

Exhibit “A”

Vision

Zero

WEST ORANGE TOWNSHIP

Vision Zero Action Plan (2023-2030)
*Strategies and Actions to Reduce Traffic Deaths and
Serious Injuries to **Zero***

December 2023



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Special thanks to the West Orange Vision Zero Task Force for their time and on-going commitment to making roads safer for all users in West Orange Township.

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A LETTER FROM THE MAYOR

Hello West Orange,

As your Mayor, I am writing to explain my support for implementing the Vision Zero Action Plan for the Township.

My primary reason is the call-to-action for safety and the quality of life for every resident and visitor to our town. Vision Zero is a comprehensive approach to road safety that aims to eliminate traffic fatalities and severe injuries; while promoting safe, healthy, and equitable mobility for all.

Vision Zero is a safety Action Plan that lays out actionable, measurable strategies, emphasizing design and policy solutions and promoting a transportation system that prioritizes the well-being of all individuals. As your Mayor, my primary concern is the safety and quality of life for every resident of our town. Therefore, I am committed to the implementation of Vision Zero principles to ensure that our streets are as safe as they can possibly be.

Our Township is the 5th largest municipality in Essex County with an area of approximately 12 square miles and a population of approximately 49,000 residents. More than 20% of our population are children under the age of eighteen, while 18% are adults 65 years of age and over. Since the Township is both culturally and economically diverse, this leads to the population relying on various modes of transportation.

Over the years West Orange has grown with enhanced economic investments, residential development bringing with it transportation needs and responsibilities. As such, it is imperative the Township provides proper walking, biking corridors and vehicular patterns to ensure the safety of our residents.

The Vision Zero Action Plan will enable the Township to implement policies and regulations that protect motorists, cyclists, and pedestrians and allow our municipal government to act as a liaison between various entities to ensure safety initiatives are successfully put into place. The Township intends to collaborate Vision Zero planning efforts with the West Orange Police Department, Downtown West Orange Alliance, West Orange Board of Education, the Pleasant Valley Civic Association, West Orange Pedestrian Safety Advisory Board, the West Orange Youth Advisory Board, West Orange Council of PTA's, NJ Bike/Walk Coalition, EZ Ride TMA, NBF and you.



Bureau of Safety,
Bicycle, and
Pedestrian Programs



Administration, Schools, Police/
Safety, Fire, Senior Services, Health,
Engineering Planning,
Environmental



Engineering,
Planning

West Orange Pedestrian Safety
Advisory Board (WOPSAB)



nbf
nikhil badlani foundation



Thomas Edison
National Historical Park



To achieve the Vision Zero Action Plan goals, the Township will initiate the following key components:

- **For Safer Streets:** The Township will invest in engineering measures that improve the safety of our roadways. This includes the redesign of intersections, the installation of better signage and lighting, and the creation of pedestrian-friendly walkways and dedicated bike lanes.
- **Education:** The Township is committed to increasing awareness and understanding of road safety. We will work closely with schools, community organizations, and the local media to promote safe behavior for all road users.
- **Enforcement:** Our law enforcement agencies will play a crucial role in ensuring that traffic laws are obeyed. We will support their efforts to make our streets safer by addressing speeding, reckless driving, and impaired driving.
- **Data Collection:** The Township will gather and analyze data on traffic crashes and their causes to make informed decisions about improving road safety.
- **Community Engagement:** The Township values constructive input and participation. We will hold community meetings, workshops, and surveys to understand the community's concerns and preferences regarding road safety measures.
- **Inclusivity:** Vision Zero is about creating safer streets for all members of our community, regardless of age, ability, or mode of transportation. We are dedicated to making our Township accessible and safe for everyone.

I urge you to get involved and volunteer if you can in this important effort. Your support and active engagement will be instrumental in making our streets safer for all. Please look for announcements about community meetings and initiatives related to Vision Zero, to make your voice heard.

Together, we can work towards a goal where our children can play on our streets without fear, pedestrians and bicyclists can travel without anxiety, and where traffic crashes are a thing of the past. The Vision Zero initiative is not just a program: it's both a commitment and an investment in our future toward the safety and well-being of our community.

Respectfully,



Mayor Susan McCartney

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GLOSSARY OF TERMS

Vision Zero

Vision Zero is a strategy to eliminate fatalities and serious injuries in the road system. This was first implemented in Sweden in the 1990s, has become standard and successful across Europe, and has begun to spread across the world. Vision Zero reframes traffic safety, from severe car crashes being inevitable accidents that are part of modern living to being preventable crashes to be prevented in as many ways as possible to save lives. Vision Zero acknowledges human error, systems over individual responsibility, and that saving lives is not expensive.

Safe System Approach

The Safe System Approach is a framework to address roadway safety that has been adopted by the US Department of Transportation. It builds multiple layers of protection for road users to both prevent crashes and mitigate the harm caused in crashes.

KSI Crash

KSI Crashes are crashes where a victim is killed (K) or severely injured (SI).

Proven Safety Countermeasures

The Federal Highway Administration (FHWA) has identified 28 countermeasures and strategies with proven effectiveness in reducing crash rates and/or crash severity. These are context- and user-specific but can make significant improvements to the safety of a road system when applied broadly.

Complete Streets

Complete Streets are streets designed to safely support all road users. This applies to both all modes of travel and also all abilities of the road users, including people with disabilities, children and seniors, and more. Complete Streets require varying degrees of intervention depending on the context, both in terms of land use and in terms of traffic volumes and speeds.

Environmental Justice

Environmental Justice is, as defined by the EPA, “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”

High-Injury Network

Vision Zero Action Plans identify a High-Injury Network (HIN), the roadways in a municipality or city's road system with the highest prevalence of crashes or greatest crash severity. Actions to address these issues are concentrated on the HIN.

Vulnerable Road Users

Certain Users of the road system are those not protected inside a vehicle when using the road system. This includes pedestrians, cyclists, skateboarders, rollerskaters and more.

VISION ZERO GOAL

West Orange Township will eliminate traffic deaths and life-altering injuries by the year 2030.

WHY VISION ZERO? BY THE NUMBERS*

More than

2



people have lost their lives in a crash every year

28



Number of severe injury crashes



Pedestrian Fatalities



Bicyclist and Pedestrian Severe Injury Crashes

* Source: Safety Voyager crash data (2015-2021). Crashes on Route 280 are included.

VISION ZERO SAFETY PLEDGE

Our vision for zero deaths and serious injuries can only be achieved if all community members support and do their part to reach the goal of zero. A traffic safety pledge (in English and Spanish) was developed with the Vision Zero Task Force and was available for the community to sign online and in-person at the public workshops. The Vision Zero Pledge for West Orange will continue to be an important part of engaging and sharing responsibility with the community, well beyond the year 2030.



VISION ZERO SAFETY PLEDGE

I understand that it is possible to eliminate traffic-related deaths and serious injuries in West Orange Township by doing my part while also supporting the Township in developing a Safe System with Safe Street Design and Safe Speeds in West Orange.

I PLEDGE TO:

- *Only drive when I am sober, alert and without distractions such as my phone or other devices and keep my eyes on the street at all times.*
- *Slow down, drive carefully and give at least four feet of space when possible, or slow down to 25 mph when passing bicyclists¹.*
- *Follow all laws and regulations on West Orange's streets, especially yielding to all vulnerable users such as pedestrians and bicyclists.*
- *Never flee a crash scene because I can save lives by calling 911 immediately.*
- *Recognize that as speed increases the risk of fatality and serious injury increases drastically.*

sign to pledge

¹NJ Safe Passing Law (<https://www.njoag.gov/about/divisions-and-offices/division-of-highway-traffic-safety-home/division-of-highway-traffic-safety-pedestrian-safety/>)



ZERO TRAFFIC-RELATED DEATHS AND SERIOUS INJURIES IN WEST ORANGE TOWNSHIP BY 2030!





Vision Zero
WEST ORANGE TOWNSHIP

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- ☒ Never flee a crash scene because I can save lives by calling 911 immediately.
- ☒ Recognize that as speed increases the risk of fatality and serious injury increases drastically.

Keslie Tarnay



ZERO TRAFFIC-RELATED DEATHS AND SERIOUS INJURIES IN WEST ORANGE TOWNSHIP BY 2050

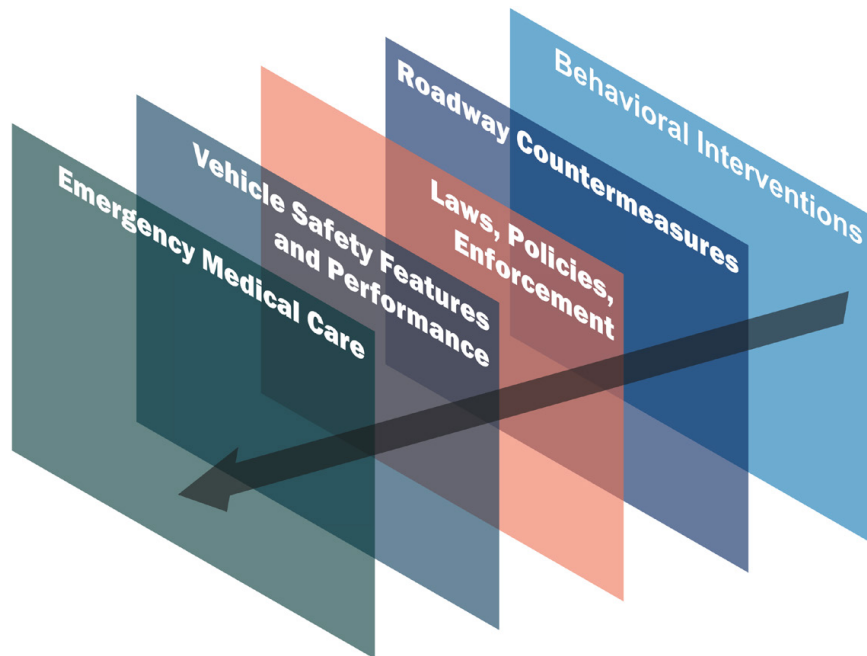
USDOT ROADWAY SAFETY STRATEGY

The USDOT National Roadway Safety Strategy (NRSS), published January 2022, recognizes that the United States is at a critical juncture in terms of roadway safety¹. The rate of fatalities on US roadways decreased consistently from 1980 to 2010, but stagnated after 2010 and spiked nationwide in 2020 (which also occurred in West Orange). An estimated 38,680 people died in motor vehicle crashes in 2020, of which an estimated 6,236 were pedestrians. In 2021, this increased by an additional 10.5 percent to 42,915 fatalities including 7,342 pedestrian fatalities. These alarming statistics presented a call to action to make the US roadway system safer for all users, which is why the NRSS sets a vision and goal for the safety of US roadways: zero roadway fatalities.

As stated in the NRSS document, "zero is the only acceptable number of deaths on our highways, roads and streets." In order to achieve this, this strategy promotes the adoption of the Safe System Approach, which has seen success in its early adopters such as Sweden, the Netherlands, and more. The Safe System Approach involves anticipating human error by designing the roadway system to keep the risk/impact of the human error low. It takes into account human vulnerability and consists of six principles and five elements.

Additionally, roadway safety is an important foundation to achieving success in addressing two other major priorities: equity and climate. By implementing ways to encourage safe multi-modal travel, lower dependency on single-occupancy vehicles and through sustainable and environmentally-friendly street design, this plan will help address climate change. In addition, equity is a defining factor of the West Orange Vision Zero Action Plan.

All layers of a Safe System Approach are critical.



Source: USDOT National Roadway Safety Strategy

1 <https://www.transportation.gov/nrss/usdot-national-roadway-safety-strategy>

ROADMAP TO VISION ZERO

HOW WILL WEST ORANGE ACHIEVE VISION ZERO?

This Vision Zero Action Plan provides a roadmap to achieve Vision Zero in West Orange. It outlines key strategies and actions based on the Safe System Approach that are developed through a robust data-driven process and community input, with direction from a multidisciplinary and engaged Vision Zero Task Force.



SAFE SYSTEM APPROACH

By adopting a Safe System Approach, West Orange Township will steadily progress towards Vision Zero. A Safe System Approach, at its core, focuses on the two main factors in roadway safety - Roadway Speed and Design. It also emphasizes that safety is a shared responsibility.

A Safe System Approach incorporates the following six principles:

- 1. DEATH AND SERIOUS INJURIES ARE UNACCEPTABLE.** While no crashes are desirable, the Safe System Approach prioritizes the elimination of crashes that result in death and serious injuries since no one should experience either when using the transportation system.
- 2. HUMANS MAKE MISTAKES.** People will inevitably make mistakes and decisions that can lead or contribute to crashes, but the transportation system can be designed and operated to accommodate certain types and levels of human mistakes, and avoid death and serious injuries when a crash occurs.
- 3. HUMANS ARE VULNERABLE.** People have physical limits for tolerating crash forces before death or serious injury occurs; therefore, it is critical to design and operate a transportation system that is human-centric and accommodates physical human vulnerabilities.
- 4. RESPONSIBILITY IS SHARED.** All stakeholders – including government at all levels, industry, non-profit/advocacy, researchers, and the public – are vital to preventing fatalities and serious injuries on our roadways.
- 5. SAFETY IS PROACTIVE.** Proactive tools should be used to identify and address safety issues in the transportation system, rather than waiting for crashes to occur and reacting afterwards.
- 6. REDUNDANCY IS CRUCIAL.** Reducing risks requires that all parts of the transportation system be strengthened, so that if one part fails, the other parts still protect people.



Source: USDOT FHWA

The Safe System Approach is based on the following five elements:

	SAFER ROADS Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.
	SAFER SPEEDS Promote safer speeds in all roadway environments through a combination of thoughtful, equitable, context-appropriate roadway design, appropriate speed-limit setting, targeted education, outreach campaigns, and enforcement.
	SAFER PEOPLE Encourage safe, responsible driving and behavior by people who use our roads and create conditions that prioritize their ability to reach their destination unharmed.
	SAFER VEHICLES Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.
	POST-CRASH CARE Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

Through improvements in these five areas, the goal of zero fatalities and life-altering injuries from car crashes can be achieved. The Safe System Approach guiding principles and elements are reflected in the West Orange Vision Zero Action Plan.

STRONG COLLABORATION WITH ESSEX COUNTY

West Orange Township will achieve its Vision Zero goal through its partnership with Essex County since County roadways account for the majority of the high-injury network (HIN) in West Orange. Essex County has been a valuable member of the West Orange Vision Zero Task Force and will soon be developing a countywide Vision Zero Action Plan funded through the federal Safe Streets and Roads for All (SS4A) Grant Program. West Orange Township must continue to collaborate with Essex County through the implementation of the actions in this plan and inform and support the development of the Essex County Vision Zero Action Plan.



IMPLEMENTATION/FUNDING

West Orange Township will achieve its Vision Zero goal by building on national momentum for Vision Zero and pursuing funding for the action plan. At the top of the list of funding sources is the Safe Streets and Roads for All implementation grant. Additionally, West Orange should ensure that the Safe System Approach is central to all roadway infrastructural decision-making in the Township. Appendix C includes a list of funding sources for implementation.

MONITORING AND EVALUATION

This plan is intended to be a living document and should be updated annually, tracked, and evaluated on a regular basis. As actions are implemented, West Orange Township should monitor progress utilizing performance measures developed in this plan. The results of the progress tracking will help inform future projects related to roadway safety in the Township and ensure that the West Orange is steadily moving towards the goal of zero deaths and serious injuries.

"WE ALL HAVE A RESPONSIBILITY TO MAKE OUR ROADWAYS SAFER FOR EVERYONE" - USDOT



I PLEDGE TO:

- Only drive when I am sober, alert and without distractions such as my phone or other devices and keep my eyes on the street at all times.
- Slow down, drive carefully and give at least four feet of space when possible, or slow down to 25 mph when passing bicyclists¹.
- Follow all laws and regulations on West Orange's streets, especially yielding to all vulnerable users such as pedestrians and bicyclists.
- Never flee a crash scene because I can save lives by calling 911 immediately.
- Recognize that as speed increases the risk of fatality and serious injury increases drastically.

VISION ZERO SAFETY PLEDGE

I understand that it is possible to eliminate traffic-related deaths and serious injuries in West Orange township by doing my part while also supporting the Township in developing a Safe System with Safe Street Design and Safe Speeds in West Orange.

¹NJ Safe Passing Law (<https://www.njoag.gov/about/divisions-and-offices/division-of-highway-traffic-safety-home/division-of-highway-traffic-safety-pedestrian-safety/>)



ZERO TRAFFIC-RELATED DEATHS AND SERIOUS INJURIES IN WEST ORANGE TOWNSHIP BY 2030!

SIGN TO PLEDGE

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Nate Craig

Alexa Casanova
Spiderman
Black Panther
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Chanda Skyrni
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Kimya Woodridge
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Dale Kagan
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Luz Finkler
Izzy Pincham
Nikogan Miller
Dana Boush
Udalyne Miel

TRAFFIC SAFETY TRENDS

CRASH DATA ANALYSIS OVERVIEW

Vision Zero is data-driven, with fatal and severe injury (KSI)¹ crashes as the focus of the analysis.

The process began with an understanding of where and why fatal and injury crashes occurred in West Orange, revealing the factors that contributed to the crashes and suggesting the appropriate countermeasures to address them.

In November 2022, the project team obtained crash data from NJDOT's Safety Voyager crash tool, and from NJDHTS's Numetric Tool. Seven (7) years of crash data were downloaded (2015 through 2021) for analysis. A technical memorandum of the detailed crash data analysis was submitted and is on file with West Orange Township and NJDOT. Key findings are highlighted in the following pages.

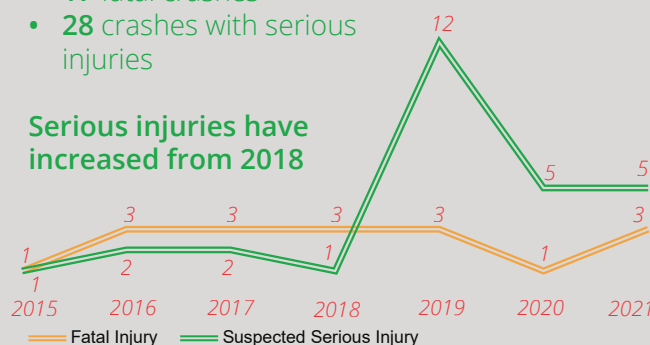
According to Safety Voyager data, a total of 8,548 crashes occurred within West Orange Township from 2015-2021. This is equivalent to over three crashes occurring every single day in West Orange. During the same time period, there occurred 17 fatal crashes and 28 severe injury crashes, averaging over two fatal crashes and four severe injury crashes per year. While acknowledging that West Orange Township will only have direct control over crashes occurring on local streets, this analysis includes all crashes within the Township including county roads and state highways such as I-280 and Route 10. Overall, the total number of fatal crashes has stayed the same over the 7-year period; however, severe injury crashes have steadily increased.²

Vision Zero focuses on crashes where victims are seriously injured or killed

From 2015-2021 in West Orange Township:

- 17 fatal crashes
- 28 crashes with serious injuries

Serious injuries have increased from 2018



¹ Crashes where victims are Killed or Seriously Injured

² In 2019, New Jersey updated the police crash report to be consistent with the federally required injury classifications that may have resulted in the jump in severe injuries in 2019. The HIN development takes into account fatal, severe and minor injury crashes to account for this change.

Figure 1. All Crashes Map (2015-2021)

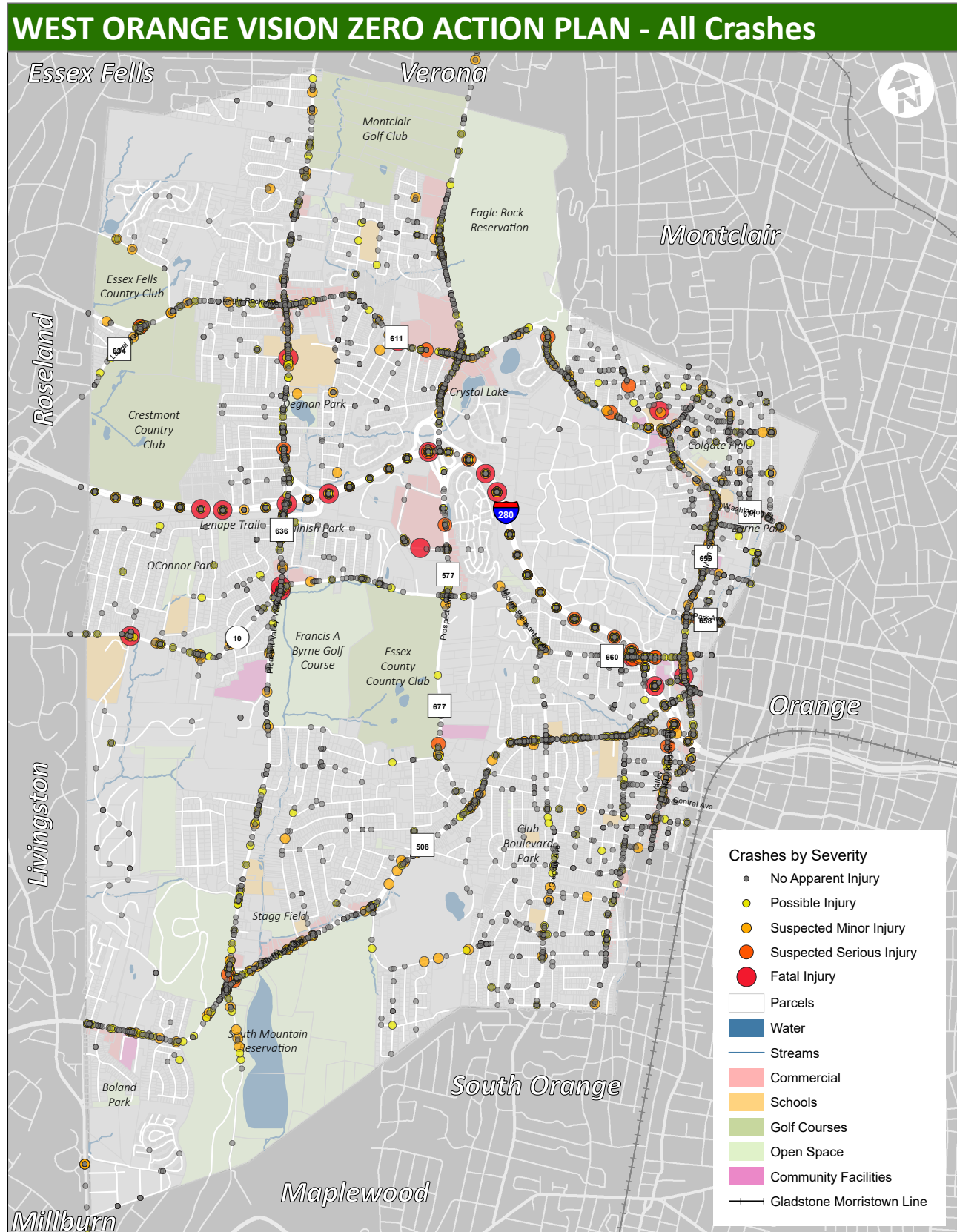
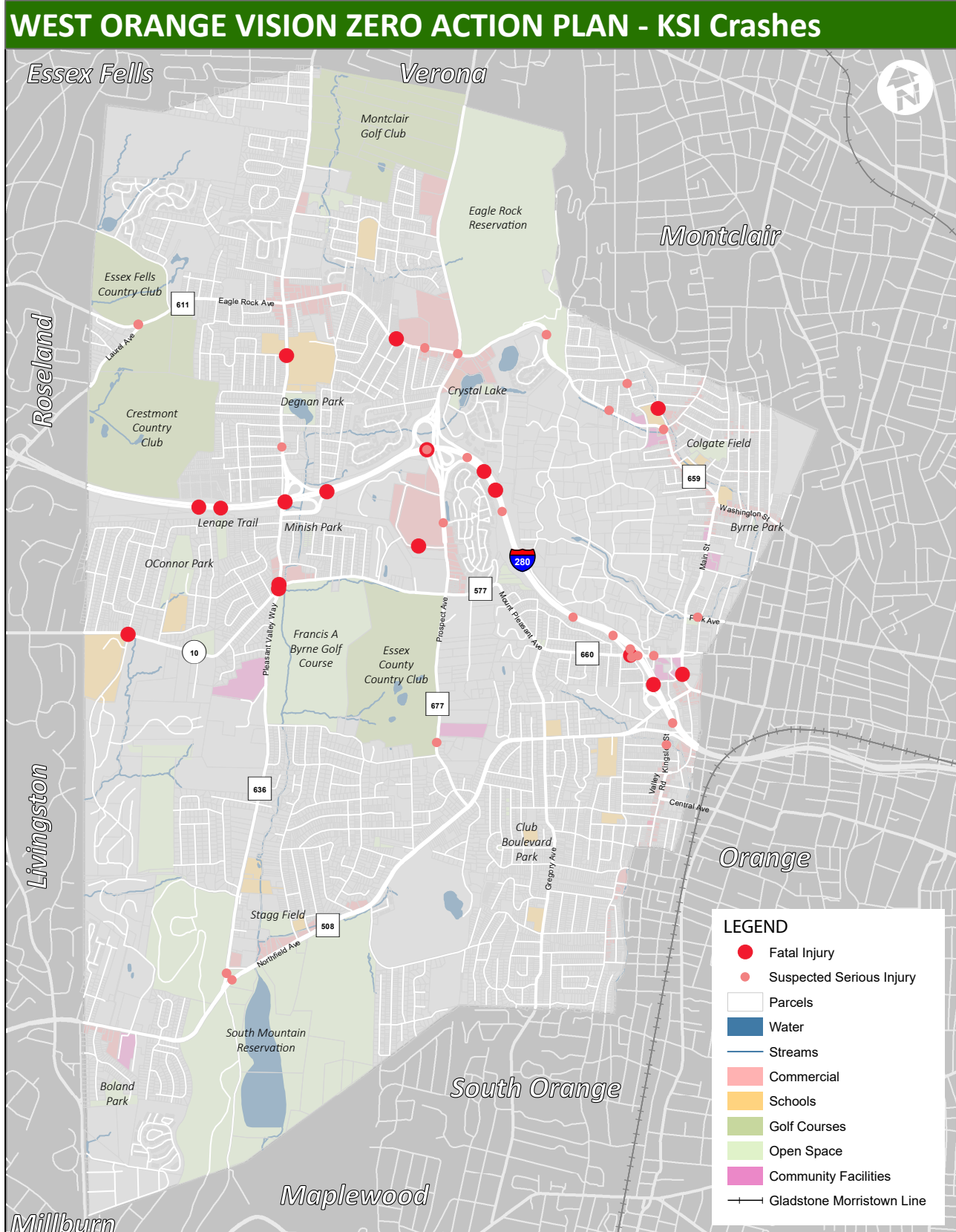


Figure 2. Severe and Fatal Injury (KSI) Crash Map (2015-2021)



Seniors and minors are more at risk of serious injury and death in crashes

Of all Crashes in West Orange

- Young People involved: **23%**
- Seniors Involved: **30%**

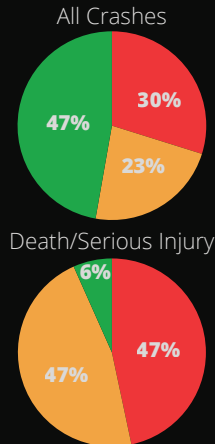
Of all Death & Serious Injuries

- Young People: **47%**
- Seniors: **47%**

● **Adults (20-64)**

● **Young People (<20)**

● **Seniors (65+)**



Source: NJDOT Safety Voyager & NJDHTS Numetric, Crash Data from 2015-2021

Pedestrians and bicyclists have high death and injury rates in crashes

In West Orange:

- 1% of **crashes** involved PEDESTRIANS
- 0.4% involved BICYCLISTS

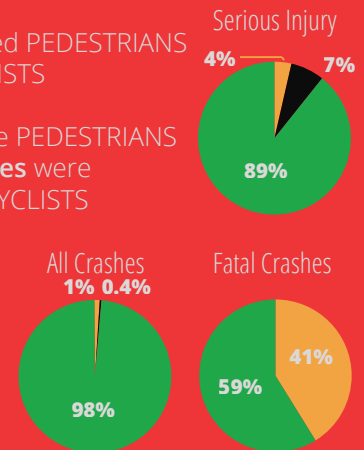
yet:

- 41% of **fatalities** were PEDESTRIANS
- 11% of **serious injuries** were PEDESTRIANS OR BICYCLISTS

● **Vehicles**

● **Pedestrians**

● **Bicyclists**

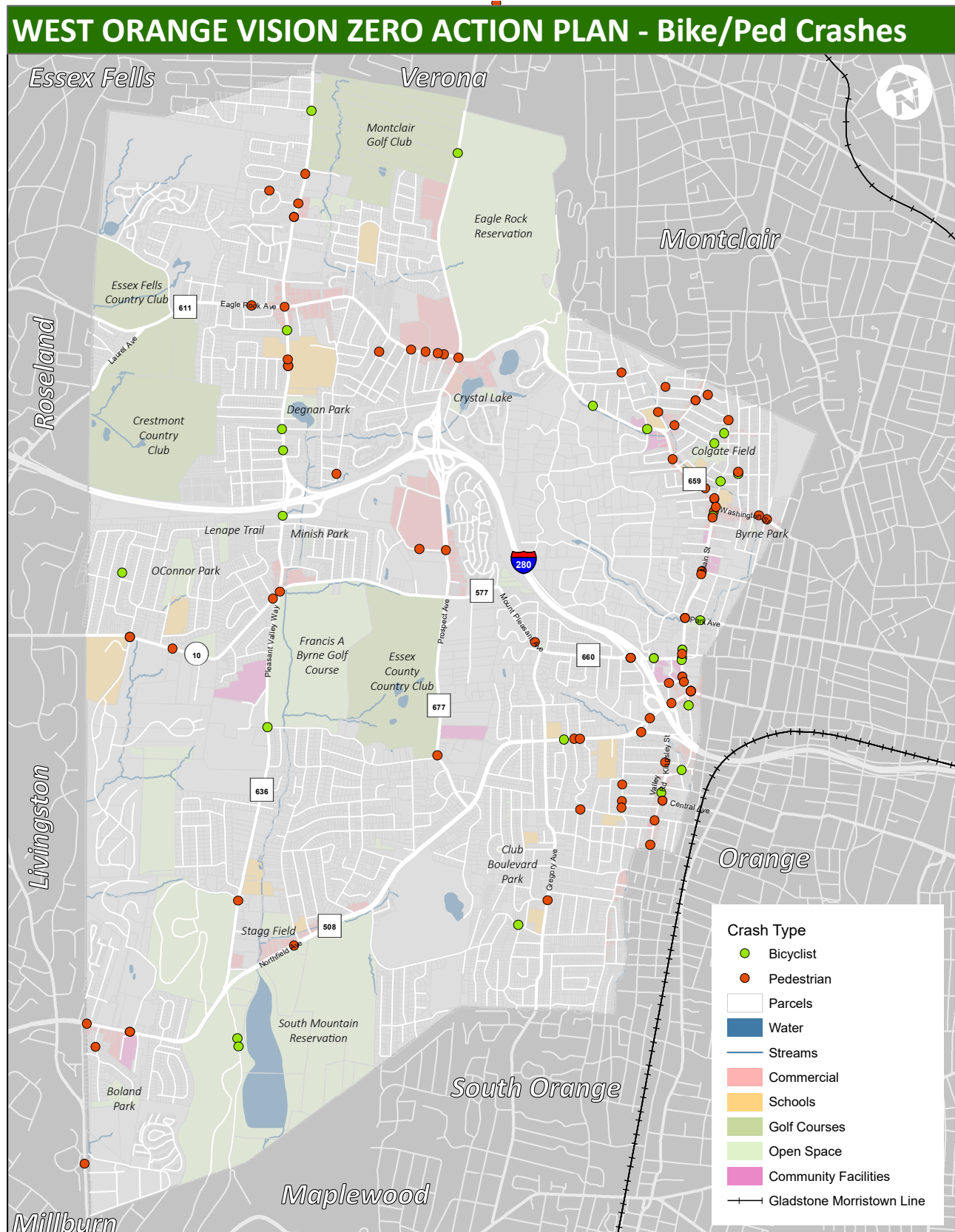


Vulnerable road users such as seniors, minors, pedestrians and bicyclists are most at risk of a fatal or severe injury.

During the study period, children (19 and under) were involved in 23% of all crashes, but 47% of KSI crashes. Similarly, seniors (65+ years) were involved in 30% of all crashes but 47% of KSI crashes. Pedestrian and bicyclist crashes accounted for 1.4% of all crashes from 2015-2021 in West Orange Township, but 41 % of the fatalities involved pedestrians and 11 % of KSI crashes involved bicyclists or pedestrians.



Figure 3. Bicyclist and Pedestrian Crash Map (2015-2021)



Source: NJDOT Safety Voyager data, 2015-2021

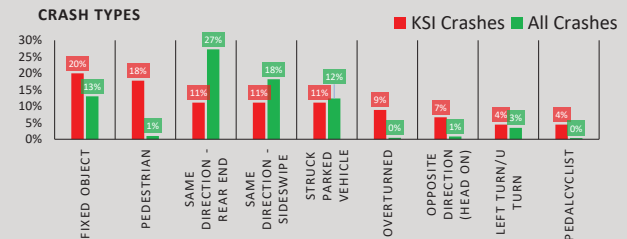
Pedestrian, rear-end, and certain other types of crashes are particularly dangerous.

Of the 8,548 crashes from 2015-2021, the most common type was a rear-end crash, with 2,332 (27%), and the other most common types were same-direction sideswipes (1,556, 18%), fixed object crashes (1,114, 13%), crashes with parked vehicles (1,059, 12%) and right angle ("T-bone") crashes (787, 9%).

As mentioned earlier, crashes involving pedestrians and bicyclists tended to be more severe than other crash types. In addition, more than 53% of the collisions were either fixed object, rear-end/sideswipe or vehicles striking parked car crashes.

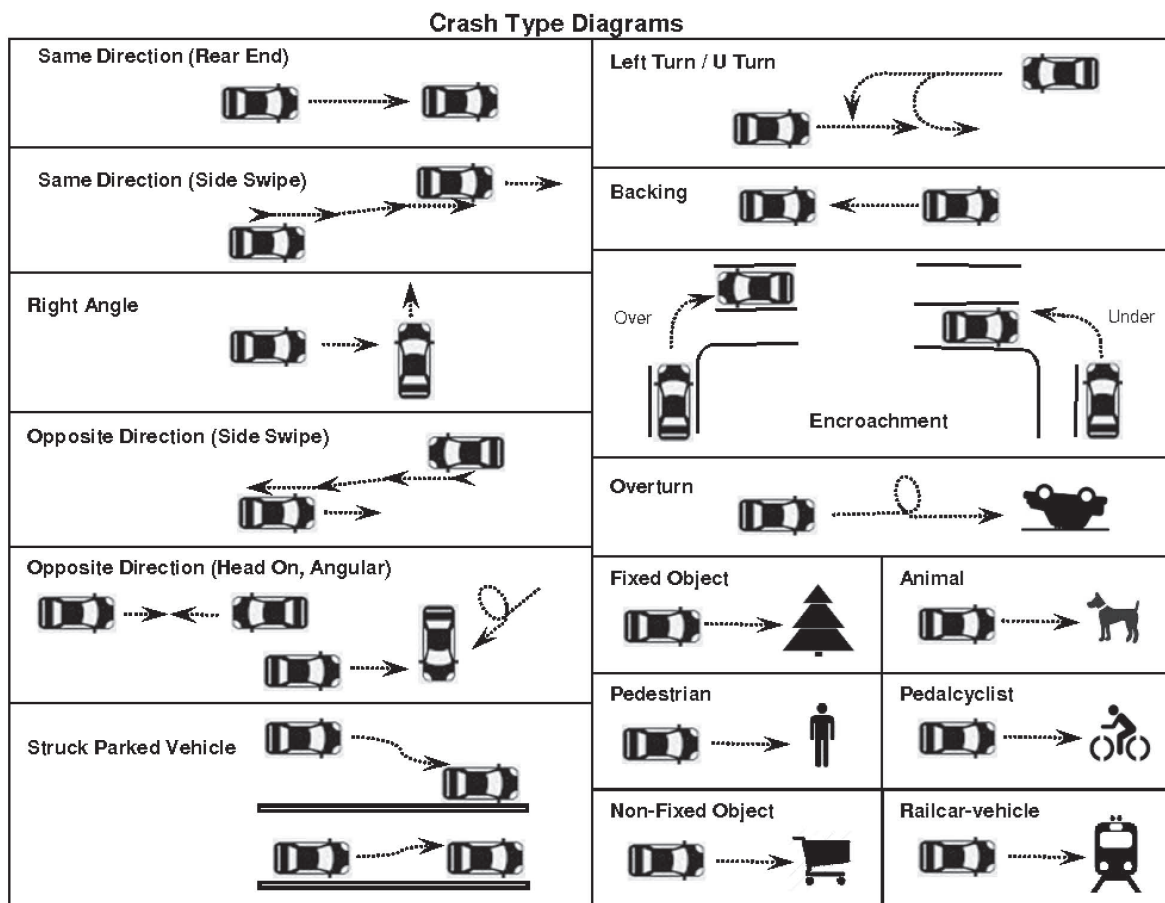
Some crash types can be more severe than others

While the most common kinds of crash in West Orange involve cars hitting cars (Rear-End 27%, Same-Direction Sideswipe 18%), the most common kinds of crash with serious injury or death involve cars hitting other things (Fixed Object 20% [13% of all crashes], Pedestrian 18% [1% of all crashes]).



Source: NJDOT Safety Voyager & NJDHTS Numetric, Crash Data from 2015-2021

Figure 4. Crash Types (NJTR-1 Form)



At intersections, right-angle, rear-end, and sideswipe crashes are the most common types of crashes, with pedestrian, bicyclist and left-turn/u-turn making up the majority of the KSI crashes.

Of 2,044 intersection crashes from 2015-2021 in West Orange, there were three primary crash types: right angle (499, 24.75%), rear-end (495, 24.55%), and same direction - sideswipe (365, 18.11%). Two additional types were common: left turn / u-turn (195, 9.67%) and fixed object (156, 7.74%).

Twelve KSI crashes occurred at intersections. The most common type was pedestrian crashes (5, 41.67%), and the others with more than one death or serious injury were left turn / u-turn and bicyclist (2 of each, or 16.67%).

Distracted driving and unsafe speed were the top driver-contributing factors in all crashes and KSI crashes.

Distracted driving accounted for nearly 56% of the KSI crashes and 56% of all crashes in West Orange from 2015 to 2021. Unsafe speed was a factor in almost 13% of the KSI crashes and 8% of all crashes. Of the other KSI crash causes, alcohol involvement contributed to 2% of all crashes but 9% of KSI crashes, drowsy/fatigued driving contributed to 1% of all crashes, drugged driving contributed to 2% of all crashes but 4% of KSI crashes, and cell phone use contributed to 0.6% of all crashes but 2% of KSI crashes.

Driving straight ahead, negotiating curves and being parked are the top pre-crash actions for KSI crashes.

From 2015 to 2021, driving straight ahead was the most common pre-crash action in both KSI crashes (71%) and crashes at large (67%) in West Orange Township. Being parked is the second most common pre-crash action in all crashes (17%) and third most common pre-crash action in KSI crashes (13%). However, while being stopped in traffic is the third most common pre-crash action in all crashes (15%), it is not common in KSI crashes (4%). Conversely, the second most common pre-crash action in KSI crashes is negotiating a curve (18%), a behavior which is present in 3% of all crashes.

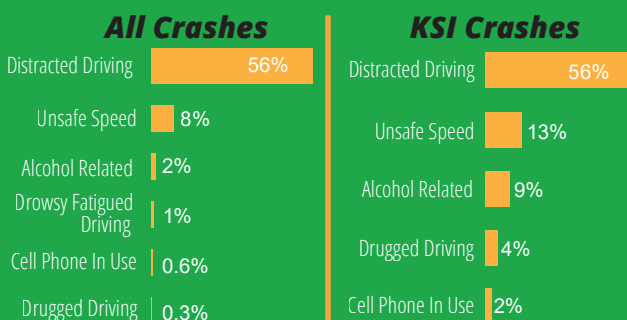
What are the leading causes of crashes?

In West Orange:

Distracted Driving - most common cause of crashes (57%); 56% of crashes in which victims were killed or seriously injured (KSI)

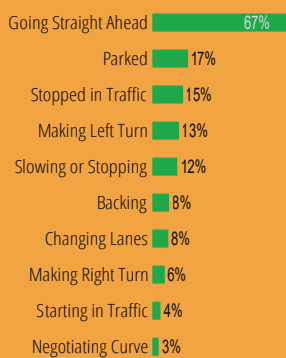
Unsafe Speed - 8% of all crashes; 13% of KSI

Alcohol-related - 2% of all crashes; 9% of KSI

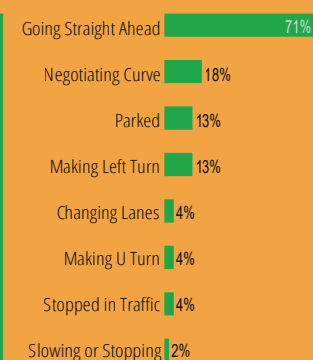


What are people doing when they crash in West Orange Township?

The most common pre-crash actions in all crashes:



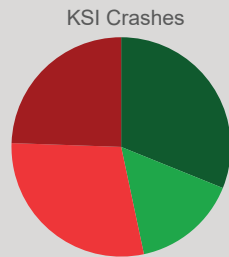
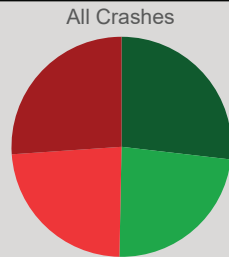
In crashes where people were killed or seriously injured:



Which seasons see the most crashes?

In West Orange, **crashes** were distributed roughly **evenly throughout the seasons**, with slightly more in Fall and Winter. **KSI crashes** occurred **more frequently in Winter** than any other season, and **Spring saw fewer** than the other seasons.

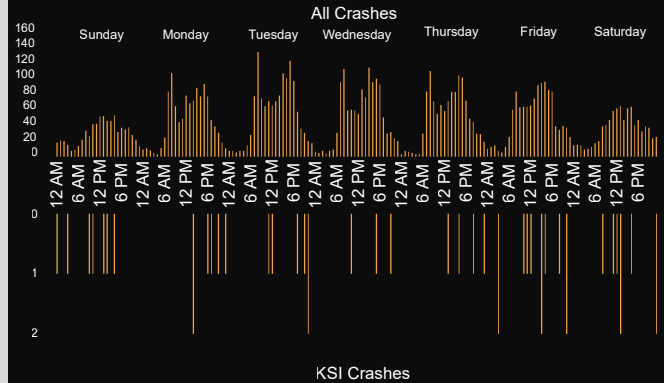
- **Spring (Mar-May)**
- **Summer (Jun-Aug)**
- **Fall (Sep-Nov)**
- **Winter (Dec-Feb)**



When do crashes happen?

In West Orange, there were more crashes **on weekdays**, spiking at **rush hour**. **Sunday** had the least crashes overall.

Conversely, KSI crashes occurred most often **on weekends**, with many occurring at night.



Source: NJDOT Safety Voyager & NJDHTS Numetric, Crash Data from 2015-2021

More fatal crashes occurred in the winter months (December-February) and more severe injury crashes occurred in the summer months (June-August).

Of the 8,548 total crashes from 2015-2021, October and January had the highest crashes (845 and 830 respectively). In terms of day of the week, Tuesday accounted for the highest percentage (approximately 17%) of crashes with the remainder of weekday crashes distributed relatively evenly over the other four days. By comparison, there were fewer crashes on the weekend than weekdays. Weekdays saw a consistent trend of crashes during rush hours, with the largest spikes coming during the morning rush hour.

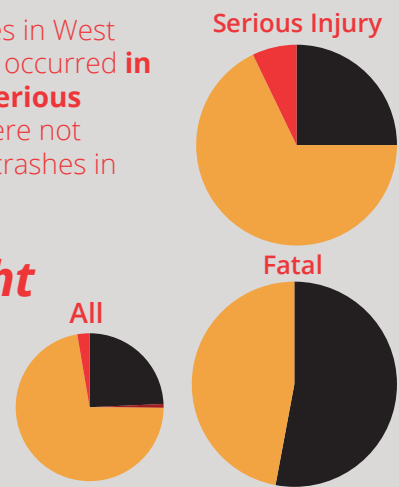
More than half of the fatal crashes and a quarter of the severe injury crashes occurred in the dark.

From 2015-2021, nine of the 17 fatal crashes (53%) occurred in the dark in West Orange, with seven of those fatalities occurring in locations with streetlights. While a majority of all crashes (71%) and KSI crashes (60%) occurred during daylight conditions, about 20% of all collisions and 27% of KSI collisions occurred in the dark in locations with street lights on, suggesting a need for further lighting analysis. About 4% of all crashes and 9% of KSI crashes occurred in the dark at locations with no street lights or street lights off. Majority of all crashes (76%) and KSI crashes (87%) took place during dry and clear roadway conditions

Light conditions were a factor in fatal crashes

Most **fatal** crashes in West Orange Township occurred **in the dark**, while **serious injury** crashes were not different than all crashes in terms of lighting

- **Daylight**
- **Dark**
- **Dawn**
- **Dusk**



Source: NJDOT Safety Voyager & NJDHTS Numetric, Crash Data from 2015-2021

Source: NJDOT Safety Voyager data, 2015-2021

Almost half of KSI crashes occurred on County roads, and a third occurred on I-280.

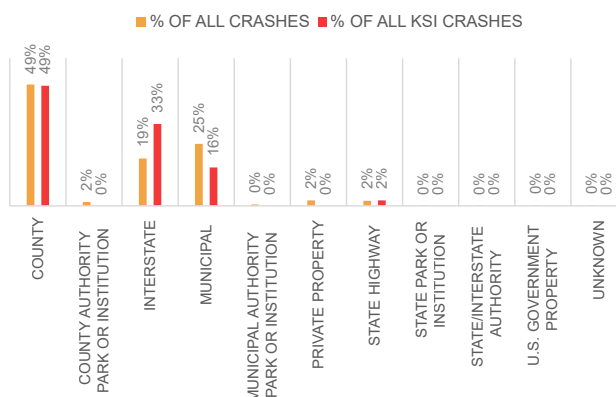
Almost half of all crashes in West Orange from 2015-2021 took place on County roadways, which also saw 49% of KSI crashes. Municipal roadways accounted for 25% of all crashes and 16% of KSI crashes. State roads only saw 2% of crashes and 2% of KSI crashes, and I-280 (the only Interstate in West Orange) saw 19% of crashes and 33% of KSI crashes.

Significant numbers of crashes (34%) and KSI crashes (27%) took place on roads with a posted speed limit of 25 MPH, including 59% of all crashes involving bicyclists or pedestrians.

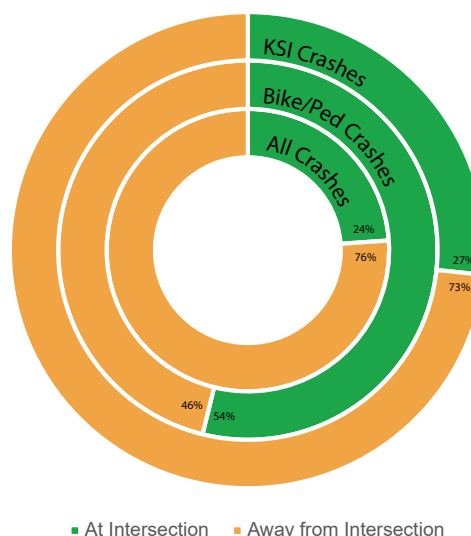
Majority of the bicyclist and pedestrian crashes occurred at intersections, while majority of KSI crashes occurred in locations away from intersections.

Approximately 24% of all crashes and 27% of KSI crashes in West Orange from 2015-2021 occurred at intersections. Of the KSI crashes, 29% of fatal crashes and 25% of serious injury crashes occurred at intersections. Over half (54%) of all crashes involving bicycles or pedestrians occurred at intersections, and seven of the ten total KSI crashes involving pedestrians or bicyclists occurred at intersections.

CRASHES BY ROAD SYSTEM



Crashes at Intersections



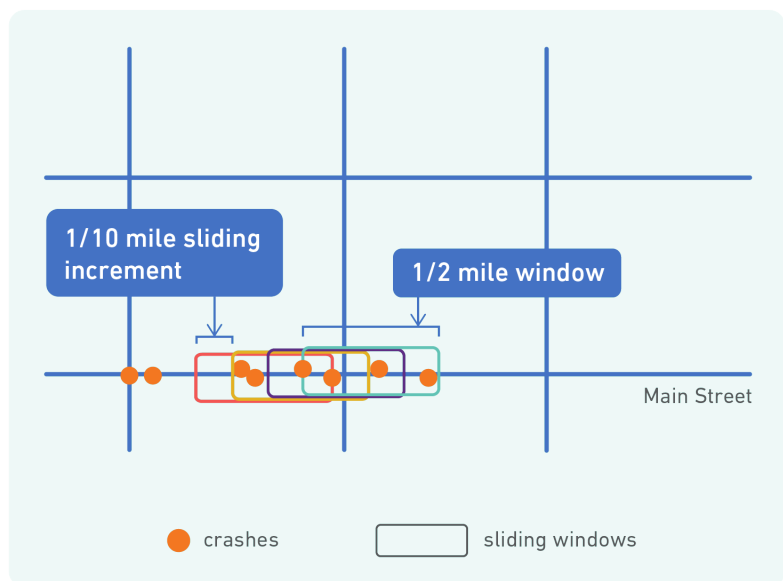
HIGH-INJURY NETWORK

A High-Injury Network (HIN) identifies focus areas and strategies for the Vision Zero Action Plan. A HIN is typically a network of streets with a high incidence of fatal and severe injury crashes. The HIN network also incorporates additional factors such as environmental justice data, roadway characteristics, and local context.

Methodology

HINs are typically developed by analyzing only fatal and severe (KSI) crashes. However, in certain places where the fatal and severe crash counts are lower, this may result in sparse or patchy results. Therefore, moderate injury crash data was used along with fatal and severe crashes. In addition, for vulnerable users such as pedestrians and bicyclists, the difference in circumstances that result in a minor injury opposed to severe injury crash is minimal and a minor injury crash can become a severe injury for a vulnerable user if the speed or angle of crash is only slightly higher. For the purposes of this HIN development, the fatal (K), severe (A), and moderate injury (B) crashes were analyzed for the study period (2015-2021)³.

Figure 5. Sliding Window Analysis Methodology



The project team developed the HIN using the Safer Streets Priority tool by Toole Design Group that utilizes a sliding window analysis to develop high-injury corridors for pedestrians, bicyclists and vehicles (or other crashes). The sliding window analysis uses a 1/2 mile window and 1/10 mile increment across all corridors to identify high-injury crash concentration for each segment of roads in West Orange (see Figure 5).

³New Jersey utilizes the KABCO Injury Classification scale to evaluate the severity of a car crash. The scale is setup as:

K: Killed (Victim is deceased),

A: Incapacitated (Victim has a non-fatal injury. Cannot walk, drive or normally continue the activities that they could perform before the motor vehicle crash),

B: Moderate Injury (An evident injury, other than fatal and incapacitating. Injury is visible, such as a lump on head, abrasion, bleeding or lacerations.)

C: Complaint of Pain (A reported or claims of injury that is not fatal, incapacitating or moderate. Injury is not visible to the investigating officer.)

O: Property Damage Only (No injury)

The HIN score assigns a higher weight to the most severe crashes. The HIN score is calculated by multiplying the number of Fatal (K) and Incapacitating Injury (A) crashes by 3, and multiplying the number of Non-Incapacitating Injury (B) crashes by 1. Once the weights are established and applied to the crashes, the total number of crashes are aggregated along a corridor while incorporating the crash severity weighting. Possible Injury (C) crashes and Property Damage Only (O) crashes are not reflected.

Separate weighted HINs were developed for each mode (pedestrian, bicycle and motor vehicle) based on different thresholds. The Pedestrian HIN includes all segments with a score of 1 or greater and covers ~17 miles or 10% of West Orange roads. The Bicyclist HIN includes all segments with a score of 1 or greater and covers ~8 miles or 5% of West Orange roads. The Vehicular HIN includes all segments with a score of 5 or greater and covers ~22 miles or 13% of West Orange roads. The combined HIN included all three of the individual-mode HINs and covers about ~34 miles or 20% of all West Orange roads.

HIN Intersections

Intersections were rated using the same criteria the project team developed to create the High-Injury Network. The top two, Eagle Rock Avenue (Route 611) and Laurel Avenue (Route 634) and Mt Pleasant Avenue (Route 660) and Laird Drive, were also the only intersections with multiple KSI crashes. The next three, with ratings of 5, were also intersections with a KSI crash.

Table 1. High-Injury Crash Intersections

High-Injury Crash Intersections		
Crash Location	Cross Street	Rating
Eagle Rock Avenue (CR 611)	Laurel Avenue (CR 634)	10
Mt Pleasant Avenue (CR 660)	Laird Drive	9
Pleasant Valley Way (CR 636)	Mt Pleasant Avenue (NJ 10)	5
Mt Pleasant Avenue (CR 660)	Brennan Drive	5
Park Avenue (CR 658)	Main Street (CR 659)	4
Main Street (CR 659)	Northfield Avenue (CR 508 Spur)	4
Harrison Avenue	Mississippi Avenue	4
Northfield Avenue (CR 508)	Cherry Lane / Pleasant Valley Way (CR 636)	3
Cobane Terrace	Northfield Avenue (CR 508)	3
Eagle Rock Avenue (CR 611)	Pleasant Valley Way (CR 636)	3
Eagle Rock Avenue (CR 611)	Valley Way	3
Pleasant Valley Way (CR 636)	Hoover Avenue	3
Kingsley Street	Valley Road	3
Main Street (CR 659)	Lindsley Avenue	3
Mt Pleasant Avenue (NJ 10)	Kelly Drive / Merklin Avenue	3
Northfield Avenue (CR 508)	Giraffe Way	3
Northfield Avenue (CR 508)	Walker Road	3
Prospect Avenue (CR 577)	Guerino Drive	3

Figure 6. High-Injury Network Map

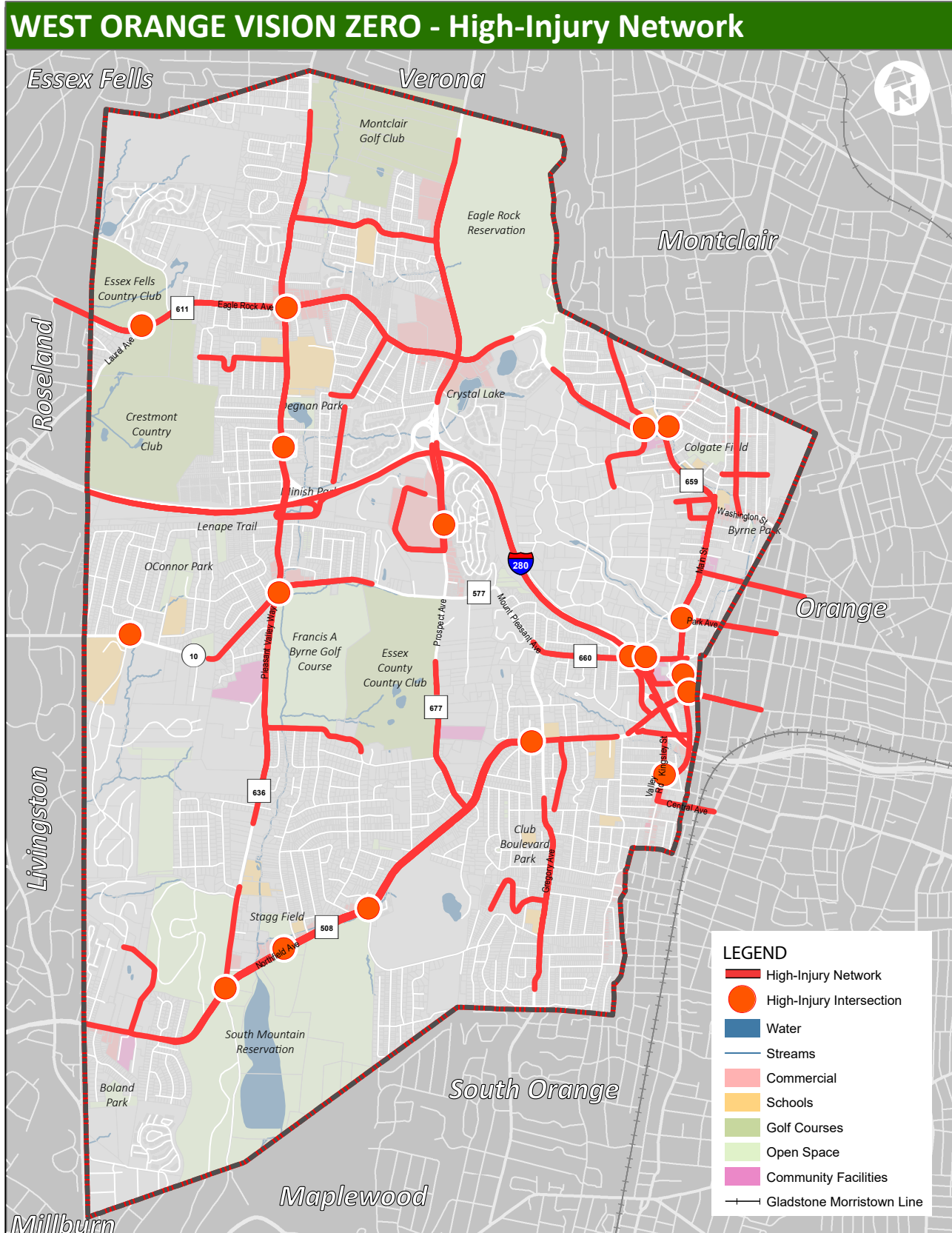
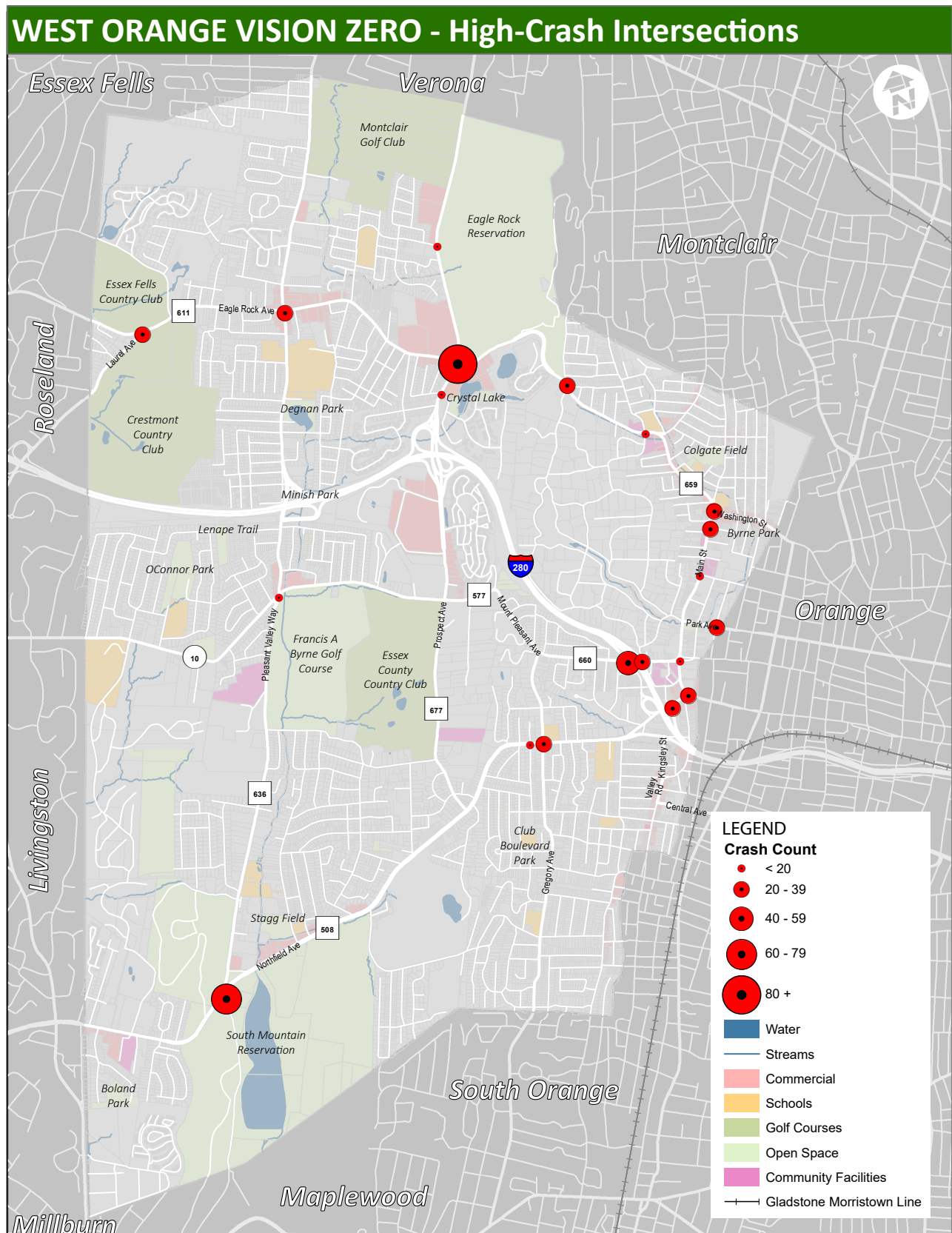


Figure 7. High Crash Intersections Map (2015-2021)



Source: NJDOT Safety Voyager data, 2015-2021

ENVIRONMENTAL JUSTICE

In the context of Vision Zero, it is important to acknowledge that many groups face different barriers to safe travel on the road network. Because the needs of certain groups vary, identifying the locations of various vulnerable groups is important for the prioritization of improvements across West Orange.

Equity Factors

The North Jersey Transportation Planning Authority's Equity Analysis Tool assesses census tracts based on the status of populations included in US Executive Order 12898 on Environmental Justice and in Title VI of the US Civil Rights Act. There are 11 factors through which populations are assessed in this tool based on their respective share of each: Minority, Low Income, Limited English Proficiency, Disability, Age (<5 years old, 5-17 years old, 65+ years old), Foreign-Born, Female Population, Zero-Vehicle Households, and Educational Attainment (less than high school degree).

For this demographic analysis, the team analyzed the following nine factors, as identified by the Vision Zero Task Force, per NJTPA's Equity Analysis Tool:

- *Minority - The minority factor identifies populations described in Title VI of the Civil Rights Act, FHWA and FTA's Title VI guidelines and Executive Order 12898, all of which prohibit discrimination based on race. Data collected for this factor include all persons who are not single-race White and Non-Hispanic or Latino.*
- *Low Income Households - The low income factor addresses one of the population groups defined in Executive Order 12898 on Environmental Justice (EJ) as well as the Federal Highway Administration and Federal Transit Administration's guidance on EJ policy. These policies seek to identify impacts of transportation investments, programs and projects on low-income people. Data collected for the factor represents a percentage of a specific geographic area's population in households where the household income is less than or equal to twice the federal poverty level.*
- *Limited English Proficiency - This factor addresses Title VI and Executive Order 13166, as well as FTA's Title VI guidance that requires recipients of federal funding to "take reasonable steps to ensure meaningful access to their programs and activities by LEP persons." Data collected for the factor represents all people in the region who speak a language other than English, and those who speak English less than very well.*
- *Disability - Title VI requires agencies receiving federal funding to adhere to Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990. These acts protect people with disabilities against discrimination. Data collected for this factor represents any person who indicated having one or more physical or mental disabilities.*
- *Age: FHWA's EJ recommendation and Additional Nondiscrimination Requirement suggests including children and elderly populations in discussions regarding traditionally underserved populations. Three factors were created to represent distinct age cohorts: youth, adolescents and elderly populations. Data collected for the factors represents individuals under 5 years of age, individuals between 5 and 17, and individuals 65 years old and older.*

- **Foreign-Born** - *The foreign-born factor represents populations included in Title VI of the Civil Rights Act and FHWA's and FTA's Title VI requirements and guidelines, all of which prohibit discrimination of persons in the United States based on national origin. Data collected for the factor represents all people who have indicated that they were not born in the United States.*
- **Zero-Vehicle Households** - *The zero-vehicle households factor should be interpreted in concert with other measures. For example, a community well served by various mass transit modes may have a larger share of zero vehicle households, because a personal vehicle is not considered a necessity. For some, not owning a car is a lifestyle choice and not an indicator of an economically disadvantaged population. Looking at this measure alone may not provide an accurate picture of communities most in need. Data collected for the factor represent all households who have indicated that they do not have a car.*

The percentage of the population falling into these categories is statistically assessed relative to regional averages, with a following scale of:

0 = Very Below Average

1= Below Average

2 = Average

3 = Above Average

4 = Very Above Average

These numeric ratings are based on the standard deviation from the NJTPA regional averages for each factor, with 0 and 1 being beyond two and one standard deviations below the average respectively, and 3 and 4 being beyond one and two standard deviations above the average respectively.

Overall Equity Analysis

There are nine census tracts in West Orange as shown in Figure 9. These maps show the location of census tracts in West Orange that fall into the "Above Average" rating for each equity factor. It is worth noting that West Orange does not have any tracts with a rating of Very Above Average for any of these categories. The following table shows the overall West Orange Township equity data compared to Essex County data.

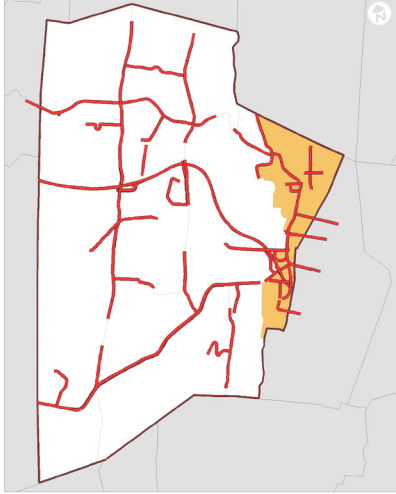
Table 2. Equity Factors in West Orange and Essex County

Equity Factor	West Orange	Essex County
Minority	55.5%	70.9%
Low Income Households	10.5%	31.8%
Limited English Proficiency	10.5%	15.6%
Disability	9%	11.5%
Children (Under 5 Years old)	5.1%	6.5%
Youth (5-17 Years old)	15.1%	17.4%
Seniors (65+ Years old)	19.3%	13.6%
Foreign Born	29.5%	28.7%
Zero-Vehicle Households	7.7%	22%

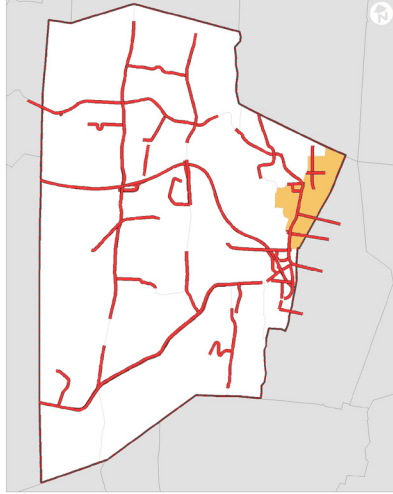
Figure 8. Equity Factors by Census Tract

Census Tracts with an "Above Average" Rating
— High-Injury Network

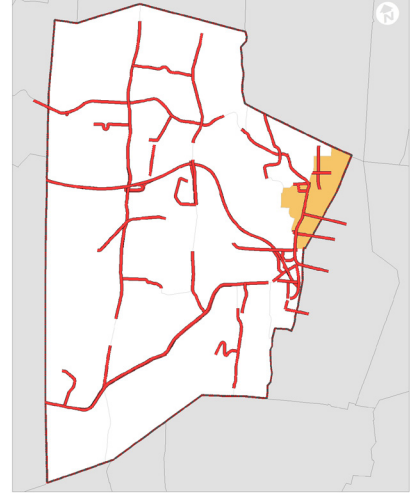
Minority



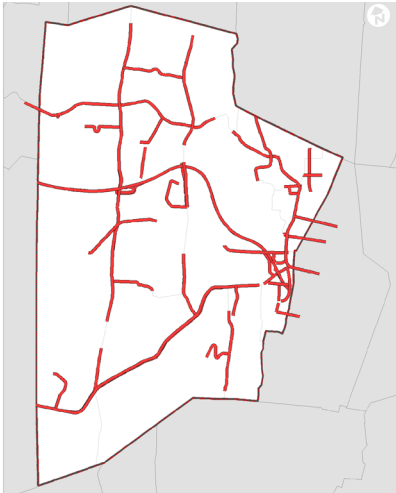
Low Income



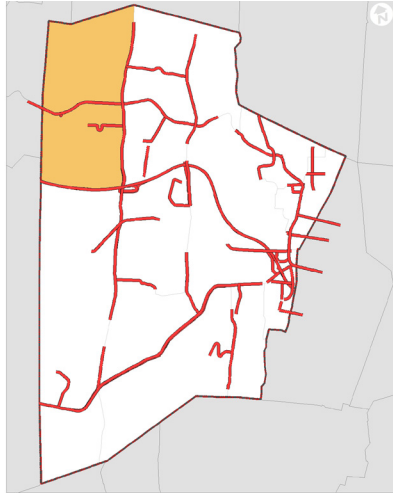
Limited English Proficiency



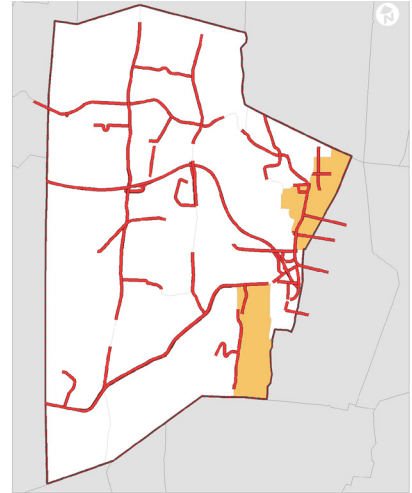
Disability



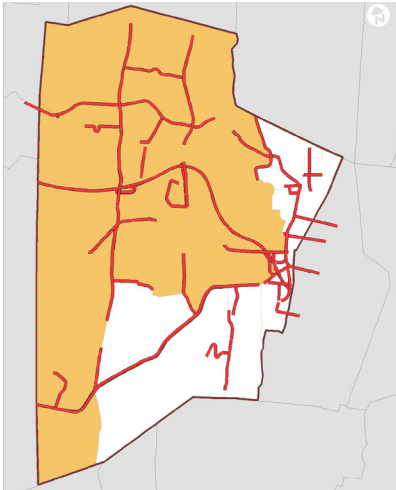
Children (Under 5 Years Old)



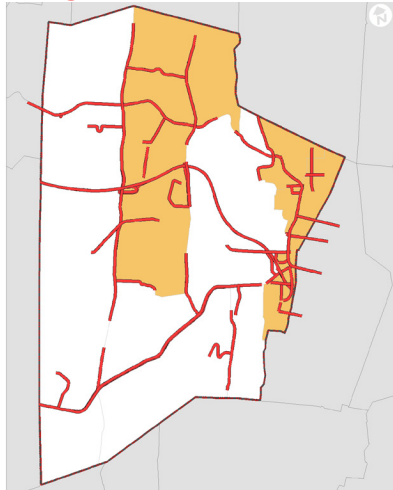
Youth (5-17 Years Old)



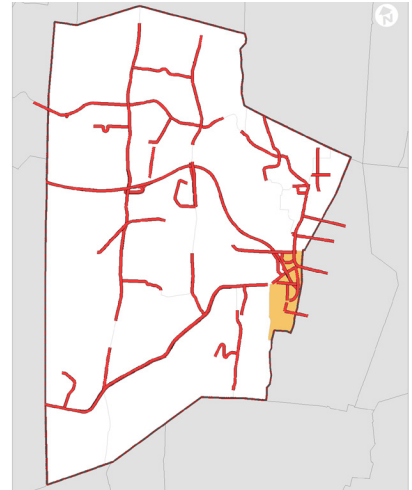
Seniors (Over 65 Years Old)



Foreign-Born



Zero-Vehicle Households

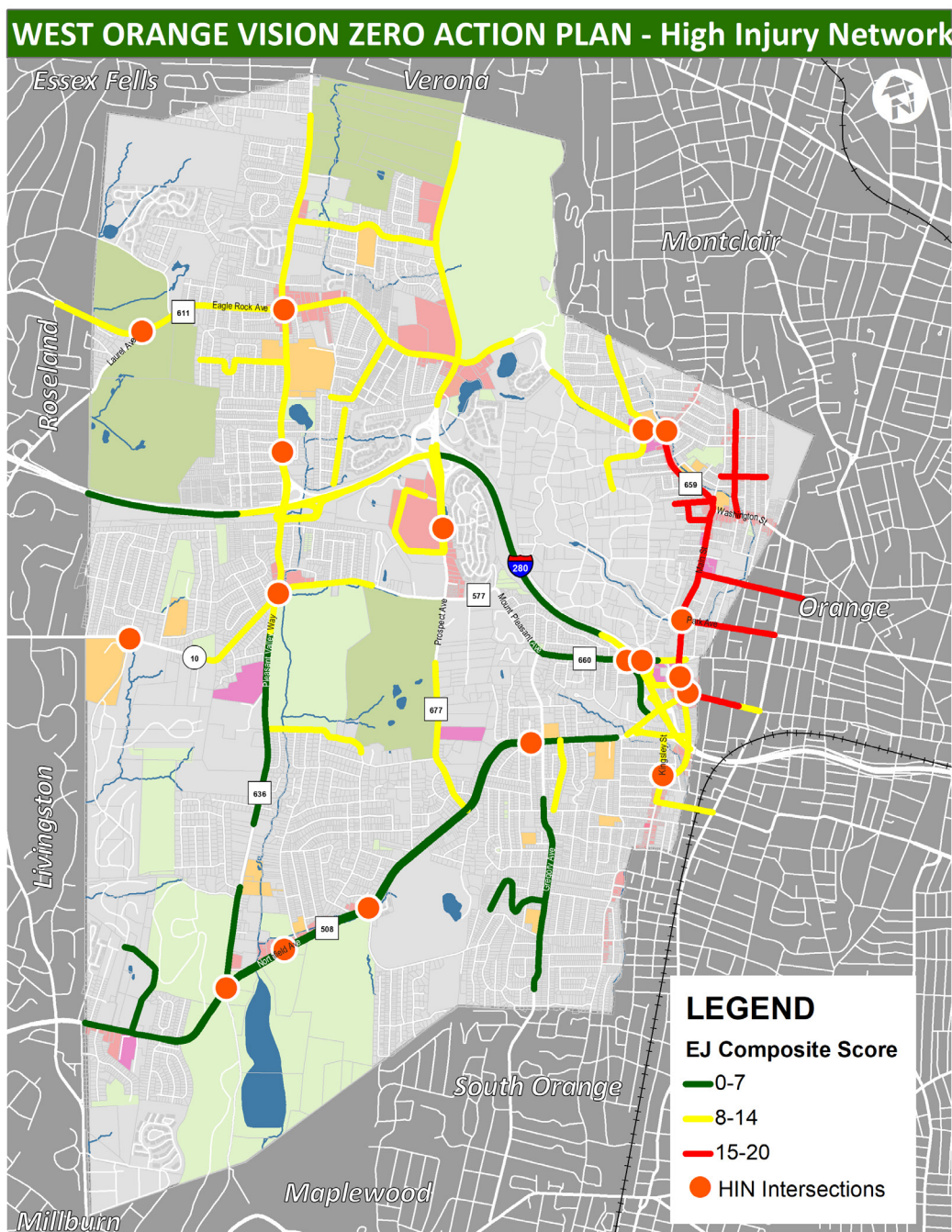


Source: NJTPA Equity Analysis Tool (2017-2021) and NJDOT Safety Voyager (2015-2021)

Environmental Justice Composite Score

The team then assigned an environmental justice score to each network segment using these factors to identify which network segments should be prioritized based on equity factors. All HIN network segments were given a composite score based on the highest average score for each factor. The figure below shows the HIN with priority segments based on the composite EJ score. The scores for each segment ranges from 0-20 with Main Street receiving the highest composite EJ score of 20.

Figure 9. High-Injury Network Environmental Justice Composite Score



Note: HIN corridors are all 0.5 miles, so some extend beyond West Orange borders

Source: NJDOT Safety Voyager data, 2015-2021

PRIORITIZED HIGH-INJURY NETWORK

Prioritized HIN

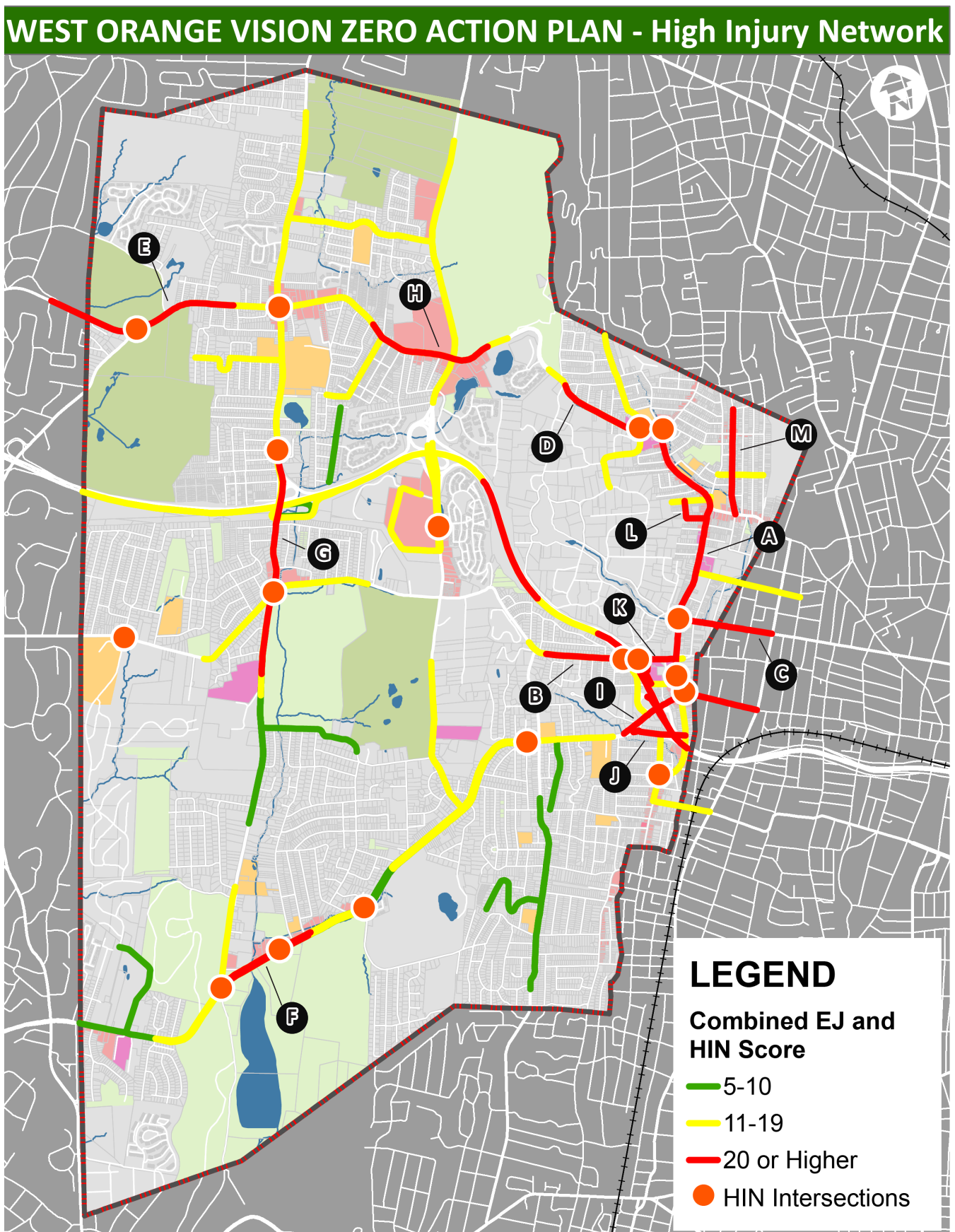
The project team developed the final recommended HIN by combining the EJ composite score and the HIN crash score. This HIN represents the high-injury (fatal, severe and moderate injury) crash corridors and intersections prioritized based on the equity analysis. While the entire HIN should be given consideration for safety enhancements, these highest-scored corridors are the highest priority based on this analysis. As noted in the earlier section, nine factors were analyzed to develop the composite EJ score. The individual and composite EJ scores for the corridors with a combined score above 20, shown in red in Figure 10, are given in Table 1. The scores for the rest of the segments are provided in Appendix D.

Table 3. Prioritized HIN Corridors - Road Details

HIN SEGMENT NO.	HIN Corridor	CROSS STREET 1	CROSS STREET 2	ROAD CLASSIFICATION	JURISDICTION	SPEED LIMIT	NO. OF LANES	COMPOSITE EJ / HIN SCORE
A	Main Street	Harrison Avenue	Township Border	Major Arterial	County	25	4	44
B	Mount Pleasant Avenue	Gregory Avenue	Main Street	Major Arterial	County	40	2 to 4	39
C	Park Avenue	Main Street	Township Border	Major Arterial	County	35	4	28
D	Eagle Rock Avenue	Harrison Avenue	Fairmont Terrace	Major Arterial	County	35	3 to 4	26
E	Eagle Rock Avenue	Township Border	Sherwood Place	Major Arterial	County	35	4	24
F	Northfield Avenue	Pleasant Valley Way	Sheridan Avenue	Major Arterial	County	40	4	23
G	Pleasant Valley Way	Old Indian Road	Mellon Avenue	Major Arterial	County	50	2 to 4	23
H	Eagle Rock Avenue	Phyllis Road	Smith Manor Boulevard	Major Arterial	County	35	4	22
I	Northfield Avenue	Whittingham Place	Main Street	Major Arterial	County	35	3 to 4	21
J	Whittingham Place	Northfield Avenue	Valley Road	Major Arterial	County	25	2 to 3	21
K	Gaston Street	Mount Pleasant	Lindsley Avenue	Local Road	Municipal	25	2	20
L	Sayres Place	Llewellyn Avenue	Main Street	Local Road	Municipal	25	1	20
M	Whittlesey Avenue	Samuel Street	Washington Street	Local Road	Municipal	25	2	20

Source: NJTPA Equity Analysis Tool (2017-2021) and NJDOT Safety Voyager (2015-2021)

Figure 10. Prioritized High-Injury Network



ENGAGEMENT OVERVIEW

The project team developed a multi-pronged approach to involve the community in developing the Vision Zero Action Plan. This included assembling a Vision Zero Task Force consisting of representatives from the various organizations in town.

To engage the public, the project team developed project flyers and outreach tools/materials that were presented and used at multiple public workshops and also posted on the Township's webpage.

The following engagement tools were created and engagement activities were conducted:

1. Vision Zero Website
2. Vision Zero Video Series
3. Vision Zero Safety Map
4. Vision Zero Safety Survey
5. Vision Zero Public Workshops



Pictured (from left): Brian Stankus, Lt. Pat Matullo, Sangeeta Badlani, Mayor Susan McCartney, Rachana Sheth, William Riviere, Ricardo Valderrama, Paul Grygiel, Jerry Guarino

VISION ZERO TASK FORCE

Vision Zero Task Force Members

The following organizations made up the West Orange Vision Zero Task Force:

- New Jersey Department of Transportation
 - Bureau of Safety, Bicycle, and Pedestrian Programs
- West Orange Township
 - Administration
 - Schools
 - Police/Safety
 - Fire
 - Senior Services
 - Health
 - Engineering
 - Planning
 - Environmental
- Essex County
 - Engineering
 - Planning
- West Orange Pedestrian Safety Advisory Board
- Families for Safe Streets New Jersey
- Nikhil Badlani Foundation
- Thomas Edison National Historical Park
- Downtown West Orange
- EZ Ride

The Vision Zero Task Force assisted with organizing outreach, providing valuable context and knowledge, and evaluation of the findings of this project. Meetings were held monthly to discuss these findings and to guide the continued efforts involved in creating the Vision Zero Action Plan. In these monthly meetings, the progress of the project was discussed along with new findings, and the Task Force's input was taken into consideration for future actions by the project team.



NJDOT BUREAU
OF SAFETY,
BICYCLE, AND
PEDESTRIAN
PROGRAMS



ENGINEERING,
PLANNING



ADMINISTRATION,
SCHOOLS, POLICE/
SAFETY, FIRE, SENIOR
SERVICES, HEALTH,
ENGINEERING,
PLANNING,
ENVIRONMENTAL

WEST ORANGE
PEDESTRIAN
SAFETY
ADVISORY
BOARD
(WOPSAB)



nikhil badlani foundation



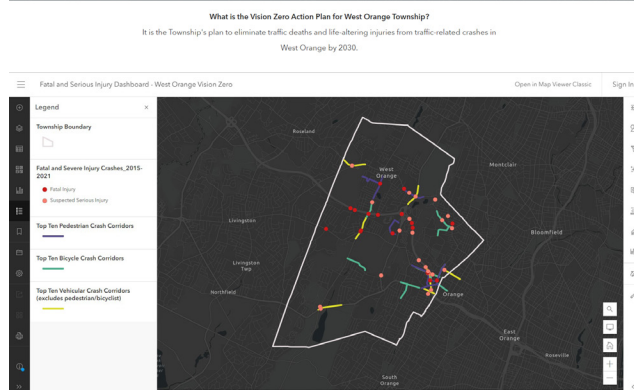
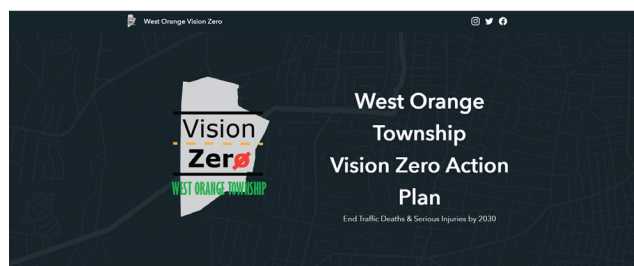
THOMAS
EDISON
NATIONAL
HISTORIC
PARK



OUTREACH TOOLS AND SUMMARY OF RESULTS

Project Website

An ArcGIS Hub website was created for this project as a central source for information regarding the Vision Zero Action Plan. This website contained links to surveys and mapping tools, relevant statistics and contact information for members and organizations involved in the project. The website included an interactive data dashboard where website visitors could view the locations of severe and fatal crashes as well as the top ten pedestrian, bicycle and vehicular crash corridors in West Orange.

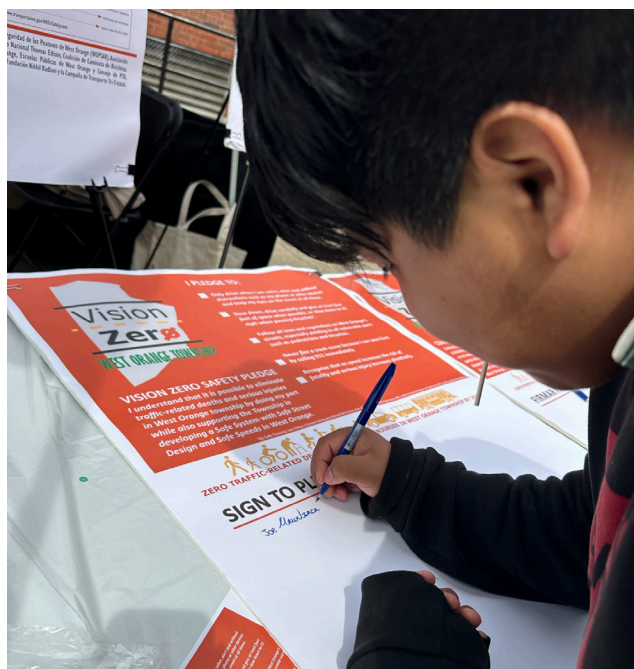


Safety Pledge

A safety pledge was developed for West Orange residents to sign, encouraging safe and responsible behavior on roadways. This pledge was distributed as a handout and made available on a large board with room for signatures at the two public workshops. The safety pledge ultimately accumulated over 70 signatures.

Vision Zero Community Safety Survey

To support the West Orange Vision Zero Action Plan, the project team created a survey that incorporated questions regarding the community's travel behaviors, knowledge of Vision Zero, interest in and prioritization of the various concepts and intents of Vision Zero, perceptions of safety across travel modes and perception of the community's present day needs. The survey was available in both English and Spanish, and was open from March to July 2023. A total of 454 surveys were completed. The team also created paper surveys with a mapping exercise to be shared with the Seniors and Older Adults Advisory Board. A detailed technical memorandum of the outreach summary was submitted and is on file with West Orange Township and NJDOT. Key findings are highlighted in the following pages, and all survey results are located in Appendix F.



Vision Zero and Safe System Approach

Respondents were asked about their awareness of Vision Zero and the Safe System Approach. 241 respondents (53%) were not aware of Vision Zero or the Safe System Approach. Of those who were, 96 (21%) were aware of both, 101 (22%) only knew about Vision Zero, and just 5 were only familiar with the Safe System Approach.

One question asked how important they felt a "policy and plan in West Orange Township that aims to eliminate deaths and serious injuries from traffic crashes" was to adopt in West Orange. Respondents overwhelmingly felt it was important: 379 respondents (83.5%) answered with "Very Important" with an additional 42 (9.3%) selecting "Important." Of those choosing a lower option, 14 (3%) selected "Moderately Important" and 2 (0.4%) selected "Of Little Importance."

Travel Modes and Concerns

Survey respondents were asked how often they typically travel using a variety of modes. In terms of walking, 312 respondents (69%) indicated "sometimes," with 107 (24%) selecting "most often" and 23 (5%) selecting "never". Bicycling was less common among these respondents, with 272 (60%) selecting "never," 120 (26%) selecting "sometimes" and just 15 (3%) selecting "most often."

When asked how safe they perceive walking to be, respondents were mixed, with "somewhat safe" the most common response (34%) but "very unsafe" (13%) more common than "very safe" (9%). Because bicycling was so uncommon, most chose the "not applicable" option (48%), but those that do bicycle largely perceive it as an unsafe activity in West Orange, with "very unsafe" (17%) the most common response and "somewhat unsafe" (14%) the second most common response; only 8% of respondents selected "somewhat safe" and just 1.5% selected "very safe."

Survey respondents were asked about the barriers to non-motorized forms of travel, with the ability to select all they felt applied. The most commonly selected barrier was that "the sidewalk network is incomplete/in need of repair" (63%); "speeding cars" (52%), "crossings feel unsafe" (46%), "distracted drivers" (44%), "there are no safe ways to bike such as bike lanes" (43%) and "driving is practical" (42%) were all selected by over 40% of respondents.

Equity and Safety Trade-Offs

Realistically, any safety improvements to the transportation network will require trade-offs in other areas; making the public aware of these helps them give informed opinions on these safety

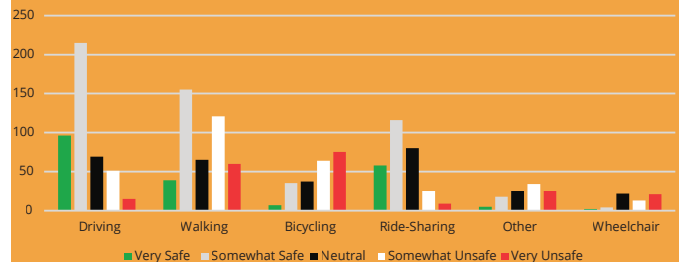
West Orange residents don't find walking or biking as safe as driving

Active Transportation Modes

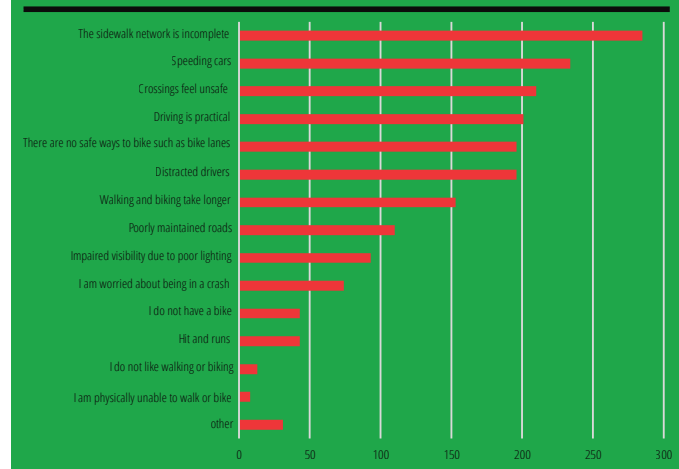
- Walking Safety - 9% "Very" & 35% "Somewhat"
- Bicycling Safety - 3% "Very" & 16% "Somewhat"

Motorized Transportation Modes

- Driving Safety - 22% "Very" & 48% "Somewhat"
- Ridesharing Safety - 20% "Very" & 40% "Somewhat"



Common barriers to active transportation in West Orange Township

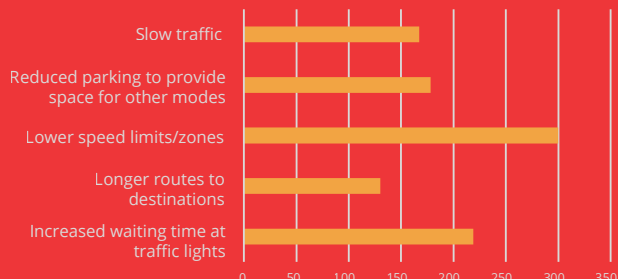


What would people accept for safer roads?

The most common tradeoffs to achieve safer roads for West Orange residents were:

- Lower speed limits/zones (66%)
- Increased waiting time at traffic lights (48%)

People were less enthusiastic about longer routes to destinations (29%)



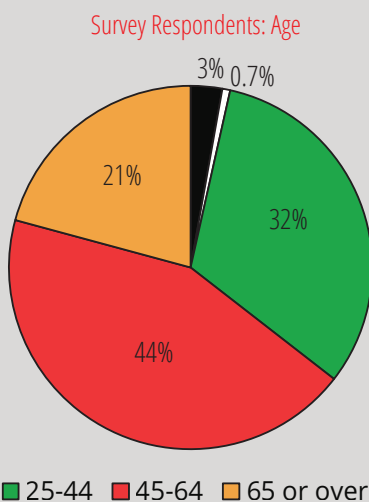
improvements. When asked about a selection of trade-offs in terms of their willingness to accept them, there were none with universal approval but also none that were broadly rejected. Lower speed limits/zones (66%) was the only option with over 50% acceptance; the remaining options were increased waiting time at traffic lights (48%), reduced parking to provide space for other modes (39%), slow traffic (36%) and longer routes to destinations (29%).

Respondents were asked about equity concerns in the implementation of traffic safety improvements for West Orange. Of the options presented, the most common selection (with multiple selections allowed) was "ensuring investment is equitably distributed" with 201 selections (44%), while "targeted enforcement in communities of color" received 120 selections (26%) and "cost of ticketing for limited income households" received 100 selections (22%).

Who did we hear from?

Of all the people who answered our survey:

- Most were 45 or older (65%)
- Few were under 24 years old (under 4%)
- 24% were either under 18 or a parent of a child under 18
- 98% were West Orange residents



Demographics

Vulnerable road users are a priority in Vision Zero analysis, and in the case of this survey the most represented groups of vulnerable users were: 136 Seniors (55+), 109 children or parents of children, and 65 non-motorists. 83 respondents skipped this question, and there were only 23 transit riders, 21 community members that reported experiencing racial, ethnic or socioeconomic disparities, and 17 people with disabilities.

Over 97% of survey respondents reported living in West Orange, while just over 6% reported working in the Township and just over 3% were local business owners.

Respondents were also asked where in town they lived. Using a word cloud tool to summarize responses, the project team found that some of the most common roads included the major arterials of

West Orange including Gregory Avenue, Pleasant Valley Way, Mt. Pleasant Avenue, Eagle Rock Avenue and Main Street.

Nearly all responses came from working-age adults or older, with 25-44 year olds comprising over 30% of respondents and 45-64 year olds the most common age group with over 41% of responses. Nearly 20% of respondents were seniors. Just 12 responses (2.64%) came from people under 18 years old and just 3 responses from people aged 18-24.

**Vision
Zero**
WEST ORANGE TOWNSHIP

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WEST ORANGE WORKS



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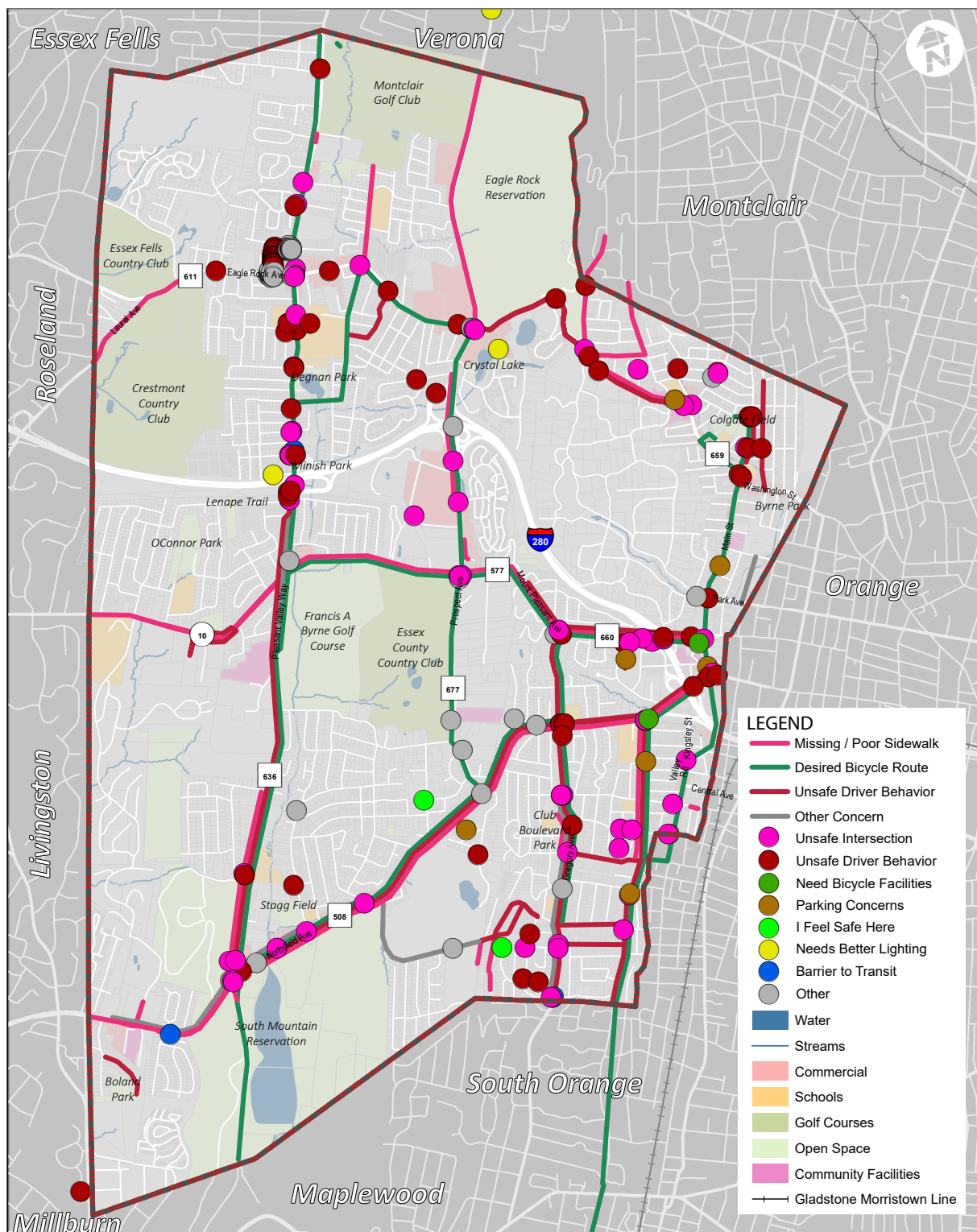


Vision
Zero
WEST ORANGE WORKS



Vision
Zero
WEST ORANGE WORKS

Figure 11. Wikimapping input: points and lines



SAFETY MAP for the WEST ORANGE VISION ZERO ACTION PLAN
MAPA DE SEGURIDAD PARA PLAN DE ACCIÓN DE VISIÓN CERO DEL MUNICIPIO DE WEST ORANGE
 This project is funded by West Orange Township with support from the New Jersey Department of Transportation and NJDOT's consultant, NVS. Click here for more information.
 Este proyecto es dirigido por el Municipio de West Orange con apoyo del Departamento de Transportación de Nueva Jersey y su consultora NVS/Clayton Corporation.

INSTRUCCIONES

CLICK "ADD POINTS OR LINES" BELOW
HACER CLIC "AÑADIR PUNTOS O LÍNEAS" ABAJO
SELECT THE POINT OR LINE TYPE TO ADD
SELECCIONAR EL TIPO DE PUNTO O LÍNEA QUE SE QUIERE AÑADIR
ADD A COMMENT TO THE POINT OR LINE (OPTIONAL)
AÑADIR UN COMENTARIO AL PUNTO O LA LÍNEA (OPCIONAL)
UPLOAD A PHOTO TO THE POINT OR LINE (OPTIONAL)
SUBIR UNA FOTO AL PUNTO O LA LÍNEA (OPCIONAL)

USER COMMENTS / COMENTARIOS DEL USUARIO

Add Points / Añadir Puntos

- Safe Pedestrian Crossing Needed / Paso de peatones seguro necesario
- Unsafe Location for Bicyclists / Ubicación insegura para ciclistas
- Unsafe Driver Behavior / Comportamiento inseguro del conductor
- Lighting Improvement Needed / Se necesita mejorar la iluminación

- Parking Concerns / Problemas de estacionamiento
- Barriers To Transit / Barreras al tránsito
- Other Traffic or Travel Concerns / Otras inquietudes de tránsito o viaje
- I feel safe traveling here / Me siento segura viajando aquí

Add Lines / Añadir Líneas

- Sidewalk Improvement or Missing / Mejora de la acera o faltante
- Desired Biking Routes / Ruta ciclista deseada
- Unsafe Driver Behavior / Comportamiento inseguro del conductor
- Other Traffic or Travel Concerns / Otras inquietudes de tránsito o viaje
- I feel safe traveling here / Me siento segura viajando aquí

[illegible]

Lines <i>(representing issues along a corridor)</i>	63
Desired Biking Route	22
Other Traffic / Travel Concern	6
Sidewalk Improvement/Missing	27
Unsafe Driver Behavior	28
Points <i>(represnting issues in individual locations)</i>	260
Barrier to Transit	3
Bicycle Facilities Needed	2
I Feel Safe Here	3
Needs Better Lighting	3
Other Travel Concerns	74
Parking Concerns	7
Unsafe Driver Behavior	98
Unsafe Intersection	70
Grand Total	343

Many points and lines included comments which were translated into a word cloud as shown. It can be seen that common concerns include speeding, texting, disregard of other road users, and dangerous behavior. The comments were then grouped by category to identify recurring issues and recommendations.

The options for line drawing were to identify: desired routes for a bicycle network, sidewalk gaps/deteriorated sidewalks, corridors of unsafe driving, and any other concerns.

Table 5. Roads of Concern by Category

Category of Concern	Roads Identified (Bold indicates the entire distance of the road)
Missing / Poor Sidewalk	Northfield Avenue, Laurel Avenue, Mt. Pleasant Avenue, Forest Avenue, Pleasant Valley Way, Prospect Avenue, Mountain Avenue/Undercliff Road, Fairmount Terrace, Valley Way, Rollinson Street, Undercliff Terrace, Burnett Terrace
Desired Bicycle Route	Pleasant Valley Way, Northfield Avenue, Prospect Avenue, Mt. Pleasant Avenue, Main Street, Eagle Rock Avenue, Hooper Avenue/Conforti Avenue, Valley Road, Rollinson Street, Gregory Avenue, Franklin Avenue
Unsafe Driver Behavior	Mt. Pleasant Avenue, Pleasant Valley Way, Northfield Avenue, Gregory Avenue, Rollinson Street, Eagle Rock Avenue, Franklin Avenue, Whittlesey Avenue, Walker Road, Lawrence Avenue, Forest Hill Road, Burnett Terrace, Dogwood Drive, Phyllis Road
Other	Pleasant Valley Way, Northfield Avenue, Gregory Avenue, Walker Road, Standish Avenue

The lines categorized as "other" included complaints about road striping on Northfield Avenue near Pleasant Valley Way, dissatisfaction with speed humps on Walker Road, poor road quality on Standish Avenue, and the width of Pleasant Valley Way.

The options for point placement were to identify: unsafe intersections, unsafe driver behavior, need for bicycle facilities, parking concerns, need for lighting improvement, barriers to transit, and other concerns as well as places people feel safe. Points identified across West Orange were well-mixed, with concentrations of points identifying the various topics scattered across the municipality. Below is a list of some common themes for each.

- Unsafe Intersections

- Many intersections were marked as unsafe across West Orange. Common areas include:
 - Eagle Rock Avenue and Pleasant Valley Way and the intersections nearby
 - Pleasant Valley Way and the Interstate 280 ramps, Eagle Rock Avenue and Prospect Avenue

- Northfield Avenue and Pleasant Valley Way and the nearby intersections on Northfield Avenue
- Mt. Pleasant Avenue and Prospect Avenue
- Mt. Pleasant Avenue and Gregory Avenue
- Junctions surrounding the Essex Green Mall
- Main Street and both Mt. Pleasant Avenue and Northfield Avenue
- Eagle Rock Avenue and both Harrison Avenue and Mountain Avenue
- Northfield Avenue and the Interstate 280 ramps
- Several intersections along Gregory Avenue and Rollinson Street in the southeastern portion of the municipality

- Unsafe Driver Behavior
 - Unsafe Driver Behavior was identified across the municipality, including concentrated areas of reporting along Pleasant Valley Way, Eagle Rock Avenue, Northfield Avenue, Main Street and Gregory Avenue.
 - Other areas include:
 - neighborhoods off of the eastern portion of Eagle Rock Avenue
 - neighborhoods surrounding Gregory Avenue
 - the area surrounding the intersection of Eagle Rock Avenue and Pleasant Valley Way
- Need Bicycle Facilities
 - While this concern was primarily addressed through line-based submissions, the WikiMap contained points where bicycle facilities are needed, identified at the intersection of Main Street and Mt. Pleasant Avenue and at the intersection of Northfield Avenue and Rollinson Street.
- Parking Concerns
 - Parking Concerns were centered around the areas closer to Downtown West Orange, with points placed along Rollinson Street, Main Street, Northfield Avenue, Mt. Pleasant Avenue and Eagle Rock Avenue, all of which were located in the eastern portion of the municipality.
 - Comments about this issue were largely related to illegal parking or parking in ways that block visibility, but others were concerned about parking availability for those without personal driveways and equitable parking enforcement.
- Need Lighting Improvement
 - Of the two points placed within the West Orange boundary, one was related to lighting along the path at Crystal Lake Park and the other requests better lighting near the intersection of Pleasant Valley Way and Interstate 280 due to reports of criminal activity in the area.
- Barrier to Transit
 - Multiple comments involved buses. People noted difficulty reaching buses at both the intersection of Interstate 280 and Pleasant Valley Way and at the intersection of Woods End Road and Northfield Avenue, both of which were due to a lack of sidewalk access to the bus stop. Another difficulty was reaching the school bus along Gregory Avenue.
- I feel safe here
 - Three points were placed where people felt safe: the intersection of Mountain Way and Sylvan Place, the intersection of Benvenue Avenue and Ridgeway Avenue, and the intersection of Valley Road and Freeman Street.

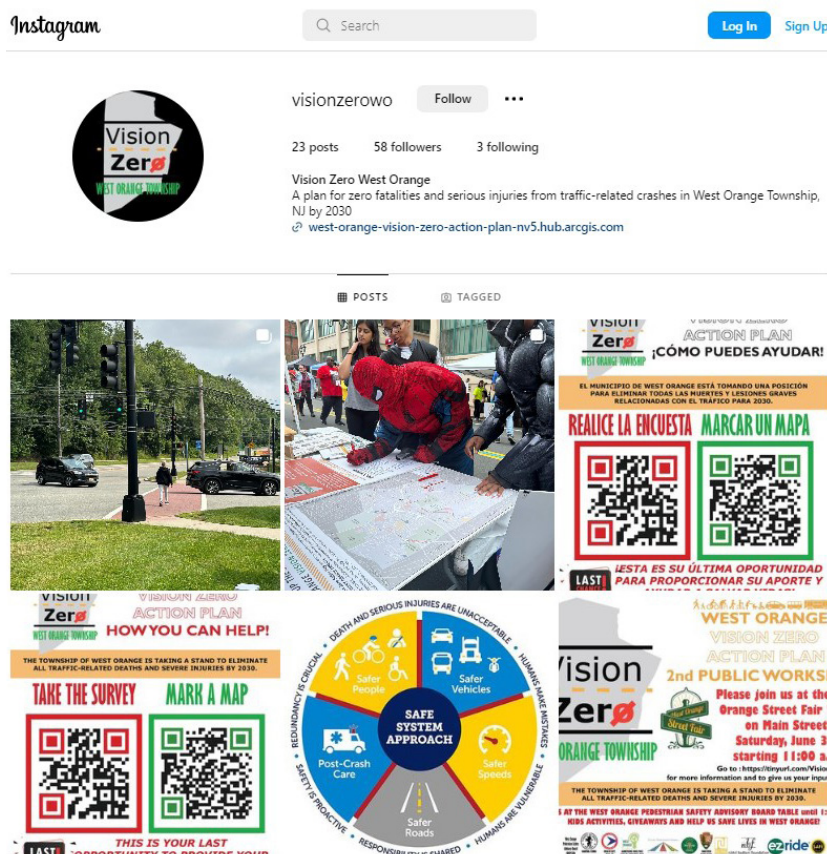
Safety Videos

Two promotional videos to educate the community were included as part of this project. Civic Eye Collaborative worked with NV5 and the Task Force to develop the videos to help inform the West Orange community about the Vision Zero Action Plan. The first is a project overview, providing meaningful statistics, an overview of Vision Zero, and a general summary of the project goals. The second video (currently in development) will be an update on the project, providing elements of the Action Plan and the proven safety countermeasures that may be used to improve roadway safety in West Orange.



Social Media/Newsletter

The project team created and maintained a project Instagram account with regular updates regarding the project status, workshop announcements and outreach tool links. West Orange also developed a Vision Zero page with links to the project website, outreach tools, workshop and project overview flyers (English/Spanish). The Township regularly posted updates on the its Facebook page and in the monthly newsletter.



PUBLIC WORKSHOPS

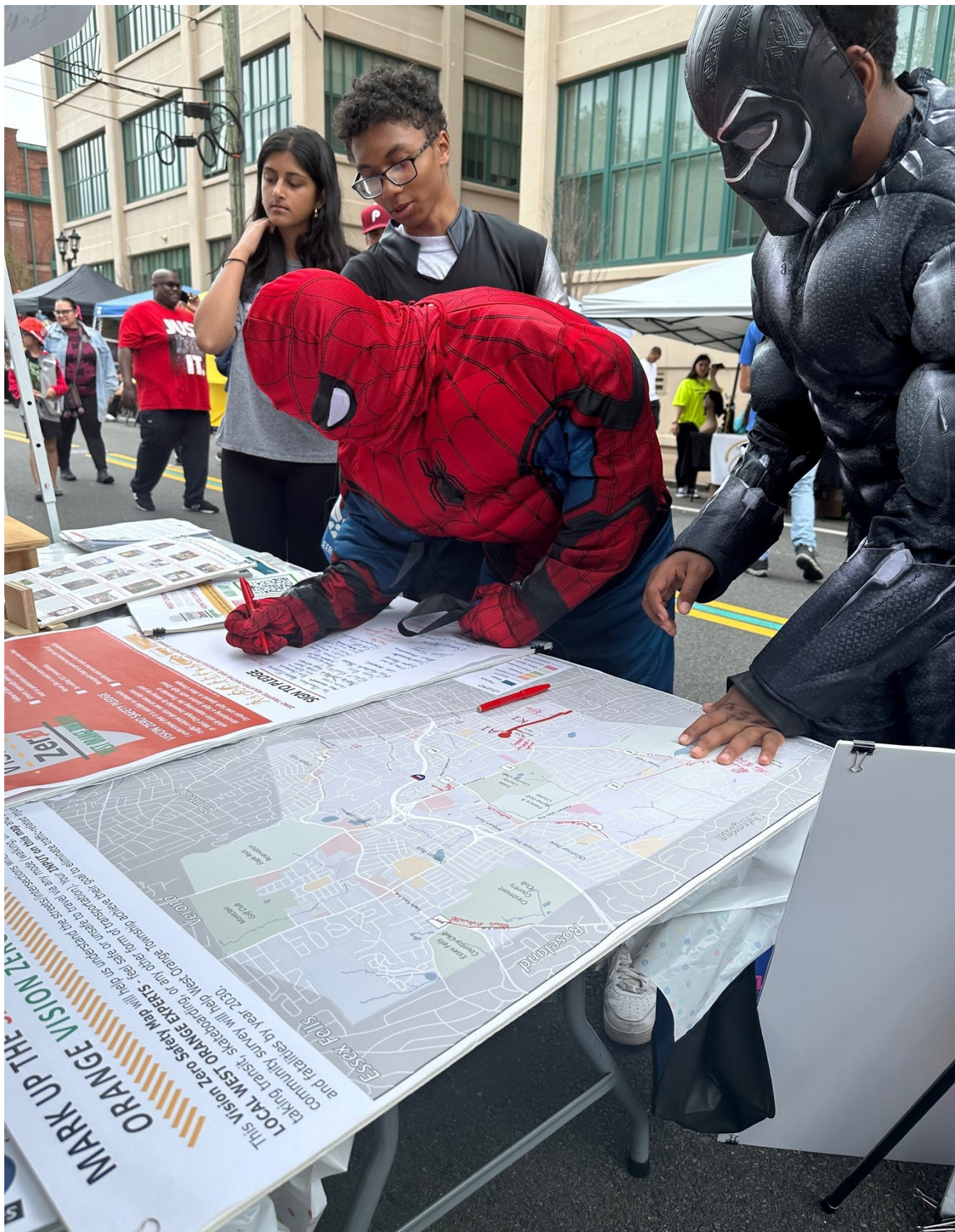
Public Workshop 1, April 22, 2023

On April 22, 2023, the first West Orange Vision Zero Public Workshop was held at Washington School. Members of the community were invited to learn about current road safety conditions in West Orange, and were given tools to add their own input including a community survey and an interactive map where they could identify areas of interest. Additionally, a pledge to be a safe driver was provided (both physically and online). All materials were presented in English and Spanish versions. EZ Ride TMA, the West Orange Pedestrian Safety Advisory Board and the Nikhil Badlani Foundation also had booths where community members could engage and discuss road safety awareness, and there were activities for kids including face painting and coloring pages.



Public Workshop 2, June 3, 2023

The West Orange Street Fair on June 3, 2023 hosted food vendors, craftspeople and many other booths and attracted a robust turnout. One booth at the street fair was home to the West Orange Vision Zero Action Plan team, including representatives of both the New Jersey Department of Transportation and NV5. Members of the public were invited to take the survey on their personal devices or on a tablet, as well as to add locations to the online interactive map or the physical map where there were safety concerns or desired improvements. Common themes community members mentioned included elements such as sidewalk gaps, speeding hotspots, illegal parking, safe routes to school and more. Survey responses and map markups from both workshops are summarized in the description of outreach tools earlier in this report.



VISION ZERO ACTION PLAN

West Orange Township is committed to using a Safe System approach to achieve Vision Zero. The strategies and actions to achieve zero traffic fatalities or serious injuries by the year 2030 were identified by the project team based on the data analysis and outreach findings with input from the Vision Zero Task Force and are organized into the five elements of the Safe System Approach.

As noted earlier, the Plan follows the six principles of the Safe System Approach:

- 1. DEATH AND SERIOUS INJURIES ARE UNACCEPTABLE.** While no crashes are desirable, the Safe System Approach prioritizes the elimination of crashes that result in death and serious injuries since no one should experience either when using the transportation system.
- 2. HUMANS MAKE MISTAKES.** People will inevitably make mistakes and decisions that can lead or contribute to crashes, but the transportation system can be designed and operated to accommodate certain types and levels of human mistakes, and avoid death and serious injuries when a crash occurs.
- 3. HUMANS ARE VULNERABLE.** People have physical limits for tolerating crash forces before death or serious injury occurs; therefore, it is critical to design and operate a transportation system that is human-centric and accommodates physical human vulnerabilities.
- 4. RESPONSIBILITY IS SHARED.** All stakeholders – including government at all levels, industry, non-profit/advocacy, researchers, and the public – are vital to preventing fatalities and serious injuries on our roadways.
- 5. SAFETY IS PROACTIVE.** Proactive tools should be used to identify and address safety issues in the transportation system, rather than waiting for crashes to occur and reacting afterwards.
- 6. REDUNDANCY IS CRUCIAL.** Reducing risks requires that all parts of the transportation system be strengthened, so that if one part fails, the other parts still protect people



APPROACH

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

Source: USDOT FHWA

SAFE SYSTEM APPROACH ELEMENTS

The goal is zero deaths and serious injuries and adopting the five elements of the Safe System Approach will help West Orange Township achieve its goal by 2030. FHWA's Proven Safety Countermeasures were utilized in identifying specific improvements to address the various crash types along the High-Injury Network.

The Safe System Approach can improve safety for all users, including children and seniors. West Orange is an *Age-Friendly community*¹ and one where residents can age in place, and the Vision Zero Action Plan will influence the quality of life of older adults. It will support senior residents by giving them a safe transportation system to remain physically, socially, and mentally engaged and help to make West Orange a great place to live.

The five elements of the Safe System Approach are:

	SAFER ROADS Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.
	SAFER SPEEDS Promote safer speeds in all roadway environments through a combination of thoughtful, equitable, context-appropriate roadway design, appropriate speed-limit setting, targeted education, outreach campaigns, and enforcement.
	SAFER PEOPLE Encourage safe, responsible driving and behavior by people who use our roads and create conditions that prioritize their ability to reach their destination unharmed.
	SAFER VEHICLES Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.
	POST-CRASH CARE Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

In addition to the action plan table in the following pages, specific recommendations and countermeasures were developed for the top Prioritized HIN corridors in Appendix A: Priority HIN Projects: Fact Sheets.

¹ <https://www.westorange.org/DocumentCenter/View/6813/Age-Friendly-Designation->



SAFER SPEEDS

Supporting Safer Speeds is a priority in the Safe System Approach and is integral to Vision Zero. As speed increases, the chance of survivability decreases. This is especially true for vulnerable users such as bicyclists and pedestrians. Per the Safe System Approach by the FHWA, "humans are unlikely to survive high-speed crashes. Reducing speeds can accommodate human injury tolerances in three ways: reducing impact forces, providing additional time for drivers to stop, and improving visibility."

While safer roads and safer people also play a big role in managing speeds, the actions for this element primarily focus on speed limit policy changes, programs to slow vehicles, and education.

Per the crash data analysis, unsafe speed was a factor in 18% of KSI crashes, and 7.6% of all crashes in West Orange Township. Speeding was observed on several HIN corridors with a speed limit of 35 - 40 mph by the project team and was also noted in community surveys and on the interactive safety map.

Lowering the speed limit is a safety trade-off as slowing cars can impact traffic time. In West Orange, survey responses indicate that the West Orange community supports lowering speed limits and having neighborhood slow zones to help improve traffic safety.

While speed-camera programs are an important component of Vision Zero, in New Jersey they are currently not permitted. However, efforts to reduce speed should look beyond enforcement and focus on infrastructure changes to ensure that the posted speed limits are followed.

SAFE SPEEDS: REDUCING PEDESTRIAN FATALITIES

Hit by a vehicle
traveling at

23

MPH

10% risk of death



Hit by a vehicle
traveling at

42

MPH

50% risk of death



Hit by a vehicle
traveling at

58

MPH

90% risk of death



Source: FHWA. Adapted from USDOT Pedestrian Safety Action Plan

"SPEED IS AT THE HEART OF A FORGIVING ROAD TRANSPORT SYSTEM. IT TRANSCENDS ALL ASPECTS OF SAFETY: WITHOUT SPEED THERE CAN BE NO MOVEMENT, BUT WITH SPEED COMES KINETIC ENERGY AND WITH KINETIC ENERGY AND HUMAN ERROR COME CRASHES, INJURIES, AND EVEN DEATHS."

*ORGANIZATION FOR ECONOMIC COOPERATION
AND DEVELOPMENT*

Table 6. Safer Speeds Actions



SAFER SPEEDS

Promote safer speeds in all roadway environments through a combination of thoughtful, equitable, context-appropriate roadway design, appropriate speed-limit setting, targeted education, outreach campaigns, and enforcement.

#	Action Description	Partners	Time Frame Short/ Medium/ Long	Cost (High- Medium- Low)	
SS1	Advocate for setting appropriate speed limits (including using the USDOT USLIMITS2 tool), traffic calming and safety countermeasures on County roads along the HIN network. Ensure that measures to improve safety along County roads align with the future Essex County Vision Zero Action Plan.	Essex County	Medium	Low	
SS2	Implement roadway design to achieve appropriate speed limits on the municipal HIN roads based on land use context.	West Orange Township	Medium	Medium	
SS3	Create a neighborhood slow zone program, utilizing traffic calming features.	Community Members	Medium	Medium	
SS4	Create a traffic calming toolkit for West Orange to empower the community to assist the Township in addressing traffic safety needs.	West Orange Township	Short	Low	
SS5	Advocate to legalize camera-based ticketing for speeding and red light running.	State of New Jersey, Essex County	Medium	Medium	

TIMEFRAME:

- Short - Under 2 years
- Medium - 2-5 years
- Long - 5+ years

ESTIMATED COST:

- Low - < \$100,000
- Medium - \$100,000 - \$1 Million
- Long - \$1 Million +

	Performance Measures	Equity Priority (Yes/No)	Impact on Safety (High / Medium /Low)
	Speed limit re-evaluation undertaken and recommendations implemented on applicable roads	Yes	High
	Speed monitoring showing target speeds are being consistently followed	Yes	High
	Neighborhood slow zones identified and and miles of roadways with traffic calming measures in neighborhood slow zones	Yes	High
	Traffic calming toolkit created and provided to relevant organizations; number of locations where traffic calming is recommended by community members	Yes	Medium
	Camera-based ticketing legalized and implemented at all high-crash intersections and corridors	Yes	High

SAFER ROADS

Designing roads that encourage safe travel behavior, encourage compliance with safe speeds, enhance visibility, and reduce distractions is key to a Safe System Approach. The Vision Zero Action Plan identifies safety improvements along the entire HIN based on FHWA's Proven Safety Countermeasures.

The actions identified in this plan support and enhance the work already being done by the Township to support safety. From implementing a road diet on Main Street to adopting a Complete Streets Policy, the Township of West Orange has been working towards improving safety.

The HIN identifies corridors and intersections that, when improved, will have a direct impact on safety in West Orange and help achieve the Vision Zero goal.

The Township will prioritize improvements on the HIN starting with the corridors identified as Priority HIN Corridors based on a combination of the crash and equity analysis. In addition, the Township will monitor locations that were identified through community input but did not meet the threshold for inclusion based on crash and equity analysis.

Key findings of the data analysis include:

- » County roads make up the majority of the HIN (59.5%)
- » I-280 and Route 10 account for 35.5% of KSI crashes

- » Municipal roads account for 24.5% of the HIN
- » HIN corridors account for 75% of all crashes and 89% of KSI crashes between 2015-2021
- » Prioritized HIN Corridors account for almost 50% of all fatal crashes, 50% of all severe injury crashes, and 40% of all crashes between 2015-2021
- » HIN Intersections account for 21.4% of all intersection crashes
- » Vulnerable users such as seniors, minors, pedestrians and bicyclists are most at risk of a fatal or severe injury
- » Pedestrian and rear-end crashes are particularly dangerous
- » At intersections, right-angle, rear-end and sideswipe crashes are the most common types of crashes with pedestrian, bicyclist and left-turn/u-turn making up the majority of KSI crashes
- » Distracted driving and unsafe speed were the top driver contributing factors in all crashes and KSI crashes
- » Driving straight ahead, negotiating curves and striking a parked car are the top pre-crash actions for KSI crashes
- » More fatal crashes occurred in the winter



months (December - February) and more severe injury crashes occurred in the summer months (June-August)

- » Street lighting was a factor in more than half of the fatal crashes and a quarter of the severe injury crashes
- » Majority of the bicyclist and pedestrian crashes occurred at intersections, while majority of KSI crashes occurred in locations away from intersections
- » Almost half of KSI crashes occurred on County roads, and a third occurred on I-280

The safety improvements identified are based on the data analysis findings and engineering judgement. The key Proven Safety Countermeasures that will help address safety in West Orange include but are not limited to the 10 listed below:

Appendix A includes factsheets about each of the countermeasures and their impact on safety.

Safer Roads actions aim to implement features appropriate for the intended road use and environment and reduce the likelihood of error and the consequence of error. This is achieved by separating users in space (such as bike lanes, sidewalks etc.), separating users in time (such as lead pedestrian interval timing, traffic signal operations, etc.) and increasing awareness and reducing distractions (increased signage, daylighting intersections, backplates with retroreflective borders, RRFBs, etc.). Managing the angle of crash reduces impact of a crash; for example, installing a roundabout could change a potential head on collision to a less deadly side swipe collision.

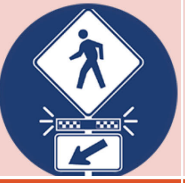
	Road Diets/ Roadway Configuration		Roundabouts
	Leading Pedestrian Interval		Rectangular Rapid Flashing Beacons (RRFB)
	Walkways / Sidewalks		Bike Lanes
	Dedicated Left & Right Turn		Backplates with Retroreflective Borders
	Crosswalk Visibility Enhancements		Appropriate Speed Limits

Table 7. Safer Roads Actions



SAFER ROADS

Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.

#	Action Description	Partners	Time Frame Short/ Medium/ Long	Cost (High- Medium- Low)	
SR1	Implement short-term street safety improvements (Proven Safety Countermeasures) along the HIN systematically, starting with the Prioritized HIN segments (Appendix A).	Essex County, NJDOT, West Orange	Short	Medium	
SR2	Implement roundabouts/traffic circles.	Essex County, West Orange	Long	High	
SR3	Implement traffic signal phasing improvements such as protected left turns and lead pedestrian interval timing.	Essex County, West Orange	Short	Low	
SR4	Implement street lighting improvements.	Essex County, West Orange, PSE&G	Medium	Medium	
SR5	Implement road diets and create center turning lanes on same roads.	Essex County, West Orange	Long	Low	
SR6	Implement pedestrian visibility improvements.	Essex County, West Orange	Short	Medium	
SR7	Create pedestrian malls and other pedestrian-friendly places.	Essex County, Local Business Owners	Medium	High	
SR8	Assess existing sidewalks for ADA-compliance and assess segments in need of maintenance or repair.	Essex County, West Orange	Medium	Medium	
SR9	Identify streets that would benefit from proactive safety improvements but did not meet the threshold for inclusion in the HIN.	Essex County, NJDOT, West Orange	Medium	Medium	

TIMEFRAME:

- Short - Under 2 years
- Medium - 2-5 years
- Long - 5+ years

ESTIMATED COST:

- Low - < \$100,000
- Medium - \$100,000 - \$1 Million
- Long - \$1 Million +

	Performance Measures	Equity Priority (Yes/No)	Impact on Safety (High / Medium /Low)
	Proven Safety Countermeasures implemented Township-wide along the HIN	No	High
	Number of roundabouts installed with additional studies and analysis	No	High
	Protected left turns and lead pedestrian intervals implemented Township-wide as applicable	No	Medium
	Street lighting improvements implemented as indicated in future study of lighting conditions	No	Medium
	Road diets and center turning lanes implemented on relevant roads	No	Medium
	Pedestrian visibility improvements implemented Township-wide	Yes	Medium
	Pedestrian malls implemented on commercial corridors, including creation of "streateries" (on-road restaurant seating)	Yes	Medium
	Study of sidewalk gaps undertaken and all applicable gaps filled	Yes	High
	List of streets for potential improvements that are not on the HIN	Yes	Low



SAFER ROADS (CONTD.)

Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.

#	Action Description	Partners	Time Frame Short/ Medium/ Long	Cost (High- Medium- Low)	
SR10	Develop a quick-build program to implement safety treatments with maximum impact throughout the Township.	Essex County, West Orange	Short	Medium	
SR12	Expand the Township's biking and walking network to key destinations and encourage multi-modal travel.	Essex County, West Orange	Long	High	
SR13	Support the continuation of the jitney and additional improvements to improve access to and comfort of transit shelters.	Essex County, NJ TRANSIT, West Orange	Short	Low	
SR14	Evaluate street safety improvements on a regular basis to assess the impact on safety.	West Orange	Medium	Medium	
SR15	Support and assist in advancing regional efforts for Vision Zero and active transportation such as the future Essex County Vision Zero Action Plan, NJTPA's Active Transportation Plan.	Essex County, NJTPA, West Orange	Long	Low	
SR16	Support and engage local community organizations to build consensus on traffic safety investments.	West Orange	Short	Medium	
SR17	Develop a Vision Zero checklist for development review to include safety countermeasures.	West Orange	Short	Low	

TIMEFRAME:

- Short - Under 2 years
- Medium - 2-5 years
- Long - 5+ years

ESTIMATED COST:

- Low - < \$100,000
- Medium - \$100,000 - \$1 Million
- Long - \$1 Million +

	Performance Measures	Equity Priority (Yes/No)	Impact on Safety (High / Medium /Low)
	Development of a quick-build program	Yes	Medium
	Miles of bicycle facilities and sidewalks installed and bicycle and pedestrian network developed	Yes	High
	Number of bus shelters installed and jitney route assessed annually	No	Medium
	Before and after studies of implemented safety improvements	No	Medium
	Appoint Township staff on steering committees or similar committees of regional plans	No	Medium
	Township staff to contact local organizations prior to quick-build and safety improvements	Yes	Medium
	Development and inclusion of safety countermeasures as a checklist for site plan review	Yes	Medium

SAFER PEOPLE

Promote a culture of safety by frequent and ongoing public communication and providing ample opportunity prioritizing traffic safety in the community. This includes all members of the community from residents to Township staff. Education campaigns supported by fair and equitable enforcement can help improve traffic safety. Continued community engagement on Vision Zero efforts will enhance knowledge about safe travel behaviors and Vision Zero progress.

Automated traffic enforcement is proven to improve safety; however, it is currently illegal in New Jersey to use speed safety cameras. The Township must support legislation to allow speed safety cameras. As of September 2023, over 200 communities have

implemented red light safety camera programs in 20 states and Washington D.C.

The top crash factors in West Orange included:

- » distracted driving
- » unsafe speed
- » unsafe turning movements
- » negotiating curves

The Township should formally establish a Vision Zero Committee in charge of implementation and monitoring progress.





Table 8. Safer People Actions



SAFER PEOPLE

Encourage safe, responsible driving and behavior by people who use our roads and create conditions that prioritize their ability to reach their destination unharmed.

#	Action Description	Partners	Time Frame Short/ Medium/ Long	Cost (High- Medium- Low)	
SP1	Establish a culture of safety and institutionalize Vision Zero concepts in local government .	West Orange	Medium	Low	
SP2	Shift road improvement priorities from vehicle speed and capacity to vulnerable road user safety.	Essex County	Short	Low	
SP3	Communicate openly and actively with local businesses, transportation/logistics companies, and taxi/ride-hailing companies.	Local Businesses, Transportation/ Logistics and Taxi/Ride-Hailing Companies	Medium	Low	
SP4	Conduct regular outreach to schools, older adults, and senior citizens.	West Orange schools, Senior Services, Older Adults Advisory Board, EZ Ride TMA	Medium	Low	
SR5	Implement high-visibility and automated enforcement along the HIN.	West Orange Police Department, Essex County	Long	Low	
SR6	Develop Vision Zero toolkits for community ambassadors and knowledge building.	West Orange	Short	Low	
SR7	Regularly maintain and update Vision Zero online tools such as the website, crash data dashboard and social media accounts.	West Orange	Short	Low	

TIMEFRAME:

- Short - Under 2 years
- Medium - 2-5 years
- Long - 5+ years

ESTIMATED COST:

- Low - < \$100,000
- Medium - \$100,000 - \$1 Million
- Long - \$1 Million +

	Performance Measures	Equity Priority (Yes/No)	Impact on Safety (High / Medium /Low)
	Local policies reviewed for inclusion of Vision Zero language and concepts, and changes made as applicable. Institute an internal Vision Zero committee for implementation and tracking progress	No	Low
	Change in street improvement policy/checklist to include pedestrian and bicyclist infrastructure and Vision Zero action items	Yes	High
	Regular correspondence with local businesses, transportation/logistics companies, and taxi/ride-hailing companies	No	Low
	Number of outreach programs/sessions undertaken in schools and with senior citizens	Yes	Medium
	Police vehicles or speed cameras located in high-speed and/or high-crash corridors	No	High
	Completed toolkits for community ambassadors	No	Low
	Regular maintenance and updates to online Vision Zero tools	No	Low

SAFER VEHICLES

Safer Vehicles involve supporting "active" safety measures, to help prevent crashes from occurring, such as lane departure warning, autonomous emergency braking, and "passive" safety measures such as seatbelts and airbags. Understanding that West Orange may not have the capacity to lobby

vehicle manufacturers, the Township can provide support for such improvements where possible. The Township can lead by example by ensuring the Township fleet has the latest safety features and encourage "right-sizing" vehicles and moving to smaller vehicles when feasible.





Table 9. Safer Vehicles Actions



SAFER VEHICLES

Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.

#	Action Description	Partners	Time Frame Short/ Medium/ Long	Cost (High- Medium- Low)	
SV1	Outfit Township vehicles with the latest safety features, such as blind spot detection, pedestrian automatic emergency braking and new vehicle design to improve driver visibility of the immediate pedestrian/roadway visibility.	West Orange	Short	Medium	
SV2	Collaborate with private industry groups to incorporate safety-related technology into their vehicles.	Private Industry Groups, West Orange	Short	Low	
SV3	Ensure Township vehicles are the "right size" and take opportunities to transition to smaller vehicles.	West Orange	Medium	Medium	

TIMEFRAME:

- Short - Under 2 years
- Medium - 2-5 years
- Long - 5+ years

ESTIMATED COST:

- Low - < \$100,000
- Medium - \$100,000 - \$1 Million
- Long - \$1 Million +

	Performance Measures	Equity Priority (Yes/No)	Impact on Safety (High / Medium /Low)
	Review of Township-owned vehicles for safety improvements, and implementation of these improvements	No	Medium
	Distribution of list of safety features being implemented in Township buildings to private industry groups	No	Medium
	Evaluation of Township vehicles for reduction of sizes, and procedural replacement of vehicles to "right sized" fleet	No	Medium

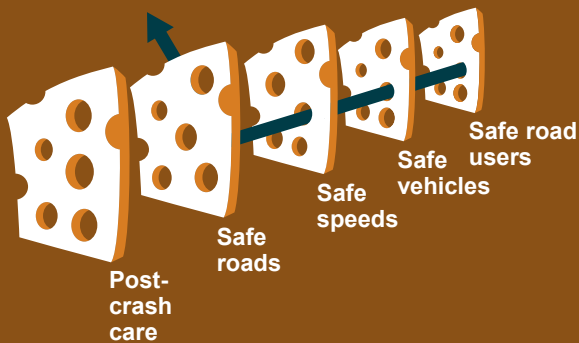
POST-CRASH CARE

Post-Crash Care actions are the final line of defense if all the other layers of the Safe System Approach fail. After a crash, it should be a priority to document and share all crash factors across the respective Township departments, as well as the County and/or NJDOT as applicable. Effective media coverage of crashes and safety can assist in highlighting problem locations to the community, promoting public safety. The Township must also promote the use of the term "crash" and not "accident" in the media.

Investigation and feedback to the Township following a crash will help address road safety in planning, design and maintaining the roadways and the traffic system.

THE 5 SAFE SYSTEM ELEMENTS CREATE REDUNDANCY

The "Swiss Cheese Model" of redundancy creates layers of protection



Death and serious injuries only happen when all layers fail



Source: FHWA



Table 10. Post-Crash Care Actions



POST-CRASH CARE

Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

#	Action Description	Partners	Time Frame Short/ Medium/ Long	Cost (High- Medium- Low)	
PC1	Create a multidisciplinary Rapid Response Team to analyze every fatal crash for cause and prevention and coordinate with victims' families.	West Orange, Essex County	Medium	Medium	
PC2	Track deployment times of emergency and medical response vehicles.	Hospital Administration, 911 Dispatch Centers	Medium	Low	
PC3	Create a standard crash summary for police officers to determine street design-related factors.	West Orange	Short	Low	

TIMEFRAME:

- Short - Under 2 years
- Medium - 2-5 years
- Long - 5+ years

ESTIMATED COST:

- Low - < \$100,000
- Medium - \$100,000 - \$1 Million
- Long - \$1 Million +

	Performance Measures	Equity Priority (Yes/No)	Impact on Safety (High / Medium /Low)
	Creation of Rapid Response Team, and regular collaboration between organizations involved to collaborate on post-crash safety recommendations	No	Low
	Analysis of deployment times disclosed in annual report	No	High
	Creation of standard crash summary, leading to creation of a crash database including these street design-related factors	No	Medium

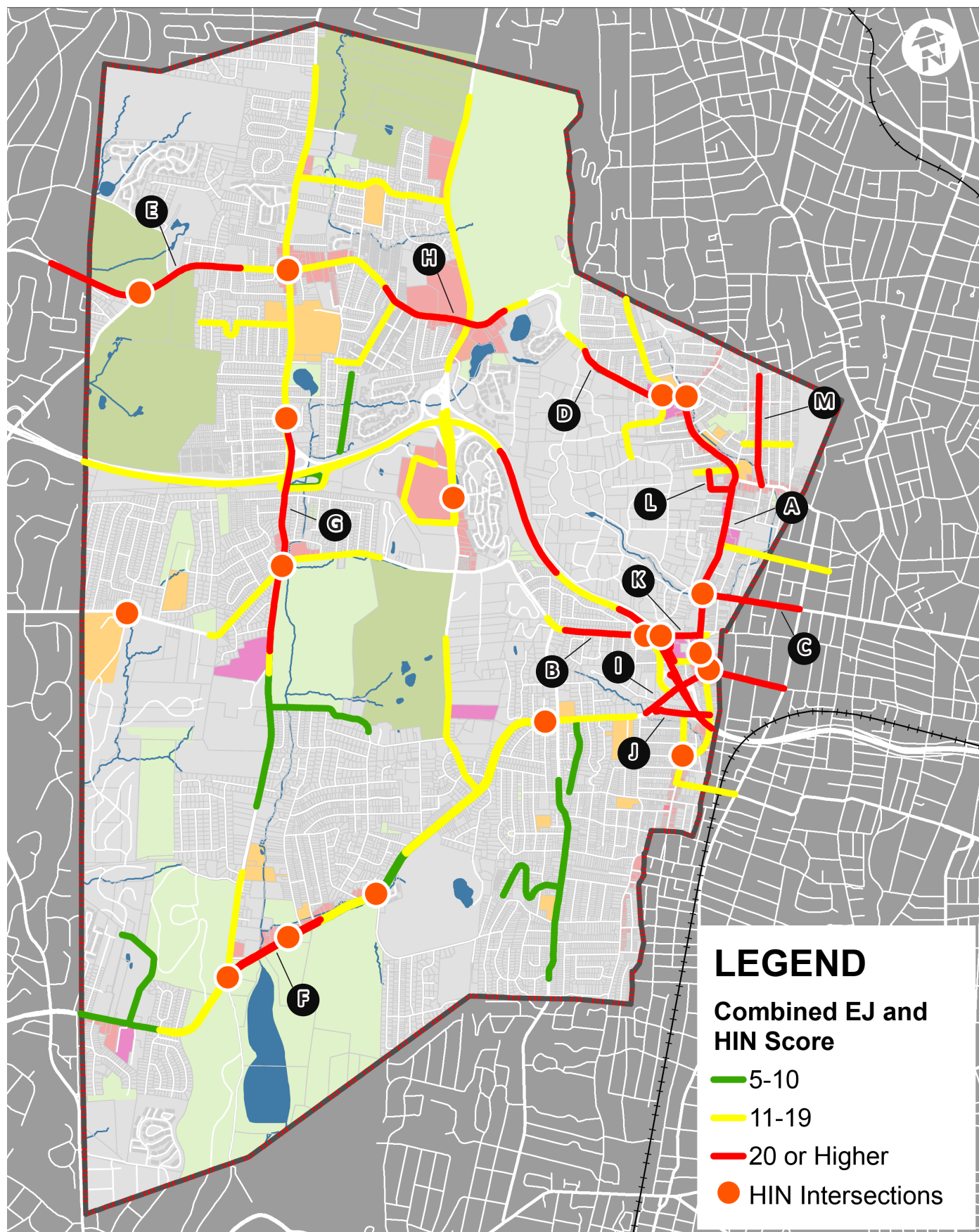
PRIORITY HIN CORRIDOR PROJECTS

The project team developed the final recommended HIN by combining the EJ composite score and the HIN crash score. The Priority HIN represents the high-injury (fatal, severe and moderate injury) crash corridors and intersections prioritized based on the equity analysis. While the entire HIN should be given consideration for safety enhancements, these highest-scored corridors are the highest-priority based on the crash and equity analysis. The 13 corridors rated the highest using the composite score are labeled on the map on the next page, in descending order of score (A is the highest, B the second-highest etc.).

Table 11. HIN Corridor Lengths

Corridor	Road	Segment Length	% of HIN Miles
A	Main Street (CR 659)	1.4 Miles	4%
B	Mt Pleasant Avenue (CR 660)	0.6 Miles	1.6%
C	Park Avenue (CR 658)	0.2 Miles	0.5%
D	Eagle Rock Avenue (CR 611)	0.6 Miles	1.8%
E	Eagle Rock Avenue (CR 611)	0.7 Miles	2%
F	Northfield Avenue (CR 508)	0.5 Miles	1.4%
G	Pleasant Valley Way (CR 636)	1 Mile	3%
H	Eagle Rock Avenue (CR 611)	0.6 Miles	1.8%
I	Northfield Avenue (CR 508 Spur)	0.3 Miles	0.9%
J	Whittingham Place (CR 508)	0.2 Miles	0.7%
K	Gaston Street	0.1 Miles	0.3%
L	Sayers Street	0.2 Miles	0.5%
M	Whittlesey Avenue	0.4 Miles	1.1%
TOTAL		6.8 MILES	19.6%

Figure 12. Prioritized HIN Corridor Locations



Source: NJTPA Equity Analysis Tool (2017-2021) and NJDOT Safety Voyager

Table 12. Proven Safety Countermeasures, by Priority HIN Corridor

FHWA Proven Safety Countermeasures	Estimated Benefits and Cost
 Bicycle Lanes	Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads
 Crosswalk Visibility Enhancements/ Lighting	- High-visibility crosswalks: 40% reduction in pedestrian injury crashes - Intersection lighting: 42% reduction in pedestrian crashes - Advance yield or stop markings and signs: 25% reduction in pedestrian crashes
 Leading Pedestrian Interval	13% reduction in pedestrian/vehicle crashes at intersections
 Rectangular Rapid Flashing Beacons (RRFB)	- Reduction in pedestrian crashes by 47% - Increase of motorist yielding rates up to 98% (depending on context)
 Road Diets/Roadway Configuration	4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes
 Walkways/Sidewalks	- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways - Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways
 Appropriate Speed Limits	A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.
 Backplates with Retroreflective Borders	15% reduction in total crashes - Very low cost
 Dedicated Left and Right Turn	- Added Left-Turn Lanes: 28-48% reduction in total crashes - Positive Offset Left-Turn Lanes: 36% reduction in fatal and injury crashes - Right-Turn Lanes: 14-26% reduction in total crashes - Cost varies
 Roundabouts	- Two-Way Stop-Controlled Intersection converted to Roundabout: 82% reduction in fatal and injury crashes - Signalized Intersection to Roundabout: 78% reduction in fatal and injury crashes

Corridor A Main Street	Corridor B Mt Pleasant Avenue	Corridor C Park Avenue	Corridor D Eagle Rock Avenue	Corridor E Eagle Rock Avenue	Corridor F Northfield Avenue	Corridor G Pleasant Valley Way	Corridor H Eagle Rock Avenue	Corridor I Northfield Avenue	Corridor J Whittingham Place	Corridor K Gaston Street	Corridor L Sayers Place	Corridor M Whittlesey Avenue
												
												
												
												
												
												
												
												
												
												

NEXT STEPS

West Orange should adopt the Vision Zero Action Plan and continue its efforts in implementing the actions identified in the plan. Key components for success will be monitoring progress on a regular basis and ensuring a multi-disciplinary Vision Zero Task Force is formally adopted by the Township. The Vision Zero website should be regularly edited with crash data and status updates. Regular reporting is essential to Vision Zero and will create accountability. Each of the strategies and actions in the action plan have associated performance metrics that should be tracked on an annual basis.

The most important metric is the number of fatal and severe injury crashes in the Township and that should be updated as soon as data is available. At the time of the development of this plan, crash data was available and complete until the year 2021. The crash data for 2022 would be available soon for analysis and the Township should analyze that data to inform the implementation of this plan.

As noted earlier, lists of specific improvements are identified for the priority HIN Corridors as an immediate first step for implementation. These lists of improvements are included in Appendix A with key data facts for each Priority HIN Corridor. As and when funding is secured, the Township must continue implementation of Proven Safety Countermeasures for all the corridors and intersections on the HIN.

A list of funding sources is included in Appendix C including, but not limited to, the Safe Streets For All and Road to Safety grants.



APPENDIX A: PRIORITY HIN PROJECTS: FACT SHEETS

APPENDIX B: FHWA PROVEN SAFETY COUNTERMEASURES

APPENDIX C: FUNDING SOURCES

APPENDIX D: OVERALL HIN CORRIDOR LIST

APPENDIX E: DESIGN GUIDANCE

APPENDIX F: SURVEY RESULTS

APPENDIX A: PRIORITY HIN PROJECTS: FACT SHEETS

This appendix contains information on each of the 13 priority HIN corridors, including the jurisdiction, speed limit, number of lanes, basic crash statistics (number of crashes, injury crashes, bicycle and pedestrian crashes), top crash types relative to West Orange as a whole, the most common crash factors, as well as the HIN score and composite score. Additionally, the Proven Safety Countermeasures recommended for each corridor are indicated.

LEGEND

CRASH TYPES

-  **Animal**
-  **Encroachment**
-  **Fixed Object**
-  **Left Turn/U Turn**
-  **Opposite Direction: Head-On**
-  **Opposite Direction: Sideswipe**
-  **Overtaken**
-  **Bicyclist**
-  **Pedestrian**
-  **Right Angle**
-  **Same Direction: Rear-End**
-  **Same Direction: Sideswipe**
-  **Struck Parked Vehicle**

CRASH FACTORS

-  **Distracted Driving**
-  **Unsafe Speed**
-  **Lighting Conditions**

MAP ELEMENTS

-  **Priority HIN**
-  **Bicyclist Crash**
-  **Pedestrian Crash**
-  **High-Injury Intersection**
-  **No Apparent Injury**
-  **Possible Injury**
-  **Suspected Minor Injury**
-  **Suspected Serious Injury**
-  **Fatal Injury**

HIN CORRIDOR FACT SHEETS

CORRIDOR A: MAIN STREET

Represents 4% of HIN miles

KEY CRASH FACTS

#	%
 847 Crashes	10% of all West Orange Crashes
 45 Fatal, Severe & Minor Injury Crashes	10% of all Fatal, Severe & Minor Injury Crashes
 21 Pedestrian Crashes	24% of all Pedestrian Crashes
 5 Bicyclist Crashes	16% of all Bicyclist Crashes

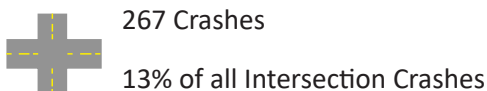
OVERREPRESENTED CRASH TYPES



TOP CRASH FACTORS



INTERSECTION CRASHES



COUNTY ROUTE 659

1.4 MILES

48' WIDTH / 2 - 4 LANES

SHOULDER

PARKING PERMITTED

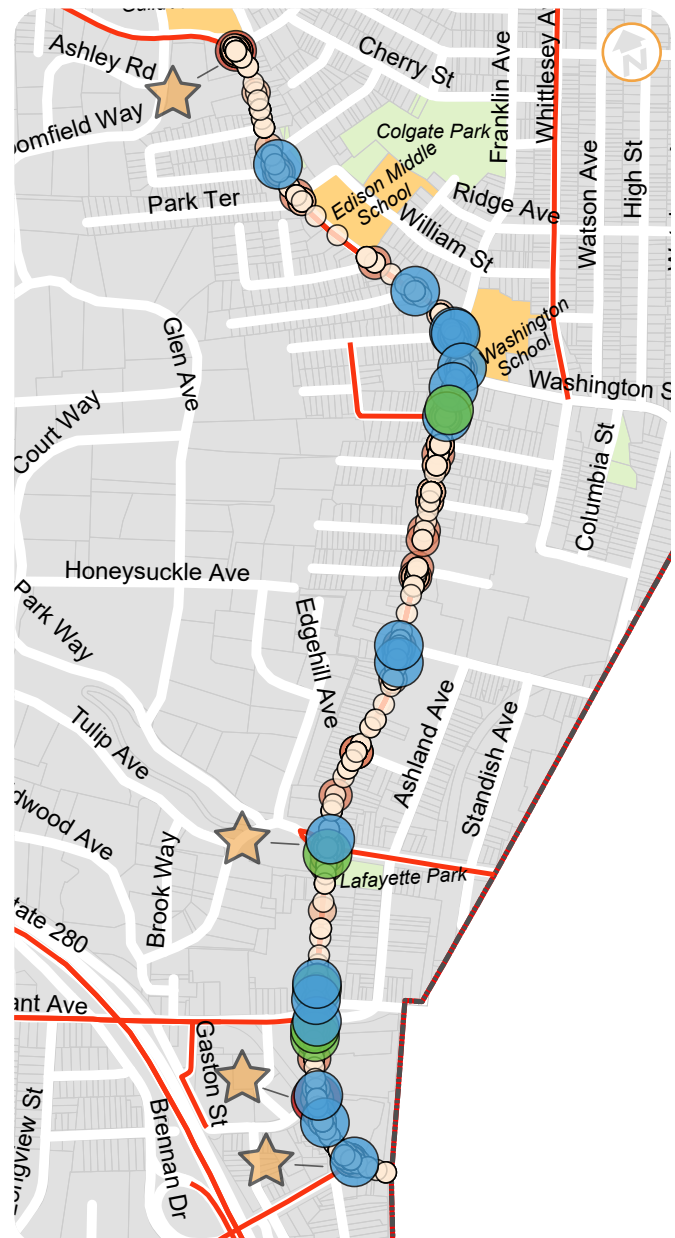


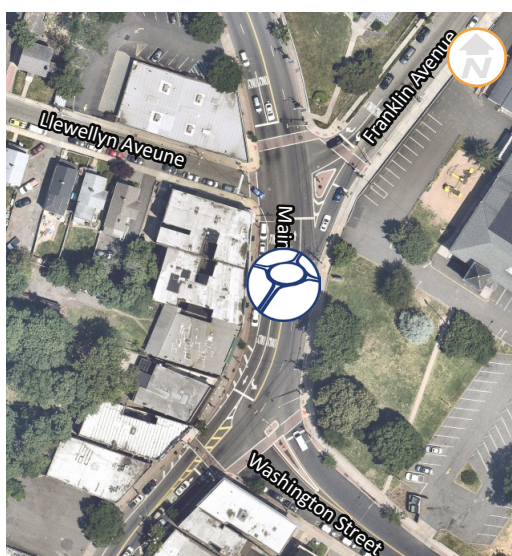
HIN SCORE

24

EQUITY + HIN SCORE

44





RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- *Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads*



- *High-visibility crosswalks: 40% reduction in pedestrian injury crashes*
- *Intersection lighting: 42% reduction in pedestrian crashes*
- *Advance yield or stop markings and signs: 25% reduction in pedestrian crashes*



- *13% reduction in pedestrian/vehicle crashes at intersections*



- *4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes*



- *Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways*



- *15% reduction in total crashes*
- *Very low cost*



- *Signalized Intersection to Roundabout: 78% reduction in fatal and injury crashes*

**Estimated
Construction Cost:
~\$3 Million***

*Includes cost of roundabouts and cost of countermeasures that overlap with intersecting corridors. Roundabouts are subject to additional feasibility and cost studies, and estimates do not account for Right-of-Way acquisition. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

** Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

HIN CORRIDOR FACT SHEETS

CORRIDOR B: MT PLEASANT AVENUE

Represents 1.6% of HIN miles

KEY CRASH FACTS

#	%
 275 Crashes	3.2% of all West Orange Crashes
 15 Fatal, Severe & Minor Injury	3.3% of all Fatal, Severe & Minor Injury Crashes
 3 Pedestrian Crashes	3.5% of all Pedestrian Crashes
 4 Bicyclist Crashes	13% of all Bicyclist Crashes

COUNTY ROUTE 660
0.6 MILES
40-50' WIDTH / 2 - 4 LANES
SHOULDER VARY
PARKING PERMITTED AT SHOULDERS

SPEED
LIMIT
40

HIN SCORE

25

EQUITY + HIN SCORE

39

OVERREPRESENTED CRASH TYPES

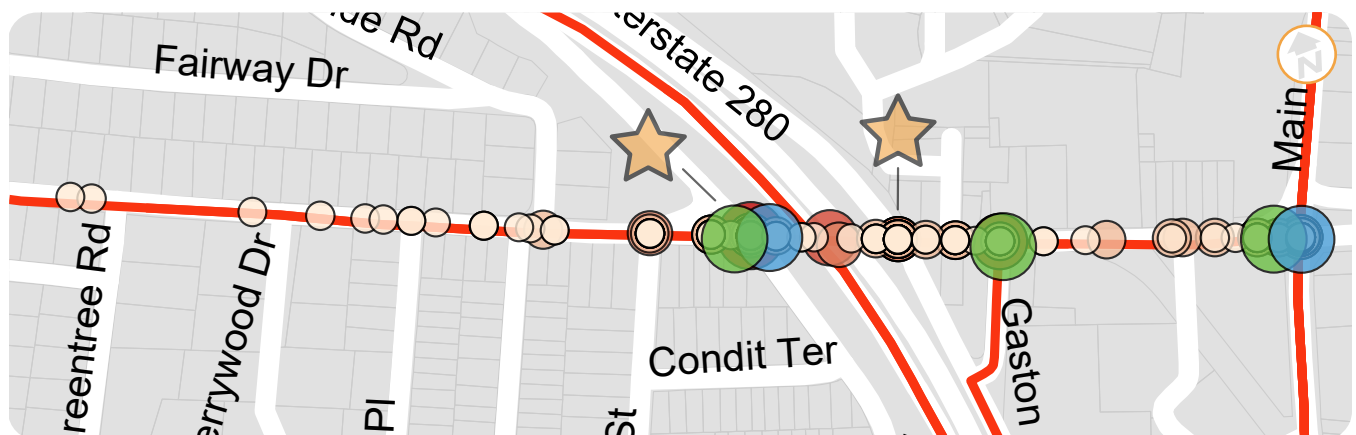


TOP CRASH FACTORS

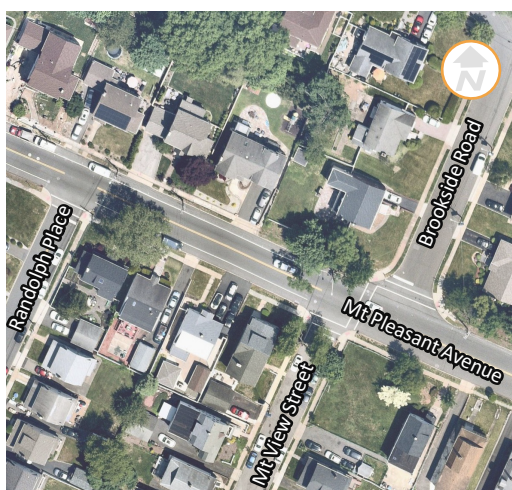
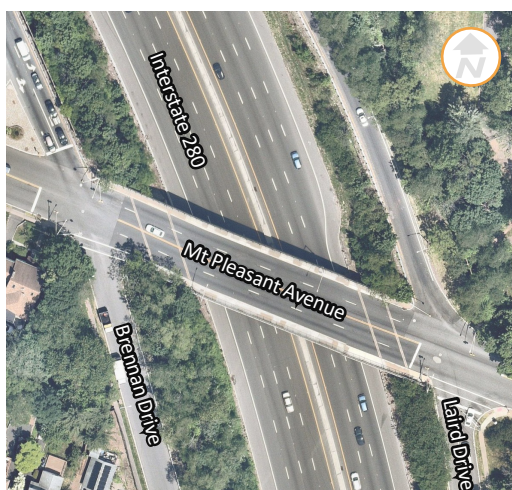


INTERSECTION CRASHES

 144 Crashes
7% of all Intersection Crashes



Any intersections, signals and ramps with I-280 are NJDOT jurisdiction and will be subject to coordination and review with FHWA and NJDOT.



RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- High-visibility crosswalks: 40% reduction in pedestrian injury crashes
- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes



- 4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes



- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
- Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



- A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.



- 15% reduction in total crashes
- Very low cost



- Added Left-Turn Lanes: 28-48% reduction in total crashes



- Positive Offset Left-Turn Lanes: 36% reduction in fatal and injury crashes
- Right-Turn Lanes: 14-26% reduction in total crashes
- Cost varies



- Signalized Intersection to Roundabout: 78% reduction in fatal and injury crashes

**Estimated
Construction Cost:
~\$600,000***

*Includes cost of roundabouts and cost of countermeasures that overlap with intersecting corridors. Roundabouts are subject to additional feasibility and cost studies, and estimates do not account for Right-of-Way acquisition. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

** Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.



RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- High-visibility crosswalks: 40% reduction in pedestrian injury crashes
- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes



- 4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes



- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
- Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



- A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.



- 15% reduction in total crashes
- Very low cost



- Signalized Intersection to Roundabout: 78% reduction in fatal and injury crashes

Estimated Construction Cost:

~\$400,000*

*Includes cost of roundabouts and cost of countermeasures that overlap with intersecting corridors. Roundabouts are subject to additional feasibility and cost studies, and estimates do not account for Right-of-Way acquisition. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

**Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

HIN CORRIDOR FACT SHEETS

CORRIDOR D: EAGLE ROCK AVENUE (MP 0-0.6)

Represents 1.8% of HIN miles

KEY CRASH FACTS*

#	%
 525 Crashes	6.1% of all West Orange Crashes
 32 Fatal, Severe & Minor Injury Crashes	7.1% of all Fatal, Severe & Minor Injury Crashes
 5 Pedestrian Crashes	5.8% of all Pedestrian Crashes
 2 Bicyclist Crashes	6.5% of all Bicyclist Crashes

COUNTY ROUTE 611
0.6 MILES
40' WIDTH / 4 LANES
NO SHOULDERS
NO PARKING PERMITTED



HIN SCORE*

16

EQUITY + HIN SCORE*

26

OVERREPRESENTED CRASH TYPES



TOP CRASH FACTORS



INTERSECTION CRASHES



212 Crashes

10% of all Intersection Crashes



*Combined statistics for all three Eagle Rock corridors, highest HIN score and combined HIN score displayed



RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- *Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads*



- *High-visibility crosswalks: 40% reduction in pedestrian injury crashes*
- *Intersection lighting: 42% reduction in pedestrian crashes*
- *Advance yield or stop markings and signs: 25% reduction in pedestrian crashes*



- *13% reduction in pedestrian/vehicle crashes at intersections*



- *Reduction in pedestrian crashes by 47%*
- *Increase of motorist yielding rates up to 98% (depending on context)*



- *4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes*



- *Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways*
- *Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways*



- *A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.*



- *15% reduction in total crashes*
- *Very low cost*

Estimated Construction Cost:

~\$800,000*

*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

** Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

HIN CORRIDOR FACT SHEETS

CORRIDOR E: EAGLE ROCK AVENUE (MP 2.3-3)

Represents 2% of HIN miles

KEY CRASH FACTS*

#	%
 525 Crashes	6.1% of all West Orange Crashes
 32 Fatal, Severe & Minor Injury Crashes	7.1% of all Fatal, Severe & Minor Injury Crashes
 5 Pedestrian Crashes	5.8% of all Pedestrian Crashes
 2 Bicyclist Crashes	6.5% of all Bicyclist Crashes

COUNTY ROUTE 611
0.7 MILES
40' WIDTH / 4 LANES
NO SHOULDERS
NO PARKING PERMITTED



HIN SCORE*

16

EQUITY + HIN SCORE*

26

OVERREPRESENTED CRASH TYPES



TOP CRASH FACTORS

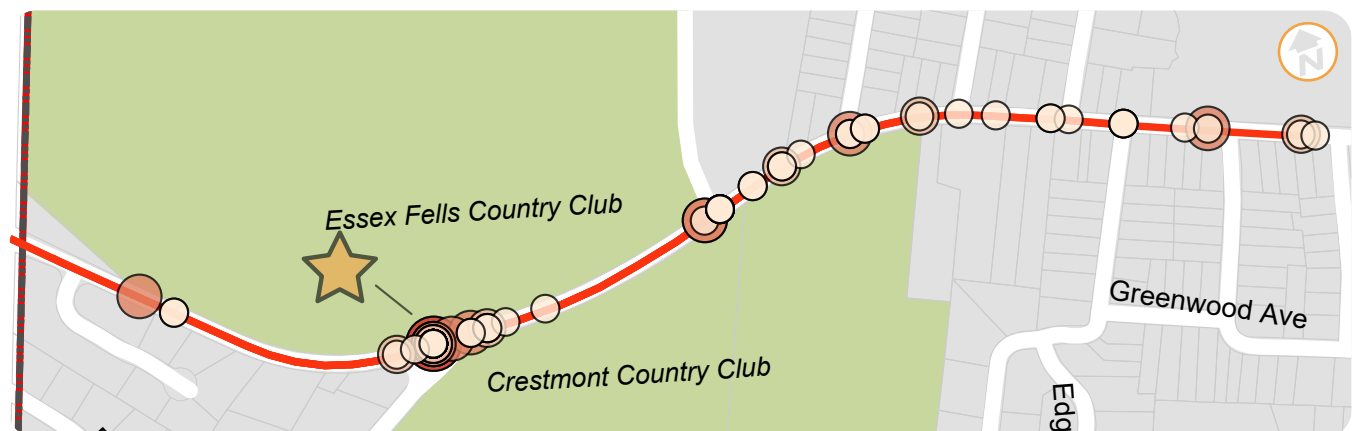


INTERSECTION CRASHES



212 Crashes

10% of all Intersection Crashes



*Combined statistics for all three Eagle Rock corridors, highest HIN score and combined HIN score displayed



RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- *Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads*



- *High-visibility crosswalks: 40% reduction in pedestrian injury crashes*
- *Intersection lighting: 42% reduction in pedestrian crashes*
- *Advance yield or stop markings and signs: 25% reduction in pedestrian crashes*



- *13% reduction in pedestrian/vehicle crashes at intersections*



- *Reduction in pedestrian crashes by 47%*
- *Increase of motorist yielding rates up to 98% (depending on context)*



- *4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes*



- *Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways*
- *Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways*



- *A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.*



- *15% reduction in total crashes*
- *Very low cost*

Estimated Construction Cost:

~\$900,000*

*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

** Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

HIN CORRIDOR FACT SHEETS

CORRIDOR F: NORTHFIELD AVENUE (MP 3.8-4.4)

Represents 1.4% of HIN miles

KEY CRASH FACTS

#	%
 301 Crashes	3.5% of all West Orange Crashes
 17 Fatal, Severe & Minor Injury Crashes	3.8% of all Fatal, Severe & Minor Injury Crashes
 1 Pedestrian Crash	1.2% of all Pedestrian Crashes
 0 Bicyclist Crashes	0% of all Bicyclist Crashes

COUNTY ROUTE 508
0.5 MILES
52' - 80' WIDTH / 4 LANES
NO SHOULDERS
PARKING PERMITTED



HIN SCORE

18

EQUITY + HIN SCORE

23

OVERREPRESENTED CRASH TYPES



TOP CRASH FACTORS

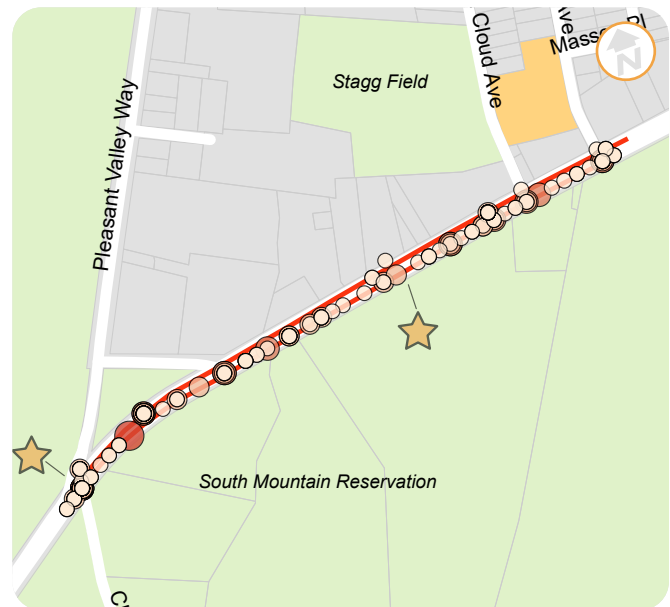


INTERSECTION CRASHES



90 Crashes

4.4% of all Intersection Crashes





RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- High-visibility crosswalks: 40% reduction in pedestrian injury crashes
- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes



- Reduction in pedestrian crashes by 47%
- Increase of motorist yielding rates up to 98% (depending on context)



- 4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes



- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
- Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



- A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.



- 15% reduction in total crashes
- Very low cost



- Added Left-Turn Lanes: 28-48% reduction in total crashes

- Positive Offset Left-Turn Lanes: 36% reduction in fatal and injury crashes

- Right-Turn Lanes: 14-26% reduction in total crashes
- Cost varies



- Two-Way Stop-Controlled Intersection converted to Roundabout: 82% reduction in fatal and injury crashes
- Signalized Intersection to Roundabout: 78% reduction in fatal and injury crashes

*Includes cost of roundabouts and cost of countermeasures that overlap with intersecting corridors. Roundabouts are subject to additional feasibility and cost studies, and estimates do not account for Right-of-Way acquisition. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

** Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/ Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

**Estimated
Construction Cost:
~\$600,000***

Represents 3% of HIN miles

#	%
303 Crashes	3.5% of all West Orange Crashes

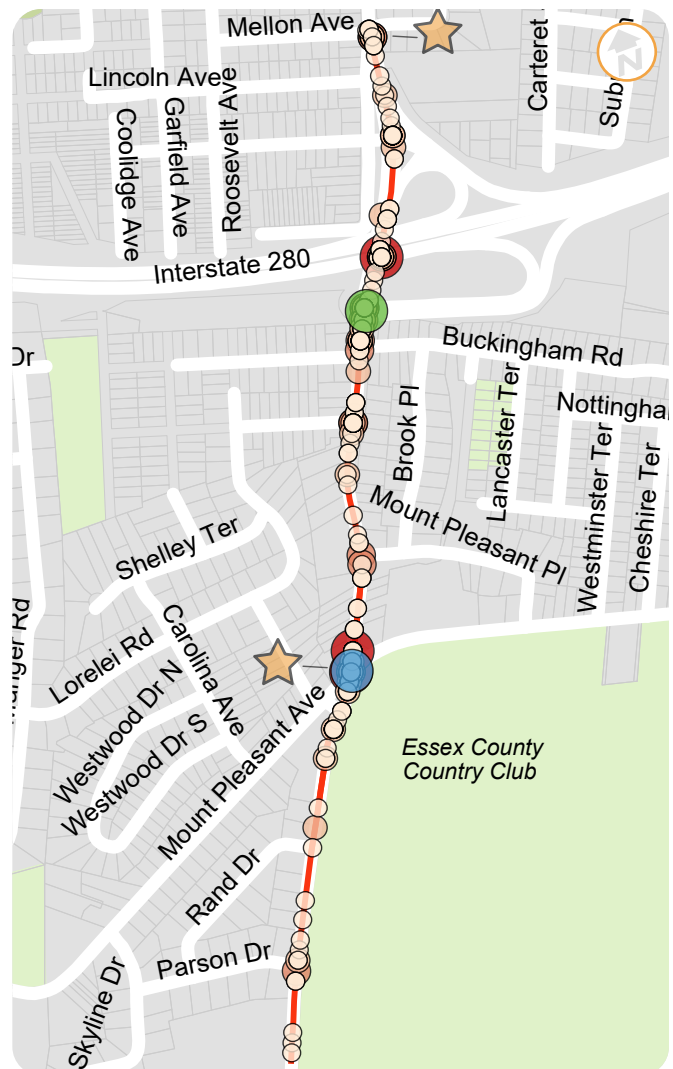


SPEED
LIMIT
40

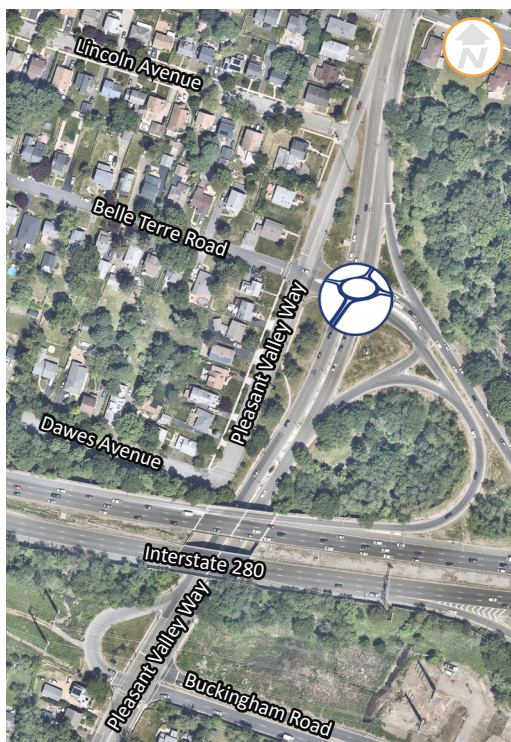
15

23

5.6% of all Intersection Crashes



Any intersections and signals with Route 10/Mt. Pleasant Avenue are NJDOT jurisdiction and will be subject to coordination and review with NJDOT.



RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- *Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads*



- *High-visibility crosswalks: 40% reduction in pedestrian injury crashes*
- *Intersection lighting: 42% reduction in pedestrian crashes*
- *Advance yield or stop markings and signs: 25% reduction in pedestrian crashes*



- *13% reduction in pedestrian/vehicle crashes at intersections*



- *Reduction in pedestrian crashes by 47%*
- *Increase of motorist yielding rates up to 98% (depending on context)*



- *4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes*



- *Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways*
- *Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways*



- *A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.*



- *15% reduction in total crashes*
- *Very low cost*



- *Added Left-Turn Lanes: 28-48% reduction in total crashes*



- *Positive Offset Left-Turn Lanes: 36% reduction in fatal and injury crashes*
- *Right-Turn Lanes: 14-26% reduction in total crashes*
- *Cost varies*



- *Signalized Intersection to Roundabout: 78% reduction in fatal and injury crashes*

** Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

**Estimated
Construction Cost:
~\$1.8 Million***

*Includes cost of roundabouts and cost of countermeasures that overlap with intersecting corridors. Roundabouts are subject to additional feasibility and cost studies, and estimates do not account for Right-of-Way acquisition. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

HIN CORRIDOR FACT SHEETS

CORRIDOR H: EAGLE ROCK AVENUE (MPI.1-1.7)

Represents 1.8% of HIN miles

KEY CRASH FACTS

#	%
 525 Crashes	6.1% of all West Orange Crashes
 32 Fatal, Severe & Minor Injury Crashes	7.1% of all Fatal, Severe & Minor Injury Crashes
 5 Pedestrian Crashes	5.8% of all Pedestrian Crashes
 2 Bicyclist Crashes	6.5% of all Bicyclist Crashes

COUNTY ROUTE 611
0.6 MILES
40' WIDTH / 4 LANES
NO SHOULDERS
NO PARKING PERMITTED



HIN SCORE*

16

EQUITY + HIN SCORE*

26

OVERREPRESENTED CRASH TYPES



TOP CRASH FACTORS

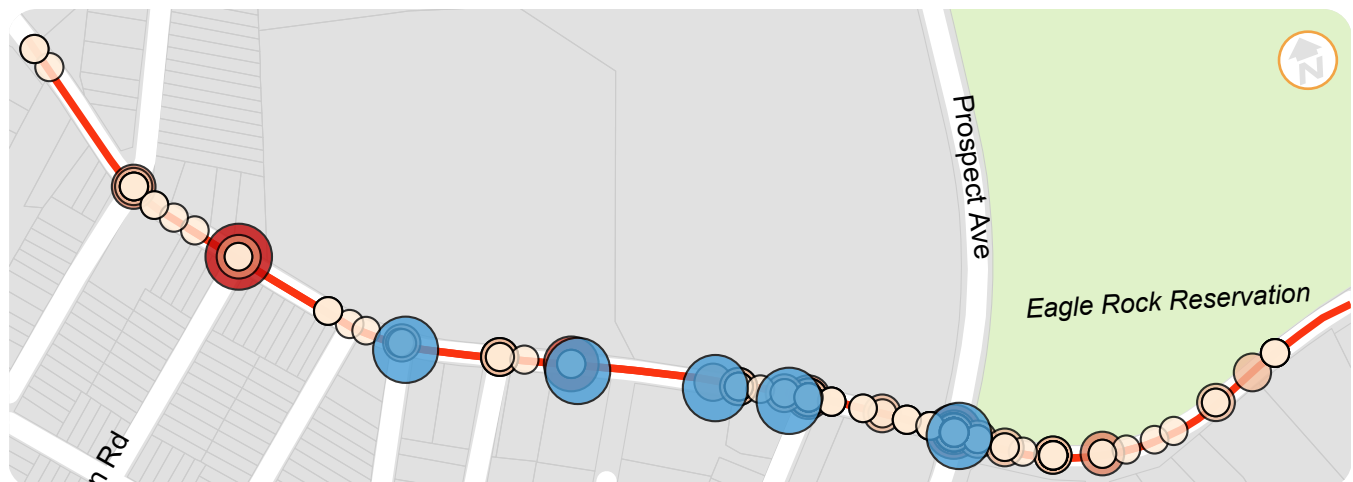


INTERSECTION CRASHES



212 Crashes

10% of all Intersection Crashes



*Combined statistics for all three Eagle Rock corridors, highest HIN score and combined HIN score displayed



RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- *Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads*



- *High-visibility crosswalks: 40% reduction in pedestrian injury crashes*
- *Intersection lighting: 42% reduction in pedestrian crashes*
- *Advance yield or stop markings and signs: 25% reduction in pedestrian crashes*



- *13% reduction in pedestrian/vehicle crashes at intersections*



- *Reduction in pedestrian crashes by 47%*
- *Increase of motorist yielding rates up to 98% (depending on context)*



- *4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes*



- *Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways*
- *Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways*



- *A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.*



- *15% reduction in total crashes*
- *Very low cost*

Estimated Construction Cost:

~\$900,000*

*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

** Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

HIN CORRIDOR FACT SHEETS

CORRIDOR I: NORTHFIELD AVENUE (508 SPUR)

Represents 0.9% of HIN miles

KEY CRASH FACTS

#	%
 180 Crashes	2.1% of all West Orange Crashes
 8 Fatal, Severe & Minor Injury Crashes	1.7% of all Fatal, Severe & Minor Injury Crashes
 6 Pedestrian Crashes	7% of all Pedestrian Crashes
 0 Bicyclist Crashes	0% of all Bicyclist Crashes

COUNTY ROUTE 508 SPUR
0.3 MILES
40' - 50' WIDTH / 3 - 4 LANES
NO SHOULDERS
NO PARKING PERMITTED

**SPEED
LIMIT
35**

HIN SCORE

7

EQUITY + HIN SCORE

21

OVERREPRESENTED CRASH TYPES

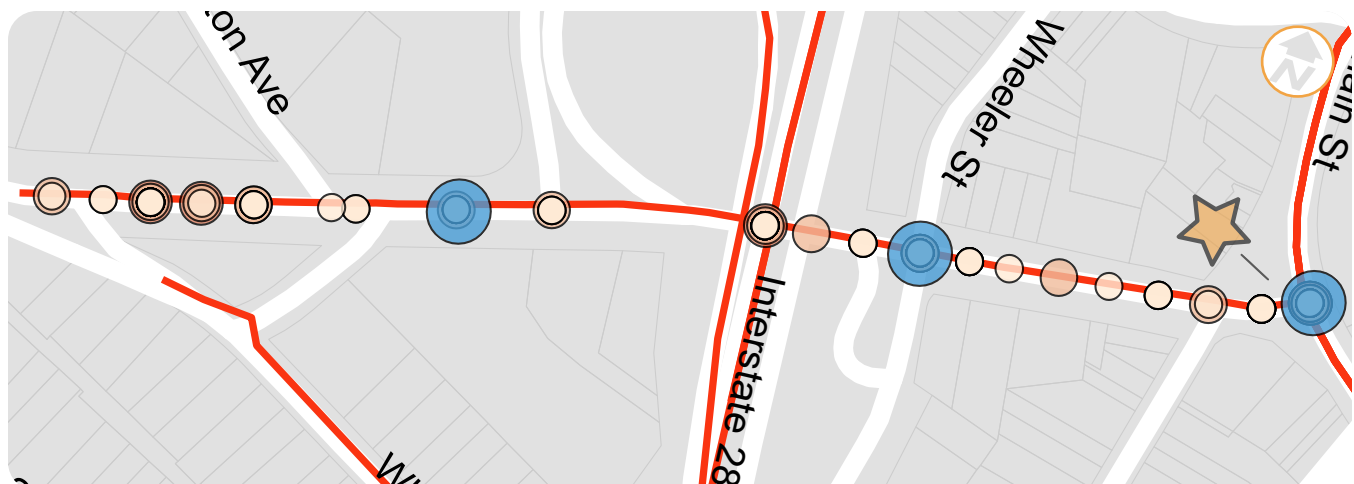


TOP CRASH FACTORS



INTERSECTION CRASHES

 108 Crashes
5.3% of all Intersection Crashes



Any intersections, signals and ramps with I-280 are NJDOT jurisdiction and will be subject to coordination and review with FHWA and NJDOT.



RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- High-visibility crosswalks: 40% reduction in pedestrian injury crashes
- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes



- 13% reduction in pedestrian/vehicle crashes at intersections



- 4-lane to 3-lane road diet conversion: 19-47% reduction in total crashes



- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
- Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



- A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.



- 15% reduction in total crashes
- Very low cost



- Added Left-Turn Lanes: 28-48% reduction in total crashes

- Positive Offset Left-Turn Lanes: 36% reduction in fatal and injury crashes

- Right-Turn Lanes: 14-26% reduction in total crashes
- Cost varies

**Estimated
Construction Cost:
~\$190,000***

*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

**Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.



RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- High-visibility crosswalks: 40% reduction in pedestrian injury crashes
- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes



- 13% reduction in pedestrian/vehicle crashes at intersections



- Reduction in pedestrian crashes by 47%
- Increase of motorist yielding rates up to 98% (depending on context)



- Roadway reconfiguration



- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways
- Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



- 15% reduction in total crashes
- Very low cost

Estimated Construction Cost:

~\$140,000*

*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

**Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

HIN CORRIDOR FACT SHEETS

CORRIDOR K: GASTON STREET

Represents 0.3% of HIN miles

KEY CRASH FACTS

#	%
 17 Crashes	0.2% of all West Orange Crashes
 2 Fatal, Severe & Minor Injury Crashes	0.4% of all Fatal, Severe & Minor Injury Crashes
 0 Pedestrian Crashes	0% of all Pedestrian Crashes
 2 Bicyclist Crashes	6.4% of all Bicyclist Crashes

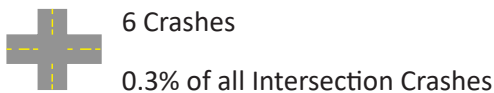
OVERREPRESENTED CRASH TYPES



TOP CRASH FACTORS



INTERSECTION CRASHES



MUNICIPAL ROAD
0.1 MILES
24' - 30' WIDTH / 1 - 2 LANES
NO SHOULDERS
PARKING PERMITTED

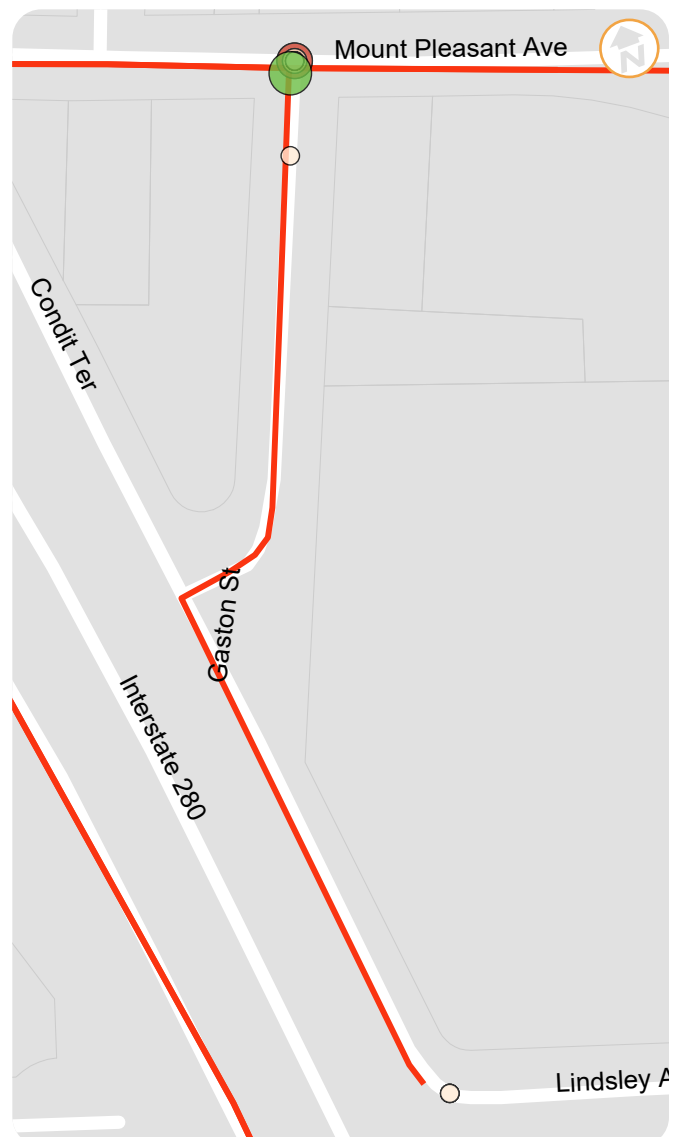


HIN SCORE

6

EQUITY + HIN SCORE

20





RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- High-visibility crosswalks: 40% reduction in pedestrian injury crashes

- Intersection lighting: 42% reduction in pedestrian crashes

- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes



- Reduction in pedestrian crashes by 47%
- Increase of motorist yielding rates up to 98% (depending on context)



- Roadway reconfiguration



- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways

- Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways



- Added Left-Turn Lanes: 28-48% reduction in total crashes

Estimated Construction Cost:

~\$70,000*

*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

** Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/ Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

HIN CORRIDOR FACT SHEETS

CORRIDOR L: SAYERS STREET / PROSPECT PLACE

Represents 0.5% of HIN miles

KEY CRASH FACTS

#	%
 19 Crashes	0.2% of all West Orange Crashes
 3 Fatal, Severe & Minor Injury Crashes	0.6% of all Fatal, Severe & Minor Injury Crashes
 1 Pedestrian Crash	1.2% of all Pedestrian Crashes
 0 Bicyclist Crashes	0% of all Bicyclist Crashes

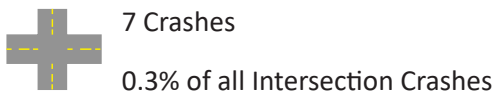
OVERREPRESENTED CRASH TYPES



TOP CRASH FACTORS



INTERSECTION CRASHES



MUNICIPAL ROAD
0.2 MILES
24' - 30' WIDTH / 1 LANE
SHOULDERS
PARKING PERMITTED

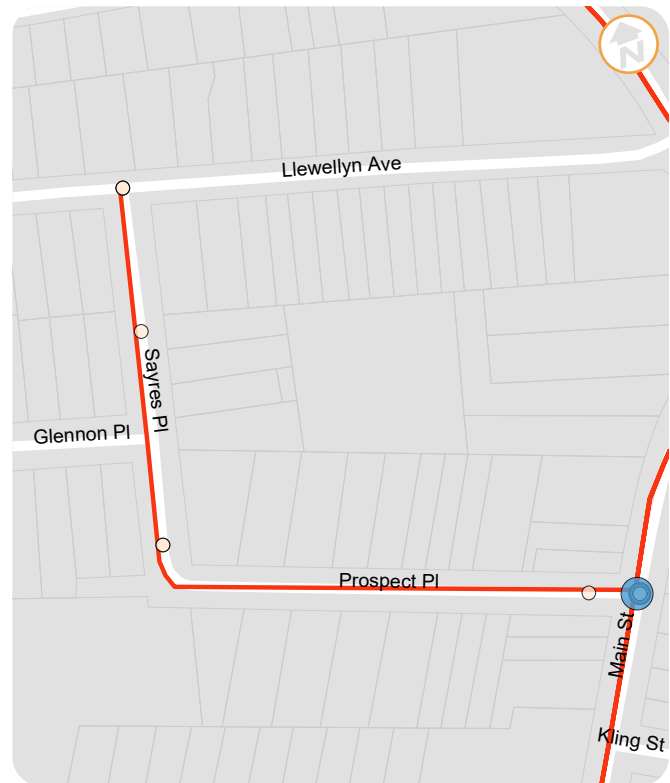


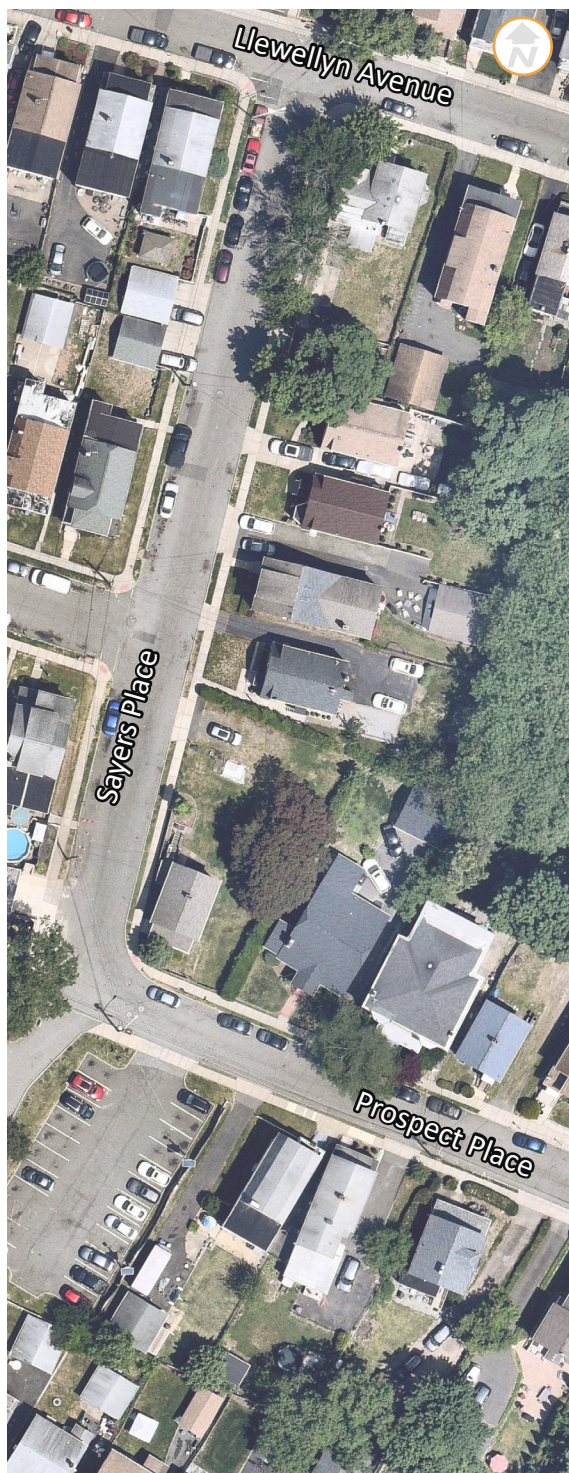
HIN SCORE

3

EQUITY + HIN SCORE

20





RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- *Bicycle Lanes: 49% reduction in crashes on urban four-lane undivided collectors and local roads, 30% reduction in crashes on urban two-lane undivided collectors and local roads*



- *High-visibility crosswalks: 40% reduction in pedestrian injury crashes*



- *Intersection lighting: 42% reduction in pedestrian crashes*
- *Advance yield or stop markings and signs: 25% reduction in pedestrian crashes*
- *Reduction in pedestrian crashes by 47%*
- *Increase of motorist yielding rates up to 98% (depending on context)*



- *Roadway reconfiguration*



- *Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways*
- *Paved Shoulders: 71% reduction in crashes involving pedestrians walking along roadways*

Estimated Construction Cost:

~\$250,000*

*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

** Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/ Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

HIN CORRIDOR FACT SHEETS

CORRIDOR M: WHITTLESEY AVENUE

Represents 1.1% of HIN miles

KEY CRASH FACTS

#	%
 39 Crashes	0.5% of all West Orange Crashes
 3 Fatal, Severe & Minor Injury Crashes	0.6% of all Fatal, Severe & Minor Injury Crashes
 1 Pedestrian Crash	1.2% of all Pedestrian Crashes
 1 Bicyclist Crash	3.2% of all Bicyclist Crashes

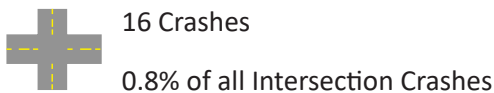
OVERREPRESENTED CRASH TYPES



TOP CRASH FACTORS



INTERSECTION CRASHES



MUNICIPAL ROAD
0.4 MILES
30' WIDTH / 2 LANES
SHOULDER
PARKING PERMITTED

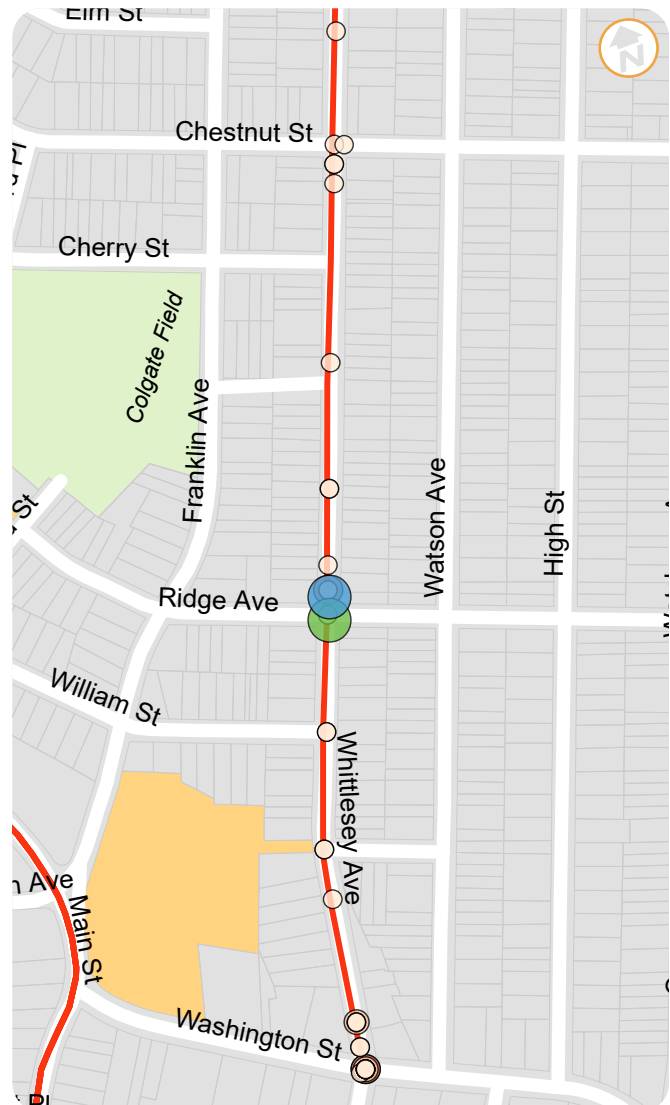


HIN SCORE

3

EQUITY + HIN SCORE

20





RECOMMENDED PROVEN SAFETY COUNTERMEASURES**



- High-visibility crosswalks: 40% reduction in pedestrian injury crashes
- Intersection lighting: 42% reduction in pedestrian crashes
- Advance yield or stop markings and signs: 25% reduction in pedestrian crashes



- Reduction in pedestrian crashes by 47%
- Increase of motorist yielding rates up to 98% (depending on context)



- Sidewalks: 16-89% reduction in crashes involving pedestrians walking along roadways



- A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them. At 20 miles per hour, that percentage drops to 5 percent.

Estimated Construction Cost:

~\$300,000*

*Includes cost of countermeasures that overlap with intersecting corridors. Estimated cost does not include lighting improvements (additional studies are recommended). Cost estimates are primarily based on the NJDOT 2022 cost estimate guidelines for safe routes. <https://www.saferoutesnj.org/wp-content/uploads/2022/05/Design-Treatment-Estimating-Guidelines.pdf>

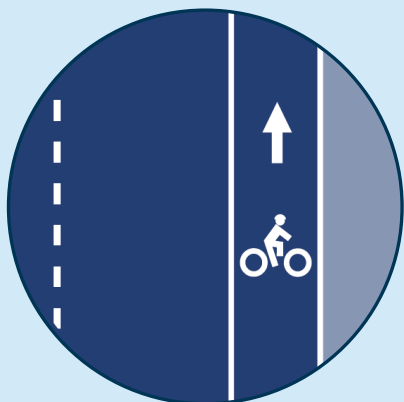
**Although not specifically a Proven Safety Countermeasure, traffic signal timing update/optimization should be included as part of Road Diet/ Reconfiguration, Left- and Right-Turn Lanes, Leading Pedestrian Intervals, and Protected-Only Left Turn Signal Phasing alternatives.

APPENDIX B: FHWA PROVEN SAFETY COUNTERMEASURES

The FHWA Proven Safety Countermeasures are a collection of 28 countermeasures and strategies with data-supported effectiveness in reducing roadway fatalities and serious injuries. While some are resource- and time-intensive, others are low-cost and easy to implement quickly. The list of these countermeasures is as follows:

- | | |
|--|--|
| 1. Appropriate Speed Limits for All Road Users | 15. Roadside Design Improvements at Curves |
| 2. Speed Safety Cameras | 16. SafetyEdge |
| 3. Variable Speed Limits | 17. Wider Edge Lines |
| 4. Bicycle Lanes | 18. Backplates with Retroreflective Borders |
| 5. Crosswalk Visibility Enhancements | 19. Corridor Access Management |
| 6. Leading Pedestrian Interval | 20. Dedicated Left- and Right-Turn Lanes at Intersections |
| 7. Medians and Pedestrian Refuge Islands in Urban and Suburban Areas | 21. Reduced Left-Turn Conflict Intersections |
| 8. Pedestrian Hybrid Beacons | 22. Roundabouts |
| 9. Rectangular Rapid Flashing Beacons | 23. Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections |
| 10. Road Diets (Roadway Reconfiguration) | 24. Yellow Change Intervals |
| 11. Walkways | 25. Lighting |
| 12. Enhanced Delineation for Horizontal Curves | 26. Local Road Safety Plans |
| 13. Longitudinal Rumble Strips and Stripes on Two-Lane Roads | 27. Pavement Friction Management |
| 14. Median Barriers | 28. Road Safety Audit |

Countermeasures listed in **bold** have been assessed for their suitability for each of the 13 Priority HIN Corridors (see pages 84-85 and Appendix A). Detailed information on the characteristics and effects of each of these countermeasures can be found on the following pages.



Safety Benefits:

Bicycle Lane Additions can reduce crashes up to:

49%

for total crashes on urban 4-lane undivided collectors and local roads.⁶

30%

for total crashes on urban 2-lane undivided collectors and local roads.⁶



Separated bicycle lane in Washington, DC.
Source: Alex Baca, Washington Area Bicyclist Association

Separated bicycle lanes may provide further safety benefits. FHWA is anticipating completion of research in Fall 2022.

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures/> and https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwsa18077.pdf.

Bicycle Lanes

Most fatal and serious injury bicyclist crashes occur at non-intersection locations. Nearly one-third of these crashes involve overtaking motorists¹; the speed and size differential between vehicles and bicycles can lead to severe injury. To make bicycling safer and more comfortable for most types of bicyclists, State and local agencies should consider installing bicycle lanes. These dedicated facilities for the use of bicyclists along the roadway can take several forms. Providing bicycle facilities can mitigate or prevent interactions, conflicts, and crashes between bicyclists and motor vehicles, and create a network of safer roadways for bicycling. Bicycle Lanes align with the Safe System Approach principle of recognizing human vulnerability—where separating users in space can enhance safety for all road users.

Applications

FHWA's [Bikeway Selection Guide](#) and [Incorporating On-Road Bicycle Networks into Resurfacing Projects](#) assist agencies in determining which facilities provide the most benefit in various contexts. Bicycle lanes can be included on new roadways or created on existing roads by reallocating space in the right-of-way.

In addition to the paint stripe used for a typical bicycle lane, a lateral offset with painted buffer can help to further separate bicyclists from vehicle traffic. State and local agencies may also consider physical separation of the bicycle lane from motorized traffic lanes through the use of vertical elements like posts, curbs, or vegetation.² Based on international experience and implementation in the United States, there is potential for further safety benefits associated with separated bicycle lanes. FHWA is conducting research on separated bicycle lanes, which includes the development of crash modification factors, to be completed in 2022 to address significant interest on this topic.

Considerations

- City and State policies may require minimum bicycle lane widths, although these can differ by agency and functional classification of the road.
- Bicycle lane design should vary according to roadway characteristics (e.g., motor vehicle volumes and speed) in order to maximize the facility's suitability for riders of all ages and abilities and should consider the travel needs of low-income populations likely to use bicycles. The [Bikeway Selection Guide](#) is a useful resource.
- While some in the public may oppose travel lane narrowing if they believe it will slow traffic or increase congestion, studies have found that roadways did not experience an increase in injuries or congestion when travel lane widths were decreased to add a bicycle lane.³
- Studies and experience in US cities show that bicycle lanes increase ridership and may help jurisdictions better manage roadway capacity without increased risk.
- In rural areas, rumble strips can negatively impact bicyclists' ability to ride if not properly installed. Agencies should consider the dimensions, placement, and offset of rumble strips when adding a bicycle lane.⁴
- Strategies, practices, and processes can be used by agencies to enhance their ability to address equity in bicycle planning and design.⁵

1 Thomas et al. Bicyclist Crash Types on National, State, and Local Levels: A New Look. Transportation Research Record 673(6), 664-676, (2019).

2 [Separated Bike Lane Planning and Design Guide](#). FHWA-HEP-15-025, (2015).

3 Park and Abdel-Aty. "Evaluation of safety effectiveness of multiple cross sectional features on urban arterials". Accident Analysis and Prevention, Vol. 92, pp. 245-255, (2016).

4 FHWA Tech Advisory [Shoulder and Edge Line Rumble Strips](#), (2011).

5 Sandt et al. [Pursuing Equity in Pedestrian and Bicycle Planning](#). FHWA, (2016).

6 Avelar et al. Development of Crash Modification Factors for Bicycle Lane Additions While Reducing Lane and Shoulder Widths. FHWA, (2021).



Safety Benefits:

**High-visibility crosswalks
can reduce pedestrian injury
crashes up to:**
40%¹

**Intersection lighting can
reduce pedestrian crashes
up to:**
42%²

**Advance yield or stop
markings and signs can
reduce pedestrian
crashes up to:**
25%³

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://highways.dot.gov/safety/proven-safety-countermeasures> and <https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/techSheetVizEnhancemt2018.pdf>.

Crosswalk Visibility Enhancements

Poor lighting conditions, obstructions such as parked cars, and horizontal or vertical roadway curvature can reduce visibility at crosswalks, contributing to safety issues. For multilane roadway crossings where vehicle volumes are in excess of 10,000 Average Annual Daily Traffic (AADT), a marked crosswalk alone is typically not sufficient. Under such conditions, more substantial crossing improvements could prevent an increase in pedestrian crash potential.

Three main crosswalk visibility enhancements help make crosswalks and the pedestrians, bicyclists, wheelchair and other mobility device users, and transit users using them more visible to drivers. These include high-visibility crosswalks, lighting, and signing and pavement markings. These enhancements can also assist users in deciding where to cross. Agencies can implement these features as standalone or combination enhancements to indicate the preferred location for users to cross.

High-visibility crosswalks

High-visibility crosswalks use patterns (i.e., bar pairs, continental, ladder) that are visible to both the driver and pedestrian from farther away compared to traditional transverse line crosswalks. They should be considered at all midblock pedestrian crossings and uncontrolled intersections. Agencies should use materials such as inlay or thermoplastic tape, instead of paint or brick, for highly reflective crosswalk markings.

Improved Lighting

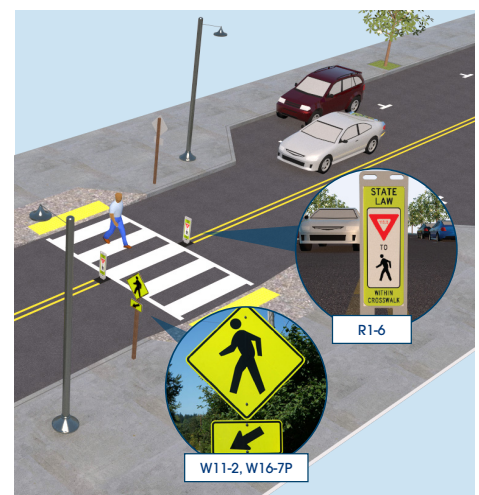
The goal of crosswalk lighting should be to illuminate with positive contrast to make it easier for a driver to visually identify the pedestrian. This involves carefully placing the luminaires in forward locations to avoid a silhouette effect of the pedestrian.

Enhanced Signing and Pavement Markings

On multilane roadways, agencies can use "YIELD Here to Pedestrians" or "STOP Here for Pedestrians" signs 20 to 50 feet in advance of

a marked crosswalk to indicate where a driver should stop or yield to pedestrians, depending on State law. To supplement the signing, agencies can also install a STOP or YIELD bar (commonly referred to as "shark's teeth") pavement markings.

In-street signing, such as "STOP Here for Pedestrians" or "YIELD Here to Pedestrians" may be appropriate on roads with two- or three-lane roads where speed limits are 30 miles per hour or less.



Source: FHWA

¹ (CMF ID: 4123) Chen, L., C. Chen, and R. Ewing. The Relative Effectiveness of Pedestrian Safety Countermeasures at Urban Intersections - Lessons from a New York City Experience. (2012).

² (CMF ID: 436) Elvik, R. and Vaa, T. Handbook of Road Safety Measures. Oxford, United Kingdom, Elsevier, (2004).

³ (CMF ID: 9017) Zeeger et al. Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments, FHWA, (2017).



Safety Benefits:

13%

reduction in pedestrian-vehicle crashes at intersections.¹

Leading Pedestrian Interval

A leading pedestrian interval (LPI) gives pedestrians the opportunity to enter the crosswalk at an intersection 3-7 seconds before vehicles are given a green indication. Pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn right or left.

LPIs provide the following benefits:

- Increased visibility of crossing pedestrians.
- Reduced conflicts between pedestrians and vehicles.
- Increased likelihood of motorists yielding to pedestrians.
- Enhanced safety for pedestrians who may be slower to start into the intersection.

FHWA's Handbook for *Designing Roadways for the Aging Population* recommends the use of the LPI at intersections with high turning vehicle volumes. Transportation agencies should refer to the *Manual on Uniform Traffic Control Devices* for guidance on LPI timing and ensure that pedestrian signals are accessible for all users. Costs for implementing LPIs are very low when only signal timing alteration is required.



An LPI allows a pedestrian to establish a presence in the crosswalk before vehicles are given a green indication. Source: FHWA



LPIs reduce potential conflicts between pedestrians and turning vehicles. Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://highways.dot.gov/safety/proven-safety-countermeasures> and <https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/fhwasa19040.pdf>.

¹ (CMF ID: 9918) Goughnour, E., D. Carter, C. Lyon, B. Persaud, B. Lan, P. Chun, I. Hamilton, and K. Signor. "Safety Evaluation of Protected Left-Turn Phasing and Leading Pedestrian Intervals on Pedestrian Safety." Report No. FHWA-HRT-18-044. Federal Highway Administration. (October 2018)



Safety Benefits:

RRFBs can reduce crashes up to:

47%

for pedestrian crashes.⁴

RRFBs can increase motorist yielding rates up to:

98%

(varies by speed limit, number of lanes, crossing distance, and time of day).³



RRFBs used at a trail crossing.
Source: LJB

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://highways.dot.gov/safety/proven-safety-countermeasures> and https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/techSheet_RRFB_2018.pdf.

Rectangular Rapid Flashing Beacons (RRFB)

A marked crosswalk or pedestrian warning sign can improve safety for pedestrians crossing the road, but at times may not be sufficient for drivers to visibly locate crossing locations and yield to pedestrians. To enhance pedestrian conspicuity and increase driver awareness at uncontrolled, marked crosswalks, transportation agencies can install a pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) to accompany a pedestrian warning sign. RRFBs consist of two, rectangular-shaped yellow indications, each with a light-emitting diode (LED)-array-based light source.¹ RRFBs flash with an alternating high frequency when activated to enhance conspicuity of pedestrians at the crossing to drivers.

For more information on using RRFBs, see the Interim Approval in the *Manual on Uniform Traffic Control Devices (MUTCD)*.¹

Applications

The RRFB is applicable to many types of pedestrian crossings but is particularly effective at multilane crossings with speed limits less than 40 miles per hour.² Research suggests RRFBs can result in motorist yielding rates as high as 98 percent at marked crosswalks, but varies depending on the location, posted speed limit, pedestrian crossing distance, one- versus two-way road, and the number of travel lanes.³ RRFBs can also accompany school or trail crossing warning signs.

RRFBs are placed on both sides of a crosswalk below the pedestrian crossing sign and above the diagonal downward arrow plaque pointing at the crossing.¹ The flashing pattern can be activated with pushbuttons or passive (e.g., video or infrared) pedestrian detection, and should be unlit when not activated.

Considerations

Agencies should:²

- Install RRFBs in the median rather than the far-side of the roadway if there is a pedestrian refuge or other type of median.
- Use solar-power panels to eliminate the need for a power source.
- Reserve the use of RRFBs for locations with significant pedestrian safety issues, as over-use of RRFB treatments may diminish their effectiveness.

Agencies shall not:²

- Use RRFBs without the presence of a pedestrian, school or trail crossing warning sign.
- Use RRFBs for crosswalks across approaches controlled by YIELD signs, STOP signs, traffic control signals, or pedestrian hybrid beacons, except for the approach or egress from a roundabout.

¹ *MUTCD Interim Approval 21 - RRFBs at Crosswalks*.

² "Rectangular Rapid Flash Beacon" in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. FHWA, (2013).

³ Fitzpatrick et al. "Will You Stop for Me? Roadway Design and Traffic Control Device Influences on Drivers Yielding to Pedestrians in a Crosswalk with a Rectangular Rapid-Flashing Beacon." Report No. TTI-CTS-0010. Texas A&M Transportation Institute, (2016).

⁴ (CMF ID: 9024) NCHRP Research Report 841 Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments, (2017).



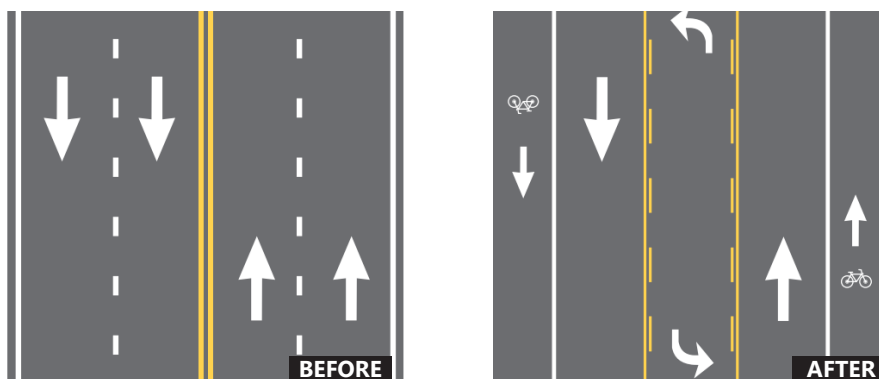
Safety Benefits:

4-Lane to 3-Lane
Road Diet Conversions

19-47%
reduction in total crashes.¹

Road Diets (Roadway Reconfiguration)

A Road Diet, or roadway reconfiguration, can improve safety, calm traffic, provide better mobility and access for all road users, and enhance overall quality of life. A Road Diet typically involves converting an existing four-lane undivided roadway to a three-lane roadway consisting of two through lanes and a center two-way left-turn lane (TWLTL).



Before and after example of a Road Diet. Source: FHWA

Benefits of Road Diet installations may include:

- Reduction of rear-end and left-turn crashes due to the dedicated left-turn lane.
- Reduced right-angle crashes as side street motorists cross three versus four travel lanes.
- Fewer lanes for pedestrians to cross.
- Opportunity to install pedestrian refuge islands, bicycle lanes, on-street parking, or transit stops.
- Traffic calming and more consistent speeds.
- A more community-focused, Complete Streets environment that better accommodates the needs of all road users.

A Road Diet can be a low-cost safety solution when planned in conjunction with a simple pavement overlay, and the reconfiguration can be accomplished at no additional cost. Typically, a Road Diet is implemented on a roadway with a current and future average daily traffic of 25,000 or less.



Road Diet project in Honolulu, Hawaii.
Source: Leidos

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://highways.dot.gov/safety/proven-safety-countermeasures> and <https://highways.dot.gov/safety/other/road-diets>.

¹ (CMF ID: 5554,2841) Evaluation of Lane Reduction "Road Diet" Measures on Crashes, FHWA-HRT-10-053, (2010).

Proven Safety Countermeasures



Safety Benefits:

Sidewalks

65-89%

reduction in crashes involving pedestrians walking along roadways.³

Paved Shoulders

71%

reduction in crashes involving pedestrians walking along roadways.³

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://highways.dot.gov/safety/proven-safety-countermeasures> and http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=1.

Walkways

A walkway is any type of defined space or pathway for use by a person traveling by foot or using a wheelchair. These may be pedestrian walkways, shared use paths, sidewalks, or roadway shoulders.

With more than 6,200 pedestrian fatalities and 75,000 pedestrian injuries occurring in roadway crashes annually,¹ it is important for transportation agencies to improve conditions and safety for pedestrians and to integrate walkways more fully into the transportation system. Research shows people living in low-income communities are less likely to encounter walkways and other pedestrian-friendly features.²

Well-designed pedestrian walkways, shared use paths, and sidewalks improve the safety and mobility of pedestrians. Pedestrians should have direct and connected network of walking routes to desired destinations without gaps or abrupt changes. In some rural or suburban areas, where these types of walkways are not feasible, roadway shoulders provide an area for pedestrians to walk next to the roadway, although these are not preferable.

Transportation agencies should work towards incorporating pedestrian facilities into all roadway projects

unless exceptional circumstances exist. It is important to provide and maintain accessible walkways along both sides of the road in urban areas, particularly near school zones and transit locations, and where there is a large amount of pedestrian activity. Walkable shoulders should also be considered along both sides of rural highways when routinely used by pedestrians.



Example of a sidewalk in a residential area.
Source: pedbikeimages.org / Burden



Paved shoulder used as a walkway. Source: pedbikeimages.org / Burden

¹ National Center for Statistics and Analysis. (2020, March). Pedestrians: 2018 data (Traffic Safety Facts. Report No. DOT HS 812 850). National Highway Traffic Safety Administration.

² Gibbs, et al. Income Disparities in Street Features that Encourage Walking. Bridging the Gap, (2012, March).

³ Gan et al. Update of Florida Crash Reduction Factors and Countermeasures to Improve the Development of District Safety Improvement Projects. Florida DOT, (2005).



Safety Benefits:

Traffic fatalities in the City of Seattle decreased 26 percent after the city implemented comprehensive, city-wide speed management strategies and countermeasures inspired by Vision Zero. This included setting speed limits on all non-arterial streets at 20 mph and 200 miles of arterial streets at 25 mph.⁵

One study found that on rural roads, when considering other relevant factors in the engineering study along with the speed distribution, setting a speed limit no more than 5 mph below the 85th-percentile speed may result in fewer total and fatal plus injury crashes, and lead to drivers complying closely with the posted speed limit.⁶

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://highways.dot.gov/safety/proven-safety-countermeasures> and <https://highways.dot.gov/safety/speed-management/reference-materials>.

Appropriate Speed Limits for All Road Users

There is broad consensus among global roadway safety experts that speed control is one of the most important methods for reducing fatalities and serious injuries. Speed is an especially important factor on non-limited access roadways where vehicles and vulnerable road users mix.

A driver may not see or be aware of the conditions within a corridor, and may drive at a speed that feels reasonable for themselves but may not be for all users of the system, especially vulnerable road users, including children and seniors. A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them.¹ At 20 miles per hour, that percentage drops to 5 percent.¹ A number of cities across the United States, including New York, Washington, Seattle and Minneapolis, have reduced their local speed limits in recent years in an effort to reduce fatalities and serious injuries, with most having to secure State legislative authorization to do so.

States and local jurisdictions should set appropriate speed limits to reduce the significant risks drivers impose on others—especially vulnerable road users—and on themselves. Addressing speed is fundamental to the Safe System Approach to making streets safer, and a growing body of research shows that speed limit changes alone can lead to measurable declines in speeds and crashes.²

Applications

Posted speed limits are often the same as the legislative statutory speed limit. Agencies with designated authorities to set speed limits, which include States, and sometimes local jurisdictions, can establish non-statutory speed limits or designate reduced speed zones, and a growing number are doing so. While non-statutory speed limits must be based on an engineering study, conducted in accordance with the *Manual on Uniform Traffic Control Devices* (MUTCD) involving multiple factors and engineering judgment, FHWA is also encouraging agencies to use the following:³

- Expert Systems tools.
 - [USLIMITS2](#).
 - [NCHRP 966: Posted Speed Limit Setting Procedure and Tool](#).
- Safe System approach.

Based on international experience and implementation in the United States, the use of 20 mph speed zones or speed limits in urban core areas where vulnerable users share the road environment with motorists may result in further safety benefits.⁴

Considerations

When setting a speed limit, agencies should consider a range of factors such as pedestrian and bicyclist activity, crash history, land use context, intersection spacing, driveway density, roadway geometry, roadside conditions, roadway functional classification, traffic volume, and observed speeds.

To achieve desired speeds, agencies often implement other speed management strategies concurrently with setting speed limits, such as self-enforcing roadways, traffic calming, and speed safety cameras. Additional information is in the following FHWA resources:

- [FHWA Speed Management website](#).
- [Self-Enforcing Roadways: A Guidance Report](#).
- [Noteworthy Speed Management Practices](#).
- [Jurisdiction Speed Management Action Plan Development Package](#).
- [Traffic Calming ePrimer](#).

¹ Reducing the speed limit to 20 mph in urban areas: Child deaths and injuries would be decreased.

² Lowering the speed limit from 30 to 25 mph in Boston: effects on vehicle speeds.

³ FHWA's Methods and Practices for Setting Speed Limits: An Informational Report. (2012).

⁴ Recommendations of the Academic Expert Group for the 3rd Global Ministerial Conference on Road Safety.

⁵ https://safety.fhwa.dot.gov/speedmgmt/ref_mats/fhwasa20047/sec8.cfm#foot813

⁶ Safety and Operational Impacts of Setting Speed Limits below Engineering Recommendations.



Safety Benefits:

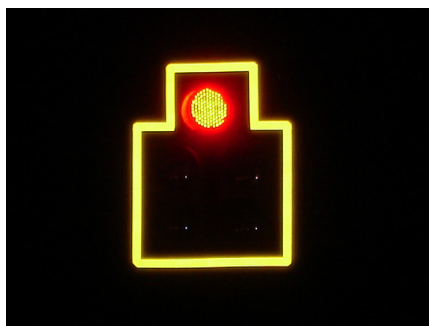
15%

reduction in total crashes.¹

Backplates with Retroreflective Borders

Backplates added to a traffic signal head improve the visibility of the illuminated face of the signal by introducing a controlled-contrast background. The improved visibility of a signal head with a backplate is made even more conspicuous by framing it with a 1- to 3-inch yellow retroreflective border. Signal heads that have backplates equipped with retroreflective borders are more visible and conspicuous in both daytime and nighttime conditions.

This treatment is recognized as a human factors enhancement of traffic signal visibility, conspicuity, and orientation for both older and color vision deficient drivers. This countermeasure is also advantageous during periods of power outages when the signals would otherwise be dark, providing a visible cue for motorists to stop at the intersection ahead.



Retroreflective borders are highly visible during the night. Source: South Carolina DOT

Considerations

Transportation agencies should consider backplates with retroreflective borders as part of their efforts to systematically improve safety performance at signalized intersections. Adding a retroreflective border to an existing signal backplate is a very low-cost safety treatment. This can be done by either adding retroreflective tape to an existing backplate or purchasing a new backplate with a retroreflective border already incorporated. The most efficient means of implementing this proven

safety countermeasure is to adopt it as a standard treatment for signalized intersections across a jurisdiction or State.

Implementation challenges include minimizing installation time, accessing existing signal heads, and structural limitations due to added wind load in instances where an entire backplate is added. Agencies should consider the design of the existing signal support structure to determine if the design is sufficient to support the added wind load.



Signal backplate framed with a retroreflective border. Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://highways.dot.gov/safety/proven-safety-countermeasures> and <https://rosap.nhtl.bts.gov/view/dot/42807>.

¹ (CMF ID: 1410) Sayed, T., Leur, P., and Pump, J., "Safety Impact of Increased Traffic Signal Backboards Conspicuity," 2005 TRB 84th Annual Meeting: Compendium of Papers CD-ROM, Vol. TRB#05-16, Washington, D.C., (2005).



Safety Benefits:

Left-Turn Lanes

28-48%

reduction in total crashes.¹

Positive Offset Left-Turn Lanes

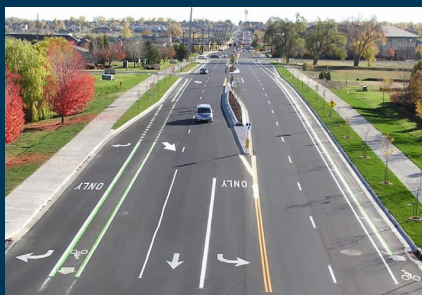
36%

reduction in fatal and injury crashes.²

Right-Turn Lanes

14-26%

reduction in total crashes.¹



Left- and right-turn lanes at a two-way stop-controlled intersection. Source: City of Greeley, CO

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://highways.dot.gov/safety/proven-safety-countermeasures> and <https://www.fhwa.dot.gov/publications/research/safety/02103/02103techbrief.pdf>.

Dedicated Left- and Right-Turn Lanes at Intersections

Auxiliary turn lanes—either for left turns or right turns—provide physical separation between turning traffic that is slowing or stopped and adjacent through traffic at approaches to intersections. Turn lanes can be designed to provide for deceleration prior to a turn, as well as for storage of vehicles that are stopped and waiting for the opportunity to complete a turn.

While turn lanes provide measurable safety and operational benefits at many types of intersections, they are particularly helpful at two-way stop-controlled intersections. Crashes occurring at these intersections are often related to turning maneuvers. Since the major route traffic is free flowing and typically travels at higher speeds, crashes that do occur are often severe. The main crash types include collisions of vehicles turning left across opposing through traffic and rear-end collisions of vehicles turning left or right with other vehicles following closely behind. Turn lanes reduce the potential for these types of crashes.

Installing left-turn lanes and/or right-turn lanes should be considered for the major road approaches for improving safety at both three- and four-leg intersections with stop control on the minor road, where significant turning volumes exist, or where there is a history of turn-related crashes. Pedestrian and bicyclist safety and convenience should also be considered when adding turn lanes at an intersection. Specifically, offset left- and right-turn

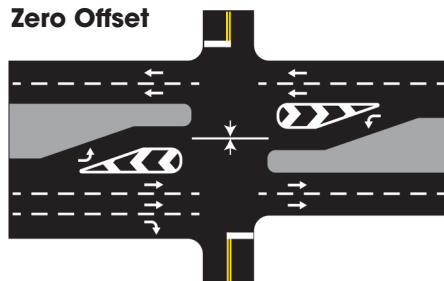
lanes will lengthen crossing distances for pedestrians.

Offset Turn Lanes

Providing offset of left- and right-turn lanes to increase visibility can provide added safety benefits, and is preferable in many situations, particularly at locations with higher speeds, or where free-flow or permissive movements are possible.

At turn lanes with zero or negative offset, turning vehicles can block sightlines. For left-turn lanes, this usually involves opposing left-turning vehicles occupying the turn lanes at the same time. For right-turn lanes, this typically involves right-turning vehicles from the major road and vehicles entering the intersection from the minor road. In both scenarios, adding positive offset to turn lanes enhances the sight distance to approaching vehicles that conflict with the turning movement. Offset turn lanes should be considered when there is a high frequency of these types of conflicts in order to reduce the likelihood of a severe crash.

Zero Offset



Positive Offset

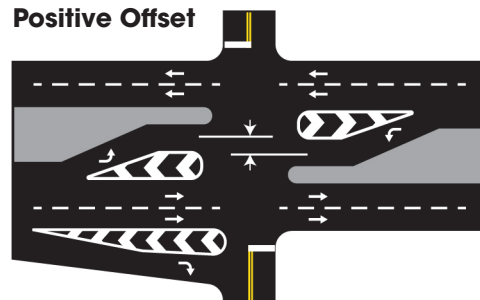


Illustration comparing zero offset to positive offset of left- and right-turn lanes. Source: FHWA

¹ (CMF ID: 260, 268, 285, 289) Harwood et al. Safety Effectiveness of Intersection Left- and Right-Turn Lanes. FHWA-HRD-02-089, (2002).

² (CMF ID: 6096) Persaud et al. Safety Evaluation of Offset Improvements for Left-Turn Lanes. FHWA-HRT-09-035, (2009).

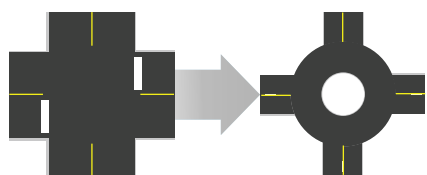


Proven Safety Countermeasures



Safety Benefits:

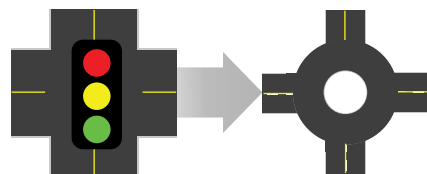
Two-Way Stop-Controlled Intersection to a Roundabout



82%

reduction in fatal
and injury crashes.¹

Signalized Intersection to a Roundabout



78%

reduction in fatal
and injury crashes.¹

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://highways.dot.gov/safety/proven-safety-countermeasures> and <https://highways.dot.gov/safety/intersection-safety/intersection-types/roundabouts>.

Roundabouts

The modern roundabout is an intersection with a circular configuration that safely and efficiently moves traffic. Roundabouts feature channelized, curved approaches that reduce vehicle speed, entry yield control that gives right-of-way to circulating traffic, and counterclockwise flow around a central island that minimizes conflict points. The net result of lower speeds and reduced conflicts at roundabouts is an environment where crashes that cause injury or fatality are substantially reduced.

Roundabouts are not only a safer type of intersection; they are also efficient in terms of keeping people moving. Even while calming traffic, they can reduce delay and queuing when compared to other intersection alternatives. Furthermore, the lower vehicular speeds and reduced conflict environment can create a more suitable environment for walking and bicycling.

Roundabouts can be implemented in both urban and rural areas under a wide range of traffic conditions. They can replace signals, two-way stop controls, and all-way stop controls. Roundabouts are an effective option for managing speed and transitioning traffic from high-speed to low-speed environments, such as freeway interchange ramp terminals, and rural intersections along high-speed roads.

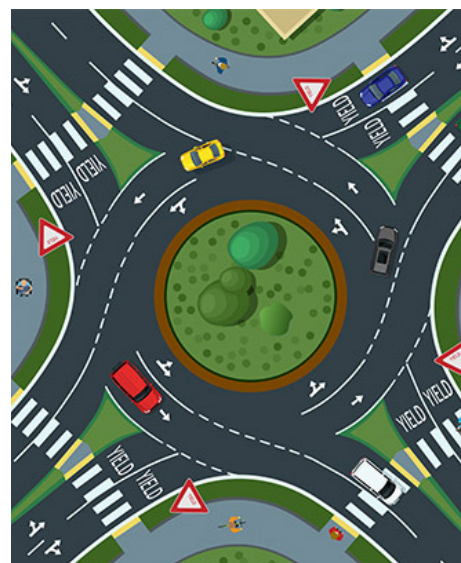


Illustration of a multilane roundabout.
Source: FHWA



Example of a single-lane roundabout. Source: FHWA

¹ (CMF ID: 211.226) AASHTO. The Highway Safety Manual, American Association of State Highway Transportation Professionals, Washington, D.C., (2010).

APPENDIX C: FUNDING SOURCES

Funding Sources

The following is a general compilation of funding sources that have been or could be used to fund improvements in West Orange Township. The list is not exhaustive, but identifies a selection of federal, state, and private/non-profit funding sources for pedestrian and bicycle planning, project development, and construction. For each source, links are provided to program websites that contain additional information related to: how to apply for funding, typical grant amounts, application deadlines, and eligible activities. Some funding sources may also be used to fund programmatic activities, related to safety, enforcement, and education. Potential funding sources are listed below followed by a detailed description of each source on subsequent pages.

Federal Funding Opportunities

- The Fixing America’s Surface Transportation (FAST) ACT
 - » Safe Streets and Roads for All Program (SS4A)
 - » Congestion Mitigation and Air Quality Improvement (CMAQ) Program
 - » Transportation Alternatives Set-Aside
 - » Highway Safety Improvement Program (HSIP)
 - » Safe Routes to School Program (SRTS)
 - » Recreational Trails Program
 - » Reconnecting Communities Pilot Program (RCP)
 - » Thriving Communities Program (TCP)
 - » Neighborhood Access and Equity Grant Program
- Road to Zero Community Traffic Safety Grants

» NJDOT – Transit Village Program

- New Jersey Transportation Infrastructure Bank
- NJ Division of Highway Traffic Safety Grants (HTS Grants)
 - » Comprehensive Traffic Safety Programs (CTSPs)
 - » Pedestrian Safety
 - » Other Eligible Programs

Private or Non-Profit Funding Sources

- Sustainable Jersey
- Sustainable Jersey for Schools
- Robert Wood Johnson Foundation
- The Geraldine R. Dodge Foundation

Other

- Impact Fees
- County and Municipal Open Space Trust Funds
- County and Municipal Capital Programs

State Funding Opportunities

- State Infrastructure Grant Programs
 - » NJDOT – Municipal Aid
 - » NJDOT – County Aid
 - » NJDOT – Bikeway Grant Program
 - » NJDOT – Safe Streets to Transit Program

Federal Funding Opportunities

Infrastructure Investment and Jobs Act

On November 6, 2021, President Biden signed the Infrastructure Investment and Jobs Act, also referred to as the Bipartisan Infrastructure Law, into law. Alongside funding for utilities, internet, electricity, resiliency and pollution cleanup, transportation funding was a central piece of this bill. This included funding for airports and rail, but also allocated \$110 billion to repairs and improvements to roads and bridges. (The previous relevant federal program was known as the Fixing America's Surface Transportation Act, or "FAST Act"). Funding programs under the Infrastructure Investment and Jobs Act, many of which are continued from the FAST Act from 2016-2020, are summarized below.

<https://www.fhwa.dot.gov/bipartisan-infrastructure-law/>

Safe Streets and Roads for All (SS4A) Program

This program was established out of the Infrastructure Investment and Jobs Act of 2021 (IIJA). It funds planning and implementation of projects and strategies which share a goal of eliminating roadway deaths and serious injuries. Many Complete Streets-related measures are eligible. Funding can be used to produce a comprehensive safety action plan, undergo demonstration projects, and implement permanent measures. Congress has appropriated \$5 billion for the program through fiscal year 2026, and all grants require a 20 percent local match. The SS4A program supports the National Roadway Safety Strategy and the United States Department of Transportation's goal of zero deaths and serious injuries on our nation's roadways. Counties, municipalities, and other non-State government entities are eligible to apply.

<https://www.transportation.gov/grants/SS4A>

Congestion Mitigation and Air Quality Improvement (CMAQ) Program

The CMAQ program provides a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funds may be used for a transportation project or program such as construction of bicycle and pedestrian facilities that are not exclusively recreational (as they must reduce vehicle trips and therefore vehicle emissions), outreach promoting safe bicycle use, and other bicycle and pedestrian programs. CMAQ eligibilities include public transit, bicycle and pedestrian facilities, travel demand management strategies, alternative fuel vehicles, and facilities serving electric or natural gas-fueled vehicles.

<https://www.fhwa.dot.gov/bipartisan-infrastructure-law/cmaq.cfm>

Transportation Alternatives Set-Aside

The Transportation Alternatives Set-Aside (TA Set-Aside, or TA) authorizes funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, such as historic preservation and vegetation management, and environmental mitigation related to stormwater and habitat connectivity; recreational trail projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former divided highways.

https://www.fhwa.dot.gov/environment/transportation_alternatives/

Highway Safety Improvement Program (HSIP)

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance.

<https://safety.fhwa.dot.gov/hsip/>

Safe Routes to School Program (SRTS)

The Safe Routes to School Program (SRTS) is a federally funded reimbursement program administered by the New Jersey Department of Transportation (NJDOT), in partnership with the North Jersey Transportation Planning Authority (NJTPA). Under MAP-21 legislation, the Transportation Alternatives Program (TAP) funding does not provide for a standalone Safe Routes to School Program. The New Jersey Department of Transportation (NJDOT) has elected to continue funding the SRTS program separately.

Infrastructure projects may include the installation of sidewalks, crosswalks, bike lanes, multi-use paths, traffic calming measures, and other means to ensure the ease and safety of children walking or biking to school. Projects must be located within two miles of a school that serves students in grades K-8 and involve the school commute.

Any municipality, school district, or county is eligible to apply for funding after a solicitation is announced. Non-profit organizations are not eligible as direct grant recipients for the solicitation. However, non-profit organizations may partner with a local public agency that will assume responsibility and administration for the grant.

In 2016, NJDOT announced a pilot program called “Design Assistance.” The program assists municipalities which received funding with development of plans, specifications and estimates for their SRTS projects.

<http://www.state.nj.us/transportation/business/localaid/srts.shtm>

<https://www.njtpa.org/Projects-Programs/Local-Programs/Safe-Routes-To-School.aspx>

Recreational Trails Program

Recreational Trails Program: The Recreational Trails Grant Program administered by the NJDEP Green Acres Program provides federal funds for developing new trails and maintaining and restoring existing trails and trail facilities including trails for non-motorized, multi-use (including land and water) and motorized purposes. The program is currently on hold as it undergoes revisions.

<https://dep.nj.gov/greenacres/trails-program-home/>

Reconnecting Communities Pilot Program (RCP)

The Reconnecting Communities Pilot Program was established by the Infrastructure Investment and Jobs Act of 2021 (IIJA). The program aims to correct wrongs of past transportation projects that have isolated or otherwise cut off communities from jobs and other amenities. Ideal projects improve access in one or more ways, increasing opportunities for residents of impacted communities. Congress has appropriated \$1 billion for this program through fiscal year 2026. States, counties, and local units of government are eligible to apply for funding to plan and implement projects on facilities of which the applicant is the owner. Non-owners may apply for planning grants, as well as capital construction grants, provided that the facility owner has appropriately endorsed the application. All grants require a 20 percent local match.

<https://www.transportation.gov/grants/reconnecting-communities>

Thriving Communities Program (TCP)

The Thriving Communities Program provides technical assistance to governments and transit agencies. The program focuses on communities that have suffered historic disinvestment and lack the resources and capacity to successfully engage, develop, design, and deliver infrastructure projects. The program provides planning, technical assistance, and capacity building to better navigate federal requirements, identify financing and funding opportunities, and grow long-term capacity to leverage transportation investments to achieve broader economic and community development goals.

<https://www.transportation.gov/grants/thriving-communities>

Neighborhood Access and Equity Grant Program

This program was created by the Inflation Reduction Act of 2022 (IRA). Much of the eligibility and criteria are similar to the Reconnecting Communities Pilot (RCP, see above). It appropriates over \$3 billion to reconnecting communities by supporting neighborhood equity, safety, and affordable transportation access as well as mitigating negative environmental impacts.

Road to Zero Community Traffic Safety Grants

The Road to Zero Coalition was formed in 2016 as a partnership between the US Department of Transportation and the National Safety Council, with the goal of ending fatalities on the nation's roads by 2050. The Road to Zero Community Safety Grant Program supports innovative and promising approaches to implementing evidence-based countermeasures, supporting a Safe System approach, and performing necessary research to eliminate traffic fatalities. Grants are for one year, and supplanting the effort with federal funds is prohibited. Proposals are due on January 14, 2024.

State Funding Opportunities

The New Jersey Department of Transportation (NJDOT) Division of Local Aid and Economic Development administers funds to local public agencies such as county and municipal governments for construction projects to improve the state's transportation system. Grant support and technical assistance is provided through the Local Aid Resource Center's Help Desk (<https://njdotlocalaidrc.com/>). The New Jersey Transportation Trust Fund and the 2021 Bipartisan Infrastructure Law provide the opportunity for funding assistance to local governments for road, bridge, and other transportation projects. While NJDOT and the three metropolitan planning organizations that cover the state administer many federal aid programs, including Transportation Alternatives and Safe Routes to School, the USDOT administers some grant programs directly. NJDOT administers state aid programs. Below are some options for funding infrastructure projects through NJDOT.

State Aid Infrastructure Grant Programs

NJDOT – Municipal Aid

In the Municipal Aid program, funds are appropriated by the Legislature for municipalities in each county based on a formula contained in legislation. Additionally, \$10 million is allotted for those municipalities that qualify for Urban Aid. Urban Aid is distributed by a formula that is computed by the New Jersey Department of Community Affairs. Each spring, the NJDOT announces the program for that fiscal year and invites municipalities to apply. Road improvement projects such as resurfacing, rehabilitation or reconstruction and signalization are funded and distributed by formula.

Applications receive points based on various criteria including existing road conditions, Average Daily Traffic (ADT), safety improvements, and access to nodes (schools, residential areas, employment centers, etc.). Other important criteria include the project's readiness to construct, whether the municipality has received an allotment within the last three years, and the municipality's award and close-out performance on previously awarded State grants.

The State pays 75% of the funds at the time of bid approval and the remainder on a reimbursement basis after acceptance by the municipality and the State of the work completed.

<http://www.state.nj.us/transportation/business/localaid/municaid.shtm>

NJDOT – County Aid

County Aid funds are appropriated by the Legislature annually for the improvement of public roads and bridges under county jurisdiction. Public transportation and other transportation projects are also included.

Each project must be included in the County's Annual Transportation Program (ATP). In accordance with the County Aid regulations N.J.A.C. 16:20A, the ATP shall list a pool of eligible projects by name and location, including municipality, with a brief description of each project, project limits and an estimate of the construction cost.

NJDOT – Bikeway Grant Program

The New Jersey Department of Transportation's (NJDOT) Bikeway Grant Program provides funds to counties and municipalities to promote bicycling as an alternate mode of transportation in New Jersey. A primary objective of the Bikeway Grant Program is to support the State's goal of constructing 1,000 new miles of dedicated bike paths (facilities that are physically separated from motorized vehicular traffic by an open space or barrier either within the highway right of way or within an independent right of way). In an effort to establish regionally connected bicycle networks, this program is available to every municipality and county throughout New Jersey. Although priority will be given to construction of new bike paths, the proposed construction or delineation of any new bicycle facility will be considered.

<http://www.state.nj.us/transportation/business/localaid/bikewaysf.shtm>

NJDOT – Safe Streets to Transit Program

This program encourages counties and municipalities to construct safe and accessible pedestrian linkages to all types of transit facilities and stations, to promote increased usage of transit by all segments of the population and decrease private vehicle use.

<https://njdotlocalaidrc.com/state-funded-programs/safe-streets-to-transit>

NJDOT – Transit Village Program

This program awards grants for transportation projects that enhance walking, biking, and/or transit ridership within a ½ mile of the transit facility. Municipalities must already be designated as a Transit Village by the NJDOT Commissioner and the inter-agency Transit Village Task Force to be eligible to apply.

<https://njdotlocalaidrc.com/state-funded-programs/transit-village>

New Jersey Transportation Infrastructure Bank

The Transportation Bank is a partnership between the NJ Department of Transportation (NJDOT) and the New Jersey Infrastructure Bank (I-Bank). The goal of the Transportation Bank is to provide low interest financing for a variety of capital projects including public highways, approach roadways and other necessary land-side improvements, ramps, signal systems, roadbeds, transit lanes or rights of way, pedestrian walkways and bridges connecting to passenger stations and servicing facilities, bridges, and grade crossings.

Applications are accepted on a quarterly basis and funding is available to any local government unit (defined as county, municipality, municipal, county or regional transportation authority, or any other political subdivision of the State authorized to construct, operate, and maintain public highways or Transportation Projects) within the state.

NJ Division of Highway Traffic Safety Grants (HTS Grants)

The NJ Division of Highway Traffic Safety offers, on an annual basis, federal grant funding to agencies that wish to undertake programs designed to reduce motor vehicle crashes, injuries, and fatalities on the roads of New Jersey. Municipal, county, state government and law enforcement agencies, as well as non-profit organizations, are encouraged to apply for NJDHTS grant funding to address specific, local traffic safety issues.

Grant funding will only be awarded to programs that are in line with federal and state traffic and safety priorities to reduce car crashes, injuries and deaths.

<https://www.njoag.gov/about/divisions-and-offices/division-of-highway-traffic-safety-home/hts-grants/>

The grant funding is distributed under the following programs:

- Comprehensive Traffic Safety Programs (CTSPs)
 - » Comprehensive Traffic Safety Program grants address multiple traffic safety concerns within a county or region. CTSP grants include numerous tasks and strategies involving enforcement, education and engineering.
 - » Any CTSPs for the state of New Jersey fall under the Division of Highway Traffic Safety Grants. The CTSP grants include tasks involving enforcement, education and engineering to improve traffic safety. Other eligible programs for these grants include speeding, bicycle safety, school bus/pupil transportation and traffic engineering.
- Pedestrian Safety
 - » Because the proportion of crash fatalities involving pedestrians in New Jersey is 30.2% (well above the national average), pedestrian safety is a continuing priority. The goal of the pedestrian safety program area is to lower the pedestrian fatality and injury crash rates. In New Jersey, municipalities that are statistically high for pedestrian injury crashes are eligible to apply for our Pedestrian Safety Grant. The grant includes funding for overtime enforcement at pedestrian safety hot spots in the community and educational outreach throughout the community.
- Other Eligible Programs
 - » Grant applications may also be submitted that utilize enforcement, education or engineering counter-measures to address other specific traffic safety issues including:
 - Speed
 - Aggressive Driving
 - Bicycling Safety

- Crash Investigation
- Distractions
- EMS Training - relating to crash response
- Motorcycle Safety
- School Bus/Pupil Transportation
- Traffic Engineering - primarily pedestrian pavement markings and pedestrian signs, but some traffic studies will be considered.

Private or Non-Profit Funding Sources

Sustainable Jersey

Sustainable Jersey is a nonprofit organization that provides tools, training and financial incentives for sustainable community initiatives. Their statewide certification program helps municipalities take steps to sustain their quality of life over the long term. In 2014, the Sustainable Jersey for Schools certification program was launched for New Jersey public schools interested in "going green" and conserving resources.

Participating local governments and schools voluntarily complete and document actions to earn points toward certification. Sustainable Jersey offers small grants ranging from \$2,000 to \$20,000 to assist communities and schools with completing Sustainable Jersey and Sustainable Jersey for Schools actions. To be eligible for a Sustainable Jersey or Sustainable Jersey for Schools Small Grant, a community or school must be registered or certified with Sustainable Jersey or Sustainable Jersey for Schools and have an active Green Team. The funds can only be used to implement actions that earn points in the Sustainable Jersey or Sustainable Jersey for Schools program.

Several Sustainable Jersey action items help provide sustainable transportation options. Safe Routes to School, Complete Streets Programs, Bicycle and/or Pedestrian Audits, and Bicycle and/or Pedestrian Plans can be funded. Sustainable Jersey for Schools actions related to active transportation include Pedestrian and Bicycle Safety Promotion Initiatives, Safe Routes to School District Policy, and School Travel Plan for Walking and Bicycling.

www.sustainablejersey.com/grants-resources/

Sustainable Jersey for Schools

Sustainable Jersey for Schools grants are intended to help districts and schools make progress toward Sustainable Jersey for Schools certification.

<http://www.sustainablejerseyschools.com/>

Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation (RWJF) invests in grantees (e.g., public agencies, universities, and public charities) that are working to improve the health of all Americans. Current or past projects in the topic area "walking and biking" include greenway plans, trail projects, advocacy initiatives, and policy development.

New Jersey Health Initiatives (www.njhi.org/) is the statewide grant making program of the Robert Wood Johnson Foundation. New Jersey Health Initiatives supports innovations and drives conversations to build healthier communities through grant making across New Jersey.

www.rwjf.org/

The Geraldine R. Dodge Foundation

The Geraldine R. Dodge Foundation provides funding for Arts, Education, Environment and Informed Communities initiatives that are innovative and promote collaboration and community-driven decision making.

Recipients may include nonprofit, community, government, and business leaders.

<http://www.grdodge.org/what-we-fund/>

Other Funding Sources

Impact Fees

Regulated by subdivision polices, impact fees require residential, industrial and commercial development project leaders to provide sites, improvements, and/or funds to support public amenities such as open space and trails. Impact fees may be allocated to a particular trail or greenway from land development projects if the fund is a dedicated set-aside account established to help develop a county- or municipality-wide system of trails or pedestrian/bicycle infrastructure facilities.

County and Municipal Capital Programs

All New Jersey counties and many New Jersey municipalities have an Open Space Trust Fund, which is a dedicated program supporting open space land acquisition. The trust funds are established by ballot measure. Depending on the fund parameters, other development projects can be eligible including trails, historical preservation, and farmland protection.

<https://tpl.quickbase.com/db/bbqna2qct?a=dbpage&pageID=8>

County and Municipal Open Space Trust Funds

In the case where alternative funds are not available but there is community consensus and political will to move forward with a project, county and municipal capital programs should be considered. Local budgets may have the ability to support some projects, especially if other state and federal programs provide budget relief in other areas.

APPENDIX D:

OVERALL HIN

CORRIDOR LIST

This appendix includes the entire list of High-Injury Network segments in West Orange based on the crash and equity analysis. The project team developed the HIN using the Safer Streets Priority tool by Toole Design Group that utilizes a sliding window analysis to develop high-injury corridors for pedestrians, bicyclists and vehicles (or other crashes). The sliding window analysis uses a 1/2 mile window and 1/10th mile increment across all corridors to identify high-injury crash concentration for each segment of roads in West Orange.

The HIN score assigns a higher weight to the most severe crashes. The HIN score is calculated by multiplying the number of Fatal (K) and Incapacitating Injury (A) crashes by 3, and multiplying the number of Non-Incapacitating Injury (B) crashes by 1. Once the weights are established and applied to the crashes, the total number of crashes are aggregated along a corridor while incorporating the crash severity weighting. Possible Injury (C) crashes and Property Damage Only (O) crashes are not reflected.

Separate weighted HINs were developed for each mode (pedestrian, bicycle and motor vehicle) based on different thresholds. The Pedestrian HIN includes all segments with a score of 1 or greater and covers ~17 miles or 10% of West Orange roads. The Bicyclist HIN includes all segments with a score of 1 or greater and covers ~8 miles or 5% of West Orange roads. The Vehicular HIN includes all segments with a score of 5 or greater and covers ~22 miles or 13% of West Orange roads. The combined HIN included all three of the individual-mode HINs and covers about ~34 miles or 20% of all West Orange roads.

The team then developed an environmental justice score to identify which network segments should be prioritized based on equity factors. All HIN network segments were given a composite score based on the highest average score for each factor.

As noted in the report, the project team then developed the final HIN score by combining the EJ composite score and the HIN crash score.

HIN Corridor	ROAD CLASSIFICATION	BICYCLE HIN SCORE	PEDESTRIAN HIN SCORE	VEHICULAR HIN SCORE	LENGTH (Miles)	TOTAL HIN SCORE	EJ SCORE	COMPOSITE EJ/HIN SCORE
Interstate 280	Expressway	0	0	30	0.50	30	14	44
Main Street	Major Arterial	1	8	15	0.44	24	20	44
Main Street	Major Arterial	1	8	15	0.50	24	20	44
Mount Pleasant Avenue	Major Arterial	7	3	15	0.50	25	14	39
Main Street	Major Arterial	1	5	13	0.50	19	20	39
Interstate 280	Expressway	0	0	24	0.50	24	14	38
Main Street	Major Arterial	1	7	7	0.50	15	20	35
Main Street	Major Arterial	1	2	11	0.50	14	20	34
Main Street	Major Arterial	0	3	13	0.50	16	17	33
Interstate 280	Expressway	0	0	26	0.50	26	5	31
Main Street	Major Arterial	0	2	12	0.50	14	17	31
Main Street	Major Arterial	0	3	11	0.50	14	17	31
Main Street	Major Arterial	0	2	10	0.50	12	17	29
Main Street	Major Arterial	0	3	9	0.50	12	17	29
Park Avenue	Major Arterial	0	1	10	0.43	11	17	28
Main Street	Major Arterial	0	1	10	0.47	11	17	28
Mount Pleasant Avenue	Major Arterial	6	3	13	0.50	22	5	27
Eagle Rock Avenue	Major Arterial	1	0	14	0.50	15	11	26
Main Street	Major Arterial	1	7	7	0.50	15	11	26
Main Street	Major Arterial	0	2	7	0.50	9	17	26
Interstate 280	Expressway	0	0	10	0.50	10	14	24
Eagle Rock Avenue	Major Arterial	0	0	16	0.16	16	8	24
Park Avenue	Local Road	0	1	2	0.50	3	20	23
Northfield Avenue	Major Arterial	0	1	17	0.50	18	5	23
Pleasant Valley Way	Major Arterial	0	3	12	0.50	15	8	23
Northfield Avenue	Major Arterial	0	1	17	0.50	18	5	23
Eagle Rock Avenue	Major Arterial	0	0	15	0.50	15	8	23
Eagle Rock Avenue	Major Arterial	0	0	15	0.50	15	8	23
Eagle Rock Avenue	Major Arterial	0	0	15	0.07	15	8	23
Interstate 280	Expressway	0	0	11	0.50	11	11	22
Eagle Rock Avenue	Major Arterial	0	3	11	0.14	14	8	22
Pleasant Valley Way	Major Arterial	1	0	10	0.31	11	11	22
Interstate 280	Expressway	0	0	16	0.34	16	5	21
Northfield Avenue	Major Arterial	0	3	4	0.24	7	14	21
Whittingham Place	Major Arterial	0	0	7	0.50	7	14	21
Eagle Rock Avenue	Major Arterial	0	0	13	0.50	13	8	21
Eagle Rock Avenue	Major Arterial	0	3	10	0.50	13	8	21
Gaston Street	Local Road	6	0	0	0.13	6	14	20
Sayres Place	Local Road	0	1	2	0.17	3	17	20
Whittlesley Avenue	Local Road	0	1	2	0.49	3	17	20

HIN Corridor	Senior (65+) Population Score	Youth (5-17) Population Score	Disabled Population Score	Zero-Vehicle Household Score	Minority Score	Low Income Score	LEP Score	Foreign-Born Population Score	Child (Under 5) Population Score
Interstate 280	3	0	2	3	3	0	0	3	0
Main Street	0	3	2	3	3	3	3	3	0
Main Street	0	3	2	3	3	3	3	3	0
Mount Pleasant Avenue	3	0	2	3	3	0	0	3	0
Main Street	0	3	2	3	3	3	3	3	0
Interstate 280	3	0	2	3	3	0	0	3	0
Main Street	0	3	2	3	3	3	3	3	0
Main Street	0	3	2	3	3	3	3	3	0
Main Street	0	3	2	0	3	3	3	3	0
Interstate 280	3	0	2	0	0	0	0	0	0
Main Street	0	3	2	0	3	3	3	3	0
Main Street	0	3	2	0	3	3	3	3	0
Main Street	0	3	2	0	3	3	3	3	0
Main Street	0	3	2	0	3	3	3	3	0
Park Avenue	0	3	2	0	3	3	3	3	0
Main Street	0	3	2	0	3	3	3	3	0
Mount Pleasant Avenue	3	0	2	0	0	0	0	0	0
Eagle Rock Avenue	3	0	2	0	3	0	0	3	0
Main Street	0	0	2	3	3	0	0	3	0
Main Street	0	3	2	0	3	3	3	3	0
Interstate 280	3	0	2	3	3	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	0	3
Park Avenue	3	3	2	0	3	3	3	3	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Eagle Rock Avenue	3	0	2	0	0	0	0	0	3
Eagle Rock Avenue	3	0	2	0	0	0	0	0	3
Eagle Rock Avenue	3	0	2	0	0	0	0	0	3
Interstate 280	0	0	2	3	3	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Interstate 280	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	3	3	0	0	3	0
Whittingham Place	3	0	2	3	3	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	0	3
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Gaston Street	3	0	2	3	3	0	0	3	0
Sayres Place	0	3	2	0	3	3	3	3	0
Whittlesey Avenue	0	3	2	0	3	3	3	3	0

HIN Corridor	ROAD CLASSIFICATION	BICYCLE HIN SCORE	PEDESTRIAN HIN SCORE	VEHICULAR HIN SCORE	LENGTH (Miles)	TOTAL HIN SCORE	EJ SCORE	COMPOSITE EJ/HIN SCORE
Pleasant Valley Way	Major Arterial	0	3	9	0.50	12	8	20
Interstate 280	Expressway	0	0	14	0.50	14	5	19
Llewellyn Avenue	Local Road	0	1	1	0.50	2	17	19
Lakeside Avenue	Local Road	0	1	1	0.50	2	17	19
Northfield Avenue	Major Arterial	0	1	13	0.50	14	5	19
Mount Pleasant Avenue	Major Arterial	0	3	11	0.50	14	5	19
Northfield Avenue	Major Arterial	0	1	13	0.50	14	5	19
Pleasant Valley Way	Major Arterial	0	3	8	0.50	11	8	19
Pleasant Valley Way	Major Arterial	0	3	8	0.46	11	8	19
Prospect Avenue	Major Arterial	0	0	11	0.50	11	8	19
Prospect Avenue	Major Arterial	0	0	11	0.17	11	8	19
Pleasant Valley Way	Major Arterial	1	3	4	0.03	8	11	19
Franklin Avenue	Major Collector	0	1	1	0.01	2	17	19
Franklin Avenue	Major Collector	0	1	1	0.49	2	17	19
Ridge Avenue	Local Road	0	1	0	0.50	1	17	18
Eagle Rock Avenue	Major Arterial	0	3	7	0.06	10	8	18
Eagle Rock Avenue	Major Arterial	0	3	7	0.50	10	8	18
Pleasant Valley Way	Major Arterial	1	3	3	0.50	7	11	18
Pleasant Valley Way	Major Arterial	1	3	3	0.50	7	11	18
Laurel Avenue	Minor Arterial	0	0	10	0.21	10	8	18
Interstate 280	Expressway	0	0	12	0.50	12	5	17
Interstate 280	Expressway	0	0	9	0.50	9	8	17
Interstate 280	Expressway	0	0	9	0.50	9	8	17
Northfield Avenue	Major Arterial	0	0	12	0.50	12	5	17
Northfield Avenue	Major Arterial	0	0	12	0.50	12	5	17
Northfield Avenue	Major Arterial	0	0	12	0.50	12	5	17
Northfield Avenue	Major Arterial	0	0	12	0.25	12	5	17
Eagle Rock Avenue	Major Arterial	0	3	6	0.50	9	8	17
Prospect Avenue	Major Arterial	0	0	9	0.46	9	8	17
Mount Pleasant Avenue	Major Arterial	0	3	6	0.50	9	8	17
Prospect Avenue	Major Arterial	0	0	9	0.50	9	8	17
Prospect Avenue	Major Arterial	0	0	9	0.50	9	8	17
Prospect Avenue	Major Arterial	0	0	9	0.50	9	8	17
Eagle Rock Avenue	Major Arterial	0	0	6	0.50	6	11	17
Interstate 280	Expressway	0	0	11	0.50	11	5	16
Interstate 280	Expressway	0	0	8	0.50	8	8	16
Northfield Avenue	Major Arterial	0	0	11	0.50	11	5	16
Northfield Avenue	Major Arterial	0	0	11	0.50	11	5	16
Northfield Avenue	Major Arterial	0	0	11	0.50	11	5	16
Mount Pleasant Avenue	Major Arterial	0	3	5	0.50	8	8	16

HIN Corridor	Senior (65+) Population Score	Youth (5-17) Population Score	Disabled Population Score	Zero-Vehicle Household Score	Minority Score	Low Income Score	LEP Score	Foreign-Born Population Score	Child (Under 5) Population Score
Pleasant Valley Way	3	0	2	0	0	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	0	0
Llewellyn Avenue	0	3	2	0	3	3	3	3	0
Lakeside Avenue	0	3	2	0	3	3	3	3	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Mount Pleasant Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Franklin Avenue	0	3	2	0	3	3	3	3	0
Franklin Avenue	0	3	2	0	3	3	3	3	0
Ridge Avenue	0	3	2	0	3	3	3	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Laurel Avenue	3	0	2	0	0	0	0	0	3
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	3	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Mount Pleasant Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	3
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	3	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Mount Pleasant Avenue	3	0	2	0	0	0	0	3	0

HIN Corridor	ROAD CLASSIFICATION	BICYCLE HIN SCORE	PEDESTRIAN HIN SCORE	VEHICULAR HIN SCORE	LENGTH (Miles)	TOTAL HIN SCORE	EJ SCORE	COMPOSITE EJ/HIN SCORE
Mount Pleasant Avenue	Major Arterial	0	3	5	0.18	8	8	16
Mount Pleasant Avenue	Major Arterial	0	3	5	0.50	8	8	16
Pleasant Valley Way	Major Arterial	1	3	4	0.50	8	8	16
Mount Pleasant Avenue	Major Arterial	0	3	5	0.50	8	8	16
Kingsley Street	Major Arterial	0	0	5	0.19	5	11	16
Eagle Rock Avenue	Major Arterial	0	0	5	0.50	5	11	16
Eagle Rock Avenue	Major Arterial	0	0	5	0.50	5	11	16
Eagle Rock Avenue	Major Arterial	0	0	5	0.50	5	11	16
Eagle Rock Avenue	Major Arterial	0	0	5	0.50	5	11	16
Pleasant Valley Way	Major Arterial	0	1	4	0.50	5	11	16
Pleasant Valley Way	Major Arterial	1	3	1	0.50	5	11	16
Pleasant Valley Way	Major Arterial	0	0	5	0.42	5	11	16
Interstate 280	Expressway	0	0	10	0.48	10	5	15
Interstate 280	Expressway	1	0	6	0.50	7	8	15
Interstate 280	Expressway	0	0	7	0.30	7	8	15
Woodland Avenue	Local Road	0	0	7	0.35	7	8	15
Lindsley Avenue	Local Road	0	4	0	0.50	4	11	15
Renna Plaza	Local Road	1	0	3	0.02	4	11	15
Pleasant Valley Way	Major Arterial	0	0	10	0.30	10	5	15
Pleasant Valley Way	Major Arterial	1	0	6	0.50	7	8	15
Eagle Rock Avenue	Major Arterial	0	0	7	0.41	7	8	15
Eagle Rock Avenue	Major Arterial	0	0	7	0.43	7	8	15
Prospect Avenue	Major Arterial	0	1	6	0.50	7	8	15
Prospect Avenue	Major Arterial	0	0	7	0.50	7	8	15
Eagle Rock Avenue	Major Arterial	0	0	7	0.50	7	8	15
Pleasant Valley Way	Major Arterial	0	1	3	0.12	4	11	15
Valley Road	Major Arterial	1	0	3	0.42	4	11	15
Pleasant Valley Way	Major Arterial	0	1	3	0.03	4	11	15
Main Street	Major Collector	0	0	7	0.50	7	8	15
Rooney Circle	Local Road	0	3	3	0.50	6	8	14
Prospect Avenue	Major Arterial	0	0	6	0.50	6	8	14
Prospect Avenue	Major Arterial	0	0	6	0.47	6	8	14
Pleasant Valley Way	Major Arterial	0	1	2	0.50	3	11	14
Pleasant Valley Way	Major Arterial	0	1	2	0.48	3	11	14
Pleasant Valley Way	Major Arterial	0	1	2	0.50	3	11	14
Valley Way	Major Collector	1	0	2	0.50	3	11	14
Interstate 280	Expressway	0	0	8	0.50	8	5	13
Interstate 280	Expressway	0	0	8	0.50	8	5	13
Woodland Avenue	Local Road	0	1	1	0.49	2	11	13
Prospect Avenue	Major Arterial	0	0	5	0.50	5	8	13

HIN Corridor	Senior (65+) Population Score	Youth (5-17) Population Score	Disabled Population Score	Zero-Vehicle Household Score	Minority Score	Low Income Score	LEP Score	Foreign-Born Population Score	Child (Under 5) Population Score
Mount Pleasant Avenue	3	0	2	0	0	0	0	3	0
Mount Pleasant Avenue	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	3
Mount Pleasant Avenue	3	0	2	0	0	0	0	3	0
Kingsley Street	0	0	2	3	3	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	3
Eagle Rock Avenue	3	0	2	0	0	0	0	3	3
Eagle Rock Avenue	3	0	2	0	0	0	0	3	3
Eagle Rock Avenue	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	3	0
Woodland Avenue	3	0	2	0	0	0	0	3	0
Lindsley Avenue	0	0	2	3	3	0	0	3	0
Renna Plaza	0	0	2	3	3	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	3
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Eagle Rock Avenue	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Valley Road	0	0	2	3	3	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Main Street	0	0	2	0	3	0	0	3	0
Rooney Circle	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Pleasant Valley Way	3	0	2	0	0	0	0	3	3
Valley Way	3	0	2	0	3	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	0	0
Woodland Avenue	3	0	2	0	0	0	0	3	3
Prospect Avenue	3	0	2	0	0	0	0	3	0

HIN Corridor	ROAD CLASSIFICATION	BICYCLE HIN SCORE	PEDESTRIAN HIN SCORE	VEHICULAR HIN SCORE	LENGTH (Miles)	TOTAL HIN SCORE	EJ SCORE	COMPOSITE EJ/HIN SCORE
Prospect Avenue	Major Arterial	0	1	4	0.50	5	8	13
Prospect Avenue	Major Arterial	0	1	4	0.50	5	8	13
Prospect Avenue	Major Arterial	0	1	4	0.50	5	8	13
Prospect Avenue	Major Arterial	0	0	5	0.27	5	8	13
Central Avenue	Major Arterial	0	2	0	0.10	2	11	13
Valley Road	Major Arterial	1	0	1	0.49	2	11	13
Interstate 280	Expressway	0	0	7	0.30	7	5	12
Interstate 280	Expressway	0	0	7	0.43	7	5	12
Interstate 280	Expressway	0	0	7	0.42	7	5	12
Rooney Circle	Local Road	0	3	1	0.50	4	8	12
Brennan Drive	Major Arterial	0	3	4	0.50	7	5	12
Northfield Avenue	Major Arterial	0	0	7	0.50	7	5	12
Northfield Avenue	Major Arterial	0	0	7	0.50	7	5	12
Northfield Avenue	Major Arterial	0	0	7	0.40	7	5	12
Northfield Avenue	Major Arterial	1	0	6	0.50	7	5	12
Northfield Avenue	Major Arterial	0	0	7	0.50	7	5	12
Interstate 280	Expressway	0	0	6	0.50	6	5	11
Stanford Avenue	Local Road	0	3	0	0.50	3	8	11
Fitzrandolph Road	Local Road	0	1	2	0.41	3	8	11
Bloomfield Way	Local Road	1	0	2	0.26	3	8	11
Northfield Avenue	Major Arterial	0	1	10	0.50	11	0	11
Northfield Avenue	Major Arterial	0	1	10	0.07	11	0	11
Northfield Avenue	Major Arterial	0	0	6	0.48	6	5	11
Northfield Avenue	Major Arterial	0	0	6	0.41	6	5	11
Northfield Avenue	Major Arterial	1	0	2	0.39	3	8	11
Interstate 280	Expressway	1	0	1	0.30	2	8	10
Interstate 280	Expressway	0	3	1	0.50	4	5	9
Suburban Drive	Local Road	0	1	0	0.50	1	8	9
Old Indian Road	Local Road	1	0	0	0.50	1	8	9
Colony Drive East	Local Road	1	0	0	0.50	1	8	9
Northfield Avenue	Major Arterial	0	0	9	0.50	9	0	9
Northfield Avenue	Major Arterial	0	0	9	0.50	9	0	9
Northfield Avenue	Major Arterial	0	1	8	0.50	9	0	9
Northfield Avenue	Major Arterial	0	1	8	0.03	9	0	9
Northfield Avenue	Major Arterial	0	0	9	0.35	9	0	9
Northfield Avenue	Major Arterial	0	1	8	0.49	9	0	9
Northfield Avenue	Major Arterial	0	0	9	0.33	9	0	9
Northfield Avenue	Major Arterial	0	0	8	0.50	8	0	8
Northfield Avenue	Major Arterial	0	0	8	0.50	8	0	8
Northfield Avenue	Major Arterial	0	0	8	0.50	8	0	8

HIN Corridor	Senior (65+) Population Score	Youth (5-17) Population Score	Disabled Population Score	Zero-Vehicle Household Score	Minority Score	Low Income Score	LEP Score	Foreign-Born Population Score	Child (Under 5) Population Score
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Prospect Avenue	3	0	2	0	0	0	0	3	0
Central Avenue	0	0	2	3	3	0	0	3	0
Valley Road	0	0	2	3	3	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	0	0
Rooney Circle	3	0	2	0	0	0	0	3	0
Brennan Drive	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Interstate 280	3	0	2	0	0	0	0	0	0
Stanford Avenue	3	0	2	0	0	0	0	0	3
Fitzrandolph Road	3	0	2	0	0	0	0	3	0
Bloomfield Way	0	0	2	0	3	0	0	3	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	3	0
Interstate 280	3	0	2	0	0	0	0	0	0
Suburban Drive	3	0	2	0	0	0	0	3	0
Old Indian Road	3	0	2	0	0	0	0	3	0
Colony Drive East	3	3	2	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0

HIN Corridor	ROAD CLASSIFICATION	BICYCLE HIN SCORE	PEDESTRIAN HIN SCORE	VEHICULAR HIN SCORE	LENGTH (Miles)	TOTAL HIN SCORE	EJ SCORE	COMPOSITE E/HIN SCORE
Northfield Avenue	Major Arterial	0	1	7	0.50	8	0	8
Northfield Avenue	Major Arterial	0	0	8	0.50	8	0	8
Northfield Avenue	Major Arterial	0	1	2	0.36	3	5	8
Pleasant Valley Way	Major Arterial	1	0	2	0.50	3	5	8
Pleasant Valley Way	Major Arterial	1	0	2	0.50	3	5	8
Northfield Avenue	Major Arterial	0	0	7	0.50	7	0	7
Northfield Avenue	Major Arterial	0	1	6	0.50	7	0	7
Northfield Avenue	Major Arterial	0	0	7	0.50	7	0	7
Gregory Avenue	Major Arterial	0	1	1	0.50	2	5	7
Gregory Avenue	Major Arterial	0	1	1	0.50	2	5	7
Gregory Avenue	Major Arterial	0	1	1	0.50	2	5	7
Gregory Avenue	Major Arterial	0	1	1	0.50	2	5	7
Pleasant Valley Way	Major Arterial	1	0	1	0.50	2	5	7
Gregory Avenue	Major Arterial	0	1	1	0.50	2	5	7
Pleasant Valley Way	Major Arterial	1	0	1	0.50	2	5	7
Vizcaya Boulevard	Local Road	0	1	0	0.50	1	5	6
Winding Way	Local Road	0	1	0	0.50	1	5	6
Northfield Avenue	Major Arterial	0	0	6	0.50	6	0	6
Northfield Avenue	Major Arterial	0	0	6	0.50	6	0	6
Northfield Avenue	Major Arterial	0	0	6	0.50	6	0	6
Pleasant Valley Way	Major Arterial	1	0	0	0.48	1	5	6
Northfield Avenue	Major Arterial	0	0	5	0.50	5	0	5
Northfield Avenue	Major Arterial	0	0	5	0.50	5	0	5
Northfield Avenue	Major Arterial	0	0	5	0.50	5	0	5

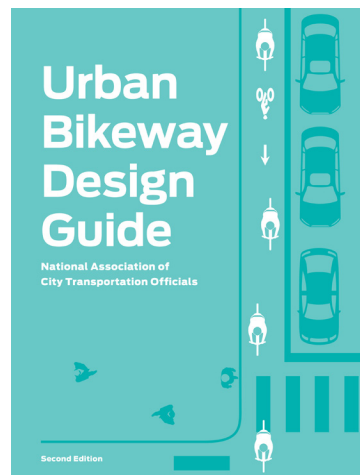
HIN Corridor	Senior (65+) Population Score	Youth (5-17) Population Score	Disabled Population Score	Zero-Vehicle Household Score	Minority Score	Low Income Score	LEP Score	Foreign-Born Population Score	Child (Under 5) Population Score
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	3	0	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Gregory Avenue	0	3	2	0	0	0	0	0	0
Gregory Avenue	0	3	2	0	0	0	0	0	0
Gregory Avenue	0	3	2	0	0	0	0	0	0
Gregory Avenue	0	3	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Gregory Avenue	0	3	2	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Vizcaya Boulevard	3	0	2	0	0	0	0	0	0
Winding Way	0	3	2	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Pleasant Valley Way	3	0	2	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0
Northfield Avenue	0	0	0	0	0	0	0	0	0

APPENDIX E: DESIGN GUIDANCE

NACTO



Urban Street Design Guide
<https://nacto.org/publication/urban-street-design-guide/>



Urban Bikeway Design Guide
<https://nacto.org/publication/urban-bikeway-design-guide/>



Transit Street Design Guide
<https://nacto.org/publication/transit-street-design-guide/>



Urban Street Stormwater Guide
<https://nacto.org/publication/urban-street-stormwater-guide/>

Guidance List Credit: NJTPA



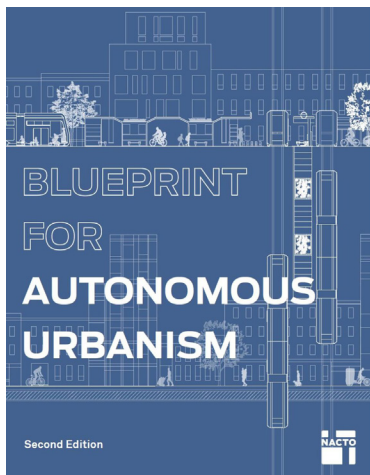
Global Street Design Guide

<https://nacto.org/publication/global-street-design-guide/>



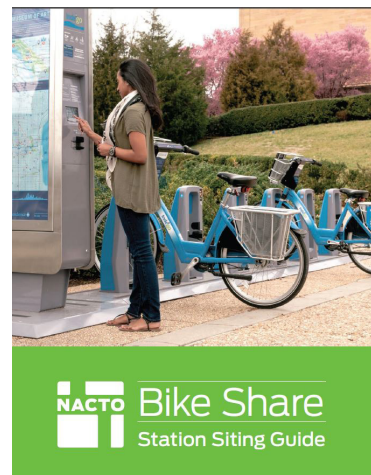
Designing Streets for Kids

<https://nacto.org/publication/designing-streets-for-kids/>



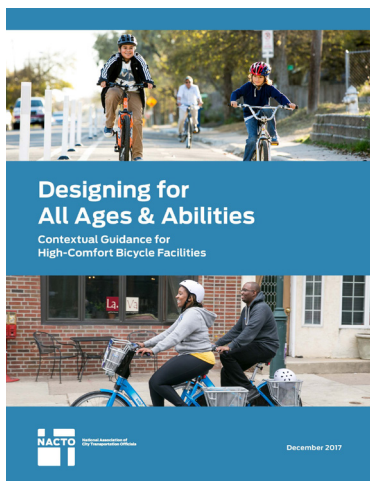
Blueprint for Autonomous Urbanism

<https://nacto.org/publication/bau2/>



Bikeshare Station Siting Guide

<https://nacto.org/publication/bike-share-station-siting-guide/>



Designing for All Ages & Abilities

<https://nacto.org/publication/urban-bikeway-design-guide/designing-ages-abilities-new/>



Don't Give Up at the Intersection

<https://nacto.org/publication/dont-give-up-at-the-intersection/>

Guidance List Credit: NJTPA

NJDOT



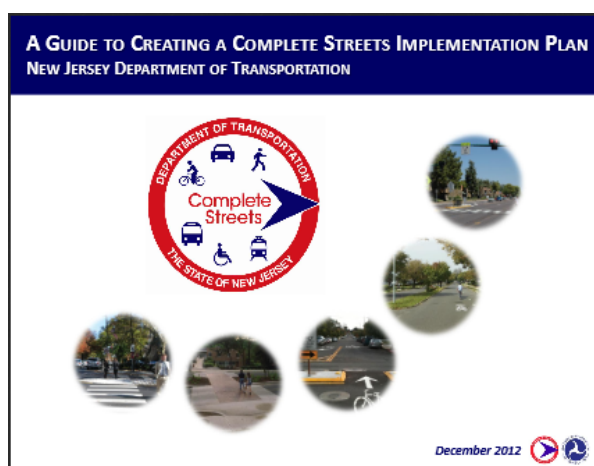
Complete & Green Streets for All

https://www.nj.gov/transportation/eng/completestreets/pdf/CS_Model_Policy_2019.pdf



NJ Complete Streets Design Guide

https://www.nj.gov/transportation/eng/completestreets/pdf/NJCS_DesignGuide.pdf



Creating a Complete Streets Implementation Plan¹

<https://www.nj.gov/transportation/eng/completestreets/pdf/csccreateimplementationplan.pdf>



Making Complete Streets a Reality¹

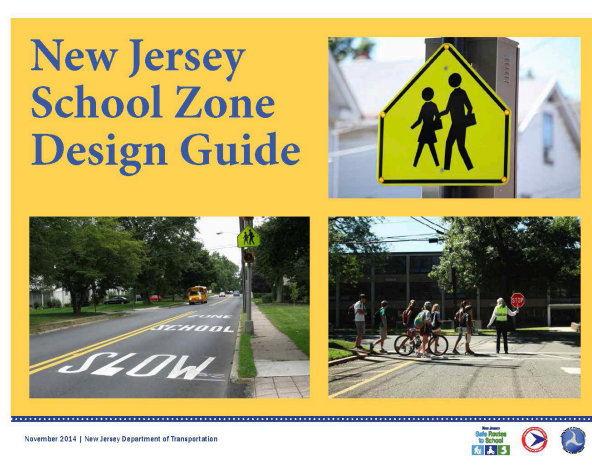
<https://www.nj.gov/transportation/eng/completestreets/pdf/cspolicydevelopmentguide2012.pdf>



School Bike Parking Guide

<https://www.saferoutesnj.org/school-bicycle-parking-guide/>
Guidance List Credit: NJTPA

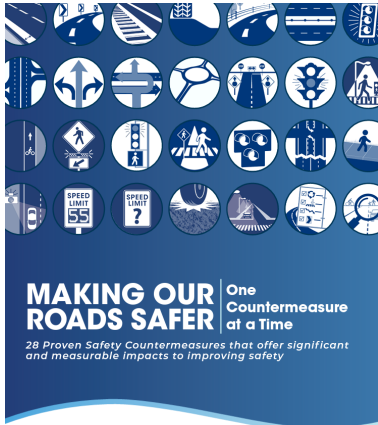
¹Newer editions of these documents should be used for guidance, if available



New Jersey School Zone Design Guide

<https://www.saferoutesnj.org/new-jersey-school-zone-design-guide/>

FHWA

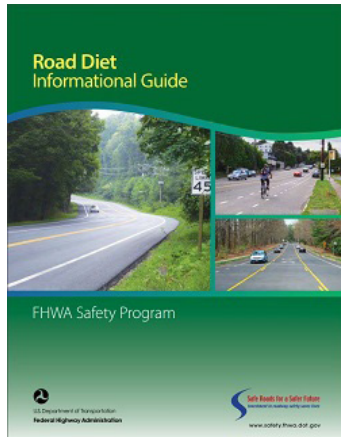


U.S. Department of Transportation
Federal Highway Administration

ZERO IS OUR GOAL
U.S. Department of Transportation
Federal Highway Administration
<https://safety.fhwa.dot.gov/>

Making our Roads Safer One Countermeasure at a Time

https://safety.fhwa.dot.gov/provencountermeasures/pdf/FHWA-SA-21-071_PSC%20Booklet_508.pdf



Road Diet
Informational Guide

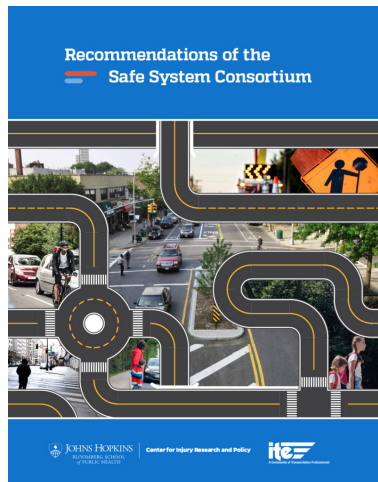
FHWA Safety Program

U.S. Department of Transportation
Federal Highway Administration

Safe Roads for a Safer Future
U.S. Department of Transportation
Federal Highway Administration
www.safety.fhwa.dot.gov

Road Diet Informational Guide

https://safety.fhwa.dot.gov/road_diets/guidance/info_guide/



Recommendations of the
Safe System Consortium

JOHNS HOPKINS
UNIVERSITY

Center for Injury Research and Policy

itf

Recommendations of the Safe System Consortium

<https://publichealth.jhu.edu/sites/default/files/2023-03/recommendations-of-the-safe-system-consortium.pdf>

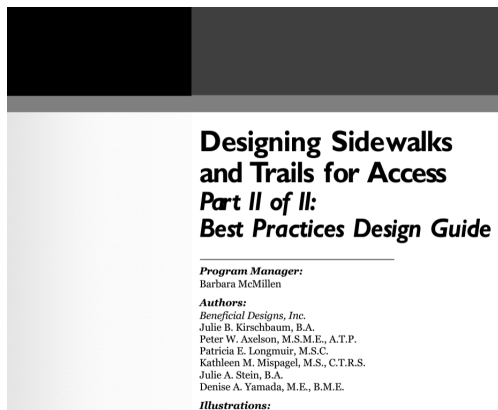


Federal Highway Administration
SEPARATED BIKE LANE
PLANNING AND DESIGN GUIDE

U.S. Department of Transportation
Federal Highway Administration

Separated Bike Lane Planning and Design Guide

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/separatedbikelane_pdg.pdf



Designing Sidewalks and Trails for Access Part II of II: Best Practices Design Guide

Program Manager:

Barbara McMillen

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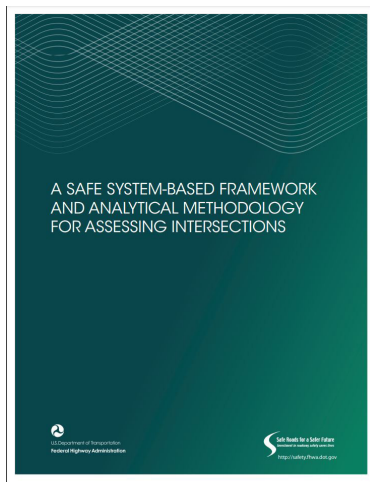
Julie A. Stein, B.A.

Denise A. Yamada, M.E., B.M.E.

Illustrations:

Designing Sidewalks and Trails for Access, Part II

https://nacto.org/wp-content/uploads/2015/04/designing_sidewalks_and_trails_access_kirschbaum.pdf



A SAFE SYSTEM-BASED FRAMEWORK
AND ANALYTICAL METHODOLOGY
FOR ASSESSING INTERSECTIONS

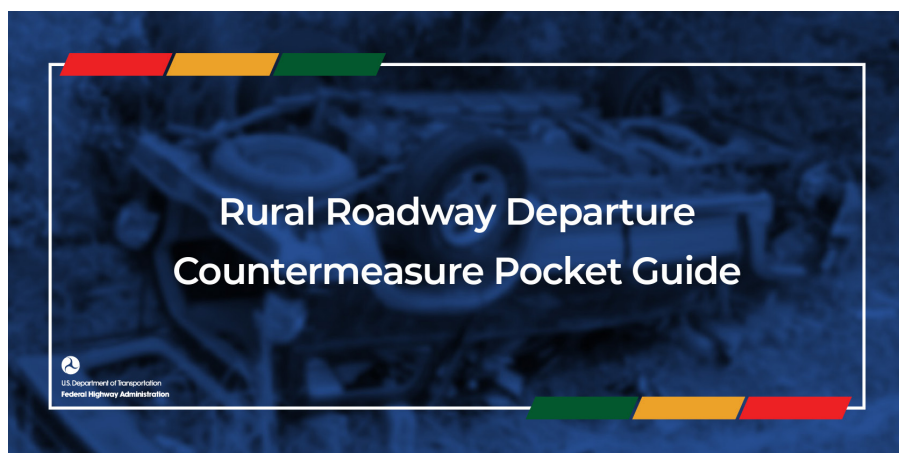
U.S. Department of Transportation
Federal Highway Administration

Safe Roads for a Safer Future
U.S. Department of Transportation
Federal Highway Administration
<http://safety.fhwa.dot.gov>

A Safe System-Based Framework and Analytical Methodology for Assessing Intersections

<https://safety.fhwa.dot.gov/intersection/ssi/fhwasa21008.pdf>

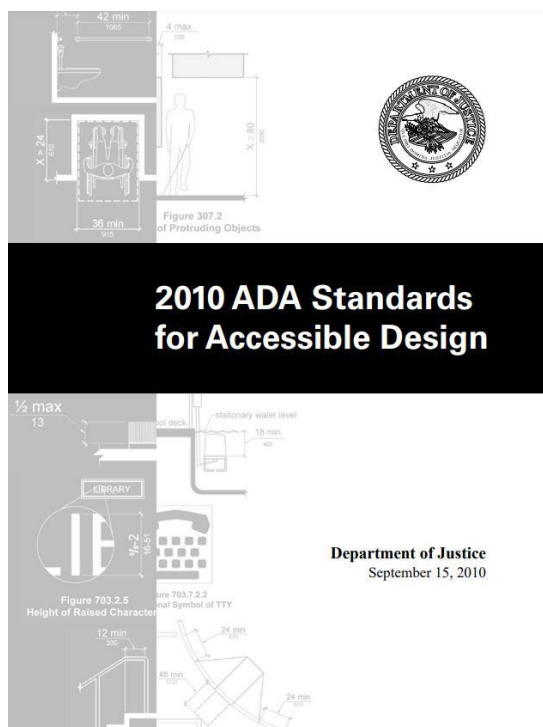
Guidance List Credit: NJTPA



Rural Roadway Departure Countermeasure Pocket Guide

<https://safety.fhwa.dot.gov/FoRRRwD/RwDPocketGuide.pdf>

ADA



2010 ADA Standards for Accessible Design

https://www.ada.gov/assets/_pdfs/2010-design-standards.pdf



The Access Board has published new guidelines under the Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA) that address access to sidewalks and streets, crosswalks, curb ramps, pedestrian signals, on-street parking, and other components of public right-of-way. These guidelines also review shared use paths, which are designed primarily for use by bicyclists and pedestrians for transportation and recreation purposes.

PROWAG- Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way

<https://www.access-board.gov/prowag/>

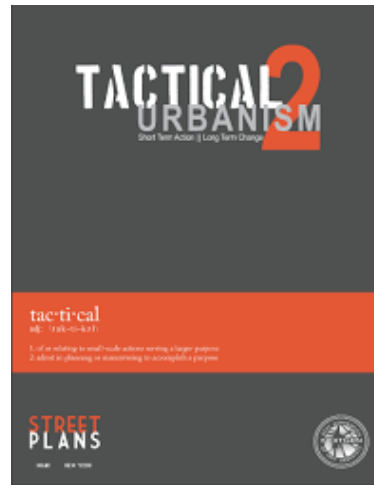
Guidance List Credit: NJTPA

TACTICAL URBANISM GUIDES



Tactical Urbanism

https://issuu.com/streetplanscollaborative/docs/tactical_urbanism_vol.1



Tactical Urbanism 2

https://issuu.com/streetplanscollaborative/docs/tactical_urbanism_vol_2_final



Urbanismo Tactico 3: Casos Latinoamericanos

https://issuu.com/streetplanscollaborative/docs/ut_vol3_2013_0528_17



Tactical Urbanism 4: Australia & New Zealand

https://issuu.com/streetplanscollaborative/docs/tacticalurbanismvol4_141020



Tactical Urbanism 5: Italia

https://issuu.com/streetplanscollaborative/docs/tu_italy_eng

TACTICAL URBANISM

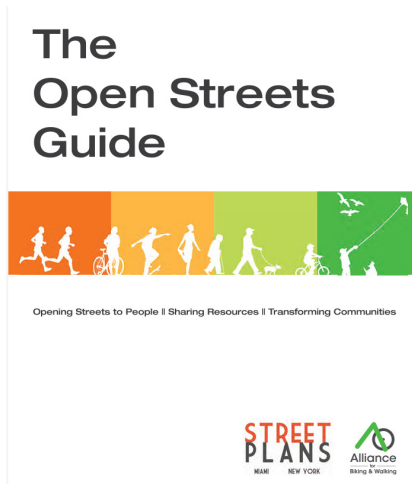
Short-term Action for Long-term Change

MIKE LYDON & ANTHONY GARCIA

FOREWORD BY ANDRÉS DUANY

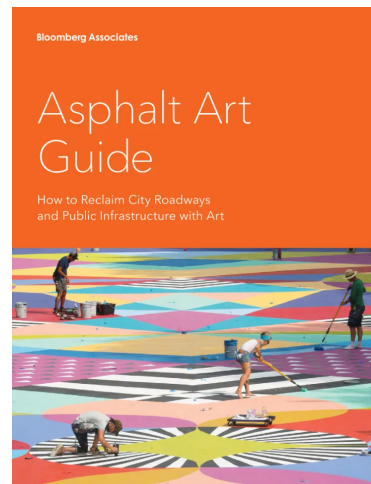
Tactical Urbanism: Short-term Action for Long-Term Change

Guidance List Credit: NJTPA



The Open Streets Guide

https://nacto.org/docs/usdg/smaller_open_streets_guide_final_print_alliance_biking_walking.pdf



Asphalt Art Guide

<https://assets.bbhub.io/dotorg/sites/43/2019/10/asphalt-art-guide.pdf>



Tactical Urbanist's Guide to Materials and Design
<http://tacticalurbanismguide.com/>

FAST-TRACKED A TACTICAL TRANSIT STUDY

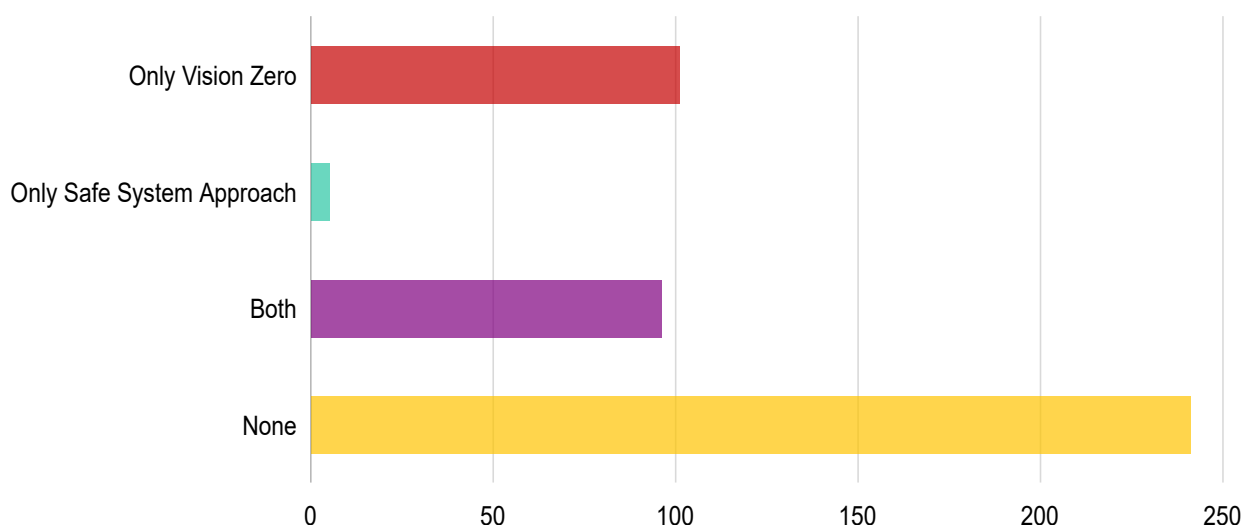


Fast-Tracked: A Tactical Transit Study
https://issuu.com/streetplanscollaborative/docs/fasttracked_finaldraft_2

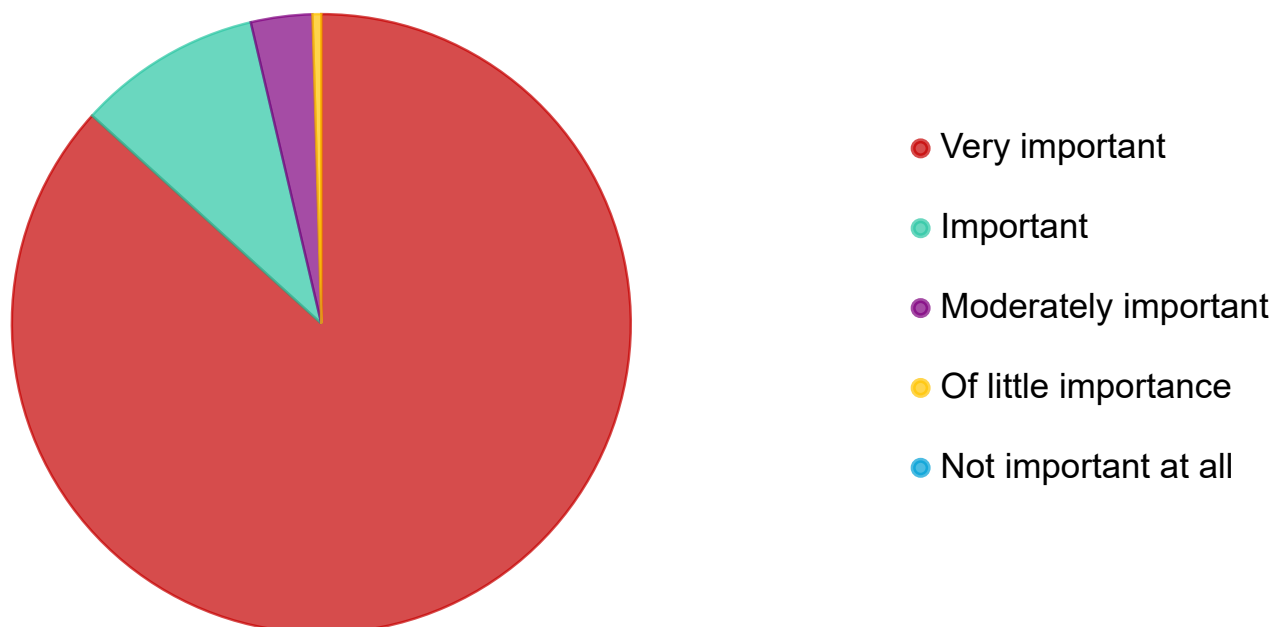
Guidance List Credit: NJTPA

APPENDIX F: SURVEY RESULTS

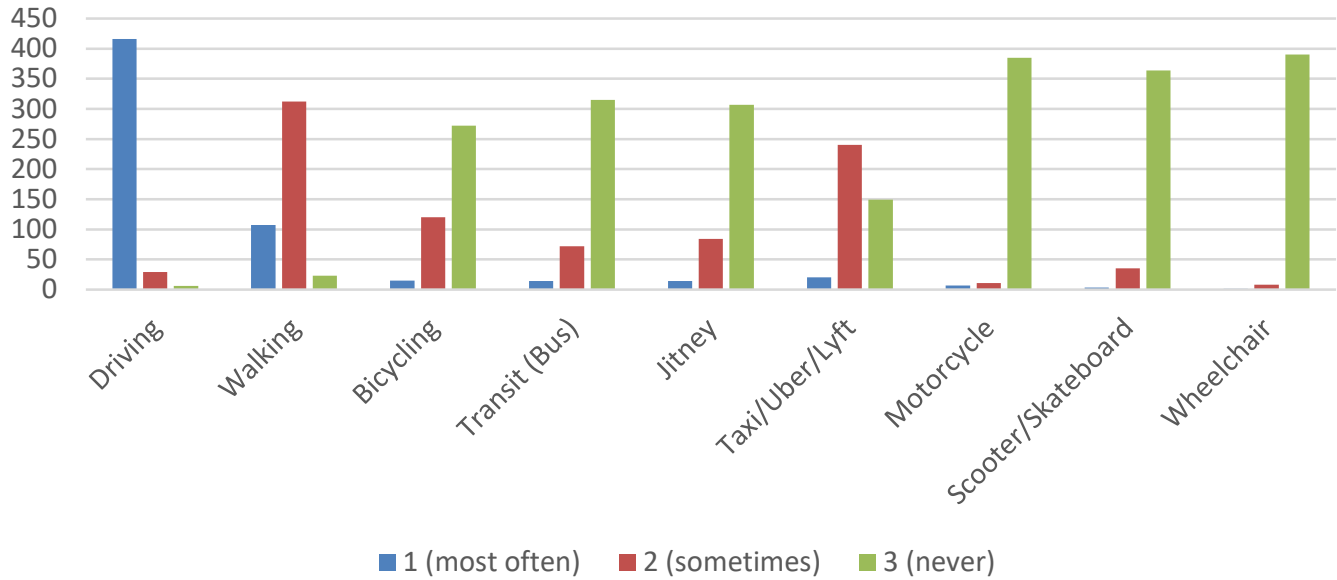
Q1. Have you heard of the Vision Zero and FHWA's Safe System Approach to traffic safety? The West Orange Vision Zero Action Plan will be adopting FHWA's Safe System Approach which focuses on a holistic view of the roadway system, noting that humans will make mistakes and are vulnerable, but the transportation system should be designed with multiple "safety nets" with the goal of eliminating deaths and serious injuries.



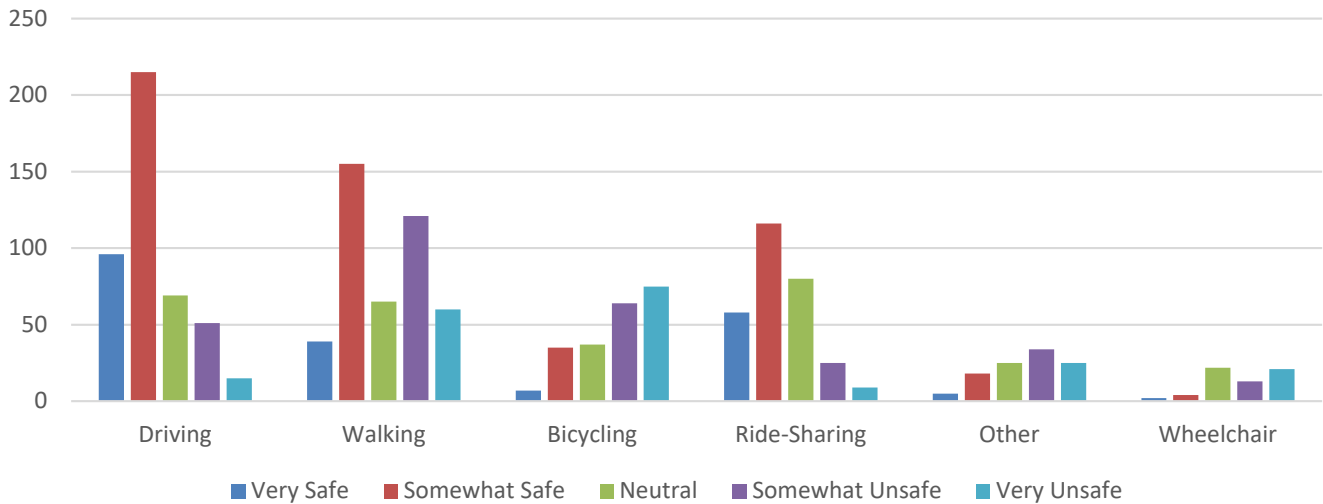
Q2. How important do you think it is to have a policy and plan in West Orange Township that aims to eliminate deaths and serious injuries from traffic crashes?



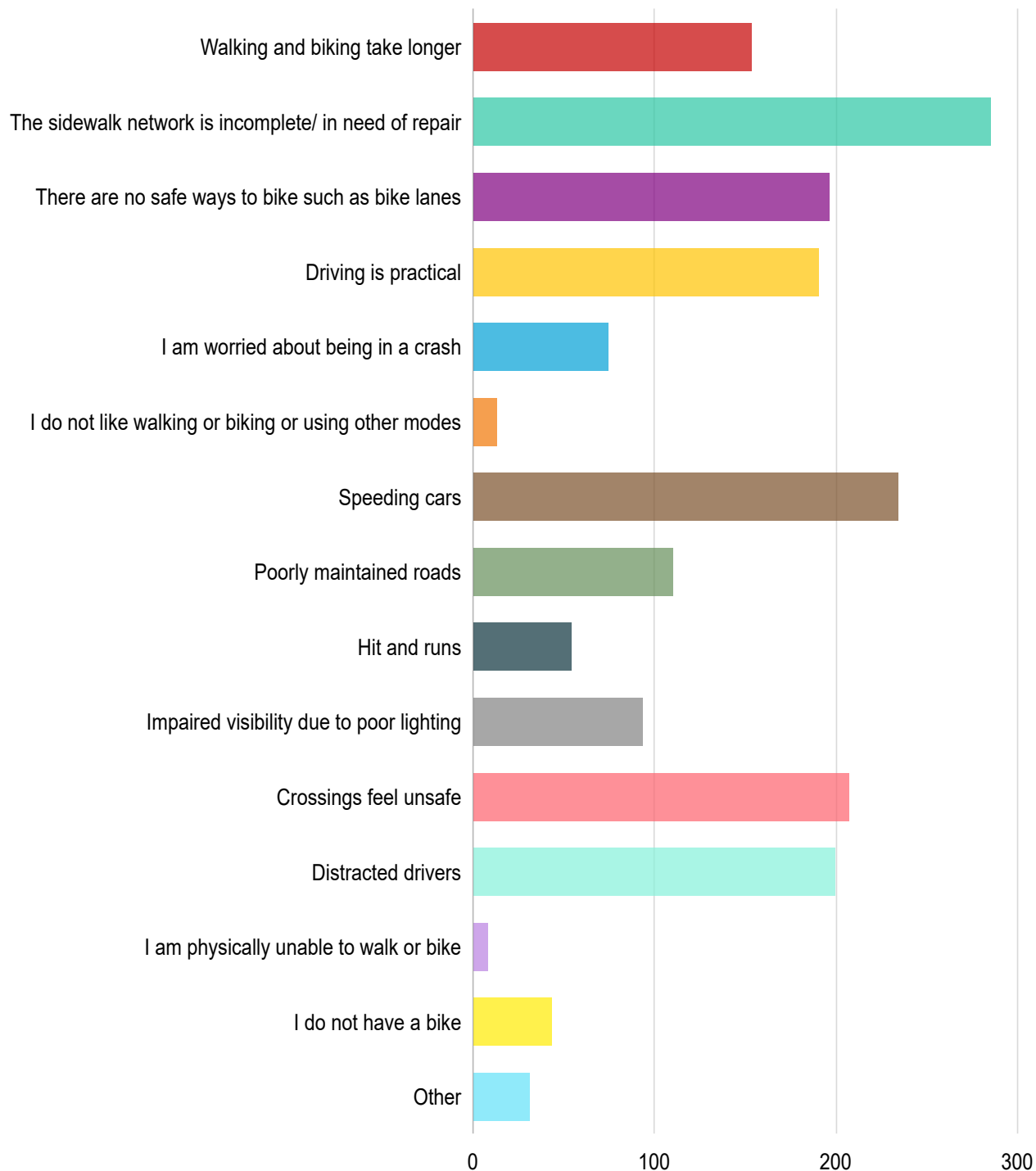
Q3. How do you typically travel in West Orange? Rank based on how often you use that travel mode (1 being the most often).



Q4-Q9. With regards to travel in West Orange, how safe do you feel doing the following:

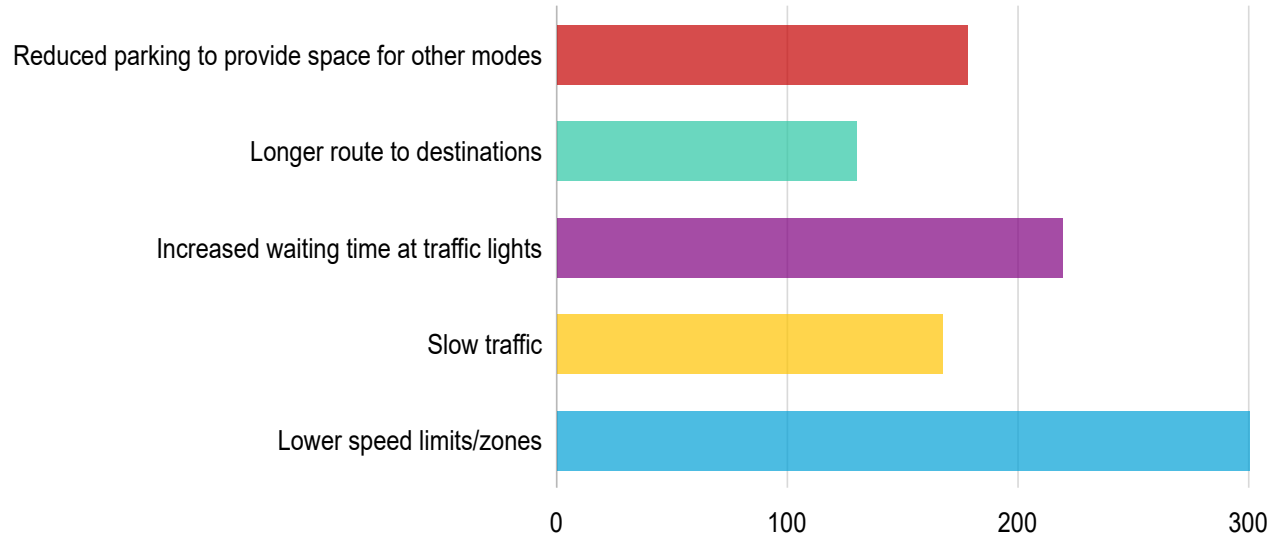


Q10: If you primarily drive to places in West Orange Township, let us know what are the major barriers to using non-motorized travel modes such as walking or driving more. If driving is NOT the primary mode of travel, please SKIP this question.

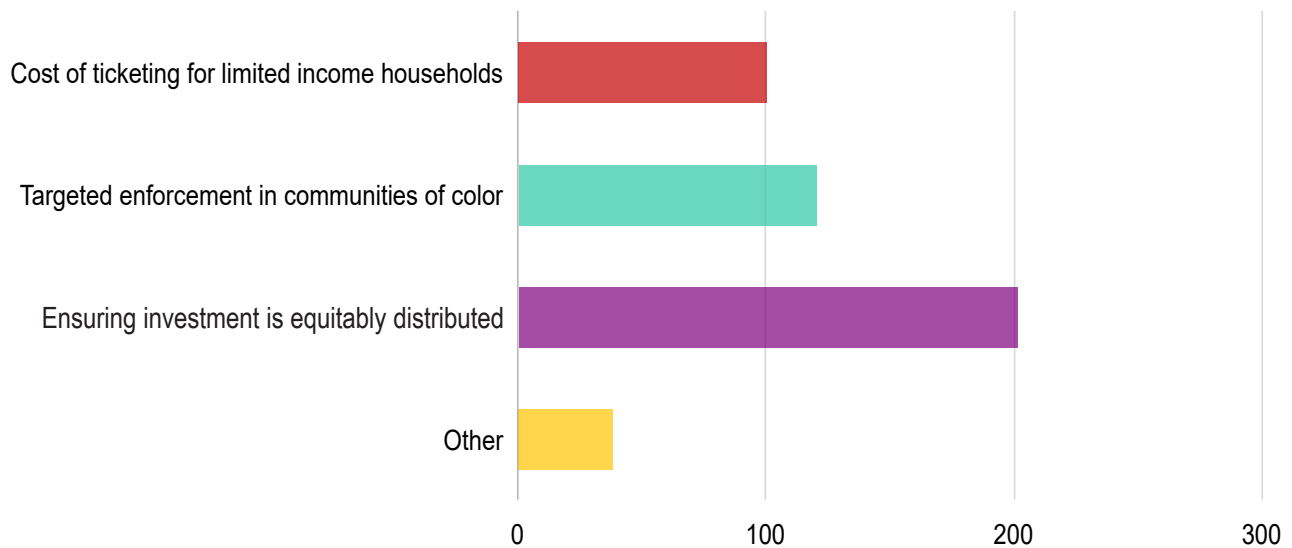


Q11: Improving roadway and traffic safety requires some trade-offs such as: (list of trade-offs pictured below)

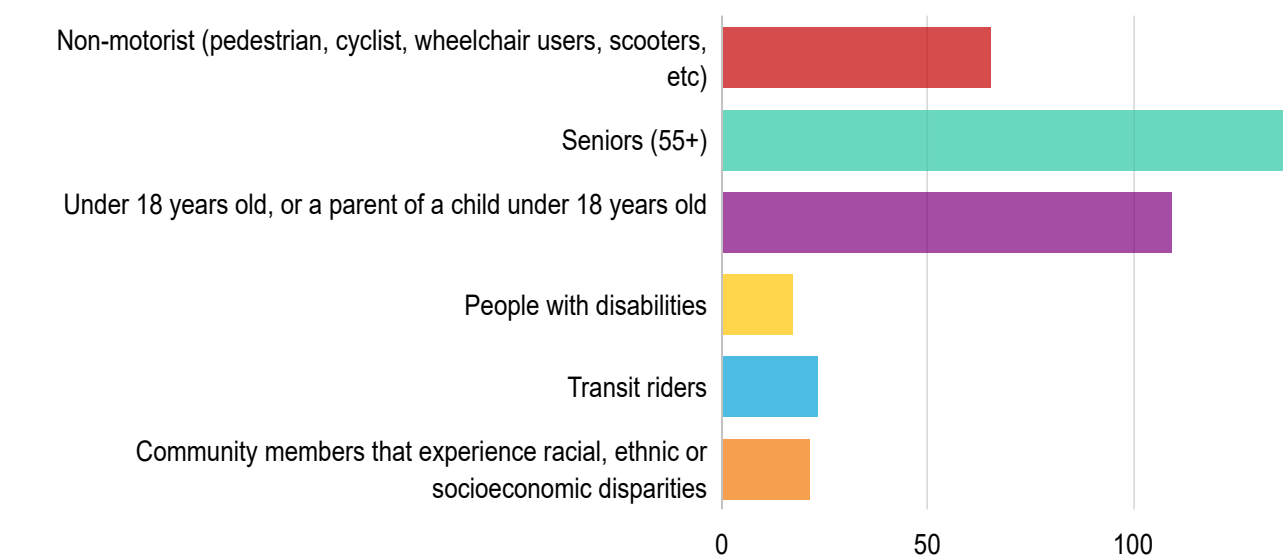
Which trade-offs would you be willing to accept in order to prioritize safety, comfort and well-being of the West Orange Community?



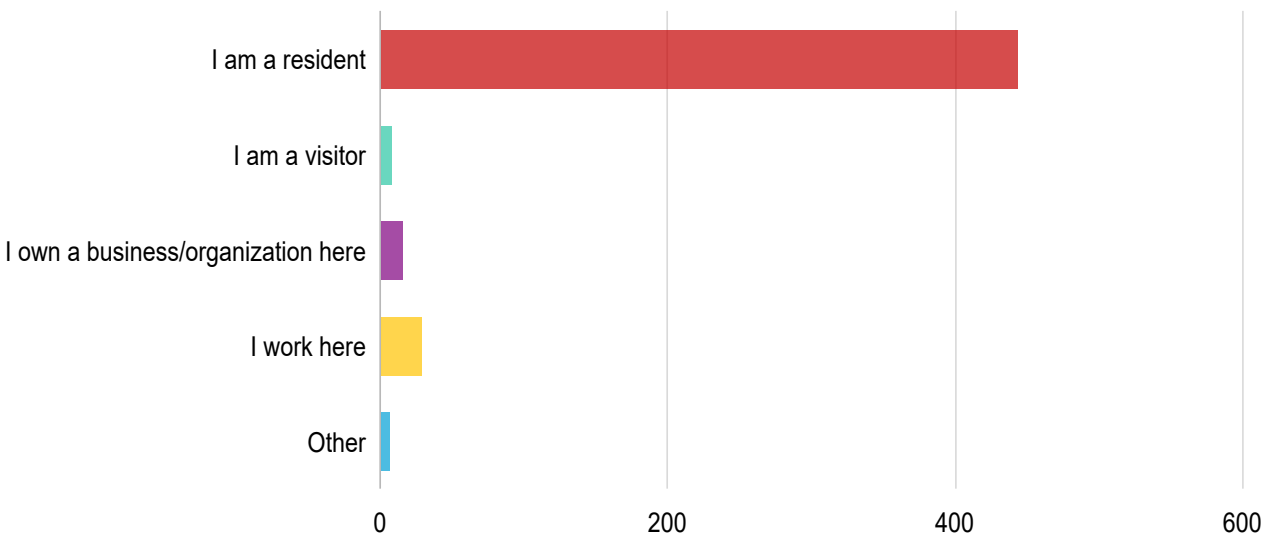
Q12: Do you have any equity or environmental justice concerns relating to strategies that will increase traffic safety?



Q14: The Township's Vision Zero Action Plan will focus on vulnerable users in developing actions to improve roadway safety. Do you identify with any of the following user groups?

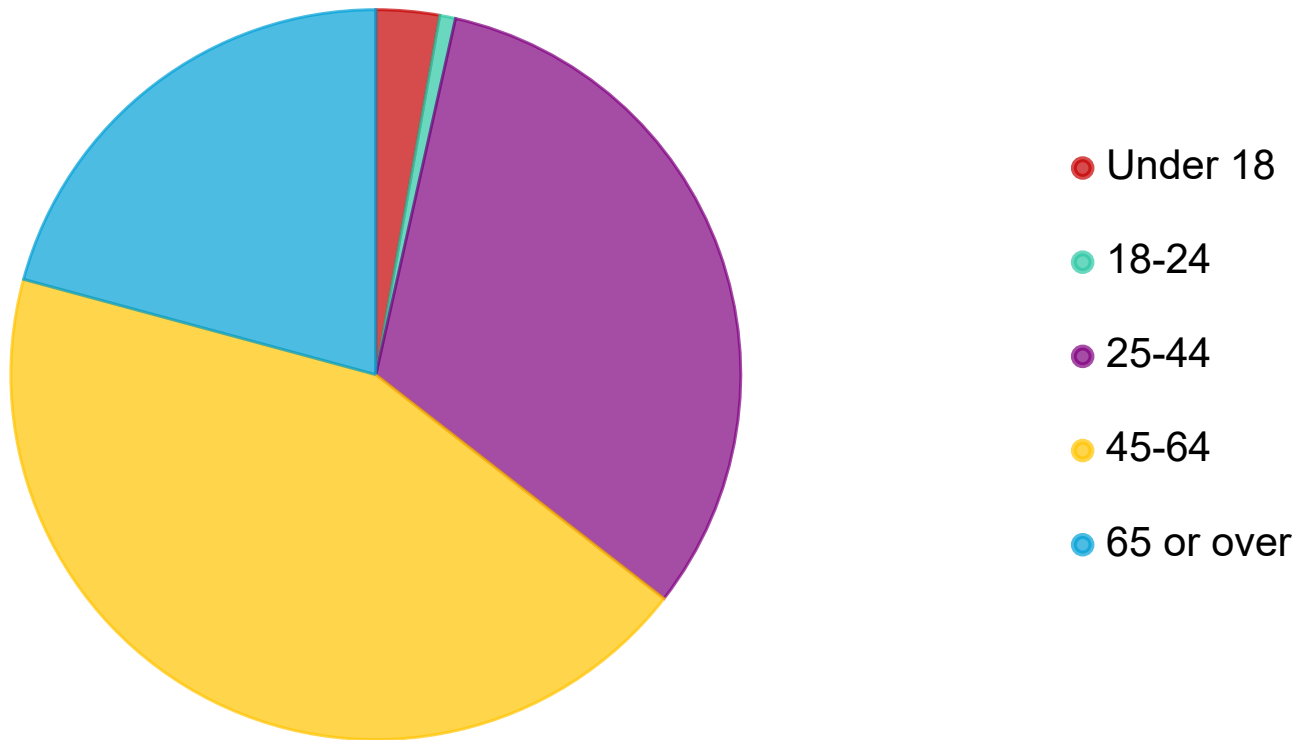


Q15: How are you connected to West Orange Township?



[illegible][illegible]

Q17: What is your age?





Vision Zero

WEST ORANGE TOWNSHIP

Exhibit “B”



Vision Zero

WEST ORANGE TOWNSHIP

Vision Zero Toolkit

*Information and Resources to **Help YOU** Engage Your
Community*

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VISION ZERO PLEDGE



VISION ZERO SAFETY PLEDGE

I understand that it is possible to eliminate traffic-related deaths and serious injuries in West Orange Township by doing my part while also supporting the Township in developing a Safe System with Safe Street Design and Safe Speeds in West Orange.

I PLEDGE TO:

- ☐ *Only drive when I am sober, alert and without distractions such as my phone or other devices and keep my eyes on the street at all times.*
- ☐ *Slow down, drive carefully and give at least four feet of space when possible, or slow down to 25 mph when passing bicyclists¹.*
- ☐ *Follow all laws and regulations on West Orange's streets, especially yielding to all vulnerable users such as pedestrians and bicyclists.*
- ☐ *Never flee a crash scene because I can save lives by calling 911 immediately.*
- ☐ *Recognize that as speed increases the risk of fatality and serious injury increases drastically.*

sign to pledge

¹NJ Safe Passing Law (<https://www.njoag.gov/about/divisions-and-offices/division-of-highway-traffic-safety-home/division-of-highway-traffic-safety-pedestrian-safety/>)



ZERO TRAFFIC-RELATED DEATHS AND SERIOUS INJURIES IN WEST ORANGE TOWNSHIP BY 2030!

VISION ZERO OVERVIEW



What is Vision Zero?

Vision Zero is a global safety initiative first adopted as a national policy in Sweden in 1997 that focuses on strategies to eliminate all traffic-related deaths and severe injuries, while increasing safety, health, and mobility for all.

Vision Zero takes a proactive, preventative approach to addressing traffic-related deaths and severe injuries versus a traditional approach to roadway crashes.

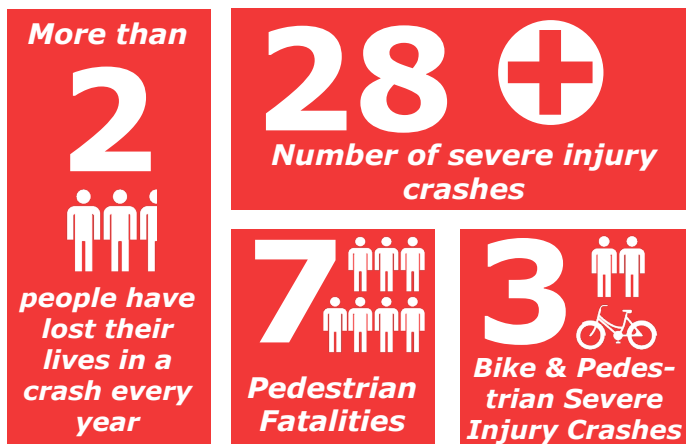
THE TOWNSHIP OF WEST ORANGE IS TAKING A STAND TO ELIMINATE ALL TRAFFIC-RELATED DEATHS AND SEVERE INJURIES BY 2030.

TOGETHER WE WILL ACHIEVE VISION ZERO.

The West Orange Vision Zero Action Plan is a roadmap to achieve the goal of zero traffic-related deaths and severe injuries in West Orange. It lays out the key action items to implement a comprehensive Vision Zero policy.

Vision Zero is based on data analysis that helps to identify the causes of crashes in our community and work to prevent them. The West Orange Vision Zero Action Plan includes a prioritized list of street improvement projects, education initiatives, city programs and proposed policy changes to achieve Vision Zero!

WHY VISION ZERO? BY THE NUMBERS*



* Crashes from 2015-2021 per Safety Voyager data also includes crashes on Route 280.

JOIN US! Engaging the community is a key priority for Vision Zero



Go to the website for updates



Follow us @ VisionZeroWO



Sign the PLEDGE



VisionZeroWo@gmail.com

VISIT: <https://tinyurl.com/VisionZeroWO>

Traditional Approach

Traffic deaths are INEVITABLE

PERFECT human behavior

Prevent COLLISIONS

INDIVIDUAL responsibility

Saving lives is EXPENSIVE

Source: <https://www.transportation.gov/NRSS/SafeSystem>

Vision Zero Approach

Traffic deaths are PREVENTABLE

Integrate HUMAN FAILING in approach

Prevent FATAL AND SEVERE CRASHES

SYSTEMS APPROACH

Saving lives is NOT EXPENSIVE

This Action Plan was made possible through a New Jersey Department of Transportation (NJDOT) Local Technical Assistance Grant. The organizations listed here supported the Township's Vision Zero project application for technical assistance from NJDOT.

The West Orange Vision Zero Task Force included: West Orange Pedestrian Safety Advisory Task Force (WOPSAB), Pleasant Valley Civic Association, Thomas Edison National Historic Park, Downtown West Orange Alliance, West Orange Public Schools and Council of PTAs, West Orange Police Department, and the Nikhil Badlani Foundation.

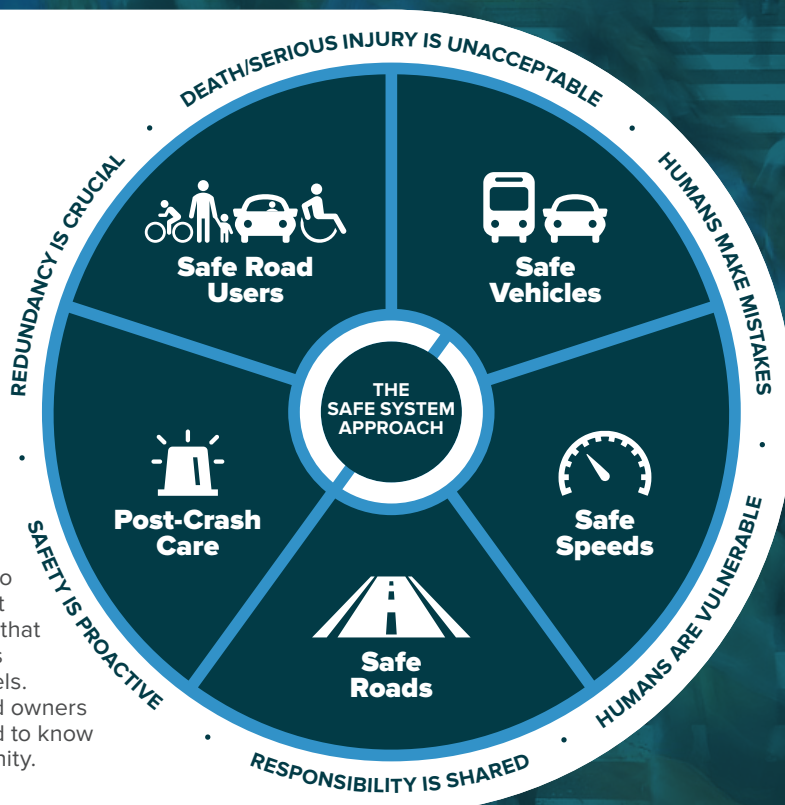
THE SAFE SYSTEM APPROACH

THE SAFE SYSTEM

APPROACH

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

Imagine a world where nobody has to die from vehicle crashes. The Safe System approach aims to eliminate fatal & serious injuries for all road users. It does so through a holistic view of the road system that first anticipates human mistakes and second keeps impact energy on the human body at tolerable levels. Safety is an ethical imperative of the designers and owners of the transportation system. Here's what you need to know to bring the Safe System approach to your community.



SAFE SYSTEM PRINCIPLES



Death/Serious Injury is Unacceptable

While no crashes are desirable, the Safe System approach prioritizes crashes that result in death and serious injuries, since no one should experience either when using the transportation system.



Humans Make Mistakes

People will inevitably make mistakes that can lead to crashes, but the transportation system can be designed and operated to accommodate human mistakes and injury tolerances and avoid death and serious injuries.



Humans Are Vulnerable

People have limits for tolerating crash forces before death and serious injury occurs; therefore, it is critical to design and operate a transportation system that is human-centric and accommodates human vulnerabilities.



Responsibility is Shared

All stakeholders (transportation system users and managers, vehicle manufacturers, etc.) must ensure that crashes don't lead to fatal or serious injuries.



Safety is Proactive

Proactive tools should be used to identify and mitigate latent risks in the transportation system, rather than waiting for crashes to occur and reacting afterwards.



Redundancy is Crucial

Reducing risks requires that all parts of the transportation system are strengthened, so that if one part fails, the other parts still protect people.



U.S. Department of Transportation
Federal Highway Administration

FHWA-SA-20-015



Safe Roads for a Safer Future
Investment in roadway safety saves lives

PROVEN SAFETY COUNTERMEASURES

MAKING OUR ROADS SAFER

One
Countermeasure
at a Time



The FHWA has identified and is promoting widespread use of a set of 28 Proven Safety Countermeasures that can offer significant, measurable impacts as part of any agency's data-driven, systemic approach to improving safety. These strategies are designed to enhance safety on all kinds of roads—from rural to urban, from high-volume freeways to less traveled two-lane State and county roads, from signalized crossings to horizontal curves, and everything in between. Each countermeasure addresses **speed management, intersections, roadway departures, or pedestrians/ bicyclists**—along with crosscutting strategies that address all four safety focus areas.

***Which Proven Safety
Countermeasures
Will You Use?***

For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures>.



U.S. Department of Transportation
Federal Highway Administration

ZERO IS OUR GOAL
A SAFE SYSTEM IS HOW WE GET THERE

<https://safety.fhwa.dot.gov/>

PROVEN SAFETY COUNTERMEASURES

OFFICE OF SAFETY

Proven Safety Countermeasures

SPEED MANAGEMENT



**Speed Safety
Cameras**



Variable Speed Limits



**Appropriate Speed
Limits for All Road Users**

ROADWAY DEPARTURE



Wider Edge Lines



**Enhanced Delineation
for Horizontal Curves**



**Longitudinal Rumble
Strips and Stripes on
Two-Lane Roads**



SafetyEdgeSM



**Roadside Design
Improvements at
Curves**



Median Barriers

INTERSECTIONS



**Backplates with
Retroreflective
Borders**



**Corridor Access
Management**



**Dedicated Left- and
Right-Turn Lanes at
Intersections**



**Reduced Left-Turn
Conflict Intersections**



Roundabouts



**Systemic Application
of Multiple Low-Cost
Countermeasures at
Stop-Controlled
Intersections**



**Yellow Change
Intervals**

PEDESTRIANS/BICYCLES



**Crosswalk Visibility
Enhancements**



Bicycle Lanes



**Rectangular Rapid
Flashing Beacons
(RRFB)**



**Leading Pedestrian
Interval**



**Medians and Pedestrian
Refuge Islands in Urban
and Suburban Areas**



**Pedestrian Hybrid
Beacons**



**Road Diets (Roadway
Reconfiguration)**



Walkways

CROSSCUTTING



**Pavement Friction
Management**



Lighting



Local Road Safety Plans



Road Safety Audit

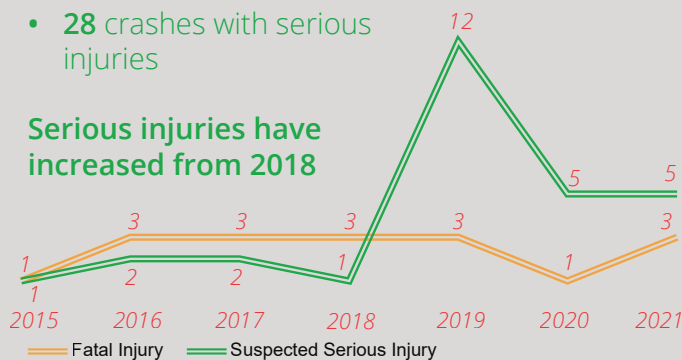
CRASH STATISTICS

Vision Zero focuses on crashes where victims are seriously injured or killed

From 2015-2021 in West Orange Township:

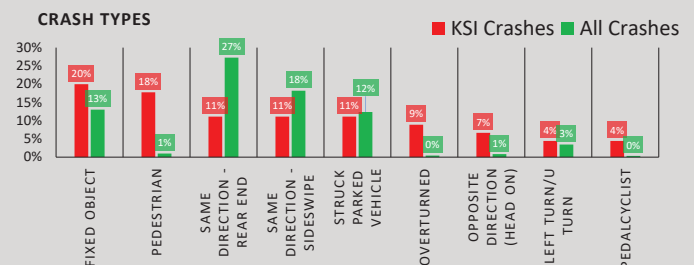
- 17 fatal crashes
- 28 crashes with serious injuries

Serious injuries have increased from 2018



Some crash types can be more severe than others

While the most common kinds of crash in West Orange involve cars hitting cars (Rear-End 27%, Same-Direction Sideswipe 18%), the most common kinds of crash with serious injury or death involve cars hitting other things (Fixed Object 20% [13% of all crashes], Pedestrian 18% [1% of all crashes]).



Source: NJDOT Safety Voyager & NJDHTS Numetric, Crash Data from 2015-2021

Seniors and minors are more at risk of serious injury and death in crashes

Of all Crashes in West Orange

- Young People involved: 23%
- Seniors Involved: 30%

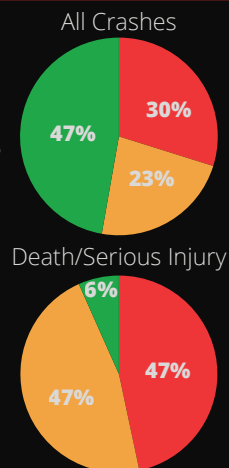
Of all Death & Serious Injuries

- Young People: 47%
- Seniors: 47%

● Adults (20-64)

● Young People (<20)

● Seniors (65+)



Source: NJDOT Safety Voyager & NJDHTS Numetric, Crash Data from 2015-2021

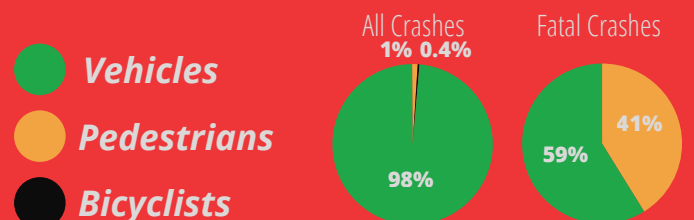
Pedestrians and bicyclists have high death and injury rates in crashes

In West Orange:

- 1% of crashes involved PEDESTRIANS
- 0.4% involved BICYCLISTS

yet:

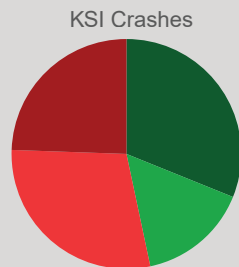
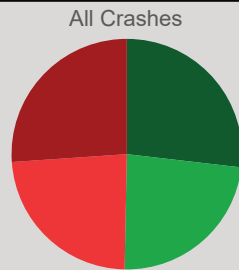
- 41% of fatalities were PEDESTRIANS
- 11% of serious injuries were PEDESTRIANS OR BICYCLISTS



CRASH STATISTICS

Which seasons see the most crashes?

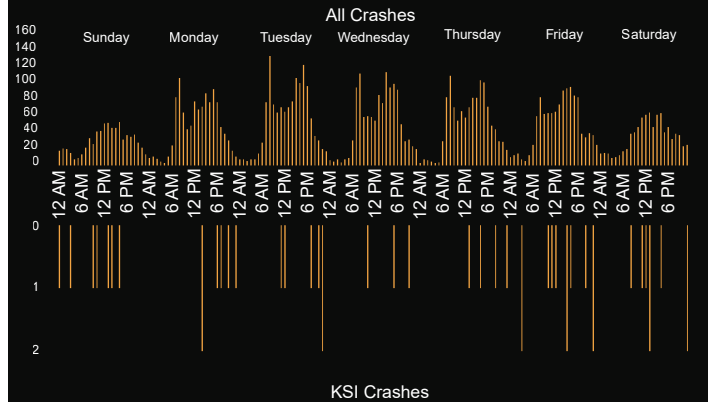
In West Orange, **crashes** were distributed roughly **evenly** **throughout the seasons**, with slightly more in Fall and Winter. **KSI crashes** occurred **more frequently in Winter** than any other season, and **Spring saw fewer** than the other seasons.



When do crashes happen?

In West Orange, there were more crashes **on weekdays**, spiking at **rush hour**. **Sunday** had the least crashes overall.

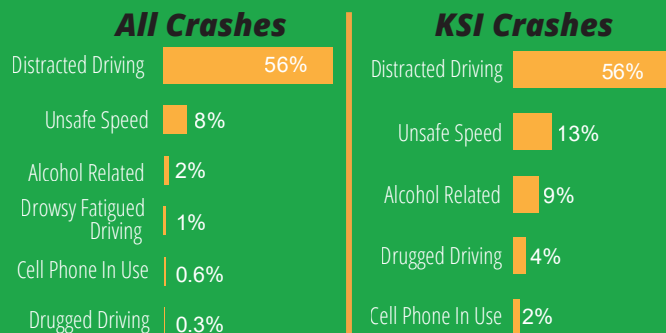
Conversely, KSI crashes occurred most often **on weekends**, with many occurring at night.



Source: NJDOT Safety Voyager & NJDHTS Numetric, Crash Data from 2015-2021

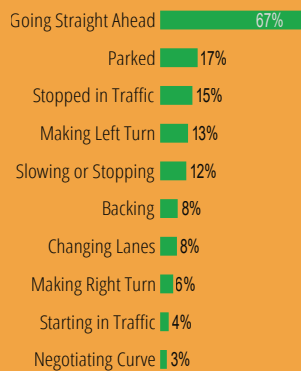
What are the leading causes of crashes?

In West Orange:
Distracted Driving - most common cause of crashes (57%); 56% of crashes in which victims were killed or seriously injured (KSI)
Unsafe Speed - 8% of all crashes; 13% of KSI
Alcohol-related - 2% of all crashes; 9% of KSI

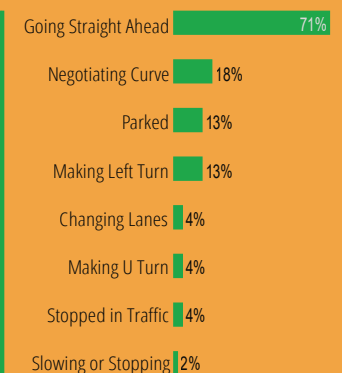


What are people doing when they crash in West Orange Township?

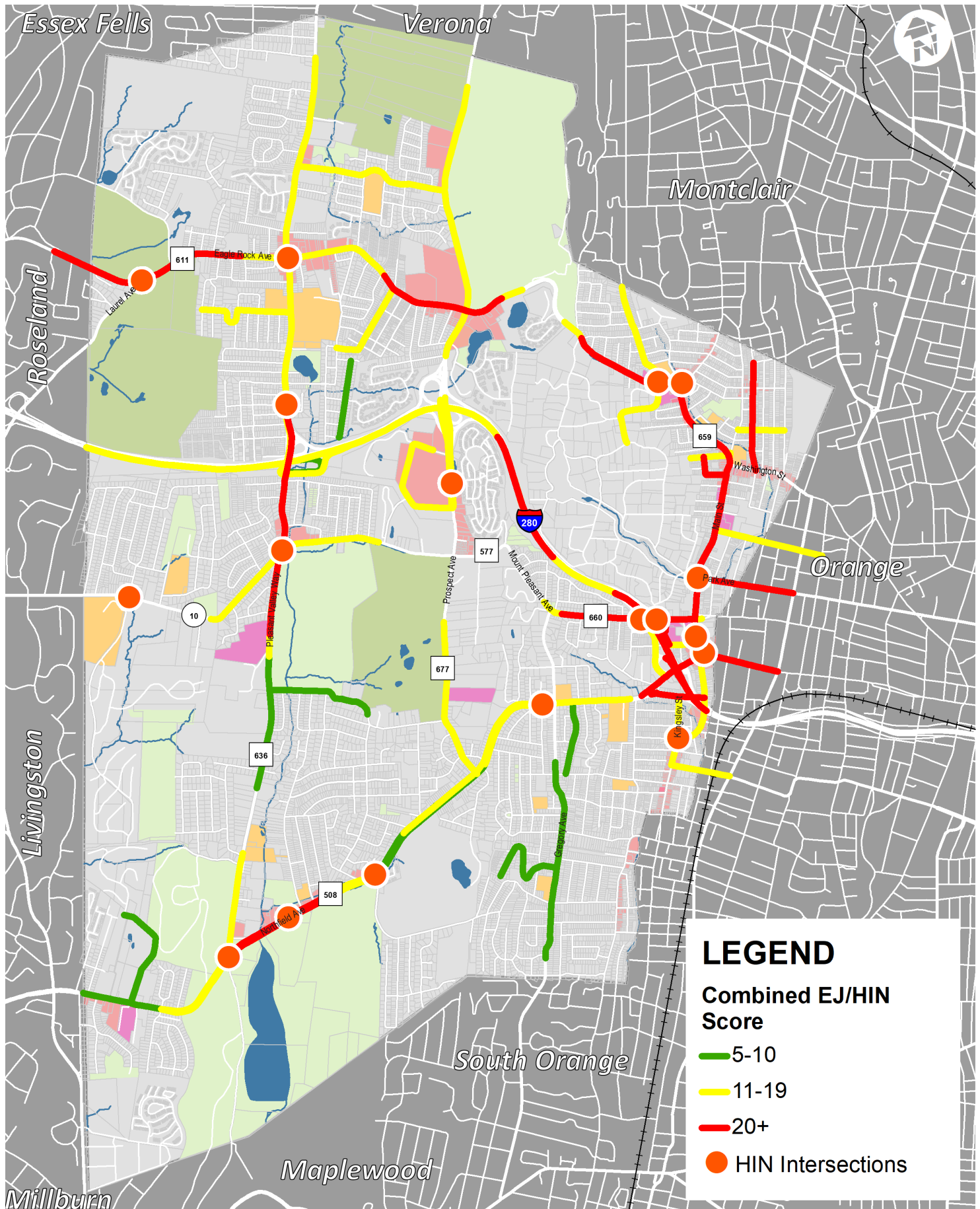
The most common pre-crash actions in all crashes:



In crashes where people were killed or seriously injured:



HIGH-INJURY NETWORK



GLOSSARY OF TERMS

Vision Zero

Vision Zero is a strategy to eliminate fatalities and serious injuries in the road system. This was first implemented in Sweden in the 1990s, has become standard and successful across Europe, and has begun to spread across the world. Vision Zero reframes traffic safety, from severe car crashes being inevitable accidents that are part of modern living to being preventable crashes to be prevented in as many ways as possible to save lives. Vision Zero acknowledges human error, systems over individual responsibility, and that saving lives is not expensive.

Safe System Approach

The Safe System Approach is a framework to address roadway safety that has been adopted by the US Department of Transportation. It builds multiple layers of protection for road users to both prevent crashes and mitigate the harm caused in crashes.

KSI Crash

KSI Crashes are crashes where a victim is killed (K) or severely injured (SI).

Proven Safety Countermeasures

The Federal Highway Administration (FHWA) has identified 28 countermeasures and strategies with proven effectiveness in reducing crash rates and/or crash severity. These are context- and user-specific but can make significant improvements to the safety of a road system when applied broadly.

Complete Streets

Complete Streets are streets designed to safely support all road users. This applies to both all modes of travel and also all abilities of the road users, including people with disabilities, children and seniors, and more. Complete Streets require varying degrees of intervention depending on the context, both in terms of land use and in terms of traffic volumes and speeds.

Environmental Justice

Environmental Justice is, as defined by the EPA, “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”

High-Injury Network

Vision Zero Action Plans identify a High-Injury Network (HIN), the roadways in a municipality or city's road system with the highest prevalence of crashes or greatest crash severity. Actions to address these issues are concentrated on the HIN.

Vulnerable Road Users

Certain Users of the road system are those not protected inside a vehicle when using the road system. This includes pedestrians, cyclists, skateboarders, rollerskaters and more.

