

⁹ In 2019, crash severity definitions changed. This change, which made the Serious Injury severity (now known as “Suspected Serious Injury”) cover a wider range of crashes, can be seen in crash data for the Meadowlands District. Between 2016 and 2018, the Meadowlands District experienced 28 crashes (roughly 9 per year) resulting in suspected serious injuries. In 2019 and 2020, the first years with the updated severity definition, the Meadowlands District experienced 35 suspected serious injury crashes (roughly 18 per year).

¹⁰ FHWA defines vulnerable road users as a “pedestrian, bicyclist, other cyclist, and person on personal conveyance.”

5.2.2 Crashes by Municipality

Focusing on the number of crashes by municipality helps identify vulnerable areas in the District. Across all District municipalities, Secaucus experienced the most crashes from 2017 through 2021. This is due, in part, to the presence of NJ 3 in Secaucus and the fact that Secaucus has the largest land area of any municipality in the District.

East Rutherford and Teterboro experienced the highest number of fatal crashes – four each – while Secaucus had the highest number of serious injury crashes. East Rutherford has sections of NJ 3, NJ 17, and NJ 120, where many crashes have occurred, while Teterboro contains a section of US 46, where serious crashes have occurred. Table 19 shows the frequency and severity of crashes by municipality (listed alphabetically). The highest number of FSI and total crashes are highlighted.

Table 19: Crash Severity by Municipality (Source: NJDOT Safety Voyager 2017-2021)

Municipality	No Apparent Injury	Possible Injury	Minor Injury	Serious Injury	Fatal	Grand Total
Carlstadt	513	80	32	8	1	634
East Rutherford	783	131	45	11	4	974
Jersey City	1,140	199	27	3	1	1,370
Kearny	861	151	51	12	2	1,077
Little Ferry	117	11	5	1	0	134
Lyndhurst	313	47	33	7	1	401
Moonachie	69	13	7	1	0	90
North Arlington	1	2	0	0	0	3
North Bergen	843	147	37	9	2	1,038
Ridgefield	109	26	10	2	0	147
Rutherford	653	110	72	6	1	842
Secaucus	2,410	488	172	15	3	3,088
South Hackensack	49	4	1	0	0	54
Teterboro	131	25	9	2	4	171
Grand Total	7,992	1,434	501	77	19	10,023



5.2.3 Crashes by Roadway Jurisdiction

State and county roads experienced the greatest number of fatal and serious crashes in the Meadowlands. On state highways, most crashes occur on NJ 3, NJ 7, US 46, and NJ 120. On county roads, crashes most frequently occur on County Avenue/CR 653, Newark-Jersey City Turnpike/CR 508, Paterson Plank Road/CR 681, Secaucus Road/CR 678, and Washington Avenue/CR 503. Table 20 displays the number of crashes by roadway jurisdiction, ranked by total crashes (last column). The highest number of FSI and total crashes are highlighted.

Table 20: Crashes by Roadway Jurisdiction (Source: NJDOT Safety Voyager 2017-2021)

Roadway System	No Apparent Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury	Fatal Injury	Total
State Highway	4,175	823	289	45	14	5,346
Municipal	1,936	263	96	10	2	2,307
County	1,392	329	110	17	2	1,850
Private Property	410	9	2	1	1	423
State/Interstate Authority	49	9	4	3	0	65
U.S. Government Property	12	0+	0	1	0	13
Municipal Authority Park or Institution	9	0	0	0	0	9
State Park or Institution	2	1	0	0	0	3
County Authority Park or Institution	7	0	0	0	0	7
Total	7,974	1,433	501	77	19	10,023

5.2.4 Crashes by Type

Assessing crashes by type can help identify common roadway safety issues (Table 21). The most common crash types within the Meadowlands District are Same Direction-Rear End and Same Direction-Sideswipe, which comprise almost 63 percent of all crashes in the District. Both types of crashes are prevalent on higher-speed, multilane roadways.

The highest number of FSI and total crashes are highlighted in Table 21. Most crashes resulting in serious injury are Same Direction-Rear End crashes, while most fatal crashes involve pedestrians. This emphasizes the vulnerable nature of pedestrians and how most crashes involving pedestrians result in at least some form of injury.

Table 21: Crash Types by Severity (Source: NJDOT Safety Voyager 2017-2021)

Crash Type	No Apparent Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury	Fatal Injury	Total
Same Direction - Rear End	2,414	710	164	20	2	3,310
Same Direction - Sideswipe	2,647	254	69	7	0	2,977
Fixed Object	1,004	124	83	14	5	1,230
Right Angle	489	157	50	3	1	700
Struck Parked Vehicle	635	25	10	3	0	673
Backing	340	14	1	0	0	355
Opposite Direction (Head On)	67	32	26	9	1	135
Left Turn/U Turn	84	21	14	1	0	120
Non-fixed Object	101	5	2	0	0	108
Opposite Direction (Sideswipe)	71	16	7	0	0	94

Crash Type	No Apparent Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury	Fatal Injury	Total
Pedestrian	5	31	26	13	9	84
Other	40	9	5	2	0	56
Overtaken	14	11	21	3	0	49
Encroachment	29	9	3	1	0	42
Animal	36	1	3	0	0	40
Pedalcyclist	6	11	14	1	1	33
Railcar - vehicle	1	0	0	0	0	1
Unknown	9	4	3	0	0	16
Total	7,992	1,434	501	77	19	10,023

Table 21 highlights that a few crash types comprise the majority of FSI crashes in the District:

- Pedestrian crashes comprised 0.8 percent of all crashes in the District but 22.9 percent of FSI crashes.
- Same Direction–Rear End crashes comprised 33.0 percent of all crashes in the District but 22.9 percent of FSI crashes.
- Fixed Object crashes comprised 12.3 percent of all crashes in the District but 19.8 percent of FSI crashes.
- Opposite Direction–Head On comprised 1.3 percent of all crashes in the District but 10.4 percent of FSI crashes.

In total, these four crash types made up 76 percent of all FSI crashes in the District between 2017 and 2021. Figure 34 displays the FSI crashes by type. Just over 40 percent of pedestrian FSI crashes resulted in a fatality, a much higher proportion than any other crash type.

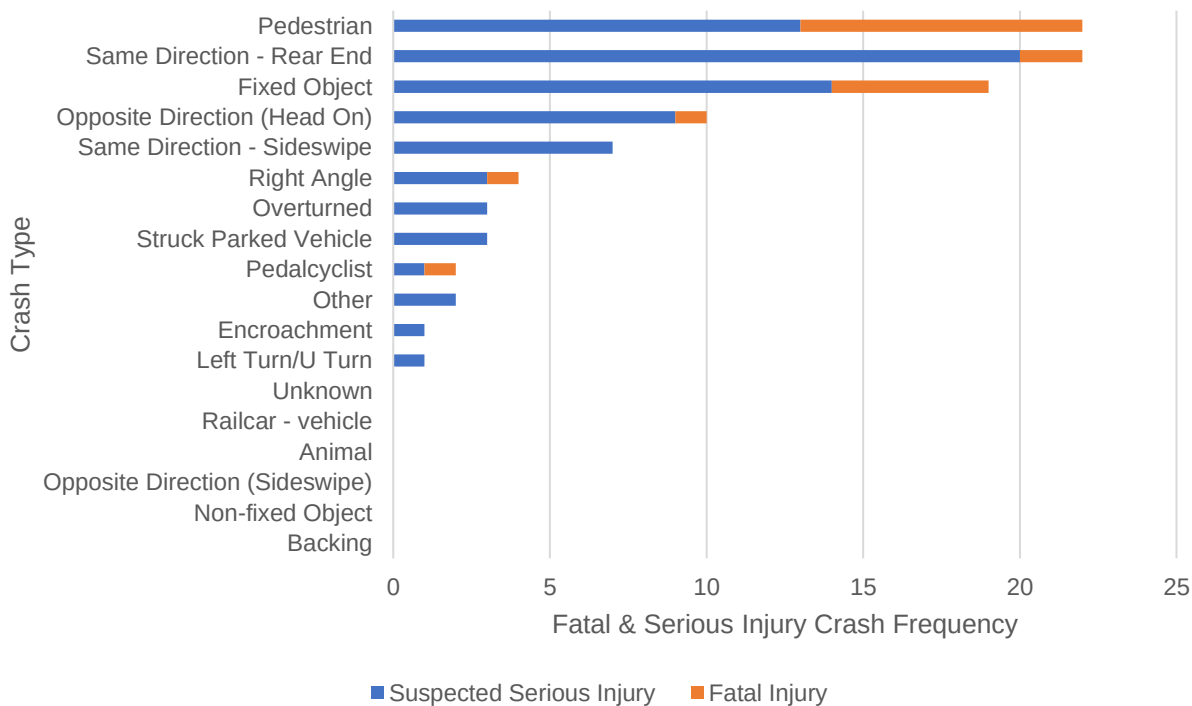


Figure 34: FSI Crashes by Crash Type (Source: NJDOT Safety Voyager 2017-2021)

To provide context for the District's crash history, crash types within the Meadowlands were compared to statewide data (Table 22). Several crash types within the District vary significantly when compared to statewide averages. Those are highlighted in the following table.

Table 22: Comparison of Meadowlands District to State – Crash Type (All Severities)
(Source: NJDOT Safety Voyager 2017-2021)

Crash Type	All Severities Meadowlands	All Severities Statewide
Same Direction - Rear End	33.0%	29.6%
Same Direction - Sideswipe	29.7%	15.4%
Fixed Object	12.3%	11.6%
Right Angle	7.0%	13.9%
Struck Parked Vehicle	6.7%	11.3%
Backing	3.5%	4.4%
Opposite Direction (Head On)	1.3%	1.5%
Left Turn/U Turn	1.2%	2.2%
Non-fixed Object	1.1%	1.2%
Opposite Direction (Sideswipe)	0.9%	1.0%
Pedestrian	0.8%	1.6%
Other	0.6%	0.8%
Overtaken	0.5%	0.5%
Encroachment	0.4%	0.4%
Animal	0.4%	4.0%
Pedalcyclist	0.3%	0.7%
Railcar - vehicle	0.0%	0.0%
Unknown	0.2%	0.0%

These variations reflect the nature of the District's roadway network, which skews towards higher-speed roads with fewer intersections than the state's roadway network.

The top five severe crash types in the Meadowlands District are:

1. **Same Direction – Rear End:** Rear End crashes make up almost one-third of all crashes within the District (33.0 percent) compared to 29.6 percent of all crashes statewide. This difference could be attributable to higher driving speeds and potentially more aggressive driving behavior within the District.
2. **Same Direction–Sideswipe:** Sideswipe crashes in the District are nearly double the statewide percentage (29.7 percent vs 15.4 percent). This difference could be attributable to the notable presence of highway ramps and multilane roads within the Meadowlands District.
3. **Fixed Object:** Fixed Object crashes make up 12.3 percent of all crashes within the District compared to 11.6 percent of all crashes statewide. This difference could be attributable to the presence of guide rails and other barriers present along roadways within the District. Increased presence of fixed objects (e.g., roadside and median barriers) could lead to more Fixed Object crashes.
4. **Right Angle:** Right Angle crashes comprise 13.9 percent of all crashes statewide and 7.0 percent of crashes within the District. The difference in Right Angle crashes could result of establishing “No Turn on red” in most congested intersections within the District.
5. **Struck Parked Vehicle:** Struck Parked Vehicle crashes comprise 6.7 percent of crashes within the District compared to 11.3 percent of crashes statewide. This difference could be attributable to roadways in the Meadowlands where street parking is not available and/or prohibited.

The following table compares the percentage of FSI crash types within the District to the percentage of FSI crash types statewide (Table 23). Notable FSI variations between Meadowlands and statewide are highlighted.

Table 23: Comparison of Meadowlands District to State – Crash Type (FSI)
 (Source: NJDOT Safety Voyager 2017-2021)

Crash Type	FSI Meadowlands	FSI Statewide
Same Direction - Rear End	22.9%	10.6%
Pedestrian	22.9%	19.7%
Fixed Object	19.8%	23.4%
Opposite Direction (Head On)	10.4%	7.1%
Same Direction - Sideswipe	7.3%	4.3%
Right Angle	4.2%	15.7%
Struck Parked Vehicle	3.1%	3.9%
Overturned	3.1%	3.8%
Other	2.1%	1.7%
Pedalcyclist	2.1%	4.3%
Left Turn/U Turn	1.0%	3.1%
Encroachment	1.0%	0.1%
Backing	0.0%	0.4%
Non-fixed Object	0.0%	0.6%
Opposite Direction (Sideswipe)	0.0%	0.8%
Animal	0.0%	0.6%
Railcar - vehicle	0.0%	0.1%
Unknown	0.0%	0.0%

Trends in FSI crashes further reflect the nature of the District's roadway network.

- **Same Direction–Rear End:** Rear End crashes comprise 22.9 percent of FSI crashes within the District compared to 10.6 percent statewide. This variation could reflect the presence of higher speed roads and aggressive driving behaviors within the Meadowlands District, where longer required stopping distances may contribute to Rear End crashes.
- **Pedestrian:** Pedestrian crashes comprise 22.9 percent of FSI crashes in the Meadowlands, compared to 19.7 percent of FSI crashes statewide. This difference is noteworthy because pedestrian crashes make up only 0.8 percent of all crashes within the District compared to 1.6 percent of all crashes statewide.
- **Same Direction–Sideswipe:** Sideswipe crashes comprise 7.3 percent of FSI crashes within the Meadowlands compared to 4.3 percent of FSI crashes statewide. The overrepresentation of sideswipe FSI crashes in Meadowlands compared to the statewide averages may be due to the overall number of sideswipe crashes occurring in the Meadowlands (Sideswipe crashes account for roughly 30 percent of all crashes in the District, roughly twice the statewide average).
- **Right Angle:** Right Angle FSI crashes comprise 4.2 percent of FSI crashes within the Meadowlands, compared to 15.7 percent of FSI crashes statewide. This difference is likely a reflection of the low frequency of Right-Angle crashes within the District.

5.2.5 Crashes by Light Condition

Since the frequency of nighttime crash fatality are historically higher than daytime crash frequency, light plays an important role in roadway safety, especially for vulnerable road users. Table 24 below summarizes crash data by Light Condition. The highest number of FSI and total crashes are highlighted. While most crashes occurred in Daylight conditions, 54 percent of FSI crashes in the District occurred in low-light conditions (lighting conditions other than "Daylight"). Given that approximately 70 percent of total trips occurred during daylight hours (7 AM–6

PM) in the District in 2024¹¹, the frequency of FSI crashes occurring in the dark indicates that low-light condition crashes are overrepresented.

Table 24: Crashes by Lighting Conditions (Source: Numetric & NJDOT Safety Voyager 2017-2021)

Light Condition	No Apparent Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury	Fatal Injury	Total
Daylight	5,338	943	293	36	8	6,618
Dark (streetlights on, Cont.)	1,811	375	152	33	8	2,379
Dark (streetlights on, Spot)	226	31	21	1	1	280
Dusk	216	34	12	1	0	263
Dawn	152	28	11	0	1	192
Dark (no streetlights)	102	14	7	5	1	129
Dark (streetlights off)	46	2	3	1	0	52
Unknown	101	7	2	0	0	110
Grand Total	2,654	1,434	501	77	19	10,023

To provide context for the District's crash history, crash Light Conditions within the Meadowlands were compared to statewide data (Table 25 and Table 26). The one notable variation is highlighted in the following table.

Table 25: Comparison of Meadowlands District to State – Light Condition in Crashes (All Severities) (Source: Numetric & NJDOT Safety Voyager 2017-2021)

Light Condition	All Severities Meadowlands	All Severities Statewide
Daylight	66.0%	69.5%
Dark (streetlights on, Cont.)	23.7%	16.6%
Dark (streetlights on, Spot)	2.8%	4.2%
Dusk	2.6%	2.6%
Dawn	1.9%	1.5%
Dark (no streetlights)	1.3%	4.0%
Dark (streetlights off)	0.5%	0.7%
Unknown	1.1%	0.8%

Crash lighting conditions within the Meadowlands were generally similar to those throughout the state during the study period. Most crashes occurred during daylight hours; 66.0 percent of all crashes in the Meadowlands occurred during the day compared to 69.5 percent of all crashes within the state. However, the percentage of crashes that occurred in Dark (Street Lights on, Continuous) conditions deviated from the statewide data. Within the District, 23.7 percent of crashes occurred in Dark (Street Lights on, Continuous) conditions compared to 16.6 percent of crashes statewide. This difference may be a result of the relatively high proportion of state highways and county roads making up the District's roadway network. These facilities are more likely to have continuous lighting compared to those under municipal jurisdiction.

Light conditions in FSI crashes within the District varied from state data. During the study period, 42.7 percent of FSI crashes within the District occurred in Dark (Street Lights on, Continuous) conditions compared to 23.0 percent of FSI crashes in the state. Additionally, most (54.2 percent) crashes within the Meadowlands occurred in low-light conditions (lighting conditions other than Daylight) compared to 45.1 percent of crashes throughout the state. Notable variations are highlighted in the following table.

¹¹ Source: Replica Traffic Data on Trip Start Time for Thursday, September 14, 2023. Trip Start Time refers to the hour that a trip begins (an individual leaves a location at which they've been for several hours),

Table 26: Comparison of Meadowlands District to State – Light Condition in Crashes (FSI)
(Source: Numetric & NJDOT Safety Voyager 2017-2021)

Light Condition	FSI Meadowlands	FSI Statewide
Daylight	45.8%	54.7%
Dark (streetlights on, Cont.)	42.7%	23.0%
Dark (streetlights on, Spot)	2.1%	7.6%
Dusk	1.0%	2.9%
Dawn	1.0%	1.9%
Dark (no streetlights)	6.3%	8.4%
Dark (streetlights off)	1.0%	1.3%
Unknown	0.0%	0.1%

5.2.6 Crashes by Time of Day

Table 27 below summarizes crash data by Time of Day, ordered chronologically from midnight to 11:59 PM. The highest number of FSI and total crashes are highlighted. Most crashes occur during typical working hours between 9:00 AM and 3:59 PM. Most serious injury crashes occur during overnight hours between midnight and 5:59 AM. **Most fatal crashes occur during evening hours between 7:00 PM and 11:59 PM.**

Table 27: Crashes by Time of Day (Source: Numetric & NJDOT Safety Voyager 2017-2021)

Time of Day	No Apparent Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury	Fatal Injury	Total
12:00 AM - 5:59 AM	619	126	68	21	1	835
6:00 AM - 8:59 AM	1,235	236	59	8	3	1,541
9:00 AM - 3:59 PM	3,163	518	153	19	2	3,855
4:00 PM - 6:59 PM	1,762	321	113	15	4	2,215
7:00 PM - 11:59 PM	1,198	232	105	14	9	1,558
Unknown	15	1	3	0	0	19
Grand Total	7,992	1,434	501	77	19	10,023

5.2.7 Crashes by Environmental Condition

Similar to lighting conditions, environmental factors such as precipitation and fog impact roadway safety.

Table 28 summarizes crash data by Environmental Condition. The highest number of FSI and total crashes are highlighted. 80 percent of all crashes occurred in clear conditions. Similarly, the majority of FSI crashes occurred in clear conditions. 13 percent of all crashes occurred during rainy conditions.

Table 28: Crashes by Environmental Condition (Source: Numetric & Safety Voyager 2017-2021)

Environmental Condition	No Apparent Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury	Fatal Injury	Total
Clear	6,381	1,147	406	60	16	8,010
Rain	1,044	204	58	11	1	1,318
Overcast	315	56	24	1	0	396
Snow	165	20	6	3	1	195
Freezing Rain	17	1	2	0	0	20
Fog/Smog/Smoke	9	0	1	2	1	13
Blowing Snow	6	1	1	0	0	8
Sleet/Hail	7	0	0	0	0	7
Other	2	1	0	0	0	3
Unknown	46	4	3	0	0	53
Grand Total	7,992	1,434	501	77	19	10,023

5.2.8 Vehicle Type in Crashes

Vehicle type plays a role in crash outcomes. Larger vehicles, such as trucks or SUVs, generally offer more occupant protection due to greater mass and structural integrity. In collisions, these vehicles tend to absorb impact forces, reducing the risk of severe injuries. Conversely, smaller vehicles may not provide the same level of protection in a crash. The disparity in size and weight between colliding vehicles can exacerbate the severity of injuries. Table 29 summarizes crash data by Vehicle Type. The highest number of FSI and total crashes are highlighted.

50 percent of all FSI crashes involved smaller passenger cars. Trucks and larger passenger vehicles (SUVs and pickups) accounted for approximately 18 percent of FSI crashes each. While motorcycles comprise less than 1 percent of all crashes in the District, motorcycles were involved in approximately 13 percent of all FSI crashes. Additionally, 20 percent of all motorcycle crashes resulted in serious injury or fatality, the highest proportion, by far, among all vehicle types.

Table 29: Vehicle Types in Crashes by Severity (Source: Numetric & Safety Voyager 2017-2021)

Vehicle Type	No Apparent Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury	Fatal Injury	Total
Car/Station Wagon/Minivan	5,793	1,119	359	51	8	7,330
SUVs & Pickups	2,309	494	174	17	4	2,998
Semi-Trailer & Other Heavy Vehicles	1,870	189	65	17	4	2,145
Buses & Vans	676	130	42	2	0	850
Motorcycles	11	22	30	13	3	79
Grand Total	10,659	1,954	670	100	19	13,402

Crashes by Vehicle Type within the District were compared to statewide data (Table 30 and Table 31). Within the District, 21.4 percent of all crashes involved a Semi-Trailer and Other Heavy Vehicles, compared to only 9.6 percent of all crashes throughout the state. This difference is likely due to the notable presence of warehouses and distribution centers within the Meadowlands.

Additionally, 29.9 percent of all crashes in the District involved an SUV or Pickup, compared to 40.4 percent throughout the state. Cars/Station Wagons/Minivans were present in 73.1 percent of crashes within the District, compared to 79.4 percent of crashes statewide. Finally, Buses and Vans make up 8.5 percent of crashes in the District compared to 6.4 percent of crashes statewide. This may be due to the presence of commercial transportation companies (bus services) that are seen frequently in the District, transporting people to and from New York and other regional destinations like Newark Liberty International Airport.

Table 30: Comparison of Meadowlands District to State – Vehicle Types in Crashes (All Severities) (Source: Numetric & NJDOT Safety Voyager 2017-2021)

Vehicle Type	All Severities Meadowlands	All Severities Statewide
Car/Station Wagon/Minivan	73.1%	79.4%
SUVs & Pickups	29.9%	40.4%
Semi-Trailer & Other Heavy Vehicles	21.4%	9.6%
Buses & Vans	8.5%	6.4%
Motorcycles	0.8%	0.8%
Note: Percentages represent the portion of crashes in which each vehicle type was present. Since multiple vehicles are often present in a single crash, the percentages add up to a value greater than 100%.		

In the Meadowlands District, the trends in FSI crashes by vehicle type generally mirror those seen in crashes of all severities. Notably, 21.9 percent of FSI crashes in the District involved a Semi-Trailer or Other Heavy Vehicle, significantly higher than the statewide figure of 8.1 percent. Motorcycles made up 16.7 percent of FSI crashes in the District, compared to only 12.6 percent of FSI crashes statewide. Additionally, passenger vehicles

(Car/Station Wagon/Minivan) were involved in 61.5 percent of FSI crashes in the District, slightly lower than the 67.4 percent observed statewide. Finally, SUVs and Pickups were underrepresented in the District's FSI crashes, accounting for 21.9 percent, compared to 35.7 percent across the state.

Table 31: Comparison of Meadowlands District to State – Vehicle Types in Crashes (FSI)
(Source: Numetric & NJDOT Safety Voyager 2017-2021)

Vehicle Type	FSI Meadowlands	FSI Statewide
Car/Station Wagon/Minivan	61.5%	67.4%
SUVs & Pickups	21.9%	35.7%
Semi-Trailer & Other Heavy Vehicles	21.9%	8.1%
Motorcycles	16.7%	12.6%
Buses & Vans	2.1%	4.9%
Note: Percentages represent the portion of crashes in which each vehicle type was present. Since multiple vehicles are often present in a single crash, the percentages add up to a value greater than 100%.		

5.2.9 Contributing Circumstances

Apparent Contributing Circumstances were reviewed to identify common crash characteristics. According to the New Jersey NJTR-1 Crash Report Manual 1st Edition¹² (NJTR-1 Manual), which establishes the standards that police officers apply when filling out an NJTR-1, contributing circumstances are the “most prominent factor(s) contributing to [a] crash, even if a summons is not issued.” The NJTR-1 Manual separates Apparent Contributing Circumstances into four categories: Human/Driver Actions, Vehicle Factors, Roadway/Environmental Factors, and Pedestrian Factors.¹³ Each vehicle or non-motorized individual (pedestrian or cyclist) involved in a crash can be assigned up to two Apparent Contributing Circumstances. Since multiple vehicles can be involved in a crash, it's possible that a given contributing circumstance could be listed more than once in a single crash. To avoid any potential double counting of contributing circumstances, the analysis considered only the first instance of each contributing circumstance in any crash. This approach is reflected in Table 32, which displays the number of crashes in which each **Human/Driver Factor** was applied rather than the total number of instances of each Human/Driver Factor. The highest number of FSI and total crashes are highlighted.

Table 32: Human/Driver Contributing Circumstances in Crashes by Severity
(Source: Numetric & NJDOT Safety Voyager 2017-2021)

Human/Driver Factors	No Apparent Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury	Fatal Injury	Total
Driver Inattention	3,782	670	186	29	0	4,667
Following Too Closely	886	262	69	6	0	1,223
Improper Lane Change	831	95	52	7	1	986
Unsafe Speed	319	112	69	16	1	517
Failed to Yield ROW to Vehicle/Pedestrian	328	87	38	6	0	459
Improper Turning	310	46	18	1	0	375
Backing Unsafely	300	13	1	0	0	314
Improper Passing	239	20	4	1	0	264
Other Driver/Pedalcyclist Action	177	39	23	6	4	249

¹² Note: A 2nd Edition of the New Jersey NJTR-1 Crash Report Manual was published in 2023. Since the crashes reviewed were governed by the 1st Edition of the NJTR-1 Manual, any definitions and context will be drawn from the 1st Edition, even though these definitions may be superseded.

¹³ New Jersey Motor Vehicle Commission, New Jersey Department of Transportation, New Jersey State Police, New Jersey Division of Highway Traffic Safety, & New Jersey Police Traffic Officers Association. (2017). *New Jersey NJTR-1 Crash Report Manual*.

Human/Driver Factors	No Apparent Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury	Fatal Injury	Total
Failed to Obey Traffic Signal	66	42	12	3	0	123
Failure To Keep Right	70	16	6	0	1	93
Other Distraction Outside Vehicle	47	10	5	1	0	63
Other Distraction Inside Vehicle	40	15	5	1	0	61
Wrong Way	25	13	9	1	0	48
Failed to Obey Stop Sign	27	9	7	0	0	43
Improper Parking	35	1	1	0	0	37
Distracted - Hand Held Electronic Device	11	5	3	0	0	19
Distracted - Hands Free Electronic Device	11	5	1	0	0	17
Improper Use/Failed to Use Turn Signal	6	1	0	0	0	7
Distracted by Passenger	4	0	2	0	0	6
Improper Use/No Lights	1	1	0	0	0	2
Failure to Remove Snow / Ice	2	0	0	0	0	2
None (Driver/Pedalcycle)	5,856	1,096	335	38	9	7,334
Grand Total	13,373	2,558	846	116	16	16,909

Notable trends in the Human/Driver Factors reported in NJTR-1 crash reports include:

- **Driver Inattention** was reported in approximately 46.6 percent of all crashes in the District and 30 percent of FSI crashes during the study period. Driver Inattention was the most prevalent Apparent Contributing Circumstance of the crashes reviewed.¹⁴ The NJTR-1 Manual states that Driver Inattention is appropriate when the driver “loses focus on the task of driving. This includes things such as daydreaming, fatigue, drowsiness, [and] other physical or emotional conditions of the driver.”
 - Driver Inattention differs from Driver Distracted, as the latter is applicable only when a driver “chooses to divert their attention from the driving task to focus on some other activity instead.”
- **Unsafe Speed** was reported in approximately 5.2 percent of all crashes in the District and 17.7 percent of FSI crashes during the study period. **Unsafe Speed is, therefore, overrepresented in FSI crashes.** The positive relationship between higher speeds and more severe crashes is well documented. Higher speeds result in longer braking distances, decreased reaction time to avoid a crash, and increased kinetic energy in a crash, increasing the probability of FSI crashes.
- **Failed to Yield ROW to Vehicle/Pedestrian** was reported in 4.6 percent of all crashes in the District and 6.3 percent of FSI crashes during the study period. Failing to yield ROW is a common mistake that can directly lead to a crash. Failing to yield often occurs when drivers, pedestrians, or cyclists misinterpret the rules of the road or when road users fail to directly observe a vehicle or pedestrian with the ROW.
- **Following too Closely** was reported in 12.2 percent of all crashes in the District and 6.3 percent of FSI crashes during the study period. According to the NJTR-1 Manual, following too closely is applied when

¹⁴ Other than None (Driver/Pedalcycle) which was reported in approximately 73% of crashes. In the New Jersey NJTR-1 Crash Report Manual, officers investigating a crash are encouraged to list two Apparent Contributing Circumstances for each party involved in a crash. Often, None (Driver/Pedalcycle), is selected as the second Apparent Contributing Circumstance for a vehicle. Accordingly, None (Driver/Pedalcycle) does not necessarily indicate a lack of Apparent Contributing Circumstances for a driver or cyclist involved in a crash.

a driver is “positioned at a distance behind another motor vehicle or non-occupant that was too close to permit safe response to any change in movement or behavior.” Simply put, following too closely is an indicator that drivers are behaving aggressively, placing themselves and others at risk. In statewide data, following too closely was reported in 13.3 percent of all crashes in New Jersey during the study period and 3.3 percent of FSI crashes. Given that following too closely was reported in roughly double the percentage of FSI crashes in the District, it’s possible that drivers are more aggressive in the Meadowlands (and North Jersey in general) than in the rest of the state.

5.3 Takeaways

- State and county roads experienced the greatest number of FSI crashes in the Meadowlands District. These roads typically include Freeways/Expressways, Arterials, and Collector roads, with the capability to carry the highest volumes of vehicles among all roadway types.
- Same Direction-Rear End crashes are the most common crash type in the District and are tied for the highest percentage of FSI crashes (23 percent) among all crash types.
- Same Direction-Sideswipe crashes are the second most common crash type in the District and are overrepresented in the District compared to statewide data.
- Pedestrian crashes represent less than one percent of all crashes within the District but account for approximately 23 percent of FSI crashes (including nine fatalities, the most of any crash type).
- Lighting is critical to safety. The majority of FSI crashes in the District occurred in low-light conditions (lighting conditions other than Daylight).
- Crashes involving Semi-Trailers and other Heavy Vehicles (including Buses and Vans) are overrepresented in the District compared to the state. The overrepresentation may be attributable to the District’s vehicle composition, which is comprised of a greater percentage of trucks and heavy vehicles due to the presence of warehousing and distribution centers.

6 NETWORK SCREENING

To establish where crashes were occurring most frequently and with the greatest severity, a network screening analysis of roads (excluding interstates) within the Meadowlands District was performed. The analysis utilized crash data in three primary ways:

- **General Crash Analysis:** This examines trends among crash types, contributing circumstances, environmental and roadway factors, and vehicle types. These elements are analyzed with respect to crash severity and compared to statewide averages. This analysis is already covered under Section 5 CRASH DATA.
- **High-Risk Network (HRN):** This includes the road segments with the most significant crash histories in the District based on Equivalent Possible Injury (EPI) score (see Section 6.1). The HRN allows for a systemic analysis of roadway features to identify those associated with increased risk. Segments with a higher number of crashes resulting in injuries and fatalities were identified. The HRN segments were identified using a network screening process known as the sliding window methodology. More details on this approach can be found in Section 6.2: Sliding Window Analysis.
 - The product of this analysis is a list of overrepresented roadway features at HRN segments, considered to be associated with increased risk. More details on the findings of this evaluation can be found in Section 6.3: High-Risk Network (HRN)
- **High-Injury Network (HIN):** This includes road segments with the highest crash histories in the District, categorized into three groups: Freeways and Expressways, Principal and Minor Arterials, and Collectors and Local Roads. Each group contains segments with the greatest crash history *within its classification*. The HIN is discussed in detail in Section 6.4: High-Injury Network (HIN). The HIN segments were also identified using the sliding window methodology, with separate analyses for each group to identify their top segments. More information is available in Section 6.2: Sliding Window Analysis.
 - **The HIN served as the basis for the development of suggested roadway safety improvement projects.**

Figure 35 presents the process for analyzing crashes. This three-pronged approach to crash analysis provides different perspectives on the crash data. Each method runs in parallel, and while their outcomes do not directly depend on one another, they collectively inform future analysis tasks.

6.1 Equivalent Possible Injury (EPI) Analysis

EPI analysis is an approach to crash analyses that assesses the combined effects of crash frequency and crash severity by weighting crashes based on their severity. In EPI analyses, each crash severity level is assigned a predetermined number of EPI crashes. The equivalent number of possible injury crashes is determined by dividing each severity's comprehensive crash costs (in dollars) by the comprehensive cost of a possible injury crash.

Table 33 displays the EPI weights used in the Meadowlands District network screening analysis.

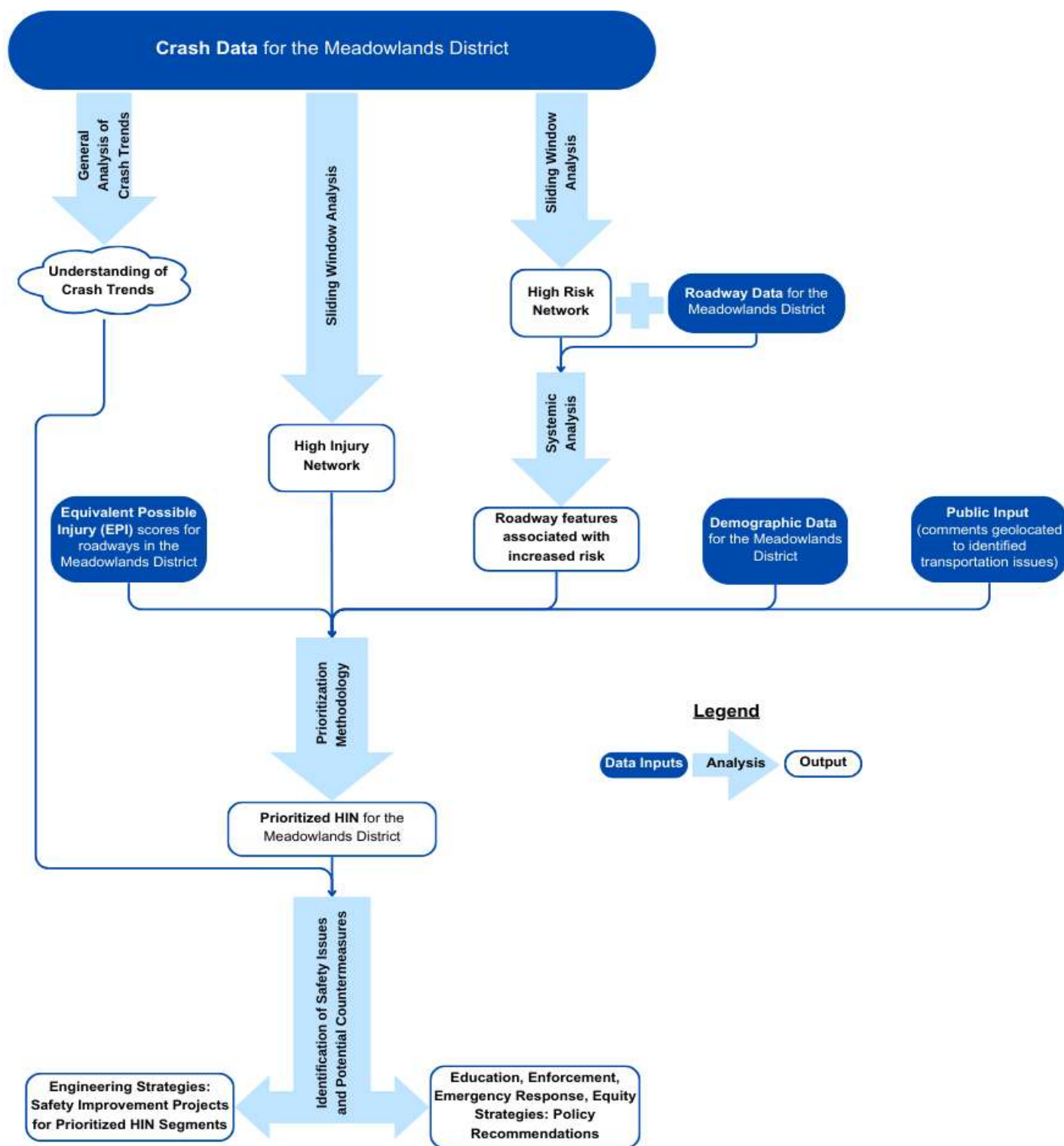


Figure 35: Flow Chart of Elements of Crash Analysis & Network Screening

Table 33: EPI Crash Weights Using 2024 Dollars (Source: NJDOT BSIP)

Equivalent Property Damage Only (EPI) Score Weights			
Crash Severity	KABCO Scale	Comprehensive Crash Cost - 2024 Dollars*	EPI Value (K=A)
Fatal Injury	K	\$ 15,031,135	5.3
Suspected Serious Injury	A	\$ 869,407	5.3
Suspected Minor Injury	B	\$ 262,449	1.6
Possible Injury	C	\$ 165,401	1.0
No Apparent Injury	O	\$ 15,115	-
*2024 Comprehensive Crash Costs courtesy of NJDOT Bureau of Safety Improvement Programs.			

Table 33 shows that in an EPI analysis, more severe crashes have higher values or weights. This recognizes the significant personal and societal impact caused by loss of life compared to the much less severe impact of damage to personal or public property, such as damage to a vehicle or infrastructure.

Additionally, Table 33 shows that FSI crashes receive the same weight as those in the EPI system. This weighting recognizes that fatal and serious injury crash outcomes are often the result of small differences in speed, angle, reaction time, and other factors. Unaltered, the weight of a fatal crash in the EPI system would be 90.9, roughly 17 times the weight of a suspected serious injury crash and 57 times greater than a suspected minor injury crash. Equating the weights of fatal and suspected serious injury crashes is an attempt to balance the results of the network screening process and avoid placing too great of an emphasis on locations where fatal crashes occurred. Moreover, the equivalent weighting of fatal and serious injury crashes recognizes the long-term reduction in quality of life experienced by individuals that sustain serious injuries from crashes. In conclusion, sustained injuries result in significant medical costs, lost productivity, emotional trauma, and long-term care needs, all of which contribute to the comprehensive cost of crashes.

To determine the EPI score of an individual location, the following equation is used:

$$EPI_{Total} = (K * EPI_K) + (A * EPI_A) + (B * EPI_B) + (C * EPI_C)$$

Where:

K = the number of fatal crashes at a location

EPI_K = EPI weight for fatal crashes

A = the number of serious injury crashes at a location

EPI_A = EPI weight for serious injury crashes

B = the number of minor injury crashes at a location

EPI_B = EPI weight for minor injury crashes

C = the number of possible injury crashes at a location

EPI_C = EPI weight for possible injury crashes

Using the EPI methodology, the entire network of roads within the Meadowlands District (excluding interstates) was assessed using the following methodology:

1. Crash data from 2017–2021 was spatially joined to Meadowlands road centerlines in ArcGIS Pro. The spatial joining used a 20-foot buffer to map crashes to road sub-segments. Crashes were mapped to multiple road sub-segments depending on their location. Mapping a single crash to multiple road sub-segments is acceptable since a crash occurring at an intersection could feasibly be mitigated through a project at intersecting roads. Crash data was obtained from NJDOT's Safety Voyager database, and crash contributing factors were sourced from Numetric.
2. The network of all roads within the Meadowlands District (excluding interstates) was segmented into equal-sized, 1/10-mile-long sub-segments.
3. The EPI score for each 1/10-mile sub-segment was calculated.

At the end of the EPI analysis, the network of roads within the Meadowlands District was divided into equal-sized sub-segments (1/10th mile), each with its own EPI score based on its respective crash history. Figure 36 shows color-coded sub-segments by EPI score.



6.2 Sliding Window Analysis

Sliding window analysis is an algorithmic method of analyzing a segmented dataset to identify local peaks in a field of interest. In crash analyses, a sliding window analysis assesses a fixed length of roadway (known as the “window size”) progressing incrementally along each road in the network to identify local peaks. In the Meadowlands District, roads were divided into individual 1/10-mile sub-segments, each with its own calculated EPI score, and a one-mile window length (10 adjacent 1/10-mile sub-segments) was run along the network to identify high-crash roadway segments.

Figure 37 demonstrates how locations on a sample road were ranked using EPI score and a sliding window analysis, taking an example of EPI scores for NJ 3 by milepost (MP).

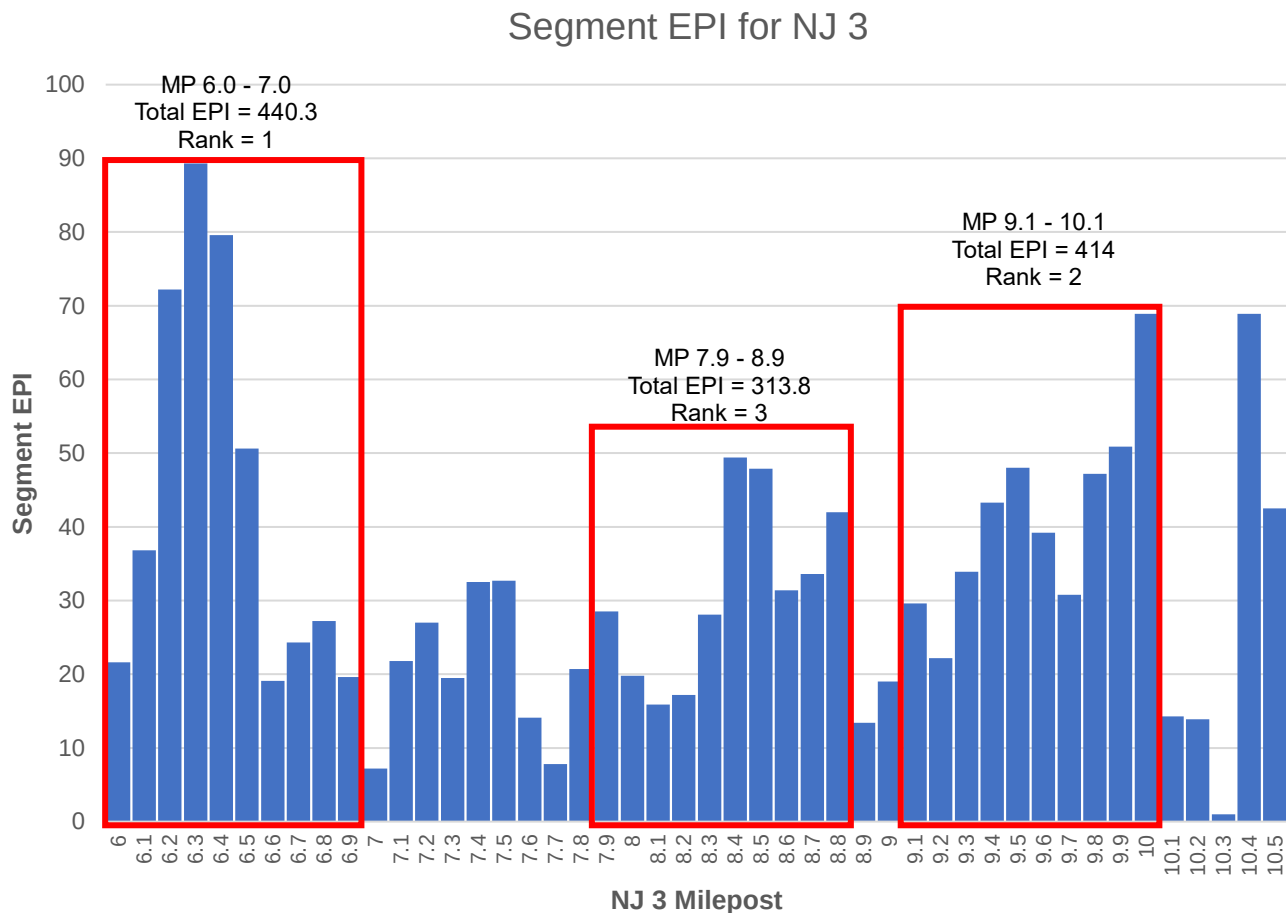


Figure 37: EPI scores of 1/10 mile segments on NJ 3 calculated using sliding window analysis

Figure 37 demonstrates key elements of the sliding window methodology:

- EPI scores are summed over the length of a one-mile segment.
- Ranked segments cannot overlap.

Consider two segments of NJ 3: MP 9.1–10.1 and MP 9.6–10.6. The first segment has an EPI score of 414, while the second has a score of 377.6. Although the MP 9.6–10.6 segment ranks among the highest in the study network, it overlaps with the higher-scoring MP 9.1–10.1 segment and is therefore excluded. This method prevents high-scoring areas from being concentrated in just a few road stretches. If segments could overlap, NJ 3 would comprise the majority of top-scoring segments.

6.3 High-Risk Network (HRN)

To perform a systemic analysis of roadways within the Meadowlands District and identify high-risk roadway features, a selection of roadway segments that are distinct in terms of crash outcomes from the wider population of facilities was identified. The group of segments was evaluated in comparison to the entire study network to identify roadway features that are overrepresented at locations with significant crash histories. This group of select roadway segments is known as the HRN.

The threshold for inclusion in the HRN was determined by setting a percentage of the study network's total roadway mileage (e.g., 20 percent or 26.99 miles). This percentage corresponds to the total length of segments with the highest EPI scores. This method grounds the threshold for inclusion in the HRN by linking the results to the total length of roads in the study network. In practice, this approach sums up the lengths of the top-scoring segments until their total length matches the predetermined percentage of the study network's roadways.

For example, if 20 percent of the study roadway network is selected as the threshold value, then the top 33 segments (total length = 26.99 miles) would be included in the HRN. Table 34 displays the results of a sensitivity analysis of different percentages of the study network.

Table 34: Sensitivity Analysis of Percentage of Roadway Network Mileage

Study Network Roadway Percentage (Roadway Miles)	Number of Segments	Total EPI Score of Segments (Percentage of Total Study Network EPI)	Ratio of EPI Score% to Network Miles% (EPI%/Miles%) *
10% (13.49 miles)	14	2331.7 (47.1%)	4.71
15% (20.24 miles)	22	2769.3 (55.9%)	3.73
20% (26.99 miles)	33	3179.2 (64.3%)	3.21
25% (33.74 miles)	42	3409.1 (68.9%)	2.76

* Called hereinafter "EPI Ratio"

The percentage of roadway miles that appears to provide the best balance of coverage of crash hot spots and the roadway network is 15 percent of the study network roadway miles (20.24 miles). **At 15 percent of the study network's roadway miles, the HRN captures over half – 55.9 percent – of the study network's total EPI score.** The number of segments included in the HRN were then rounded up from 22 to 25, ensuring that the study covers an appropriate selection of roads within the Meadowlands District.

6.3.1 Identification of High-Risk Roadway Features

To identify High-Risk roadway features, a systemic analysis was performed. The systemic analysis compared 0.1-mile sub-segments within the identified HRN to the entire District roadway network to identify roadway features that are associated with an increased crash risk. This approach to roadway safety planning allows locations with risk features to be improved, regardless of their crash history.

Roadway features were identified using data provided by NJDOT's Bureau of Transportation Data and Support from the HPMS and SLD database and spatially joined to the roadway network. Additional data was collected from Replica, a traffic data and analytics platform. The following features were included in the systemic analysis:

- Roadway Functional Classification
- Number of Lanes (Sum of Both Directions)
- Pavement Width
- Speed Limit
- Designated Freight Routes
- Number of Signalized Intersections within a 0.1-mile sub-segment

- Number of Unsignalized Intersections within a 0.1-mile sub-segment¹⁵
- AADT on 0.1-mile sub-segment
- Number of NJ TRANSIT bus stops within 50' of a 0.1-mile sub-segment
- Transit, walking, and biking trips as a percentage of total trips along the 0.1-mile sub-segment

To determine if a feature was overrepresented on sub-segments in the HRN (top 15 percent of segments), the percentage of sub-segments with a particular roadway feature included in the HRN was divided by the percentage of all roadway sub-segments with that feature. This process to calculate a Risk Factor for a generic feature is shown in the following equation:

$$\text{Risk Factor} = \frac{\% \text{ of HRN Sub-segments with Feature } X}{\% \text{ of Sub-segments with Feature } X \text{ in the entire Study Network}}$$

Risk Factors were then associated with different levels of overrepresentation (Table 35). It should be noted that a greater level of overrepresentation does not imply that one feature is inherently more dangerous than another. The degree of overrepresentation indicates that a feature is associated with increased risk. The results of the systemic analysis represent an analysis of features that are *correlated* with risk.

Table 35: Risk Factor and Level of Overrepresentation

Risk Factor	Level of Overrepresentation	Color
$0 \leq \text{Risk Factor for Feature } X < 1.25$	Underrepresented or Marginally Represented	
$1.25 \leq \text{Risk Factor for Feature } X < 1.5$	Overrepresented - Minor	
$1.5 \leq \text{Risk Factor for Feature } X < 2$	Overrepresented - Moderate	
$2 \leq \text{Risk Factor for Feature } X$	Overrepresented - Major	
Insufficient Data or N/A ¹⁶ : If the HRN percentage < 5% or If the Entire Network < 1.5%	-	

The results of the systemic analysis for each roadway feature analyzed are summarized in Table 36 to Table 44. These tables highlight how the segments with the most significant crash histories (those included in the HRN) differ from the study network as a whole in terms of the roadway features present. A systematic analysis calculates and assesses risk factor values associated with roadway characteristics/features and delineates roadway segments in need of safety countermeasures.

Table 36: Functional Classification (Source: NJDOT SLD)

Functional Class	High-Risk Network		Entire Network		Risk Factor
	Sub-Segment Frequency	Percentage	Sub-Segment Frequency	Percentage	
Local	3	1.32%	620	40.84%	0.03
Minor Collector	5	2.19%	79	5.20%	0.42
Major Collector	24	10.53%	142	9.35%	1.13
Minor Arterial	75	32.89%	218	14.36%	2.29
Other Principal Arterial	70	30.70%	167	11.00%	2.79
Other Freeway/Expressway	49	21.49%	125	8.23%	2.61

¹⁵ Unsignalized intersections include all instances in which two roadways meet. This includes stop-controlled intersections and yield-controlled intersections (such as highway ramps).

¹⁶ If a particular feature comprises too small of a portion of the HRN or the entire study network to determine whether it is overrepresented, it will be marked as "Insufficient Data or N/A". Threshold for analysis was set at 5% of the HRN and 1.5% of the study network. The threshold percentage for the HRN was set at a higher value than the entire study network because the HRN has fewer total sub-segments.

Functional Class	High-Risk Network		Entire Network		Risk Factor
	Sub-Segment Frequency	Percentage	Sub-Segment Frequency	Percentage	
Interstate	0	0.00%	2	0.13%	0.00
Blank	2	0.88%	165	10.87%	0.08

Functional classification is a system used to categorize roads based on their intended purpose and level of importance within the transportation network. The classification of a road is typically determined by its design, traffic volume, and the types of land use served. Freeway/Expressways, Principal Arterials, and Minor Arterials make up 8 percent, 11 percent, and 14 percent of roads within the Meadowlands District, respectively. However, Freeway/Expressways, Principal Arterials, and Minor Arterials comprise 22 percent, 31 percent, and 33 percent of the HRN respectively, indicating that these functional classifications are overrepresented, likely due to higher traffic volumes and posted and operating speeds.

Table 37: Number of Lanes (Source: NJDOT SLD)

Number of Lanes	High-Risk Network		Entire Network		Risk Factor
	Sub-Segment Frequency	Percentage	Sub-Segment Frequency	Percentage	
1	3	1.32%	11	0.72%	1.82
2	91	39.91%	991	65.28%	0.61
3	18	7.89%	76	5.01%	1.58
4	88	38.60%	226	14.89%	2.59
5	0	0.00%	1	0.07%	0.00
≥6	26	11.40%	48	3.16%	3.61
Blank	2	0.88%	165	10.87%	0.08

There is a positive relationship between the number of lanes on a road and its volume and speed limit. Additionally, there is an exponential relationship between speed, volume, and crash frequency and severity. As roadway speeds and volumes increase, the likelihood and severity of crashes rise exponentially until they reach a roadway capacity. Sub-segments with three, four, and six or more lanes make up approximately 5 percent, 15 percent, and 3 percent of roadway miles in the District, respectively. However, sub-segments with three, four, and six or more lanes make up approximately 8 percent, 39 percent, and 11 percent of roadway miles, respectively, in the HRN. Roadways with three, four, and six or more lane roads are therefore overrepresented at high crash locations.

Table 38: Pavement Width (Source: NJDOT SLD)

Pavement Width	High-Risk Network		Entire Network		Risk Factor
	Sub-Segment Frequency	Percentage	Sub-Segment Frequency	Percentage	
0' - 19'	2	0.88%	9	0.59%	1.48
20' - 29'	64	28.07%	755	49.74%	0.56
30' - 39'	35	15.35%	248	16.34%	0.94
40' - 49'	76	33.33%	240	15.81%	2.11
50' - 59'	13	5.70%	38	2.50%	2.28
60' - 69'	4	1.75%	6	0.40%	4.44
70'+	32	14.04%	57	3.75%	3.74
Blanks	2	0.88%	165	10.87%	0.08

The width of pavement is generally correlated with road volumes and operating speeds. Typically, wider roads have higher volumes and operating speeds, which are associated with more crashes and crash severity for roads without limitations on access (non-interstates). Sub-segments with pavement widths of 40-49 feet, 50-59 feet,

and ≥70 feet represent 16 percent, 3 percent, and 4 percent of roads in the Meadowlands District, respectively. Sub-segments with pavement widths of 40-49 feet, 50-59 feet, and ≥70 feet comprise 33 percent, 6 percent, and 14 percent of the HRN, respectively, indicating that these roadway widths are overrepresented at locations with significant crash histories.

Table 39: Posted Speed Limit (Source: NJDOT SLD)

Speed Limit	High-Risk Network		Entire Network		Risk Factor
	Sub-Segment Frequency	Percentage	Sub-Segment Frequency	Percentage	
15	0	0.00%	3	0.20%	0.00
20	0	0.00%	3	0.20%	0.00
25	60	26.32%	881	58.04%	0.45
30	6	2.63%	18	1.19%	2.22
35	39	17.11%	118	7.77%	2.20
40	32	14.04%	111	7.31%	1.92
45	20	8.77%	25	1.65%	5.33
50	27	11.84%	71	4.68%	2.53
55	27	11.84%	63	4.15%	2.85
99 ¹⁷	4	1.75%	39	2.57%	0.68
Blank	13	5.70%	186	12.25%	0.47

Higher speed limits can increase the risk and severity of crashes due to higher operating speeds, longer stopping distances, and increased kinetic energy¹⁸. Sub-segments with posted speed limits of 35 mph or greater comprised approximately 26 percent of the entire study network. In comparison, the cohort of sub-segments with posted speed limits of 35 mph or greater made up roughly 64 percent of the HRN, indicating higher posted speed limits are overrepresented at high crash locations.

Table 40: Designated Freight Routes (Source: NJDOT HPMS)

Designated Freight Route	High-Risk Network		Entire Network		Risk Factor
	Sub-Segment Frequency	Percentage	Sub-Segment Frequency	Percentage	
Yes	132	57.89%	281	18.51%	3.13
No	96	42.11%	1,237	81.49%	0.52

The NJAN is a series of designated routes on which large trucks (double-trailer truck combinations and 102-inch-wide standard trucks) may travel, according to N.J. Admin. Code § 16:32-1.4. Routes designated for trucks are generally high-speed and high-volume facilities (interstates, state highways, and 500-series county routes). Trucks and other large vehicles are more likely to cause severe accidents compared to other vehicles because of their weight, size, blind spots, and the challenges they face in maneuvering.¹⁹ Within the study network, **only 19 percent of roads are part of the NJAN compared to 58 percent of the HRN**. This indicates that truck routes (part of the NJAN) are overrepresented at high crash locations.

¹⁷ 99 is listed as the speed limit in the SLD database when the posted speed limit is atypical and can't be described by a single value.

¹⁸ FHWA. (2018, January). *Chapter 2. Relationship Between Speed and Safety - Self-Enforcing Roadways: A Guidance Report, January 2018 - FHWA-HRT-17-098*. <https://www.fhwa.dot.gov/publications/research/safety/17098/003.cfm>

¹⁹ Zhu, Xiaoyu, and Sivaramakrishnan Srinivasan. "A Comprehensive Analysis of Factors Influencing the Injury Severity of Large-Truck Crashes." *Accident Analysis & Prevention*, vol. 43, no. 1, Jan. 2011, pp. 49–57, <https://doi.org/10.1016/j.aap.2010.07.007>. Accessed 24 June 2020.

Table 41: Signalized Intersections per Sub-Segment (Source: NJDOT SLD)

Signalized Intersections per Sub-Segment	High-Risk Network		Entire Network		Risk Factor
	Sub-Segment Frequency	Percentage	Sub-Segment Frequency	Percentage	
0	187	82.02%	1,380	90.91%	0.90
≥1	41	17.98%	138	9.09%	1.98
Blank	0	0.00%	0	0.00%	N/A

Since intersections present points of conflict in a roadway network, they are a focal point of roadway safety. According to the FHWA, more than one-quarter of traffic fatalities and approximately one-half of traffic injuries occur at intersections.²⁰ Signalized intersections, in particular, are a common crossing point for pedestrians and cyclists and where most high-volume vehicular turning movements occur. Sub-segments containing at least one signalized intersection **make up 9 percent of the entire roadway network, but 18 percent of the HRN, indicating the presence of a signalized intersection is overrepresented at high crash locations.** A similar analysis of unsignalized intersections revealed that they are not overrepresented on segments in the HRN. See Table 42.

Table 42: Unsignalized Intersections per Sub-Segment (Source: NJDOT SLD)

Unsignalized Intersections per Sub-Segment	High-Risk Network		Entire Network		Risk Factor
	Sub-Segment Frequency	Percentage	Sub-Segment Frequency	Percentage	
0	159	69.74%	928	61.13%	1.14
1	44	19.30%	417	27.47%	0.70
2	20	8.77%	132	8.70%	1.01
3	4	1.75%	28	1.84%	0.95
4	0	0.00%	9	0.59%	0.00
5	1	0.44%	4	0.26%	1.66
Blank	0	0.00%	0	0.00%	N/A

Table 43: AADT (Source: NJDOT SLD)

AADT	High-Risk Network		Entire Network		Risk Factor
	Sub-Segment Frequency	Percentage	Sub-Segment Frequency	Percentage	
≤ 10,000	47	20.61%	1012	66.67%	0.31
10,001 - 20,000	70	30.70%	248	16.34%	1.88
20,001 - 30,000	15	6.58%	65	4.28%	1.54
30,001 - 40,000	11	4.82%	45	2.96%	1.63
40,001 - 50,000	13	5.70%	25	1.65%	3.46
> 50,000	72	31.58%	121	7.97%	3.96
Blank	0	0.00%	2	0.13%	0.00

AADT is a measure of the number of vehicles traveling on a road on a typical day.²¹ The volume of vehicles on a roadway is closely linked with the number of crashes expected to occur on a given facility. As the number of vehicles increases, the frequency of encounters between vehicles, as well as the potential for mistakes leading to crashes increases.²² This is reflected in the analysis summarized in Table 43. Generally, higher-volume

²⁰ FHWA. (2023, February 1). *About intersection safety*. About Intersection Safety | FHWA. Retrieved May 2, 2023, from <https://highways.dot.gov/safety/intersection-safety/about>

²¹ While the definition of AADT is the total volume on a given facility over a year divided by 365 days, NJDOT traffic count data for non-interstate roads typically relies on 48-hr or 7-day counts. While these counts are over a shorter period of time, correction factors are applied for the number of axles per vehicle and the time of year the count was performed so that counts are applicable year-round.

²² The Highway Safety Manual (HSM) Safety Performance Functions for all facility types show a positive relationship between AADT and the predicted number of crashes on a given facility.

roadway sub-segments are overrepresented in the HRN, with roadways over 40,000 AADT being most overrepresented.

Table 44: Bus Stops within 50' of Sub-Segment (Source: NJ TRANSIT)

Bus Stops within 50'	High-Risk Network		Entire Network		Risk Factor
	Sub-Segment Frequency	Percentage	Sub-Segment Frequency	Percentage	
0	172	75.44%	1304	85.90%	0.88
≥1	56	24.56%	214	14.10%	1.74

Bus stops are trip hubs often accessed on foot or by bicycle. Therefore, bus stops are historically associated with higher rates of pedestrian and bicyclist crashes, likely due to pedestrian and bicycle activity in the vicinity of bus stops.²³ The presence of a bus stop has an impact on pedestrian safety; if, for instance, it is located away from a marked crosswalk or is poorly lit, the risk of crashes near the bus stop can increase. As presented in Table 44, sub-segments with at least one bus stop within 50 feet of the sub-segment make up 14 percent of the roadway network in the Meadowlands District and 25 percent of sub-segments in the HRN, indicating that the presence of a bus stop is overrepresented at high crash locations.

²³ Ulak, M. B., Kocatepe, A., Yazici, A., Ozguven, E. E., & Kumar, A. (2020). A stop safety index to address pedestrian safety around bus stops. *Safety Science*, 133, 105017. <https://doi.org/10.1016/j.ssci.2020.105017>

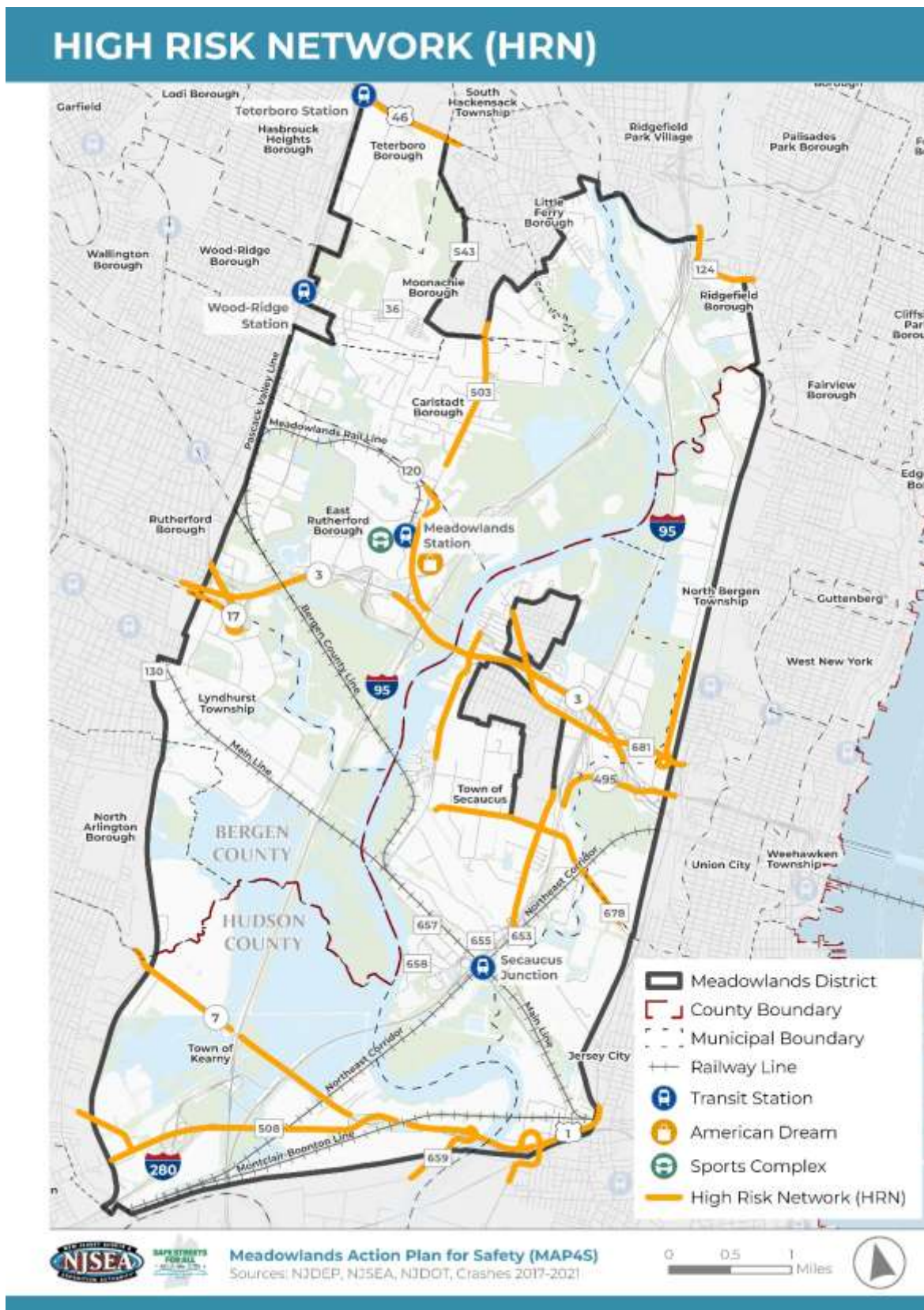


Figure 38: Meadowlands District High Risk Network (HRN)

6.4 High-Injury Network (HIN)

6.4.1 Defining the HIN

To identify the roads with the most significant crash history and the greatest potential for improvement, an HIN was established. HINs are crucial tools used in safety planning to identify and prioritize areas in greatest need of safety treatments. By identifying high-risk areas, jurisdictions can prioritize safety improvements with countermeasures, traffic calming treatments, and enhanced pedestrian and cyclist infrastructure. A Meadowlands District HIN was developed comprising three distinct groups of roadways: Freeways/Expressways, Arterials, and Collectors and Local Roads.

1. **Freeways/Expressways:** Comprised solely of the “Other Freeways and Expressways” functional classification. These do not include interstates; however, they are characterized by directional lanes usually separated by a physical barrier, similar to interstates. Access/egress to these roadways is limited to ramps and abutting/adjacent land uses are not directly served.
2. **Principal & Minor Arterials:** Comprised of the “Other Principal Arterials” and “Minor Arterials” functional classifications. These roadways serve major centers of metropolitan areas, offering more local connectivity than freeways/expressways. Abutting land uses are directly served through driveways and at-grade intersections. These roadways are often served by bus transit.
3. **Collectors & Local Roads:** Comprised of the “Major Collectors,” “Minor Collectors,” and “Local Roads” functional classifications. These roadways connect local traffic to arterial roads, serving both land access and traffic circulation purposes. These roads may pass through or make up residential neighborhoods and are not typically intended for long distance travel.

These groups were selected based on analysis of their respective roadway mileage and EPI scores within the District, as well as an understanding that similar roadways (i.e., functional classifications) should be organized together to enable appropriate comparison within each group. Table 45 highlights the relative safety of each functional classification based on EPI scores. Scores are provided for each individual functional classification as well as the three roadway groupings.

Table 45: Roadway Functional Classification by Mileage and EPI Scores

Road Functional Class	Study Network		Study Network (by HIN Group)	
	Mileage	EPI Scores	Mileage	EPI Scores
7-Local Roads	39.1%	500.4 (10.1%)	54.2%	1,017.4 (20.6%)
6-Minor Collector	5.4%	140.3 (2.8%)		
5-Major Collector	9.7%	376.7 (7.6%)		
4-Minor Arterial	15.1%	989 (20.0%)	26.4%	2,870.7 (58.0%)
3-Principal Arterial	11.3%	884.2 (17.9%)		
2-Freeway/Expressway	8.7%	1,986.5 (40.1%)	8.7%	1,986.5 (40.1%)
Blank	10.5%	71 (1.4%)	10.5%	71 (1.4%)
Total	-	4,948.1	-	4,948.1

Next, a threshold for inclusion within the HIN was established. The threshold was set at the 99th Percentile EPI score for sub-segments (0.1-mile sub-segments) under each roadway group.²⁴

²⁴ The threshold was chosen based on the assumption that a 1-mile segment should not be included in the HIN if its total EPI score did not exceed the 99th percentile EPI scores for 0.1-mile sub-segments. This methodology was selected because it compares 1-mile segments to similar facilities (as determined by functional classification), and the threshold value is inherent to the data used. Several potential thresholds were examined, including the 90th, 95th, and 99th percentile EPI scores for individual sub-segments. The 99th percentile was selected since the 90th and 95th percentiles included low EPI scores and many more segments being included in the HIN which “diluted” the results. For example, the 90th and 95th percentile EPI scores for Collectors & Locals were 6.18 and 3.2, respectively. These thresholds would have resulted in the inclusion of 38 segments at the 95th percentile and 62 segments at the 90th percentile EPI score, while the 99th Percentile resulted in 13 segments included in the HIN.

- **Freeways/Expressways** 99th Percentile EPI Score for Sub-Segments = **72.72**
- **Principal & Minor Arterials** 99th Percentile EPI Score for Sub-Segments = **35.41**
- **Collectors & Local Roads** 99th Percentile EPI Score for Sub-Segments = **20.18**

No group represents less than 20 percent of the total EPI Score within the network. One-mile segments with a total score greater than these threshold scores are part of the Meadowlands District HIN (shown in Table 46, Table 47, and

Table 48). In total, 35 segments were identified as part of the HIN. A map of the final HIN is shown in Figure 39.

Table 46: High-Injury Network – Freeways/Expressways Group (Threshold Score: 72.72)

Rank	Standard Route Identifier (SRI)	Road Name	Milepost Begin	Milepost End	EPI Score
1	00000003	NJ 3	6	7	440.3
2	00000003	NJ 3	9.1	10.1	414
3	00000003	NJ 3	7.9	8.9	313.8
4	00000495	NJ 495	0	0.9	116.4
5	00000120	NJ 120	0	1	104.6

The **Freeways/Expressways** category has five one-mile segments in the HIN above the 99th percentile EPI score threshold of 72.72. These primarily include portions of NJ 3, NJ 495, and NJ 120 in the central region of the District.

Table 47: High-Injury Network – Principal & Minor Arterials Group (Threshold Score: 35.41)

Rank	Standard Route Identifier (SRI)	Road Name	Milepost Begin	Milepost End	EPI Score
1	09000681	HUDSON COUNTY 681	3.8	4.8	193.7
2	00000001T	US 1 TRUCK	3	4.3	143.2
3	00000017	NJ 17	3.2	4.2	113.3
4	00000508	ROUTE 508 (Hudson County)*	13.8	14.8	104.5
5	00000503	ROUTE 503 (Bergen County)	0.6	1.6	100.3
6	00000046	US 46	68.2	69.1	80.1
7	09000653	HUDSON COUNTY 653	1.2	2.2	71.3
8	00000007	NJ 7	0	1	71.0
9	09000678	HUDSON COUNTY 678	0.8	1.74	65.2
10	00000007	NJ 7	1.7	2.7	55.9
11	020001241	BERGEN COUNTY 124 I	0	0.8	55.8
12	09091091	MEADOWLANDS PKWY	0	1	55.0
13	09000659	HUDSON COUNTY 659	0	0.2	49.7
14	00000007	NJ 7	2.8	3.8	45.1
15	00000508	ROUTE 508 (Hudson County)	15	16	42.1
16	00000120	NJ 120	1.3	2.3	39.6
17	09091091	MEADOWLANDS PKWY	1.1	2.1	35.9

* Note: For 500 Series routes, the county within which the segment is located is included in parentheses. This does not necessarily imply its county-owned/operated facility, as some 500 Series routes or portion of these routes are under the jurisdiction of NJDOT.

The **Principal & Minor Arterials** category has 17 one-mile segments in the HIN above the 99th percentile EPI score threshold of 35.41.

Table 48: High-Injury Network – Collectors & Local Roads (Threshold Score: 20.18)

Rank	Standard Route Identifier (SRI)	Road Name	Milepost Begin	Milepost End	EPI Score
1	00000001T_A100360	FR US 1 TRUCK EB TO NJ 7 NB	0	0.1	57.2
2	09081095	WESTSIDE AVE	0	1	48.6
3	09091116	SECAUCUS RD	0	1	48.4
4	09071144	BERGEN AVE	1	1.57	43.2
5	09000681	HUDSON COUNTY 681	5.4	6.1	30.2
6	09081122	WESTSIDE AVE	0.3	1.25	29.6
7	02371038	STATE ST	0	1	27.0
8	09061731	ST PAULS AVE	0	0.7	26.5
9	02321085	VALLEY BROOK AVE	0.3	1.3	26.5
10	02051023	VETERANS BLVD	0	0.17	25.7
11	09091128	HARMON MEADOW BLVD	0	0.51	22.8
12	02051029	COMMERCE BLVD	0	0.46	22.0
13	02051083	COMMERCE BLVD	0	0.48	22.0

The **Collectors & Local Roads** category has 13 one-mile segments in the HIN above the 99th percentile EPI score threshold of 20.18.

Table 49 summarizes the composition of the HIN by category. Arterials are the most common roadway functional classification on the HIN. The total EPI score for the HIN comes to 3140.5, which is 63.5 percent of the total EPI score for the complete District roadway network (4948.1).

Table 49: Summary of HIN

Summary	# of Segments	HIN Miles	EPI Score
Freeways/Expressways	5	4.9	1389.1
Arterials	17	15.8	1321.7
Collectors & Local Roads	13	8.6	429.7
Grand Total	35	29.4	3140.5

Table 50 summarizes the HIN miles by roadway category and municipality. Most of the HIN miles appear in Secaucus (9.1 miles), followed by Kearny (6.5 miles), with arterial roadways having the larger share in both. The highest mileage within each functional classification category is highlighted in the following table.

Table 50: Final HIN Miles by Roadway Category and Municipality

Municipality	Total Miles	High-Injury Network (HIN)			
		Collectors & Local Roads	Arterials	Freeways/Expressways	HIN Miles*
Carlstadt	14	1.1	2.3	0	3.4
East Rutherford	14	0	1.2	2.1	3.3
Jersey City	11	0.9	2	0	2.9
Kearny	11	0.6	6	0	6.5
Little Ferry	5	0	0.1	0	0.1
Lyndhurst	7	1.2	0.8	0	2.0
Moonachie	10	1.1	0.1	0	1.2
North Bergen	11	2.2	0.6	0.9	3.6
Ridgefield	3	0	0.8	0	0.8

Municipality	Total Miles	High-Injury Network (HIN)			
		Collectors & Local Roads	Arterials	Freeways/ Expressways	HIN Miles*
Rutherford	7	0	0.8	0.9	1.7
Secaucus	51	2.2	4.8	2.1	9.1
South Hackensack	1	0.6	0	0	0.6
Teterboro	3	0	0.9	0	0.9
Grand Total	148	9.8	20.4	6.0	36.2
*HIN segments sharing a boundary with two municipalities were counted in both municipalities; because of this, the Grand Total of miles differs between Table 49 and Table 50. Municipal borders showing which roads are included in two municipalities are shown in Figure 39. These include: • NJ 120 in Carlstadt and East Rutherford • Secaucus Road (CR 678) in Jersey City and North Bergen • NJ 17 in Lyndhurst and Rutherford • Empire Boulevard in Moonachie and South Hackensack					



6.4.2 Comparison to Hudson County HIN

The Meadowlands District HIN was compared to Hudson County's HIN to determine alignment and overlap. The Hudson County HIN was developed as part of a concurrent Vision Zero effort and was mainly focused on County roads. The Hudson County HIN is shown in green on the following map (Figure 40). Overlapping roadway segments include portions of:

- NJ 7 in Kearny
- Harrison Avenue/Newark-Jersey City Turnpike/CR 508 in Kearny
- NJ 495 in North Bergen
- 69th Street in North Bergen
- Paterson Plank Road/CR 681 in Secaucus/North Bergen
- County Avenue/CR 653 in Secaucus

Roadway segments shown in both HINs could potentially be prioritized for improvements due to corroborating analyses and overlapping needs as identified in MAP4S and Hudson County Vision Zero.



6.4.3 HIN Corridors within Disadvantaged Communities

By overlaying HIN corridors over disadvantage census tract area, the following HIN corridors are identified by their HIN ranking and EPI scores within or on the boundary of the District. MAP4S safety and policy recommendations should have a particular focus on the following corridors in keeping with FHWA's Justice40 policy (required at the time of performing this analysis) to "deliver 40 percent of the overall benefits of relevant Federal investments in climate and sustainable transportation to disadvantaged communities."²⁵

- **Within the District:**
 - Moonachie (CT 362)
 - No applicable HIN segments
 - North Bergen (CT 148.02)
 - NJ 495 / HIN Freeway/Expressway Corridor Rank #4 / EPI = 116.4
 - Secaucus Road/CR 678 / HIN Arterial Corridor Rank #9 / EPI = 65.2
 - West Side Avenue / HIN Collector/Local Corridor Rank #6 / EPI = 29.6
 - South Hackensack (CT 362)
 - No applicable HIN segments
- **Adjacent to the District:**
 - Jersey City (CT 9.02 and 17.01)
 - US 1 Truck / HIN Arterial Corridor Rank #2 / EPI = 143.2
 - NJ 7 / HIN Arterial Corridor Rank #8 / EPI = 71
 - Ramp from US 1 Truck EB to NJ 7 NB / HIN Collector/Local Corridor Rank #1 / EPI = 57.2
 - St. Paul's Avenue / HIN Collector/Local Corridor Rank #8 / EPI = 26.5
 - Kearny (CT 128)
 - CR 508 / HIN Arterial Corridor Rank #4 / EPI = 104.5
 - Bergen Avenue / HIN Collector/Local Corridor Rank #4 / EPI = 43.2
 - North Bergen (CT 148.01)
 - See previous HIN segments for CT 148.02

6.4.4 Location Prioritization

The 35 identified HIN segments were prioritized to determine the segments with the greatest need for safety improvements based on crash history, risk, community makeup, and public input received (more below on the four prioritization criteria). Ranking the segments also helps to guide implementation priority to align future funding – whether from SS4A implementation grants or other sources – with projects that can most effectively address safety and support the MAP4S objective of achieving zero traffic-related fatalities and serious injuries by 2040.

Prioritization Methodology

Four key criteria were identified for ranking or prioritizing the 35 identified HIN segment locations. Details on each criterion and how they were used for location prioritization are summarized below. The scoring approach differentiated roadway segments based on values for each criterion and weighted the four categories to determine locations with higher need for safety improvements based on crash history, risk, community makeup, and public input received.

1. **EPI scores** for the 35 HIN roadway segments
 - **Purpose:** This criterion reflects segment crash history based on crash severity.

²⁵ <https://highways.dot.gov/safety/zero-deaths/implement-safety-improvements-equitably>

- **Scoring Weight:** The highest weighting percentage – **35 percent** – was applied to EPI scores since they are the primary quantitative metric used to evaluate and measure safety on roadways within the Meadowlands District based on crash history.
 - **Scoring Methodology:** Points were scaled so that the segment with the highest EPI segment score of 440.3 points received this category’s full 35 points. For example, if a segment had an EPI of 80.1, the segment received 6.4 prioritization points, which is equal to 80.1 multiplied by (35/440.3).
2. **Presence of high-risk roadway features** identified through the systemic analysis of crashes, focused on features with a risk factor value of 2.0 or greater
- **Purpose:** This criterion assesses the need for roadway safety improvements based on the presence of high-risk roadway features that could contribute to crashes.
 - **Weight:** A weighting percentage of **25 percent** was applied to high-risk roadway features. A lower weighting percentage was given than EPI scores because roadways with high-risk features may not have similar crash histories as roadways with documented crash history based on higher EPI scores.
 - **Scoring Methodology:** Points were based on the total risk factor of each “majorly” overrepresented high-risk feature present at each roadway segment. Points were scaled down from a theoretical maximum risk score of 14.86, which no segment received. For example, the highest actual calculated risk score of 12.2 received 20.5 points in this category, which is equal to 12.2 multiplied by (25/14.86).
3. **Demographic data** based on findings using the NJTPA Demographic Analysis Tool, which rates 11 equity metrics for each census tract
- **Purpose:** This criterion supports project prioritization by identifying locations or communities that have historically been underrepresented related to infrastructure investment or have experienced negative impacts related to infrastructure projects due to congestion, noise, air quality, or other externalities.
 - **Weight:** **25 percent** was assigned to Demographic data so that decision-making equitably reflects the needs of the underserved communities.
 - **Scoring Methodology:** Points were based on the total possible demographic composite score based on NJTPA Demographic Analysis Tool. Points were scaled down from a theoretical maximum composite score of 44 which no segment received. For example, the highest composite score of 26 received 14.8 points in this category, which is equal to 26 multiplied by (25/44).
4. **Public input data** gathered through the project’s public engagement program
- **Purpose:** This criterion reflects community feedback from the public and project stakeholders on expressed needs for roadway safety improvements at specific locations throughout the Meadowlands District.
 - **Weight:** **15 percent** was assigned to Public Input to consider feedback received from the public about roadway safety. However, this criterion received the lowest weight to account for potential biases associated with individuals who may have placed many map pins in the online map (skewing the data) or possible user errors in placing pins in wrong locations.
 - **Scoring Methodology:** Points were assigned based on the type of safety concern identified, with a maximum of 27 possible points scaled down to the category maximum of 15 points. For example, if a location had an input score of 11.7, it received 6.5 points in this category, which is equal to 11.7 multiplied by (15/27).

The final scores of each HIN segment based on the location prioritization methodology are listed in Table 51. While the theoretical maximum score a location could receive was 100 points, actual scores ranged from a high of 78.75 to a low of 11.41. Generally, roadway segments with higher scores represent state facilities, while most of the lower-scoring segments represent collectors and local roads under county or municipal jurisdiction.

For a more detailed description of the location prioritization methodology, refer to Appendix A.

Table 51: Prioritized Ranking of Corridors

Corridor Ranking	Road Name	MP Start	MP End	Municipality	EPI Score	Roadway Risk Factors	Demographics Score	Public Input Score	Weighted Segment Prioritization Score
1	NJ 3	6.00	7.00	Rutherford	35.0	20.5	12.5	10.6	78.75
2	NJ 3	7.90	8.90	East Rutherford	32.9	18.8	12.5	7.8	69.94
3	NJ 3	9.10	10.10	Secaucus	24.9	18.8	13.4	11.7	67.66
4	HUDSON COUNTY 681	3.80	4.80	North Bergen	8.3	17.2	12.5	11.7	51.03
5	NJ 120	0.00	1.00	East Rutherford	15.4	8.2	12.7	13.3	49.40
6	ROUTE 508	13.80	14.80	Kearny	8.3	13.9	13.1	11.7	47.21
7	US 46	68.20	69.10	Teterboro	3.6	18.9	11.9	8.9	40.98
8	NJ 17	3.20	4.20	Rutherford	5.6	20.3	12.5	4.4	40.00
9	NJ 7	2.80	3.80	Kearny	4.4	18.9	12.5	6.1	39.32
10	MEADOWLANDS PKWY	0.00	1.00	Secaucus	9.0	14.3	11.1	5.0	37.61
11	NJ 7	1.70	2.70	Kearny	9.3	13.9	13.4	1.7	37.05
12	NJ 7	0.00	1.00	Kearny	6.4	9.5	13.1	8.9	36.89
13	WESTSIDE AVE	0.00	1.00	North Bergen	3.1	14.0	9.7	10.6	36.66
14	NJ 120	1.30	2.30	Carlstadt	8.0	14.3	12.2	2.8	35.73
15	BERGEN AVE	1.00	1.57	Kearny	4.4	8.2	12.5	11.7	34.78
16	ROUTE 508	15.00	16.00	Kearny	3.9	8.1	13.6	10.6	34.08
17	NJ 495	0.00	0.90	Secaucus	3.3	17.2	12.5	2.8	33.62
18	HUDSON COUNTY 678	0.80	1.74	Jersey City/North Bergen	5.2	8.2	13.4	7.2	33.35
19	MEADOWLANDS PKWY	1.10	2.10	Secaucus	3.4	3.9	13.4	11.7	33.34
20	ROUTE 503	0.60	1.60	Carlstadt	2.9	3.9	12.5	11.7	32.94
21	US 1 TRUCK	0.30	1.30	Jersey City	11.4	0.0	13.4	6.1	32.88
22	HUDSON COUNTY 653	1.20	2.20	Secaucus	5.7	3.9	12.5	6.1	28.75
23	ST PAULS AVE	0.00	0.70	Jersey City	4.4	7.6	13.9	0.0	28.33
24	FR US 1 TRUCK EB TO NJ 7 NB	0.00	0.10	Jersey City	2.1	0.0	14.4	8.9	26.68
25	WESTSIDE AVE	0.30	1.25	North Bergen	2.4	3.9	12.5	6.1	26.19
26	HUDSON COUNTY 681	5.40	6.10	Secaucus	4.5	0.0	12.5	7.2	25.48
27	VALLEY BROOK AVE	0.30	1.30	Lyndhurst	2.4	0.0	14.2	7.2	23.44
28	BERGEN COUNTY 124 I	0.00	0.80	Ridgefield	1.8	4.4	12.5	2.8	23.13
29	SECAUCUS RD	0.00	1.00	Secaucus	3.8	0.0	12.5	4.4	22.27
30	HARMON MEADOW BLVD	0.00	0.51	Secaucus	2.1	0.0	10.2	8.3	20.77
31	STATE ST	0.00	1.00	Carlstadt/South Hackensack	2.1	3.7	14.8	0.0	19.26

Corridor Ranking	Road Name	MP Start	MP End	Municipality	EPI Score	Roadway Risk Factors	Demographics Score	Public Input Score	Weighted Segment Prioritization Score
32	HUDSON COUNTY 659	0.00	0.20	Kearny	4.0	3.9	12.5	0.0	18.88
33	VETERANS BLVD	0.00	0.17	Carlstadt	1.7	4.4	9.7	0.0	15.41
34	COMMERCE BLVD	0.00	0.48	Carlstadt	2.0	0.0	9.7	2.8	14.16
35	COMMERCE BLVD	0.00	0.46	Carlstadt	1.7	0.0	9.7	0.0	11.41

6.5 Takeaways

- A systemic analysis was performed to identify the following roadway elements associated with increased risk:
 - Minor Arterial, Other Principal Arterial, and Other Freeway/Expressway functional classifications
 - Roads with three or more travel lanes
 - Road widths $\geq$ 40 feet
 - Posted speed limits $\geq$ 35 mph
 - AADT $\geq$ 10,000 Vehicles Per Day (VPD)
 - Sub-segments with at least one signalized intersection
 - Designated freight routes (roads that are part of the NJAN)
 - The presence of one or more bus stops within 50' of a sub-segment
- To perform homogenous analyses of Meadowlands District roadway types, the HIN is categorized into three groups:
 - Freeways & Expressways
 - Arterials
 - Collector & Local Roads
- Using the 99th percentile EPI scores, the HIN consists of 35 distinct roadway segments in the following functional class groups:
 - Freeways/Expressways: 5 segments
 - Arterials: 17 segments
 - Collector & Local Roads: 13 segments
- The HIN segments total approximately 29 miles of roadway or 22 percent of roadway mileage in the Meadowlands District roadway network.
 - Most HIN mileage is in Secaucus, followed (in order) by Kearny, North Bergen, and Carlstadt.
- The HIN comprises 63.5 percent of the total EPI score for all study roadways.
- The identified HIN overlaps portions of the NJTPA's Regional Active Transportation network along Harrison Avenue/CR 508, Paterson Plank Road/CR 681, and Washington Avenue/CR 503. Additionally, portions of the Hackensack Greenway along Meadowlands Parkway overlap with an identified HIN segment.
- Roughly two-thirds of roadways served by NJ TRANSIT buses appear on the District HIN. These roadway segments could benefit from safety enhancements such as lighting, marked crosswalks, or sidewalk connections and could be prioritized over peer segments due to transit presence.
- Several HIN segments pass through or intersect with census tracts identified as underserved communities through demographic analyses using existing resources such as Justice40, the NJTPA's Demographic Analysis Tool, and FHWA's STEAP. Notable HIN segments within or intersecting underserved communities include portions of:
 - US 1 Truck, NJ 7, and St. Paul's Avenue in Jersey City
 - Newark-Jersey City Turnpike/CR 508 and Bergen Avenue in Kearny
 - NJ 495, Secaucus Road/CR 678, and West Side Avenue in North Bergen

7 OUTREACH FINDINGS

MAP4S outreach efforts included a project website, an online survey and interactive map, five public events, two virtual Focus Group meetings, and seven STF meetings. To capture the needs and input from the public and stakeholders, MAP4S offered a robust outreach strategy, in which public feedback shaped project outcomes that emphasized a safer transportation network.

7.1 MAP4S Project Website

The MAP4S website served as a hub for information dissemination for the public in an accessible format. The website included project overview, a schedule of project milestones, a survey with an interactive map, and meeting presentations. All website content was translated into Spanish and Korean.

7.2 Safety Task Force (STF) Meetings

STF meetings fostered collaborative discussions between the STF and the MAP4S Project Team, focusing on identifying safety issues, discussing mitigation strategies, brainstorming solutions, and addressing other MAP4S-related topics. Meetings emphasized data presentation and feedback collection, utilizing tools like Mentimeter to structure discussions and Q&A sessions. Meeting dates and topics are summarized below:

- **Meeting #1** – March 27, 2024: Kickoff meeting to introduce MAP4S, desired outcomes, outreach activities
- **Meeting #2** – June 20, 2024: Outreach plan, preliminary data findings
- **Meeting #3** – September 25, 2024: Outreach findings, Safety Assessment Tool (SAT) introduction, High Injury Network
- **Meeting #4** – December 12, 2024: Outreach update, safety countermeasures, project ideas, policy introduction
- **Meeting #5** – February 25, 2025: Policy update, countermeasures matrix, location prioritization, SAT update and review
- **Meeting #6** – April 30, 2025: Safety projects, policy recommendations, final SAT, performance metrics
- **Meeting #7** – July 23, 2025: Review of the Plan and looking ahead/next steps, Final presentation under consultant support

7.3 Online Survey and Interactive Map

An online survey and interactive map were launched in July 2024 and made available through November 2024 to collect feedback from stakeholders and the public. 200 responses were received. The survey contained five questions aimed at understanding whether respondents live, work, or travel in the Meadowlands District, and their ideas for improving safety at specific locations in the Meadowlands District. The survey was available in English, Spanish, and Korean. For a list of the survey questions, see Appendix B.

The online survey was designed using Maptionnaire to integrate an interactive mapping tool with the survey questions. Respondents pinpointed specific locations on the map where they encountered issues, such as speeding, aggressive driving behavior, or areas for improved pedestrian or bicycling facilities. By selecting a topic of interest, participants were able to drop pins on the map to mark relevant locations. They were also able to provide detailed feedback through open-ended comments. This approach allowed for a spatial understanding of issues, giving the MAP4S Project Team valuable insights into areas with safety concerns.

Table 52 contains input summarized by safety concern. To view the map results, see Appendix B.

Table 52: Safety Concerns Reported Through Online Survey

Safety Concern	Number of Responses
Bike paths and facilities do not exist, need improvement, or are disconnected	262
Sidewalks do not exist, need improvement, or are disconnected	98

Safety Concern	Number of Responses
Aggressive driving behavior	84
Speeding	81
Difficult pedestrian crossing (no crosswalk, no pedestrian signal at intersection or mid-block, not enough signal timing)	41
No bus shelter or amenities	22
Red light or stop sign running	22
Other	20
Limited driver visibility, due to roadway alignment and/or obstructions	15
Lighting/security at night	12
Turning conflicts	10

7.4 Public Events

Five “pop-ups” at pre-planned community events were organized to provide the public with project information and solicit their feedback. The pop-ups featured a table and tent accompanied by project team members. A flyer was distributed to those interested in providing input, which contained a link and QR code to access the online survey and interactive map.

The flyer was also distributed as hard copies at high-traffic locations such as bus stops, businesses, coffee shops, corner stores, and community center bulletins. The five “pop-up” public events are summarized in Table 53.

Table 53: List of Public Events Conducted and Engagement Numbers

Event Name	Municipality	Location	Date & Time	People Engaged	Surveys Completed
Oktoberfest	South Hackensack	Veterans Park	October 20, 1:00 pm	35	25
Hispanic Parade	North Bergen	79th Street & Bergenline Avenue	October 6, 12:30 pm	-	-
Rutherford National Night Out	Rutherford	176 Park Avenue	August 20, 6:00-8:00 pm	30	15
Kearny National Night Out	Kearny	Belgrove Drive and Afton Street	August 13, 6:00-8:00 pm	60	28
Kearny Farmers Market	Kearny	2 Garfield Avenue	July 25, 2:30-5:30 pm	25	9

7.5 Focus Groups

Two Focus Group meetings were held in October 2024. These sessions fostered engagement among small, thematic groups and generated ideas for improving roadway safety and coordination across disciplines. The first Focus Group included engineers, planners, agencies, businesses, and nonprofits. The second Focus Group included schools, emergency responders, and law enforcement officers. Key topics discussed included existing safety issues, potential solutions, community-led roadway safety initiatives, and opportunities for collaboration. Focus Group questions are found in Appendix B.

7.5.1 Focus Group 1 & 2 – Takeaways

The Focus Groups discussed the following:

- **Safety and Congestion**
 - Congestion is a widespread concern, impacting local and regional roadways, particularly during peak hours. It is evident that an increase in traffic volume elevates crash risk.

- In areas such as Jersey City, unsafe conditions for walking and biking exist, with no safe routes connecting to Secaucus.
- **Workplace Accessibility**
 - Transit service is limited, particularly for employees working non-traditional hours (i.e. overnight).
- **Truck Parking**
 - Trucks are observed improperly or illegally on roadways at/near warehousing sites, especially in Jersey City, posing safety challenges by limiting mobility.
- **Curb Management**
 - Creating dedicated zones for rideshare and deliveries could also enhance safety, while parking cash-out incentives could decrease congestion and free up land for other developments, if less parking was required.
- **Encouragement and Engagement**
 - Strengthening community partnerships through advocacy, frequent communication, and engagement with residents is important for advancing safety initiatives like Vision Zero.
 - Educating the public about safety concepts, such as road diets, through simple materials can build community support and empower advocacy.
- **Housing**
 - Participants proposed policies to improve housing accessibility and separate residential from industrial zones through better planning and zoning.
- **Safe Access to Schools**
 - Drivers are observed consistently speeding at/near school crossings.
 - Participants emphasized there is a significant reliance on crossing guards who are only stationed at specific intersections at specific times. However, students utilize school facilities beyond these times.
 - Designated drop-off zones were suggested to reduce congestion and conflict at/near schools.
- **Micromobility**
 - E-scooter and E-moped drivers fail to adhere to traffic laws. Their use, particularly on sidewalks, can conflict with pedestrians, compounded by a lack of enforcement and confusion surrounding laws and regulations.
 - Implementing Complete Streets could alleviate these conflicts by providing designated spaces for various roadway users.
- **Complete Streets**
 - Participants emphasized the need to focus on enhancing accessibility and safety for walking, biking, and public transit use.
 - Road Diets were discussed as a solution to reducing fatal crashes.
- **Enforcement**
 - Initiatives like pedestrian decoy enforcement (“Cops in the Crosswalk”) and “Click It or Ticket” programs have proven effectiveness, but the lack of continuous enforcement creates opportunities for unsafe conditions to persist.
 - Narrower travel lanes and bike lanes along with other engineering solutions were suggested, since enforcement is not a sustainable, long-term solution.
 - Speed cameras, automated enforcement, and reduced speed limits were discussed to reduce crashes and fatalities.
- **Emergency Responders**
 - Police escorts for emergency responses can be dangerous in residential settings. Instead, step-by-step directions, provided directly to emergency vehicle operators, could improve emergency response times, prioritizing clear information over automation.
 - Suggestions for better communication between hospitals and emergency services for quicker responses.

7.6 Mayors Survey

The NJSEA MAP4S Safety Survey for Mayors was administered to efficiently capture essential insights on roadway safety from municipal leaders. Recognizing that mayors often have demanding schedules that make participating in a focus group challenging, a survey format was chosen to allow for quick, concise responses while still collecting valuable data. It was assumed that, due to their high-level responsibilities, mayors might not be immersed in the day-to-day details of roadway safety issues. The survey approach enabled the collection of their perspectives on policy priorities, coordination mechanisms, and the effectiveness of current safety initiatives so that partial responses contribute meaningfully to a broader understanding of public safety challenges. See Appendix B for the full survey.

The mayors that responded were from the following municipalities: North Arlington, Little Ferry, Secaucus, Kearny, Rutherford, and Ridgefield, plus one incomplete submission. Below is a brief summary of the results:

- All respondents agreed that roadway safety is “very important.”
- Funding shortages and coordination challenges with higher-level agencies were reported to be common obstacles.
- Feedback on measures like speed bumps and bike lanes ranged from positive to mixed.
- Some mayors stated that they successfully introduced traffic calming, sidewalk and crosswalk improvements, speed-limit reductions, and targeted enforcement in their municipalities.
- Speeding and unsafe driving remain the most pressing concerns, prompting ongoing efforts to strengthen roadway safety for all.

7.7 Takeaways

Planning for Complete Streets

The District’s roadway network is predominantly car centric. Adding bike facilities, installing sidewalks, improving lighting, upgrading bus stops, and other improvements to increase active transportation mobility and safety should be part of a broader strategy to rethink how people move through and experience the Meadowlands.

Fragmented Bike Infrastructure

The absence of continuously protected bike facilities prevents those who need to or choose to cycle from accessing transit hubs like Secaucus Junction or key destinations such as MetLife Stadium and American Dream. Repurposing former rail corridors for trails to improve the bike network was suggested.

Pedestrian Safety

Long or missing crossings, malfunctioning or lacking pedestrian signal heads, and poor intersection lighting put pedestrians at risk, especially near schools. Adding crosswalks and pedestrian signal heads are critical to prioritizing pedestrian mobility and safer environments.

Sidewalk gaps, particularly along major thoroughfares like NJ 120, US 46, Bellville Turnpike/NJ 7, and West Side Avenue present significant safety risks but also point to a larger issue: the imbalance in infrastructure prioritization. The lack of safe and convenient pedestrian access to major destinations limits pedestrian mobility and reinforces car reliance. Fixing these gaps involves fundamentally rethinking how pedestrians are factored into transportation planning and design.

Public Transit Access, Service and Amenities

Lack of shelters, seating, sidewalk connections, and snow removal at bus stops may discourage the use of public transit. While stop improvements are needed, a broader challenge is improving service coverage and frequency.

Aggressive Driving and Speeding

Tailgating and speeding along major roadways highlight issues associated with road design that prioritizes vehicle speed and throughput over safety. Suggested fixes like traffic calming (traffic circle, speed humps, narrower lanes, etc.) and stricter enforcement may result in shorter-term solutions. In the long term, redesigning roads to accommodate multiple modes, promoting safer speeds, and limiting aggressive driving are crucial. Safety education campaigns are key in fostering a culture of responsible driving and pedestrian awareness, complementing enforcement and infrastructure changes.

Community-Led Initiatives

Community engagement is key to advancing safety initiatives like Vision Zero, but long-term, consistent involvement is essential. Building trust through transparency and continuous dialogue between planners, officials, public and private sectors, and residents will be critical for success.

8 TREND ANALYSIS AND PATTERN IDENTIFICATION

The work summarized in this chapter analyzed crash data to define an HIN and extract roadway features contributing to crashes. If unaddressed, these roadway risk factors will continue contributing to crashes and the perpetuation of a District High-Injury Network in the future. This section summarizes key findings and trends in the following areas:

- Crashes
- Risk Factors
- High-Injury Network
- Equity
- Community Input

8.1 Crashes

An analysis of the District's crash history guided the creation of the HIN and HRN. Key crash types within the District include:

- **Pedestrian crashes** comprised 0.8 percent of all crashes in the District but 22.9 percent of FSI crashes.
- **Same Direction–Rear End crashes** comprised 33.0 percent of all crashes in the District but 22.9 percent of FSI crashes.
- **Fixed Object crashes** comprised 12.3 percent of all crashes in the District but 19.8 percent of FSI crashes.
- **Opposite Direction–Head On crashes** comprised 1.3 percent of all crashes in the District but 10.4 percent of FSI crashes.

Further, the following crash types vary significantly when compared to statewide averages:

- **Sideswipe crashes** in the District comprise nearly double the statewide percentage (29.7 percent vs 15.4 percent). This difference could be attributable to the notable presence of highway ramps and multilane roads within the Meadowlands District.
- **Right Angle crashes** comprise 7.0 percent of crashes in the District compared to 13.9 percent of crashes statewide. The drop-off in Right Angle crashes could result from a relatively low density of intersections within the Meadowlands, where Right Angle crashes typically occur.
- **Struck Parked Vehicle crashes** comprise 6.7 percent of crashes within the District compared to 11.3 percent of crashes statewide. This difference could be attributable to the character of the roadway network in the Meadowlands, which features many roads where street parking is not available and/or prohibited.

The differences in the frequency of these key crash types between the Meadowlands District and New Jersey point to the unique makeup of the Meadowlands' roadway network and land uses. The roadway network within the District skews towards larger roads that facilitate the movement of goods to accommodate, in part, regional travel and goods movement.

Crash types occurring within the HIN differ from those occurring within the overall study network.

Table 54 highlights crashes resulting in injuries (all injuries) or fatalities (I&F) that occurred on roads identified in HIN. These are the crashes that factor into and produce the greatest EPI scores within the District. Moving forward, safety improvements should focus on reducing and eventually eliminating these crashes by introducing safety countermeasures.

Table 54: Top Five Injury & Fatal Crash Types within the HIN

Top Five Injury & Fatal Crash Types	Collector & Local HIN I&F Crashes		Arterial HIN I&F Crashes		Freeway/Expressway HIN I&F Crashes		Total Injury & Fatal Crashes in HIN
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
Rear End	150	45.5%	412	42.9%	597	58.1%	1159
Side Swipe	31	9.4%	141	14.7%	241	23.5%	413
Fixed Object	27	8.2%	95	9.9%	154	15.0%	276
Right Angle	56	17.0%	110	11.4%	17	1.7%	183
Head-On	18	5.5%	45	4.7%	8	0.8%	71
Total Crashes in HIN*	330	-	961	-	1027	-	2318

*Note: The bottom row is a sum of all Fatal & Injury (all classifications from severe to minor) crashes that occurred within each HIN group.

8.2 Risk Factors

Risk factors within the District roadway network were identified as part of the systemic analysis (Section 6.3) by examining roadway features present within the Top 25 road segments with the highest overall EPI score (i.e., HRN) and comparing the prevalence of those features to the rest of the study network. Features overrepresented within HRN are associated with increased risk.

Table 55 displays the presence of these risk factors within the HIN, the HRN, and the full District study network.

8.3 High-Injury Network

The HIN network consists of 35 distinct roadway segments of approximately 29 miles, representing 22 percent of the entire road network of the District. These 35 segments account for 64 percent of the total EPI score for all study area roadways.

Roadway Characteristics: Arterial roadways are the most common roadway functional classification of the HIN and account for 56 percent of the District's pedestrian crash fatalities (the most lethal crash type). Roughly 24 percent of HIN segments have operating speeds of 35-45 mph, while 11 percent exceed 45 mph. Nearly half of HIN segments are along the New Jersey Access Network, where trucks are permitted.

Table 55: Risk Factors within the HIN, the HRN, and the Study Network

Risk Factor	Percentage of High-Injury Network	Percentage of High-Risk Network	Percentage of Study Network
Functional Classification: Minor Arterial	26.9%	32.9%	14.4%
Functional Classification: Other Principal Arterial	26.6%	30.7%	11.0%
Functional Classification: Other Freeway/Expressway	16.5%	21.5%	8.2%
Number of Lanes: Three or More Lanes	57.2%	57.9%	23.1%
Road Width: Greater Than or Equal to 40'	51.2%	54.8%	22.5%
Speed Limit: Greater Than or Equal to 35 mph	59.6%	63.6%	25.6%
Road Volume: Greater Than 10,000 Vehicle Per Day	69.0%	79.4%	33.2%
Signalized Intersections: Presence of One or More Signals	17.5%	18.0%	9.1%

Risk Factor	Percentage of High-Injury Network	Percentage of High-Risk Network	Percentage of Study Network
Freight Routes: Part of NJ Access Network	47.8%	57.9%	18.5%
Transit Presence: One or More Bus Stops within 50'	23.9%	24.6%	14.1%

Table 55 shows that the presence of risk factors within the HIN generally mirrors the HRN; roadway elements that were overrepresented in the HRN are also overrepresented in the HIN when compared to the entire study network. This result is logical, given that approximately 75 percent of HIN roadway miles are also included in the HRN. Overall, the presence of roadway features associated with increased risk remains a strong indicator of safety issues at a given location, providing a powerful tool for comparing and prioritizing locations within the network for safety upgrades.

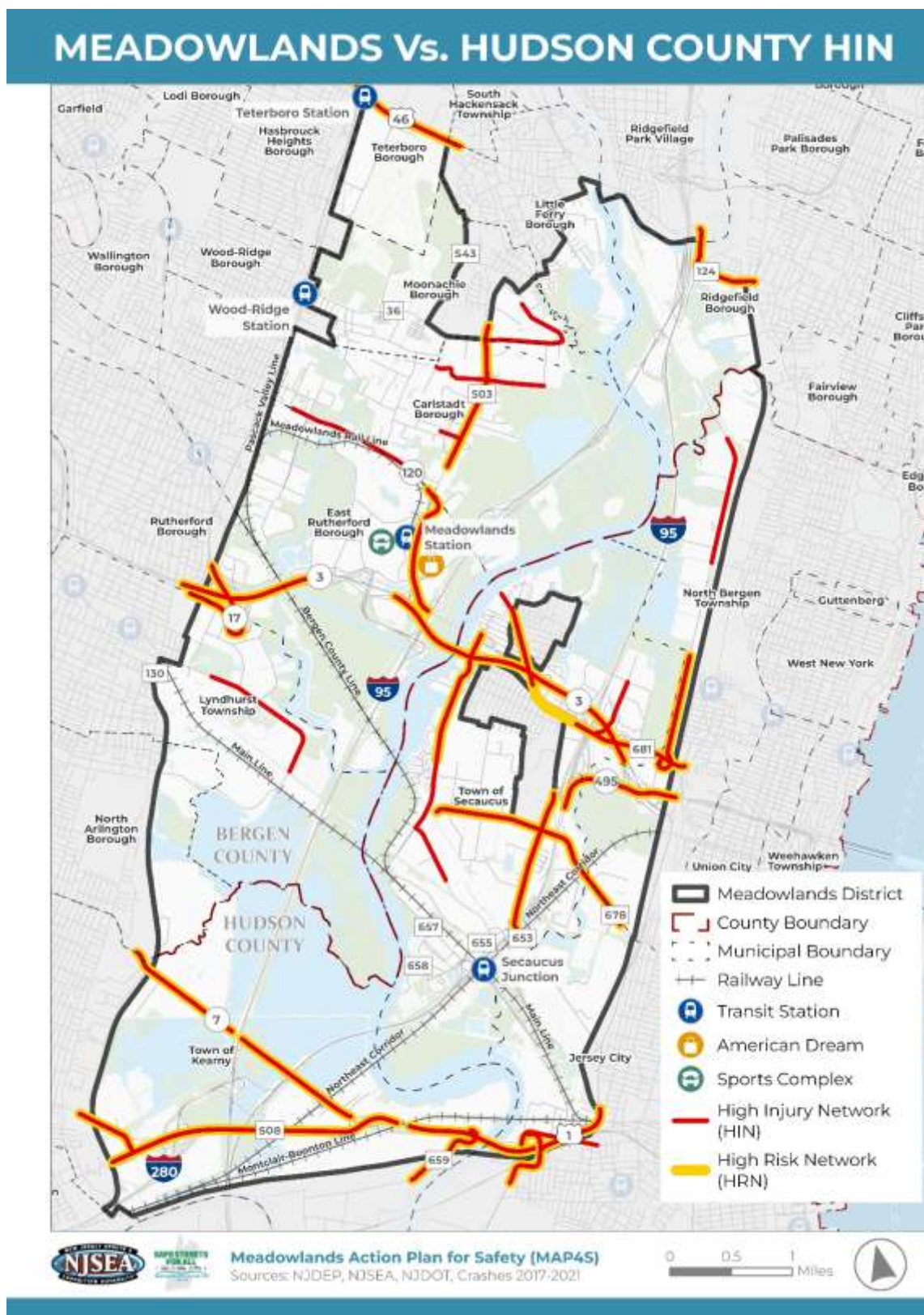


Figure 41: Meadowlands District High Risk and High Injury Networks

8.4 Equity

Based on the demographic analysis for the District, 48 percent of HIN segments fall within census tracts with demographic composite scores higher than the average scores for the entire District. These are considered underserved communities that have traditionally experienced disproportionate roadway safety impacts.

8.5 Community Input

Geolocated map responses aligned with HIN segments were compared to responses not on HIN segments. As shown in Table 56, responses such as “Lack of Bike Paths and Facilities” and “Lack of Sidewalks” differ depending on whether they are located along the HIN. Notable differences are highlighted in the table. There were more responses to “Lack of Bike Paths and Facilities” on segments not along the HIN, while “Lack of Sidewalks” had more responses along the HIN. All other categories have similar percentages of responses, whether they are on the HIN or not.

Table 56: Percentage of Survey Responses Along and Not Along the HIN by Response Category

Survey Response	Along HIN	Not along HIN
Aggressive Driver Behavior	10.3%	12.7%
Lack of Bike Paths and Facilities	41.2%	46.0%
Difficult Pedestrian Crossing	5.4%	4.4%
Lighting/Security at Night	2.0%	1.9%
Limited Driver Visibility	1.0%	1.3%
No Bus Shelter or Amenities	3.4%	3.2%
Other	2.5%	3.2%
Red Light/Stop Sign Running	1.0%	2.9%
Lack of Sidewalks	23.0%	13.0%
Speeding	9.8%	10.5%
Turning Conflicts	0.5%	1.0%

Table 57: Percentage of Survey Responses Along HIN Roadways

HIN Roadways	
Meadowlands Pkwy	24%
West Side Ave	16%
NJ 3	10%
Hudson County 653	9%
NJ 7	7%
NJ 120	5%
Harmon Meadow Blvd	4%
Hudson County 678	4%
Hudson County 681	4%
Valley Brook Ave	4%
Bergen Ave	3%
Route 508	3%
US 46	2%
NJ 495	1%

HIN Roadways	
Route 503	1%
St Pauls Ave	1%
NJ 17	0%
US 1 Truck	0%

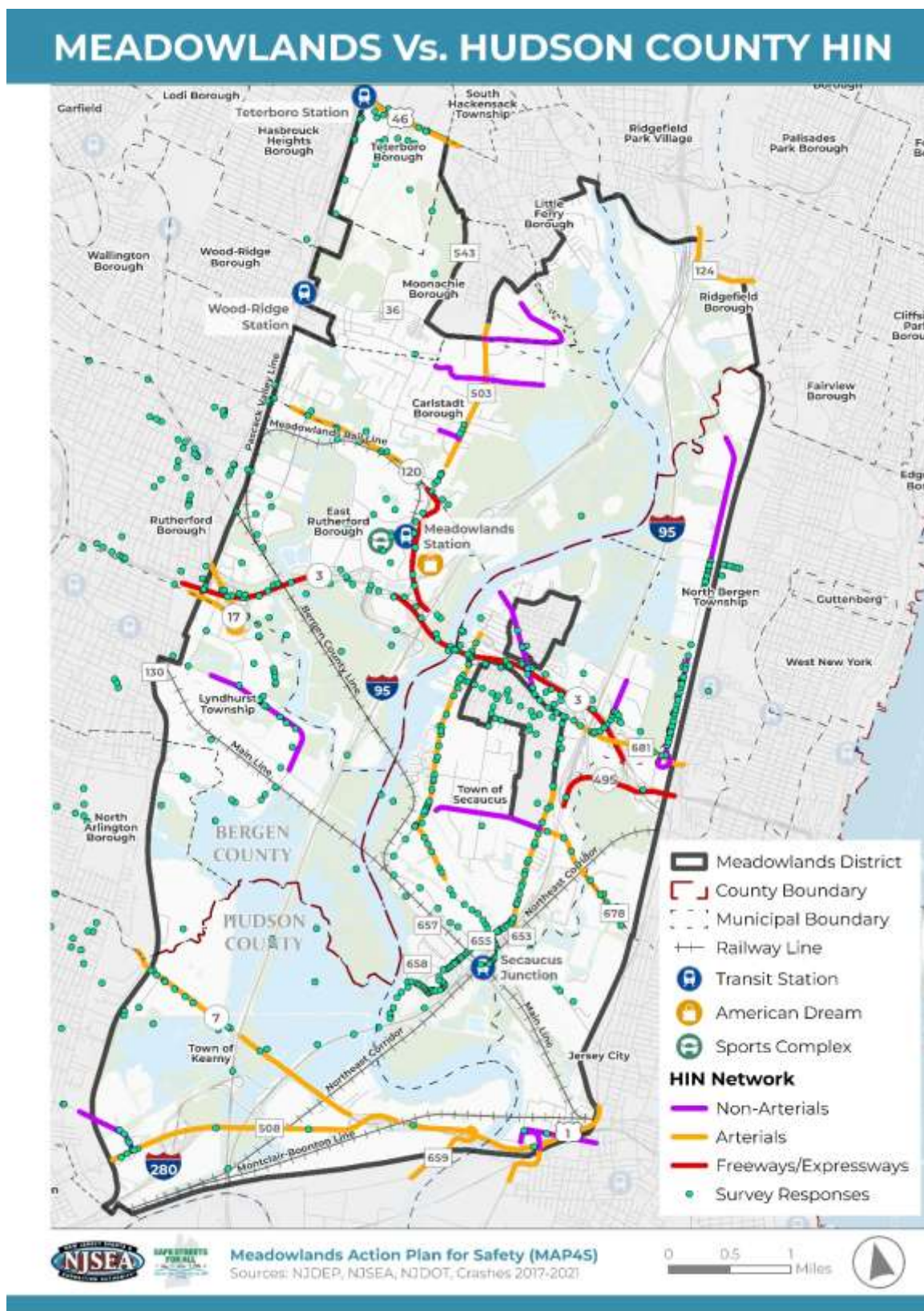


Figure 42: Meadowlands District HIN Network with Survey Responses Overlaid

9 ACTION FRAMEWORK

MAP4S aims to create a comprehensive safety framework to enhance multimodal roadway safety, focusing on underserved communities and vulnerable road users. This framework involves the development of targeted strategies encompassing the five “Es” of roadway safety:

1. **Engineering:** Designing and implementing physical infrastructure improvements to enhance safety, such as crosswalks, sidewalks, bike lanes, and traffic signal upgrades.
2. **Enforcement:** Ensuring compliance with traffic laws through law enforcement activities meant to reduce unsafe behaviors like speeding and running red lights.
3. **Education:** Teaching the community about safe travel practices, such as pedestrian and bicycle safety, and promoting and encouraging safe travel behaviors through targeted events and programs.
4. **Emergency Response:** Preparing for and responding to emergencies to minimize harm and support swift recovery. This includes developing emergency plans, coordinating with emergency services, and improving communication and response times.
5. **Equity:** Promoting safety measures and resources that are distributed fairly and address the needs of all community members, especially underserved populations. This involves identifying and addressing disparities in transportation safety and access and limiting safety impacts to vulnerable groups such as people with disabilities, children or seniors.

These five elements should be used together to create a comprehensive and inclusive approach to roadway safety.

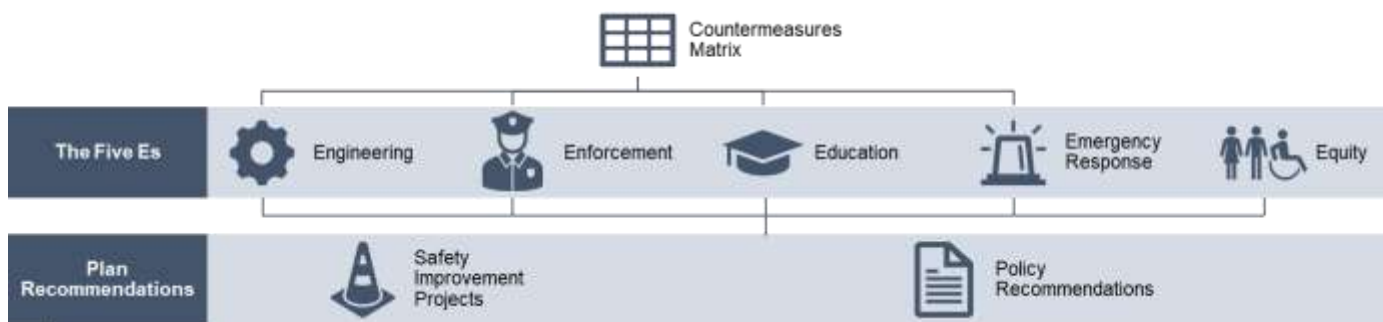


Figure 43: The Action Plan Framework of Five Es

The **Engineering** element comprises physical infrastructure and design improvements that define the **Safety Improvement Projects** suggested for the prioritized roadways segments of the HIN. For Engineering recommendations, see section 9.2.

The remaining Es – **Enforcement, Education, Emergency Response, and Equity** – are intangible programs and strategies covered as policy items. For **Policy Recommendations**, see Section 0.

9.1 Countermeasures Matrix

A “toolbox” of safety countermeasures relevant to the Meadowlands District was produced to guide development of MAP4S strategies and serve as a reference and clearinghouse for future safety recommendations beyond MAP4S adoption. Countermeasures were documented in a matrix (found in Appendix C) and include strategies representing four of the five Es of safety: Engineering, Enforcement, Education, and Emergency Response. This toolbox, which is incorporated into the Safety Assessment Tool- SAT (See Section 10.3) provides a comprehensive list of safety countermeasures from an array of five Es designed to not only address various

crash types, and mitigate crash severity, but also furnish tactical approaches to improve roadway safety within the Meadowlands District.

The matrix draws on proven safety countermeasures, bicycle and pedestrian design guides, and other resources to leverage safety best practices and establish a wide range of treatments for consideration when planning roadway safety in the future. The countermeasures matrix includes:

- A brief description of all countermeasures included
- Crash reduction factors (CRFs) for applicable crash types (with sources)
- FSI crash reduction potential
- High-level unit cost estimates
- Various contextual considerations to guide selection including applicability to different crash types, relevance to key community input themes identified through MAP4S, and considerations related to heavy vehicle movements, which is particularly important given the prevalence of warehousing in the Meadowlands District

Countermeasures included in the matrix can be used alone or together to respond to need and advance safety in a meaningful manner.

9.2 Safety Improvement Projects

Safety improvements were developed for the prioritized locations of all roadway segments included in the HIN to reduce crashes and improve safety. The methodology for developing applicable, context-sensitive safety improvements (displayed in Figure 44) included:

- evaluation of the results of the crash analysis, paying particular attention to the most serious and frequent types of crashes at each HIN location
- selection of appropriate countermeasures from the countermeasures matrix, based, in part, on their ability to mitigate crash severity, or reduce location-specific crashes
- review of previous studies and their recommendations for specific locations, such as the Meadowlands District Transportation Plan (MDTP) 2045, were conducted to inform, complement, and refine current recommendations. MDTP recommendations along HIN roadways were included in the safety improvement projects, where appropriate.
- desktop-level review of existing roadways conditions, utilizing aerial and street view imagery from Google. Roadway characteristics and constraints, such as number of lanes, roadway width, presence of pedestrian and bicycle facilities, presence of bus stops and accessibility, presence of Americans with Disabilities Act (ADA) compliant infrastructure, presence of lighting, and presence of Manual of Uniform Traffic Control Devices (MUTCD) compliant signals at intersections, helped to further inform countermeasures selection.



Figure 44: Process for developing Safety Improvement Projects for HIN Segments

Safety improvements were considered and identified for all 35 HIN locations. However, since both NJDOT and the New Jersey Turnpike Authority (NJTA) have established processes for evaluating and addressing safety, projects on HIN segments under NJDOT or NJTA jurisdiction are not presented as part of MAP4S. Therefore, Table 58 provides a summary of the 22 remaining suggested safety improvements developed for **county or municipal roadways** within the Meadowlands District. This list is **categorized first by roadway jurisdiction and ordered by their prioritization ranking**. For each project, cost estimates are provided in 2025 dollars. The costs include soft costs for engineering and design.

Table 58: Proposed Safety Improvement Projects for County and Municipal HIN Segments

Corridor Rank	Road Name	SRI	MP Start	MP End	Jurisdiction	Municipality	FSI Crashes	VRU Crashes	Safety Improvement Projects	Project Cost Estimates
20	Route 503 Washington Avenue (Capelli Sports Center to Moonachie Road)	00000503__	0.6	1.6	Bergen County	Carlstadt	3	2	Install high-friction surface treatment throughout corridor.	\$3,000,000
									Upgrade traffic signals throughout corridor to be MUTCD compliant (12" lenses) and include back plates with retroreflective borders. Upgrade to steel poles/mast arms to accommodate back-plates.	
									Install raised pavement markers throughout corridor.	
									Consider access management techniques to reduce access points near Kero Road.	
									Consider implementing Red Light Running Prediction/Dynamic All-Red Extension.	
28	Bergen County 124 I Hendricks Causeway (I-95 to Broad Avenue)	020001241__	0	0.7	Bergen County	Ridgefield	2	1	Install high-friction surface treatment throughout corridor.	\$1,500,000
									Install edge line striping to reinforce that there is only one lane per direction, or stripe a left turn lane at intersections.	
									Consider parking restrictions within 20-25 feet of intersections (Daylighting) on the minor road approaches from Victoria Terrace to Church Street, to improve sight lines.	
									Evaluate feasibility of reconfiguring Hendricks Causeway intersections with Edgewater Avenue W and Victoria Terrace to include roundabouts or traffic circles to slow turning movements.	
	Hudson County 681 Paterson Plank Road (Route 9 to Cedar lane)	09000681__	3.8	4.8	Hudson County	North Bergen & Secaucus	3	7	As an alternative to roundabouts, investigate traffic signals, Pedestrian Hybrid Beacons (PHBs), or Rectangular Rapid-Flashing Beacons (RRFBs) for pedestrian crossings at Edgewater Avenue W and Victoria Terrace intersections. Add high-visibility crosswalks and sidewalk connections. Install sequential dynamic curve warning system.	-
									Corridor currently in design phase as part of the NJTPA Local Safety Engineering Assistance Program (LSEAP)	
6	Route 508 Newark-Jersey City Turnpike (Walmart Driveway to NJ Turnpike Eastern Spur)	00000508__	13.8	14.8	Hudson County	Kearny	3	1	Investigate extending median barrier from MP 14.48 to 14.8.	\$950,000
									Investigate adding roadside design improvements from MP 14.48 to MP 14.8 such as widened shoulder and flattened side slopes.	
									Investigate installing raised pavement markers throughout corridor.	
									Investigate installing rumble strips on shoulders.	
									Investigate installing wider edge lines.	
	Route 508 Newark-Jersey City Turnpike (G&S Tech Driveway to Montclair-Boonton Rail Line)	00000508__	15	16	Hudson County	Kearny	1	0	Investigate installing speed feedback signs along the corridor.	\$4,300,000
									Investigate and install median barrier or centerline rumble strips throughout corridor.	
									Improve lighting throughout corridor.	
									Investigate and install new/upgraded sidewalks and pedestrian crossings between MASSTR signals at USPS Driveway (#801) and Freeman Driveway (#802).	
									Install sidewalks throughout corridor.	
									Upgrade traffic signals throughout corridor to be MUTCD compliant (12" lenses) and include back-plates with retroreflective borders. Upgrade to steel poles/mast arms to accommodate back-plates.	
									Install speed feedback signs along the corridor.	

18	Hudson County 678 Secaucus Road (Grand Street to County Avenue)	09000678__	0.8	1.74	Hudson County	North Bergen & Secaucus	3	1	Evaluate the feasibility of a four-to-three-lane road diet to accommodate one travel lane in each direction with a center turning lane.	\$2,700,000
									Evaluate the installation of buffered cycle track on the northbound side of the road in conjunction with road diet.	
									If four lanes are maintained, install centerline rumble strips with raised pavement markings.	
									Provide shelters at bus stops along the corridor where missing.	
									Upgrade traffic signals throughout corridor to be MUTCD compliant (12" lenses) and include back plates with retroreflective borders. Upgrade to steel poles/mast arms to accommodate back-plates.	
Install speed feedback signs along the corridor.										
22	Hudson County 653 County Avenue (County Road to UPS Drive)	09000653__	1.2	2.2	Hudson County	Secaucus	1	10	Evaluate the feasibility of a four-to-three-lane road diet between Jefferson Avenue and Paterson Plank Road to accommodate one travel lane in each direction with a center turn lane. Prohibit on-street parking where currently allowed as part of lane reconfiguration.	\$1,600,000
									Provide shelters at bus stops along the corridor where missing.	
									Upgrade traffic signals throughout corridor to be MUTCD compliant and include back plates with retroreflective borders. Upgrade to steel poles/mast arms to accommodate back plates.	
									Evaluate the feasibility of installing buffered or protected bicycle lanes throughout the corridor.	
									Install speed feedback signs along the corridor.	
26	Hudson County 681 Paterson Plank Road (1st Street to Secaucus Greenway)	09000681__	5.4	6.0	Hudson County	Secaucus	0	5	Several safety improvements completed recently including but not limited to high-visibility crosswalks, edge lines, transverse rumble strips, speed limit markings, and parking restrictions at/near intersections and crosswalks.	\$1,700,000
									Upgrade traffic signals throughout corridor to be MUTCD compliant (12" lenses) and include back plates with retroreflective borders. Upgrade to steel poles/mast arms to accommodate back plates.	
									In concurrence with municipality, consider reducing posted speed limit to 20 mph.	
									Install concrete curb extensions to narrow numerous cross streets at existing pedestrian crossing locations.	
									Install speed feedback signs along the corridor.	
32	Hudson County 659 Fish House Road (Route 508 to Pennsylvania Avenue)	09000659__	0	0.2	Hudson County	Kearny	1	5	Corridor recently reconstructed as part of Wittpenn Bridge replacement.	-
10	Meadowlands Parkway (Riverside Court to AVNA Testing Center Driveway)	09091091__	0	1	Municipal	Secaucus	1	3	Stripe high-visibility crosswalks and install curb ramps across all legs of the Riverside Court intersection, including a crosswalk with RRFBs across the Route 3 westbound slip lane. Consider reducing slip lane approach to one right turn lane or eliminating slip lane and accommodating right turns to Route 3 westbound at the existing intersection with Riverside Court.	\$2,700,000
									Explore 4-way stop control at the Riverside Court intersection.	
									Extend existing Shared Use Path from its current terminus to the Secaucus Greenway.	
									Provide sidewalk on the northbound side of Meadowlands Parkway, north of Harmon Plaza, to fill existing gaps.	
									Upgrade sidewalk on the southbound side of Meadowlands Parkway to be ADA compliant.	
Upgrade traffic signals throughout corridor to be MUTCD compliant (12" lenses) and include back-plates with retroreflective borders.										

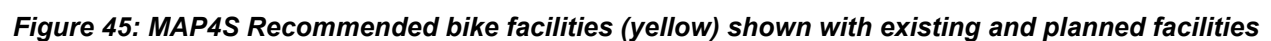
									Stripe high-visibility crosswalks and install curb ramps across the north and west legs of the Cove Court intersection to provide connections to/from bus stop on northbound side of Meadowlands Parkway (Stop ID 21583) and Hudson Regional Hospital. Adjust signal timing to accommodate pedestrian movements across north leg.	
									Install centerline rumble strips with raised pavement markings where double yellow line is present in the vicinity of Route 3.	
									Stripe high-visibility crosswalks where existing at Route 3 eastbound intersection.	
									Stripe high-visibility crosswalks across all legs of the Wood Avenue intersection.	
									Install edge striping to delineate travel lanes.	
									Evaluate and improve lighting under Route 3 overpasses.	
									Provide shelters at bus stops along the corridor where missing.	
									Investigate feasibility of a bus pull off lane for bus stop (Stop ID 21589) at Hudson Regional Hospital.	
13	West Side Avenue (Paterson Plank Road to United Candy Driveway)	09081095__	0	1	Municipal	North Bergen	0	0	Evaluate the feasibility of a four-to-three-lane road diet to accommodate one travel lane in each direction with a center turning lane. Stripe midblock crosswalks at/near existing bus stops to provide bus passengers marked crossings to access employment centers. Provide Rapid Rectangular Flashing Beacons (RRFBs) at midblock crosswalks. Improve lighting throughout corridor. Install sidewalk at various segments throughout corridor with intent to complete a continuous sidewalk network on both sides of road. Install buffered bicycle lanes or grade-separated bicycle lanes throughout corridor in conjunction with road diet. Upgrade traffic signals throughout corridor to be MUTCD compliant (12" lenses) and include back-plates with retroreflective borders. Upgrade to steel poles/mast arms to accommodate back plates. Provide shelters at bus stops along the corridor where missing.	\$1,900,000
15	Bergen Avenue (Kearny PWD to Newark-Jersey City Turnpike)	09071144__	1	1.57	Municipal	Kearny	2	1	Upgrade traffic signals at Newark-Jersey City Turnpike (CR 508) and driveways to 435 Bergen Avenue and Keegan Landfill to be MUTCD complaint (12" lenses) and include back-plates with retroreflective borders. Install/repair chevron signage in both directions at horizontal curve near driveways to 435 Bergen Avenue and Keegan Landfill. Install pavement markings at intersections throughout corridor to indicate lane & turn assignments. Install edge striping to delineate travel lanes. Improve lighting throughout corridor. Install bike lanes throughout corridor. Consider reconfiguration of skewed "K" style intersection of Bergen Avenue and driveway to 435 Bergen Avenue, such as retrofitting the intersection to a roundabout.	\$900,000
19	Meadowlands Parkway (AVNA Testing Center Driveway to Goya Driveway)	09091091__	1.1	2.1	Municipal	Secaucus	1	1	Relocate southbound NJ Transit bus stop at American Way (Stop ID 30641) to approximately 150 feet north of existing stop location. Install pedestrian signal heads with countdown timers for crossings at the east leg of American Way intersection.	\$1,400,000

										Provide sidewalks on northbound side of Seaview Drive to connect the existing network of bus stops and passengers to the adjacent employment centers. Stripe a high-visibility crosswalk and install curb ramps across the north leg of the Seaview Drive intersection. Adjust signal timing to accommodate pedestrian movements across north leg. Conduct a curb ramp assessment throughout corridor to identify specific locations in need of upgrades for ADA compliance. Install sidewalk within the NW and NE quadrants of the Seaview Drive intersection to connect existing curb ramp to proposed curb ramp and high-visibility crosswalk. Stripe high-visibility crosswalks adjacent to bus stops along the corridor to allow bus passengers to access employment centers on the opposite side of Meadowlands Parkway. This includes crosswalks at intersections or midblock, depending on the bus stop location. Provide Rapid Rectangular Flashing Beacons (RRFBs) at proposed midblock crosswalks. Upgrade traffic signals throughout corridor to be MUTCD compliant (12" lenses) and include back-plates with retroreflective borders. Upgrade to steel poles/mast arms to accommodate back-plates. Provide shelters at bus stops along the corridor where missing. Evaluate the feasibility of a four-to-three-lane road diet on Seaview Drive to accommodate one travel lane in each direction with a center turning lane. Install buffered bicycle lanes or grade-separated bicycle lanes throughout corridor in conjunction with road diet.								
23	St Paul's Avenue (Howell Street to Liberty Street)	09061731__ *	0	0.7	Municipal	Jersey City	1	2	Install sidewalks on both sides of the corridor where missing. Conduct a curb ramp assessment throughout the corridor to identify specific locations in need of sidewalk upgrades for ADA compliance. Install protected bike lanes in conformance with Jersey City's Bicycle Master Plan, and restripe all roadway markings. Improve lighting throughout corridor, especially under Route 1&9 overpass. Consider conversion to a roundabout at the intersection of St Paul's Avenue and Duffield Avenue, designed for pedestrians and cyclists in addition to vehicular traffic, and in alignment with Jersey City's future greenway plans. Stripe high-visibility crosswalks at all intersections including 3-leg intersections with ADA compliant curb ramps.	\$570,000								
25	West Side Avenue (North Bergen Pool to 69th Street)	09081122__	0.3	1.25	Municipal	North Bergen	2	1	Evaluate the feasibility of a four-to-three-lane road diet to accommodate one travel lane in each direction with a center turning lane. Stripe midblock crosswalks adjacent to bus stops to provide bus passengers with marked crossings to access employment centers. Provide Rapid Rectangular Flashing Beacons (RRFBs) at midblock crosswalks. Improve lighting throughout corridor. Install buffered bicycle lanes or grade-separated bicycle lanes throughout corridor in conjunction with road diet. Install sidewalk at various segments throughout corridor with intent to complete a continuous sidewalk network on both sides of road. Install curb ramps at all corners of 83rd Street intersection.	\$1,900,000								

									Install pavement markings and edge striping at 83rd Street intersection to delineate turning lanes. Upgrade traffic signals throughout corridor to be MUTCD compliant (12" lenses) and include back-plates with retroreflective borders. Upgrade to steel poles/mast arms to accommodate back-plates. Provide shelters at bus stops along the corridor where missing.	
27	Valley Brook Avenue (Dealer Tire Driveway to DeKorte Park)	02321085__	0.3	1.3	Municipal	Lyndhurst	0	6	Install sidewalks on eastbound and westbound side from Chubb Avenue to Polito Avenue to formalize the existing pedestrian lane located alongside the bike lane in the shoulder. Prohibit on-street parking along corridor. Re-stripe high-visibility crosswalks at Chubb Avenue intersection and install curb ramps with the intent of providing bus passengers marked crossings to access employment centers. Assess and reduce curb radii at Polito, Clay, and Chubb intersections based on truck turning templates. Convert the intersection of Clay Avenue into a signalized intersection with high-visibility crosswalks and curb ramps to provide bus passengers with marked crossings to access employment centers. Improve lighting throughout corridor. Install centerline rumble strips, transverse rumble strips, edge lines, and roadway signage. Provide shelters at bus stops along the corridor where missing. Install speed feedback signs along the corridor.	\$1,700,000
29	Secaucus Road (County Avenue to Hartz Way)	09091116__	0	1	Municipal	Secaucus	0	2	Upgrade traffic signals throughout corridor to be MUTCD compliant (12" lenses) and include back-plates with retroreflective borders. Upgrade to steel poles/mast arms to accommodate back-plates. Install sidewalk on the northbound side from the property of 530 Secaucus Road to South Enterprise Avenue (where missing). Install sidewalk on eastbound and westbound side between Enterprise Avenue and Harmon Cove Tower (where missing). Install advanced signal warning on the eastbound approach to County Avenue due to vertical curve. Install posted speed limit signage with speed feedback on the westbound downhill slope west of County Avenue. Conduct a curb ramp assessment throughout the corridor to identify specific locations in need of upgrades for ADA compliance. Stripe high-visibility crosswalks across legs and install curb ramps at all corners of Hartz Way intersection. Evaluate feasibility of a single lane roundabout at Hartz Way intersection. Provide shelters at bus stops along the corridor where missing. Stripe high-visibility crosswalks across all legs and install curb ramps at all corners of Sinvalco Road intersection with the intent of providing bus passengers marked crossings to access employment centers. Provide Rapid Rectangular Flashing Beacons (RRFBs) at east and west legs of Sinvalco Road intersection. Consider installing pedestrian refuge island at eastern intersection leg where painted median exists.	\$2,200,000
31	State Street / Empire Boulevard	02371038__	0	1	Municipal	Moonachie	0	0	Evaluate the feasibility of adding a center turn lane throughout the corridor. Restripe lane markings throughout corridor.	\$1,000,000

(Washington Avenue to Garden Street)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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30	Harmon Meadow Boulevard (Paterson Plank Road to Park Plaza Drive)	09091128__	0	0.51	Hartz Mountain	Secaucus	0	0	Install pavement markings for advanced curve warnings to reduce speeds.	\$240,000
									Upgrade Traffic signal heads at the Washington Ave intersection to the 12-inch LED signal heads with retroreflective back-plates.	
									Install chevron signage at horizontal curves.	
									Install high-friction surface treatment, directional arrows, and/or turn signage on both approaches to 90-degree horizontal curve.	
									Install transverse rumble strips on westbound approach to Commercial Avenue to alert drivers to stop sign.	
30	Harmon Meadow Boulevard (Paterson Plank Road to Park Plaza Drive)	09091128__	0	0.51	Hartz Mountain	Secaucus	0	0	Fill gap in concrete median at 500 Plaza/Chipotle driveway to physically prevent left turning movements from driveways.	\$240,000
									Install ADA-compliant curb ramps at all corners of all intersections along the corridor.	
									Upgrade Traffic signal heads at the intersection near The Plaza to 12-inch LED signal heads with reflective back-plates and retroreflective borders to aid visibility.	
									Install high-visibility crosswalk at the intersections of Plaza Drive and Park Plaza Drive.	
									Install speed feedback signs along the corridor.	



9.3 Policy Recommendations

An assessment of existing policies and safety best practices from peer organizations guided the development of non-infrastructure policy recommendations relevant to the Meadowlands District. Like Engineering strategies, policy recommendations include Education, Enforcement, Emergency Response, and Equity strategies intended to reduce crashes, particularly those resulting in fatalities and serious injuries.

The peer review of seven agencies and SS4A resources facilitated the development of 14 Vision Zero strategies, shown in Table 59, which include access management, public outreach, progress monitoring, targeted enforcement, and engagement with disadvantaged communities, among others. Each strategy was prioritized based on its potential to meaningfully improve roadway safety as well as its timeframe, i.e. duration of time to initiate and carry out a strategy toward coordination, implementation, deployment, or continuity, defined as near-term (one clock icon), assuming 0-3 years; mid-term (two icons), assuming 3-5 years; or long-term (three icons), assuming 5+ years. The strategies appear in prioritized order in Table 59. Underlying all policy recommendations is a commitment to Vision Zero principles, i.e., eliminating crashes resulting in fatalities and severe injuries while improving safe, healthy, and equitable mobility. The NJSEA commits to Vision Zero through political commitment, multi-disciplinary leadership, equity, cooperation, collaboration, data-driven performance monitoring and decision making, community engagement, and transparency. The continuation of the Safety Task Force combined with other administrative and management tasks such as annual reporting of safety outcomes will help to advance Vision Zero going forward.

For more information on the Policy development process, refer to Appendix D.

Table 59: Prioritized Policy Recommendations

Policy Theme	Timeframe	Priority	Lead Agencies	Supporting Agencies	Description/ Action Items
Agency Partnerships and Collaboration	  		NJSEA	MCC, Various Businesses, STF, NJDOT, Municipalities	- Coordination with public/private and NJDOT/SHSP - Get buy-in with MOU and financial incentives
Annual Reporting and Evaluation	  		NJSEA	STF	- Convene with STF for reporting/lessons learned - Issuance of annual reports to track progress - Vision Zero Action Plan check-ins with peers Other NJSEA activities to better track/codify safety
Vision Zero Progress Monitoring	  		NJSEA	EZ Ride, STF	- NJSEA-hosted website - Allows for public accountability
Public Outreach Campaign	  		NJTPA, TMAs	School Dist., Muni. Police, NJSEA, NJBWC, STF	- NJTPA Street Smart Campaign and track efficacy - Multimedia public education campaign
Engagement with Historically Disadvantaged Areas	  		NJSEA	Applicable municipalities, NJDOT, STF, EZ Ride	- Disadvantaged Communities Working Group - Grant assistance for disadvantaged areas
Healthcare Coordination	  		Community Health Orgs.	NJSEA, police, EMT, EMS	- Accurate fatality/serious injury reporting - Update EMT fleet for faster response
Rapid Response Team / Quick Build	  		Muni. /City. Engineering	NJSEA, STF, PDs	- Establish Rapid Response Team - Expedite action plans addressing FSI crashes - Encouragement of demonstration projects
Access Management Policies	  		Counties, Municipalities	NJSEA	- Consolidate/limit access - NJSEA to suggest candidate locations
Municipal Complete Streets Policies	  		Bergen/Muni. Planners	NJSEA	Policies for 100% of subregional agencies
Families for Safer Streets Local Chapter	  		FSSNJ, School Dist.	NJSEA, PDs, TMAs, NJDOE	- Walking/biking buses - School district coordination
Slow Streets Program	  		Muni. /City. Engineering	NJSEA, EZ Ride	Systemic speed limit reductions
Targeted Enforcement for Speeding	  		Muni./County PDs	Muni. /County DPW, EZ Ride	- Tracking with speed data collection efforts - Radar speed message signs
Demographic Impact Assessment (DIA)	  		NJSEA	STF	NJSEA to evaluate planned or constructed projects for adverse impacts
Roadway and Vehicle Safety Overlay	  		NJDOT, NJSP	NJSEA, STF	- Work with NJDOT to designate zones - Annual crash data monitoring by NJSEA - Safe vehicle technology deployment

MCC: Meadowlands Chamber of Commerce

DHS: Department of Health (or Health and Human) Services

DPW: Department of Public Works

EMT/EMS: Emergency Medical Technicians/Services

FSSNJ: Families for Safe Streets New Jersey - <https://nikhilbadlanifoundation.org/about-2/>

NJBWC: New Jersey Bike Walk Coalition

NJDOE: New Jersey Department of Education

NJDOT: New Jersey Department of Transportation

SCP: Safe Corridor Program - <https://nj-dot.nj.gov/transportation/about/safety/scp.shtm>NJSP: New Jersey State Police - <https://www.nj.gov/njsp/index.shtml>NJTPA: North Jersey Transportation Planning Authority - <https://www.njtpa.org/About-NJTPA/Who-We-Are/The-NJTPA.aspx>

PD: Police Department

TMAs: Transportation Management Associations, two of which are EZ Ride and Hudson TMA

VZNA: Vision Zero New Jersey Alliance - <https://www.visionzero4nj.org/members>

10 MEASURING PROGRESS

Measuring progress will be integral to advancing the NJSEA's commitment to safety beyond MAP4S. Supplying valuable data on the effectiveness of safety interventions will support achievement of the goal of zero FSI crashes by the MAP4S target year of 2040. In pursuit of this goal, the NJSEA will monitor crash reduction targets, track the performance of safety initiatives using a variety of defined metrics, and assess project performance using the Safety Assessment Tool (SAT), a customized online resource developed specifically for use beyond MAP4S adoption.

Methods of measuring plan progress are summarized in the following sections.

10.1 Crash Reduction Targets

To track progress towards zero FSI crashes by 2040, crash reduction targets were determined using a flat annual average of approximately seven percent (100 percent reduction divided by 15 years) or two fewer FSI crashes per year, using 31 FSI crashes (2021 data) as a baseline. Five-year crash reduction targets of approximately one-third would result in 10 to 11 fewer FSI crashes at each five-year mark. Annual percentage and crash reductions targets are shown in Table 60.²⁶

Table 60: 2040 5-Year FSI Crash Reductions

5-Year Periods	Expected 5 Year FSI Crash Amounts	5-Year amount of FSI Crash Reduction	5-Year Percent of FSI Crashes Remaining
2026 - 2030	21	10-11	67.7%
2031 - 2035	10	10-11	32.3%
2036 - 2040	0	10-11	0.0%

10.2 Performance Metrics

Performance metrics are quantifiable indicators used to evaluate the effectiveness and efficiency of MAP4S safety improvement projects and policy recommendations, and to refine and update projects and policies. They provide a clear means to assess progress towards safety goals, identifying areas of improvement, and establishing accountability.

Critical to measuring MAP4S progress will be a Safety Action Plan Annual Report, to be prepared by the NJSEA with STF collaboration, which will provide an update on the performance metrics listed in the following table. The Report will track outcomes and inform the Safety Task Force, stakeholders, municipalities, and other constituents about changes in crash data trends, policy adoption, and project implementation progress. These performance metrics are categorized to evaluate annual project performance towards the goal of zero FSI crashes by 2040 and whether project refinements and/or updates are needed to meet the 2040 goal. These performance metrics are organized in Table 61.

10.3 Safety Assessment Tool (SAT)

The Safety Assessment Tool (SAT) will be an important MAP4S legacy product produced using Power BI. The tool is intended to assist the NJSEA and municipal planners, engineers, and decision-makers in accessing and geolocating crash and equity data, performing crash data analyses, accessing safety countermeasure clearinghouse and specific location safety projects, assessing the roadway network, and tracking project

²⁶ Please note that although FSI crash reduction is averaged to 2.2 crashes per year with 33.3% reduction every five years these values are subject to change at the end of the five-year periods based on internal review. It is expected that the plan will be somewhat behind in the first five-year period before catching up and possibly exceeding the 33.3% reductions in the second and third five-year periods as more safety improvement projects and policies are implemented.

implementation and post-implementation performance. The tool will allow users to use interactive tools such as drop-down menus, radio buttons, and checkboxes to access and filter crash data and project inputs to evaluate trends using various data visualizations, including bar graphs, line graphs, tree maps, pie charts, and tables. The SAT also uses mapping elements integrated with Google Maps and Bing Maps, to map project locations and crash data. These modern visualization techniques will facilitate effective, user-friendly, data-driven safety analyses and inform planning decisions.

The SAT is structured with the following capabilities:

- **Pre-evaluation:** This part of the tool allows users to investigate existing conditions and crash data as a first step in safety assessment and project planning. Data is input from accepted data sources like NJDOT's Safety Voyager tool and should be updated as new crash data becomes available.
- **Safety countermeasures:** This allows users to investigate and review the MAP4S list of safety countermeasures (see section 9.1) based on pre-evaluation or in response to need at a particular location. This database should be updated frequently to incorporate latest revisions in CRF values, and/or new safety strategies from the five E's.
- **Projects:** This part of the tool allows users to access detail on MAP4S safety improvement projects (see section 9.2) – prepopulated in the SAT – or inputted by users, as “new” projects added to the SAT following MAP4S adoption.
- **Post-evaluation:** This allows users to assess project performance by accessing project-specific before and after crash data as a means of tracking progress in reducing crashes.

Regular maintenance will be critical to the SAT's utility over time. Current crash data must be input to track trends and project performance, projects must be input, updated, and tracked, and the Power BI interface must be kept current to meet user needs. SAT updates and maintenance are included as a key performance measure in the following table.

More information on SAT features can be found in Appendix E.

MAP4S Safety Assessment Tool

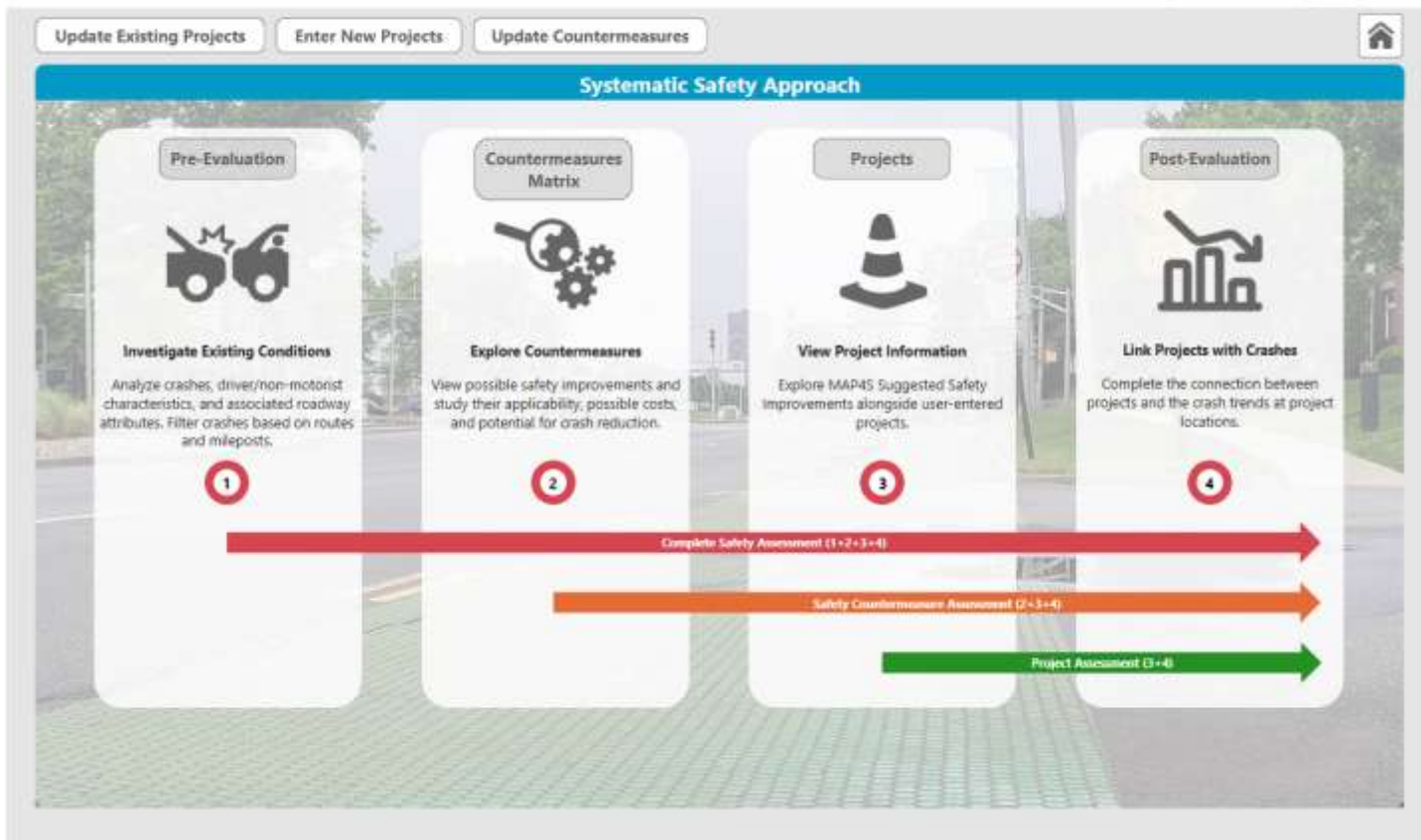


Figure 46: SAT homepage showing the tool's primary functions from Pre-Evaluation to Post-Evaluation

Table 61: Performance Metrics for Progress Tracking

ADMINISTRATION

Vision Zero Initiatives	Action Items	Responsible Parties	Start Year	Recurrence	Performance Metrics
Plan Implementation and Reporting	Adopt MAP4S	NJSEA	2025	Once	Official adoption of the Meadowlands Action Plan for Safety by the NJSEA
	Establish a permanent STF and convene on a regular basis to report on the progress of action items, adding a level of accountability	NJSEA, STF	2026	Quarterly	Four meetings per year, incentivize meetings with collaborative activities
	Prepare annual report summarizing plan progress, plan performance metrics, and the number of grants applied to, awarded, and monetary amounts received for roadway safety improvements.	NJSEA, STF	2027	Yearly	Annual issuance of Vision Zero report to be publicly displayed on NJSEA website
	Check in quarterly with one agency (Bergen County, Hudson County, Jersey City, or other municipality) with active safety action plans for lessons learned	NJSEA, related STF members	2026	Quarterly	Quarterly check-ins with application of lessons learned or best practices that have been effective in improving safety in neighboring jurisdictions.
	Evaluate NJSEA resources to hire an additional staff or on-call consultant to support/administer plan implementation.	NJSEA	2025/2026	Once/ As Needed	Hire a new FTE staff, or obtain consultant services
	Incorporate MAP4S strategies, Vision Zero principles, and the Safe System Approach into current NJSEA processes.	NJSEA	2026	As Needed	Incorporate safety principles into NJSEA planning efforts (MDTP, Master Plan updates) and land use management processes (plan review, etc.)
	Maintain/update list of safety countermeasures based on current best practices, new research, and relevance to the Meadowlands District.	NJSEA	2027	Yearly	Review and update list of safety countermeasures once per year
	Hold STF team accountable to assigned responsibilities and timelines	NJSEA, STF	2026	Yearly with STF, Monthly Internally	The table of all 14 policy strategies is to be easily accessible to the public along with information on parties responsible and whether or not work has progressed/is on schedule
	Maintain/update the SAT with new data and information.	NJSEA, STF/ SAT users	2026	As Needed	Update SAT as project status changes, new projects or countermeasures establish, or new crash data becomes available

ENGINEERING

Vision Zero Initiatives	Action Items	Responsible Parties	Start Year	Recurrence	Performance Metrics
MAP4S Safety Projects	NJSEA, based on its analysis, to suggest candidate locations to municipalities and counties based on factors such as number of crashes, spacing, and/or corner clearance data	NJSEA	2026	As Needed/Yearly	Evaluate pre- vs. post-implementation crash data to document crash trends at these locations. Compare crash reduction percentage to annual target of 7% and reassess every five years.
	Track status of engineering projects advanced beyond current phase	NJSEA	2026	Yearly	Review projects to ensure what status they currently are in (Idea/Concept, Planning/Design, Construction)
	Monitor crash data at project locations	NJSEA	TBD based on project implementation	Yearly	Evaluate pre- vs. post-implementation crash data to document crash trends at these locations. Compare crash reduction percentage to annual target of 7% and reassess every five years.
Access Management	Work with roadway jurisdictions (state, counties, municipalities) and property owners to consolidate or revoke ingress/egress points on roadways with posted speed limits at or above 35 mph	NJSEA, County and Municipal Engineering Departments	2026	Yearly	NJSEA, counties and municipalities to seek to work with property owners to consolidate or revoke at least 3 ingress/egress points per year per agency, triggers to initiate these discussions with property owners including roadway improvement projects (such as resurfacing) or developer applications
Slow Streets Program	Encourage systemic speed limit reductions within the District	NJSEA, County/Municipal Engineering, EZ Ride	2026	As needed	Investigate feasibility of reducing 25 mph posted speed limits to 20 mph on District roadways, particularly close to schools, EZ Ride to work with NJSEA to achieve this goal by planning demonstration projects at locations suffering from speeding, Jersey City will be doing similar work as part of an imminent SS4A study and has offered to lend assistance with sharing their lessons learned in trying to systemically reduce speeds
	Establish radar speed message sign in high-speed corridors or close to school zones to enforce a 15mph zone	Police, Municipalities, Counties	2027	Yearly	Establish 5 radar message signs per year in high-speed corridors or close to school zones
Quick Build/ Demonstration/ Low-Cost Projects	Encourage District municipalities and Hudson/Bergen counties to implement demonstration projects	NJSEA, STF, Municipalities, and Counties	2027	Yearly	At least two quick-build or demonstration safety projects should be built annually by each municipality and/or developer seeing a significant increase in pedestrian/bicycle trip generation, counties tied to Bergen Local and Hudson VZ Safety Action Plan. Each project's effectiveness of addressing safety countermeasures is then assessed

ENGINEERING

Vision Zero Initiatives	Action Items	Responsible Parties	Start Year	Recurrence	Performance Metrics
Quick Build/ Demonstration/ Low-Cost Projects (Cont.)	Improve roadway signage and striping in school zones throughout the District	Municipalities and Counties	2026	Yearly	At least three upgrades to school zone signage and striping should be installed annually throughout the District. Each project's effectiveness of addressing safety countermeasures is then assessed
Complete Streets	Encourage Bergen County and municipalities write a Complete Streets policy (Rutherford, Jersey City, Hudson County, and Secaucus excluded, policies already written)	NJSEA, STF, Municipalities, Bergen County	2026	As needed	100% of counties and municipalities under the District have a policy by Target Year

ENFORCEMENT

Vision Zero Initiatives	Action Items	Responsible Parties	Start Year	Recurrence	Performance Metrics
Targeted Enforcement of Speeding	Use an off-the-shelf tool to document and analyze vehicle operating speeds within the District to inform targeted enforcement at specific locations	Municipalities, Counties, EZ Ride	2026	Yearly	Select seven major arterials identified with aggressive driving to annually collect and monitor speed data and perform targeted enforcement.
	Encourage municipal fleet “safe vehicle” improvements, including vehicles w/ crash avoidance tech, speed limiters, and Lane Departure Warning monitoring	NJSEA, STF	2026	Reevaluate Goal After 2030	50% of fleet with “safe vehicle” technologies by 2030
Safety Overlay District	Petition NJDOT to designate HIN roads under state jurisdiction as Safe Corridors	NJSEA, NJDOT, and New Jersey State Police (NJSP)	2026	Yearly	Install signs and augment NJSP enforcement efforts on segments of Routes 1&9T, 3, 7, 17, 46, 120, and 495 to double fines for speeding and other violations
	Continue monitoring FSI crash data on roadways in the District to add/remove Safe Corridor overlays as needed	NJSEA	2027	Yearly	Annually refresh HIN mapping for roadways under NJDOT jurisdiction to see how roadway limits for the HIN change year-by-year

EDUCATION

Vision Zero Initiatives	Action Items	Responsible Parties	Start Year	Recurrence	Performance Metrics
Public Outreach Campaign	Leverage NJTPA's Street Smart campaign ²⁷ material where safety projects, countermeasures, or quick build/demonstration projects are being installed/implemented.	NJTPA, EZ Ride, Municipalities, TMAs, School Districts, Municipal Police Departments	2030	Yearly	Implement campaign/signing at 3 locations, expand program based on reception, EZ Ride has offered to lead one Street Smart campaign per year, while Jersey City has extended an open invitation to collaborate on one such campaign
	Develop a multimedia public education campaign focused on roadway safety and public health impacts associated with fatal and serious injury (FSI) crashes.	NJSEA, STF, EZ Ride, Hudson TMA, NJBWC	2026	Yearly	Development and updating communications and education materials for a social media and advertising (possible billboard) campaign, Jersey City indicated opportunities to collaborate on a Public Service Announcement (PSA) that will soon be underway thanks to SS4A funding
	Track effectiveness of public outreach campaigns	NJSEA, STF	2027	Yearly	Evaluate pre- vs. post-implementation crash data or leading safety indicator data (speeds, yielding %, red light running, conflict/near miss analysis, etc.) to document downward crash trend at HIN Street Smart locations, Jersey City has offered to share on similar data collection methods used/to be used
Vision Zero Website	Use map4s.com and njsea.com to host FSI crash maps, MAP4S document, and linked resources for STF team's use	NJSEA	2026	Yearly with STF, Monthly Internally	Generating traffic of at least 100 unique hits to signify significant traffic from stakeholders and public for project information and transparency, EZ Ride and Jersey City propose to promote this website on social media/Vision Zero pages, website is to keep track of municipalities that have adopted a Complete Streets policy
Families for Safer Streets	Establish a new local Meadowlands chapter for Families for Safe Streets (FSS)	NJSEA, municipalities, NJFSS	2026	One Time	Establish a local Meadowlands chapter, participate at three events promoting FSS campaigns/signage, and expand based on program reception, EZ Ride has suggested involving municipalities for success

²⁷ [Home | Street Smart | NJ](#)

EDUCATION

Vision Zero Initiatives	Action Items	Responsible Parties	Start Year	Recurrence	Performance Metrics
Families for Safer Streets (Cont.)	Establish a walking or biking bus in school districts that do not provide busing within two miles ²⁸ of K-8 schools and/or in municipalities with overrepresentation of crashes involving those under 18	School Districts, EZ Ride, Hudson TMA	2026	Yearly	Schedule two walk and/or bike bus events per year in identified communities
	Coordinate with school districts to make traffic safety training mandatory in elementary schools	NJSEA, NJDOE, NJDOT, School Districts, EZ Ride, Hudson TMA, Law Enforcement	2026	Yearly	Evaluate pre- vs. post-implementation crash data near schools and pre- vs. post-crash education surveys to document downward crash trend and health crisis awareness, to work with NJDOE (Department of Education) and local Board of Educations (BOEs) to add Bike/Ped education to Phys. Ed. courses, EZ Ride has also offered to work with school districts to establish Safe Routes to School (SRTS) policies in concert with NJDOT
Agency Partnerships and Collaboration	Coordinate with major district employers to sign Vision Zero commitment and distribute program educational material to employees	NJSEA, District Employers, Meadowlands Chamber of Commerce, Hudson TMA, EZ Ride	2025	As needed	Seek talks with 10 major employers within the District, broaden influence by working with the Meadowlands Chamber of Commerce to establish large and small business contacts and publish articles within Meadowlands Magazine
	Pursue establishing a Vision Zero Memorandum of Understanding (MOU) with state, counties, and District municipalities	NJSEA, NJDOT, Counties, Municipalities	2026	Once	Establish 2 MOUs per year with all sub-regional and partnering agencies to all agree upon the commitment to safer transportation by the Targeted year
	Include representative from NJDOT Bureau of Safety on MAP4S STF and work collaboratively with NJDOT to advance safety improvements on state highways in the Meadowlands District.	NJSEA, NJDOT	2026	Once	Add at least one representative from NJDOT to STF as an active, participating member.
	Advocate for NJSEA inclusion on the NJDOT Strategic Highway Safety Plan (SHSP) Steering Committee.	NJSEA, NJDOT	2026	Once	Establish NJSEA representation on SHSP Steering Committee within two years of MAP4S adoption.
	Leverage possible financial incentives to encourage Vision Zero support.	NJSEA, District Employers, EZ Ride, Hudson TMA	2027	As needed	Engage in discussions with up to five District employers beginning in 2027 to determine if programs that track employee speeds to monitor fuel usage advance Vision Zero in the Meadowlands.

²⁸ https://www.nj.gov/education/genfo/faq/faq_transportation.shtml

EMERGENCY RESPONSE

Vision Zero Initiatives	Action Items	Responsible Parties	Start Year	Recurrence	Performance Metrics
Rapid Response/Quick Build Team	Create a Rapid Response Team to convene after every severe (FSI) crash to discuss crash conditions, contributing factors, and possible improvement strategies and perform a field visit	NJSEA, STF, Municipalities, Counties	2026	As Needed, After FSI Crashes	Hold a meeting within a week of each FSI crash to formulate a plan to fix by any means possible with the idea that all crashes are preventable. Jersey City and Secaucus are deploying something similar and are happy to share early results
	Produce action plans for addressing the FSI crashes on District roadways.	NJSEA, STF, Municipal/County planners, engineers, police	2026	As Needed, After FSI Crashes	Prepare brief action plan summarizing conditions, contributing circumstances, and proposed short-term improvement strategies within a month for every FSI crash, many municipalities are already employing such strategies
Healthcare Coordination	Coordinate with police departments to determine if any reported injury crashes are updated by healthcare providers as fatalities within 30 days of incident. The Fatality Analysis Reporting System (FARS) associates a fatality with a crash if the fatality occurs within 30 days of the crash.	NJSEA, NJSP, County Sheriffs, Municipal Police Departments, Community Health Organizations	2026	As Needed, After FSI Crashes	NJSEA should seek to establish channels to ensure data is available and compiled after 30 days of all FSI crashes
	Coordinate with municipal and private EMS to understand the mechanism of fleet dispatch and related FSI crash response needs and challenges	NJSEA, Municipal EMS, Private EMT	2027	As needed, Yearly	Track and analyze the trend of response time to FSI crashes, Jersey City has offered to collaborate on this initiative, Secaucus PD currently does this with their Traffic Unit

EQUITY

Vision Zero Initiatives	Action Items	Responsible Parties	Start Year	Recurrence	Performance Metrics
Historically Disadvantaged Communities	Create a District Disadvantaged Communities Working Group comprised of interested STF members and/or local advocates to focus outreach efforts on vulnerable communities and lead Equity Impact Assessments (EIAs) for all safety improvement projects	NJSEA, NJDOT, STF, County/ Municipal representatives, Local advocates, Hudson TMA, EZ Ride	2027	Yearly	Provide educational resources on traffic safety, created by Disadvantaged Communities Working Group, to at least one community in need of assistance per year, EZ Ride proposes its help to coordinate with NJDOT to get SRTS assistance in these communities since the SRTS program prioritizes disadvantaged communities
	Partner with municipalities in which disadvantaged communities are located to apply for funding to construct safety countermeasures	NJSEA, Disadvantaged Communities Working Group, local stakeholders	2026	Yearly	Select and partner with one disadvantaged community per year (Moonachie, North Bergen, South Hackensack, etc.) to apply for one grant for roadway safety improvements
Equity Impact Assessment (EIA)	Where safety projects are to be implemented, perform an assessment to ensure that disadvantaged communities would not be negatively impacted	NJSEA, STF (Disadvantaged Communities Working Group)	2027	As needed	Specific negative impacts (if any) such as right-of-way, noise, GHG emissions, access restrictions, or other adverse impacts identified in each project assessment prior to project implementation.

11 CONCLUSION

11.1 Summary

MAP4S is the first comprehensive action plan devoted to roadway safety and the elimination of fatal and serious injury crashes within the Meadowlands District.

An analysis of crash data revealed critical insights into safety challenges. The most severe crash types included Pedestrian crashes (23 percent of all FSI crashes), Same Direction-Rear End crashes (23 percent), Fixed Object crashes (20 percent), and Opposite Direction-Head On crashes (10 percent).

Crash data served as a key input in the definition of a District High Injury Network (HIN). Using a sliding window analysis methodology, 35 HIN segments spanning approximately 29 miles of roadway throughout the District were identified. State, county, and local roads were included in the analysis. These segments represent 22 percent of the District's overall roadway mileage but account for 64 percent of the District's total Equivalent Possible Injury (EPI) scoring, highlighting HIN's disproportionate safety risk.

HIN segments were organized into three functional classification groups to allow for representation of multiple types of roadways since the NJSEA does not have roadway jurisdiction. The 35 segments are categorized as follows:

- **Freeways/Expressways:** 5 HIN segments; approximately 5 total roadway miles
- **Principal and Minor Arterials:** 17 HIN segments; approximately 16 miles total
- **Major and Minor Collectors and Local Roads:** 13 HIN segments; approximately 9 total miles

Several of these HIN segments pass through or intersect with census tracts identified as underserved communities through a demographic analysis using existing resources such as Justice40, the NJTPA's Demographic Analysis Tool, and FHWA's STEAP. Notable HIN segments within or intersecting underserved communities include portions of:

- US 1 Truck, NJ 7, and St. Paul's Avenue in **Jersey City**
- Newark-Jersey City Turnpike/CR 508 and Bergen Avenue in **Kearny**
- NJ 495, Secaucus Road/CR 678, and West Side Avenue in **North Bergen**

A systemic analysis further identified high-risk roadway features based on the geometric and operational characteristics of roadway segments with the highest EPI scores in the District. The features associated with the most crash risk include, but are not limited to, roads with three or more travel lanes; roads at or greater than 40 feet wide; roads with posted speed limits of 35 mph or higher; roads with volumes at or above 10,000 vehicles per day; and designated truck routes as part of the New Jersey Access Network.

Beyond data analyses, community engagement played a vital role in shaping MAP4S. Through five "pop-up" public outreach events, an online survey and map, two focus group meetings, and several STF meetings, stakeholders voiced concerns about aggressive driving, speeding, and the need for safer, more connected multimodal infrastructure, complete streets, and improved transit connections.

The insights gained from these diverse but related data and outreach inputs guided proactive approach to safety by developing pertinent strategies, which form the foundation for safety countermeasures to reduce crashes in the Meadowlands District.

A comprehensive "toolbox" of safety countermeasures relevant to the Meadowlands District was developed to provide a detailed list of safety treatments designed to address various crash types and improve roadway safety. Countermeasures were then applied to the 35 HIN locations that were prioritized considering crash history, presence of high-risk features, community demographics, and public input. The application of countermeasures formed location-specific safety improvement projects that contextually considered localized crash data and

existing conditions and constraints. NJSEA Staff and members of STF provided critical feedback on the suggested safety improvements to help refine them.

In parallel, non-infrastructure policy recommendations were crafted using best practices from a review of peer agency best practices. Fourteen total strategies were selected after review by and input from the STF. Each are designed with action items, designated responsibilities, implementation timelines, and measurable performance targets. The strategies span a broad spectrum of focus areas, including access management, public education and outreach, targeted enforcement, equity-centered engagement, rapid response to serious crashes, and inter-agency coordination.

To further support MAP4S performance and tracking, the Safety Assessment Tool (SAT) was developed as a legacy product to support data-driven roadway safety planning. It enables the NJSEA as well as municipal planners, engineers, and decision makers to access and evaluate crash data, view or add safety countermeasures, view and/or input safety improvement projects within the District, and track project performance over time.

11.2 Lessons Learned

During MAP4S development, lessons were learned on strategies and best practices that can be utilized or repurposed for future efforts such as project's deployment/installation, MAP4S updates, refining community outreach, and STF coordination. Understanding and reflecting on these lessons learned is crucial for continuous improvement and generating future success of the projects and programs provided within this plan. Some of these lessons are as follows:

- Hold regularly scheduled stakeholder meetings and present updates in the future to engage more groups. Follow-up with unresponsive stakeholders to encourage participation.
- Establish accessible, visible advertisements for community input (surveys, flyers, websites, etc.) and seek out underrepresented communities and stakeholders that may not normally be solicited for feedback.
- Establish a consistent, routine meeting schedule to set expectations for engaging the STF and stakeholders, and communicate meetings at least two weeks in advance. Monitor attendance to determine participation or engagement levels.
- To establish seamless and effective plan implementation across jurisdictions, NJSEA shall define the roles and responsibilities of each municipal and county entity and communicate these expectations to them.
- Recognize NJSEA's role as the leading agency to support Vision Zero initiatives by advancing and updating MAP4S strategies and monitoring progress toward satisfying the ultimate goal of zero fatalities and serious injuries on roadways.
- Identify a safety champion (NJSEA staff, STF chairperson, or similar) who can lead MAP4S plan execution beyond adoption and continually emphasize safety goals to keep others on target.

Organizational Structure: Following MAP4S adoption, establishing safety leadership (a champion) and an organizational structure to support plan implementation will be critical to sustain forward progress. With a support structure in place, effective communication, messaging, and engagement with the STF and other stakeholders will be important to maintain momentum towards achieving plan goals. Expectations for interested stakeholders should be communicated in early stages, including roles and responsibilities and meeting commitments. Once plan execution is underway, a consistent meeting schedule and regular updates on plan performance and progress can be used to maintain engagement and sustain the interest and energy of the STF and other involved parties.

11.3 Recommendations

The continued convening of the STF following MAP4S adoption will be central to the advancement of Vision Zero principles, as the NJSEA and constituent municipalities work towards eliminating fatal and serious injury crashes. In conjunction with the STF, the NJSEA will track plan progress using the MAP4S Performance Metrics as a framework and convey progress via annual reports.

Together, all MAP4S strategies form the backbone of a transparent, inclusive, and “living” safety initiative that will be monitored and modified as needed to meaningfully advance safety on District roadways. The MAP4S framework, produced using rigorous data analyses, community input, and proven safety best practices, not only addresses immediate safety concerns but also lays the foundation for sustained, long-term improvements in multimodal roadway safety in the Meadowlands District.

APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E