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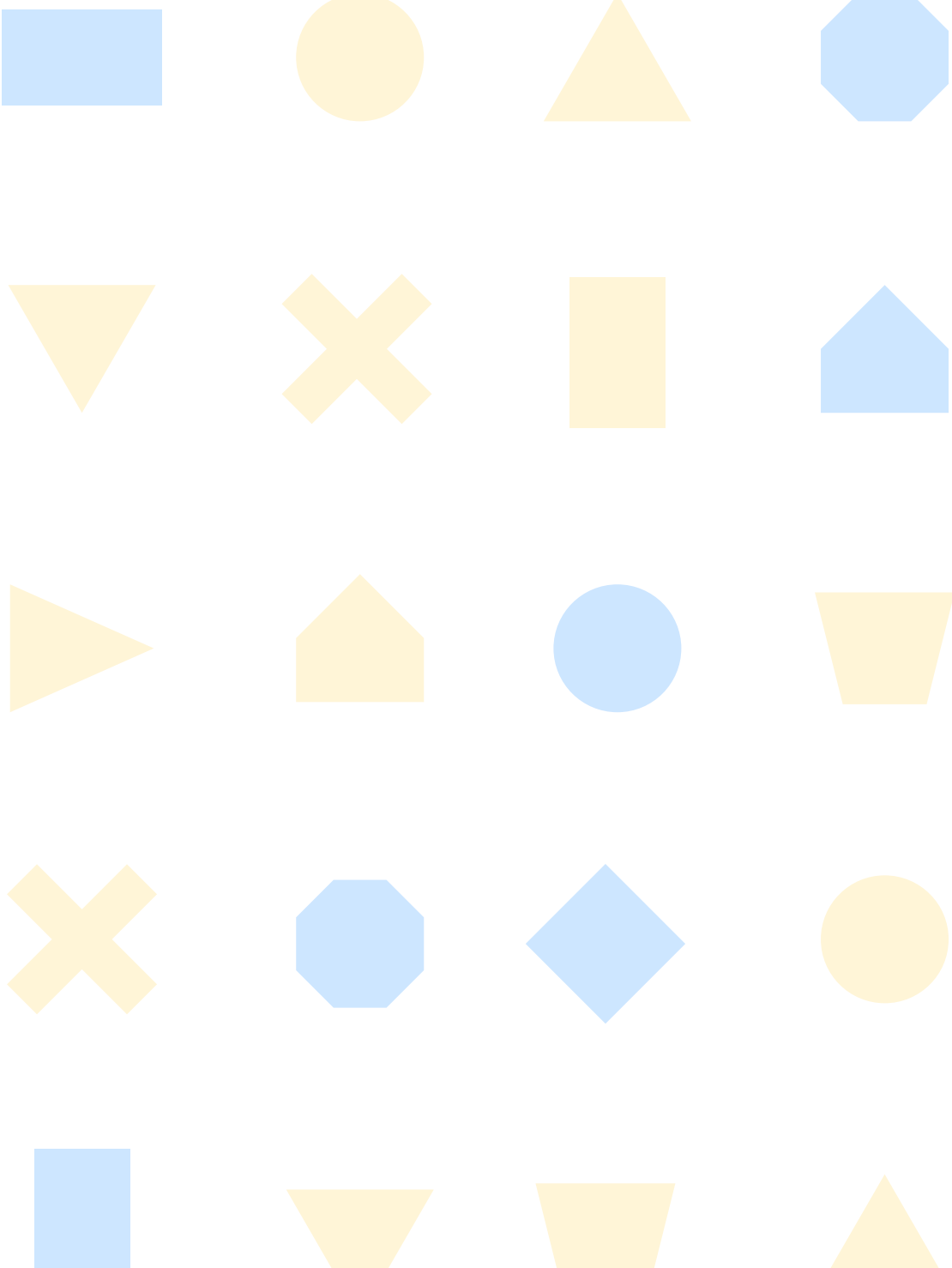
**VISION
ZERO
LOUISVILLE**



Vision Zero Louisville
Safety Report 2013-2017

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Introduction

The Kentucky Transportation Cabinet (KYTC), in partnership with Louisville Metro, initiated the Vision Zero Louisville (VZL) project to develop a data-driven process to identify and prioritize safety projects. In addition, the VZL project involved the identification of common traits and risk factors for which countermeasures can be applied to prevent serious injuries and fatalities.

In support of this effort, a safety database was created with crash data from Kentucky State Police and detailed roadway and multimodal transportation system information from KYTC, Louisville Metro, and other agencies. The analysis study period was 2013 to 2017 with a focus on non-interstate crashes. The project placed an emphasis on preventing serious injuries and fatalities across Louisville for all modes of travel including vehicular, pedestrian, and bicyclists.

Safety by the Numbers

(Louisville Metro safety statistics between 2013 and 2017)



127,000+ vehicle crashes on non-interstate roadways

2,144 serious injury VEHICULAR CRASHES

357 FATAL crashes



2,230 crashes involved a pedestrian

260 serious injury PEDESTRIAN CRASHES

93 FATAL pedestrian crashes



832 crashes involved a bicycle

64 serious injury BICYCLE CRASHES

9 FATAL bicycle crashes

Every year in Louisville there are approximately ...

70 Fatal Crashes

430 Serious Injury Crashes

Between 2013 and 2017, there were 357 fatal crashes and 2,144 serious injury crashes on non-interstate roads and streets in Louisville Metro, which is approximately 70 fatal crashes and 430 serious injury crashes per year. Furthermore, the annual number of fatal crashes increased by 22% over the five year study period.

One of the highest rates of fatal and serious injury crashes is for pedestrians. Pedestrians were involved in less than 2% of all crashes, but represented 26% of the fatal crashes and 12% of serious injury crashes. Another critical user category is motorcyclists. They account for 1% of all crashes but 18% of fatal crashes. Together, these two groups represent 44% of all fatal crashes.

Louisville Metro is devising strategies to reach the goal of eliminating fatalities and serious injuries by implementing Vision Zero principles and practices.

Vision Zero is a strategy to eliminate all traffic related fatalities and serious injury crashes by taking a proactive, preventive approach rather than a reactive approach to address safety challenges. The Vision Zero fundamental principles are:

- Traffic deaths and severe injuries are acknowledged to be preventable.
- Human life and health are prioritized within all aspects of transportation systems.
- Human error is acknowledged as inevitable, and transportation systems should be forgiving.
- Safety work should focus on systems-level changes above influencing individual behavior.
- Speed is recognized and prioritized as the fundamental factor in crash severity.

The graphic to the right highlights the major differences when comparing Vision Zero to traditional approaches to safety. ¹



Louisville Metro considers the following Vision Zero principles:



People First: Keep a focus on people. Prevent the loss of human life and life-altering injuries, even at the expense of public or private property. Take a proactive and systemic approach to improving safety for all users.



Data Informed and Action Oriented: Develop strategies and actions based on relevant data, best practices, and community input. Improve the data and analysis over time. Take action based on the findings without undue delay, using an interdisciplinary approach to carrying out the 4 E's of Engineering, Education, Emergency Services, and Enforcement



Equity: Work to eliminate racial, economic, and other inequities in high severity traffic crashes by placing an emphasis on Environmental Justice areas.



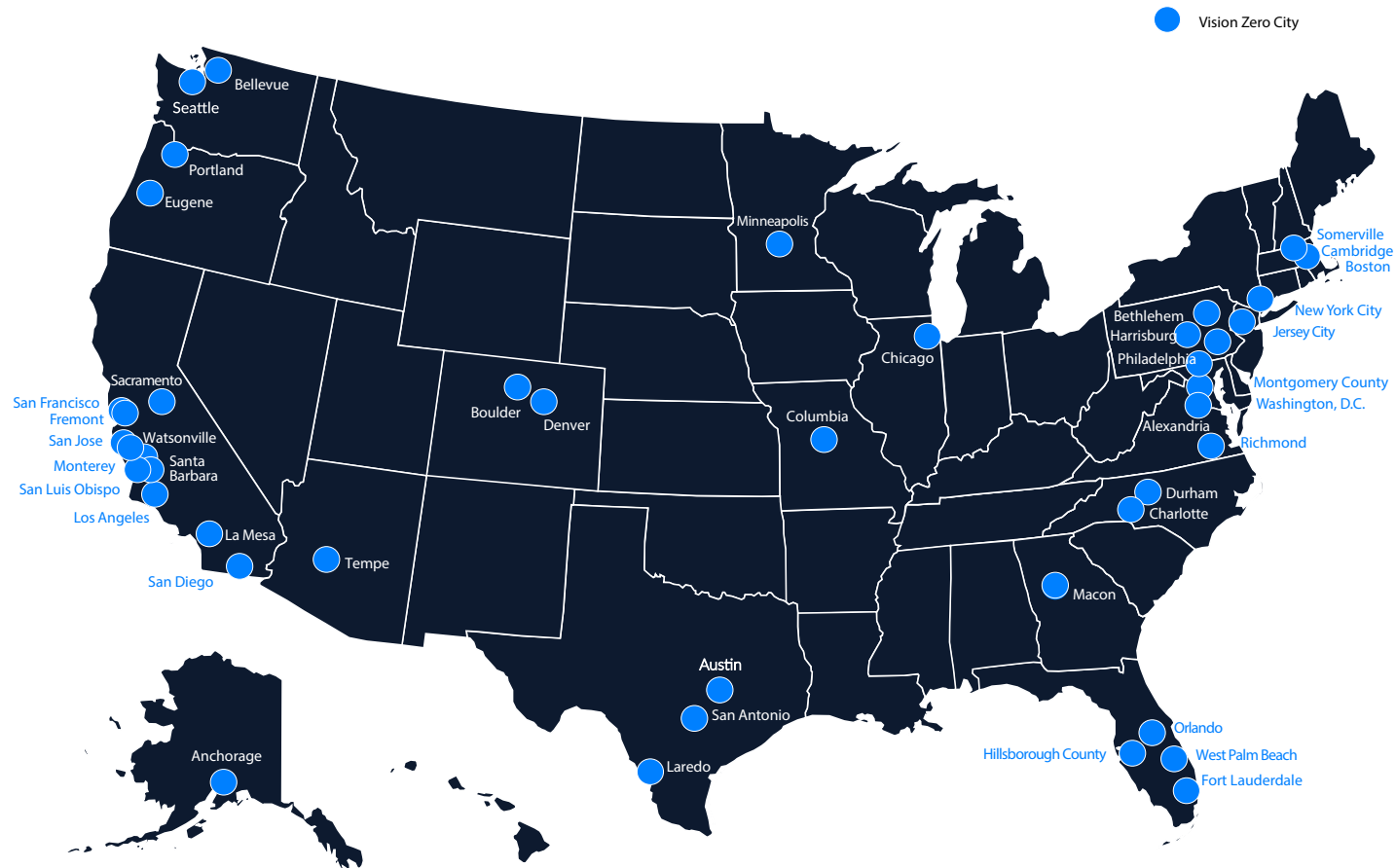
Accountability and Continuous Improvement: Set clear objectives and report progress regularly. Be transparent and include meaningful and diverse community engagement that helps guide actions. Actively collaborate with community and agency partners to embrace, develop, and implement Vision Zero. Adapt and improve our approach as needed in the future.



Safe Systems Approach: Practice a Safe Systems approach that recognizes:

- People make mistakes that lead to road crashes.
- The human body has limited physical ability to tolerate crash forces.
- The responsibility for making the mobility system safe is a shared responsibility across all stakeholders and requires personal responsibility.
- All parts of the system must be strengthened to multiply the impact of interventions and provide a safety net when any one part of the system is deficient.³

Vision Zero Cities



Currently Louisville is not part of the Vision Zero Network, however, Louisville Metro plans to join within the next 2 years.

How does Louisville move forward with Vision Zero?

Progress will be made by executing the list of recommended strategies provided toward the end of this document. In addition, the Technical Appendix provides a more detailed list of prioritized projects that can be used to assist agencies in development of policy and execution of projects aimed at improving safety across the community. This report includes a review and summary of crash data between 2013 and 2017 on non-interstate roads and streets in Louisville Metro to help educate stakeholders and the public about safety trends in the Louisville area.

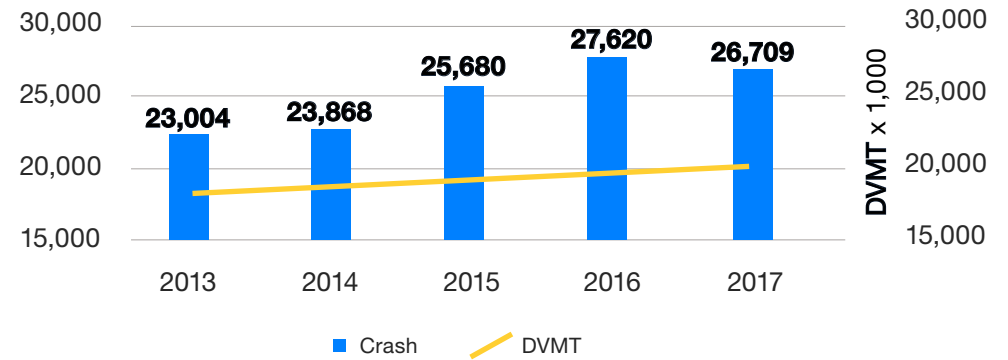
Study Overview

The following sections are based on all crashes that occurred on **NON-INTERSTATE ROADS** and streets in Louisville Metro between 2013 and 2017. This section provides an overview of the crash analysis and the associated trends of the crash data.

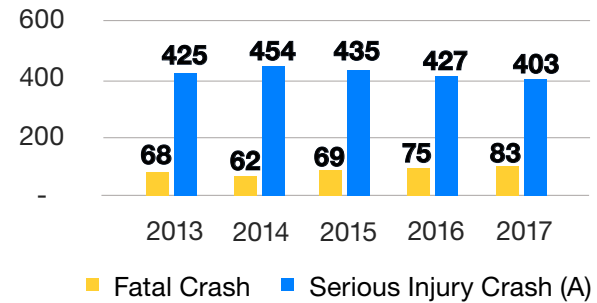
Crashes

Between 2013 and 2017, an average of 25,385 crashes occurred each year on non-interstate roadways with the highest number occurring in 2016. Between 2013 and 2017, the annual number of crashes increased by 16%, while the Daily Vehicle Miles Traveled (DVMT) increased by 4%, indicating an increasing rate of crashes relative to DVMT in this time period. The number of serious injury crashes trended downward between 2013 and 2017, but the annual number of fatal crashes increased 22%.

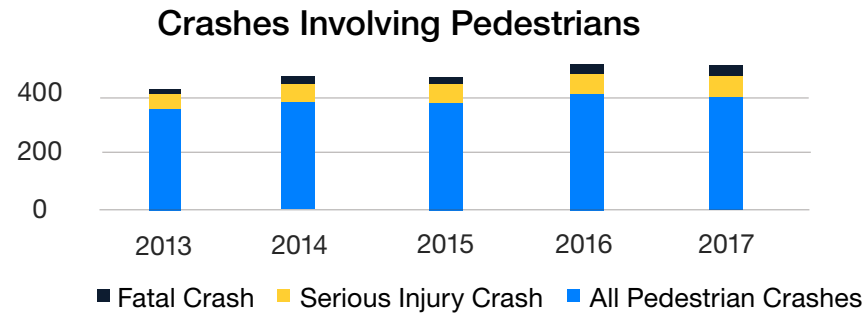
Total Crashes and Daily Vehicle Miles Traveled (DVMT) by Year
(All Modes of Travel) (Non-Interstate)



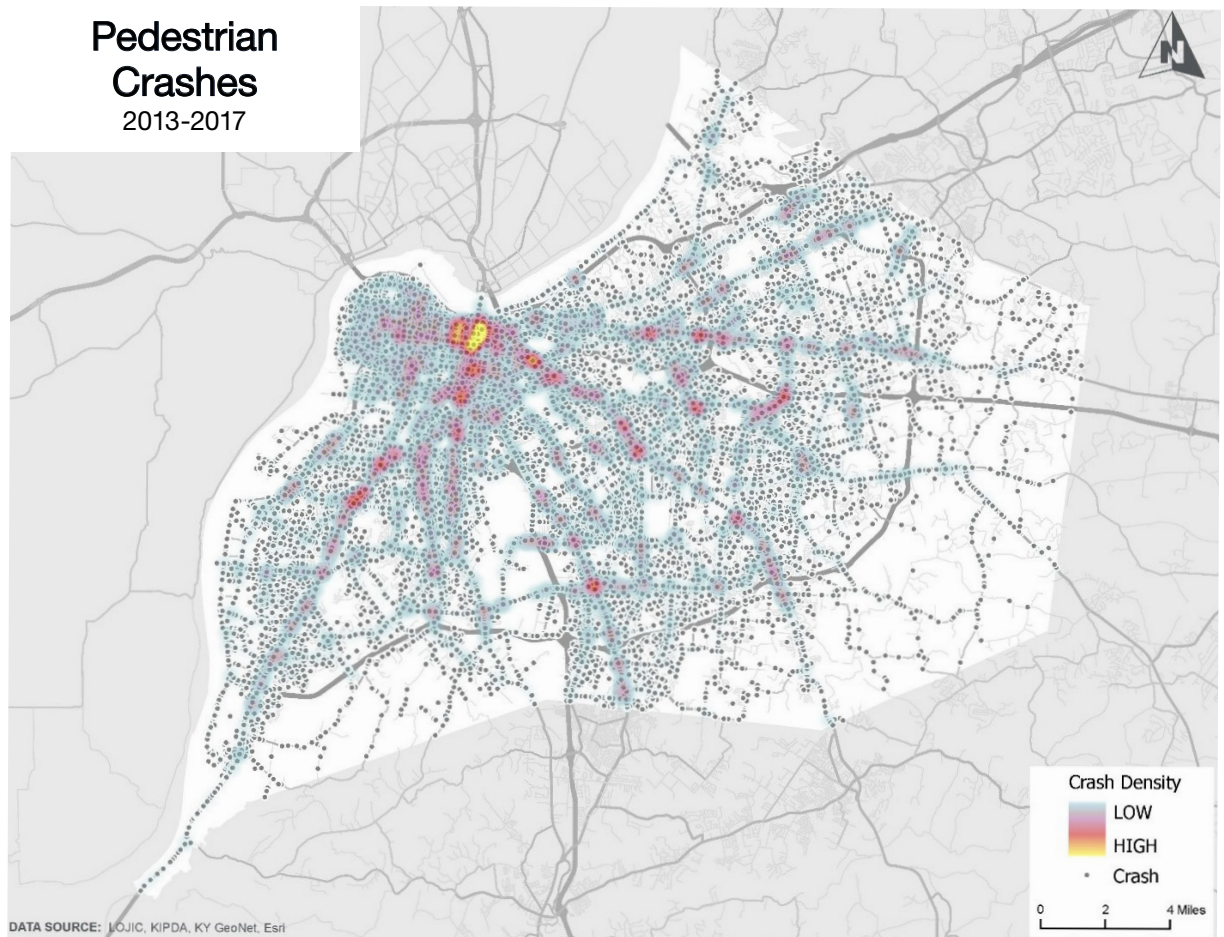
Fatal and Serious Injury Crashes by Year
(All Modes of Travel) (Non-Interstate)



Pedestrians are the most vulnerable users of any roadway network. Nationally, pedestrian and bicycle fatalities increased by 32% in the ten-year period between 2008 and 2017. During that same time, total traffic fatalities decreased by 0.8%. In Louisville Metro, fatal pedestrian crashes doubled during the study.



Pedestrian Crashes
2013-2017



Fatal
Pedestrian
Crashes
DOUBLED
from 2013
to 2017

26%

of all Fatal
Crashes
involve
a Pedestrian

The Cost to our Community

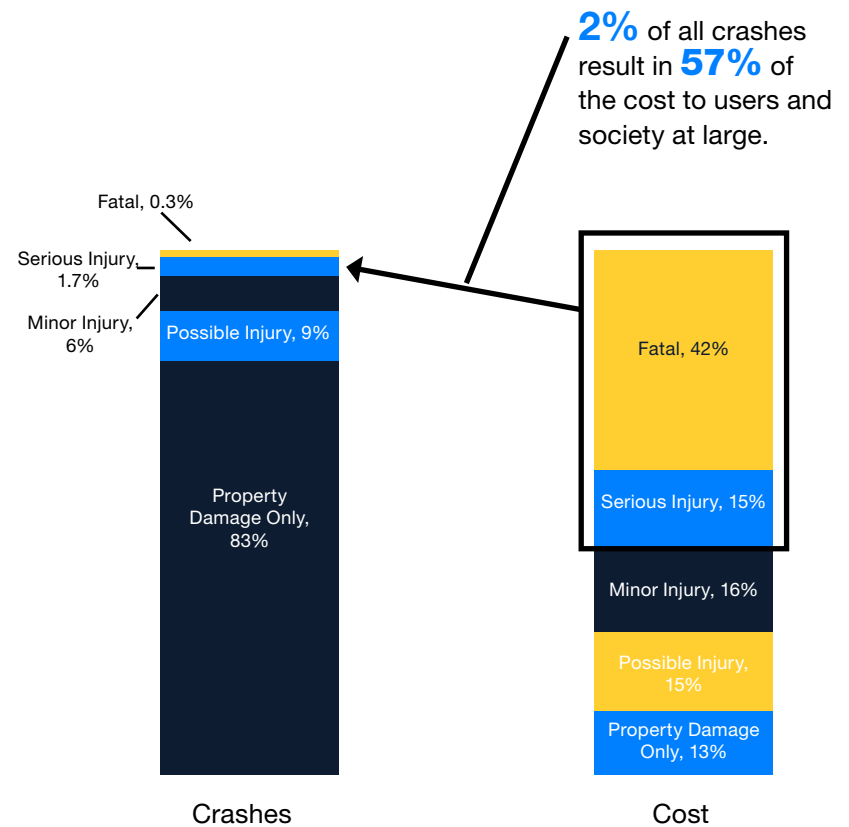
In the past, traffic deaths have been considered inevitable in our modern day life. The Vision Zero proactive, preventative approach prioritizes traffic safety. The personal cost of a death causes significant emotional trauma to a family and community. The loss of life extends beyond the immediate and enduring impact to a lost one's family and community. In addition to the loss of life, there is a cost to society when considering wages and productivity, medical expenses, administrative expenses, motor vehicle damage, and employer uninsured costs. The Louisville Metro experienced a societal cost of nearly \$8 billion over five years covering 127,000+ crashes.

The societal cost of the **2,501 FATAL AND SERIOUS** injury crashes is nearly **\$4.5 Billion**. These crashes make up 2% of all crashes, but they are over half of the total crash cost. This supports the Vision Zero focus on preventing these most serious crashes.

Cost of Crashes (2013-2017)

Crash Severity	Number of Crashes	Comprehensive Cost Per Crash*	Societal Cost (rounded)
Fatal	357	\$9,281,571	\$3,313,500,000
Serious Injury	2,144	\$537,913	\$1,153,300,000
Minor Injury	7,741	\$162,885	\$1,260,900,000
Possible Injury	11,696	\$102,957	\$1,204,200,000
Property Damage Only	105,236	\$9,689	\$1,019,600,000
Total	127,174		\$7,951,500,000

*Based on Kentucky Specific Data



Crash Severity Compared with Cost

Areas of Opportunity

Areas of Opportunity

A data-informed approach was developed to identify areas of opportunity for preventing the number of fatalities and serious injuries. The Vision Zero Louisville (VZL) areas of opportunity followed the structure of the Kentucky Strategic Highway Safety Plan (KYSHSP) developed by the Governor’s Executive Committee on Highway Safety. Similar to the KYSHSP, a comprehensive analysis of crash data was conducted to identify trends, patterns, and opportunities. The crash analysis focused on fatal and injury crashes in conjunction with crash locations, roadway characteristics, driver behavior, vehicle types, and non-motorized users. The results of the crash analysis were compared to the KYSHSP data as part of the selection of the VZL areas of opportunity.

Vision Zero Louisville identified areas of opportunity, which were categorized within the following categories:

- Design & Operations
- Vulnerable Roadway Users
- Behavior Modifications
- Urban Considerations

Vision Zero Louisville Areas of Opportunity

- Intersections
- Roadway Departures
- Four-Lane Undivided Highways
- Motorcycles
- New and Mature Drivers
- Pedestrians
- Bicycles
- Aggressive Drivers
- Distracted Drivers
- Impaired Drivers
- Occupant Protection
- Environmental Justice Areas
- Lighting

Areas of Opportunity		Kentucky Strategic Highway Safety Plan		Vision Zero Louisville
		2015-2019	2020-2024	
Design & Operations	Intersections	✓		✓
	Roadway Departures	✓	✓	✓
	Four-Lane Undivided Highways			✓
Vulnerable Roadway Users	Non-Motorized Users	✓	✓	✓
	Motorcycles	✓	✓	✓
	New and Mature Drivers	✓		✓
	Pedestrians	✓	✓	✓
	Bicycles	✓	✓	✓
Behavior Modifications	Aggressive Driving	✓	✓	✓
	Distracted Driving	✓	✓	✓
	Impaired Driving	✓	✓	✓
	Occupant Protection	✓	✓	✓
Urban Considerations	Environmental Justice Areas			✓
	Lighting			✓
System Management	Commercial Motor Vehicles	✓		
	Incident Management	✓		



Intersections

In Louisville, 68% of all crashes and 65% of fatal and serious injury crashes occur at intersections. This is significantly higher than the statewide averages of approximately 25% and 24%, respectively. Approximately 35% of all crashes occur at the 930 signalized intersections, while 28% occur at the over 16,000 unsignalized intersections. Severe crashes are divided more evenly, at 32% and 31% for the two types of intersections. These statistics demonstrate why intersections are areas of opportunity for VZL. Severe crashes must be prevented at intersections in order to achieve Vision Zero in Louisville.

Hot Spot Locations

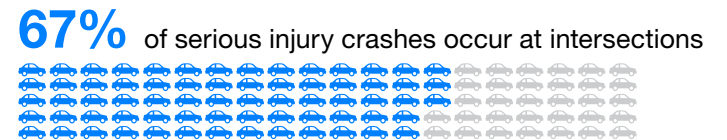
Twenty signalized intersections had five or more fatal and serious injury crashes. Six of the twenty poorest performing intersections are on KY 1934 (Greenbelt Hwy and Cane Run Road). Safety improvements have been studied at 10 of the poorest performing intersections under the KYTC Highway Safety Improvement Program (HSIP).

Previously Warranted Signals

Population and business activity have spread out from the older developed areas to more recently developed areas. This shift has caused traffic volumes to decrease in some neighborhoods and along some streets. With the shifting traffic patterns, there may be new traffic control needs. For example, there are intersections where volumes may have previously warranted a traffic signal but now do not. It is possible that signals at these locations may cause an increase in crashes compared to stop-control. However, it is also recognized that these same locations often have pedestrian traffic; therefore thoughtful pedestrian focused improvements may be needed at these same locations in conjunction with any change to the traffic control.

Key countermeasures to prevent intersection serious injuries and fatalities

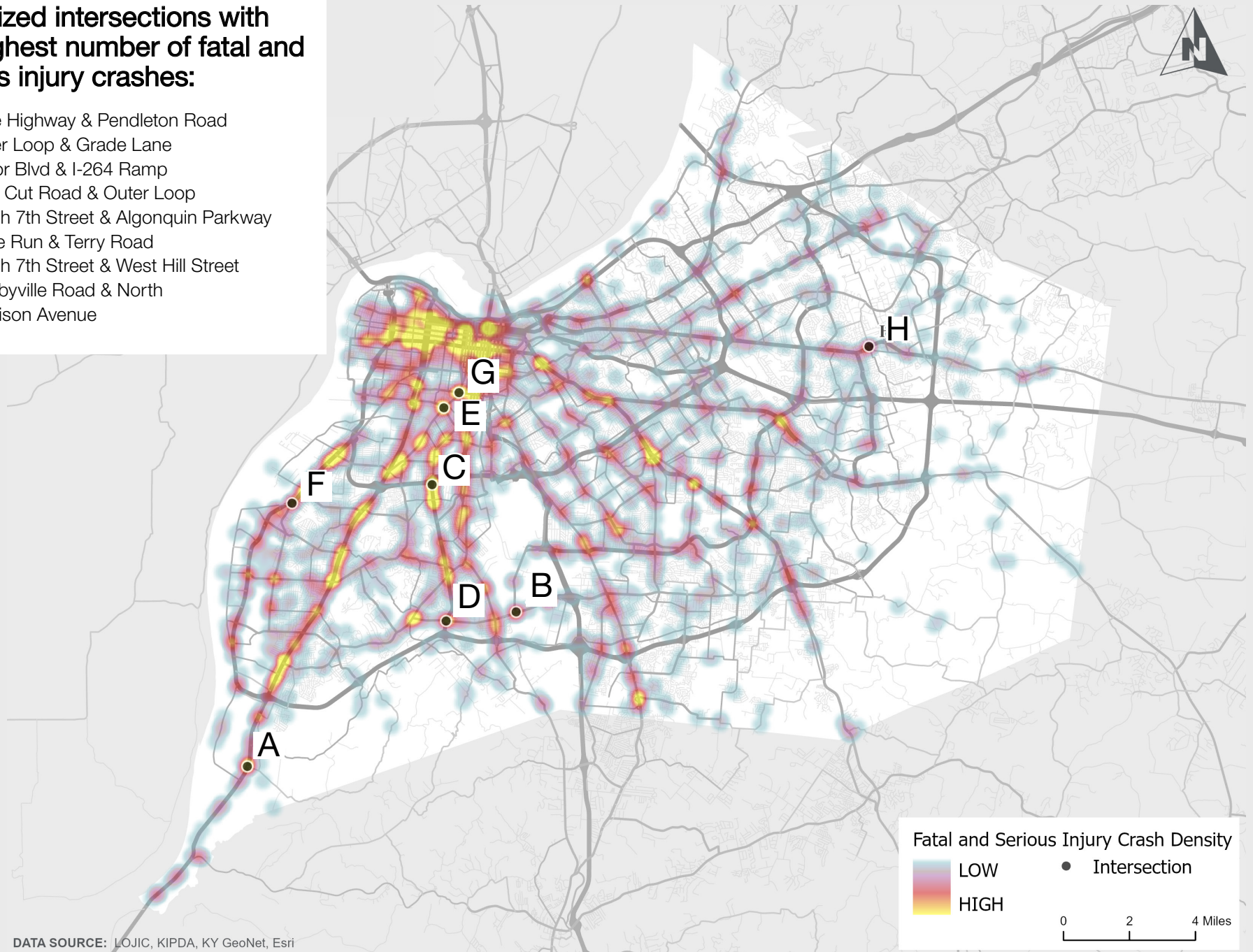
- Crosswalk visibility enhancements
- Signal timing improvements
- Remove previously warranted signals
- Signal head per approach lane
- Backplates with retro-reflective borders
- Dedicated left-and right-turn lanes
- Roundabouts
- Reduced left-turn conflict intersections, ex. RCUT



- Removal of a previously warranted signal on non-arterial one-way streets can reduce crashes by 24%⁴
- Converting a signalized intersection to a roundabout can reduce severe crashes by 78%⁵

Signalized intersections with the highest number of fatal and serious injury crashes:

- A. Dixie Highway & Pendleton Road
- B. Outer Loop & Grade Lane
- C. Taylor Blvd & I-264 Ramp
- D. New Cut Road & Outer Loop
- E. South 7th Street & Algonquin Parkway
- F. Cane Run & Terry Road
- G. South 7th Street & West Hill Street
- H. Shelbyville Road & North Madison Avenue



DATA SOURCE: LOJIC, KIPDA, KY GeoNet, Esri

Roadway Departures

A roadway departure crash is a non-intersection crash that occurs after a vehicle crosses an edge line, a centerline, or otherwise leaves the roadway. While these crashes can occur on urban streets or rural highways, severe roadway departure crashes tend to occur more frequently in rural locations.

In Kentucky between 2013 and 2017, 64% of all traffic related fatalities involved roadway departure. In Louisville Metro, 23% of all fatal crashes involved a roadway departure. Although most of the roadway mileage in the city is urban, several rural roadway corridors present a history of roadway departure crashes.

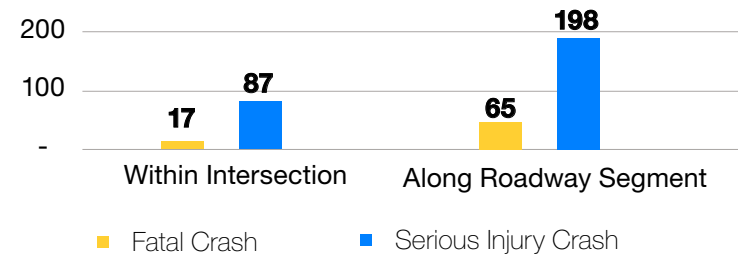
Single vehicle non-intersection crashes account for 46% of fatal roadway departure crashes and 41% of serious injury roadway departure crashes that occurred in Jefferson County.

Contributing factors to roadway departure crashes occurring on curves during wet conditions are inadequate superelevation and/or pavement friction. One potential solution to mitigate these contributing factors is through the installation of a high friction surface treatment (HFST). A recent study, using crash data from 2006 to 2017 examined the effects of installing HFST on targeted, curved roadway sections in Kentucky. The results showed an 87% reduction in wet pavement, roadway departure crashes. The study noted that these highly effective results were due to thorough analysis of existing site conditions to ensure increased friction was the underlying need prior to installation of HFST.⁶

Roadway Departure Crash Summary



Roadway Departure Crash Locations

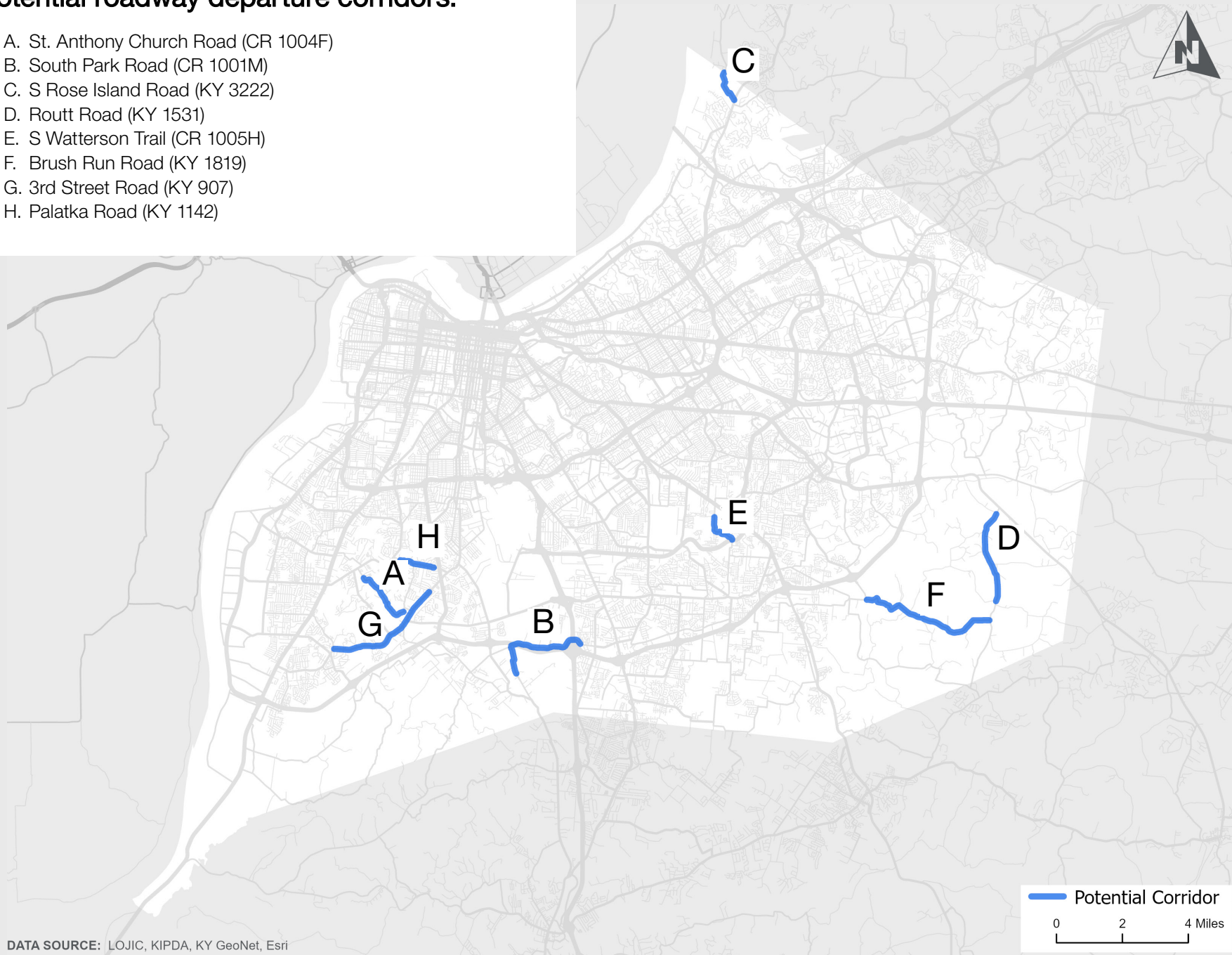


Key countermeasures to prevent roadway departure serious injuries and fatalities

- Pavement markings / Striping
- Horizontal alignment signing
- Guardrail improvements
- High friction surface
- Widening travel lanes
- Superelevation improvements
- Rumble strips
- Shoulder widening

Potential roadway departure corridors:

- A. St. Anthony Church Road (CR 1004F)
- B. South Park Road (CR 1001M)
- C. S Rose Island Road (KY 3222)
- D. Routt Road (KY 1531)
- E. S Watterson Trail (CR 1005H)
- F. Brush Run Road (KY 1819)
- G. 3rd Street Road (KY 907)
- H. Palatka Road (KY 1142)



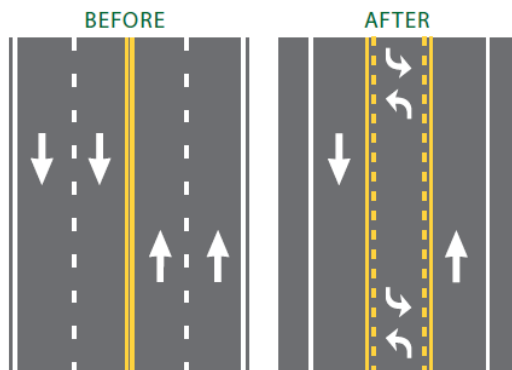
DATA SOURCE: LOJIC, KIPDA, KY GeoNet, Esri

Four-Lane Undivided Roadways

In the past, as volumes and congestion increased on two-lane roadways, it was common to add two additional lanes. Often this resulted in a four-lane undivided roadway, though sometimes medians and/or left turn lanes were also added to improve safety and traffic flow. Over time, and depending on traffic volumes and multi-modal use, it has become apparent that many of these four-lane undivided roadways would function more safely and efficiently as three-lane roadways with a center two-way left-turn lane (TWLTL). The conversion of a four-lane roadway (with or without left turn lanes) to a three-lane roadway is often referred to as road reconfiguration or as "right sizing" the street. These options are considered to be proven safety countermeasures for four-lane roadways with a high crash history that meet the operational criteria.⁷ The operational criteria for making the change includes traffic volume, driveways, intersections, and other factors. Louisville Metro has completed many road reconfiguration projects, including Brownsboro Road, West Market Street, Grinstead Avenue, Lexington Avenue, and Baxter Avenue. These changes have reduced crashes and crash severity on several of these streets.

Key benefits of road reconfiguration installations

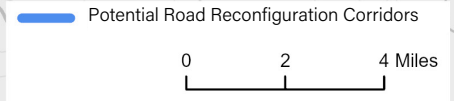
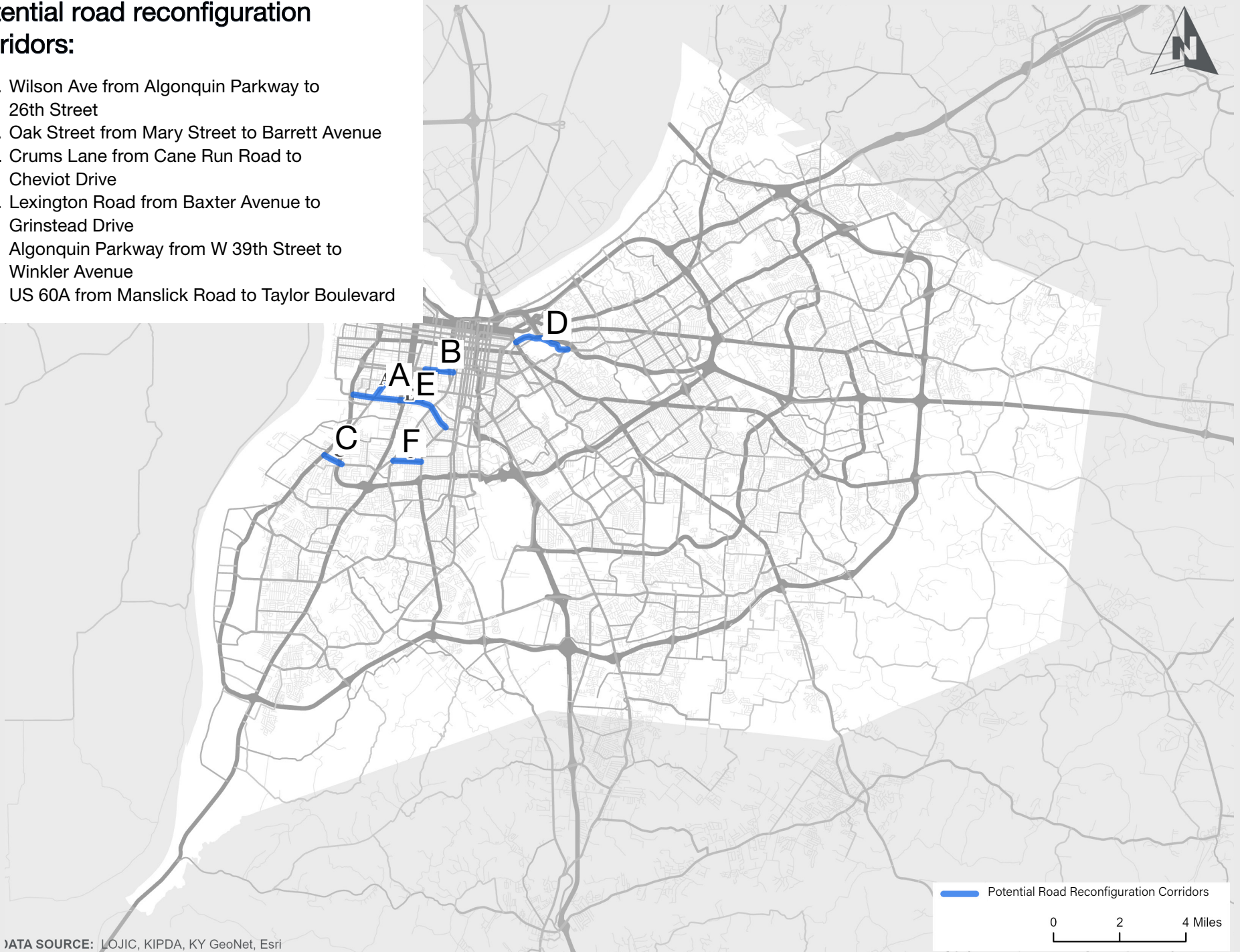
- Reduction of right-angle crashes, as side-street motorists cross three instead of four travel lanes
- Reduction of rear-end and left-turn crashes due to the dedicated left-turn lane
- Fewer travel lanes for pedestrians to cross
- Opportunity to install pedestrian refuge islands, bicycle lanes, on-street parking, and/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

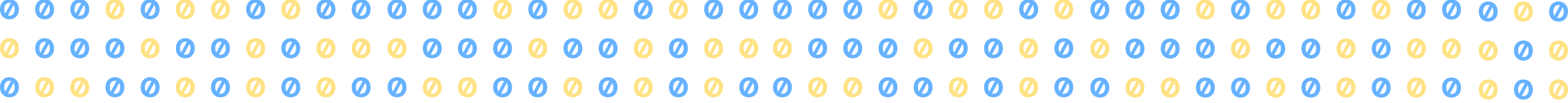


Converting a 4-lane road to a 3-lane road can reduce all crashes by 19 to 47%⁸

Potential road reconfiguration corridors:

- A. Wilson Ave from Algonquin Parkway to 26th Street
- B. Oak Street from Mary Street to Barrett Avenue
- C. Crums Lane from Cane Run Road to Cheviot Drive
- D. Lexington Road from Baxter Avenue to Grinstead Drive
- E. Algonquin Parkway from W 39th Street to Winkler Avenue
- F. US 60A from Manslick Road to Taylor Boulevard





Pedestrians

Pedestrians are the most vulnerable users on Louisville’s roadway system. Between 2013 and 2017, Louisville experienced a 68% increase in pedestrian fatal and serious injury crashes. In the U.S. during the same time period, the number of pedestrians killed in fatal crashes increased by 27%.⁹ On average, more than **FIVE** pedestrian fatal or serious injury crashes have occurred **per month** in Jefferson County over the five year study period.

In Louisville, over half of all pedestrian fatal crashes occurred in low income and minority neighborhoods. Although a majority of the pedestrian crashes were located in the urbanized downtown area, 43% of all pedestrian fatal crashes occurred on the following five routes:

- US 31W — Dixie Hwy, South 22nd Street, West Market Street
- US 31E — E Main Street, Baxter Avenue, Bardstown Road.
- KY 155 — Taylorsville Road
- KY 1020 — South 2nd Street, Southern Parkway, Southside Drive
- US 150 — Broadway
- 59% of pedestrian fatal and serious injury crashes occurred at intersections
- 56% of pedestrian fatal crashes occurred at signalized intersections.

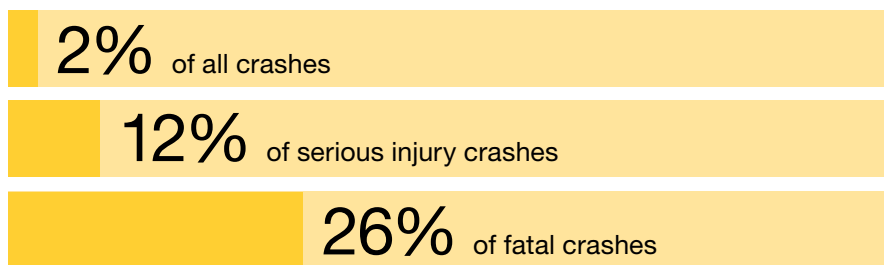
Common pedestrian crash contributing factors

- Speeding
- Distraction
- Traffic Law Violation
- Sight Distance
- Lighting and Visibility

Key countermeasures to prevent pedestrian serious injuries and fatalities

- Exclusive pedestrian phasing
- Youth educational program (i.e. Pedestrian Safer Journey)
- Pedestrian safety campaign
- Traffic law enforcement
- Community outreach program
- Traffic calming
- Roadway narrowing or lane reduction
- Signal timing improvements
- Gateway treatment for pedestrian crossings
- Pedestrian countdown signal heads
- Raised median
- Leading pedestrian interval (LPI)
- Raised refuge islands
- Remove previously warranted signals
- Lighting improvements

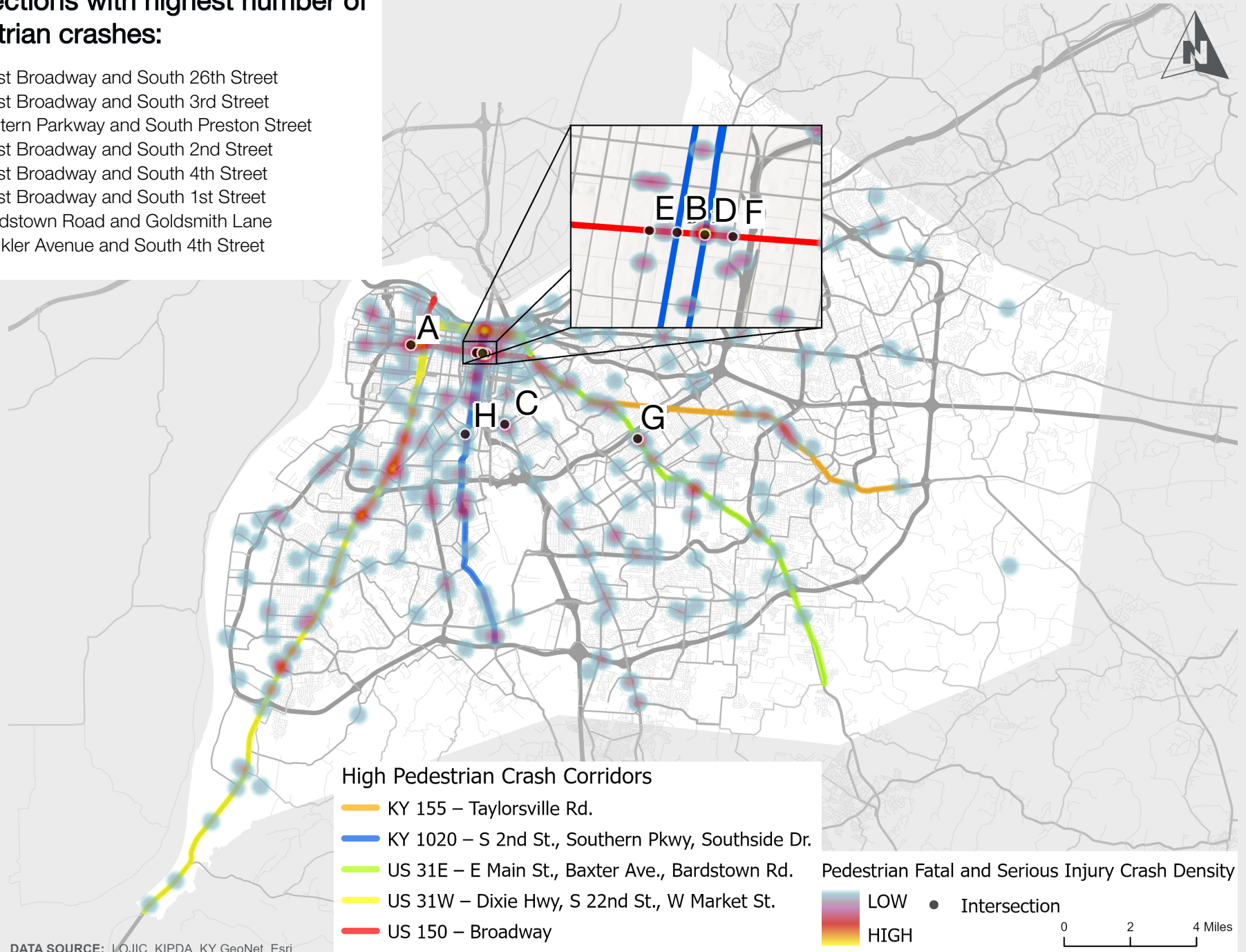
Pedestrian Crash Summary



- A restricted crossing u-turn intersection can reduce pedestrian injury and fatal crashes by 54%¹⁰
- Leading pedestrian intervals (LPI) can reduce pedestrian crashes by 60%¹¹
- Pedestrian refuge islands can reduce pedestrian crashes by 56%¹²

Intersections with highest number of pedestrian crashes:

- A. West Broadway and South 26th Street
- B. West Broadway and South 3rd Street
- C. Eastern Parkway and South Preston Street
- D. West Broadway and South 2nd Street
- E. West Broadway and South 4th Street
- F. West Broadway and South 1st Street
- G. Bardstown Road and Goldsmith Lane
- H. Winkler Avenue and South 4th Street



DATA SOURCE: LOJIC, KIPDA, KY GeoNet, Esri

Bicycles

Bicyclists are some of the more vulnerable users on Louisville's roadway system. Although Louisville experienced a 28% decrease in bicycle crashes between 2013 and 2017, the fatal and serious injury crashes remained steady; 10% of the bicycle crashes were fatal or serious injury and another 60% involved lesser injuries.

- 88% of the bicycle crashes occurred where there was not a bicycle facility.
- 92% of the fatal bicycle crashes occurred where there was not a bicycle facility.
- 62% of the bicycle fatal and serious injury crashes occurred at intersections.

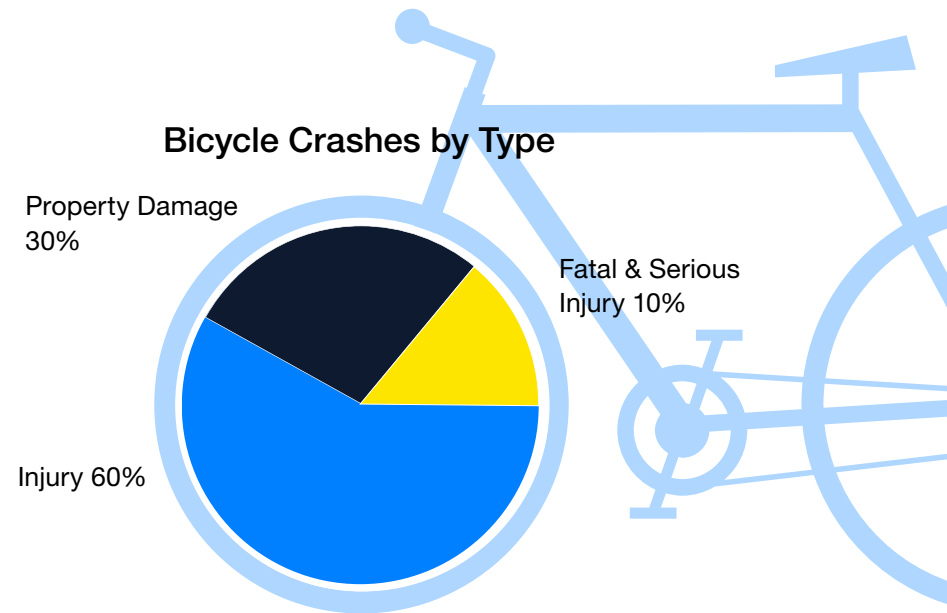
Common bicycle crash contributing factors¹³

(Based on National Data)

- Drivers failure to yield
- Bicyclists failure to yield
- Traffic law violation
- Distraction
- Lighting and visibility

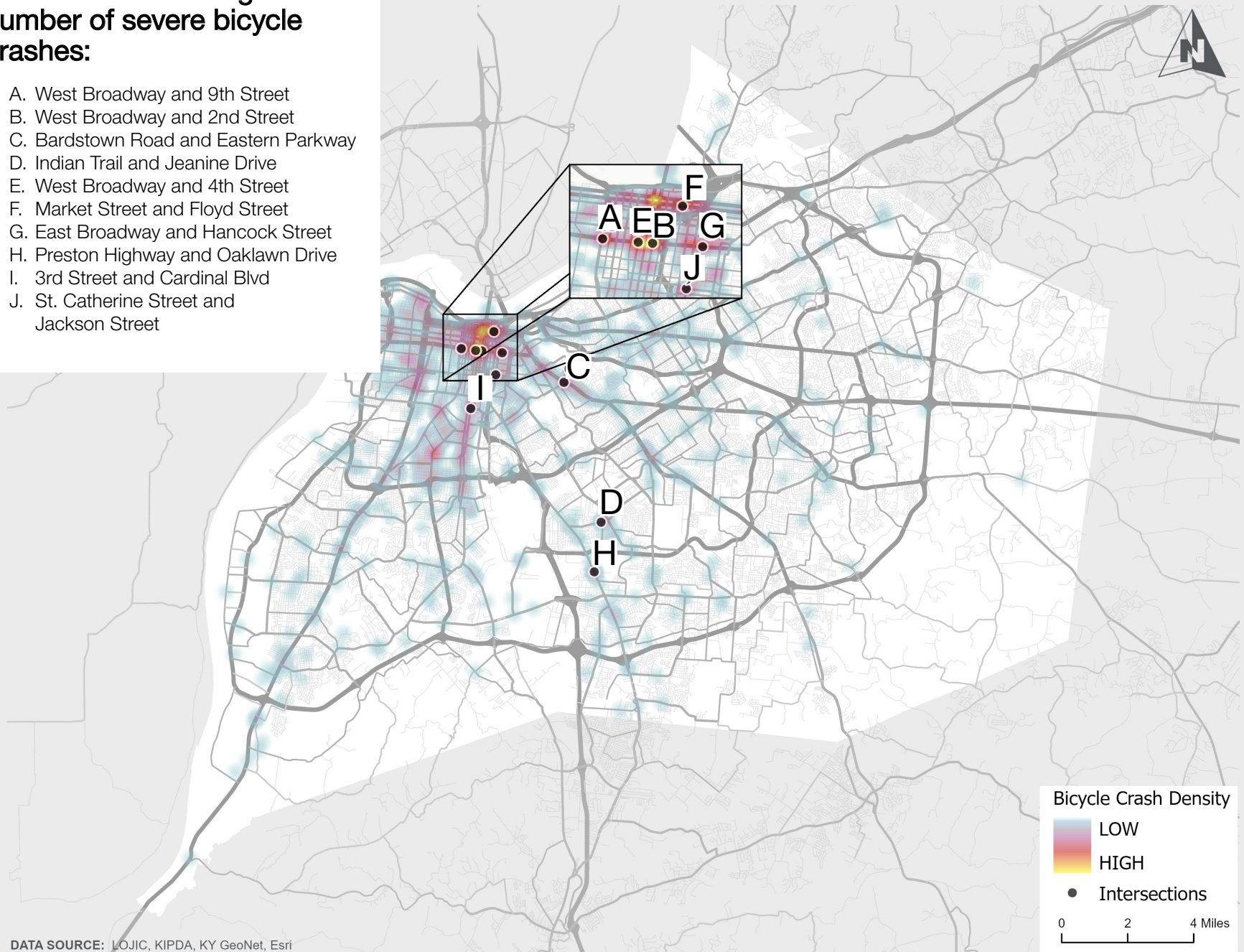
Key countermeasures to prevent bicycle serious injuries and fatalities

- Bicycle lanes
- Youth educational programs (i.e. Bicycle Safer Journey)
- Bicycle safety campaign
- Provide helmets in EJ areas
- Traffic law enforcement
- Community outreach program
- Sidewalks or shared-use paths
- Lighting improvements
- Sight distance improvements
- Raised medians and crossing islands
- Intersection pavement markings
- Bicycle signal phasing/timing
- Rectangular Rapid Flashing Beacons (RRFB)



Intersections with highest number of severe bicycle crashes:

- A. West Broadway and 9th Street
- B. West Broadway and 2nd Street
- C. Bardstown Road and Eastern Parkway
- D. Indian Trail and Jeanine Drive
- E. West Broadway and 4th Street
- F. Market Street and Floyd Street
- G. East Broadway and Hancock Street
- H. Preston Highway and Oaklawn Drive
- I. 3rd Street and Cardinal Blvd
- J. St. Catherine Street and Jackson Street

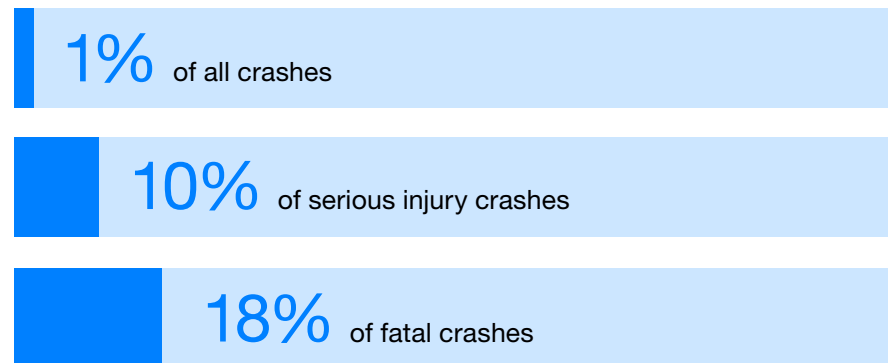


DATA SOURCE: LOJIC, KIPDA, KY GeoNet, Esri

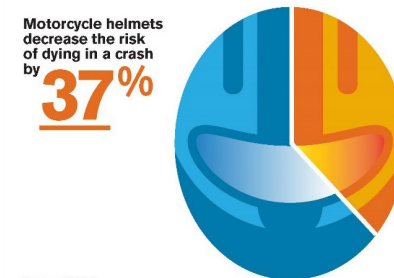
Motorcycles

Between 2013 and 2017, motorcycle crashes accounted for 13% of fatal crashes in Kentucky. Between 2013 and 2017, motorcycle crashes accounted for 18% of fatal crashes in Louisville on local and state routes. 22% of all motorcycle crashes were fatal or serious injury crashes.

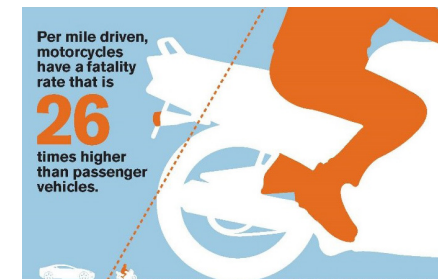
Motorcycle Crash Summary



Between 2013 and 2017, one of every six motorcycle crashes was a fatal or serious injury crash.



Source: NHTSA



Source: NHTSA

Potential countermeasures and strategies to improve motorcycle safety:

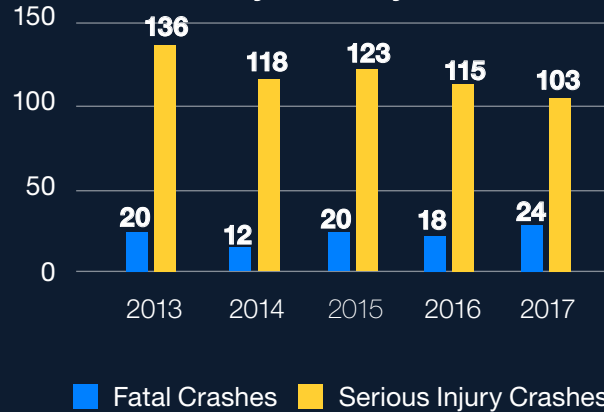
- Establish Motorcycle Coalition to identify safety improvement opportunities and promote safety
- Communicate roadway conditions for construction, maintenance, and hazardous location information with KYTC, on social media, and directly with motorcycle rider advocacy groups
- Track and investigate motorcycle crashes to determine the need for additional signage, improved friction, wider shoulders, or modification of traffic control
- Increase use of advance warning traffic control devices for motorcycle hazards
- Develop media campaigns to promote and educate on motorcycle safety
- Reference motorcycle-related safety practices and materials from other states and the federal government
- Promote and encourage motorcyclists to wear helmets that meet Federal Motor Vehicle Safety Standard (FMVSS) 218 and clothing that provides protection and visibility

New and Mature Drivers

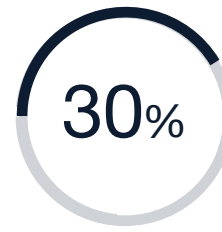
A new driver is between the ages of 16 and 20 while a mature driver is age 65 or older. While an 18% reduction in the number of new and mature fatal and serious injury crashes occurred between 2013 and 2017, these drivers were still involved in 26% of fatal crashes. In Kentucky during the same time period, 21% of drivers involved in a fatal crash were new or mature drivers.

- In 53% of the fatal and serious injury crashes, the driver was involved in an angle crash, or the driver was turning left at an intersection.
- In 59% of the fatal crashes, the driver was entering or leaving an entrance.

New and Mature Driver Crashes by Severity



New and Mature Driver Crash Summary



of all Crashes

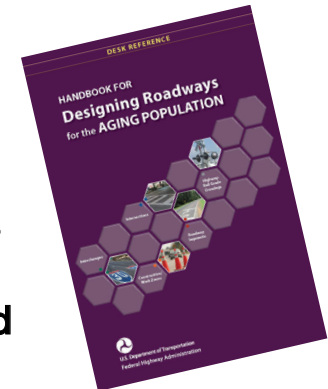


of Serious Injury Crashes



of Fatal Crashes

Potential countermeasures and strategies to improve safety for New and Mature Drivers



- Continued legislative support of Graduated License Programs (GDL)
- Support of Kentucky license screening and testing programs
- Support legislation for license renewal restrictions for mature drivers
- Update design practices to include aging population
- Enforcement of GDL and Zero-Tolerance Laws
- Enhanced pre-licensure driver training requirements
- Community outreach through AAA, social clubs, and senior living communities

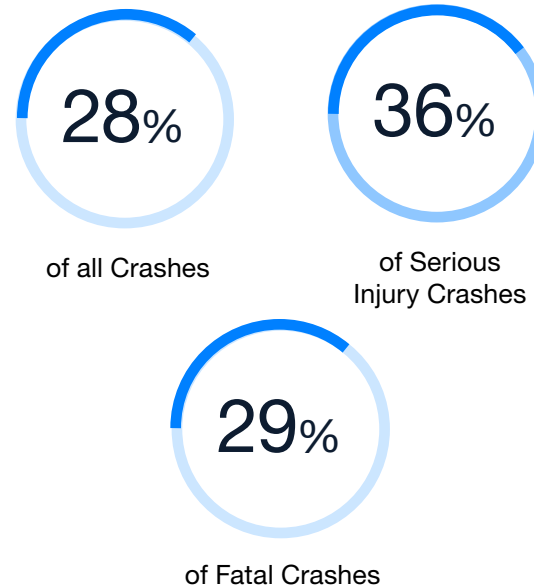
Aggressive Drivers

Aggressive driving is generally defined as actions by drivers that result in adverse safety effects on other drivers. Common aggressive driver actions include:

- Speeding
- Failing to yield right of way
- Following too closely
- Driving too fast for conditions
- Red light running
- Disregarding traffic control
- Passing improperly
- Weaving in traffic

Aggressive driving was involved in **29%** of FATAL CRASHES, which is similar to the statewide 33% during the same time period

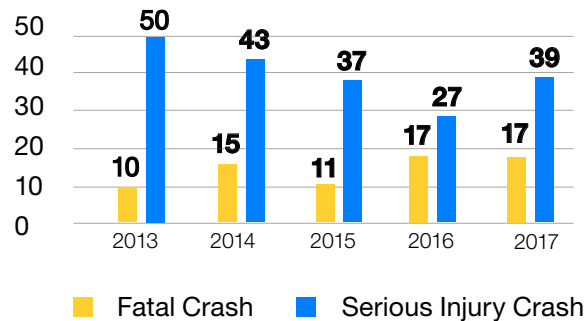
Aggressive Driver Crash Summary



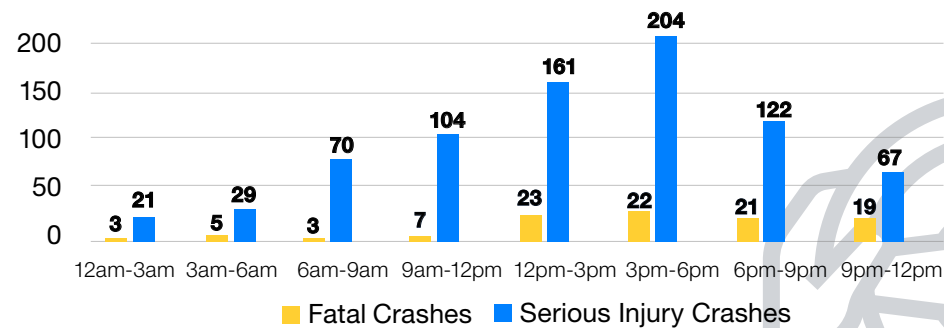
Potential countermeasures and strategies for aggressive drivers

- Educational and/or behavioral countermeasures including awareness campaigns
- Louisville Metro and KYTC Task Force to systemically lower speeds in problem areas
- Performing saturation highway patrols in aggressive driving problem areas
- Portable speed feedback trailers
- Policy/Enforcement related to handheld cellphone use bans
- Intersection monitoring for red light running and speeding

Crashes Involving Speed



Aggressive Driver Crashes by Time of Day

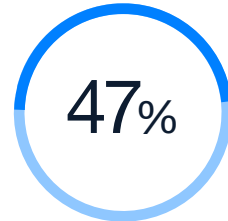


Distracted Drivers

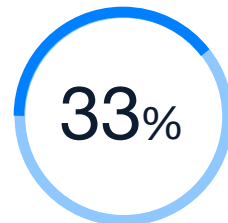
Distracted driving is any activity by the operator of a motor vehicle that has the potential to distract the operator from the primary task of driving, increasing the risk of crashing.

- **24%** of distracted fatal and serious injury crashes occurred in the evening rush hours between 3:00pm and 6:00pm.
- Distracted driving was an indicator for over **20%** of pedestrian and bicycle **FATAL AND SERIOUS INJURY CRASHES.**

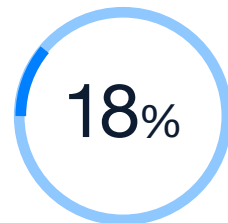
Distracted Driver Crash Summary



of all Crashes

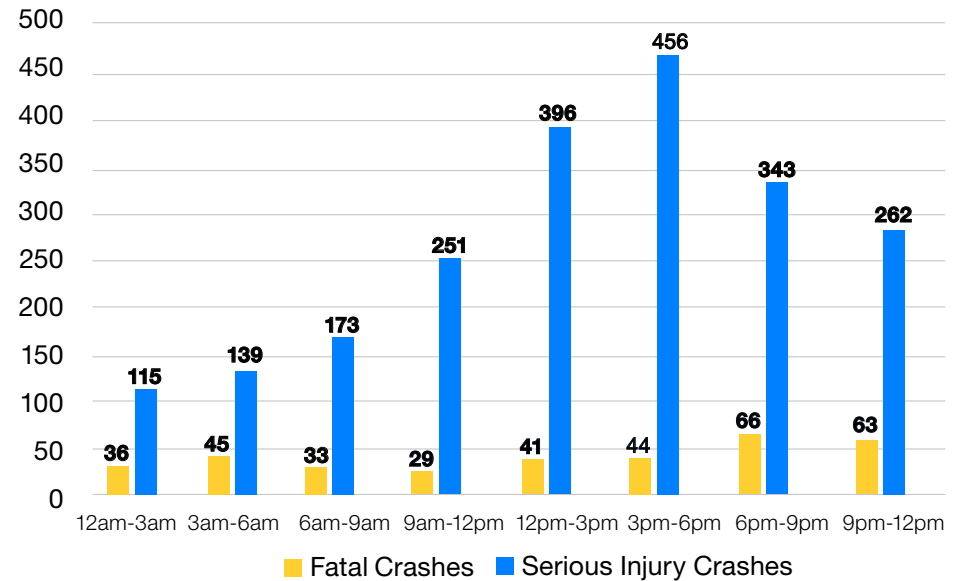


of Serious Injury Crashes



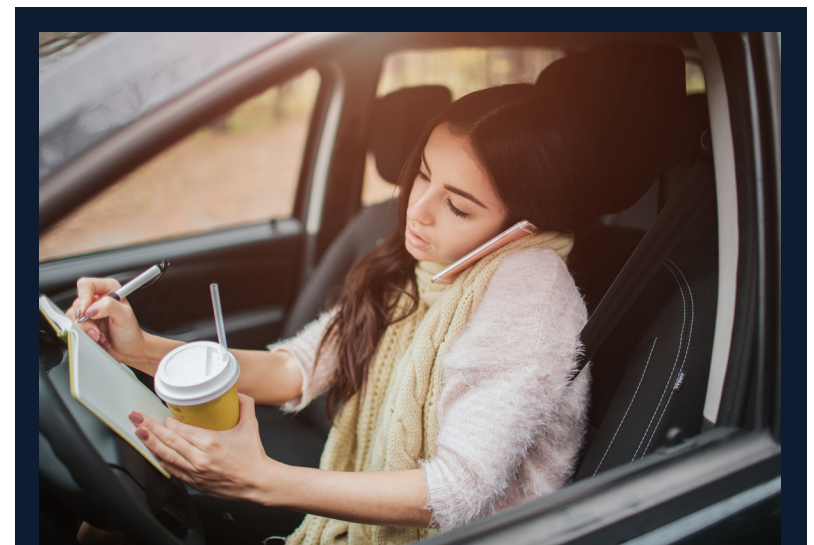
of Fatal Crashes

Distracted Driver Crashes by Time of Day



Potential countermeasures and strategies for distracted drivers

- Educational and/or behavioral countermeasures including awareness campaigns
- Policy/Enforcement related to bans on handheld cellphone use
- Target teenage drivers for texting ban enforcement
- Improve visibility of signals, signage, and delineation

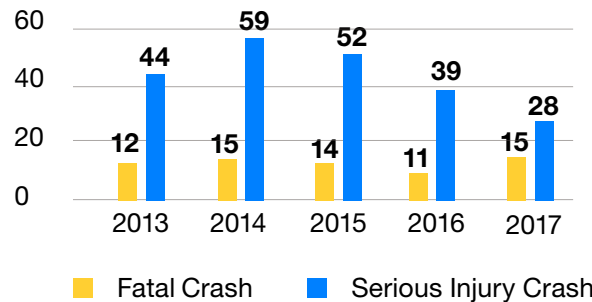


Impaired Drivers

Impaired driving is recognized as driving a motor vehicle while under the influence of alcohol or narcotics. While a reduction in the number of impaired fatal and serious injury crashes occurred between 2013 and 2017, impaired driving was still involved in 19% of the fatal crashes, which is equal to the Kentucky statewide statistic during the same time period.

- **46%** of impaired fatal and serious injury crashes occurred between 10:00 PM and 5:00 AM.
- In **25%** of the impaired fatal and serious injury crashes, a vehicle COLLIDED WITH A FIXED OBJECT.
- IMPAIRMENT was involved in **6%** of pedestrian fatal and serious injury crashes.

Impaired Driver Crashes by Severity



Impaired Driver Crash Summary



Potential countermeasures and strategies to prevent impaired driving

- Deter impaired driving through publicized traffic safety checkpoints, high-visibility saturation patrols, and perform impaired driving enforcement campaigns
- Promote mass media campaigns to educate and inform how impaired driving can injure and kill
- Encourage and support legislative strategies to enhance impaired Blood Alcohol Content (BAC) penalties, further enforcement of Driving Under the Influence (DUI) laws, and stricter prosecution of impaired driving offenders
- Establish DUI courts dedicated to changing behaviors through supervision, monitoring, and treatment
- Law enforcement training in Advanced Roadside Impaired Driving Enforcement and Drug Recognition Evaluator programs
- Alcohol and drug screening and brief intervention at emergency and trauma centers
- Train and certify Drug Recognition Experts (DREs) and provide Advanced Roadside Impaired Driving Enforcement (ARIDE) courses
- Encourage and support local community programs providing opioid/addiction assistance
- Education and training for DUI prosecutors and law enforcement
- Promote development and implementation of Alternative Transportation Programs designed to avoid driving a vehicle while impaired ¹⁴



Occupant Protection

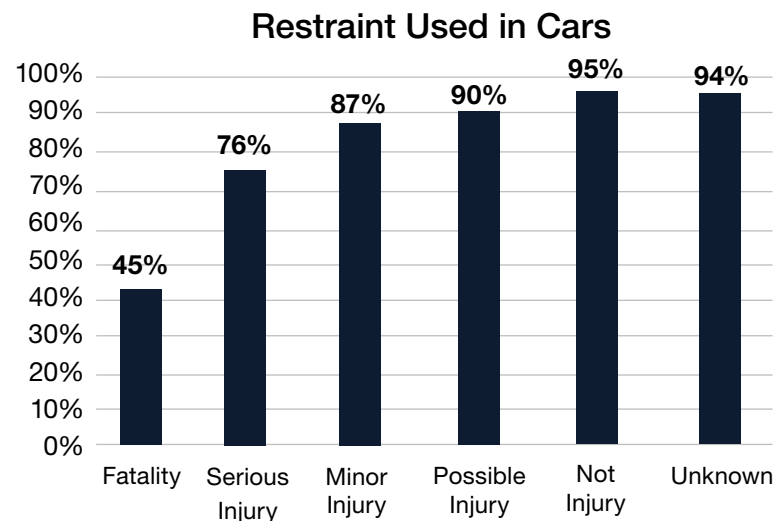
Occupant Protection involves any device which is intended for protective use in a vehicle such as a seatbelt, airbag, child safety seat or booster seat, which helps to prevent death or serious injury in the event of a collision. Nationally, seatbelt usage has increased over the last ten years, and Kentucky has seen a gradual increase in seatbelt use during this time period. In 2007, Kentucky began enforcement of the primary seatbelt law, which has resulted in a dramatic increase in usage.

The restraint crash data used for this study was based on the restraint use for drivers of vehicles in collisions. Restraint use of passengers was not available.

- A recent survey in the county determined that approximately **91%** of all front-seat occupants in Louisville Metro use their seatbelt. This is above the national average and the state average.
- **55%** of the fatalities in crashes did not use proper restraints.

Potential countermeasures and strategies for increasing use of occupant protection devices

- Continued support of occupant restraint use law and strengthening of child/youth occupant restraint laws through high visibility media campaigns
- Continued emphasis on enforcement of occupant restraint policies
- Education and outreach regarding enforcement of restraint use law and also focusing on lower-use groups
- Community outreach to employ statewide media campaigns such as Buckle Up, Phone Down campaign
- Promoting traffic safety education through programs and outreach at schools, clinics, and community events
- Partnering with businesses and car dealerships to encourage improved community usage



Restraint use reduces the risk of fatal injury in front-seat passenger car occupants by **45%**.¹⁵



Rear seat passengers are 2 times more likely to die in a crash if they are unbelted.

Source: NHTSA Fatality Analysis Reporting System, 2018 data

Environmental Justice Areas

Environmental Justice (EJ) areas evaluated in this study were developed using the KIPDA definition, which is a low-income and/or minority population in a census block that is more than twice the region’s average for those groups. A key study finding is that the crash rate per person is 2.5 times higher in these EJ areas. This outcome indicates that there is a disproportionately high number of crashes occurring in EJ areas and that these geographic areas should be an emphasis for safety improvements in Louisville.

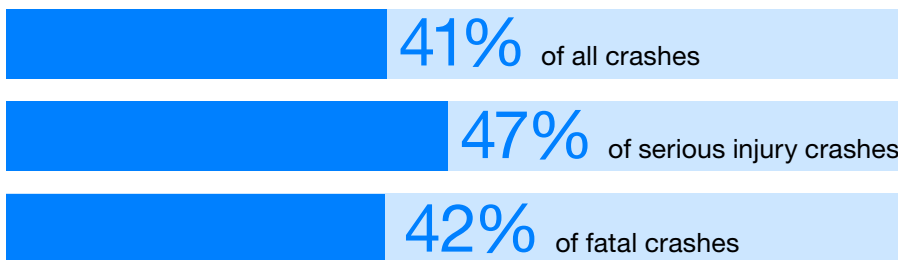
About 19% of the region is considered part of the EJ area. This includes the downtown core, much of the area west of downtown, and several southern and central areas. The fatal crash rate per population in EJ areas is almost Three times higher than in Non-EJ areas. Between 2013 and 2017, one of every two fatal or serious injury crashes occurred in an EJ area.

Although 30% of the population reside in an EJ area:

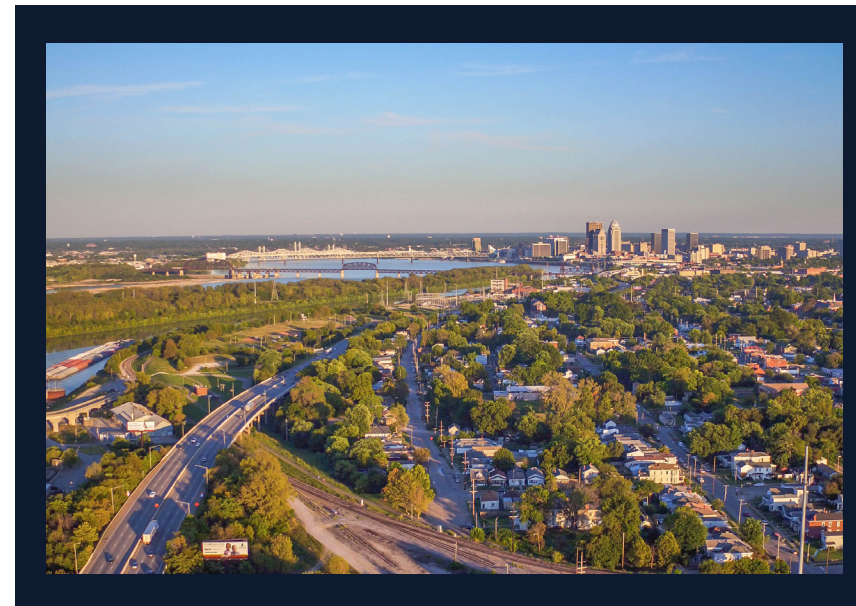
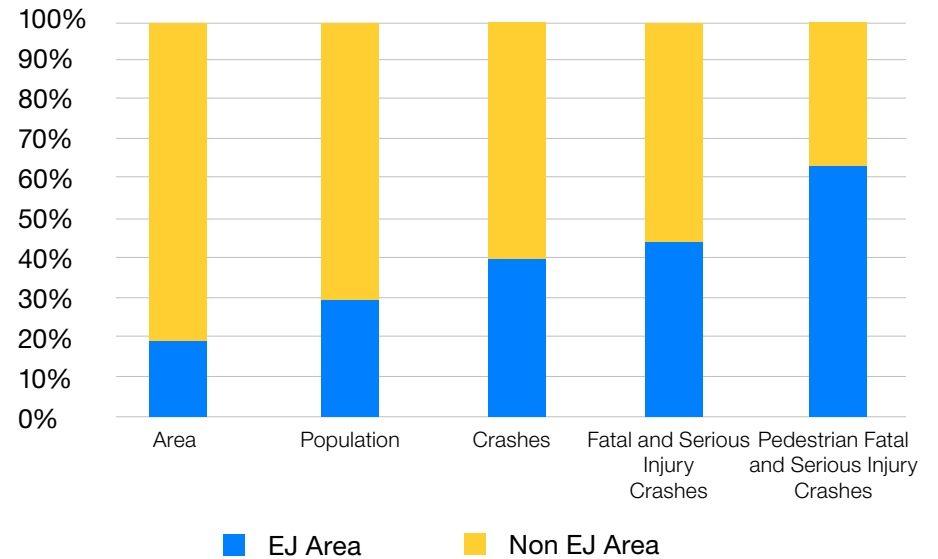
- 63% of the pedestrian fatal and serious injury crashes occurred in an EJ area
- 56% of the bicycle fatal and serious injury crashes occurred in an EJ area

As noted above, a disproportionately high number of all crashes and severe crashes occur in these portions of Louisville. This is especially true for severe pedestrian crashes.

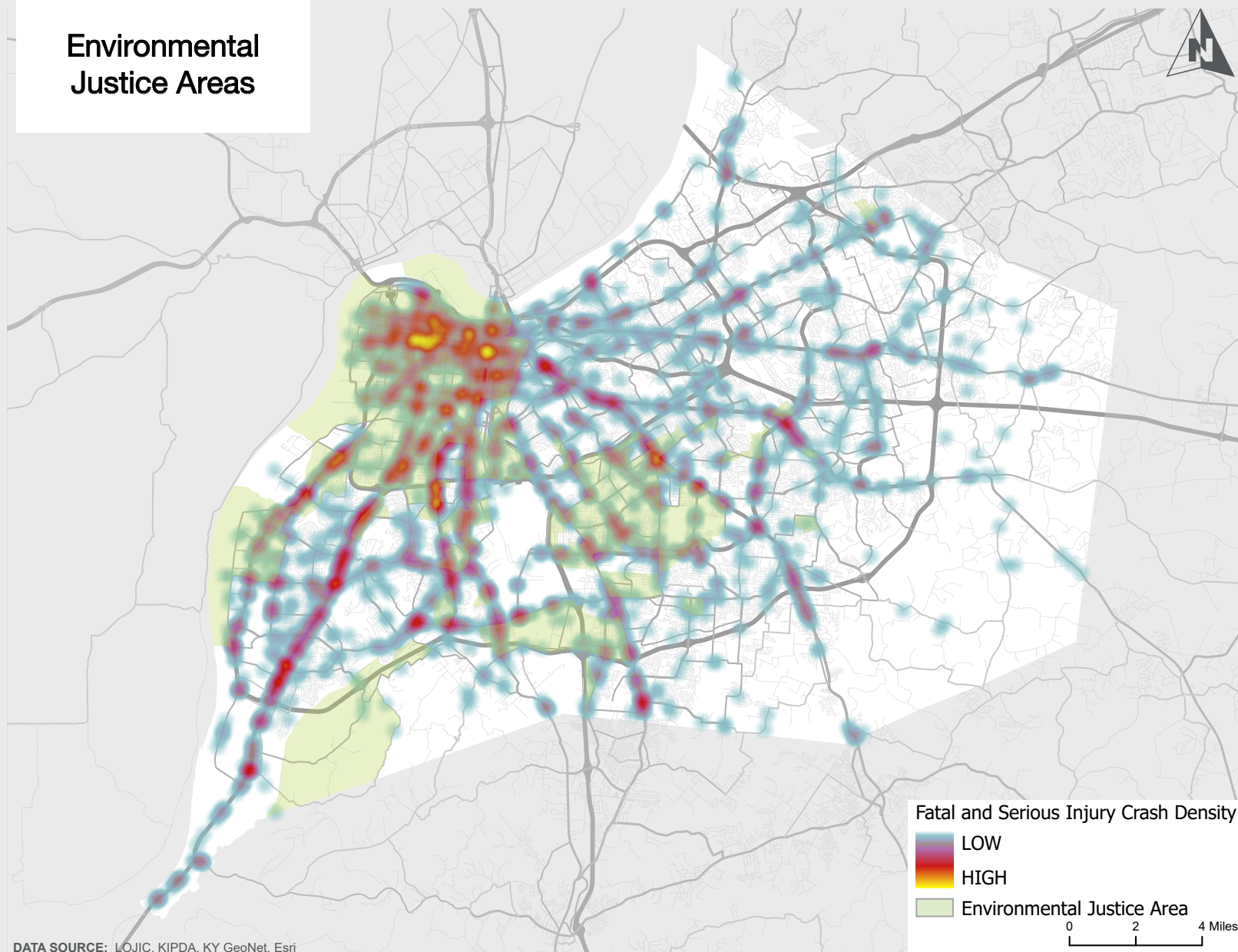
Environmental Justice Area Crash Summary



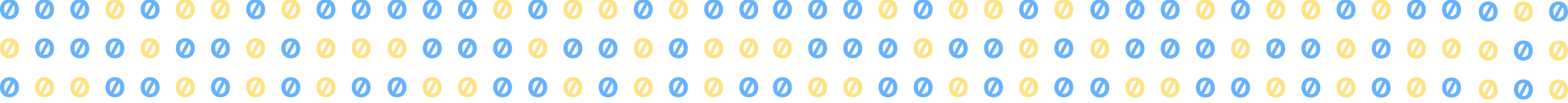
Environmental Justice Area Comparison



Environmental Justice Areas



DATA SOURCE: LOJIC, KIPDA, KY GeoNet, Esri



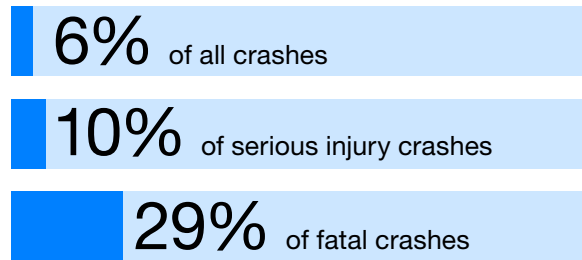
Lighting

Data for documenting adequate lighting on Louisville's roadways is limited. Although street lighting is present along some of the city's roadways, there are opportunities to improve lighting to provide safe nighttime visibility. At intersections, 22% of all crashes occurred during dark conditions (no lighting), while 33% of fatal and serious injury crashes occurred during dark conditions.

Reduced visibility during low light conditions is less safe for pedestrians walking along and across a roadway. 48% of all pedestrian crashes and 85% of pedestrian fatal crashes occur during low visibility conditions.

Between 2013 and 2017, one of every seven fatal or serious injury crashes occurred during dark conditions.

Summary of Crashes Involving Poor Lighting

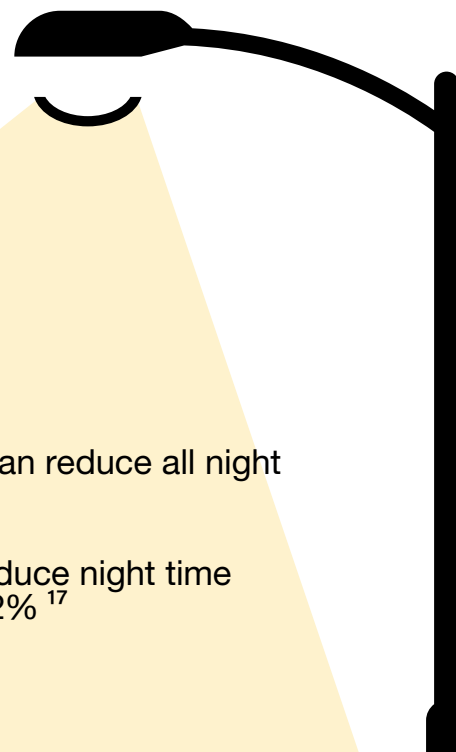


Potential countermeasures and strategies to prevent nighttime crashes

- Improve existing street and intersection lighting
- Incorporate illumination of the sidewalk in lighting design where appropriate
- Safety campaign focused on improving pedestrian nighttime safety and visibility by wearing reflective materials and using a flashlight
- Community education about nighttime visibility

Low Visibility (non daylight)

Traveling during the nighttime, or times of low visibility, is less safe, especially for pedestrians. For this study, the data revealed that 30% of all crashes and 40% of fatal and serious injury crashes occurred during times of low visibility.

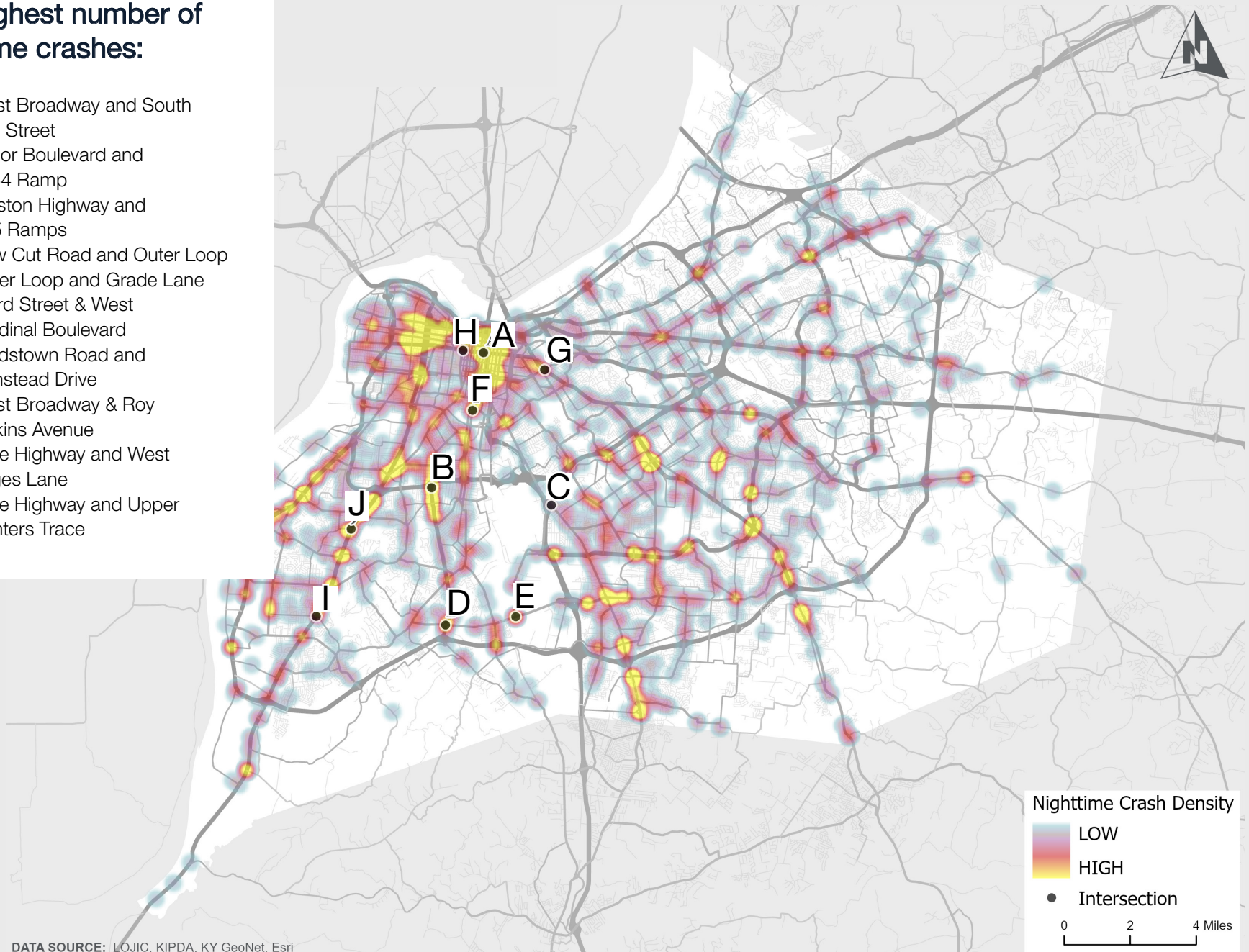


- Installing intersection lighting can reduce all night time injury crashes by 29% ¹⁶
- Intersection illumination can reduce night time pedestrian injury crashes by 42% ¹⁷



Signalized Intersections with highest number of nighttime crashes:

- A. West Broadway and South 2nd Street
- B. Taylor Boulevard and I-264 Ramp
- C. Preston Highway and I-65 Ramps
- D. New Cut Road and Outer Loop
- E. Outer Loop and Grade Lane
- F. S 3rd Street & West Cardinal Boulevard
- G. Bardstown Road and Grinstead Drive
- H. West Broadway & Roy Wilkins Avenue
- I. Dixie Highway and West Pages Lane
- J. Dixie Highway and Upper Hunters Trace



DATA SOURCE: LOJIC, KIPDA, KY GeoNet, Esri

A Systemic Approach to Safety

The evaluation of safety has changed substantially over the last several decades. The traditional reactive approach of evaluating historic crash data to identify specific locations with safety challenges is still being used, but a new complementary systemic approach has evolved. Combining these two approaches together results in a more comprehensive safety management program.

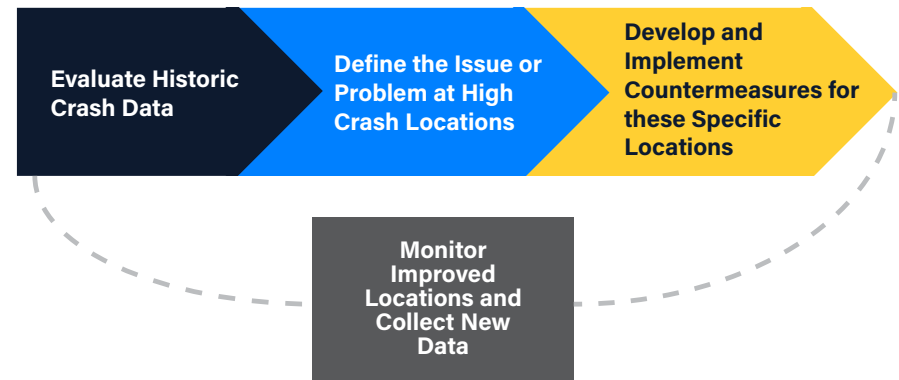
A **systemic approach** is a broader view that takes into account factors that contribute to crashes across the system as a whole. This method looks for trends and common characteristics, such as geometry or traffic volume, associated with where severe crashes have occurred. This process evaluates an entire system using a defined set of conditions to identify candidate locations for safety investments to prevent the occurrence of, and the potential for, severe crashes.

An example of the systemic approach is the evaluation of a highway system to determine the risk factors for cross-median crashes on divided highways with grass medians. Once those factors have been identified (e.g. median width, curvature, traffic volumes, speeds, etc.) then the system can be prioritized, and cable barrier or some other treatment could be installed across the portions of the system that have those risk factors, regardless of whether they have experienced cross-median crashes in the last five years.

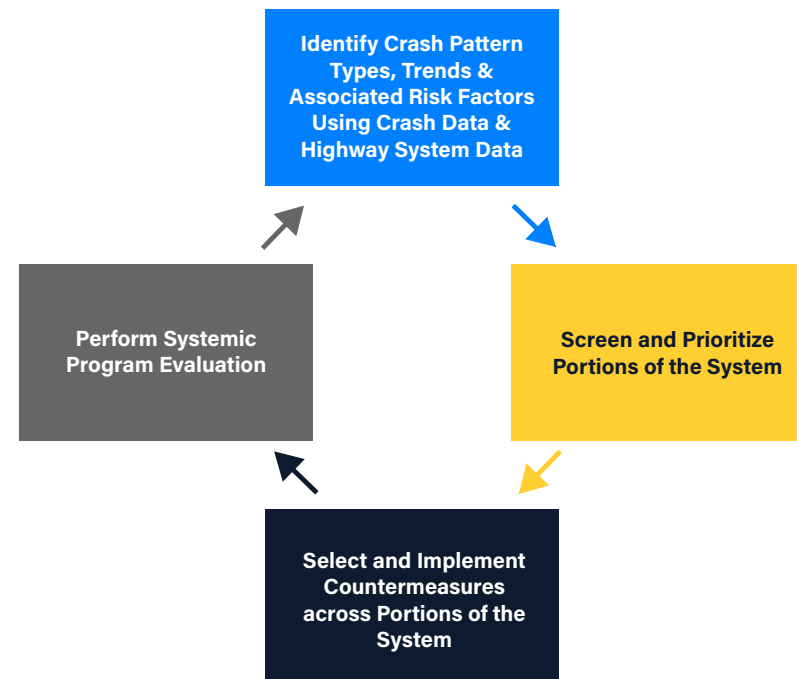
A **reactive approach** involves three main steps: evaluating historic crash data, defining safety challenges, and developing and implementing safety improvement opportunities that address the specific safety challenges.



Traditional Reactive Approach to Safety



Systemic Approach to Safety



Risk Factors

As part of the crash analysis, roadway characteristics were evaluated to identify trends and risk factors common to where crashes occurred. This involved examining the entire non-interstate street and highway system in Louisville considering factors such as numbers of lanes, speed limits, curvature, and volume. The following risk factors were identified through this process.

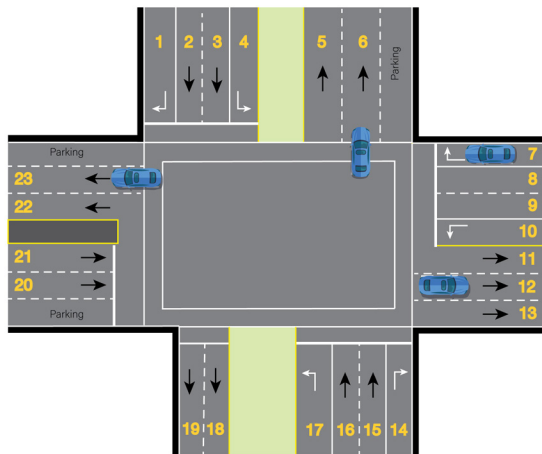
Locations Within Environmental Justice Areas

The analysis indicated that streets and intersections in EJ areas of the community were associated with much higher crash rates than the rest of Louisville. This includes both high severity and pedestrian crashes. Therefore, being in an EJ area was determined to be an important risk factor that applies to all facility types and risk categories.

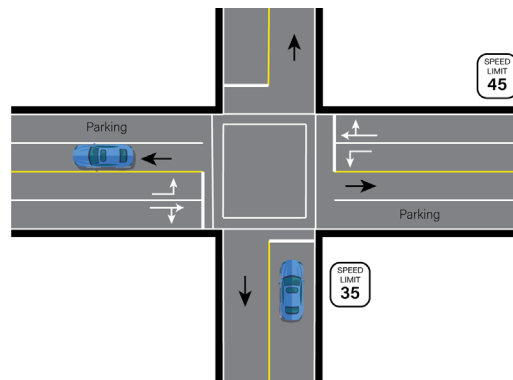
Signalized Intersections

1. Involving two-way streets where the total number of approach and departure lanes is 13 or more.
2. Involving two-way streets with at least four approaches and a minimum posted speed of 35mph.
3. Involving one-way streets where the total number of approach and departure lanes is 9 or more.
4. Where the volumes are not high enough to warrant a traffic signal.

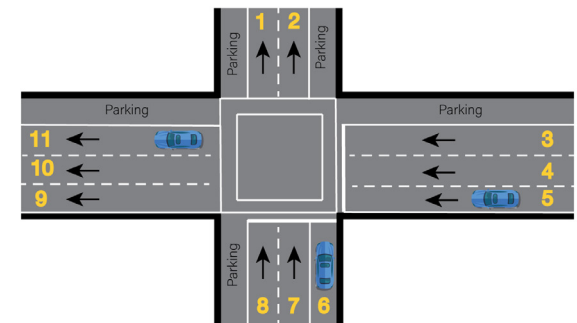
Signalized Intersection Risk Factor 1



Signalized Intersection Risk Factor 2



Signalized Intersection Risk Factor 3

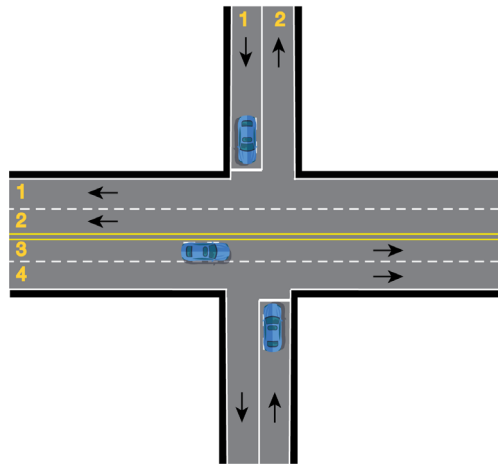




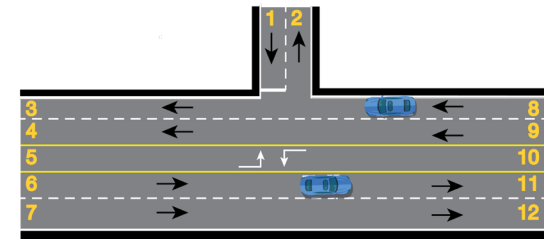
Unsignalized Intersections

1. Where the major street has 4 or more approach lanes and the minor street has 2 approach lanes.
2. Three-leg intersections where the total number of approach and departure lanes is 9 or more
3. Involving one-way streets, excluding ramp intersections.
4. Four-leg approaches where the total number of approach and departure lanes is 13 or more*
5. Involving only two-way streets where the total number of approach and departure lanes is between 8 and 12
6. Four-leg approaches with speed limits between 35mph and 45mph

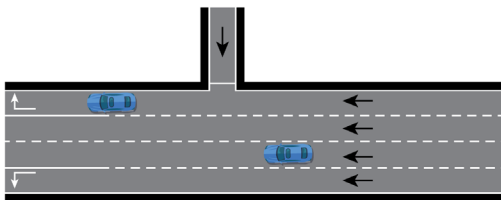
Unsignalized Intersection Risk Factor 1



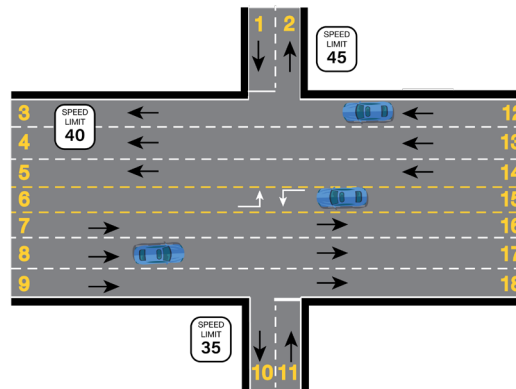
Unsignalized Intersection Risk Factor 2



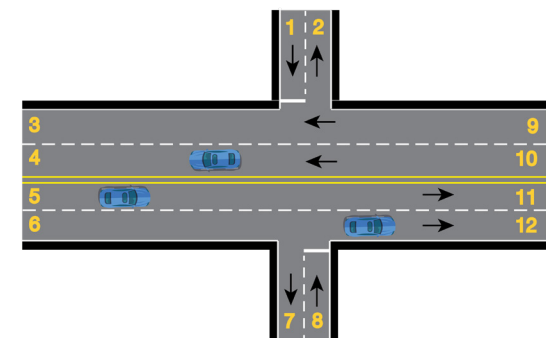
Unsignalized Intersection Risk Factor 3



Unsignalized Intersection Risk Factor 4 and 6



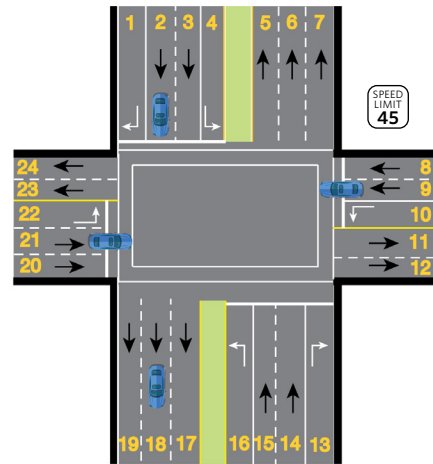
Unsignalized Intersection Risk Factor 5



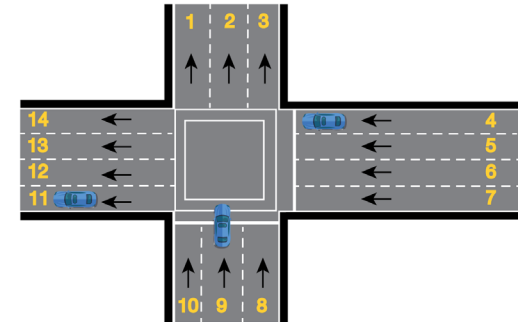
Signalized Intersections involving Pedestrians

1. Maximum posted speed limit between 40 and 50 mph
2. Involving only two-way streets with total approach and departure lanes of 17 or more
3. Involving only one-way streets with total approach and departure lanes of 11 or more
4. Involving median divided roadway with total approach and departure lanes of 13 or more
5. Involving intersections with four or more auxiliary lanes

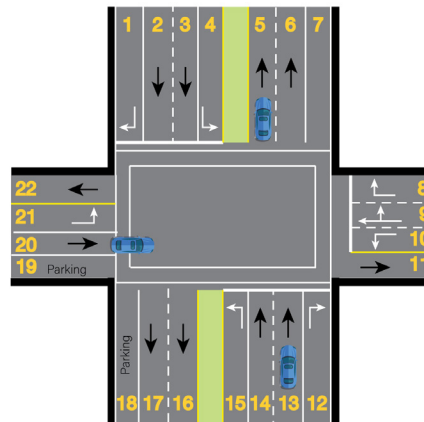
Signalized Intersection Involving Pedestrians Risk Factor 1 and 2



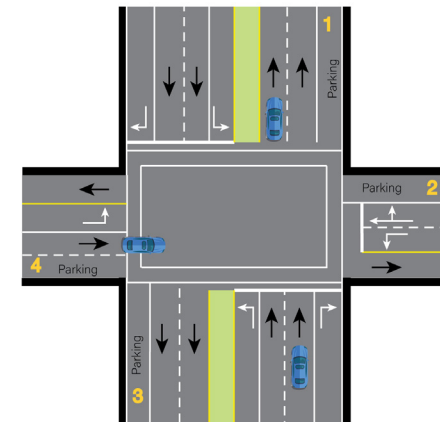
Signalized Intersection Involving Pedestrians Risk Factor 3



Signalized Intersection Involving Pedestrians Risk Factor 4



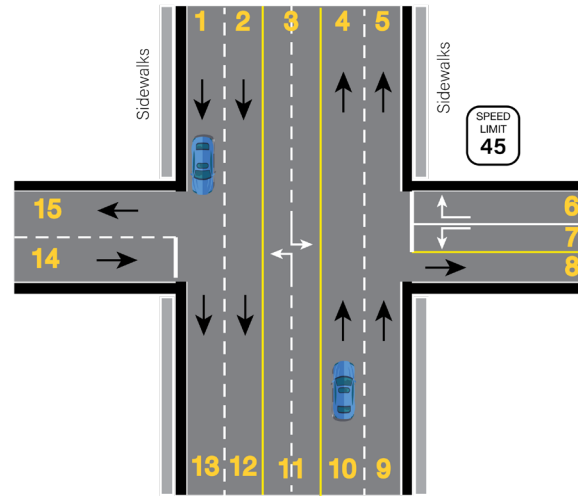
Signalized Intersection Involving Pedestrians Risk Factor 5



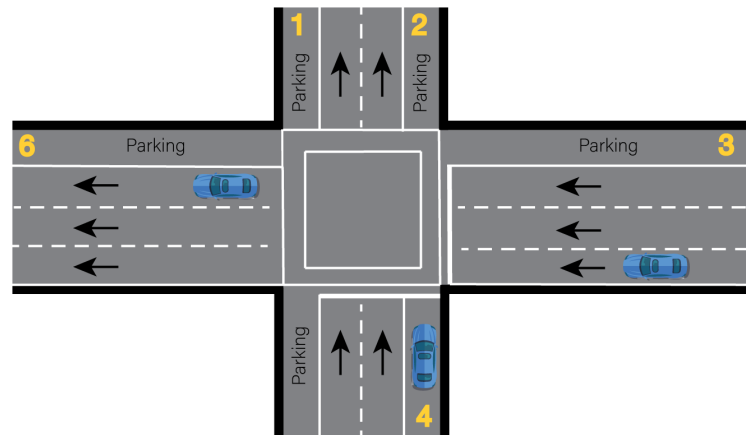
Unsignalized Intersections involving Pedestrians

1. Four approach legs
2. Total number of approach and departure lanes is equal to 10, 12 or 14
3. Maximum speed for any leg is 35mph to 45 mph
4. Three or more auxiliary lanes
5. Involving a divided or one-way street

Unsignalized Intersection Involving Pedestrians Risk Factor 1, 2, and 3



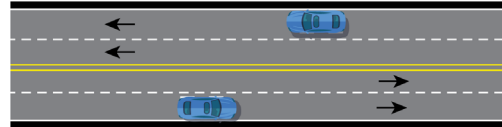
Unsignalized Intersection Involving Pedestrians Risk Factor 4 and 5



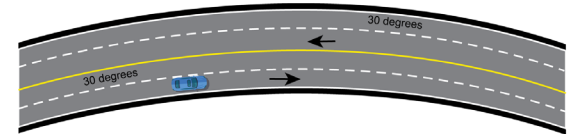
Street Segments

1. Four lanes with 8,000 to 17,000 vehicles per day
2. One-way streets
3. Two-way streets with 4 lanes
4. Streets with between 5 and 12 lanes
5. Lane width of 10 feet or less
6. Curve degree is greater than 7.0
7. Posted speed limit of 50 mph or higher
8. Streets with 2 lanes and 6,000 or fewer vehicles per day

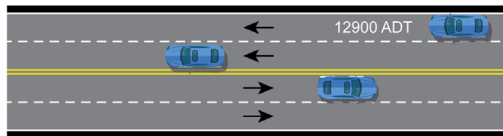
Street Segment Risk Factor 3



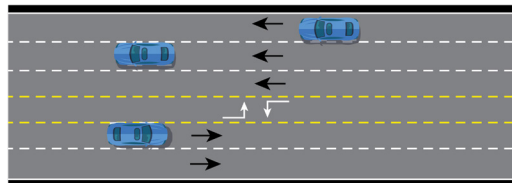
Street Segment Risk Factor 6



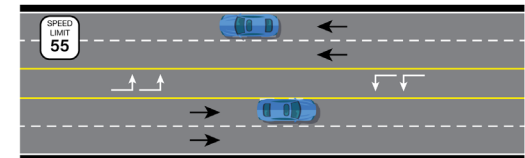
Street Segment Risk Factor 1



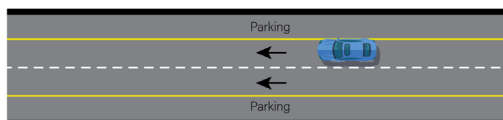
Street Segment Risk Factor 4



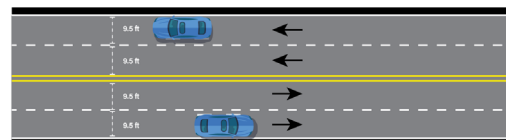
Street Segment Risk Factor 7



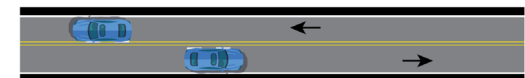
Street Segment Risk Factor 2

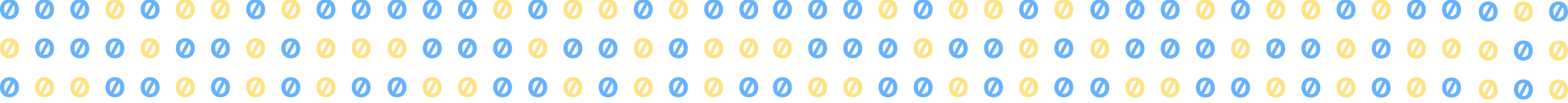


Street Segment Risk Factor 5



Street Segment Risk Factor 8





Measuring Success and Monitoring Progress

Vision Zero requires a continuous evaluation and reporting process with flexibility to embrace new technologies and trends in the safety field. The Vision Zero Coalition meets regularly to evaluate crash trends and discuss the implementation of improved safety measures for all users of the transportation network. This Vision Zero Safety Report will require yearly plan updates using a data-informed process to monitor progress on the implementation strategies and actions. Measurable goals have been established based on the four implementation strategies to ensure accountability that progress is being made and that time frames are being met.

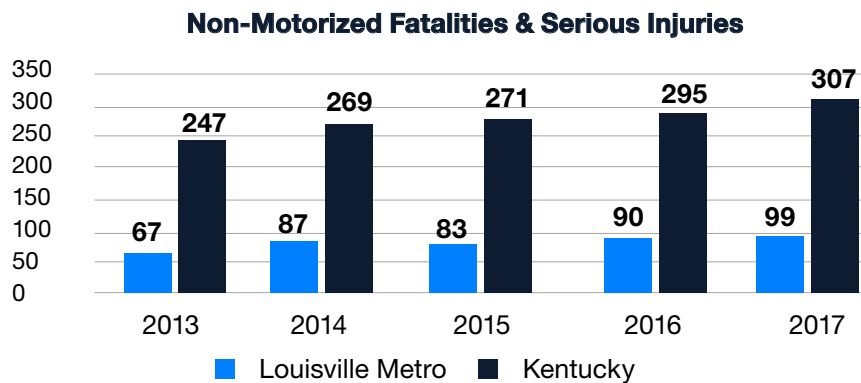
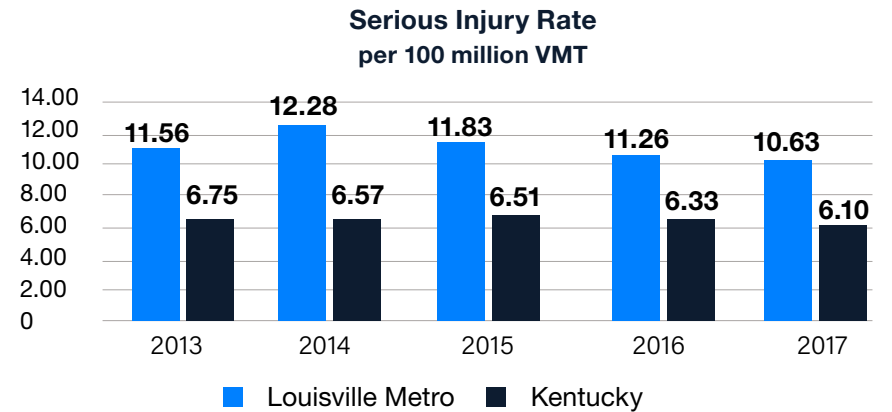
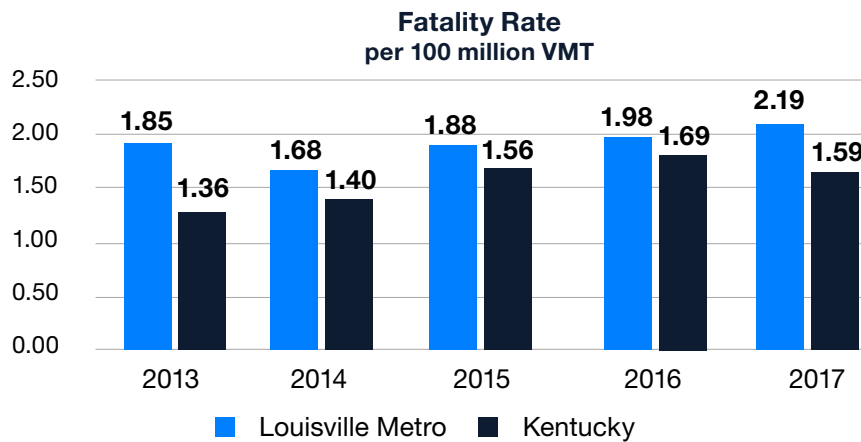
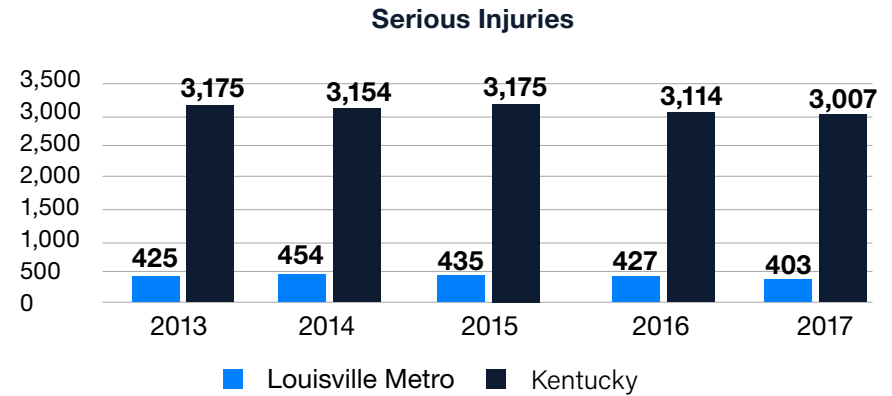
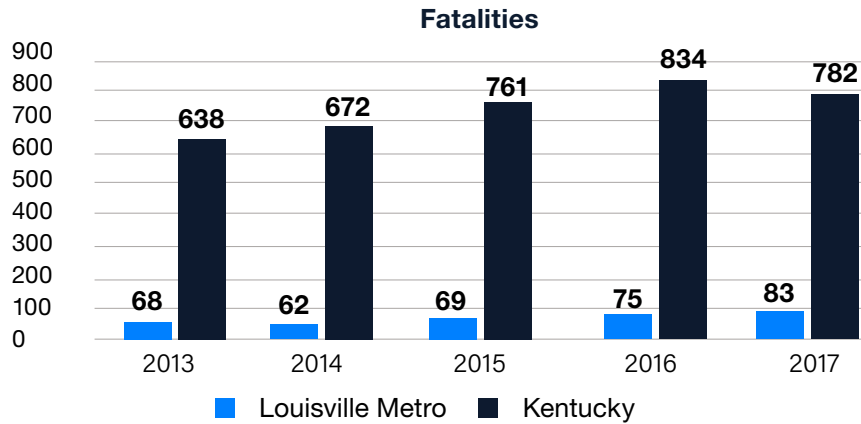
The Vision Zero Coalition will report periodically to Louisville Metro leadership, KIPDA, other community partners, and KYTC Office of Highway Safety on the year's progress in meeting these goals. It is important to note that improvements made under one implementation strategy will also provide benefits to other implementation strategies.

The United States Department of Transportation (USDOT) has adopted five annual safety performance measures to report on the overall progress of safety plans. In Kentucky's 2020-2024 Statewide Highway Safety Plan, the KYTC Office of Highway Safety reported on the performance of each of these overarching measures to provide context of the long-term trends for the state. The five measures adopted by the USDOT include:

Annual Safety Performance Measures

Fatalities	The number of persons killed in crashes on all public roads in a calendar year.
Fatality Rate	The number of persons killed in crashes per 100 million vehicle miles traveled (VMT) in a calendar year.
Non-Motorized Fatalities and Serious Injuries	The number of pedestrian and bicyclists killed or seriously injured in crashes involving a motor vehicle on all public roads in a calendar year.
Serious Injuries	The number of persons seriously injured in a calendar year.
Serious Injury Rate	The number of persons seriously injured in crashes per 100 million VMT in a calendar year.

The following five graphs show the 2013-2017 Louisville Metro non-interstate values for each performance measure within the context of Kentucky's statewide numbers and rates provided. Kentucky statewide numbers include interstate crashes.



Summary of Metro Trends

The Fatalities and Fatality Rate have trended upward in Louisville from 2013 to 2017, similar to statewide trends in Kentucky. Non-motorized fatalities and serious injuries have trended upward more quickly in both Louisville and statewide during the period. Louisville experiences about 10% of the fatalities statewide, but when adjusted for VMT, the Louisville area has a much higher fatality rate than Kentucky as a whole. Serious injuries are a greater percentage in Louisville with roughly 13% of the serious injuries in the state. The Serious Injury Rate has approached twice the statewide average compared to Kentucky. Louisville's share of Non-Motorized Fatality and Serious Injury crashes is closer to 30% of the total in Kentucky, leading to the emphasis this plan places on multi-modal safety.

Engagement and Communication

In 2018, a coalition of stakeholders began meeting regularly to strategize on how to prevent traffic fatalities in Jefferson County. In 2020, this group became known as "Vision Zero Louisville". Expanding this coalition will be critical to meeting the goals of the Vision Zero Safety Report. Through community outreach and engagement regarding the philosophies and benefits of the Vision Zero movement, Louisville Metro will strive to prevent fatalities. Vision Zero Louisville is broad based with members of multiple organizations including:



Engaging and listening to the public is a major focus of the Implementation Strategies provided. The effective gathering of opinions from and collaboration on solutions with the public will become the foundation from which plan success will grow.

Celebrating the achievements of the Vision Zero Safety Report will help the community see the benefits of improved driver behavior and engineering

projects that make impactful changes to safety. Whether it is educating the public why low-cost improvements were made to a series of high risk intersections or the conversion of a four-lane street to a three-lane street with enhanced pedestrian and bicycle safety features, it is beneficial to make the public aware of activities and initiatives Louisville Metro is focused on related to safety.

This Vision Zero Safety Report is the first step in beginning to establish a dialogue with the community regarding strategies aimed at improving safety for users of the Louisville transportation area network. On-going communication will be a central element in advancing the Vision Zero initiative in Louisville. As Louisville Metro works towards implementing the strategies in this document, communication efforts and tools related to Vision Zero Louisville will focus on:

Education- Key findings in this report and supporting analysis provides information that can be used to help the public and stakeholders understand areas of opportunity and the need to focus on safety improvements related to the transportation network. Additionally, Louisville Metro will partner this information with technical guidance from other national sources regarding safety trends and improvement strategies. This information will be stored on the Vision Zero Louisville website (VisionZeroLouisville.org) and can be referenced in social media.

Facilitating Collaboration- The goal of Vision Zero Louisville includes making measurable progress on safety and will be best achieved with broad community and stakeholder support. Louisville Metro will work to expand the Complete Streets Coalition and use that group to help to continue to develop broad community support for

focusing efforts to prevent fatalities and serious injury crashes in the Louisville area.

Strategy Implementation- Several of the strategies outlined in this document involve changes in human behavior, such as Distracted Driving, which will be best achieved by engaging with the public regarding modifying specific behaviors. Targeted social media campaigns will be developed and implemented using Louisville Metro's Facebook and Twitter accounts. Additionally, Louisville Metro will work with

community leaders who have active social media accounts to broaden the audience reached by targeted campaigns.

Performance Assessment- A key aspect of this initiative includes measuring progress towards achieving goals. Louisville Metro will utilize the Vision Zero Louisville website to provide updates on progress towards goals. These updates will also be periodically shared on social media.

<https://www.facebook.com/VisionZeroLouisville>
 Twitter: @VisionZero_Lou



Vision Zero

Recommended Strategies

The goal of reaching zero deaths on the Louisville transportation network will require a multi-faceted approach with numerous partners and embracing a Safety Culture in the city. By bringing together the Kentucky Office of Highway Safety, the Kentucky Transportation Cabinet, Louisville Metro Government, and a myriad of community partners, the city will make significant progress in achieving that goal. Louisville has already formed a Road to Zero Coalition that has been meeting regularly for over two years to increase the emphasis on transportation safety.

Reducing fatal crashes will be best served by implementing a systemic data-driven approach. The systemic data-driven approach recognizes that human error is inevitable and strives to reduce the potential for crashes and limit the severity of the crashes when an error is made.

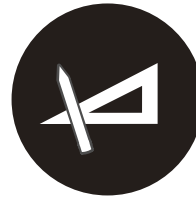
Reducing crash severity involves a focus on all users of the network, particularly the most vulnerable users - pedestrians, bicyclists, and motorcyclists. The implementation of safety improvements should not be viewed as a trade-off between safety and mobility. Increasing the visibility of pedestrians and bicyclists or improved lighting can provide substantial safety benefits. Crash severity can also be mitigated by increasing the spacing of turning movements, improving sight distance, reducing conflict points, and minimizing right-angle crashes.

Implementation Strategies And Actions

Using the areas of opportunity established through a data-informed process of reviewing the detailed five-year crash data from 2013 to 2017, a series of Implementation Strategies have been formed. These Implementation Strategies are divided into four main objectives as follows:

- Improve Multi-Modal Safety
- Improve Roadway Network
- Improve Environmental Justice
- Improve Human Behavior

Each Implementation Strategy contains a series of action items with measurable goals to track their success over time. These Action Items are intended to be flexible in their use so that new data, new ideas, and improved funding sources will guide revisions to the Implementation Strategies. The use or impact on the 4 E's of Safety are included in the recommended strategies to emphasize the roles of each area.



Engineering



Education



Emergency Services



Enforcement

Improve Multi-Modal Safety

Metro Louisville has a considerable over representation of fatal and serious injury crashes for multi-modal users in Kentucky due to a higher usage of these modes of travel, including motorcycles. The Improve Multi-Modal Safety Implementation Strategy is focused on these vulnerable users. The severity of crashes for multi-modal users is also extremely high in the Louisville area.

Both systemic (high risk) and reactive (high crash) Action Items are included in this Implementation Strategy with targets for improving multiple intersections in the city each year. The Improve Multi-Modal Safety Implementation Strategy involves all of the 4 E's of Safety in various ways. Selected four-lane streets with lower daily traffic volumes (ADT) are candidates for road reconfigurations that reduce from four lanes to either two or three lanes and provide bicycle lanes or enhance pedestrian opportunities while reducing the crossing distance for pedestrians to limit their exposure to traffic.

Prioritized lists with candidate project locations are included in the Technical Appendix for several of the action items.

Improve Roadway Network

Improve Roadway Network strategies and actions focus on roadway design and traffic operations to improve safety. The Improve Roadway Network strategy will use a data-informed approach along with agency and community feedback to prioritize

project investments. Most of the action items under Improve Roadway Network pertain to the Engineering area.

Improve Roadway Network strategies and actions will focus on areas of opportunity and risk factors identified in the data informed process and analysis. Intersections are the main focus of this area given the high severe crash rate at intersections in Louisville. Both systemic (high risk) and reactive (high crash) initiatives are included with a higher emphasis on signalized intersections. Some of the systemic action items involve low-cost improvements to an entire corridor, such as installing reflective backplates at multiple consecutive intersections. Higher cost, innovative intersection treatments, such as mini-roundabouts and RCUT treatments are also included to reduce conflict points for more prevalent fatal and serious injury crash locations. Prioritized lists of candidate project locations are included in the technical appendix for several of the action items.

Improve Environmental Justice Areas

The strategy of Improving Environmental Justice Areas is a recognition of the disproportionate number of fatal and serious injury crashes that fall in Census areas described as Environmental Justice Areas. The implementation of this Vision Zero Safety Report must place an emphasis, both in engagement and in funding, on improving safety for all users in these high-risk areas.

Placing an emphasis on Environmental Justice Areas of Louisville will be the first critical step in gaining community buy-in for achieving the goals of Vision Zero.

Improve Human Behavior

The Improve Human Behavior Implementation Strategy includes an emphasis on preventing crashes including human error and lessening the crash severity. This strategy is more education and enforcement based with a focus on providing information to the community through a multimedia platform including social media, traditional television and radio outlets, and direct community and school system contacts.










Major areas of opportunity are Distracted, Impaired, and Aggressive Driving. Partnerships with local public and private schools aimed at new drivers will be important to educate at the earliest stages emphasizing defensive driving habits. Effectively collecting community input and providing progress will be instrumental in creating a safety culture in Louisville.

Excessive speed is a major contributor to severe crash rates in Louisville. A Speed Limit Task Force with KYTC and Louisville Metro representatives will be set up to systematically reduce speeds in problem areas to improve safety.

Vision Zero Recommended Strategies

In order for Louisville to meet its goals for reducing the five major performance measures, all four E's need to be involved and committed to applying the Implementation Strategies. The following tables of actions outline the potential strategies involved, the time frame, and performance measures.

Improve Multi-Modal Safety

Action	4 E's	Potential Countermeasures	Time Frame	Performance Measure
Media Campaign Related to Educate Multi-Modal Safety Measures		Road Reconfigurations, Gateway Crosswalks, Curb Bulb-outs	Ongoing	Reduction in Non-Motorized Fatalities and Serious Injuries
Implement Road Reconfiguration Corridors via Normal Resurfacing Program		Reduce Lanes, Bicycle Facilities, Curb Bulb-outs, Enhanced Crosswalks	Annual	Target: 5 Corridors per year
Implement Roadway Reconfiguration using HSIP funds		Reduce Lanes, Bicycle Facilities, Curb Bulb-outs, Enhanced Crosswalks	Annual	Target: 1 Corridor per year
Implement Low-Cost Systemic Countermeasures at High-Risk Signalized Intersections for Pedestrians		Signing, Striping, Lighting, Gateway Crosswalks, LPI, Countdown Timers	Annual	Target: 5 Intersections per year
Implement Reactive Countermeasures at High-Pedestrian-Crash Intersections		Signing, Striping, Lighting, Gateway Crosswalks, Speed Tables	Annual	Target: 10 intersections per year
Implement Reactive Countermeasures at High-Bicycle-Crash Signalized Intersections		Bike Boxes, Multi-Use Trails, Striping, Signing, Lighting, Channelization	Annual	Target: 5 Intersections per year
Implement New Signal-Timing Practices		Leading Pedestrian Intervals	Annual	Target: 5 Intersections per year
Education and Enforcement for Motorcycle Safety	 	Television and Radio Commercials, Social Media Campaigns, Additional Aggressive Driving Stops involving Motorcycles	Ongoing	Reduce Motorcycle Fatal and Serious Injury Crashes

KEY  Engineering  Education  Emergency Services  Enforcement

Improve Multi-Modal Safety (continued)

















Action	4 E's	Potential Countermeasures	Time Frame	Performance Measure
Partner with Colleges and Universities to Improve Multi-modal Safety on and Near Campuses.		Campus or Campus Edge Improvement Projects	Annual	Target: 2 Intersections per year
Expand and Connect Pedestrian and Bicycle Infrastructure		Sidewalk, Bike Lane, and Multi-Use Path Projects	Annual	Target: 10 Projects per year
Install Lighting at High Crash Intersections		Lighting	Annual	Target: 5 Intersections per year
Implement Traffic Calming Measures		Speed Tables, Curb Bulb-outs, Reduced Lane Widths, Reduce Speed Limits, Road Reconfiguration	Ongoing	Consideration in Capital Improvement Projects
Increase Complete Streets Emphasis in Zoning Approvals		Signing, Striping, Bicycle and Pedestrian Facilities	Ongoing	Increased Awareness for Inclusion in Zoning Requests
Implement Media Campaign for Pedestrian and Bicycle Safety Education		Television and Radio Commercials, Social Media Campaigns	Ongoing	Reduce Multi-Modal Serious Injuries and Fatalities

Improve Roadway Network

Action	4 E's	Potential Countermeasures	Time Frame	Performance Measure
Implement Low-Cost, Systemic Countermeasures for High-Risk Signalized Intersection Corridors		Reflective Backplates, Striping, Signing	Annual	Target: 5 Intersection Corridors per year
Implement Low-Cost Systemic Countermeasures at High-Risk Signalized Intersections		Reflective Backplates, Striping, Signing, LPI	Annual	Target: 5 Intersections per year
Implement Reactive Countermeasures at High-Crash Signalized Intersections		Turn Lanes, Striping, Signing, Reflective Backplates, Lighting, AWSC/ TWSC, Signal Timing	Annual	Target: 5 Intersections per year

KEY Engineering Education Emergency Services Enforcement

Improve Roadway Network (continued)

Action	4 E's	Potential Countermeasures	Time Frame	Performance Measure
Implement Low-Cost Systemic Countermeasures at High-Risk Unsignalized Intersections		Striping, Signing, Lighting	Annual	Target: 5 Intersections per year
Implement Low-Cost Systemic Countermeasures at High-Risk Unsignalized Intersections (Non-EJ Areas)		Reflective Backplates, Striping, Signing	Annual	Target: 5 Intersections per year
Implement Reactive Countermeasures at High-Crash Unsignalized Intersections		Striping, Signing, Lighting	Annual	Target: 5 Intersections per year
Install Innovative Intersections	 	RCUT, Mini-Roundabout	Annual	Target: 2 Intersections per year
Implement Positive Offset Left-Turn Lanes		Offset Left Turn Lanes	Annual	Target: 2 Intersections per year
Removal of Previously Warranted Signals	 	Signing, Mini-Roundabout	Annual	Target: 3 Intersections per year
Explore Additional Local and Grant Funding Opportunities			Ongoing	Increased Funding for Safety
Evaluate Before-and-After Performance of Safety Improvements			3-Year Follow-up	System Wide Reduction in Fatal and Serious Injury Crashes
Employ Access Management in Capital Improvement Projects	 	Raised Medians, Roundabouts, RCUT, Right-in/Right-out, Driveway Consolidation	Ongoing	Awareness of Safety in Capital Improvement Projects
Implement Systemic Countermeasures on High-Risk Roadway Departure Corridors	 	Signing, Striping, Rumble Strips, Lane and Shoulder Widening	Annual	Target: 2 Corridors per year
Implement Reactive Countermeasures on High-Crash Roadway Departure Corridors	 	High Friction Surface, Cross Slope Correction, Lane Widening, Rumble Strips	Annual	Target: 2 Corridors per year



Improve Environmental Justice Areas




















Action	4 E's	Potential Countermeasures	Time Frame	Performance Measure
Install Signing for Vision Zero with Emphasis in Environmental Justice Areas		Create Logo and Sign	Ongoing	Target: Place 100 Signs in EJ Areas and at High-Crash Locations
Continued Data Analysis in Environmental Justice Areas		Crash Data Analysis of Risk Factors	Ongoing	Reduce Fatal and Severe Crash Rates in EJ Areas
Inventory and Condition Evaluation of Safety Assets in Environmental Justice Areas		Inventory Pedestrian and Bicycle Facilities	Ongoing	Reduce Fatal and Severe Crash Rates in EJ Areas
Establish a Vision Zero Subgroup to Improve Safety in Environmental Justice Areas		Community Advocacy and Education	Ongoing	Reduce Fatal and Severe Crash Rates in EJ Areas

Improve Human Behavior

Action	4 E's	Potential Countermeasures	Time Frame	Performance Measure
Maintain updated Vision Zero Website with Project Information and Up-to-Date Statistics		Media Campaigns, Questionnaires, Information on Completed or Upcoming Projects	Ongoing	Website Visits
Continue Participation in National and Local Vision Zero Movement to Share and Gain Ideas		Fatal Crash Reviews	Ongoing	Reduction in Fatal and Serious Injury Crashes
Establish Speed Limit Task Force as a Subgroup of the Vision Zero Working Group		Reduce Speed Limits	Ongoing	Reduction in Fatal and Serious Injury Crashes Involving Speeding
Increased Social Media Safety Presence and partner with Enforcement and Emergency Services		Facebook, Twitter	Ongoing	Number of Posts and Number of Followers
Media Campaigns Aimed at Educating Drivers		"Buckle Up/Phone Down", "Arrive Alive", and "Click it or Ticket"	Ongoing	Reductions in All Crashes and Fatal and Serious Injury Crashes

KEY Engineering Education Emergency Services Enforcement

Improve Human Behavior (continud)

Action	4 E's	Potential Countermeasures	Time Frame	Performance Measure
Conduct Interactive Questionnaire of Community Understanding of Vision Zero	 	Website link from Facebook and Twitter	Ongoing	Community Understanding of Vision Zero Goals and Legislative Improvements
Speed Awareness Signing	  	Speed Awareness Signs	Ongoing	10 Signs Rotated at Speeding Related High Crash Locations
Intersection Monitoring for Red Light Running and Speeding	  	Inform LMPD of Areas with High Red Light Running for Potential Increased Enforcement	Annual	Target: 25 Intersections per year
Partner with High Schools to Provide Education Materials to Promote Improving Transportation Safety	 	Safety Flyers and Educational Material for High School Students and School Working Groups	Annual	5 Engagement activities with High Schools
Advocate for Increased Seatbelt and Helmet Use	 	Provide Speakers	Ongoing	Meeting all Requests
Provide a Speaker Bureau to Present to Interested Communities or Organizations	  	Provide Speakers	Ongoing	Meeting all Requests
Increase Enforcement on Impaired Crash Corridors	   	LMPD Enforcement	Annual	Target: 5 Corridors per year

KEY  Engineering  Education  Emergency Services  Enforcement

Glossary

Term	Acronym	Definition
All Way Stop Control	AWSC	An intersection which requires all vehicles to stop at an intersection, also known as a four way stop.
Arterial	-	A high capacity urban road whose primary function is to deliver traffic from collector roads to freeways or expressways.
Backplate	-	Thin plates of material that surround traffic signal indication lights and can have enhanced reflectivity to improve visibility.
Complete Streets	-	Streets designed and operated to facilitate safe use and support mobility for all users.
Daily Vehicle Miles Traveled	DVMT	The measurement of how much traffic flows along a specific roadway or segment during an average 24 hour period.
Environmental Justice	EJ	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.
Fatality Rate	-	The number of persons killed in crashes per 100 million vehicle miles traveled in a calendar year.
Federal Highway Administration	FHWA	A federal agency that supports state and local governments in the design, construction and maintenance of the nation's highway system, and roads on federally and tribally owned land.
Federal Motor Vehicle Safety Standard	FMVSS	Standards that identify mandatory minimum safety performance standards for motor vehicles. The National Highway Traffic Safety Administration is the federal agency that issues or enforces FMVSS.
High Friction Surface Treatment	HFST	A roadway pavement surface treatment that is intended to increase the amount of friction on the roadway surface helping motorists maintain control in both dry and wet conditions.
Highway Safety Improvement Program	HSIP	A federal-aid program with the objective of reducing the number and severity of crashes and decreasing the potential for crashes on all public roads.
Kentuckiana Regional Planning & Development Agency	KIPDA	Metropolitan Planning Organization in Louisville area who provide regional planning, review and technical services in the areas of public administration, social services and transportation.
Kentucky Strategic Highway Safety Plan	KYSHSP	Kentucky's statewide plan that outlines measurable strategic opportunities to reduce fatalities and serious injuries on roadways within the state of Kentucky.
Kentucky Transportation Cabinet	KYTC	Kentucky's state agency responsible for building and maintaining federal and state highways as well as regulating other transportation related policies.
Leading Pedestrian Interval	LPI	A signal phase that provides a headstart (typically 3-7 seconds) for pedestrians to advance into the crosswalk prior to traffic being given a green light
Multi-modal		A term used to describes many forms of travel or mobility including walking, biking, riding a bus or driving.

Term	Acronym	Definition
Offset Left Turn Lanes		A modification in the geometric layout of an intersection that increases the space between opposing left turn movements.
Restricted Crossing U-Turn	R-CUT	A non-traditional intersection strategy that eliminates or reduces side-street left turn movements.
Rectangular Rapid Flashing Beacons	RRFB	User-activated amber LEDs that supplement warning signs at unsignalized intersections or midblock crosswalks. Can be activated by pedestrians manually by push button or passively by a pedestrian detection system.
Roundabout		A circular intersection which permits traffic flow in one direction around a central island.
Two-Way Left Turn Lane	TWLTL	A lane that permits left turns in both directions
Two-Way Stop Control	TWSC	An intersection which requires vehicles in two opposing directions to stop at the intersection.
United States Department of Transportation	USDOT	A federal Cabinet department of the United States government involved with the development and coordination of national policies related to transportation.
Vehicle Miles Traveled	VMT	Measurement of the amount of travel for all vehicles in a specific geographic area over a specific period of time, for the purposes of this report the time period is 1 year.
Vision Zero	-	A national strategy to eliminate all traffic fatalities and severe injuries, while increasing safety, health, and equitable mobility for all.

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