MURFREESBORO
SAFE STREETS

MURFREESBORO SAFE STREETS

May 2026

Approval Letter from Leadership

Dear Residents of Murfreesboro,

Improving roadway safety has always been a priority of the City of Murfreesboro. In recent years we have undertaken numerous projects to accommodate the growing number of vehicles and vulnerable road users that travel in and through our city.

To continue the ongoing effort to promote traffic safety, the leaders of the City of Murfreesboro are proud to support this effort toward making our roadways safer for all who travel them. Between 2020 and 2024, our city experienced 26,023 reported roadway crashes, of which 369 crashes led to deaths or serious injuries. These events are tragedies for the victims, their families, and our communities. The impacts are profound and devastating.

Fatalities and serious injuries due to traffic crashes are preventable, and the City of Murfreesboro is committed to significantly reducing and ultimately eliminating these occurrences. This Comprehensive Safety Action Plan is a crucial first step toward making this commitment a reality. As a data-driven and actionable document, this Safety Action Plan lays the groundwork for projects and strategies that can make a tangible difference on our roadways.

Access to safer roadways should not be reserved only for a select few; rather, the entire population of the City of Murfreesboro should be able to travel safely, regardless of their income level, where they live, their race, or their age. The City of Murfreesboro cannot achieve its goals without the support and participation of the people in our communities and our partner agencies. Every person has a role to play and a responsibility to help make our roads safer. Together, we can accomplish a great deal.

Our intent is that this Safety Action Plan will provide a roadmap of the steps that the City of Murfreesboro will take toward improving safety on the roadways. Based on the analysis of traffic and accident data and the input of citizens during the research phase, this plan provides specific steps necessary and the progress markers allowing us the opportunity to take actions to improve traffic safety in our city. The work has only just begun, but having a solid plan is the foundation for achieving our goals and eliminating these preventable tragedies from our roadways.

Thank you for your commitment and support to improving roadway safety and the quality of life in the City of Murfreesboro, Tennessee.

Sincerely,

Shane McFarland

Mayor of the City of Murfreesboro

Special Thanks

We extend our sincere appreciation and gratitude to the residents of Murfreesboro, the City staff, advocacy groups, stakeholders, and the public who assisted in the public surveys, meetings, and the entire planning process. The critical input guided the development of the Safety Action Plan (SAP) and in turn will have a positive impact on the City.

City of Murfreesboro – City Council

Shane McFarland – Mayor of Murfreesboro

Bill Shacklett – Vice Mayor

Jami Averwater

Madelyn Scales Harris

Austin Maxwell

Kirk Wade

Shawn Wright

City of Murfreesboro – Steering Committee

Jim Kerr – Transportation Director

Lee Smith – Deputy Director Transportation/City Traffic Engineer

Lexi Stacy – Project Coordinator

Alan Bozeman – Communication Director

Greg McKnight – Executive Director, Development Services

Mathew Blomeley - Assistant Planning Director, AICP

Battalion Chief Joe Bell – Fire Rescue Department

Lt. Zachary Ferrell – Murfreesboro Police Department

Consultant Team

Kimley–Horn

Contents

Appendices

Abbreviations

SS4A – Safe Streets and Roads for All
SAP – Safety Action Plan
FHWA – Federal Highway Administration
USDOT – United States Department of Transportation
TDOT – Tennessee Department of Transportation
COM – City of Murfreesboro
SHSP – Strategic Highway Safety Plan
AADT – Annual Average Daily Traffic
TEV – Total Entering Vehicles
VRU – Vulnerable Road User
BIL – Bipartisan Infrastructure Law
HIN – High Injury Network
CMF – Crash Modification Factor
MTSU – Middle Tennessee State University
NHTSA – National Highway Traffic Safety Administration
HSM – Highway Safety Manual
PDO – Property Damage Only
ADA – Americans with Disabilities Act
DSDS – Dynamic Speed Display Signs
TIS – Traffic Impact Study
AICP – American Institute of Certified Planners
CDC - Centers for Disease Control and Prevention
DRC – Driver- Related Countermeasure
GIS – Geographic Information System
SR – State Route
SVI – Social Vulnerability Index
VMT – Vehicle Miles Traveled
TZD – Towards Zero Deaths

Introduction

Introduction

Alignment with SS4A

The Bipartisan Infrastructure Law (BIL) established the Safe Streets and Roads for All (SS4A) discretionary program to fund regional, local, and Tribal initiatives through grants to prevent roadway deaths and serious injuries involving motorists, pedestrians, and cyclists.

One of the initiatives funded by the SS4A program is the development of a Safety Action Plan, which includes all seven required SS4A components shown in Figure 1.

A Safety Action Plan (SAP) is a planning document that serves as a road map to identify and prioritize safety improvements. Having a formal plan will help the City of Murfreesboro communicate clearly with stakeholders and access funding opportunities under this program.

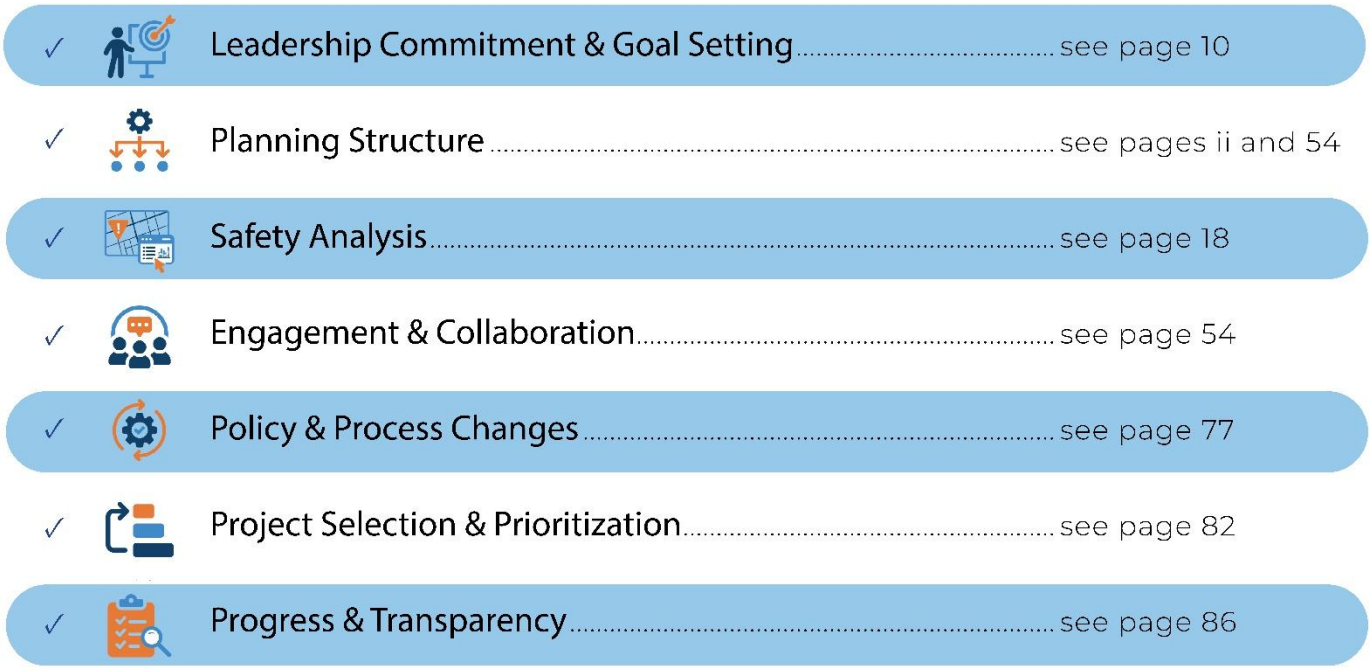


Figure 1: Alignment with SS4A

Document Organization

The Murfreesboro SAP is organized into the following chapters:

(Graphic Generated by AI)

Purpose of the SAP

The City of Murfreesboro Safety Action Plan (SAP) provides a framework for identifying and prioritizing safety improvements to benefit transportation safety for all roadway users. The SAP recommendations aim to reduce fatal and serious injury crashes, guided by the principles established in the 2025-2029 Tennessee Strategic Highway Safety Plan (TN SHSP) and the citywide systemic data analysis conducted as part of this plan.

This report aligns with the components required to apply for SS4A Implementation Grant funding. As such, the SAP involves a community-informed and data-driven approach to roadway safety, with commitment from City leadership to reducing roadway fatalities and suspected serious injury crashes.

Leadership Commitment & Goal Setting

The City of Murfreesboro's leadership commits to making progress toward a long-term goal of zero traffic deaths and serious injuries with an interim goal of 25% reduction in fatal and serious injury crash rates by 2045 from the projected trend. While the City of Murfreesboro exhibits a sharply declining historical crash rate for the previous five-year period, it is not feasible to assume this trend will continue such a drastic decline given the recent population growth. Remaining committed to making progress toward the long-term goal of zero traffic deaths and serious injuries, the City's interim goal of a 25% reduction allows for a more realistic measurement of future progress.

Appendix A includes a copy of the signed resolution from the Murfreesboro City Council. **Figure 2** illustrates the five-year rolling average of the fatal & serious injury crash rate for the years 2020 to 2024. Based on the current trend, the crash rate is projected to decrease by 90% by 2045, with an annual decrease of 3.5% per year. Additional details regarding crash trends and reductions are included in the Crash Data Analysis section of this document.

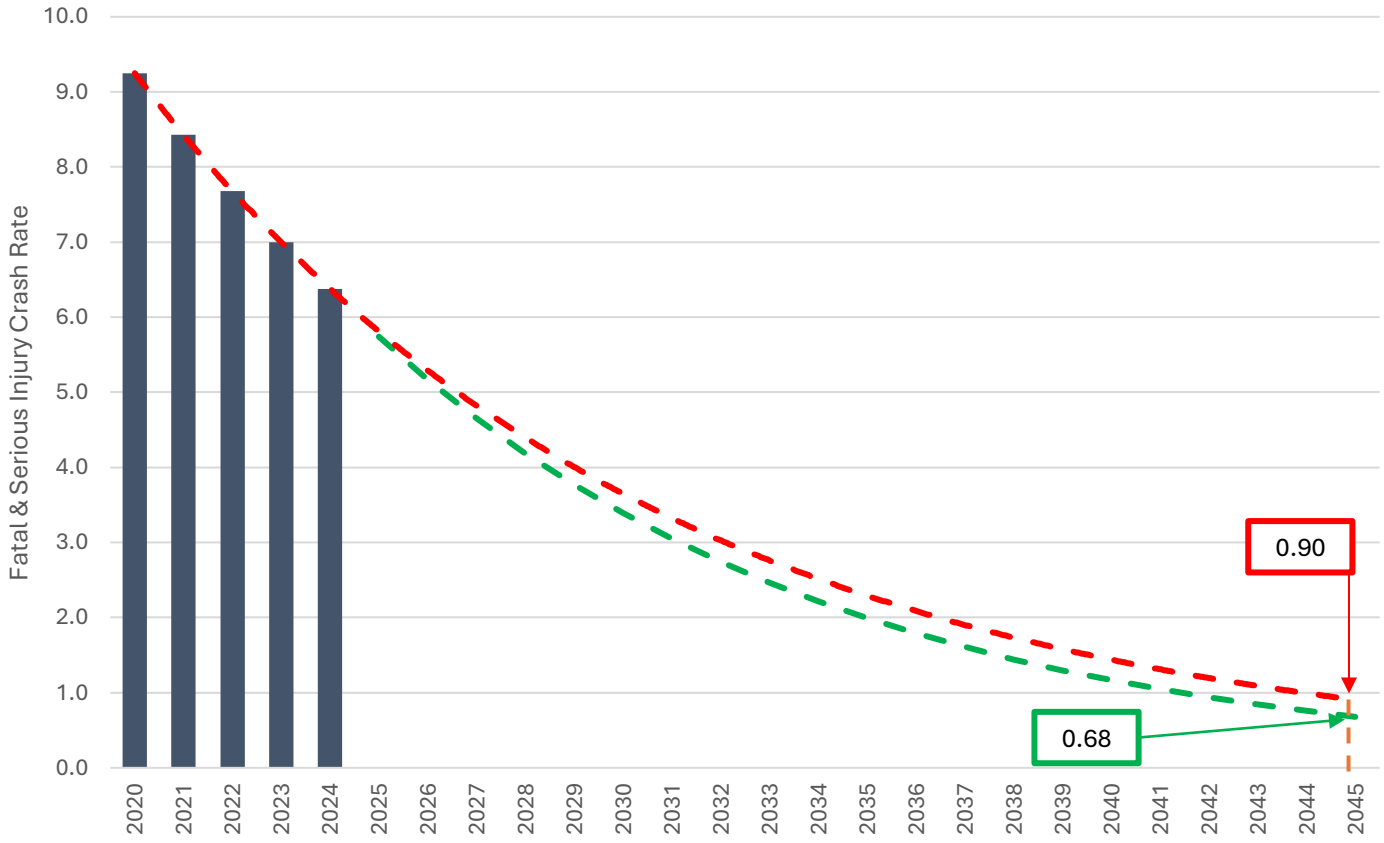


Figure 2: Murfreesboro Fatal & Serious Injury Crash Rate Trend

Safe System Approach

The activities conducted during this study build upon the Federal Highway Administration (FHWA) Safe System Approach, the TN SHSP, City-specific data analysis findings, and community feedback. The Safe System Approach is the guiding paradigm of the USDOT regarding roadway safety (see **Figure 3**). It prioritizes the elimination of crashes that result in death or serious injury. This approach is a shift from the conventional safety approach in that it focuses on both human mistakes and human vulnerability and seeks to design a system with multiple layers of protection. See **Figure 4** for a comparison between the traditional approach versus Safe System Approach. This Safety Action Plan will integrate the Safe System Approach by analyzing the transportation system holistically and proposing solutions and strategies across the spectrum of principles that make up the Safe System Approach. Those principles are as follows:

- Deaths & Serious Injuries are Unacceptable
- Humans Make Mistakes
- Humans are Vulnerable
- Responsibility is Shared
- Safety is Proactive
- Redundancy is Crucial

Figure 3: Elements of the Safe Systems Approach (Source: USDOT)

Traditional Approach	vs	Safe Systems Approach
Traffic Deaths and Serious Injuries are INEVITABLE		Traffic Deaths and Serious Injuries are PREVENTABLE
IMPROVE human behavior		INTEGRATE human error into approach
INDIVIDUAL responsibility		SHARED responsibility
Prevent COLLISIONS		Prevent FATAL AND SERIOUS INJURY CRASHES
REACT based on crash history		PROACTIVELY identify and address risks
Saving lives is EXPENSIVE		Saving lives is NOT EXPENSIVE

Figure 4: Traditional Approach vs Safe Systems Approach

Study Area

The City of Murfreesboro, Tennessee, is located in Rutherford County within the Nashville Metropolitan area. It encompasses approximately 64 square miles of land and is home to an estimated 168,000 residents as of 2025, making it one of the fastest-growing cities in Tennessee. Murfreesboro operates under a Council-Manager form of government, where an elected City Council—consisting of a Mayor and six council members—sets policies, and an appointed City Manager oversees daily operations and services. The City lies about 30 miles southeast of Nashville and serves as the county seat of Rutherford County. Murfreesboro shares its northwest border with the Town of Smyrna and is near other communities such as La Vergne, Shelbyville, and Woodbury.

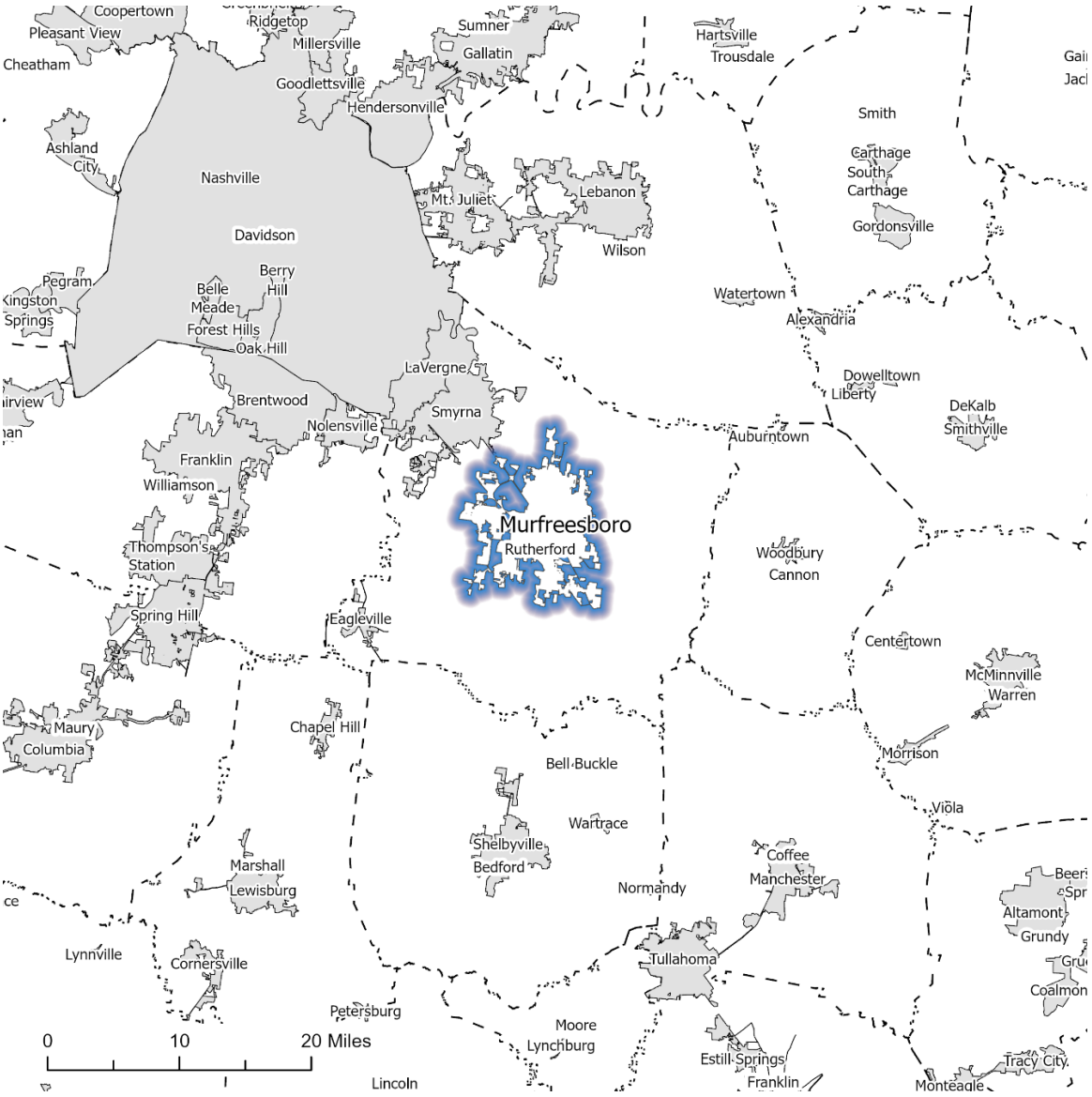
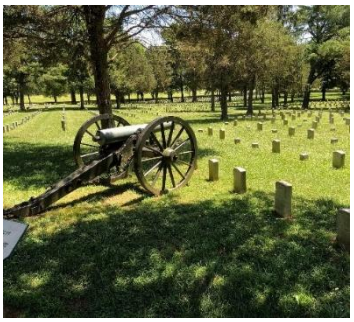


Figure 5: City of Murfreesboro Surrounding Area

History



The City of Murfreesboro was established in 1811 as the new county seat for Rutherford County and originally named Cannonsburgh in honor of Newton Cannon. Within weeks, the name was changed to Murfreesborough, later shortened to Murfreesboro, in tribute to Colonel Hardy Murfree, a Revolutionary War hero. The City was incorporated in 1817 and served as the capital of Tennessee from 1818 to 1826 because of its central location. During the Civil War, Murfreesboro was the site of the Battle of Stones River (December 31, 1862–January 2, 1863), among the war's bloodiest engagements. The outcome provided a crucial Union morale boost and is widely linked to momentum surrounding the Emancipation Proclamation. The battlefield is preserved today as the Stones River National Battlefield. In the early 1900s, the City strengthened its role in education with the founding of Middle Tennessee State Normal School (1911), now Middle Tennessee State University (MTSU)—recognized for having the largest undergraduate enrollment in Tennessee. After World War II, Murfreesboro experienced steady population increases for decades and is projected to continue growing through the planning horizon. The Murfreesboro 2035 Comprehensive Plan indicates a population growth estimate in the City of 228,090 by 2035. The City's transportation system has been shaped by sustained population growth, major employment centers, and expanding development corridors, with concentration along major corridors such as Old Fort Parkway, Memorial Boulevard, South Church Street, and Medical Center Parkway. Large employers in manufacturing, healthcare, education, logistics, and government generate substantial commuter travel and contribute to peak-hour congestion along these corridors. MTSU, the largest undergraduate university in Tennessee, plays a significant role in local travel patterns by generating daily commuter trips and higher concentrations of pedestrians, bicyclists, and transit users near the campus and connecting corridors. Transit is an important mobility strategy, with existing fixed-route bus service providing connections between residential areas, employment centers, and MTSU, and emphasizes future transit enhancements to better align with continued growth and multimodal travel demand.

Land Uses & Attractions

Murfreesboro's economy is driven by healthcare, education, and manufacturing, with major employers such as National HealthCare Corporation, Murfreesboro Medical Clinic, and Kasai North America. The City offers an extensive parks and recreation system covering more than 1,200 acres, including the Stones River Greenway, a 15-mile trail network ideal for walking, biking, and nature viewing. Popular destinations include Barfield Crescent Park, Richard Siegel Soccer Complex, and Murfree Springs Wetlands, known for its scenic boardwalks and wildlife observation. Murfreesboro also features numerous attractions that highlight its rich heritage and vibrant culture. Stones River National Battlefield preserves the site of a pivotal Civil War battle, while Cannonsburgh Village and Oaklands Mansion showcase 19th-century life and architecture. Families enjoy interactive learning at the Discovery Center at Murfree Spring, and downtown Murfreesboro offers shopping, dining, breweries, and seasonal events.

Roadway Networks

Murfreesboro's roadway system is anchored by I-24, which runs southeast–northwest through the City and connects Nashville to Chattanooga. The City also benefits from access to I-840, forming a partial outer loop that links Murfreesboro to Franklin, Lebanon, and other Middle Tennessee communities. Major U.S. and state routes include US-231 (Memorial Boulevard), U.S. 41/70S (Broad Street), and State Route 96 (Old Fort Parkway), all serving as key commercial corridors. Traffic volumes reflect Murfreesboro's rapid growth. Old Fort Parkway (SR-96) is among the busiest corridors, carrying around 50,000 vehicles daily, while Memorial Boulevard and Broad Street also experience heavy congestion during peak hours. I-24 exceeds 100,000 AADT near major interchanges, making it one of the most heavily traveled segments in Middle Tennessee. Planned improvements include a Cherry Lane interchange at I-840 and widening projects along Old Fort Parkway, aimed at reducing congestion and improving connectivity. Other notable thoroughfares include Thompson Lane, New Salem Highway, and Joe B. Jackson Parkway, which provide access to growing residential and industrial areas.

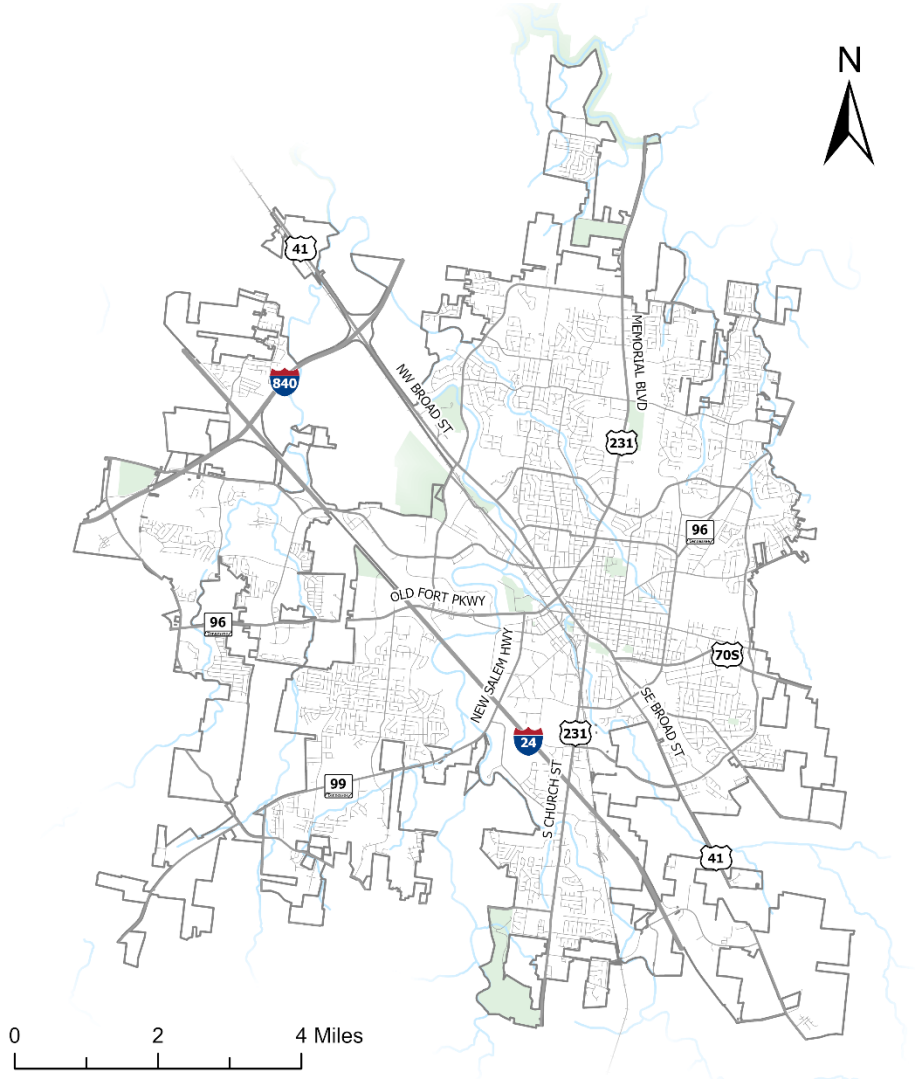


Figure 6: Murfreesboro Roadway Network

Schools

The Rutherford County School System operates the schools in the City of Murfreesboro. While it is not a comprehensive list, schools included in the City's GIS database that are located within Murfreesboro city limits are listed below and shown in **Figure 7**.

- A – Redeemer Classical Academy
- B – Providence Christian Academy
- C – Primrose School of Murfreesboro
- D – Montessori Weaver School
- E – Middle Tennessee Christian School
- F – Cedar Grove School
- G – Belle Aire Baptist Church
- H – Saint Rose of Lima Catholic Elementary
- I – Kinder Care Learning Center
- J – Middle Tennessee State University
- K – First Presbyterian Pre School
- L – Tennessee College of Applied Technology
- M – Genesis Teen Learning Center School
- N – Bellwood Christian Academy
- O – Rutherford Academy School
- P – Murfreesboro Adventist School
- Q – Rutherford County Community Learning Center
- R – Erma Siegel Elementary
- S – Discovery School
- T – Bradley Academy
- U – Hodgood Elementary
- V – Mitchell-Neilson Elementary
- W – John Pittard Elementary
- X – Northfield Elementary
- Y – Black Fox Elementary
- Z – Scales Elementary
- AA – Reeves-Rogers Elementary
- AB – Overall Creek Elementary
- AC – Salem Elementary
- AD – Carson Lane Academy
- AE – Barfield Elementary
- AF – Blackman High School
- AG – Blackman Elementary
- AH – Holloway High School
- AI – Homer Pittard Campus School
- AJ – McFadden School of Excellence
- AK – Oakland High School
- AL – Riverdale High School
- AM – Siegel Middle School
- AN – Blackman Middle School
- AO – Siegel High School
- AP – Central Magnet School
- AQ – Oakland Middle School
- AR – Whitworth-Buchanan Middle School

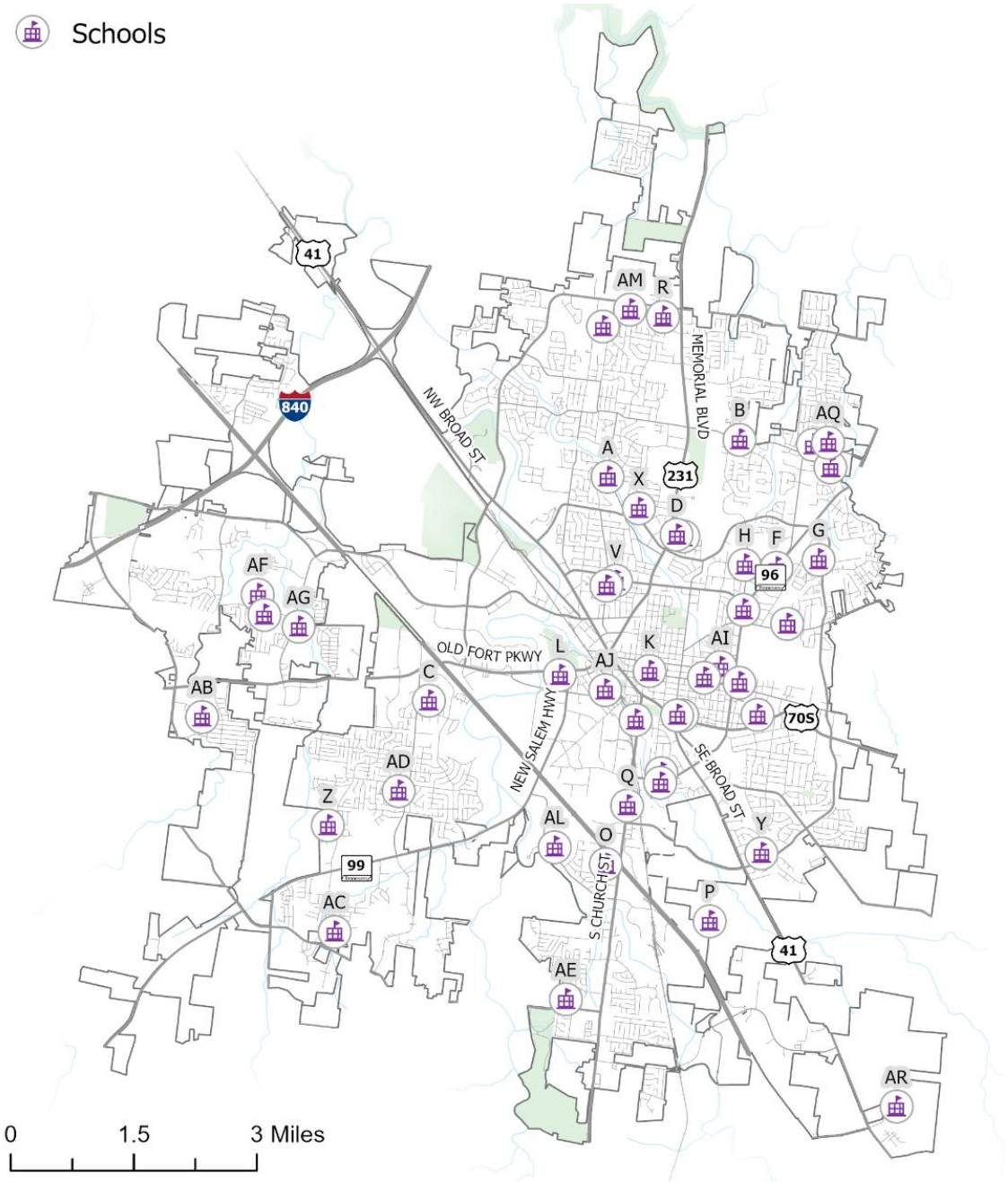


Figure 7: City of Murfreesboro Schools

MURFREESBORO SAFE STREETS

Safety Analysis

Safety Analysis

The safety analysis for the Murfreesboro Safety Action Plan explored city-wide historical trends to understand where crashes occurred, crash severities, and their contributing factors. This safety analysis section summarizes data sources, safety emphasis areas, city-wide crash trends, transportation demographics considerations, and the identification of a high-injury network. The findings from this safety analysis helped inform the development of engineering projects and strategies identified later in this plan.

KABCO Crash Severity

The KABCO scale measures the injury severity for any person involved in the crash and is defined as K for fatal injury, A for suspected serious injury, B for suspected minor injury, C for possible injury, and O for property damage only (PDO). As shown in **Figure 8**, there were 26,023 reported crashes on roadways in the City of Murfreesboro from 2020 to 2024, of which 369 resulted in fatalities or serious injuries.

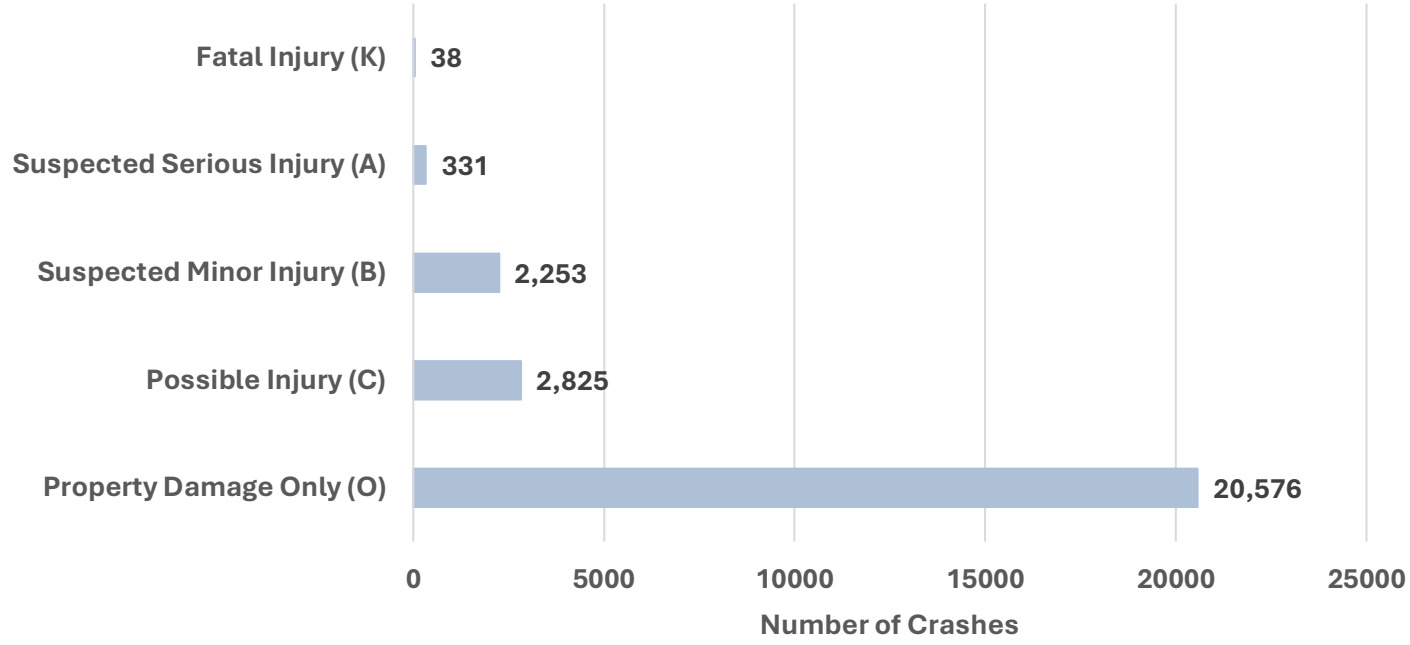


Figure 8: Crashes in Murfreesboro by KABCO Scale

Data Gathering

Historical crashes were obtained from the TDOT's AASHTOWare Safety online crash database for crashes reported from 2020 to 2024. The data was combined and cleaned at a high level to provide a more complete record of crashes within the City. This cleaning included filtering out interstate crashes, duplicate crashes, erroneous crash information, and geographically inaccurate crash data. The analysis also incorporated roadway ownership information and additional roadway characteristics (such as road type and signal locations) provided by TDOT.

Emphasis Areas

State DOTs develop Strategic Highway Safety Plans under the Federal Highway Administration's direction to identify safety emphasis areas based on historical crash trends and severities. Crashes resulting in fatalities and suspected serious injuries were evaluated in the 2020-2024 Tennessee Strategic Highway Safety Plan to identify the top statewide safety emphasis areas. These analysis results help inform how transportation safety funding should be directed to reduce statewide fatal and serious injury crashes for all road users.

Table 1 shows a comparison of the City of Murfreesboro's fatal and serious injury crashes to statewide totals, while **Table 2** compares the data to the urbanized areas of Tennessee. The tables are formatted to emulate the emphasis areas documented in the TN SHSP and intend to highlight how the emphasis areas in Murfreesboro compare to statewide trends.

Note that individual crash events may be associated with more than one emphasis area. For example, a roadway departure crash could have involved an impaired young driver. As such, the values in the columns may not add to equal the exact totals. In Table 1 and Table 2, orange-shaded cells show which contributing factors were more prevalent in the City of Murfreesboro than the statewide data over the five-year study period while the blue-shaded cells show which contributing factors were less prevalent in the City of Murfreesboro. As shown in these tables, the City of Murfreesboro experienced higher percentages for several emphasis areas, including intersections, roadway departures, aggressive drivers/speeding, teen drivers, motorcycles, and bicycles. It is important to note that when comparing the aggressive drivers and teen drivers in the urban areas, these values are less prevalent than the statewide data.

Table 1: Crashes in Murfreesboro by Contributing Factors – Statewide Comparison

Category	Emphasis Areas	City of Murfreesboro				State of Tennessee
		# of Fatal Crashes	# of Serious Injury Crashes	Total	% Fatal & Serious Injury Crashes	% Fatal & Serious Injury Crashes
All Severe Crashes		38	331	369	100.0%	100.0%
Roadway	Intersections	12	133	145	39.3%	26.7%
	Roadway Departures	12	186	198	53.7%	25.6%
Drivers	Aggressive Drivers / Speeding	3	46	49	13.3%	12.0%
	Senior Drivers (65+)	9	52	61	16.5%	18.0%
	Teen Drivers (13-19)	8	47	55	14.9%	13.6%
	Unrestrained Occupants	12	68	80	21.7%	25.7%
	Impaired Drivers	1	9	10	2.7%	12.3%
	Inattentive, Distracted, & Drowsy Drivers	1	6	7	1.9%	4.6%
Vehicles	Motorcycles	6	56	62	16.8%	14.9%
	Large Trucks (Truck/Bus)	3	18	21	5.7%	5.8%
Special Users	Pedestrians	6	23	29	7.9%	9.2%
	Bicycles	3	10	13	3.5%	1.3%

Table 2: Crashes in Murfreesboro by Contributing Factors – Statewide Urban Area Comparison

Category	Emphasis Areas	City of Murfreesboro				Urban Areas – State of Tennessee
		# of Fatal Crashes	# of Serious Injury Crashes	Total	% Fatal & Serious Injury Crashes	% Fatal & Serious Injury Crashes
All Severe Crashes		38	331	369	100.0%	100.0%
Roadway	Intersections	12	133	145	39.3%	30.9%
	Roadway Departures	12	186	198	53.7%	15.9%
Drivers	Aggressive Drivers / Speeding	3	46	49	13.3%	14.4%
	Senior Drivers (65+)	9	52	61	16.5%	17.0%
	Teen Drivers (13-19)	8	47	55	14.9%	16.5%
	Unrestrained Occupants	12	68	80	21.7%	22.5%
	Impaired Drivers	1	9	10	2.7%	10.3%
	Inattentive, Distracted, & Drowsy Drivers	1	6	7	1.9%	5.7%
Vehicles	Motorcycles	6	56	62	19.2%	13.4%
	Large Trucks (Truck/Bus)	3	18	21	5.7%	7.4%
Special Users	Pedestrians	6	23	29	7.9%	12.8%
	Bicycles	3	10	13	3.5%	1.6%

Crash Data Analysis

Table 3 summarizes crashes by KABCO Scale severity and year occurring on all roadways within the City of Murfreesboro, which shows a gradual increase in total crashes over a 5-year period.

Table 3: Crashes in Murfreesboro by Severity

Year	Fatal Injury (K)	Serious Injury (A)	Minor Injury (B)	Possible Injury (C)	PDO (O)	Total
2020	8	54	566	394	3,592	4,614
2021	4	65	396	677	4,167	5,309
2022	7	80	407	622	4,368	5,484
2023	9	60	441	643	4,230	5,383
2024	10	72	443	489	4,219	5,233
Total	38	331	2,253	2,825	20,576	26,023
Percentage of All Crashes	0.1%	1.3%	8.7%	10.8%	79.1%	100.0%

For the purposes of this study, the data includes the total number of fatalities and serious injuries resulting from crashes within the analysis period. It's important to note that a single fatal crash can result in multiple fatalities, and similarly, a serious injury crash can lead to multiple serious injuries. For the purposes of this study, only the total number of vehicle crashes, regardless of injury type, was used in the analysis.

Vehicle Miles Travelled (VMT)

Vehicle Mile Traveled data was gathered through the TDOT's Highway Performance Monitoring, which is available at the county level. From 2015 to 2024, Rutherford County experienced a growth rate in VMT of approximately 2% per year as shown in **Figure 9** below.

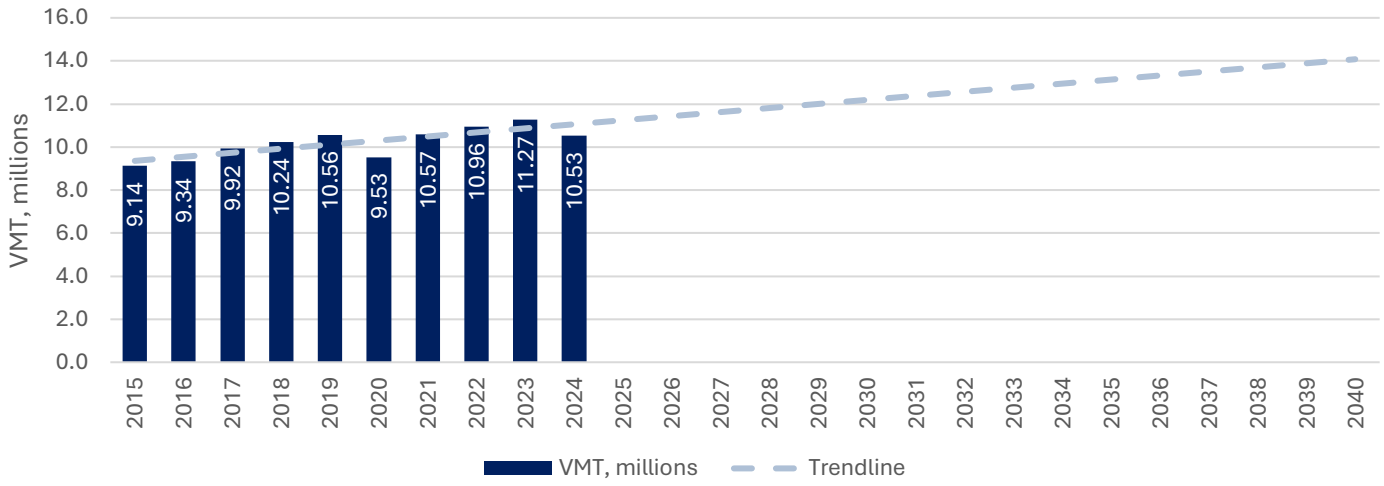


Figure 9: VMT Trends, Rutherford County

Crash Rate Analysis

Normalizing crash trends using VMT or population tells a more comprehensive story. Especially in a community with as much growth as Murfreesboro. See **Figure 10** for a comparison between Murfreesboro fatal and serious injury crash trends and Rutherford County VMT data from 2015 to 2024. As shown in the figure, from 2015 to 2019 the KA crashes tend to decrease as VMT increases. During the time period between 2020 and 2022, the KA crashes tend to increase and decrease at a similat rate to the VMT with a rapid dip in KA crashes occuring in 2023.

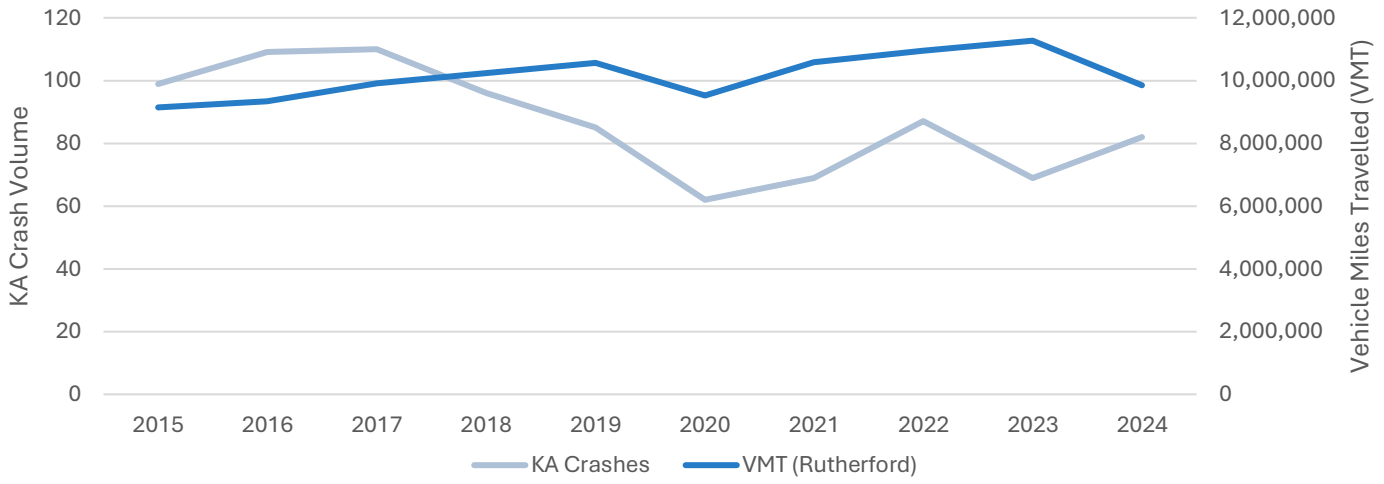


Figure 10: Murfreesboro KA Crash Trend vs Rutherford County VMT

See **Figure 11** for a comparison between Murfreesboro fatal and serious injury crash trends and Murfreesboro population growth data from 2015 to 2024. As shown, the population of Murfreesboro tends to be increasing at a constant rate while the number of KA crashes have a slight increase from 2015 to 2017 and then a rapid decrease from 2017 to 2020. Since 2020, the KA crashes have shown a slight increase.

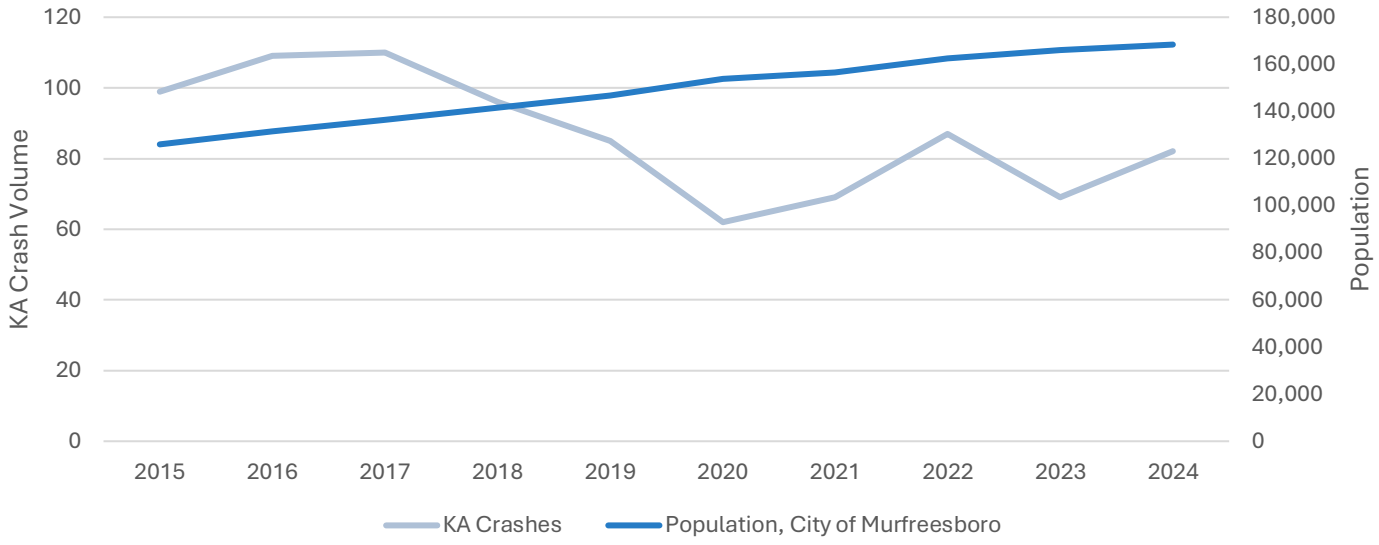


Figure 11: Murfreesboro KA Crash Trend vs City Population

Fatal Crash Rates

Figure 12 illustrates the five-year rolling average of the total fatal crashes expressed in terms of fatal crashes per million vehicle miles traveled per year. As shown, the rate is rapidly decreasing, and annual crash rates are shown. By 2040, the growth rate is projected to decrease by 93%.

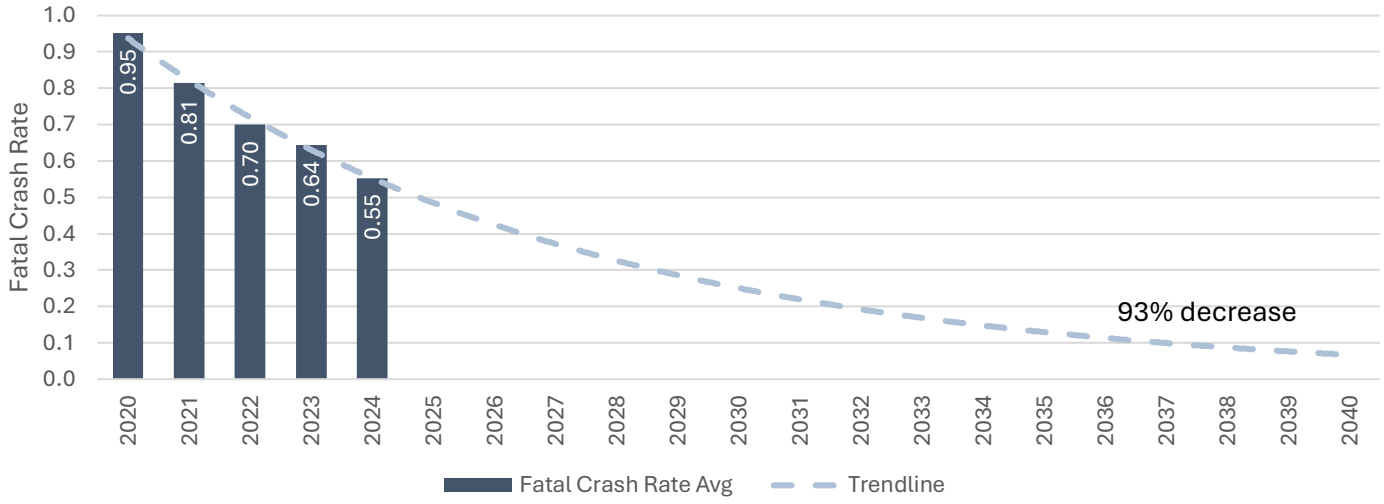


Figure 12: Fatal Crash Rates in Murfreesboro

Serious Injury Crash Rates

Figure 13 illustrates the five-year rolling average of the total serious injury crashes. The rates are decreasing at a smaller rate over these five years. The overall decrease rate by 2040 is 79%.

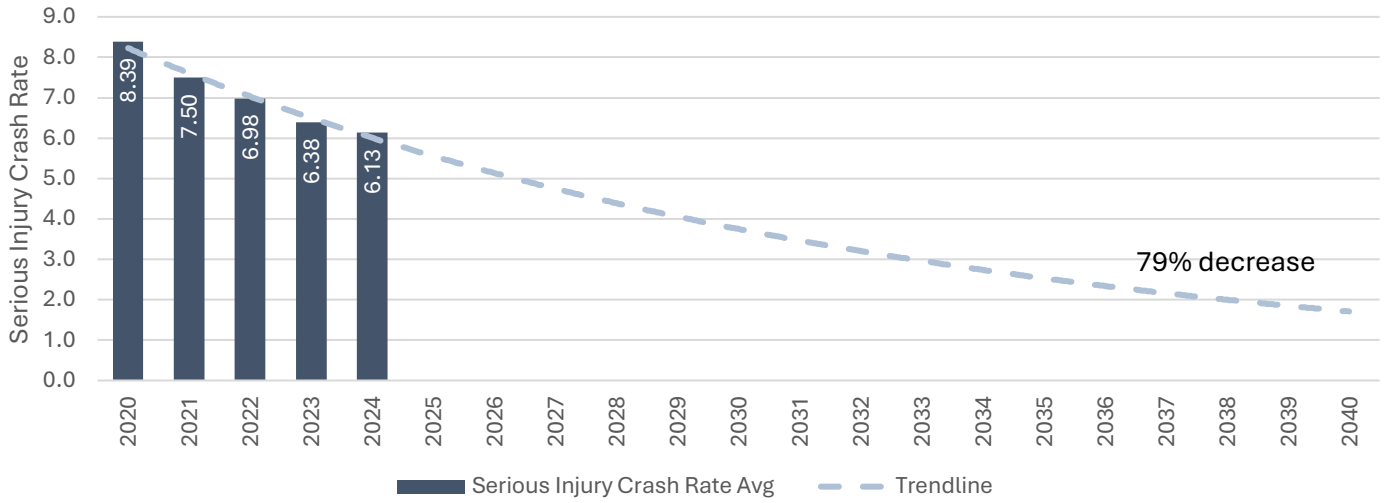


Figure 13: Serious Injury Crash Rates in Murfreesboro

VRU Crash Rates

Figure 14 illustrates the five-year rolling average of the total vulnerable road users (VRU) crashes. VRU can refer to pedestrians, cyclists, mobility device users, and shared micromobility riders who are more at-risk in the event of a motorist crash. The overall crash rate for these users has a projected decreasing rate of 73% by 2040. The annual rate is 3.65% decrease.

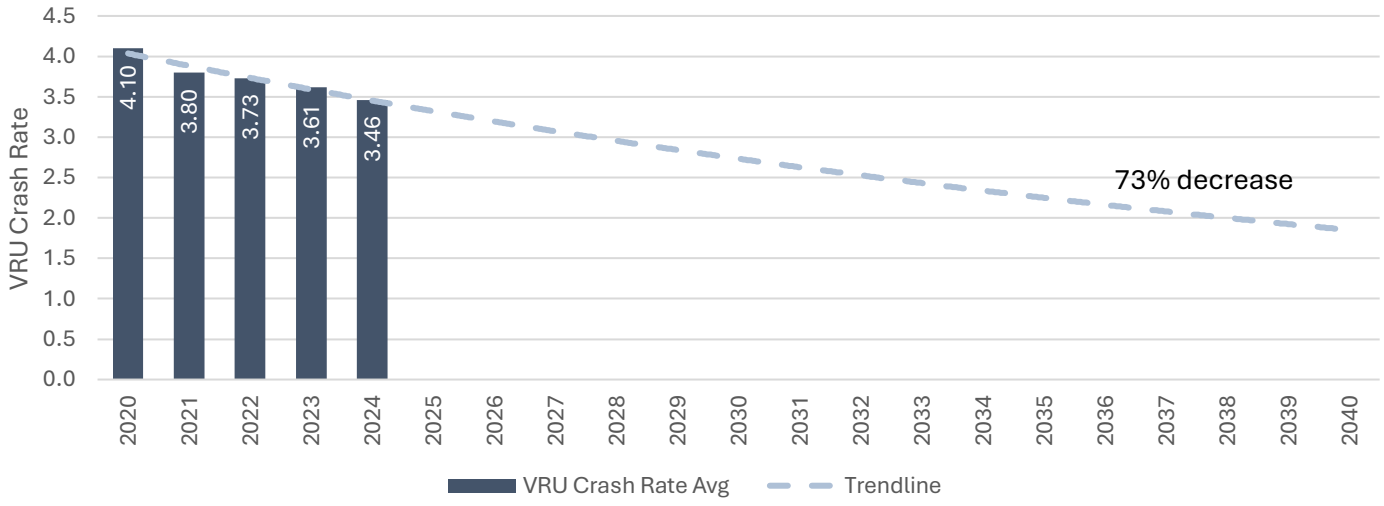


Figure 14: VRU Crash Rates in Murfreesboro

Crash Density

Crash density is defined as the total number of crashes per unit, commonly measured as crashes per unit area. **Figure 15** displays a total crash density map, highlighting locations where fatal, serious injury, and vulnerable road user crashes occurred along the roadway network. The highest crash densities are typically observed at locations with higher traffic volumes, as this translates to more exposure and potential risk for all road users. As shown in the figure, the highest crash densities can be found along Broad Street, Old Fort Parkway and S Church Steet. Some of these largely dense areas also include the interchanges off I-24.

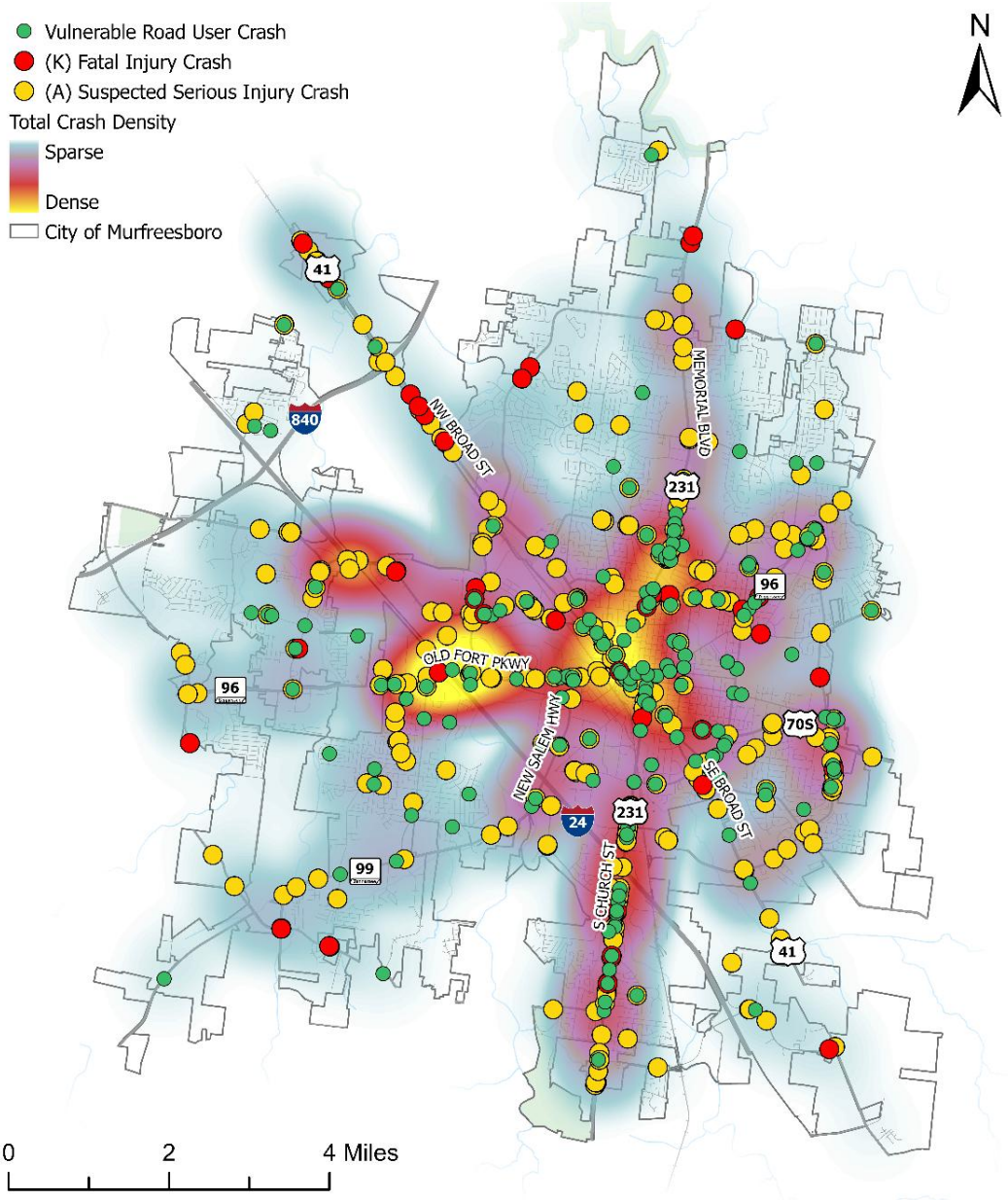


Figure 15: Fatal & Serious Injury Crashes with Overall Crash Density

Crashes by Type

Crash type is indicated on crash reports submitted by law enforcement agencies. As shown in **Table 4**, *Rear end* crashes were the most common type of crash occurring over the study period, commonly occurring at intersections or near traffic signals due to the frequent slows and stops of vehicles making turning movements. *Angle* crashes were the second most common crash type, also occurring at intersections where drivers may misjudge the adequate gaps necessary to complete safe turning movements. Various levels of traffic calming measures can be found throughout the City, including traffic circles, multi-modal accommodations, and landscaped medians along Cason Lane, which work to reduce crashes and crash types linked to high severities.

Table 4: Crashes in Murfreesboro by Type

Type of Crash	2020	2021	2022	2023	2024	Total
Angle	1,472	1,740	1,776	1,592	1,479	8,059
Rear End	1,727	1,793	1,788	1,618	1,612	8,538
No Collision with Vehicle	516	562	522	539	451	2,590
Sideswipe - Same Direction	394	527	576	582	569	2,648
Head-On	82	92	110	123	103	510
Sideswipe - Opposite Direction	71	63	94	90	104	422
Rear to Side	29	27	26	33	32	147
Rear to Rear	11	15	6	12	9	53
Other	312	490	586	794	874	3,056
Total	4,614	5,309	5,484	5,383	5,233	26,023

Compared to the statewide data, the City of Murfreesboro experienced a higher percentage of *rear end* and crashes. This is likely due to frequent slows or stops at intersections and commercial driveways. The City experienced a lower percentage of *no collision with vehicle* crashes than statewide, which can be attributed to the more urbanized characteristics of the area.

Compared to other urban areas within the State of Tennessee, the City of Murfreesboro experienced a higher percentage of *rear end* crashes and a lower percentage of *angle* crashes.

Crashes by Lighting Condition

Street lighting often serves as a safety countermeasure against nighttime crashes, and it can be a streetscaping asset if it fits the context of the community and built environment. Lighting is a valuable asset to both drivers and non-motorists, allowing all parts of the travelled roadway to be visible, especially during adverse conditions. Inadequate lighting conditions can be improved through various treatments such as installing lighting structures and retroreflective striping and signage. Additionally, improvements aimed at mitigating sun glare can enhance driver awareness during sunrise and sunset, when the sun often shines directly into the driver's view at an uncomfortable angle.

The entire range of crashes by lighting condition is listed below in **Table 5**.

Table 5: Crashes in Murfreesboro by Lighting Condition

Lighting Condition	2020	2021	2022	2023	2024	Total
Daylight	3,091	3,504	3,689	3,437	3,155	16,876
Dark - Lighted	901	972	942	869	874	4,558
Dark - Not Lighted	125	156	162	161	147	751
Dusk	162	148	104	101	128	643
Dawn	40	35	38	38	72	223
Other	295	494	549	777	857	2,972
Total	4,614	5,309	5,484	5,383	5,233	26,023

Table 6 refers to the crashes by lighting for fatal and serious injury crashes. As shown, approximately 45% of fatal and serious injury crashes occurred during non-daylight conditions (e.g., dark, dusk, and dawn)

Table 6: KA Crashes in Murfreesboro by Lighting Condition

Lighting Condition	2020	2021	2022	2023	2024	Total
Daylight	30	38	51	37	46	202
Dark – Lighted	22	23	30	22	24	121
Dark – Not Lighted	6	3	4	5	5	23
Dusk	3	5	1	2	2	13
Dawn	-	-	1	-	3	4
Dawn	1	-	-	3	2	6
Total	62	69	87	69	82	369

As seen in **Figure 16**, non-daylight crashes are frequent throughout a majority of the City, with a dense hotspot near the I-24 at Old Fort Parkway interchange.

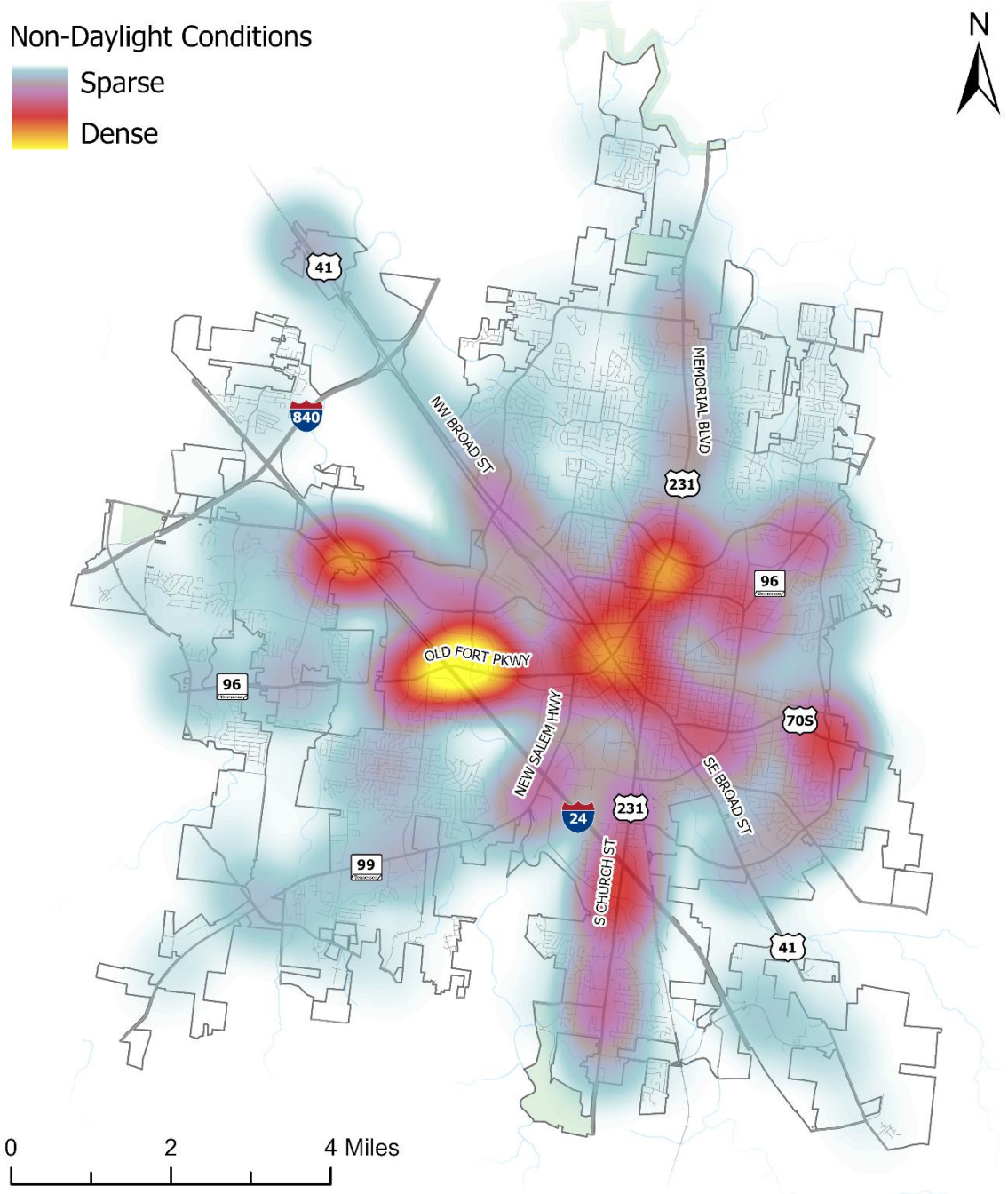


Figure 16: Murfreesboro Non-Daylight Crash Density

Crashes by Road Surface Condition

The condition of the road surface affects how vehicles interact with the roadway and directly influences the frequency of crashes. Wet pavement can reduce tire traction and exacerbate the frequency and severity of vehicle crashes. Inadequate roadway surface conditions can be improved through various pavement friction applications and treatments, as well as upgrading striping and signage to be more visible during adverse conditions.

The entire range of crashes by roadway surface condition is listed below in **Table 7**.

Table 7: Crashes in Murfreesboro by Road Surface Condition

Surface Condition	2020	2021	2022	2023	2024	Total
Dry	3,248	3,845	4,073	3,723	3,622	18,511
Wet	1,080	940	839	900	753	4,512
Snow	4	34	33	1	26	98
Ice	-	39	15	-	13	67
Unknown	282	451	524	759	819	2,835
Total	4,614	5,309	5,484	5,383	5,233	26,023

Table 8 shows a breakdown of fatal and serious injury crashes by roadway conditions. Approximately 16% of these occurred during wet or icy conditions.

Table 8: KA Crashes in Murfreesboro by Road Surface Condition

Surface Condition	2020	2021	2022	2023	2024	Total
Dry	47	58	71	60	72	308
Wet	15	10	14	9	9	57
Ice	-	1	2	-	-	3
Unknown	-	-	-	-	1	1
Total	62	69	87	69	82	369

As seen in **Figure 17**, non-dry surface condition crashes are frequent at several interchanges with I-24, along with dense hotspots along Memorial Boulevard and Broad Street.

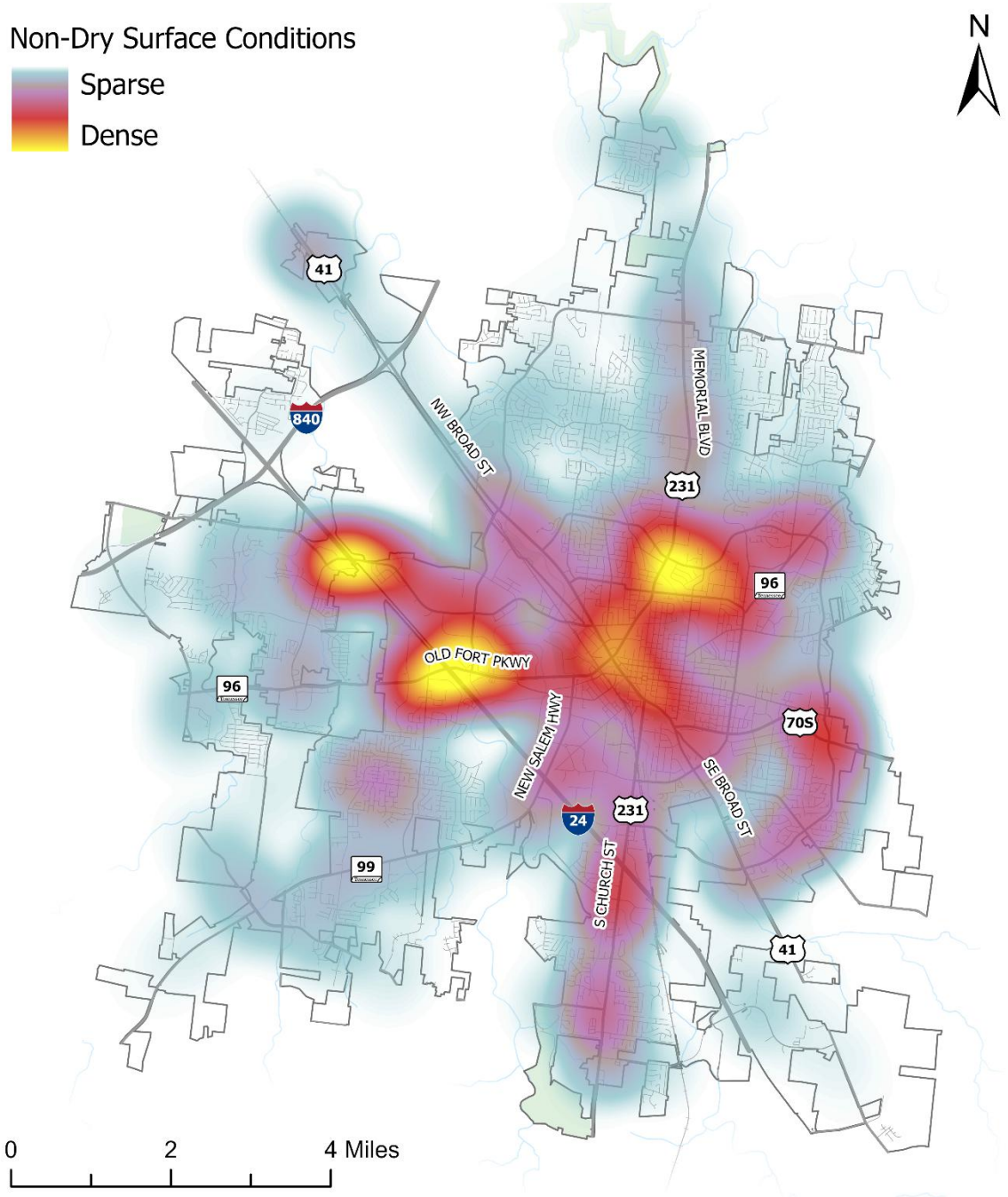


Figure 17: Murfreesboro Non-Dry Roadway Conditions Crash Density

High Crash Locations

The total number of crashes at a location does not tell the whole story, as areas with higher traffic volume are more likely to experience a greater frequency of crashes. Crash rate calculations account for traffic volumes to provide a more effective comparison among study corridors. The crash rates shown in **Table 9** below are expressed as crashes per 1 million total entering vehicles (TEV) and were calculated using the FHWA Roadway Departure Safety manual methodology. **Table 9** and **Table 10** summarizes the top 10 city roadway intersections, total crashes, and fatal and serious injury crashes, respectively. While these metrics were not the only criteria for inclusion in the HIN, this analysis was an important first step in HIN development.

Table 9: High Crash Intersections

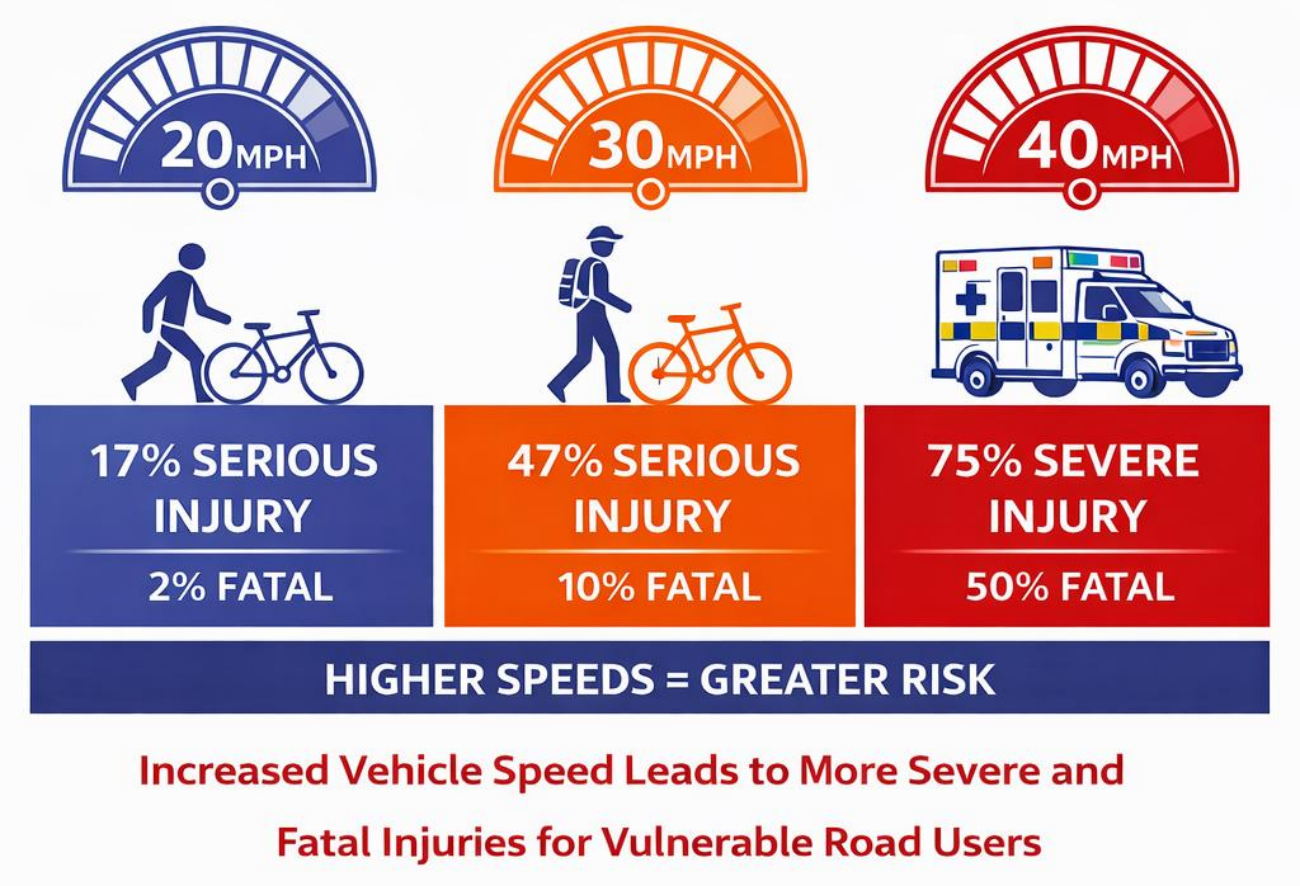
Intersection	Control Type	Total Crashes	Rank by Total Crashes	TEV	Crash Rate	Rank by Crash Rate
Old Fort Pkwy at Cason Ln / John R Rice Blvd	Signalized	262	2	45,000	3.19	1
Old Fort Pkwy at Chaffin Pl / Thompson Ln	Signalized	327	1	60,000	2.99	2
Rutherford Blvd at Dr. Martin Luther King Jr. Blvd	Signalized	194	4	45,000	2.36	3
N Rutherford Blvd at Lascassas Pk	Signalized	143	10	35,000	2.24	4
Old Fort Pkwy at Agripark Dr / Saint Andrews Dr	Signalized	149	9	37,500	2.18	5
Memorial Blvd at Dejarnette Ln/Haynes Dr	Signalized	171	7	45,000	2.08	6
Memorial Blvd at Northfield Blvd	Signalized	228	3	60,000	2.08	7
Broad St at Medical Center Pkwy	Signalized	184	5	50,000	2.02	8
Memorial Blvd at Clark Blvd	Signalized	181	6	62,500	1.59	9
Church St at Butler Dr / Warrior Dr	Signalized	170	8	65,000	1.43	10

Table 10: High KA Crash Intersection

Intersection	Control Type	KA Crashes	TEV	Crash Rate	Rank by Crash Rate
Broad St at Medical Center Pkwy	Signalized	6	50,000	0.07	5
S Rutherford Blvd. at S.E. Broad St.	Signalized	3	32,000	0.05	7
Armstrong Valley Rd.at Veterans Pkwy.	Signalized	3	20,000	0.08	1
New Salem Hwy. at Warrior Dr.	Signalized	5	35,000	0.08	4
MLK Blvd at Middle Tennessee Blvd.	Signalized	3	45,000	0.04	8
Saint Andrews Dr. at Veterans Pkwy.	Signalized	3	20,000	0.08	1
Mi-Tech Dr. at S. Church St.	TWSC	3	30,000	0.05	6
Perimeter Place Dr.at S. Church St.	TWSC	4	61,000	0.04	9
Joe B. Jackson Pkwy/Lynnford Dr. at S. Church St.	Signalized	3	55,000	0.03	10
Middle Tennessee Blvd. at Samsonite Blvd.	TWSC	3	20,000	0.08	1

Crashes Involving Vulnerable Road Users

Vulnerable road users (VRUs) include pedestrians, cyclists, mobility device users (e.g., wheelchairs), and shared micromobility riders (e.g., e-scooters). VRUs are more exposed and at higher risk in the event of a crash with motorists. Understanding the characteristics of roadways and their surrounding areas such as retail density, number of travel lanes, and roadway speed limits can help identify locations with potentially higher risk for VRUs. As mentioned in the **Emphasis Areas** section, motorcycle and bicyclist crashes are over-represented in the City of Murfreesboro compared to the statewide and other urban area trends. Although this can be attributed to the higher volume of VRU traffic in the area, the safety issue remains unacceptable. **Figure 18**, shown below, displays the locations where VRU crashes occurred along the Murfreesboro roadway network. The most dense areas of these crashes occur along Broad Steet near the intersections at Old Fort Parkway and W Main Street. There are also a large number of crashes along the north leg of Memorial Boulevard, east of Broad Street.



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Crash severity for vulnerable road users increases dramatically as vehicle speeds rise, with FHWA data showing a much higher likelihood of fatal or serious injury for pedestrians and cyclists struck at higher speeds compared to those struck at lower speeds. Vehicle speed is one of the most critical factors influencing crash severity for vulnerable road users. FHWA data illustrates that even modest increases in speed substantially raise the risk of fatal and serious injuries for pedestrians and cyclists, underscoring the importance of speed management on City streets.

Upgrading pedestrian crossings with pedestrian signal equipment, or other improvements such as RRFBs (Rectangular Rapid Flashing Beacons) and PHBs (Pedestrian Hybrid Beacons) can help to reduce conflicts between vehicles and pedestrians, while also forcing vehicles into more restrictive measures when yielding to non-motorists.

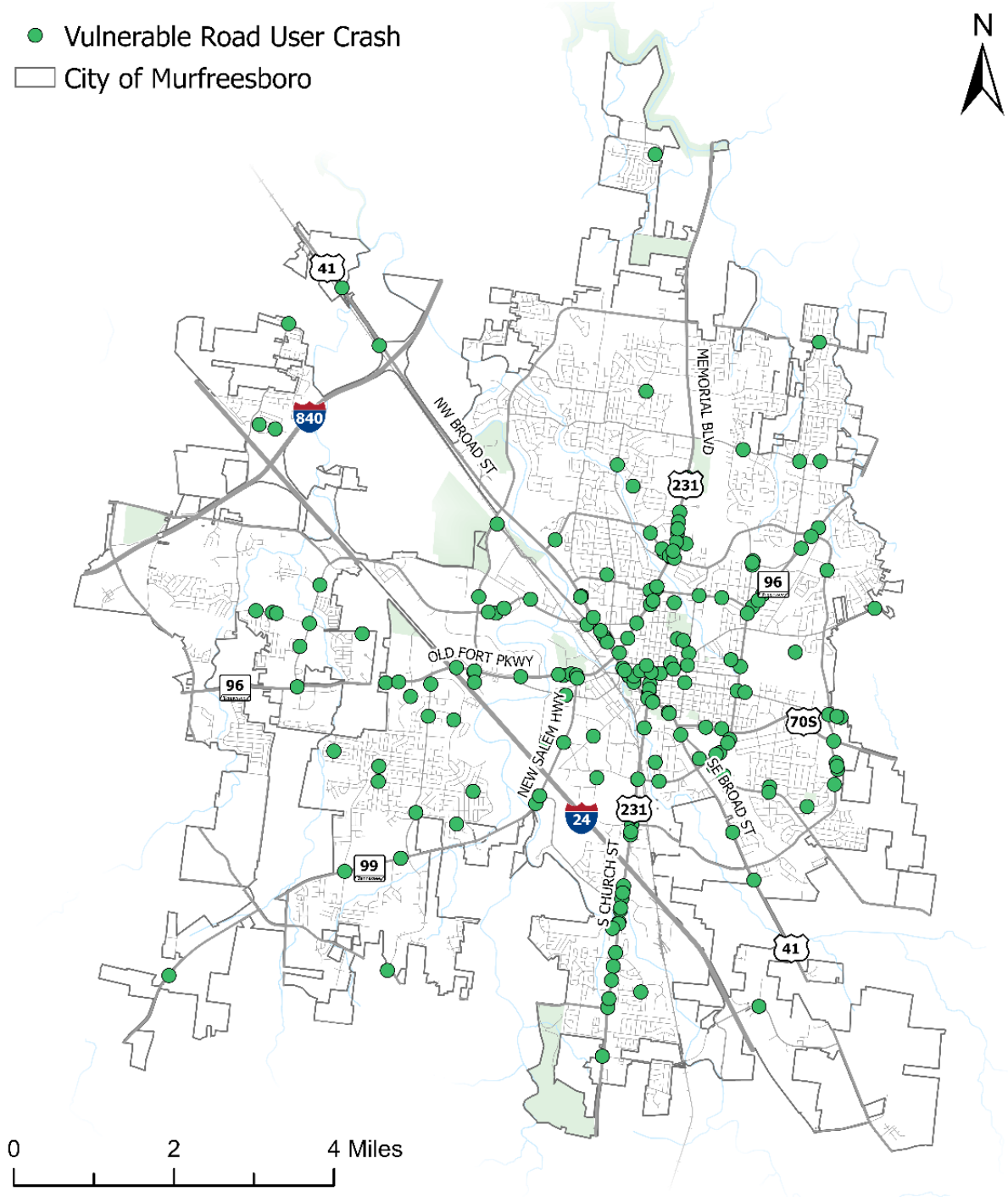


Figure 18: Crashes Involving Vulnerable Road Users (2019-2023)

Vulnerable Road User Path Connectivity

As seen in **Figure 19**, there are several areas in Murfreesboro that experience large gaps between sidewalks and multi-use paths. This disconnection can force VRUs into vehicle lanes with little to no shoulder, greatly increasing the risk of vehicular conflicts. Despite the presence of an extensive network of VRU paths in neighborhoods and parks, there is a notable lack of connectivity between neighborhoods and along higher-speed arterial and collector roads. Moreover, while many roads in the area have sidewalks, frequent switches from one side of the road to the other create numerous crossing points. These unnecessary crossings heighten the risk of conflicts between motorists and non-motorists. Implementing continuous sidewalks or shared-use paths on one or both sides of the roadway would help mitigate these conflicts and enhance overall safety. Figure 19 illustrates the locations where sidewalks are present within Murfreesboro overlayed with the total VRU crashes.

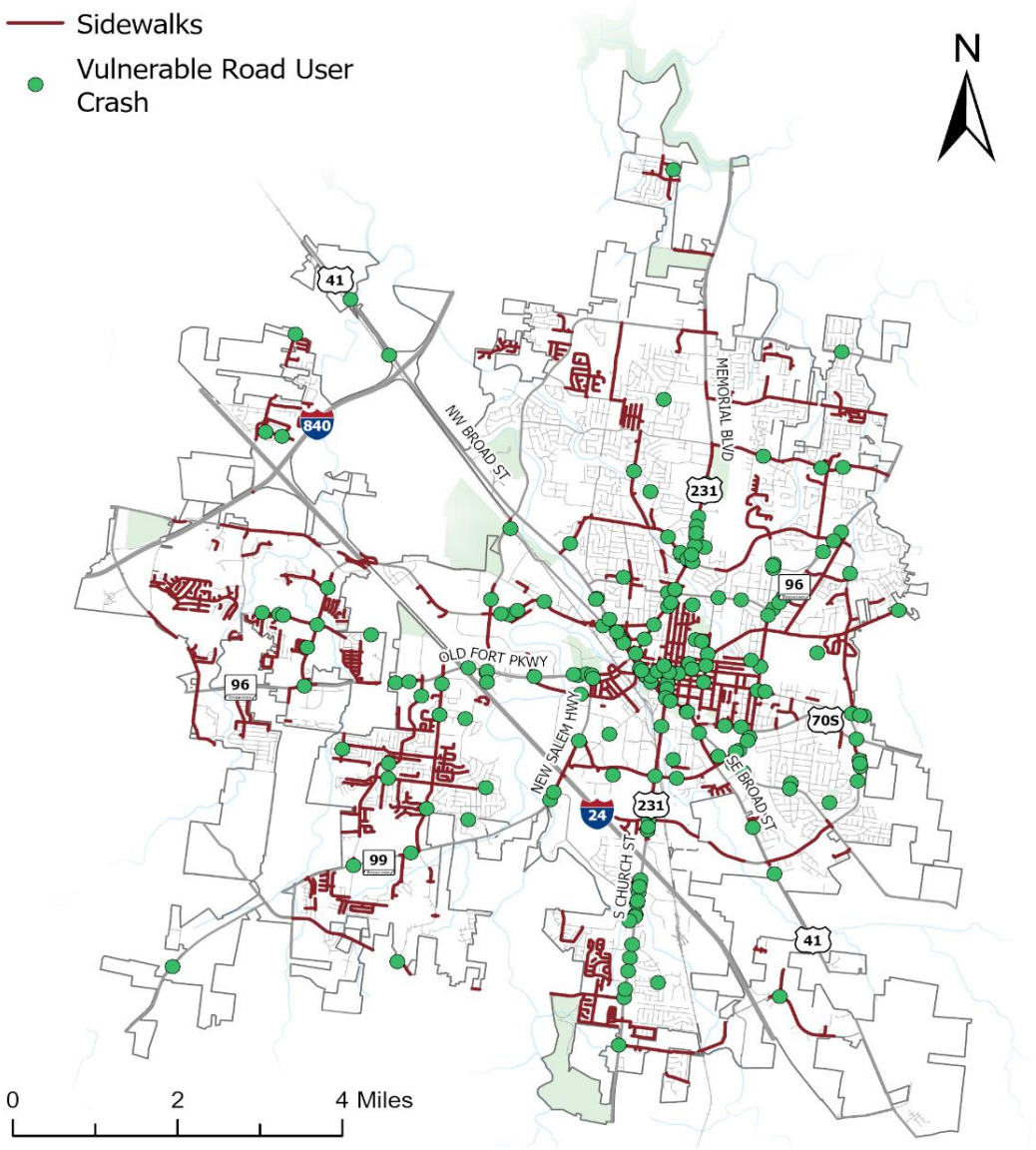


Figure 19: City of Murfreesboro Sidewalks and Multi-Use Paths

Transit Routes

Figure 20 illustrates where VRU crashes occurred relative to Murfreesboro Transit bus stops and routes. Routes primarily radiate from the city center, forming a hub pattern that connects key neighborhoods and commercial zones. Bus stops are densely clustered along these routes, especially downtown and along major corridors like Old Fort Parkway and South Church Street. This alignment indicates that public transit coverage is strongest in central and high-demand areas, providing accessibility while intersecting with several crash-prone zones. The following map overlays the 16 VRU crashes that occurred within 300 ft of a bus stop. The following bus stops experienced the greatest number of VRU crashes (i.e. within 300ft):

1. Stop ID: 14 S Church Street & NW Broad experienced five VRU crashes
2. Stop ID: 18 Farrer Bros experienced two VRU crashes
3. Stop ID: 12 Memorial & Northfield experienced two VRU crashes
4. Stop ID: 3 NW Broad & S Church experienced two VRU crashes
5. Stop ID: 5 S Church & Rutherford experienced two VRU crashes
6. Stop ID: 12 S Church & Rutherford experienced two VRU crashes

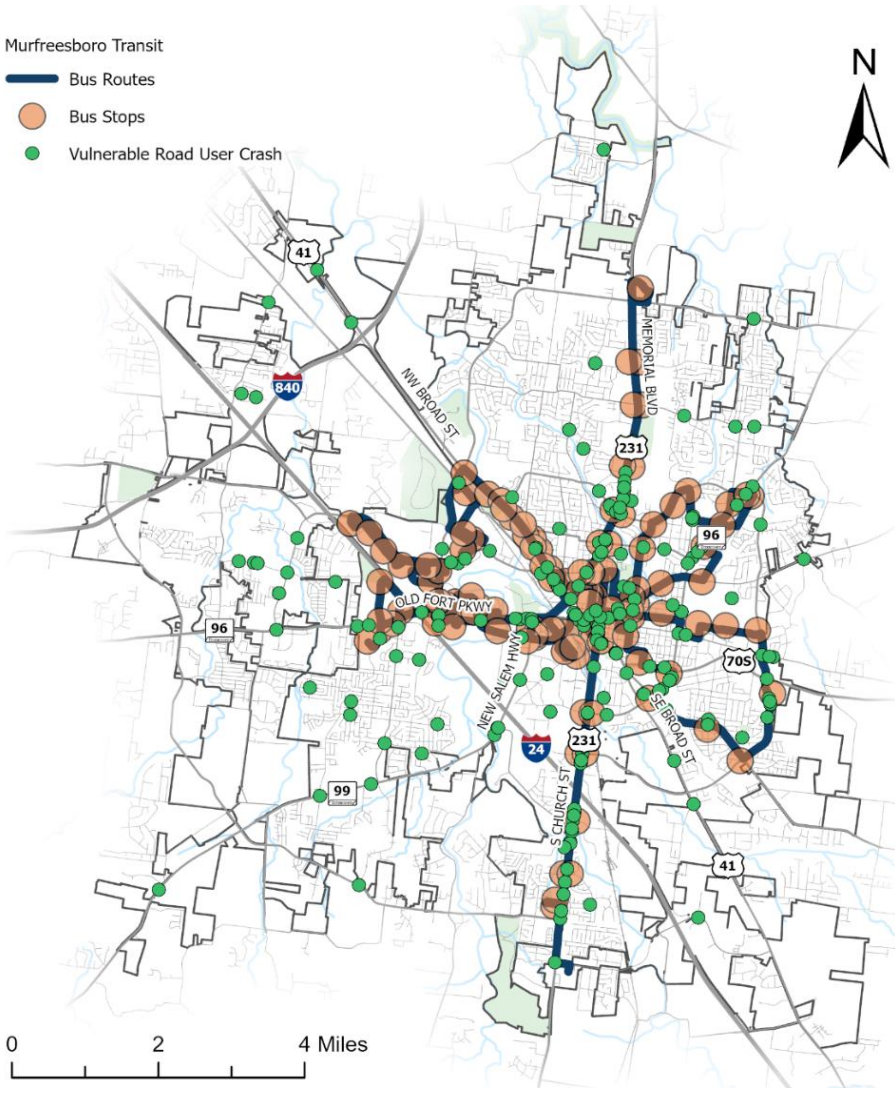


Figure 20: Murfreesboro Transit and VRU Crashes

Freight Routes

The City of Murfreesboro experiences a high presence of freight transportation due to its large industrial uses and advantageous location for connecting major hubs like Nashville and Chattanooga. **Figure 21** displays the existing freight network with an overlay of freight-related crashes as well as fatal and serious crashes that involved a truck. Over the study period, 967 truck-related crashes occurred in Murfreesboro, of which 21 resulted in a fatal or suspected serious injury. Crashes most commonly occurred along the corridors of NW Broad Street, Old Fort Parkway, and S Church Street.

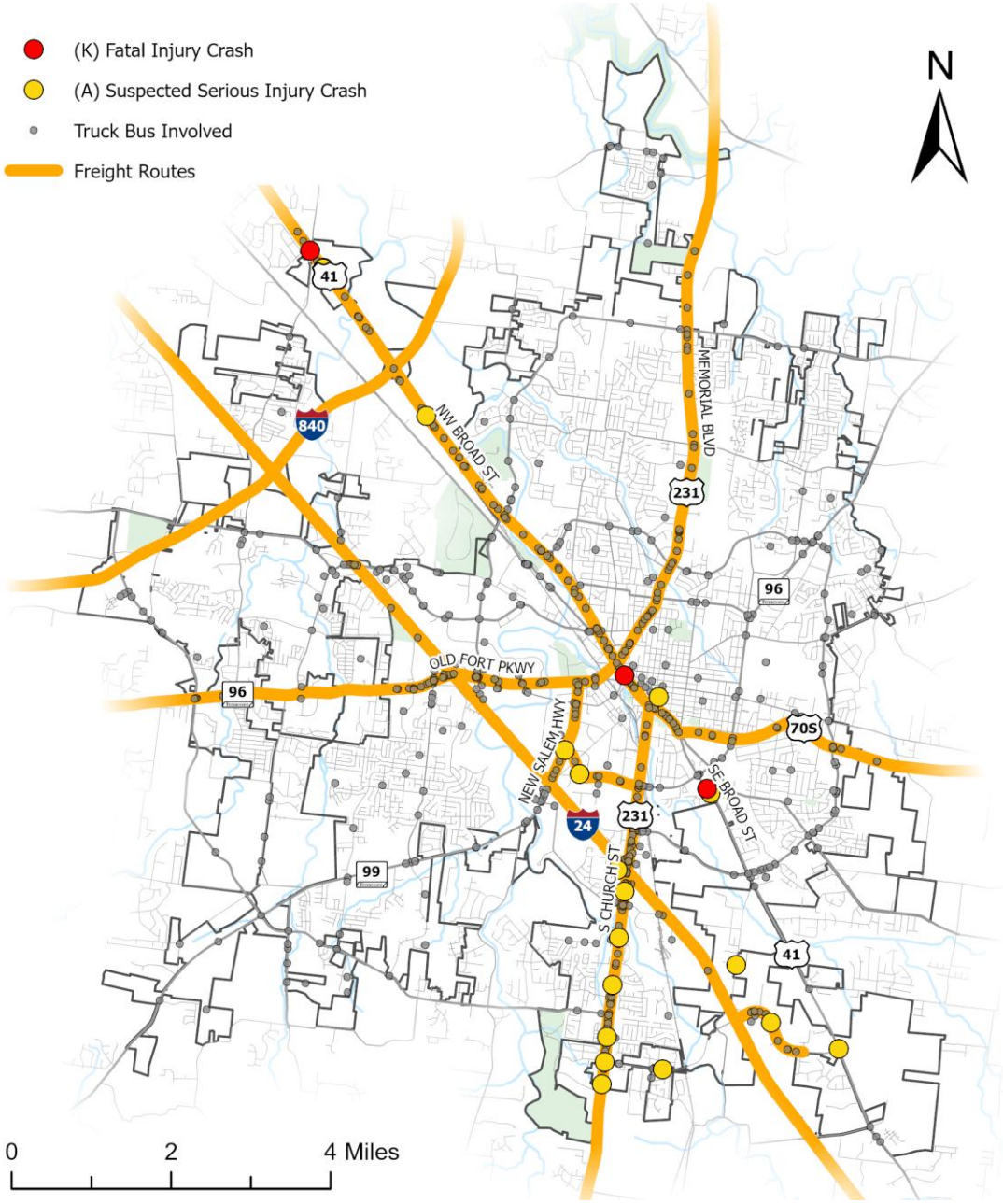


Figure 21: Freight Routes

Distracted Drivers

Distracted driving can be characterized by any activity that takes a driver's attention away from driving, such as cell phone use, eating, in-vehicle technology, or interference from a passenger. While all drivers are susceptible to distracted driving, younger drivers (15-24) and older drivers (65+) are commonly the most represented in distracted driving crashes. **Figure 22** illustrates the heat map for distracted driving related crashes across the City of Murfreesboro. As shown, the most dense areas occur along Old Fort Parkway and near the intersection at Broad Street. Other distracted driving crashes also occur at the interchange of I-24 and S Church Street.

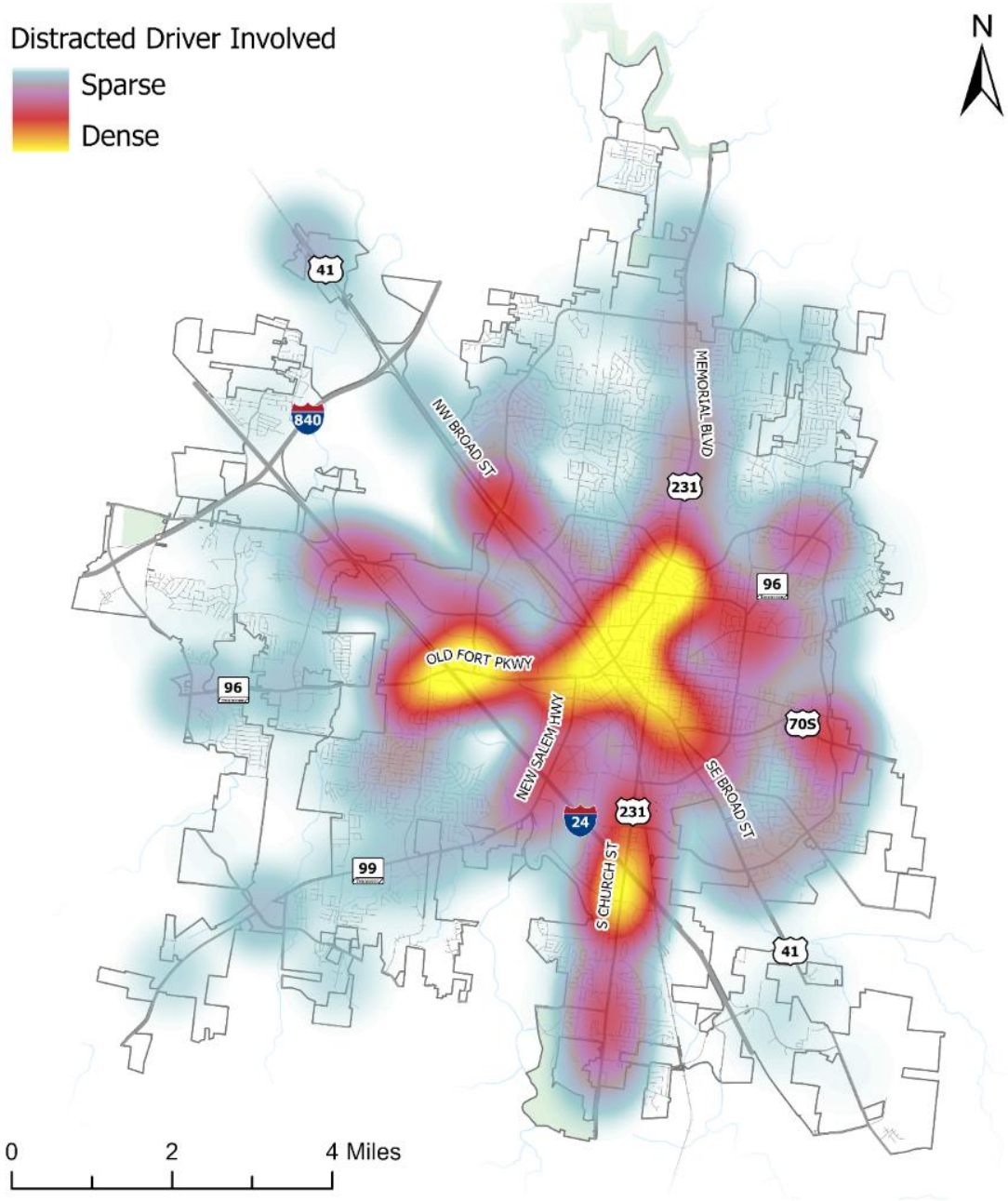


Figure 22: Murfreesboro Crashes Involving Distracted Drivers

Older Drivers

This age group (65+) is often given special consideration due to age-related changes in vision, physical fitness, and cognitive abilities, which can affect driving performance and increased crash risk. While older drivers tend to have the highest levels of experience among roadway users, they also may experience a decline in cognitive abilities. As a result, many in this age group drive less frequently, leading to a decrease in the number of drivers in this demographic. This crash type has experienced a gradual growth over the previous five years, similar to the growth trends of total crashes over the same period. A shown in **Figure 23**, the downtown area of the City as well as major intersections along Old Fort Parkway tend to be the most dense areas of crashes involving senior drivers.

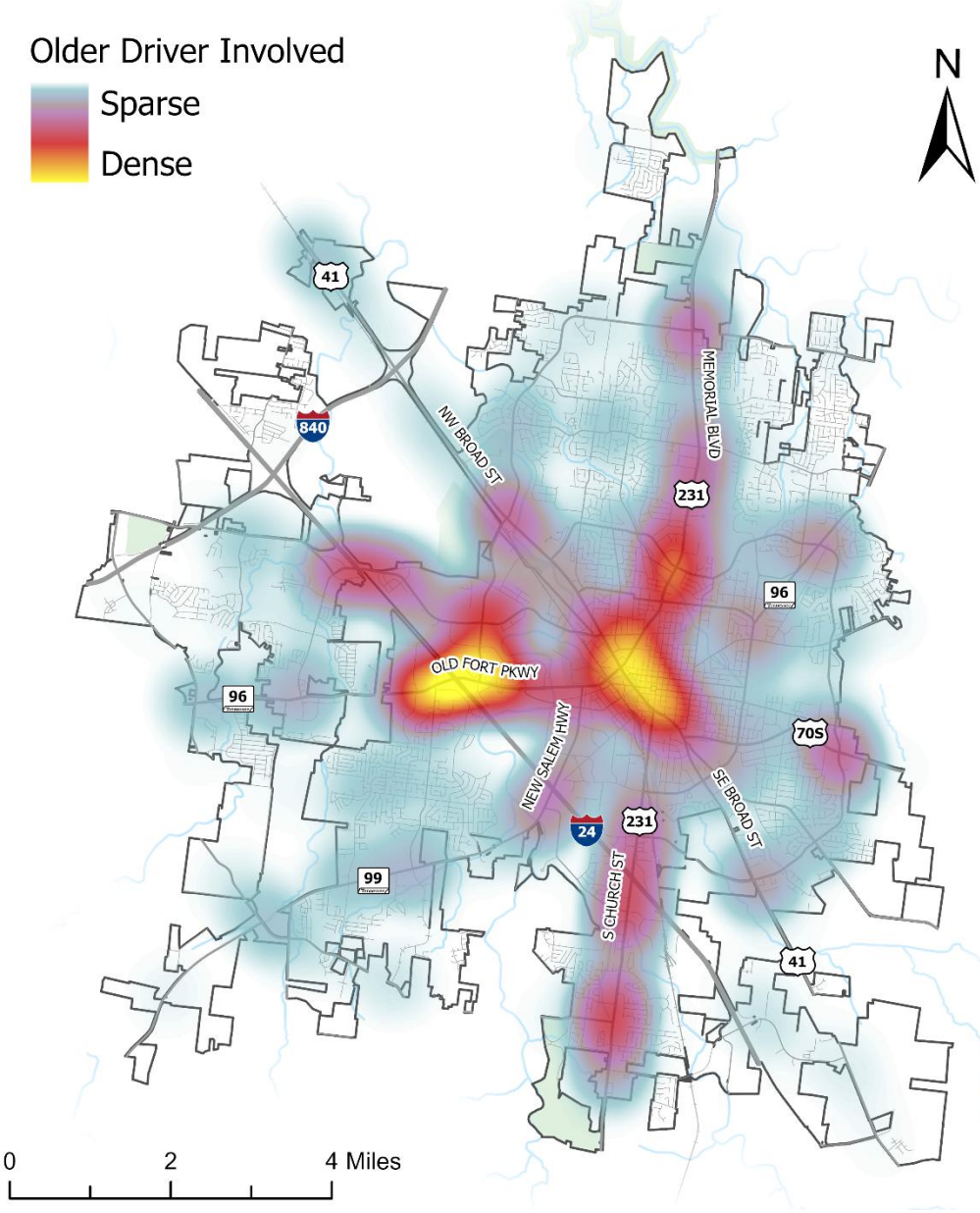


Figure 23: Murfreesboro Crashes Involving Older Drivers

Teen Drivers

This specific age group is commonly associated with higher levels of dangerous driving behaviors, which can be attributed to a combination of inexperience, risk-taking habits, and susceptibility to in-vehicle distractions (phones, passengers, etc.). This type of crash has experienced a gradual growth over the previous five years, similar to the growth trends of total crashes over the same period. **Figure 24** illustrates the heat map for the crashes with teen drivers involved. As shown in **Figure 24**, a highly dense area of this type of crash is near the interchange of I-24 and Old Fort Parkway.

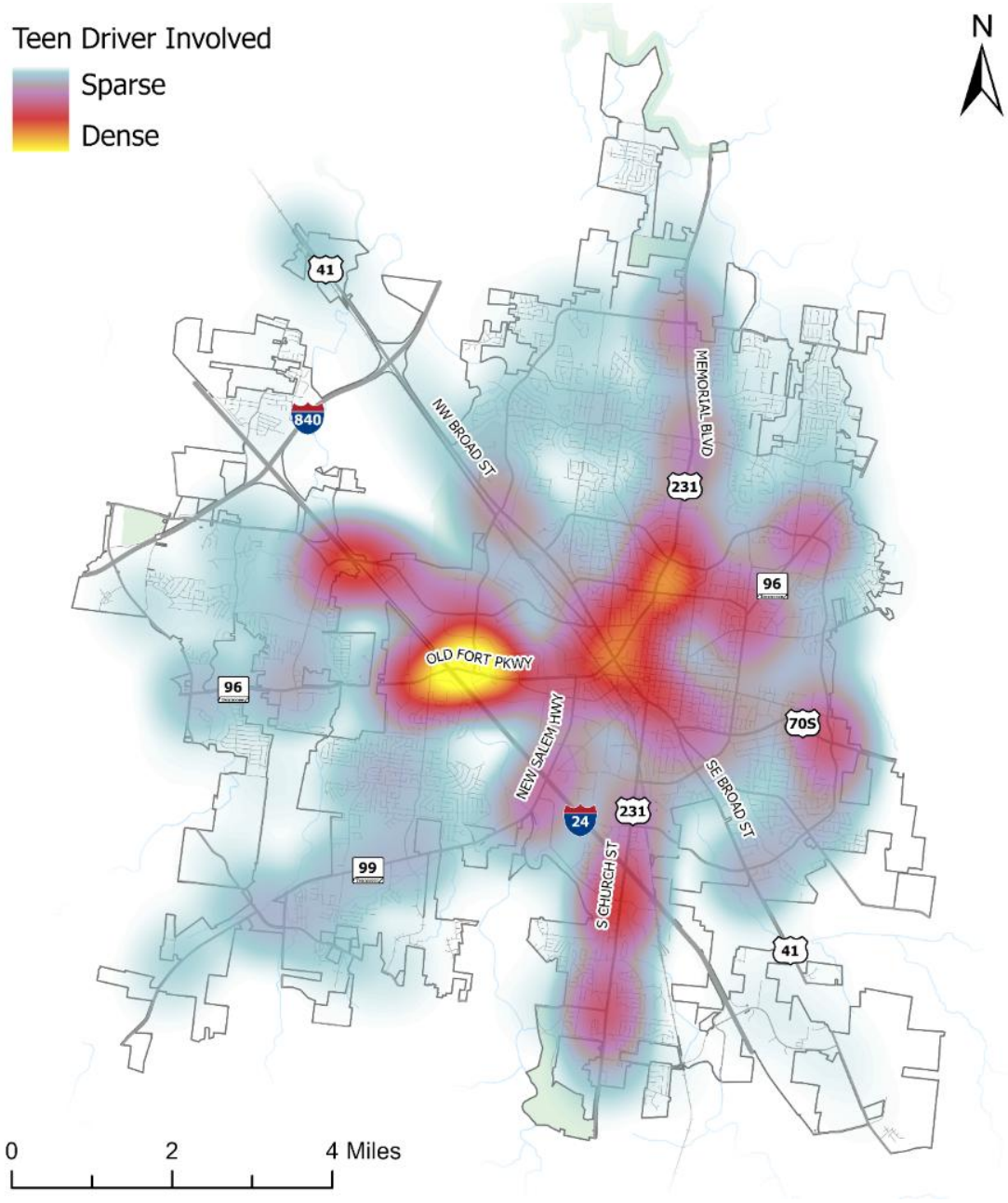


Figure 24: Murfreesboro Crashes Involving Teen Drivers

Impaired Drivers

In both total crashes and high-severity crashes, drivers between 25-34 were most commonly involved in impaired driving crashes. The totals and percentages will not sum to 100% due to the crashes involving drivers in multiple age groups. As shown in **Figure 25,** the highest crash densities occurred near and along the intersection of Broad Street and Memorial Boulevard/Old Fort Parkway.

Table 11: Impaired Drivers Crash Breakdown

Driver Age Group	Percentage of Total Crashes Involving Impaired Drivers	Percentage of Fatal & Serious Injury Crashes Involving Impaired Drivers
15-24	34%	28%
25-34	48%	38%
35-44	31%	23%
45-54	22%	11%
55-64	14%	7%
65 and Over	4%	0%

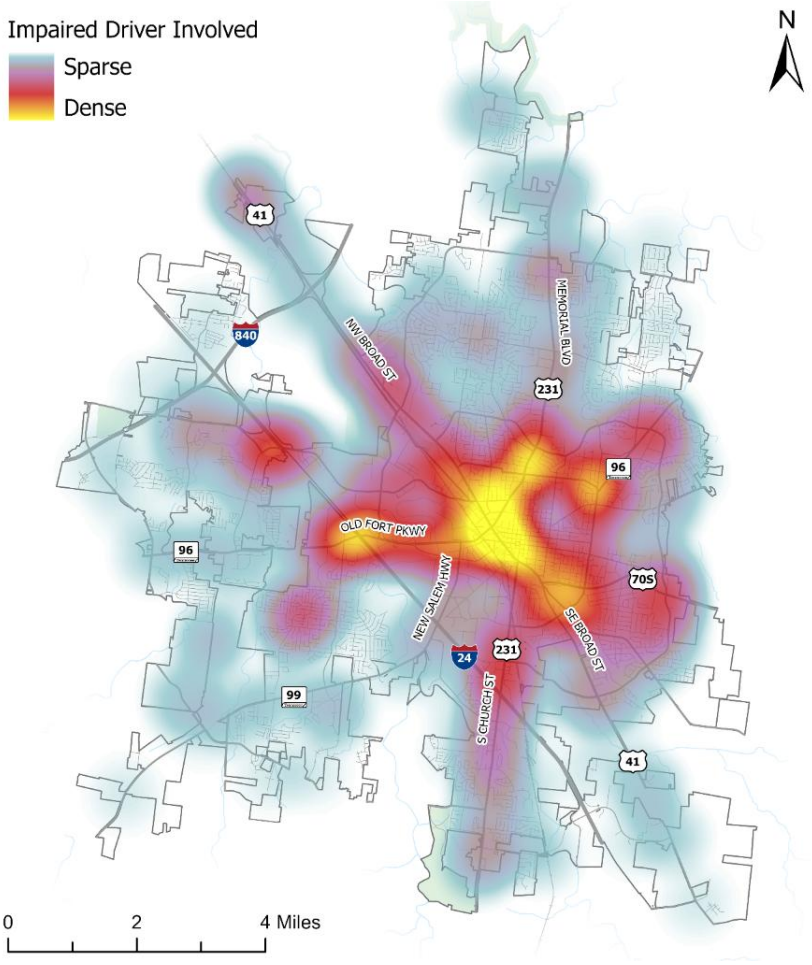


Figure 25: Murfreesboro Crashes Involving Impaired Drivers

Motorcycle Involved

While only 1% of total crashes within the study period involved a motorcycle, crashes involving a motorcycle resulted in roughly 62 fatal and serious injury crashes within the City. In terms of total crashes and fatal and serious injury crashes, drivers aged 15-24 were the most commonly involved age range. As shown in **Figure 26** the highest densities of motorcycle related crashes occur along Broad Street near Memorial Boulevard and Thompson Lane.

Table 12: Motorcycle Involved Crash Breakdown

Driver Age Group	Percentage of Total Crashes Involving Impaired Drivers	Percentage of Fatal & Serious Injury Crashes Involving Impaired Drivers
15-24	49%	39%
25-34	48%	24%
35-44	31%	12%
45-54	23%	11%
55-64	17%	21%
65 and Over	13%	9%

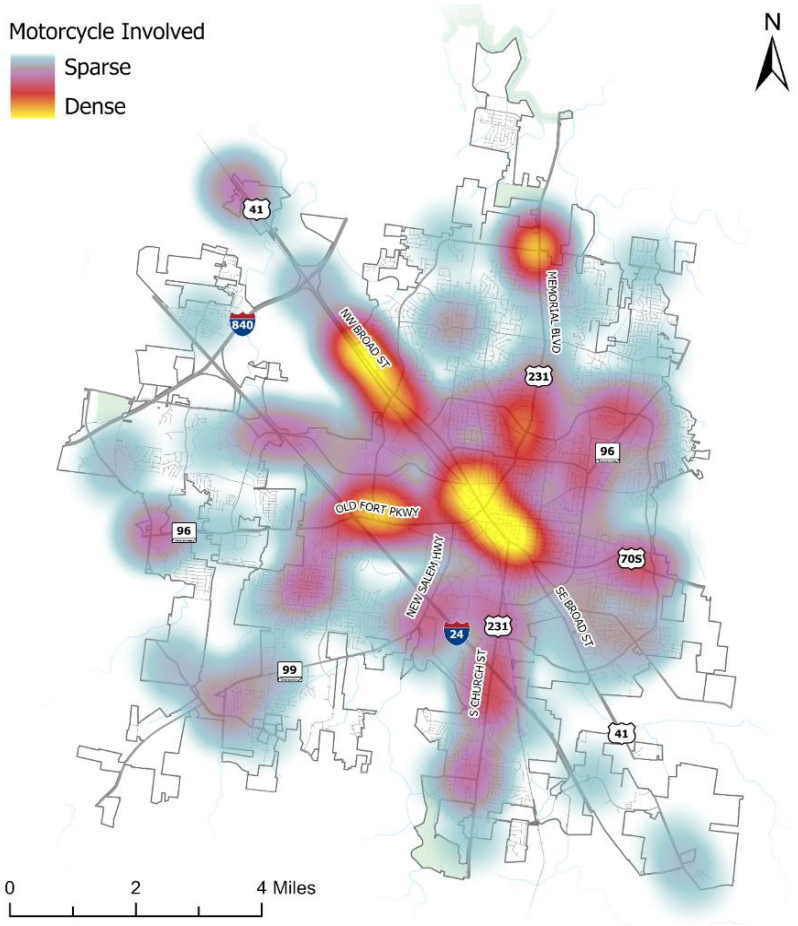


Figure 26: Murfreesboro Crashes Involving Motorcycles

Wild Animal Related Crash

Over the study period, 345 total crashes involved a wild animal, of which 77 occurred during non-daylight conditions, and fortunately none of these crashes resulted in fatal or serious injuries. While crashes are spread relatively throughout the city limits, the main dense areas are along New Salem Highway and around the central area between NW Broad Street and Old Fort Parkway. Without designated wildlife crossing areas, animals are forced to cross in uncontrolled areas where drivers are not readily expecting conflicts in their visual field.

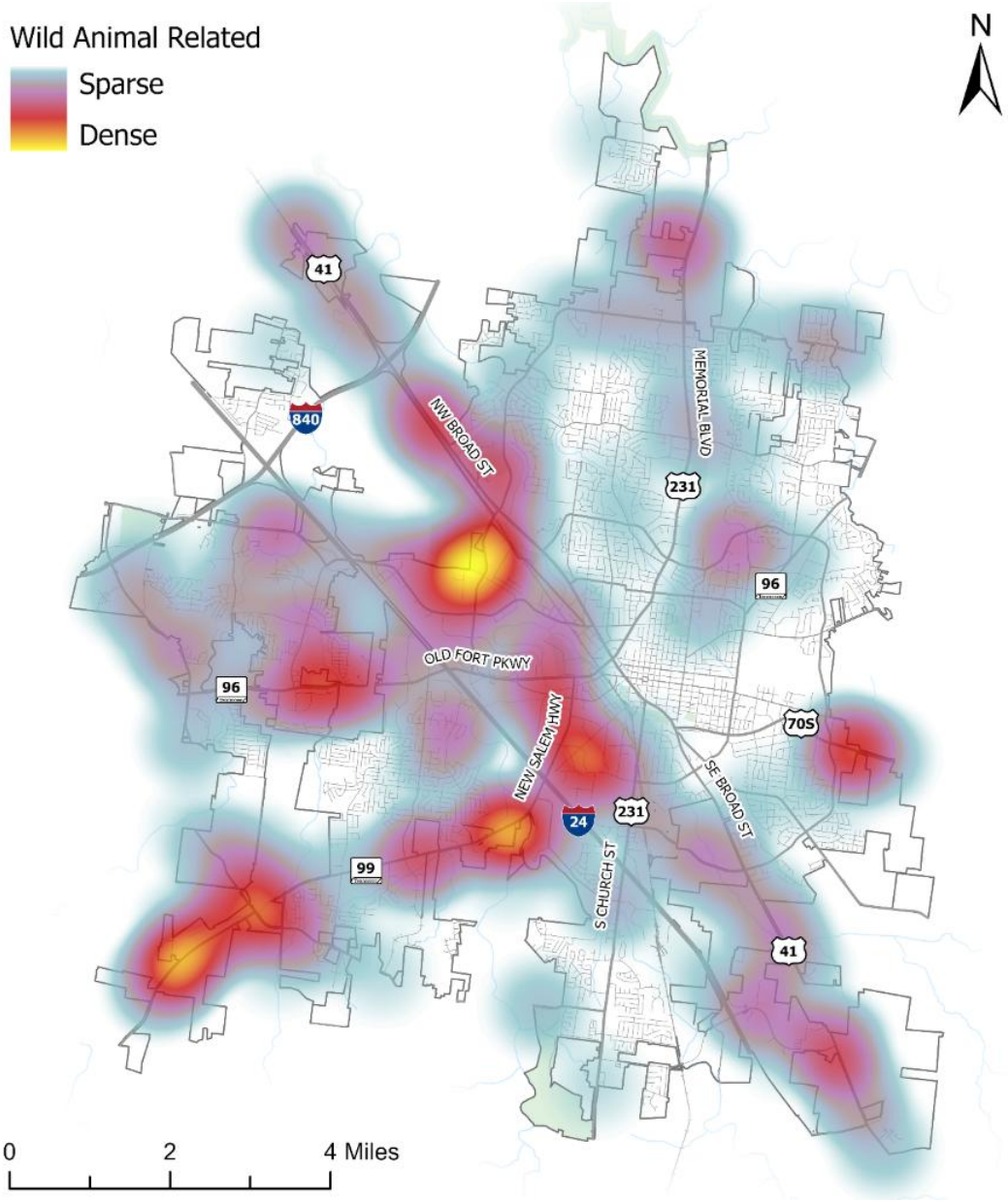


Figure 27: Murfreesboro Crashes Involving Wild Animals

Unrestrained Occupants

Out of all total crashes, the drivers between age 25-34 were most commonly involved in crashes involving an unrestrained occupant. In terms of fatal and serious injury crashes, drivers in the range of 15-24 were most commonly involved in crashes involving unrestrained occupants. As Shown in **Figure 28** the highest densities of crashes with unrestrained occupants occured along Broad Street near Memorial Boulevard and along Old Fort Parkway, west of Broad Street.

Table 13: Unrestrained Occupants Crash Breakdown

Driver Age Group	Percentage of Total Crashes Involving Unrestrained Occupants	Percentage of Fatal & Serious Injury Crashes Involving Unrestrained Occupants
15-24	44%	33%
25-34	46%	28%
35-44	28%	12%
45-54	24%	11%
55-64	15%	21%
65 and Over	8%	9%

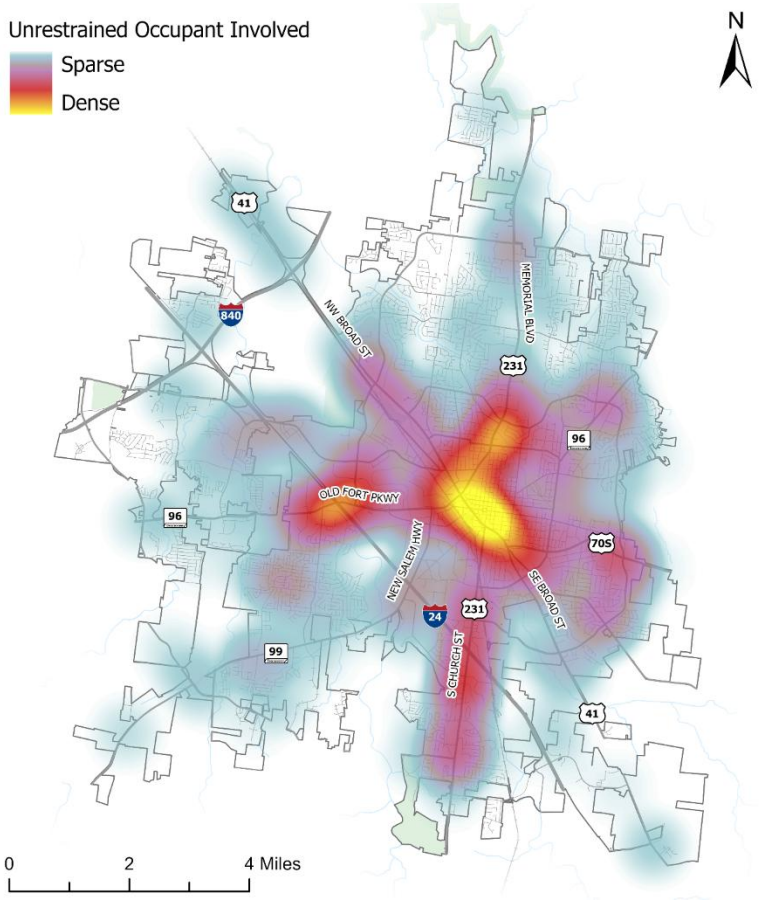


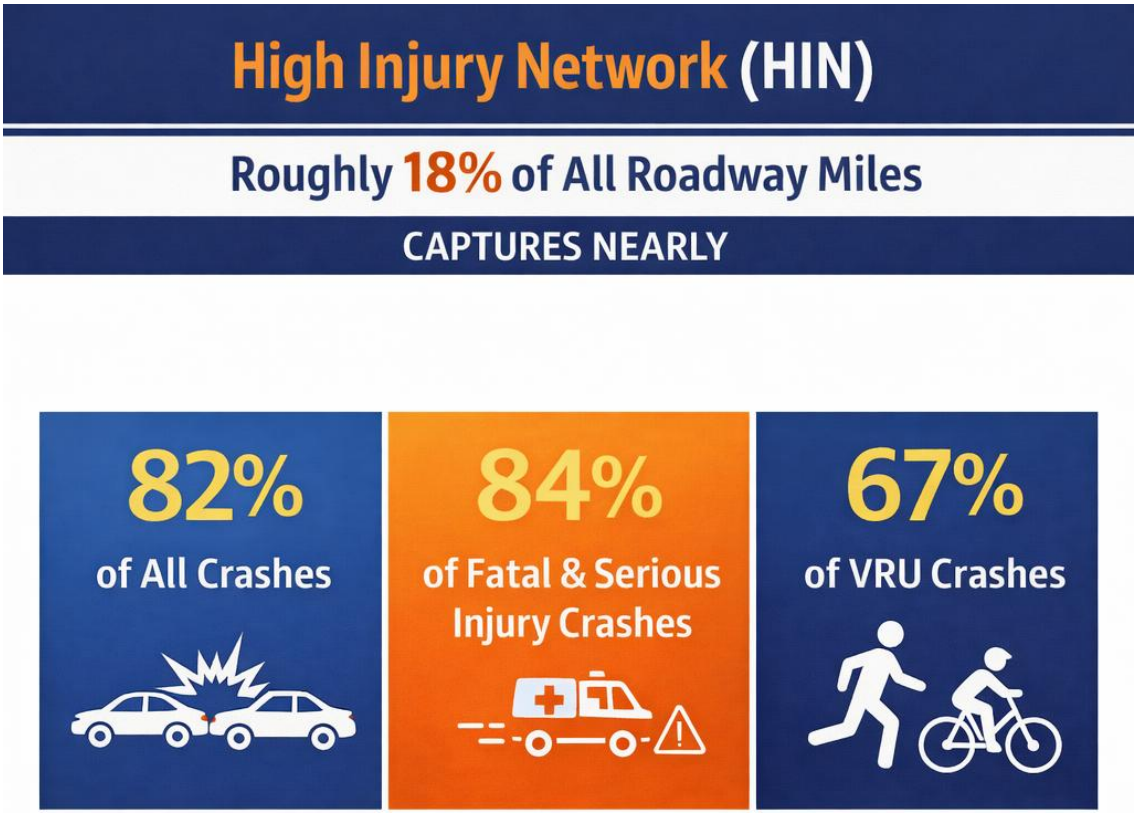
Figure 28: Murfreesboro Crashes Involving Unrestrained Occupants

Identifying a High Injury Network

A High Injury Network (HIN) was developed to identify the routes with the most fatal and serious injury crashes in the City of Murfreesboro. A HIN is a collection of corridors where a disproportionate number of these crashes occur, as well as corridors that may pose higher risks for road users. Developing a HIN allows for the proper allocation of effort and funds towards specific areas of the City that need it most. While the HIN typically includes the major thoroughfares of a study area, the methodology used also allows for minor streets and local roads to be considered and included. As detailed later in the SAP, these segments were selected using a variety of characteristics in an effort to accurately gauge the proper network. Creating the HIN is a key step toward focusing resources in the right direction to develop projects that will help reduce fatal and serious injury crashes for all road users in the City of Murfreesboro.

Methodology

The HIN was identified by first evaluating segments throughout the City of Murfreesboro's roadway network with the highest reported crash volumes and rates during the study period (2020-2024) using TDOT's AASHTOWare Safety platform and ArcGIS analysis software. Sixteen (16) high crash-rate segments were identified at logical termini (i.e., municipal boundary, road name changes, or roadway characteristic changes such as number of lanes). In an attempt to avoid selecting the highest volume roadways for the HIN, several alternate variables including crash rates, crash potential, and public comments were also considered.



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High Injury Network

The City of Murfreesboro High Injury Network (HIN), as shown in **Figure 29**, entails a collection of roadways within the City that disproportionately exhibit events and behaviors that this SAP effort means to mitigate.

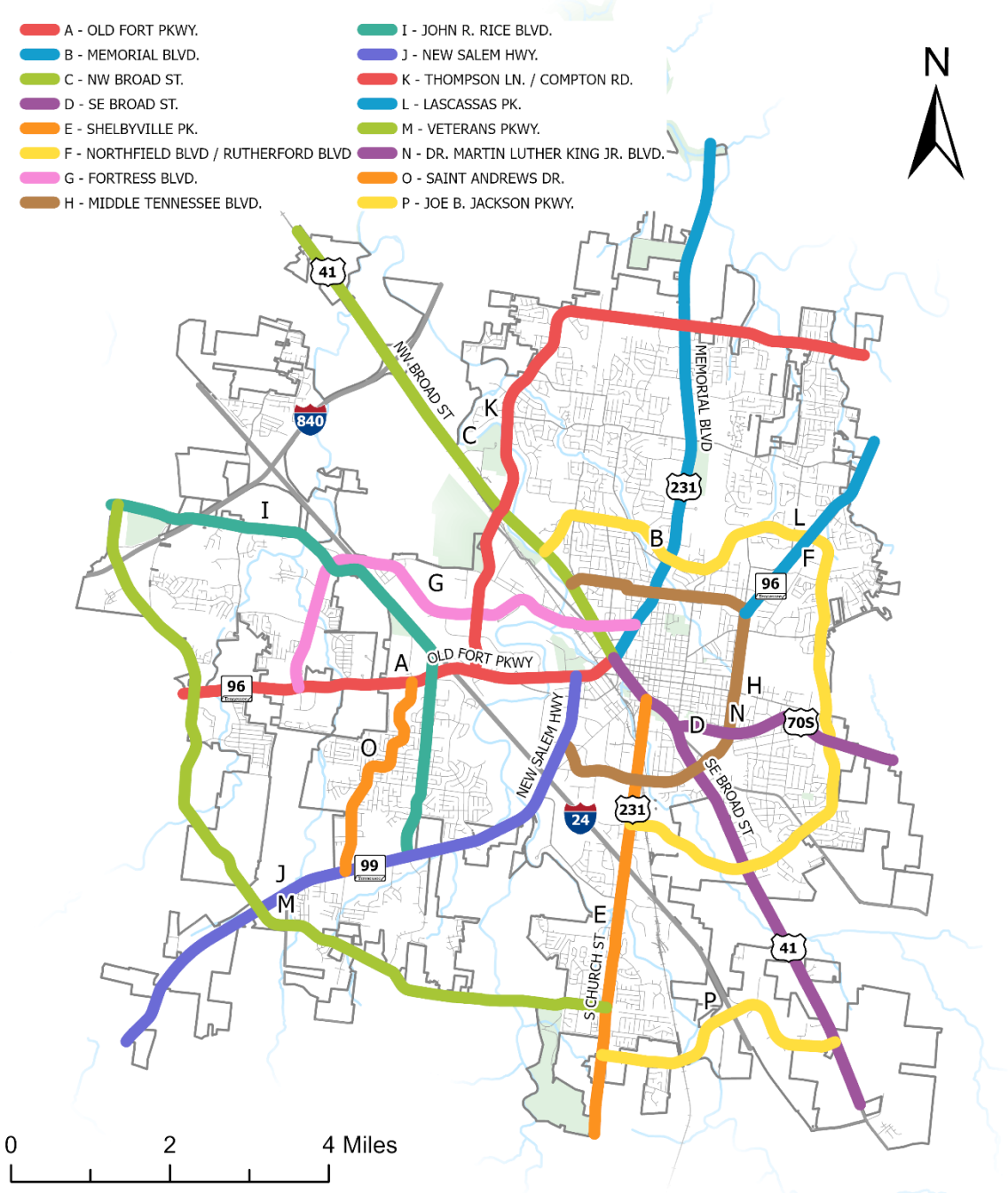


Figure 29: City of Murfreesboro High Injury Network

HIN Crash Coverage

As shown in **Figure 30**, HIN captures a high percentage of VRU crashes and fatal and serious injury crashes, which is a prominent component of the SAP process to identify and prevent in the future. Once identified as an HIN segment, countermeasures can be developed and applied to the relevant roadways in an effort to mitigate the potential for crashes to occur.

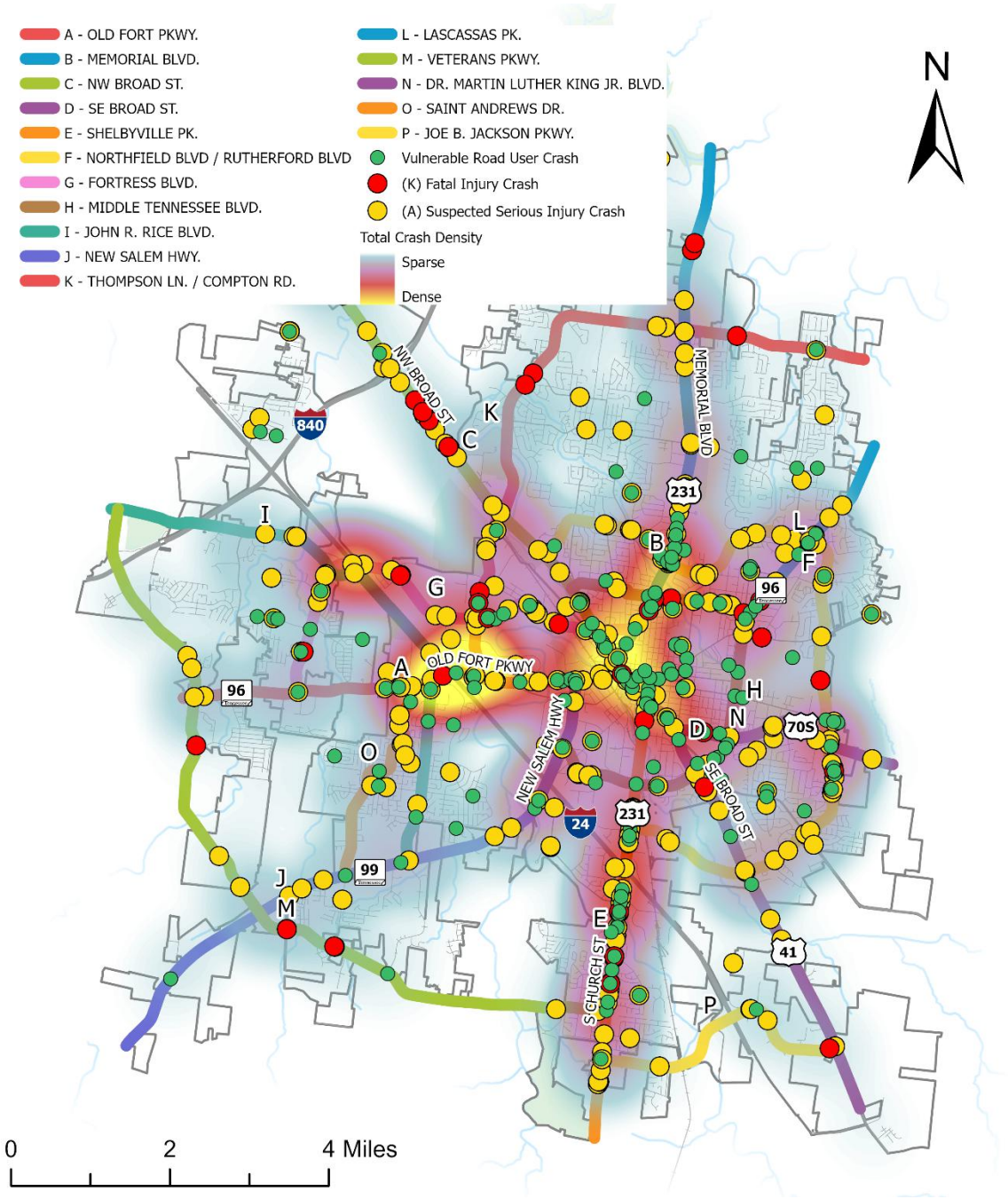


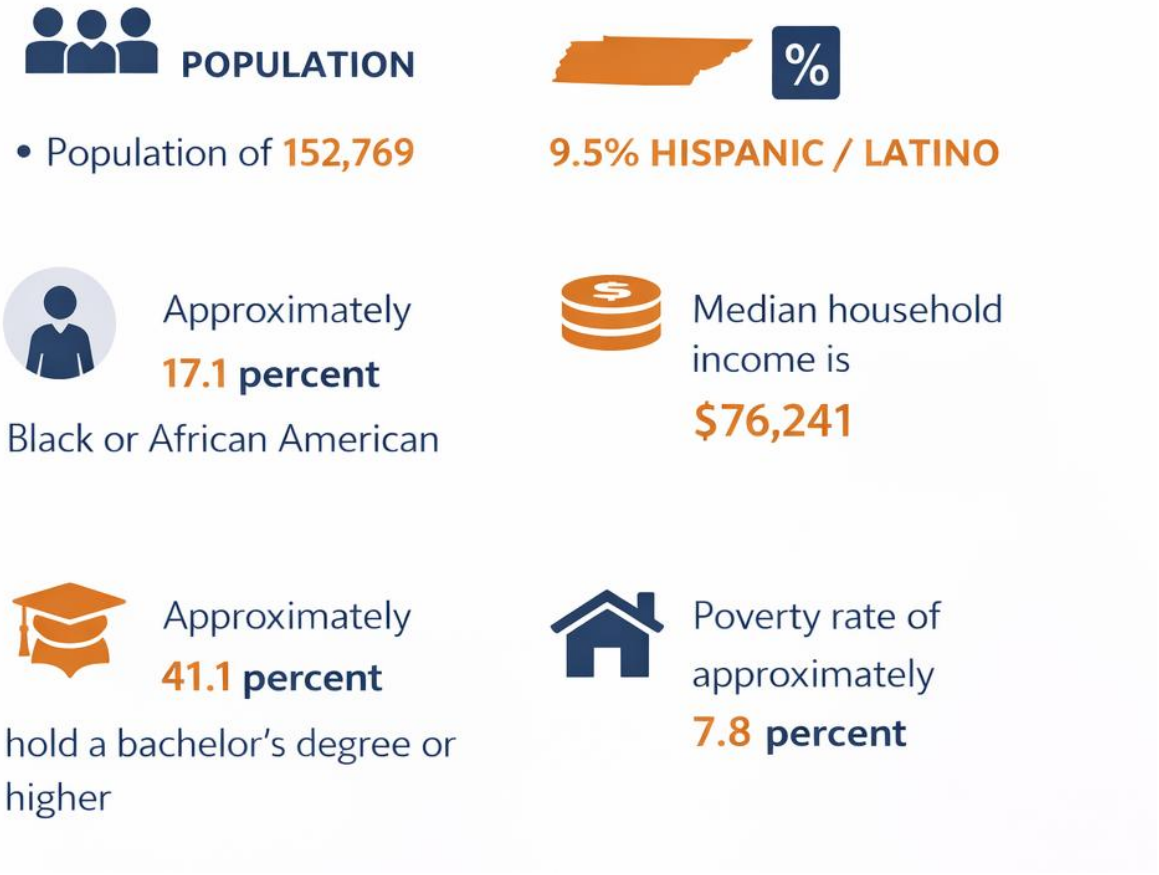
Figure 30: High Injury Network Crash Coverage

MURFREESBORO SAFE STREETS

Community Characteristics & Demographics

Community Characteristics & Demographics

This Section provides a summary of local demographics and community characteristics developed using various national datasets to better understand the City's characteristics. These findings helped form the HIN recommendations and prioritization. This was done through the lenses of both the national disadvantaged communities database and a locally developed index based on the specific attributes of the population of Murfreesboro. The following is a summary of demographic characteristics for the City of Murfreesboro.



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Historically Disadvantaged Communities

The Climate and Economic Justice Screening Tool highlights disadvantaged census tracts nationwide. A community is considered disadvantaged if it is located within a census tract that meets the threshold for one or more environmental, climate, or other burdens, and at least two associated socioeconomic burdens.

As shown below in **Figure 31**, of the 369 fatal and serious injury crashes that took place in Murfreesboro during the study period, 105 (or 28%) occurred in areas determined by the USDOT to be labeled as a Historically Disadvantaged Community.

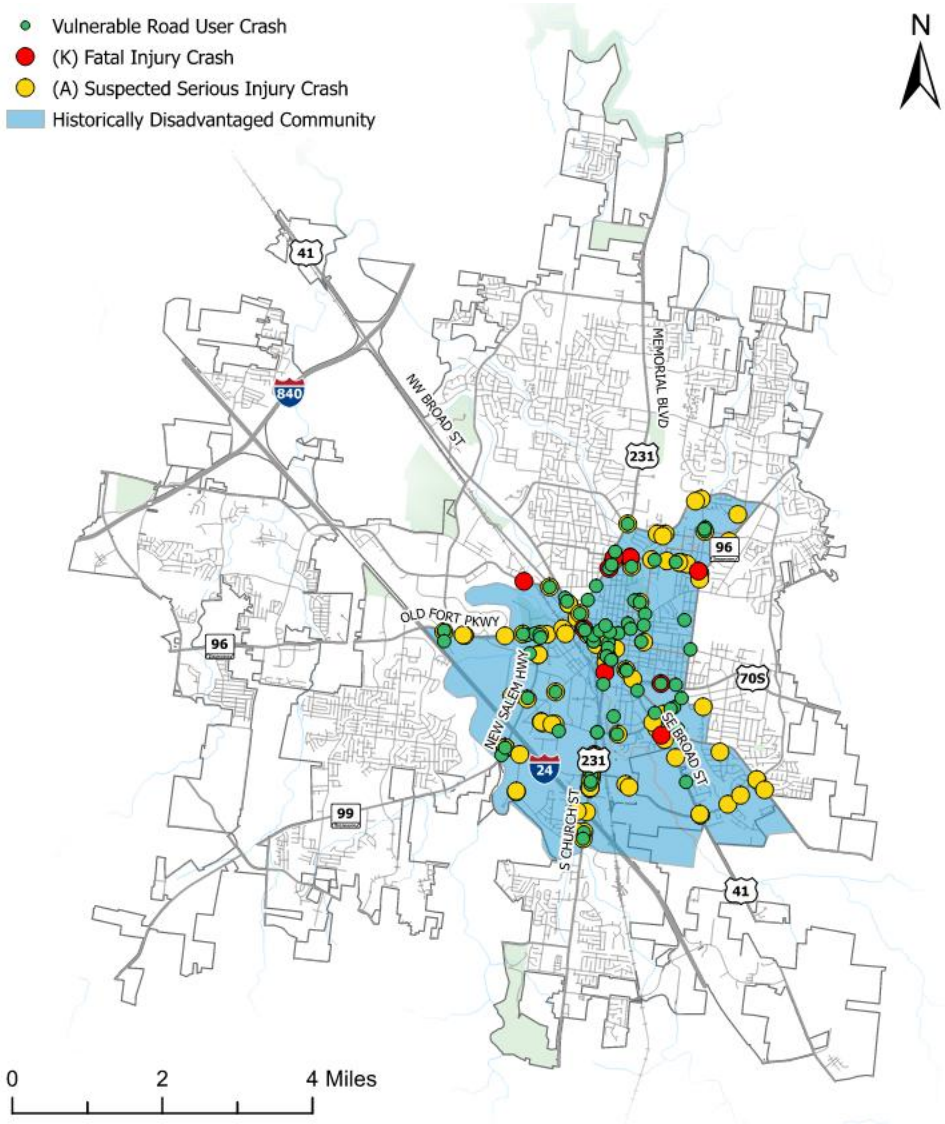


Figure 31: Historically Disadvantaged Communities

Areas of Persistent Poverty

An "Area of Persistent Poverty" is defined by the Bipartisan Infrastructure Law. A project is in an Area of Persistent Poverty if it meets one or more of the following criteria:

- The county in which the project is located consistently had greater than or equal to 20% of the population living in poverty in all three of the following datasets: (a) the 1990 decennial census; (b) the 2000 decennial census; and (c) the most recent (2021) Small Area Income Poverty Estimates; OR
- The Census Tract in which the project is located has a poverty rate of at least 20% as measured by the 2014-2018 5-year data series available from the American Community Survey of the Bureau of the Census; OR
- The project is in any territory or possession of the United States.

As shown below in **Figure 32**, of the 369 fatal and serious injury crashes occurring in Murfreesboro, 120 (33%) occurred in areas of persistent poverty.

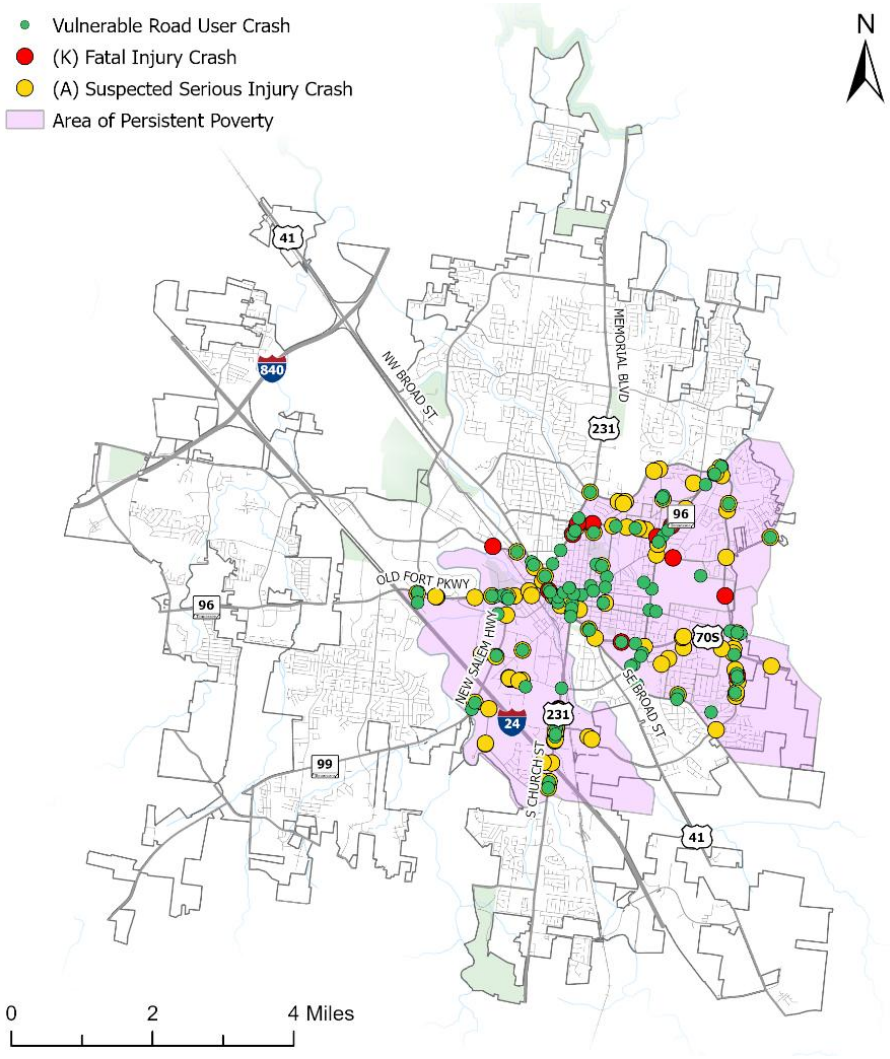


Figure 32: City of Murfreesboro Areas of Persistent Poverty

Social Vulnerability Index

The Centers for Disease Control and Prevention (CDC) developed the Social Vulnerability Index (SVI) tool that considers four overall categories of vulnerability: Socioeconomic Status, Household Characteristics, Racial & Ethnic Minority Status, and Housing Type & Transportation. Between these four categories, 16 individual variables are scaled and calculated to form an overall index score, ranging from 0 to 1 (where an index value of 1 is defined as the most socially vulnerable). Of the 369 fatal or suspected serious injury crashes occurring in Murfreesboro, 83 occurred within areas of high social vulnerability and 109 occurred within areas of medium-high social vulnerability.

The SVI results, along with an overlay of the fatal, suspected serious injury, and vulnerable road user crashes, are shown below in **Figure 33**.

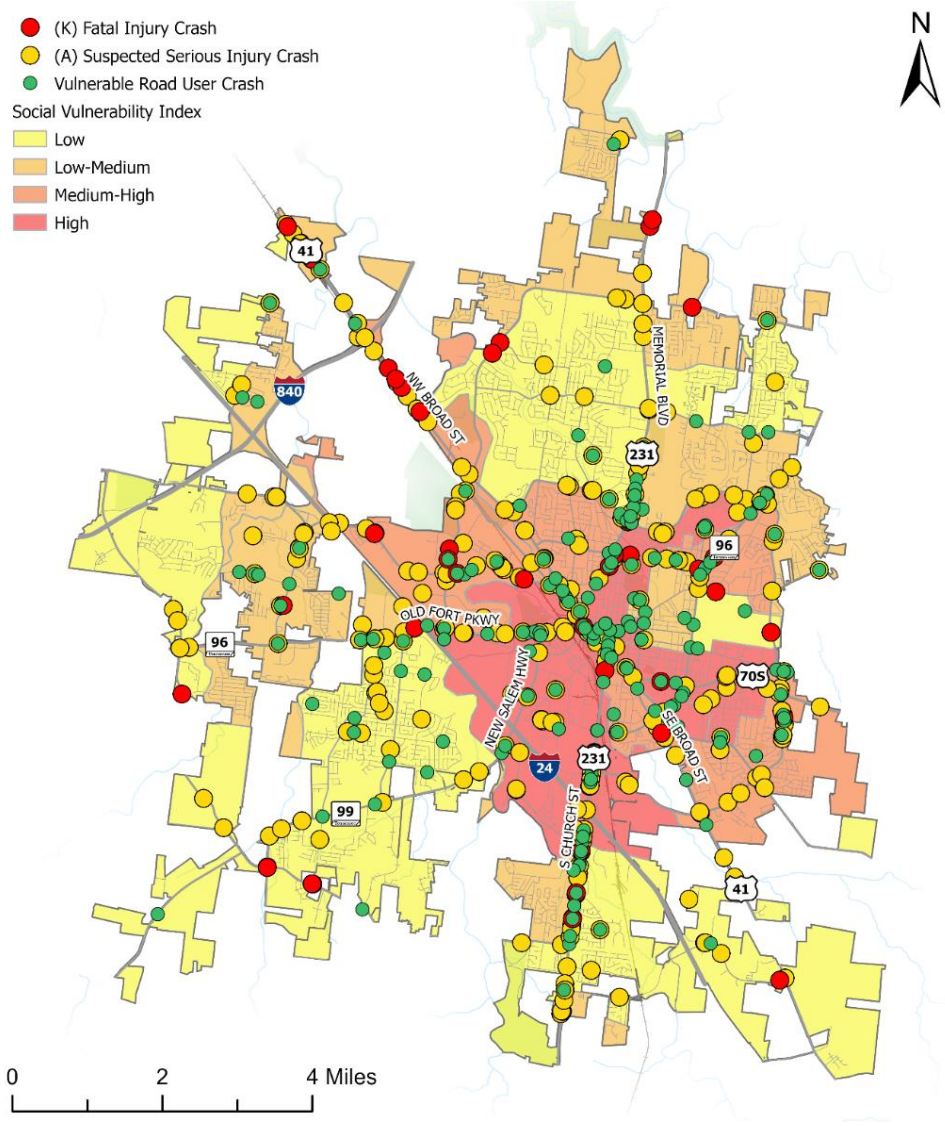


Figure 33: Social Vulnerability Index

Households with No Vehicle Access

Households without access to a personal vehicle face significant transportation challenges, which can increase vulnerability and limit mobility for work, healthcare, and essential services. Areas with higher concentrations of such households often experience reduced access to economic opportunities and emergency resources. Of the 369 fatal or serious injury crashes occurring in Murfreesboro, 137 (37%) occurred within census tracts where a substantial percentage of households reported no vehicle access (high or medium-high).

The summary of households with no vehicle access, along with an overlay of the fatal, suspected serious injury, and vulnerable road user crashes, are shown below in **Figure 34**.

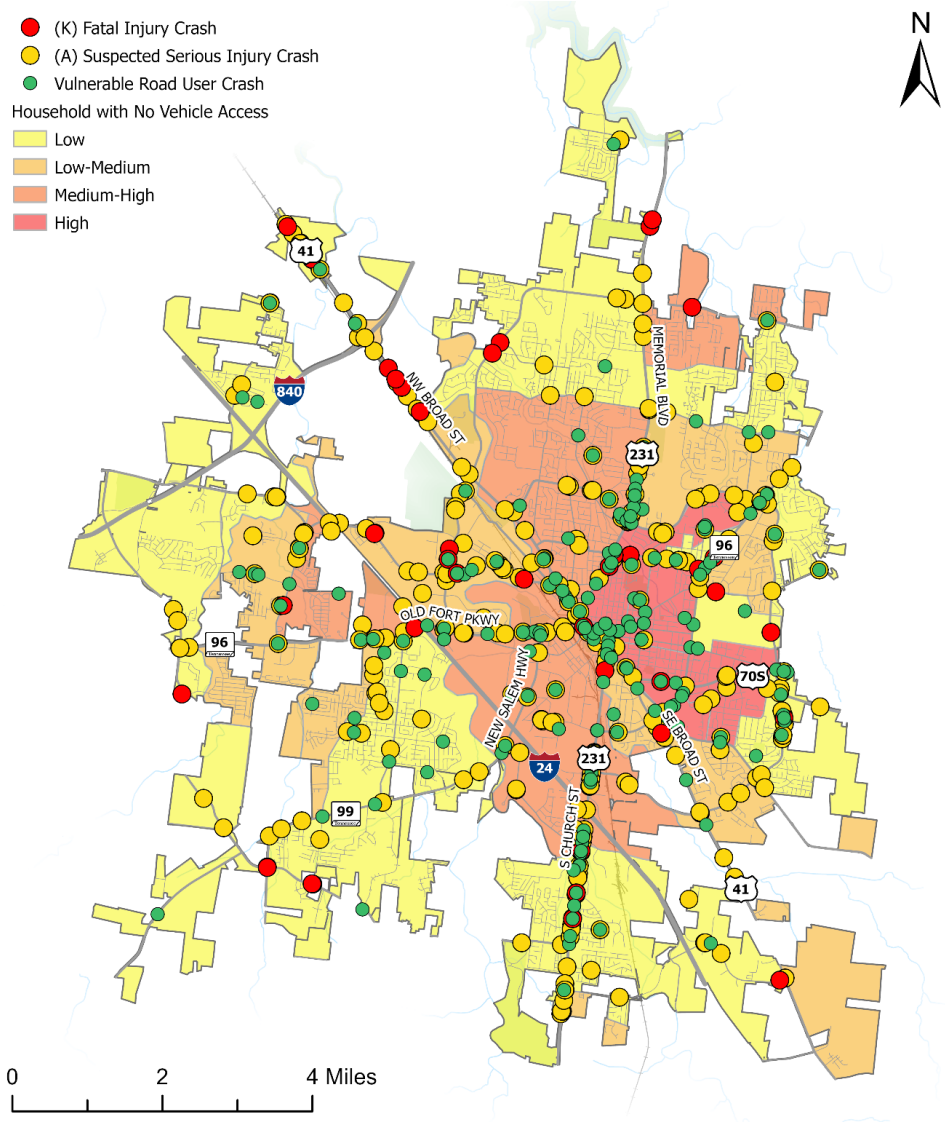


Figure 34: Households with No Vehicle Access

Opportunity Zones

Opportunity Zones are economically distressed communities, defined by individual census tract, nominated by America's Governors, and certified by the U.S. Secretary of the Treasury via their delegation of authority to the Internal Revenue Service. Their purpose is to serve as an incentive to spur private and public investment in underinvested communities. Of the 369 fatal or suspected serious injury crashes occurring in Murfreesboro, 75 occurred within opportunity zones. Additionally, 29-percent of VRU crashes occurred within opportunity zones.

The opportunity zones, along with an overlay of the fatal, suspected serious injury, and vulnerable road user crashes, are shown below in **Figure 35**.

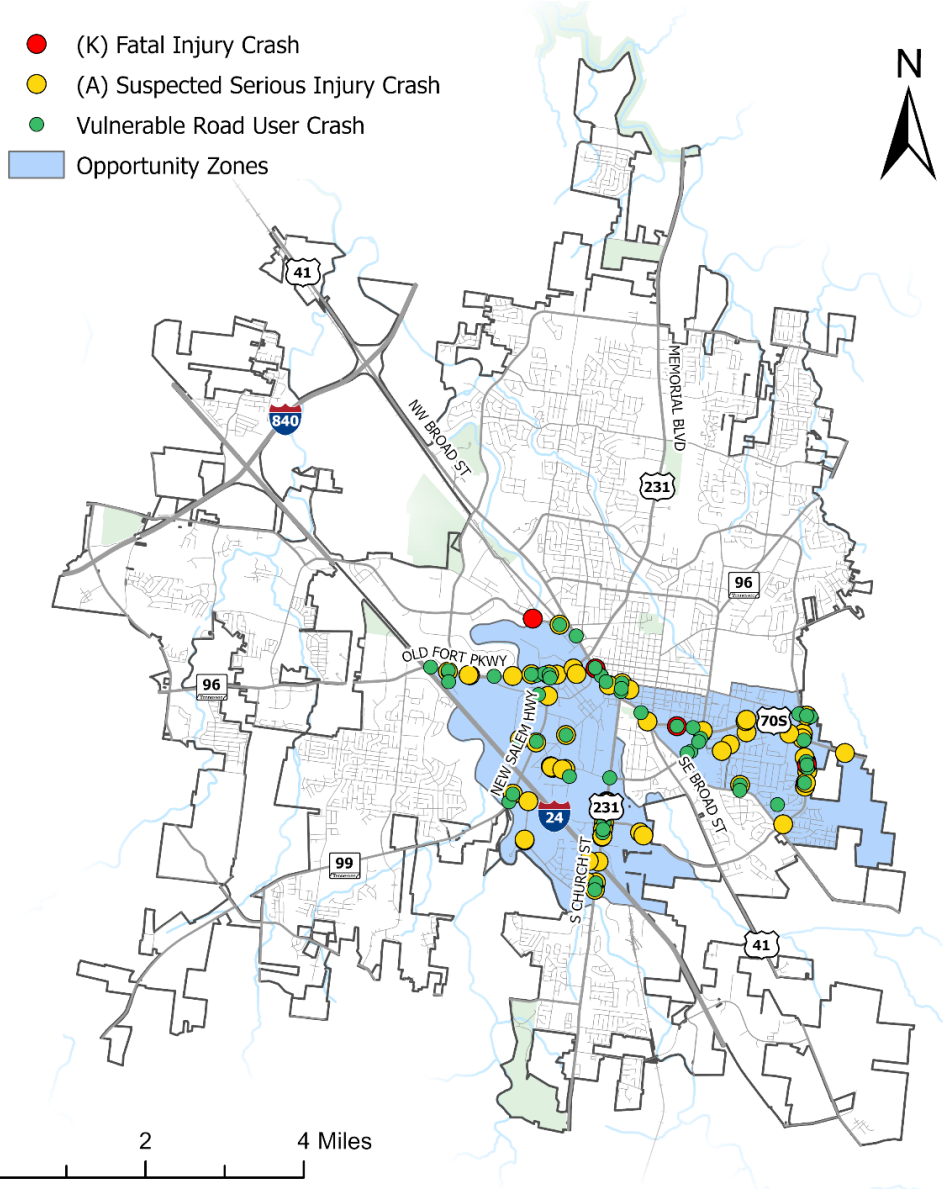


Figure 35: Opportunity Zones

MURFREESBORO SAFE STREETS

Engagement & Collaboration

Engagement & Collaboration

Introduction

Public outreach and engagement played a crucial role in collecting valuable insight into what Murfreesboro residents encounter daily while traveling routes in the study area, whether it is by car, bike, foot or bus. During the study, multiple opportunities for participation and input were offered to the general public and to community stakeholders. This included in-person events, targeted e-mail outreach, news media reports, social media posts, and a dedicated multi-lingual project website to gather and record input and disseminate information regarding the SAP and the SS4A Grant Program. By using a range of input methods, feedback was collected from a broad cross-section of the transportation network users, including individuals from traditionally underserved communities. **Figure 36** illustrates the overall project schedule, highlighting some of these community input opportunities.

Figure 36: Engagement and Collaboration Schedule (Graphic Generated by AI)

Formation of Steering Committee

To help guide the study, a Steering Committee made up of City engineering and planning staff, law enforcement representatives, and communications team members was established. Firstly, the steering committee was crucial in providing local, informed input regarding current conditions and opportunities for improvement in Murfreesboro. Secondly, the members of the Steering Committee acted as outreach conduits to the community. Multiple times during the data collection phase, the City and members of the Steering committee engaged the community through direct e-mail communications, social media blasts or direct communication to groups in the community and encouraged them to get involved and provide input. The work of this committee is in large part responsible for the success of the Public Outreach portion of this study.

Public Outreach and Engagement Summary

Throughout the course of the study, a significant number of community members were reached across a variety of events and platforms. This resulted in a robust response with 313 page views being logged on the project website. Additional engagement metrics are shown in the figure below.

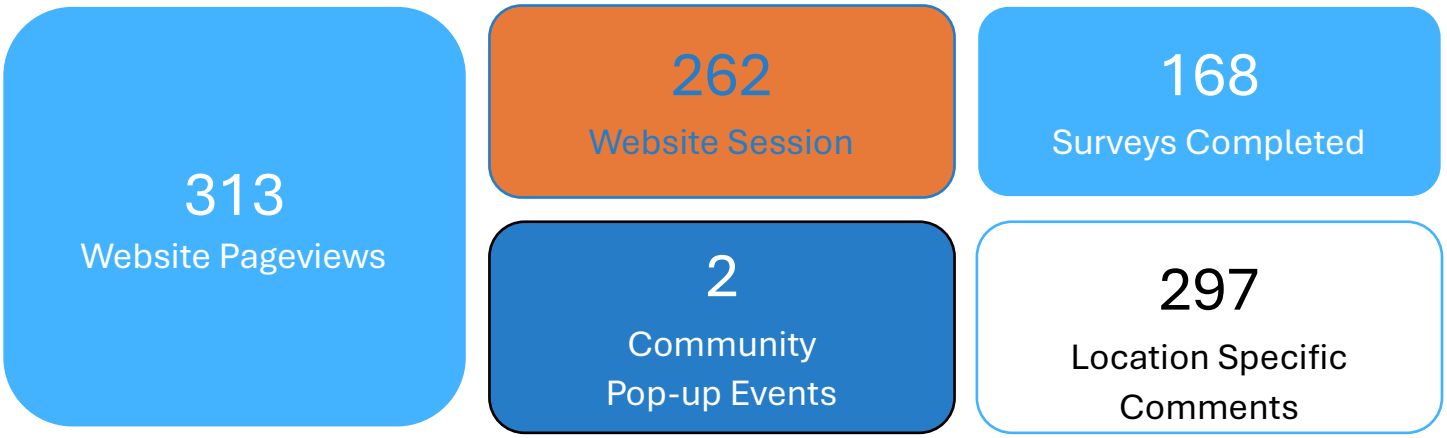


Figure 37: Engagement and Collaboration Summary

A "website pageview" refers to a single instance of a user loading the Murfreesboro SAP website, whereas a "website session" refers to a user loading and remaining on the website.

The online survey was designed to gather feedback from people in Murfreesboro about their travel patterns and the safety issues or concerns they may have. The survey asked a series of questions to understand trends, concerns, and improvements that the public would like to see. The survey questions prompted the respondents for various useful data points, including relationship to Murfreesboro, travel mode preference, and opinion of current safety measures. Additionally, there were optional questions about the respondents' demographics to help ensure that survey respondents generally reflect the demographics of the City as a whole. The goal of the survey was to gather a wide range of perspectives, suggestions, and input to help improve safety in Murfreesboro. Viewers were also able to give comments on an interactive map to better ensure location specific issues are being recognized. The following section will provide a more detailed description of each of the ways the public was able to participate in in the process.

Project Website

To display current crash data and analysis findings as well as provide a portal for public input and feedback, a project-specific website was created: https://murfreesborosafestreets.com. An image of the website landing page is shown in *Figure 38*. Within the website, users could also find information on what a Safety Action Plan is, how it can be benefit the community, and how they can participate by providing input.

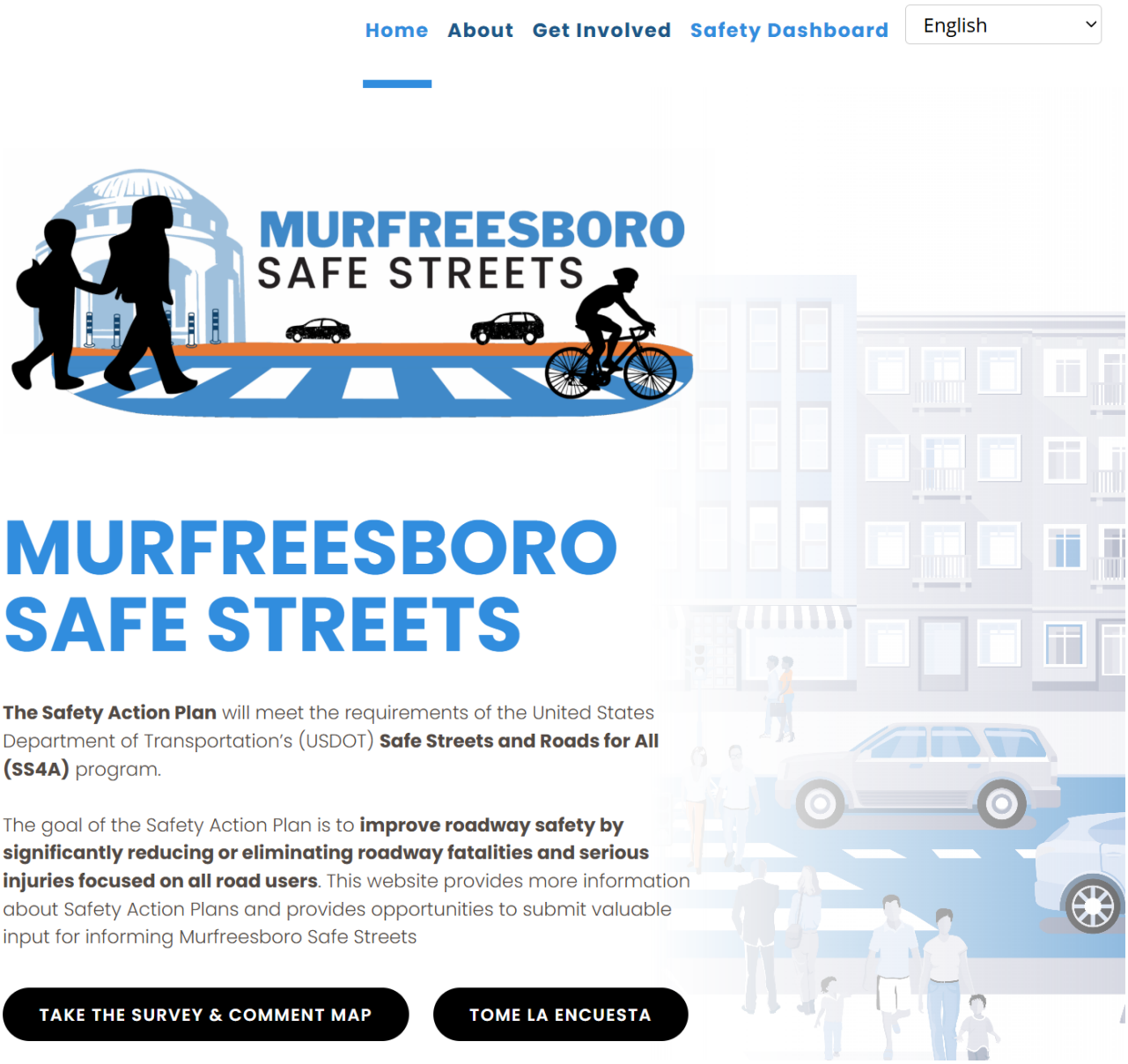


Figure 38: City of Murfreesboro SAP Website

Public Outreach

Major Outreach Activities

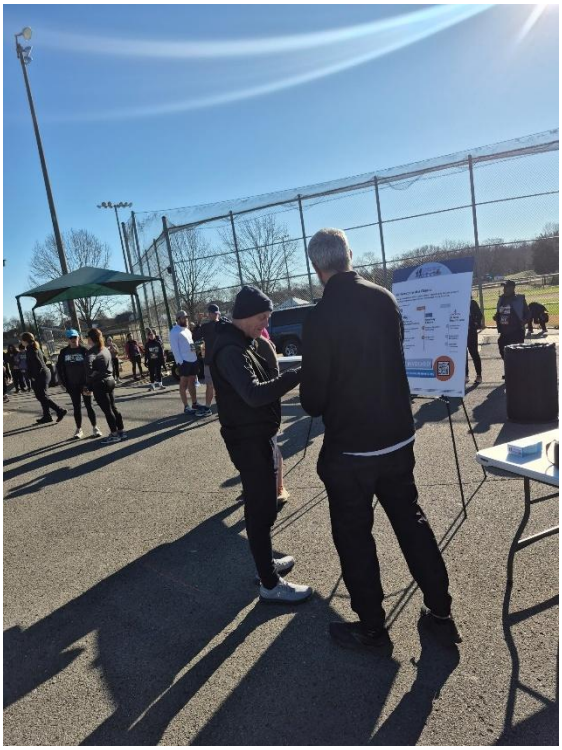
Starting in November 2025, a series of public outreach events were organized to inform the community about the SAP and collect feedback from various audiences. At these events, our team provided detailed information on the plan's objectives and implementation strategies. QR codes were made available, allowing attendees to easily access the plan's website and complete an online survey to share their feedback and suggestions. To ensure inclusive community engagement, written comment cards were also provided for those who preferred to give their input through this method.

Photos with Santa at the airport

In December 2025, a project information booth was set up at the City of Murfreesboro Municipal Airport – Photos with Santa event. The team was able to educate residents about the Safety Action Plan, designed to improve community safety. The booth provided details about the plan's goals and how it will be implemented. To encourage active participation from all community members, QR codes were distributed, enabling attendees to visit the project's website and fill out an online survey to offer their own insights and recommendations for the SAP.

New Year Day 5k

On January 1st, 2026, a booth was set up at the New Years Day 5k, hosted by the City. Participates of the race included runners from a wide range of age groups. The team got to speak with the runners of the race as well as visitors and supporters about the City's Safety Action Plan. The booth provided details about the plan's goals and QR codes were accessible to the community at the event.



Online Engagement Results

Dispersion of the online survey and interactive map were achieved through a combination of tools as outlined in this section, each intended to drive traffic to and through the project website for ease of data collection and dissemination of project information.

Online Survey

In addition to providing a broad range of safety information, the website hosted two key participation avenues. The first was an online survey that focused on user demographics and roadway safety concerns. A total of 160 participants completed the online survey, providing input and background data, ranging from travel-related characteristics and demographic information to specific safety concerns. The last question in the survey was an open-ended question that served to allow respondents the ability to give any more input that they see fit which resulted in a broad range of inputs as shown in **Figure 39** and **40**.

Figure 39: Online Survey Input Category

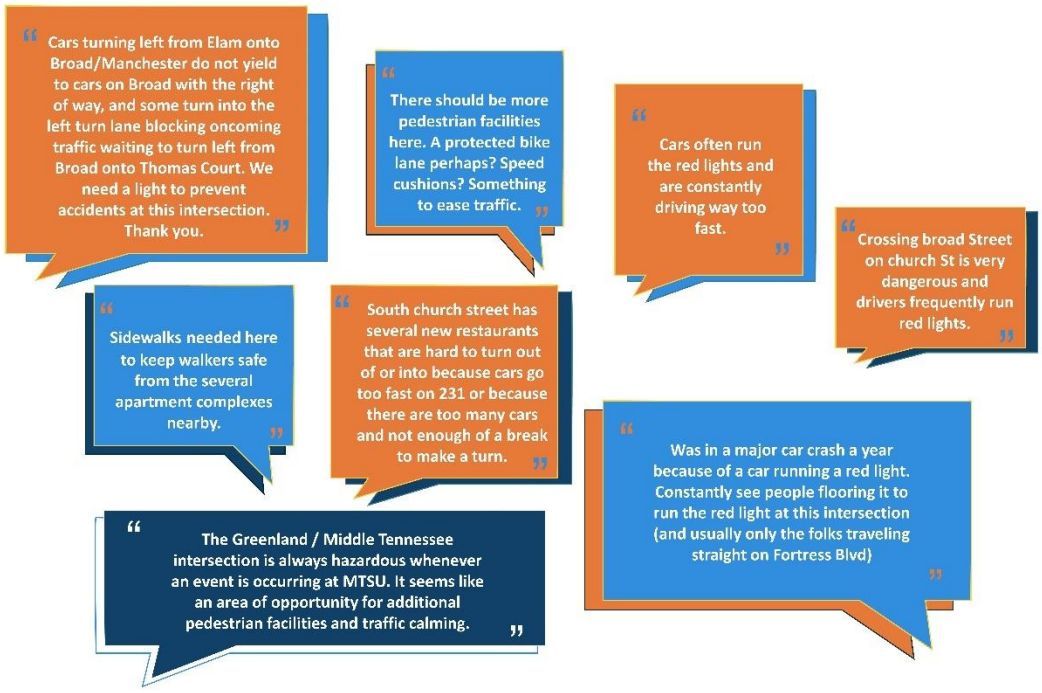


Figure 40: General Public Reponses

Interactive Map Results

The interactive mapping application on the project website allowed users to drop 'pins' at specific locations where they had safety concerns or had experienced safety-related incidents. A total of 297 location-specific comments were inputted into the interactive map, which is shown in **Figure 41.**

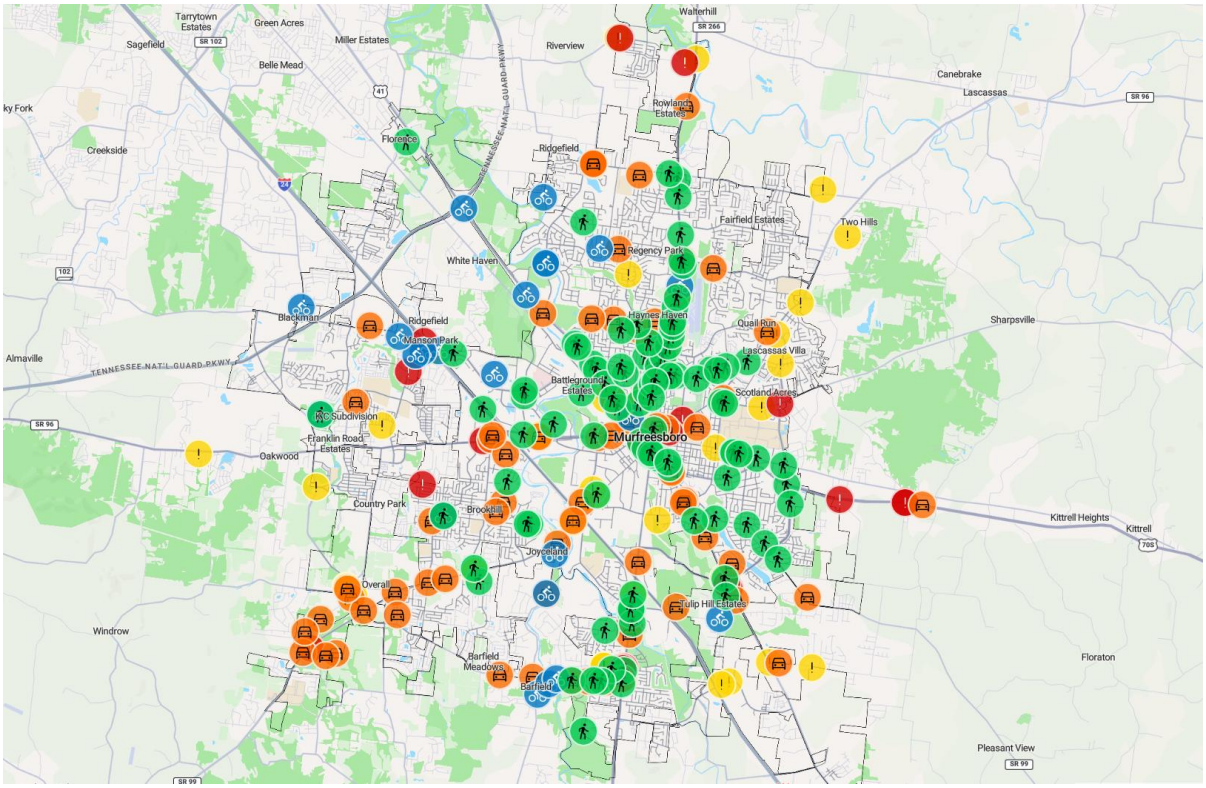


Figure 41: Results from Interactive Map

The map application provided six individual comment types for respondents to choose from: 1) pedestrian, 2) crash, 3) near crash, 4) mobility, 5) driver, and 6) bicyclist. Respondents were able to select their category and enter their related comment. There was no limit to the number of comments an individual could leave. Comments were analyzed and distilled for use in the project prioritization process, which will be discussed in a later section.

Public Input Heat Map

Based on the interactive map, respondents reported 297 individual comments for locations within the City of Murfreesboro. Mapping these responses highlights areas of public concern that may not appear in crash data analysis. Based on the heat map shown in **Figure 42**, the areas near and in downtown Murfreesboro received many public comments, with many complaints and comments being based around safety for pedestrians and bicyclists. Another location that seems to have received many comments is the area of town near the intersection of S Church Street at Veterans Parkway as shown in the south most portion of the heatmap.

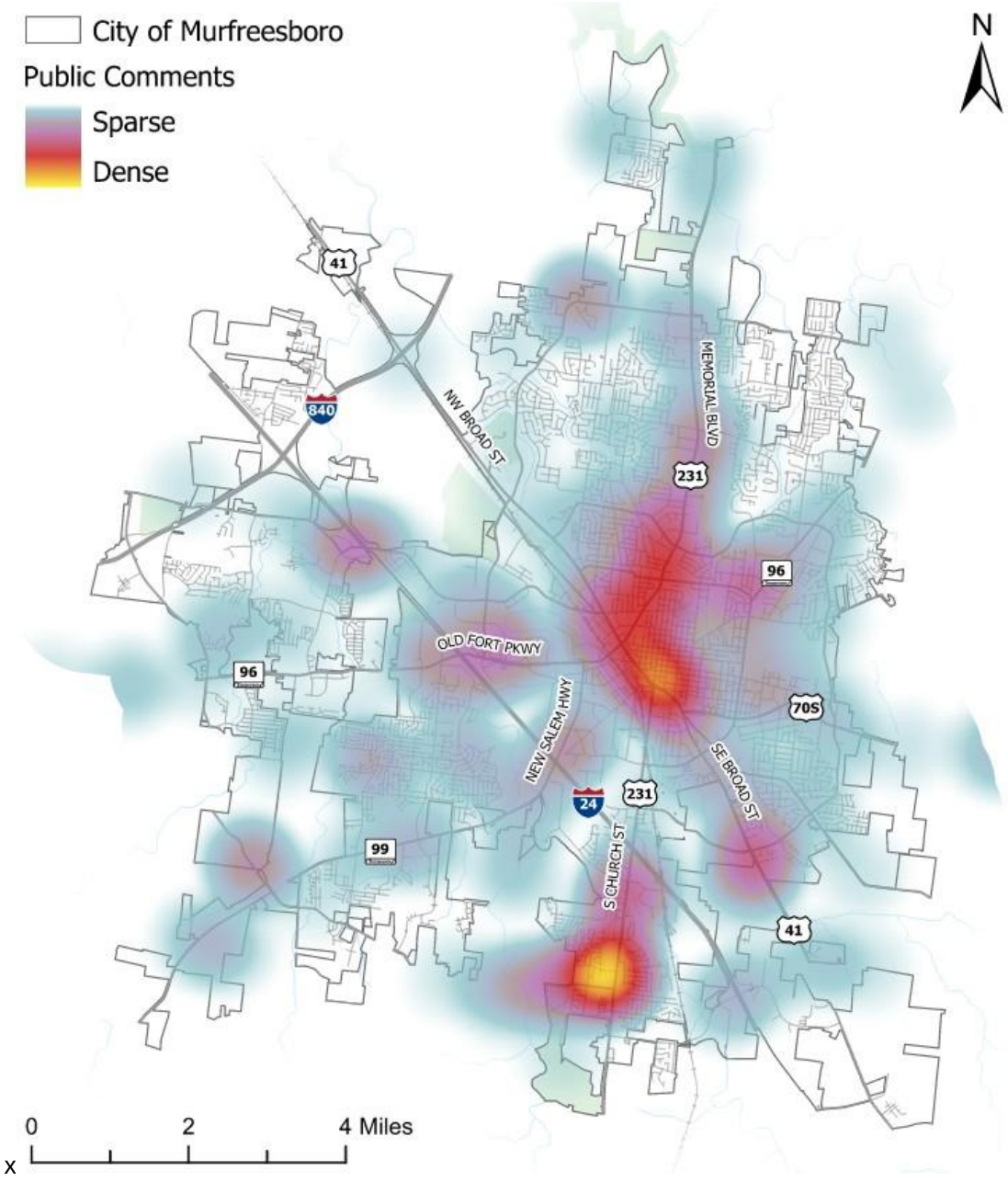


Figure 42: Concentration of Location-Specific Public Comments

Crash Data vs Public Comments

Comparing crash data with locations of public comments provides insight into areas where concerns align with existing data, as well as identifying potential safety issues that may not be evident from crash data alone. This comparison ultimately leads to a more comprehensive and effective approach toward improving safety. As shown in **Figure 43 and 44,** the emphasis areas of the dense locations based on crash data tend to align overall with dense public comment locations. The most evident trend is the most dense area of each heat map being the down town area of the City of Murfreesboro.

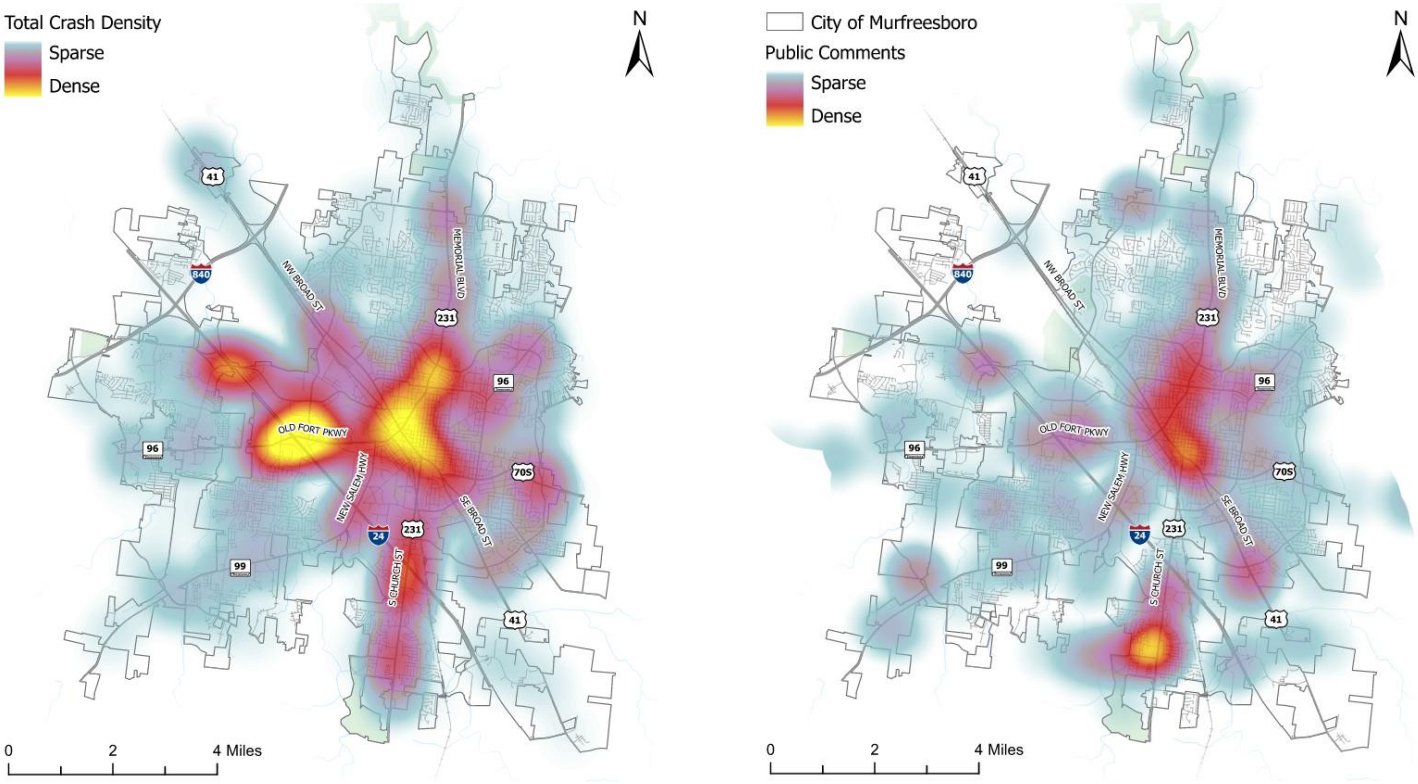


Figure 43 and Figure 44: Crash Density vs Public Comments

Summary of Survey Results

The survey and interactive map results reveal a variety of responses from individuals connected to the City of Murfreesboro. Most respondents primarily travel in/to the City by car, reflecting a strong reliance on personal vehicles. When asked about street safety, responses varied greatly, indicating different concerns about safety for transportation among the City. The most common improvements that are recommended to be made by the community include, street lighting, pedestrian sidewalk/crossing improvements, traffic enforcement, and improved signage.

Please see **Appendix D** for results of the online survey engagement results.

MURFREESBORO SAFE STREETS

Countermeasures & Strategies

Countermeasures & Strategies

The SAP identifies countermeasures and strategies addressing the City's key emphasis areas related to fatal and serious injury crashes as mentioned in the Safety Analysis section. The recommendations are classified into two categories: (1) engineering countermeasures (project recommendations) and (2) driver-related strategies (related to education, enforcement, and emergency medical services).

Engineering Countermeasures

Engineering Countermeasures in a Safety Action Plan refer to specific physical changes or improvements made to the roadway environment to enhance safety and reduce the likelihood of crashes. Examples of these include:

- Traffic signal upgrades: Installing or improving traffic signals to better manage traffic flow and reduce collisions.
- Roadway design changes: Modifying road layouts, such as adding roundabouts, medians, or bike lanes, to improve safety for all users.
- Pedestrian and cyclist infrastructure: Enhancing crosswalks, sidewalks, and bike paths to protect non-motorized road users.
- Speed management: Implementing measures like road diets, bulb-outs, chicanes, or road narrowing to control vehicle speeds.
- Visibility improvements: Increasing street lighting, adding reflective signs, and improving road markings to enhance visibility for drivers.

These countermeasures are designed and selected based on data analysis and safety studies to address specific risks and improve overall road safety.

Crash Modification Factors (CMF)

Because funding for infrastructure improvements is limited, the City of Murfreesboro can benefit from quantifying and comparing the potential benefit of safety countermeasures and treatments. Crash Modification Factors (CMF) can be used to assess the potential safety impact of improvements. A CMF is a numerical value that indicates the proportion of crashes that would be expected at a location after implementing a safety countermeasure. A CMF with a value of less than 1.0 indicates an expected decrease in crashes. Conversely, a CMF with a value greater than 1.0 indicates an expected increase in crashes. The FHWA maintains the CMF Clearinghouse, an online repository of CMFs documented in the Highway Safety Manual (HSM) and other industry resources. The following provides guidance to be considered when selecting and applying CMFs:

- Use a minimum of three years of crash data for urban and suburban sites and five years of crash data for rural sites.
- CMFs should be selected from Part D of the HSM or FHWA's CMF Clearinghouse website (https://www.cmfclearinghouse.org/).
- If possible, use CMFs with star ratings of four or five. The star rating indicates the quality or confidence in the results of the study producing the CMF.

CMFs are multiplicative, not additive, meaning that the application of two individual countermeasures with a 0.50 CMF will provide a 0.25 reduction (0.50 x 0.50 = 0.25) instead of a 1.00 reduction (0.50 + 0.50 = 1.00). However, the application of multiple CMFs can overestimate the expected crash reduction. It is recommended to use no more than three independent CMFs at a particular site.

Engineering Countermeasures Toolkit

A toolkit of engineering countermeasures was compiled for this SAP based on general applicability in the Murfreesboro study area, the level of evidence for crash reduction, and stakeholder and public feedback obtained during engagement (see the **Engagement & Collaboration** section). **Table 14** provides a summary of a representative group of countermeasures used in project recommendations for this SAP, a general level of cost/effort, their crash modification factor range (where available), and a proposed timeframe for implementation. See **Appendix E** for a complete description of each countermeasure listed below.

Table 14: City of Murfreesboro Toolkit

SOURCE	COUNTERMEASURE	CMF	CONTEXT (URBAN/ RURAL)	TIMEFRAME	COST
● ● ●	APPROPRIATE SPEED LIMITS	0.86	BOTH	SHORT	$
●	CONDUCT INTERSECTION CONTROL & ALIGNMENT EVALUATION	N/A	BOTH	SHORT	$
● ●	ENHANCED DELINEATION FOR HORIZONTAL CURVES	0.82	RURAL	SHORT	$
● ●	EVALUATE PROPER APPROACH LANEAGE	0.40-0.52	BOTH	SHORT	$
●	IMPROVE SIGNAGE	0.65-.84	BOTH	SHORT	$
● ● ●	LEADING PEDESTRIAN INTERVAL	0.90	URBAN	SHORT	$
● ●	LONGITUDINAL RUMBLE STRIPS AND STRIPES ON TWO-LANE ROADS	0.74	RURAL	SHORT	$
● ● ●	RETROREFLECTIVE BACKPLATES	0.85	BOTH	SHORT	$
●	RETROREFLECTIVE PAVEMENT MARKERS	0.54-0.89	BOTH	SHORT	$
●	SIGHT DISTANCE EVALUATION	N/A	BOTH	SHORT	$
● ● ●	SYSTEMIC APPLICATION OF MULTIPLE LOW-COST COUNTERMEASURES AT STOP-CONTROLLED INTERSECTIONS	0.73	BOTH	SHORT	$
● ●	WIDER EDGE LINES	0.97	BOTH	SHORT	$
● ● ●	YELLOW CHANGE INTERVALS	0.99	BOTH	SHORT	$
● ● ●	BIKE LANES	0.43	BOTH	SHORT	$$
● ● ●	CROSSWALK VISIBILITY ENHANCEMENTS	0.60	BOTH	SHORT	$$
	IMPROVE SIGNAL EQUIPMENT ALIGNMENT	N/A	BOTH	SHORT	$$
	UPDATE SPECIAL EVENT TRANSPORTATION MANAGEMENT	N/A	URBAN	SHORT	$$
●	FLASHING YELLOW ARROWS (FYA)	0.52-0.82	BOTH	MID	$$
● ● ●	MEDIAN AND PEDESTRIAN REFUGE ISLAND	0.29	URBAN	MID	$$
● ●	MEDIAN BARRIERS	0.29	BOTH	MID	$$

● ● ●	RECTANGULAR RAPID FLASHING BEACONS (RRFB)	0.31	BOTH	MID	$$
● ● ●	SIDEWALKS AND MULTI-USE PATHS	0.60	BOTH	MID	$$
● ● ●	TARGETED LIGHTING	0.68	BOTH	MID	$$
● ●	TRAFFIC CALMING (CORRIDOR-WIDE SPEED MANAGEMENT)	0.60	BOTH	MID	$$
	TRANSIT STOP ADDITION/ENHANCEMENT	N/A	BOTH	MID	$$
	COMPLETE MULTI-MODAL CORRIDOR EVALUATION	N/A	URBAN	MID	$$$
● ●	DEDICATED LEFT AND RIGHT-TURN LANES AT INTERSECTIONS	0.52-0.86	BOTH	MID	$$$
● ●	ELIMINATE NEGATIVE OFF-SETS AT INTERSECTIONS	0.60	BOTH	MID	$$$
	FLATTEN MINOR STREET APPROACH	N/A	BOTH	MID	$$$
● ● ●	PEDESTRIAN HYBRID BEACONS	0.88	URBAN	MID	$$$
	RAILROAD CROSSING ENHANCEMENTS	N/A	BOTH	MID	$$$
●	REDUCED LEFT-TURN CONFLICT INTERSECTIONS	0.71	BOTH	MID	$$$
	WIDEN SHOULDERS	N/A	BOTH	MID	$$$
●	SMART CHANNEL RIGHT-TURN LANE	0.40	BOTH	LONG	$$$
● ● ●	CORRIDOR ACCESS MANAGEMENT	0.93	BOTH	LONG	$$$$
● ● ●	ROADWAY RECONFIGURATION	0.53	URBAN	LONG	$$$$
● ● ●	ROUNDABOUTS	0.59	BOTH	LONG	$$$$

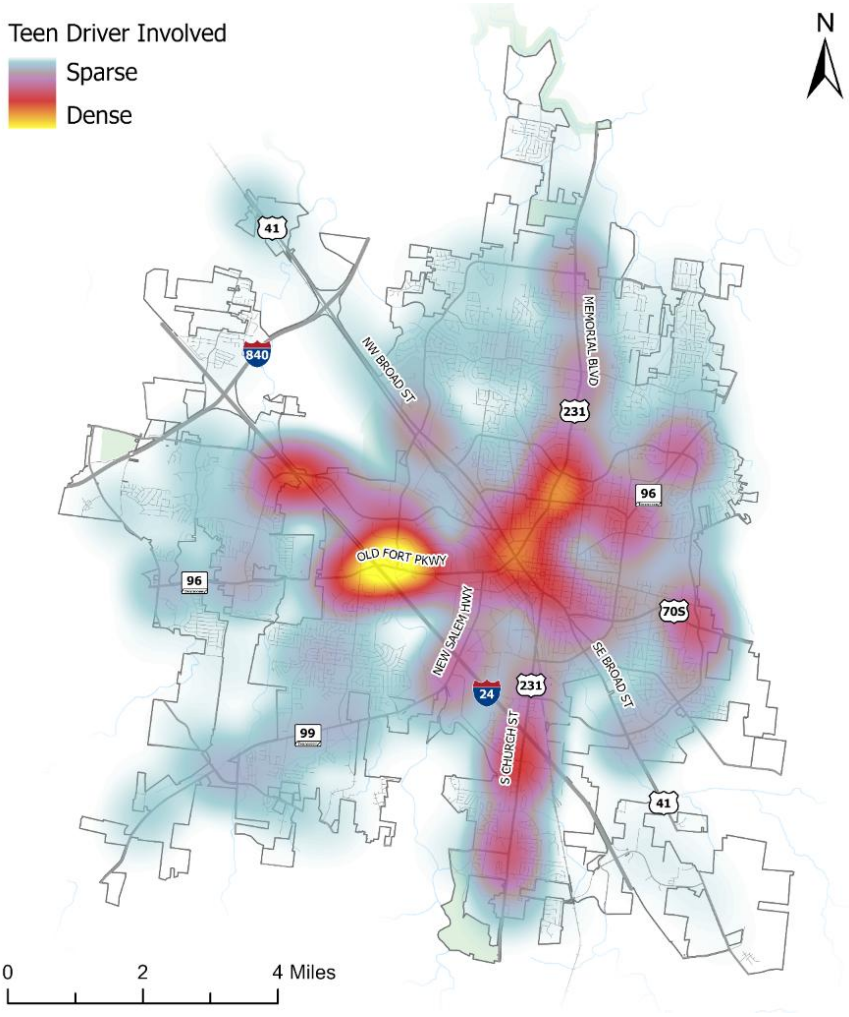
Driver-Related Strategies

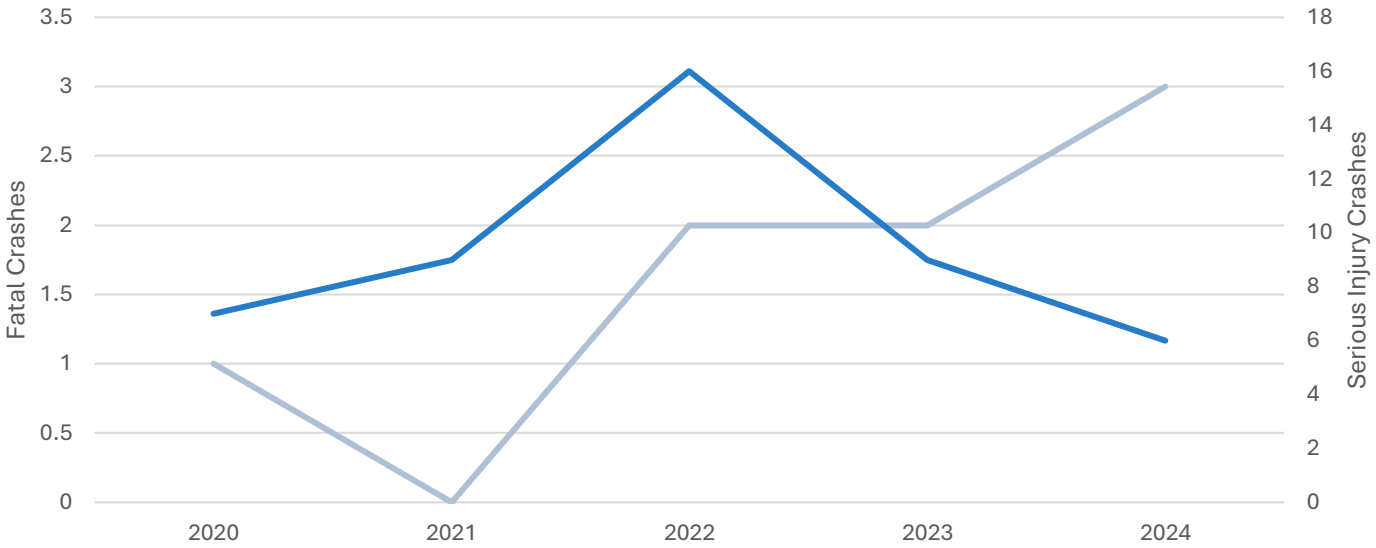
As described and presented in the **Safety Analysis** section, the data shows the City of Murfreesboro experienced higher percentages of high-severity crashes involving Teen Drivers, Bicycles, Aggressive Drivers/Speeding, and Motorcycles than the Tennessee state average. The following tables include specific strategies to reduce crashes in these emphasis areas. The strategies referenced in this section can be implemented in the short term; however, they should remain in place in the long term to fully achieve the ideal benefits. These strategies incorporate the remaining three Es of traffic safety: Education, Enforcement, and Emergency Medical Services.

Teen Drivers

Emphasis Area	Teen Drivers
Safe Systems Element	Safe Road Users
How are fatal and serious injury crashes involving teen drivers defined?	A crash that involves any driver or pedestrian who is between the ages of 15-19 years old.
Statewide Emphasis Area	Emphasis area in the 2025 – 2029 Tennessee SHSP

Teen Drivers (ages 15-19) are often considered high-risk due to limited driving experience, potential distractions, and a higher likelihood of engaging in risky behaviors such as speeding or not using seat belts. In Murfreesboro, the data shows that 55 (14.9%) of all fatal and serious injury crashes between 2020 and 2024 involved teen drivers. This is 1.3% higher than the TN state average of 13.6% and highlights the need for targeted education and enforcement strategies.





The following are recommended strategies that should be implemented to reduce fatal and serious injury crashes involving teen drivers:

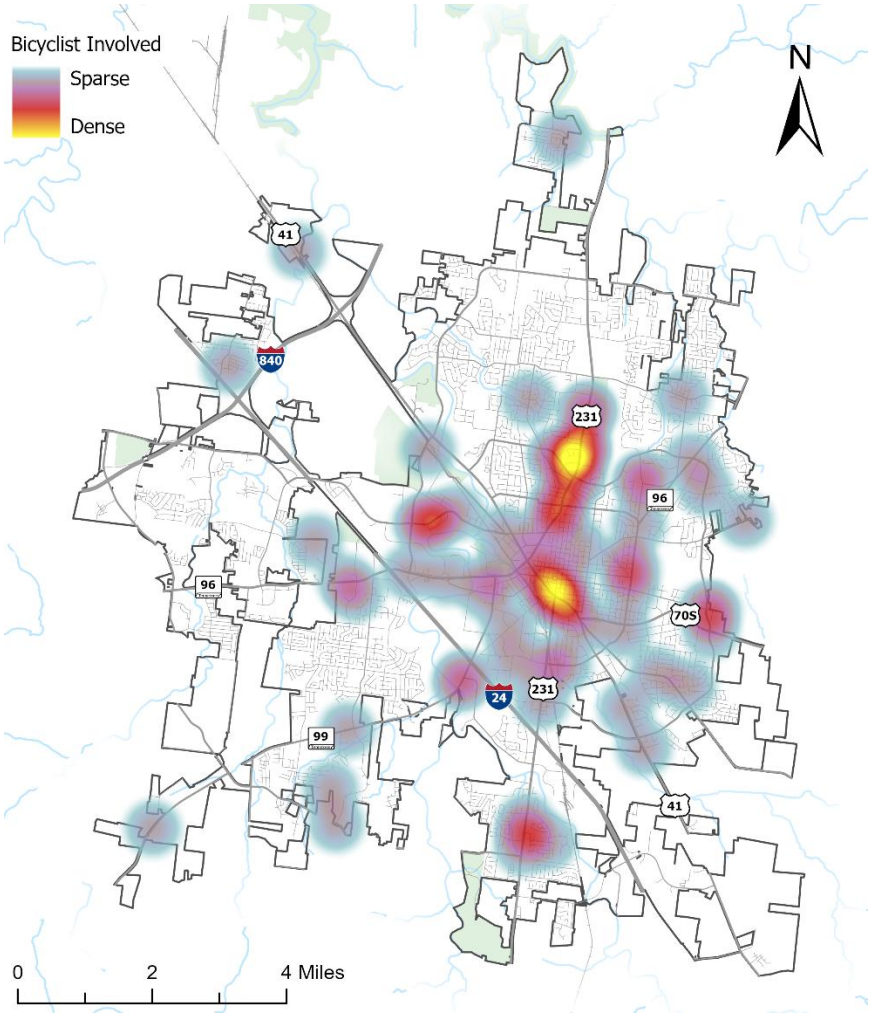
Table 15: Teen Driver Strategies

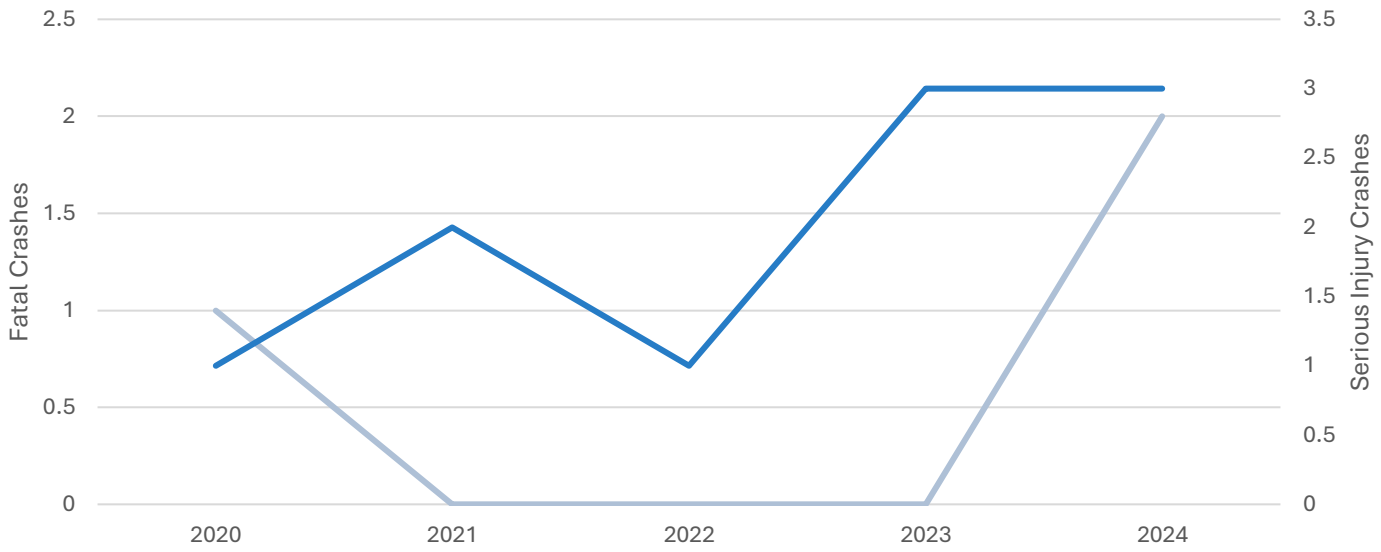
Emphasis Area	Driver-Related Strategy
Teen Drivers	Provide high-risk driver education programs targeting drivers aged 15-19 with a focus on impaired, distracted, and reckless driving.
	Support Graduated Driver Licensing (GDL) Programs (Learner's Permit, Intermediate License Nighttime Restrictions, Intermediate License Passenger Restrictions)
	Support the Enforcement of GDL

Bicycles

Emphasis Area	Bicycles
Safe Systems Element	Safe Road Users
The operation of a bicycle on shard network with vehicles contributes to increased risks	While only accounting for 0.2% of total crashes in the State of Tennessee, bicyclist-involved crashes accounted for 1.3% of fatal and serious injury crashes in 2024.
Statewide Emphasis Area	Emphasis area in the 2025 – 2029 Tennessee SHSP

Bicyclists represent a vulnerable group of road users due to their limited physical protection and exposure to motor vehicle traffic. Although bicycling accounts for a small share of overall travel, crashes involving bicyclists often result in serious injuries or fatalities. Nationwide, bicyclists account for approximately 2% of all traffic fatalities. In Murfreesboro, the data indicates that 13 (3.5%) of all fatal and serious injury crashes between 2020 and 2024 involved bicyclists. This is 2.2% higher than the TN state average of 1.3%.





The following are recommended strategies to improve bicyclist safety and reduce fatal and serious injury crashes involving bicyclists.

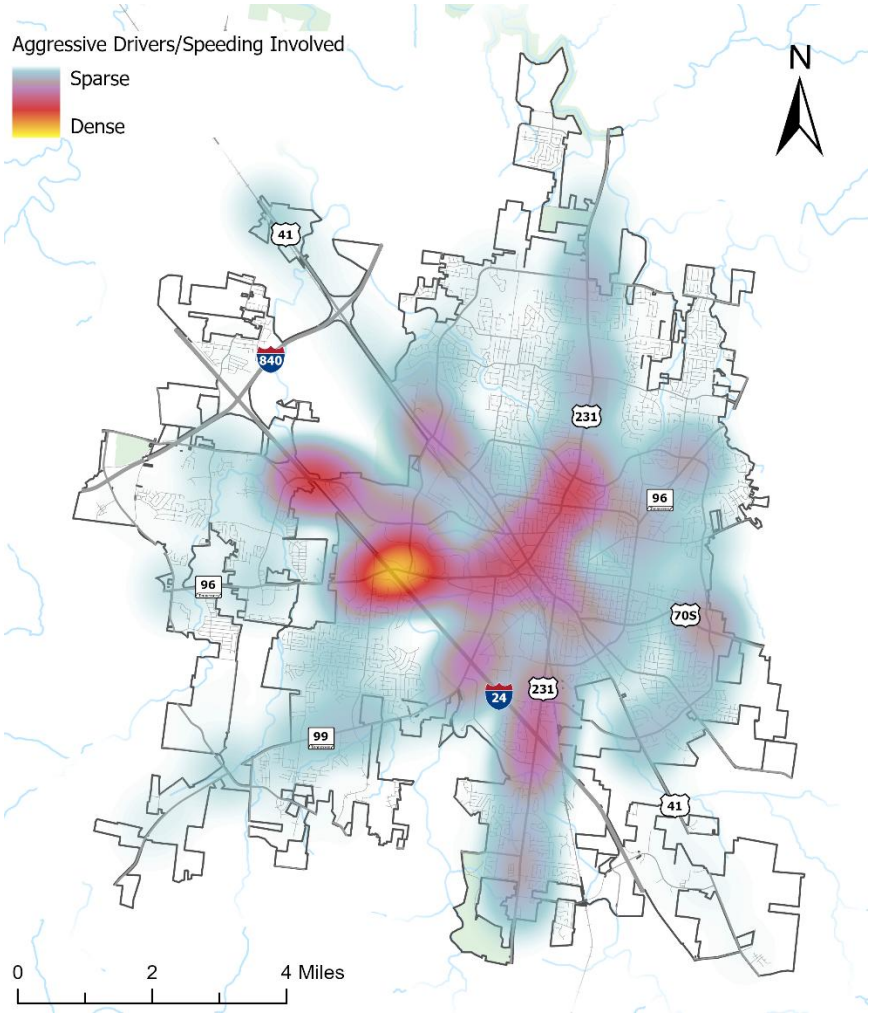
Table 16: Bicycle Strategies

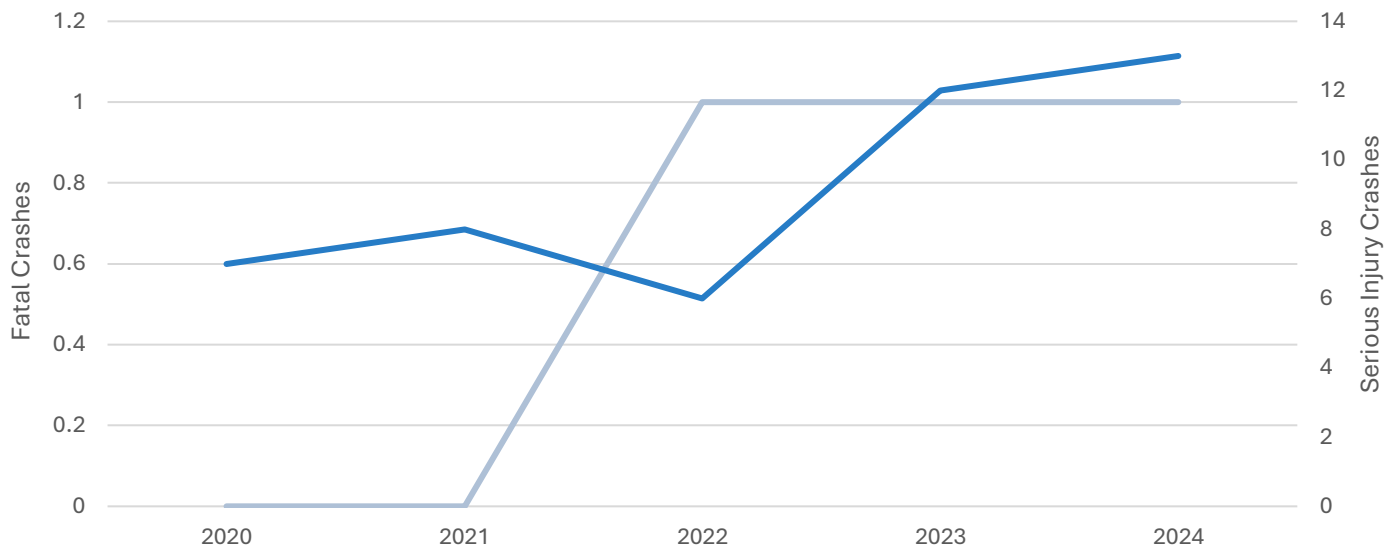
Emphasis Area	Driver-Related Strategy
Bicyclist	Maintain, Improve, and Install bicycle and pedestrian facilities through bicycle and pedestrian specific projects and in conjunction with other roadway and safety improvements projects.
	Enhance driver awareness of bicyclists on the roads through communication efforts on social media and websites.
	Create a quick-build pilot program to implement safety countermeasures at high-crash locations for pedestrians, bicyclists and other low-speed users
	Support and Enforcement of the Bicycle Helmet Laws for Children, and Universal Bicycle Helmet Laws

Aggressive Drivers/Speeding

Emphasis Area	Aggressive Drivers/Speeding
Safe Systems Element	Safe Road Users and Safe Speeds
How are fatal and serious injury crashes involving aggressive driving and speeding defined?	A crash in which any vehicle involved drives too fast for conditions or exceeds the posted speed limit.
Statewide Emphasis Area	Emphasis area in the 2025-2029 Tennessee SHSP

Aggressive Drivers refer to individuals who engage in unsafe driving behaviors with deliberate disregard for safety. These behaviors can include speeding, tailgating, weaving in and out of traffic, running red lights, and other actions that endanger other road users. The data shows that 13.3% (49 crashes) of all fatal and serious injury crashes between 2020 and 2024 in the City of Murfreesboro involved aggressive drivers and/or speeding. This is 1.3% higher than the TN State average of 12%.





The following are recommended strategies that should be implemented to reduce fatal and serious injury crashes involving aggressive drivers and or speeding:

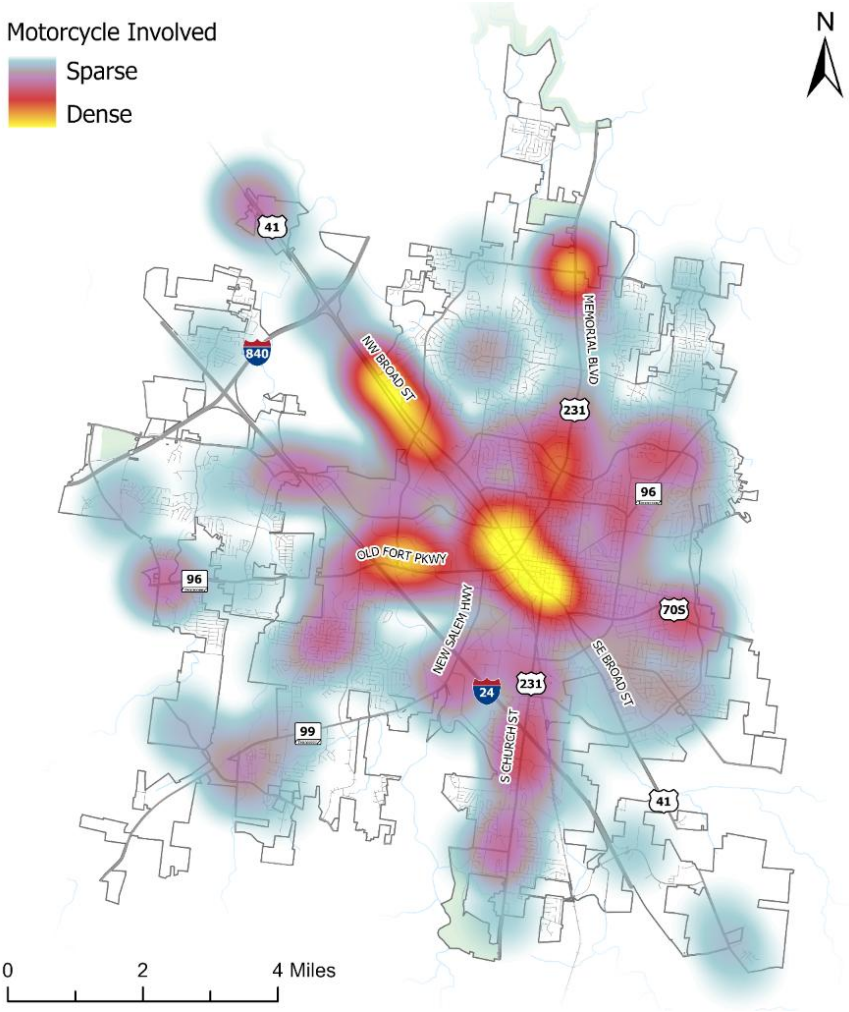
Table 17: Aggressive Driver/Speeding Strategies

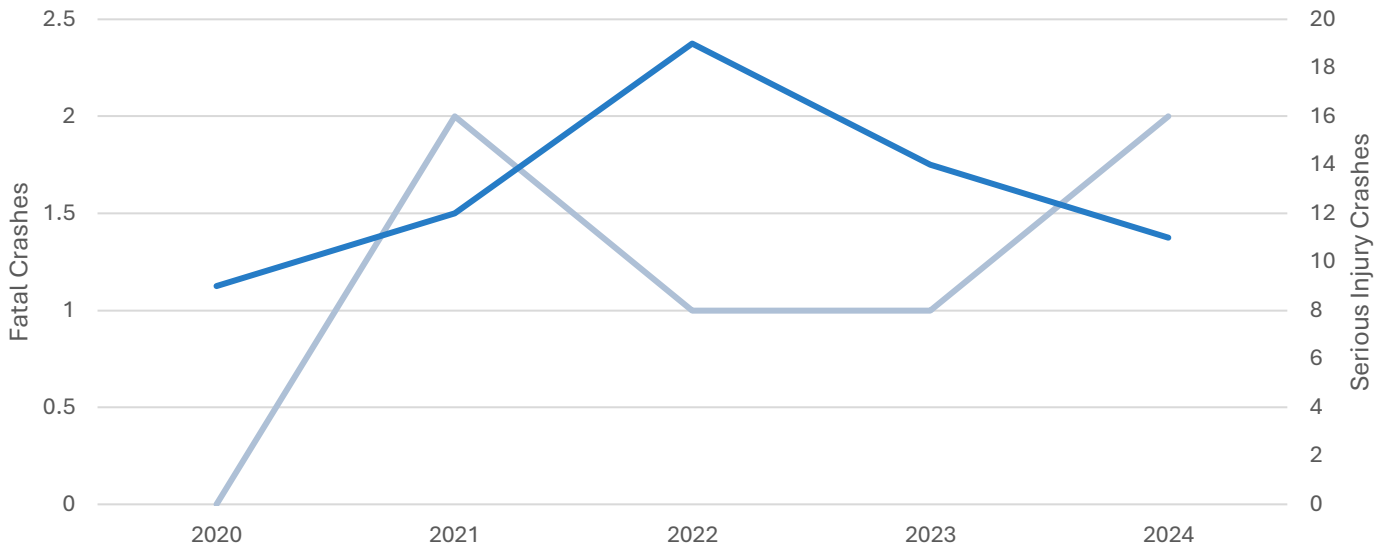
Emphasis Area	Driver-Related Strategy
Aggressive Drivers/Speeding	Develop and implement enforcement programs aimed at aggressive driving in high frequency areas.
	Update Murfreesboro's local traffic calming policy to include additional effective devices and processes. This includes traffic calming equipment that implements vertical deflection (e.g., speed, tables) horizontal deflection (e.g., chicanes), and roadside features (e.g., Dynamic Speed Display Signs [DSDS])
	Conduct a city-wide campaign highlighting the local consequences of aggressive drivers or speeding, using testimonials, local crash statistics, or interactive digital media.
	Explore implementing Automated Speed Enforcement (ASE) cameras in high-risk or repeated speeding zones, emphasizing their role in reducing aggressive driving or speed-related incidents.

Motorcycles

Emphasis Area	Motorcycles
Safe Systems Element	Safe Road Users
The operation of a motorcycle contributes to increased risks	According to the National Highway Traffic Safety Administration (NHTSA), motorcyclists accounted for 15 percent of all traffic fatalities nationwide, despite only accounting for an estimated 0.7 percent of VMT (NHTSA, Traffic Facts 2015)
Statewide Emphasis Area	Emphasis area in the 2025 – 2029 Tennessee SHSP

Motorcyclists make up a disproportionate percentage of fatal and serious injury crashes. Though accounting for an estimated 0.7% of vehicle miles traveled, motorcyclists nationwide account for 15% of all traffic fatalities nationwide. In Murfreesboro, the data shows that 16.8% (62 crashes) of all fatal and serious injury crashes between 2020 and 2024 involved motorcyclists. This is 1.9% higher than the TN state average of 14.9 percent.





The following are recommended strategies to reduce fatal and serious injury crashes involving motorcycles.

Table 18: Motorcycle Strategies

Emphasis Area	Driver-Related Strategy
Motorcyclist	Support and Enforcement of the Universal Motorcycle Helmet Use Laws
	Partner with TDOT in the statewide Tennessee Motorcycle Safety Strategic Plan update, anticipated in 2027

Relevant Documents

Tennessee SHSP

The Tennessee SHSP identifies strategies that target the state's most critical roadway safety challenges. The data in this document identifies key safety needs, decisions, and countermeasure framework.

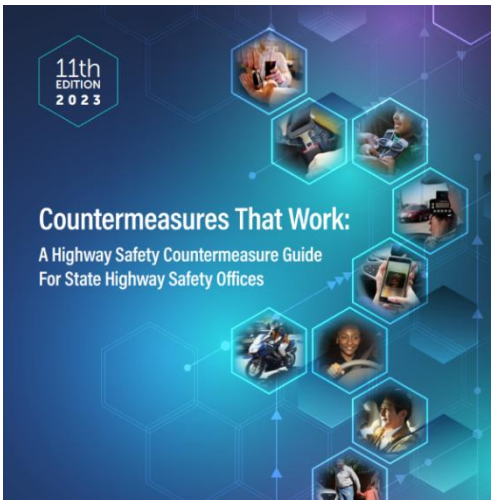
Towards Zero Deaths (TZD)

The Towards Zero Deaths (TZD): A National Strategy on Highway Safety identifies strategies that target the nation's most critical roadway safety challenges.

FHWA Proven Safety Countermeasures

The Federal Highway Administration's (FHWA) Proven Safety Countermeasures (PSCs) provide 28 countermeasures and strategies that can offer significant and measurable improvements to safety affecting all road users. Each countermeasure addresses at least one of the USDOT's safety focus areas, which include speed management, intersections, roadway departures, and pedestrians/bicyclists. Some of the PSCs are considered crosscutting, which identifies countermeasures that address more than one safety focus area at a time.

NHTSA Countermeasures that Work



The National Highway Traffic Safety Administration's (NHTSA) Countermeasures That Work is a technical report that provides a reference guide of safety strategies and countermeasures, particularly focused on human behaviors related to transportation safety. This document presents strategies and countermeasures related to the following safety areas: alcohol-impaired driving, drug-impaired driving, seat belts and child restraints, speeding and speed management, distracted driving, motorcycle safety, young drivers, older drivers, pedestrian safety, bicycle safety, and drowsy driving. Countermeasures That Work also provides data driven information such as effectiveness, costs, implementation time, and research references to support relevant countermeasures and strategies.

MURFREESBORO SAFE STREETS

Policy & Process Changes

Policy & Process Changes

Documents Reviewed

Existing City of Murfreesboro plans and policies were reviewed as part of the SAP process to gain perspective on current efforts related to transportation safety goals, policies, and actions. Key findings within these plans and policies were identified to inform the SAP. This section also includes summarized recommendations for plan and policy changes aimed at enhancing transportation safety. **Table 19**, summarizes the key findings within the existing documents.

Table 19: Existing Plans Summary

Document Name	Summary/Goals Related to Safety
Transit Route and Shelter Study	• The document includes quotes from Murfreesboro Transit front line employees. A few of these quotes mention the importance of implementing safety. • Many employees have plans for new transit facilities to be built at certain locations. • Operators and supervisors provided input on off-street bus stops/shelter locations with high priority for safety enhancement.
2040 Major Transportation Plan	• One of the main goals of the document is to reduce the number and severity of traffic incidents and promote network security. • Implement safety measures for elderly pedestrians and drivers. • Utilize access controls. • Improve signalization of intersections for both pedestrians and vehicles. • Support regular maintenance of roads and facilities. • Continue to provide adequate funding for road maintenance and improvement. • Implement bicycle safety training program for residents. • Ensure timely and reliable access for emergency response vehicles.
City of Murfreesboro Greenways, Blueways, and Bikeways Master Plan	• The plan outlines a multi-phase approach for prioritizing, funding, and implementing projects that address connectivity, accessibility, safety, and cost, ensuring that these most critical needs are met first. • Public comments expressed need for safer crossings, protected bike lanes, and improved pedestrian infrastructure. • The plan provides section drawings to reference when evaluating project recommendations for safe bikeways, greenways, and multi-use paths. • The plan emphasizes the importance of integrating greenways, blueways, and bikeways with public transit and other modes of transportation to create a seamless, multimodal network.

Murfreesboro 2035 Comprehensive Plan	• The updated (2023) land use plan outlines the relationship between land use intensity and roadway function. • The plan highlights the need to align development density and access points in order to reduce conflicts between vehicles. • The document also emphasis multimodal safety primarily focusing on vulnerable road users • The plan list transit and connectivity as major safety elements in the city.

Plan Checklist

To ensure the safety and well-being of all roadway users, it is imperative for agencies to have a set of plans and policies in place that guide and mandate roadway safety. A list of recommended plans and policies has been compiled to serve as a roadmap for addressing safety concerns and implementing appropriate measures. These plans provide strategies for designing and managing streets that prioritize safety, address accessibility needs, promote various transportation modes, assess traffic impacts of new developments, and outline a long-term vision for land use, transportation, and community development with a focus on safety considerations. **Table 20** contains the list of recommended plans and the corresponding plan(s), if applicable, in the City of Murfreesboro.

Table 20: Alignment of Safety Roadmap with Existing Plans

Checklist	Plan	Corresponding City of Murfreesboro Plan
●	Complete Streets Policy Guidelines	2040 Major Transportation Plan Murfreesboro 2035 Comprehensive Plan City of Murfreesboro Greenways, Blueways, and Bikeways Master Plan
●	ADA Transition Plan	City of Murfreesboro ADA Transition Plan July 2019
●	Multi-Modal Plan	City of Murfreesboro Greenways, Blueways, and Bikeways Master Plan 2040 Major Transportation Plan
●	Traffic Impact Study Guidelines (w/ Safety)	City of Murfreesboro Subdivision Regulations
●	Comprehensive Plan	Murfreesboro 2035 Comprehensive Plan
●	Pavement Management Plan	
●	Subdivision Regulations	City of Murfreesboro Subdivision Regulations
●	Standard Street and Sidewalk Design Specifications	City of Murfreesboro Subdivision Regulations City of Murfreesboro Greenways, Blueways, and Bikeways Master Plan City of Murfreesboro Design Guidelines
● = Has Plan	● = Mentioned In Other Plan(s)	● = Does Not Have Plan

Recommendations

The following recommendations are made to help the City better address and incorporate transportation safety through their existing plans, policies, and processes. The recommendations are provided alongside the related documents to which they apply, as well as the applicable element(s) of the "Four Es" of transportation safety (Engineering, Enforcement, Education, and Emergency Response).

Table 21: Recommended Policy and Process Changes

No.	Recommended Action	Timeframe	Lead
1	Integrate safety policy into all existing documents	Short-Term	Public Infrastructure Division, Planning Department, and Engineering Department
2	Update roadway and intersection design standards to promote safety for all roadway users and address deficiencies	Short-Term	Engineering Department
3	Establish a targeted enforcement program (for aggressive driving and high speeds) and coordinate with local law enforcement	Short-Term	Murfreesboro Police Department
4	PIO to organize educational campaigns/ provide information through community outreach. • Topics include: driving behavior, speed awareness, seatbelt usage, safe practices, for bicyclists and pedestrians • Celebrate projects that improve safety and positive movements toward the City's Safety Action Plan's goal annually. Create increased awareness within agency departments	Short-Term	Communications Department
5	Create a Safe Routes to School Partnership Program, coordinating with School Districts to organize Bike or Ride School Days	Short-Term	City/County Schools. Engineering Department, Planning Department, and Polie Department
6	Create a quick-build pilot program to implement safety	Short-Term	Engineering Department and Planning Department
7	Partner with TDOT in the statewide Tennessee Motorcycle Safety Strategic Plan	Short-Term	Planning Department and Police Department
8	Conduct public outreach campaigns and efforts to promote goals established by this SAP effort	Short-Term	Communications Department and Planning Department
9	Reprioritize future projects that achieve safety goals for future funding allocations	Mid-Term	Public Infrastructure Division

10	Increase safety education at schools and events to increase traffic safety culture of young drivers and adolescents, including increasing the awareness of the dangers of unbelted drivers and occupants, speed, impaired driving, and distracted driving	Mid-Term	City/County Schools
11	Improve highway safety through rider education, training, and a public awareness effort. The aim of this initiative is to promote motorcyclist safety and ensure that quality and consistency of training across all training sites	Long-Term	Public Infrastructure Division, Planning Department, and Police Department
12	Evaluate the adoption of a statutory traffic law through the legislative process to clearly define aggressive driving for enhanced enforcement efforts	Long-Term	Transportation Department and Police Department
13	Continue providing off-road alternatives/greenway bypasses near HIN segments. Crossings may require improvements in order to increase pedestrian and cyclist safety and comfort	Long-Term	Public Infrastructure Division
14	Improve existing traffic signal infrastructure along the High Injury network (HIN) including, but not limited to, the following recommendations: • Realignment of traffic signal heads • Installation of Backplates with Retroreflective Borders • Lighting Upgrades • Detection Upgrades • Pedestrian Equipment Upgrades • Conversion to Flashing Yellow Arrows (FYAs)	Long-Term	Public Infrastructure Division, Planning Department, and Engineering Department
15	Develop a citywide Pavement Management Plan	Long-Term	Public Infrastructure Division
16	Conduct near-miss demonstration projects along HIN segments within general proximity to Middle Tennessee State University campus and surrounding areas	Long-Term	Public Infrastructure Division and Engineering Department
17	Develop a post-crash care blood supply system to be used by Murfreesboro Fire Department and Emergency Services	Long-Term	Police Department and Fire Department

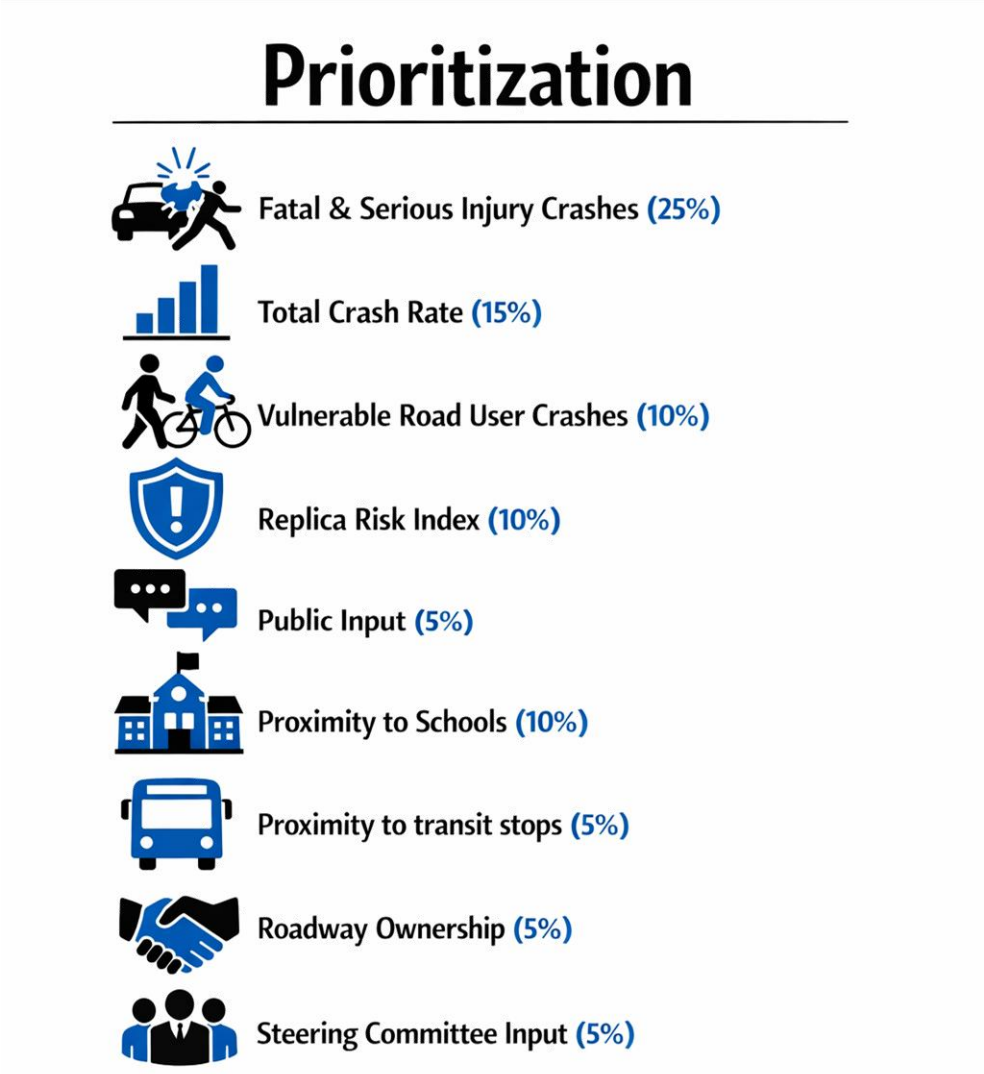
MURFREESBORO SAFE STREETS

Project Selection & Prioritization

Project Selection & Prioritization

Prioritization

After the review and validation of the HIN by the Steering Committee, nine transportation safety factors were assigned individual weights to be used in the corridor prioritization process. The weightings were determined using input from members of the steering committee and City staff. This exercise resulted in a methodology that is uniquely aligned with the priorities of the City. The nine factors are described below.



(Graphic Generated by AI)

These weightings were applied to the criteria for all the HIN segments to rank the corridors in order of priority. The results of this ranking are shown in **Table 22**.

Table 22: High Injury Network Prioritization

ID	Street Name	From	To	Score	Prioritization Rank
E	SHELBYVILLE PK.	SE Broad St	City Limits	77.4	1
A	OLD FORT PKWY.	Veterans Pkwy	Broad St	75.6	2
F	NORTHFIELD BLVD. / RUTHERFORD BLVD.	NW Broad St	S Church St	73.8	3
B	MEMORIAL BLVD.	Broad St	Dejarnette Ln	68.7	4
G	FORTRESS BLVD.	Old Fort Pkwy	NW Broad St	66.2	5
D	SE BROAD ST.	Old Fort Pkwy	Elam Rd	61.1	6
H	MIDDLE TENNESSEE BLVD.	NW Broad St	New Salem Hwy	60.8	7
C	NW BROAD ST.	Florence Rd	Old Fort Pkwy	53.0	8
I	JOHN R. RICE BLVD.	Veterans Pkwy	New Salem Hwy	47.4	9
M	VETERANS PKWY.	Burnt Knob Rd	S Church St	40.7	10
K	THOMPSON LN. / COMPTON RD.	Old Fort Pkwy	City Limits	37.2	11
O	SAINT ANDREWS DR.	Old Fort Pkwy	New Salem Hwy	35.1	12
J	NEW SALEM HWY	City Limits	Old Fort Pkwy	33.7	13
L	LASCASSAS PK.	E Clark Blvd	City Limits	33.6	14
P	JOE B. JACKSON PKWY.	S Church St	SE Broad St	32.8	15
N	DR. MARTIN LUTHER KING JR. BLVD	NE Broad St	City Limits	30.3	16

Prioritization Results

City staff worked together to select segments from the HIN for engineering countermeasure recommendations, considering current City projects and prioritization. The 15 segments for which the project team developed countermeasure recommendations are shown in **Figure 45**. Factsheets illustrating the recommendations are included in **Appendix C**. Safety improvement recommendations were developed using the Engineering Countermeasures Toolkit presented in **Appendix E**.

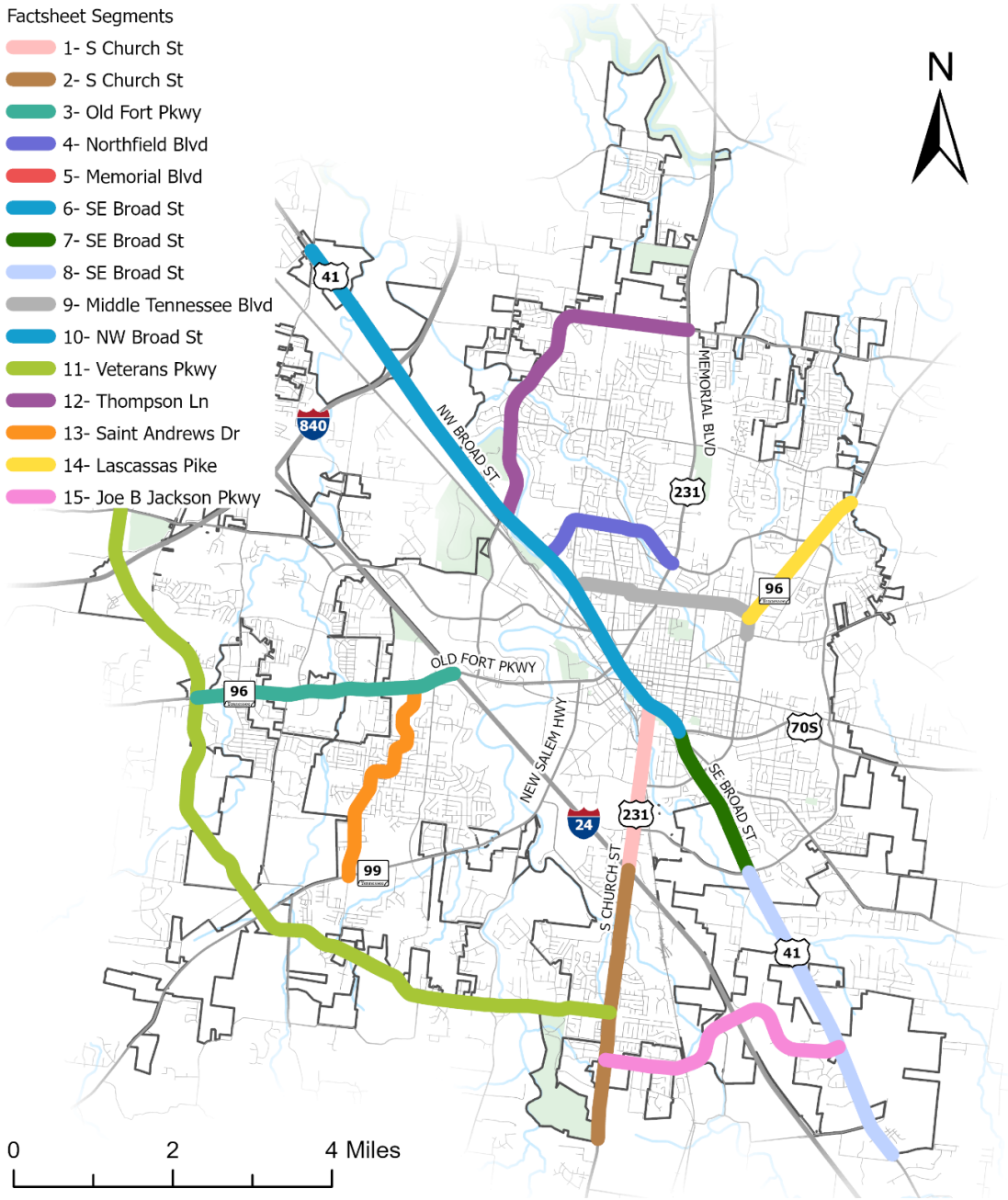


Figure 45: HIN Segment Prioritization Scores

MURFREESBORO SAFE STREETS

Progress & Transparency

Progress & Transparency

The City of Murfreesboro SAP recommends a set of actions that will support the successful implementation and monitoring of the recommended projects and strategies. The City of Murfreesboro must work alongside related departments and agencies to implement the projects and policy changes described in this SAP and assume joint responsibility for the complete fulfillment of the Plan. The City and the task force described in the following section will continue to update the public on the progress of project, policy, and process implementation. A progress and transparency toolkit has been provided to the City to keep the public informed and aware of ongoing projects and the benefits of the proposed improvements after implementation.

Implementation Process

To successfully implement an SS4A grant-funded project, the City must undertake several key steps. The first step is the preparation and adoption of a comprehensive safety action plan, which is accomplished by the City of Murfreesboro through this document. Once the plan has been approved, the City must engage in project-level planning, design, and development activities directly connected to the completion of the identified projects. This includes infrastructure improvements as well as behavioral and operational activities. The City must also ensure proper coordination among various stakeholders, including local government agencies, community organizations, and the public, to gather input and support for the projects. Additionally, the City must adhere to the timelines and funding requirements specified in the grant agreement, ensuring that all activities are completed within the stipulated period. Regular monitoring and evaluation of progress are essential to ensure that the safety goals are being met and that any necessary adjustments are made.

Task Force Implementation and Monitoring

It is recommended that a subset of the Steering Committee reconvenes in the future as a Murfreesboro Safety Task Force to direct the SAP implementation, monitoring, and future progress. The Task Force can consist of Public Works staff, other City of Murfreesboro departments, Murfreesboro Police Department, other local emergency service providers, key Rutherford County staff, key TDOT staff, other adjacent communities, and other stakeholders as needed. It is recommended that this group convene annually after the adoption of the Murfreesboro SAP to review the latest available crash data trends, discuss the progress of project implementation, and assess progress toward crash reduction goals. The Task Force will discuss opportunities to build upon the plan to address any changing crash trends alongside community needs, new technologies, and additional resources available to assist in implementation.

Public Posting of the Murfreesboro SAP

Upon completion and adoption, this plan will be made public on the dedicated project website and the City's website. It is recommended the project website be maintained to update the public with new crash data trends, project implementation status, and progress toward safety goals.

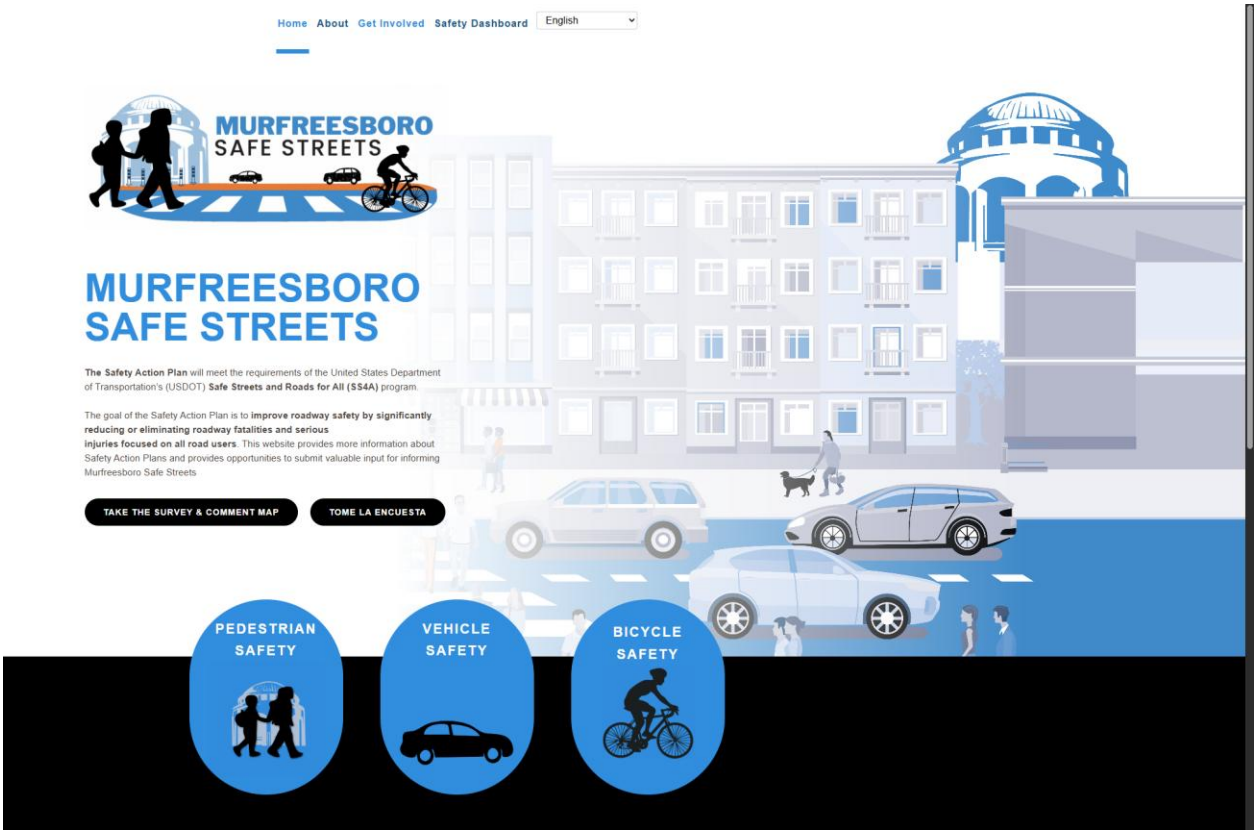


Figure 46: Murfreesboro SAP Website

Safety Dashboard Maintenance

The Murfreesboro Safety Task Force should periodically update the safety dashboard using TDOT's AASHTOWare Safety online crash database in order to inform the public of the progress toward the City's interim reduction goal and the long-term goal of zero traffic deaths and serious injuries.

Supplemental Visual Progress Indicators

These indicators can take various forms, such as maps and infographics, which visually represent the progress and impact of safety initiatives. Interactive maps can show the locations of ongoing and completed projects, allowing residents to see how their neighborhoods are being affected. Infographics can summarize key statistics and achievements in a visually appealing manner, helping to communicate the benefits of the projects effectively. By using these visual tools, the City of Murfreesboro can foster a sense of transparency and accountability, ensuring that the public remains informed and engaged throughout the implementation process. Additionally, these tools can be configured to serve as valuable feedback mechanisms, allowing residents to provide input and express concerns, which can be addressed in future project phases.

Appendix A

RESOLUTION 26-R-24 adopting the City of Murfreesboro Safety Action Plan and its Safety Targets.

WHEREAS, there were 26,023 crashes reported within the Murfreesboro City limits from 2020 to 2024; and

WHEREAS, 38 people lost their lives in crash-related deaths on Murfreesboro roadways in the five-year period; and

WHEREAS, there were 331 people with suspected serious injuries caused from crashes on Murfreesboro roadways in the five-year period; and

WHEREAS, the City of Murfreesboro is committed to the goal of significantly reducing and ultimately eliminating roadway fatalities and serious injuries on roadways within the City's police jurisdiction.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF MURFREESBORO, TENNESSEE, AS FOLLOWS:

SECTION 1. The City adopts an interim target of reducing fatal and serious injury crash rates expressed in crashes per 100 million vehicle miles travel by twenty-five (25) percent by the year 2040.

SECTION 2. The City adopts this Safety Action Plan of the Safe Streets and Roads for All initiative, to serve as a guiding document for the City as it works toward achieving its safety performance goals

SECTION 3. This Resolution shall be effective immediately, the public welfare and the welfare of the City requiring it.

Passed: May 14, 2026

Shane McFarland, Mayor

ATTEST:

Erin E. Tucker
City Recorder

APPROVED AS TO FORM:

Kelley Blevins Baker
Interim City Attorney

Appendix B

						Variable Weightings	10%	30%	10%	20%	10%	10%	5%	5%	100%	-
ID	Road Name	From	To	Length, mi	AADT	Crashes	Crash Rate	KA Crashes	Risk Index	VRU Crashes	Schools (.5 mile)	Transit (0.5 mile)	SC Inputs	Public Comments	Total Score	Rank
A	OLD FORT PKWY.	Veterans Pkwy	Broad St	5.41	38,000	2,787	7	55	99	29	1,161	2,483	7	9	90	1
B	MEMORIAL BLVD.	Broad St	Dejarnette Ln	6.86	39,254	2,475	5	28	99	18	1,359	2,437	7	32	70	4
C	NW BROAD ST.	Florence Rd	Old Fort Pkwy	6.70	28,784	1,702	5	39	95	9	378	1,209	7	15	56	8
D	SE BROAD ST.	Old Fort Pkwy	Elam Rd	6.44	29,301	1,496	4	20	95	18	1,464	1,014	7	31	60	6
E	SHELBYVILLE PK.	SE Broad St	City Limits	5.50	35,000	2,628	7	42	100	24	1,527	2,410	5	27	83	2
F	NORTHFIELD BLVD. / RUTHERFORD BLVD.	NW Broad St	S Church St	10.60	20,000	2,865	7	47	97	18	1,463	2,324	2	15	76	3
G	FORTRESS BLVD.	Old Fort Pkwy	NW Broad St	5.88	20,000	2,663	12	34	98	10	451	2,039	5	15	62	5
H	MIDDLE TENNESSEE BLVD.	NW Broad St	New Salem Hwy	6.45	20,000	2,044	9	26	97	15	1,100	1,779	2	14	59	7
I	JOHN R. RICE BLVD.	Veterans Pkwy	New Salem Hwy	7.36	8,000	1,349	13	15	99	3	691	689	-	8	39	9
J	NEW SALEM HWY	City Limits	Old Fort Pkwy	7.89	25,000	1,539	4	16	99	9	305	348	-	12	34	11
K	THOMPSON LN. / COMPTON RD.	Old Fort Pkwy	City Limits	8.72	20,000	1,708	5	17	98	4	182	1,430	3	12	37	10
L	LASCASSAS PK.	E Clark Blvd	City Limits	2.73	15,000	555	7	13	99	7	433	452	-	6	33	12
M	VETERANS PKWY.	Burnt Knob Rd	S Church St	10.51	14,000	951	4	22	95	3	177	192	-	20	31	13
N	DR. MARTIN LUTHER KING JR. BLVD	NE Broad St	City Limits	2.92	17,000	662	7	11	95	3	339	599	1	4	29	14
O	SAINT ANDREWS DR.	Old Fort Pkwy	New Salem Hwy	2.82	9,000	508	11	6	96	3	83	264	1	4	27	15
P	JOE B. JACKSON PKWY.	S Church St	SE Broad St	3.54	12,500	484	6	14	98	2	-	-	2	5	26	16

best	<	-	>	worst

MURFREESBORO SAFE STREETS

Appendix C

Shelbyville Pike (US-231)

from Broad Street to I-24

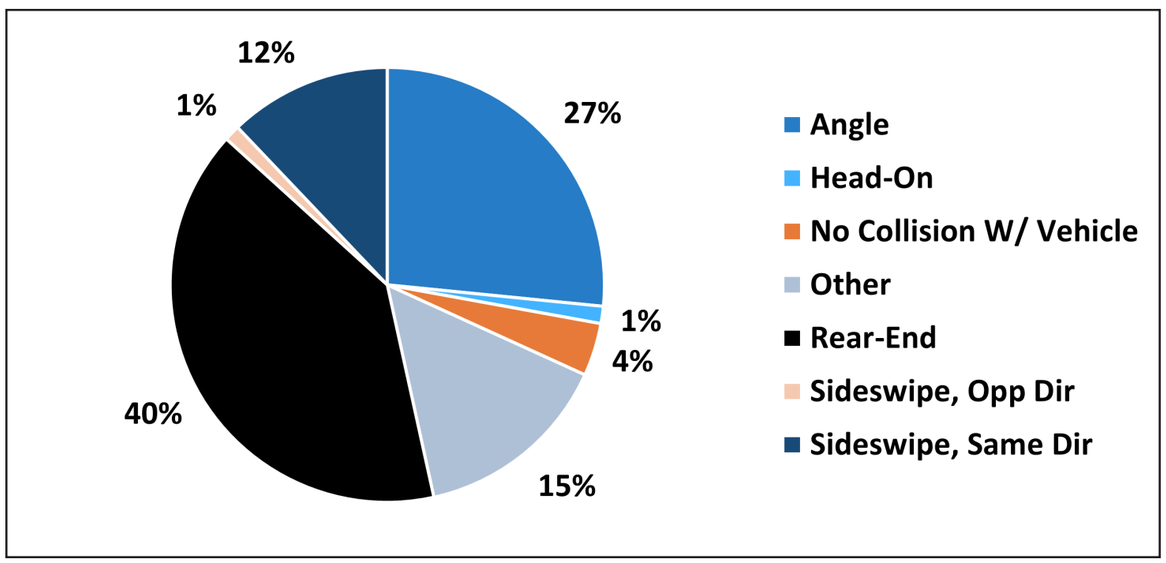
Other Principal Arterial (TDOT)

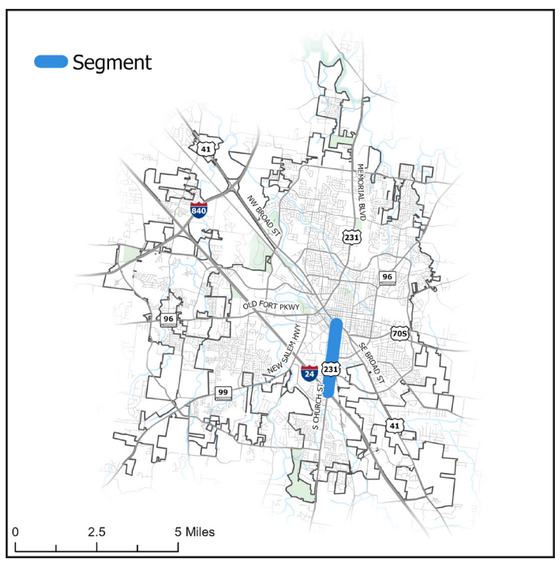
Speed Limit	45 mph
Lanes	4
Vehicles/Day	35,000
Total Crashes	1,016
HIN Intersections	-

Characteristics

This section of Shelbyville Pike (US-231) is a four-lane roadway through south Murfreesboro, divided by a bi-directional turn lane. This segment follows a straight alignment over generally rolling terrain. Multi-modal infrastructure, including sidewalks and transit stop locations, can be found throughout this segment.

Along Shelbyville Pike (US-231), Facing North, Just North of Middle Tennessee Boulevard





OVERALL RANKING: 1

Ranking Index

Fatal & Serious Injury Crashes: Low — High

Bike/Ped Crashes: Low — High

Crash Rate: Low — High

Risk Index: Low — High

Community Input: Low — High

Community Input

"The city needs to look at the bushes and shrubs around businesses blocking views when pulling out"

"Poorly designed intersections and signals"

"The new builds on S Church St need to be connected to a light."

"Crossing broad Street on church St is very dangerous and drivers frequently run red lights."

"Pedestrians frequently cross the road at the intersection with Broad St and refuse to use the crosswalk. It is dangerous for both pedestrians and vehicles alike, and it severely infringes upon the flow of traffic. Not only is it unsafe for pedestrians to cross, it is also unsafe for the vehicles who have to frequently try to avoid them on an already crowded street."

Shelbyville Pike (US-231)

from Broad Street to I-24

Shelbyville Pike (US-231)
from Broad Street to I-24

			ID	Countermeasure	Cost	Schedule	Project Readiness
			1	Conduct Intersection Control & Alignment Evaluation (Broad St)	$	Short-Term	Ready
	●		2	Flashing Yellow Arrows (FYA) (Broad St, Middle Tennessee Blvd, S Rutherford Blvd)	$$	Mid-Term	Ready
●	●	●	3	Retroreflective Backplates (Broad St, Middle Tennessee Blvd, S Rutherford Blvd)	$	Short-Term	Ready
●	●	●	4	Crosswalk Visibility and Accessibility Enhancements (Broad St, Middle Tennessee Blvd, S Rutherford Blvd)	$$	Short-Term	Ready
●	●	●	5	Targeted Lighting	$$	Mid-Term	●
			6	Transit Stop Addition/Enhancement	$$	Mid-Term	Ready
	●		7	Retroreflective Pavement Markers	$	Short-Term	Ready
●	●	●	8	Corridor Access Management	$$$$	Long-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

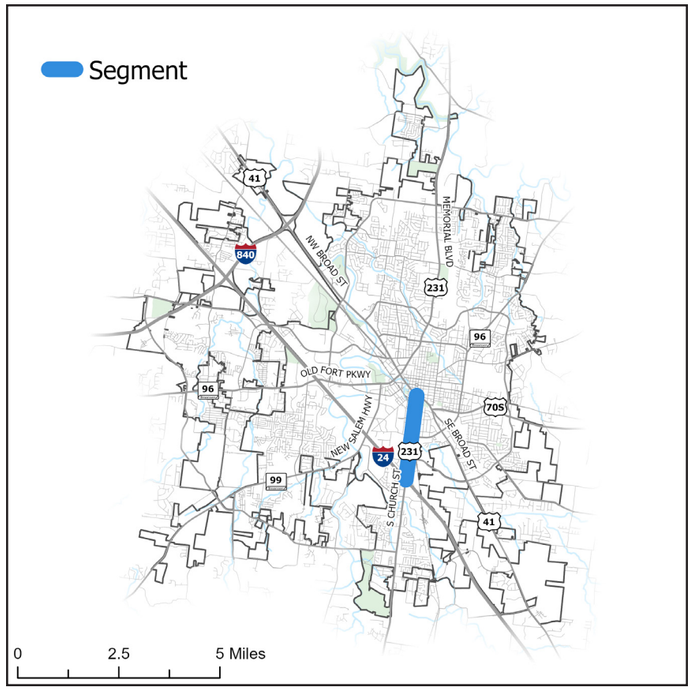
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

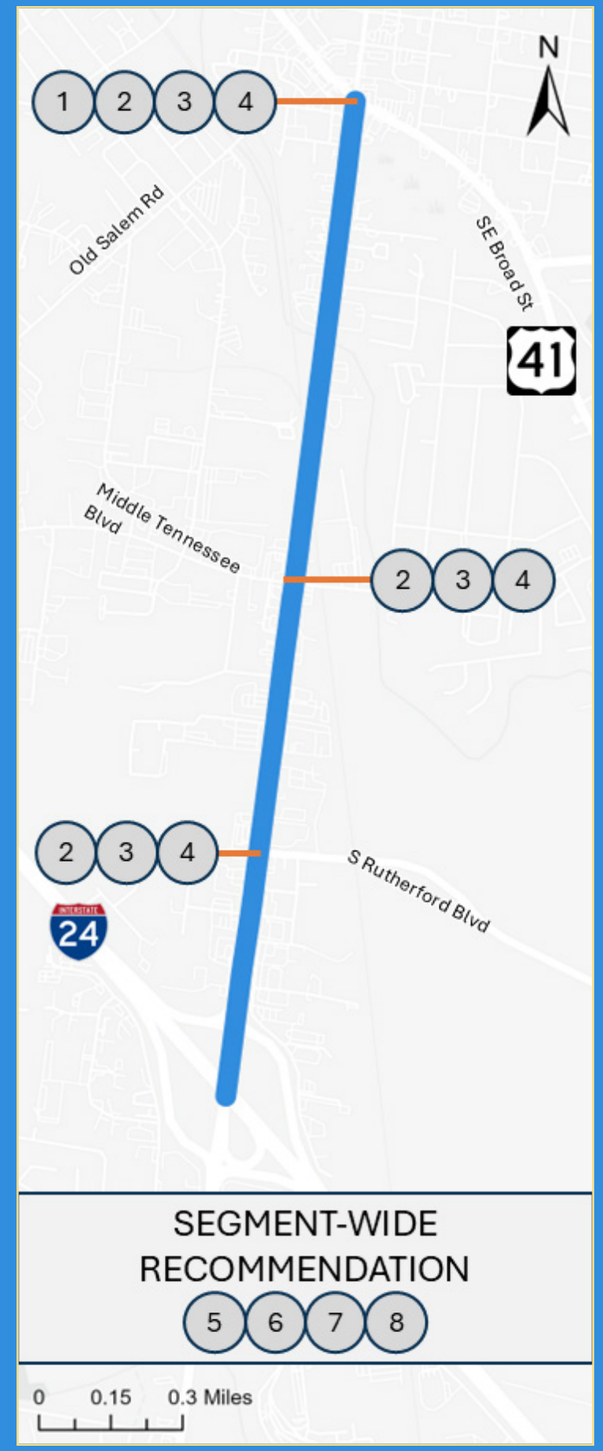
● Requires Utility Relocation

Benefit Summary

- FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.
- Evaluating alternate intersection control or geometry ensures safer, more efficient designs by reducing severe crashes, improving pedestrian safety, and calming traffic.
- Proper access management at medians can prevent left-turn and head-on crashes by separating opposing traffic flows. Consolidating driveways can also facilitate better access management by controlling where vehicles can turn, thereby reducing unpredictable movements that can lead to crashes.
- Adding or enhancing transit stop locations provides a safer path for transit user to reach their intended destinations, including accessible sidewalks, curb ramps, detectable warning surfaces, and stop shelters and benches.



RECOMMENDED COUNTERMEASURES



Shelbyville Pike (US-231)
from Broad Street to I-24

Shelbyville Pike (US-231)

from I-24 to City Limits

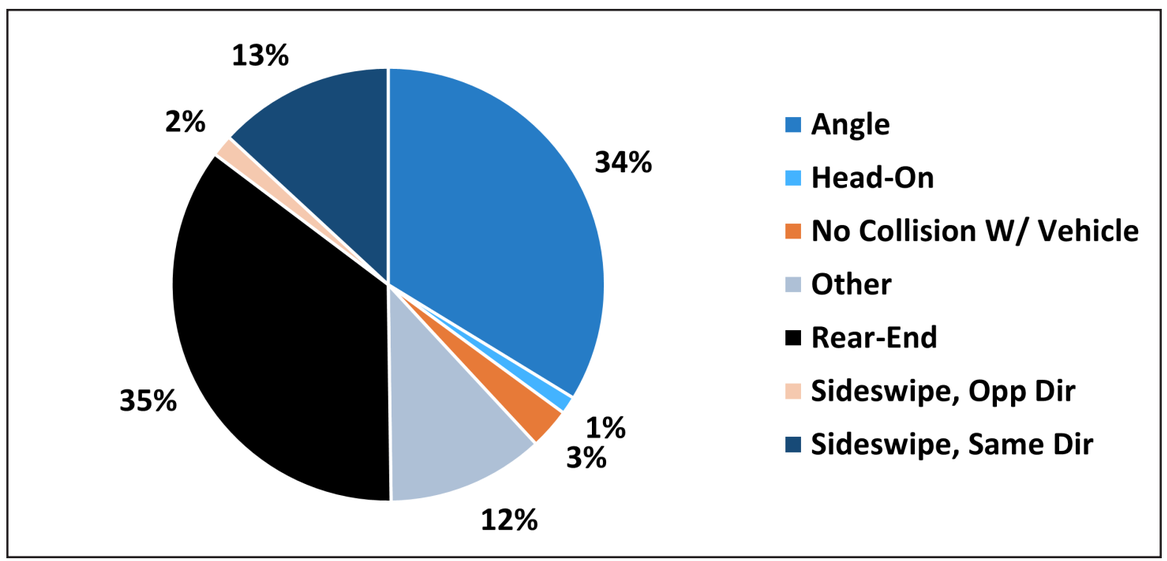
Other Principal Arterial (TDOT)

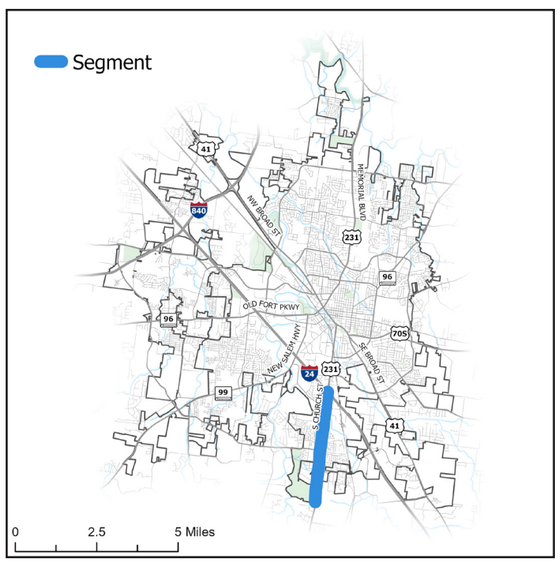
Speed Limit	45 mph
Lanes	6
Vehicles/Day	35,000
Total Crashes	1,675
HIN Intersections	-

Characteristics

This section of Shelbyville Pike (US-231) is a four-lane roadway through south Murfreesboro, divided by a bi-directional turn lane. This segment follows a straight alignment over generally rolling terrain. Multi-modal infrastructure, including sidewalks and transit stop locations, can be found throughout this segment.

Along Shelbyville Pike (US-231), Facing North, Just South of I-24





OVERALL RANKING: 1

Ranking Index

Fatal & Serious Injury Crashes: Low — High

Bike/Ped Crashes: Low — High

Crash Rate: Low — High

Risk Index: Low — High

Community Input: Low — High

Community Input

- "We see near crashes at Innsbrooke Blvd DAILY from people running the red light at Kroger on church street."
- "Many red-light runners at Innsbrooke Blvd. Add more all-red time."
- "Several new restaurants that are hard to turn out of"
- "Add crosswalks at Innsbrooke Blvd and Veterans Pkwy"
- "Many fatalities at Westgate Blvd due to pedestrians crossing from hotel to gas stations. Also lack of sidewalks down church street causes folks to walk on road."
- "Too many people run the red light resulting in MANY crashes."
- "Dozens of vehicle accidents near the First Watch location with vehicles trying to turn into the parking lot."

Shelbyville Pike (US-231)
from I-24 to City Limits

Shelbyville Pike (US-231)
from I-24 to City Limits

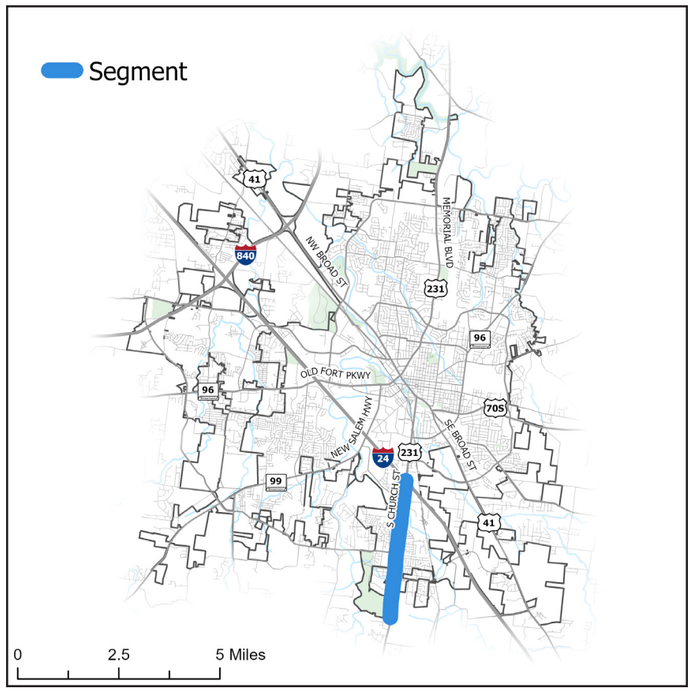
			ID	Countermeasure	Cost	Schedule	Project Readiness
	●		1	Flashing Yellow Arrows (FYA) (Warrior Dr, Indian Park Dr, Calumet Trace, Innsbrooke Blvd, Veterans Pkwy, Lansdan Dr, Joe B Jackson Pkwy, Tiger Hill)	$$	Mid-Term	Ready
●	●	●	2	Retroreflective Backplates (Warrior Dr, Indian Park Dr, Calumet Trace, Innsbrooke Blvd, Veterans Pkwy, Lansdan Dr, Joe B Jackson Pkwy, Tiger Hill)	$	Short-Term	Ready
●	●	●	3	Crosswalk Visibility and Accessibility Enhancements (Warrior Dr, Indian Park Dr, Calumet Trace, Innsbrooke Blvd, Veterans Pkwy, Lansdan Dr, Joe B Jackson Pkwy, Tiger Hill)	$$	Short-Term	Ready
●	●	●	4	Targeted Lighting	$$	Mid-Term	●
●	●	●	5	Sidewalks and Multi-use Paths	$$	Mid-Term	●
			6	Transit Stop Addition/Enhancement	$$	Mid-Term	●
●	●	●	7	Corridor Access Management	$$$$	Long-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

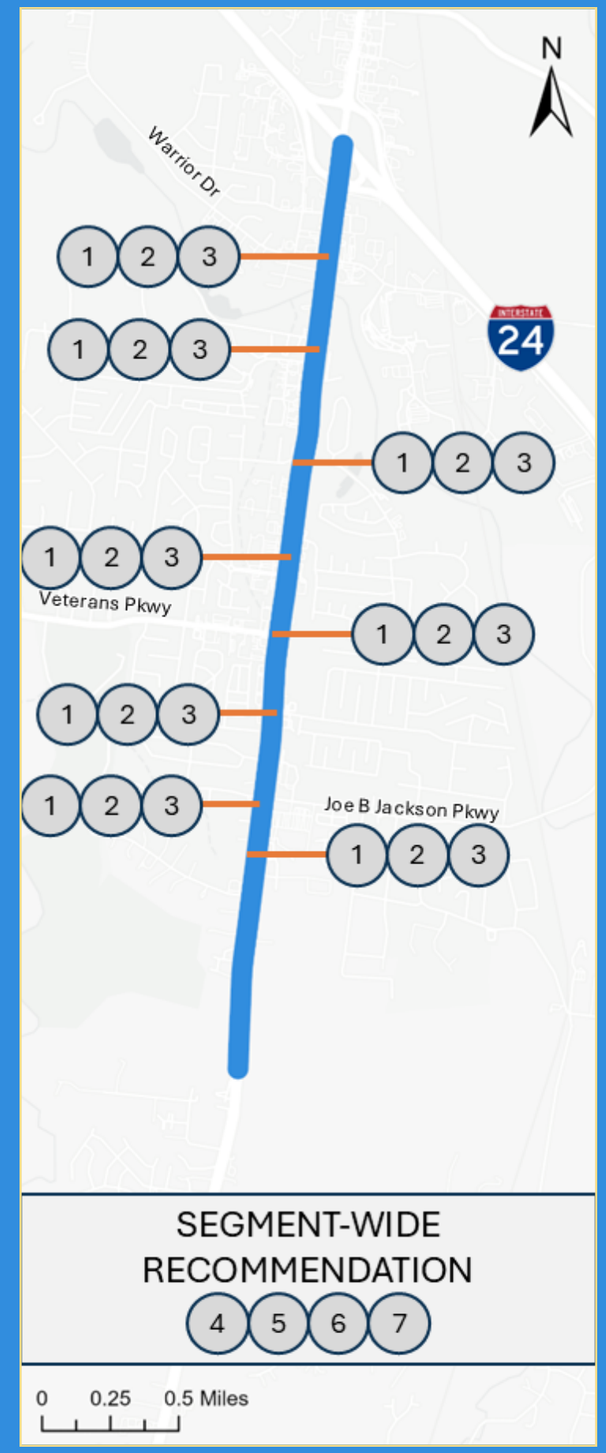
● FHWA Proven Safety Countermeasure
● Crash Modification Factors Countermeasure
● Vulnerable Road User Related Countermeasure
● Requires ROW Acquisition
● Requires Utility Relocation

Benefit Summary

- **Roadway lighting helps drivers, cyclists, and pedestrians see each other more clearly, especially during nighttime and low-visibility conditions, reducing the likelihood of crashes.**
- **FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.**
- **Evaluating alternate intersection control or geometry ensures safer, more efficient designs by reducing severe crashes, improving pedestrian safety, and calming traffic.**
- **Installing sidewalks and pedestrian infrastructure dramatically improves safety by reducing pedestrian crashes up to 88%, separating vulnerable users from traffic, and enhancing visibility and accessibility. These improvements also calm traffic, promote active transportation, and create safer, more livable communities.**
- **Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter.**



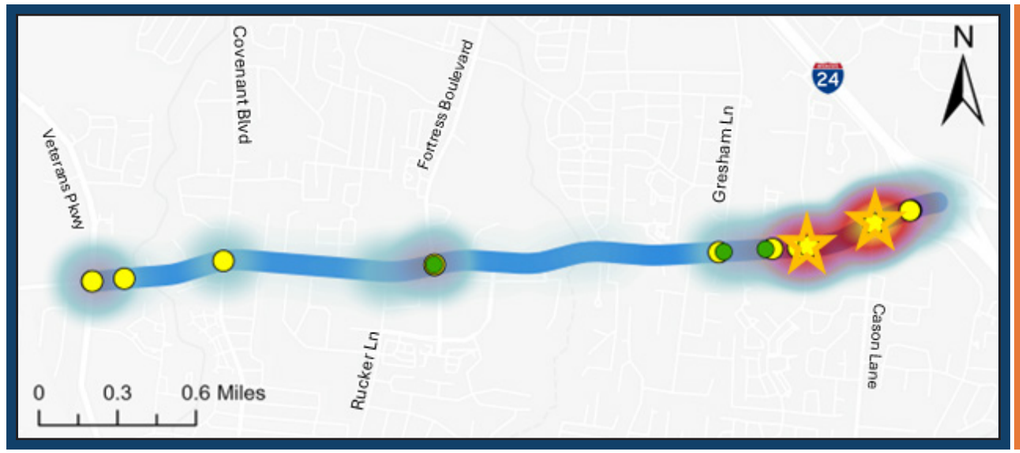
RECOMMENDED COUNTERMEASURES



Shelbyville Pike (US-231)
from I-24 to City Limits

Old Fort Parkway (TN-96)

from Veterans Parkway to I-24



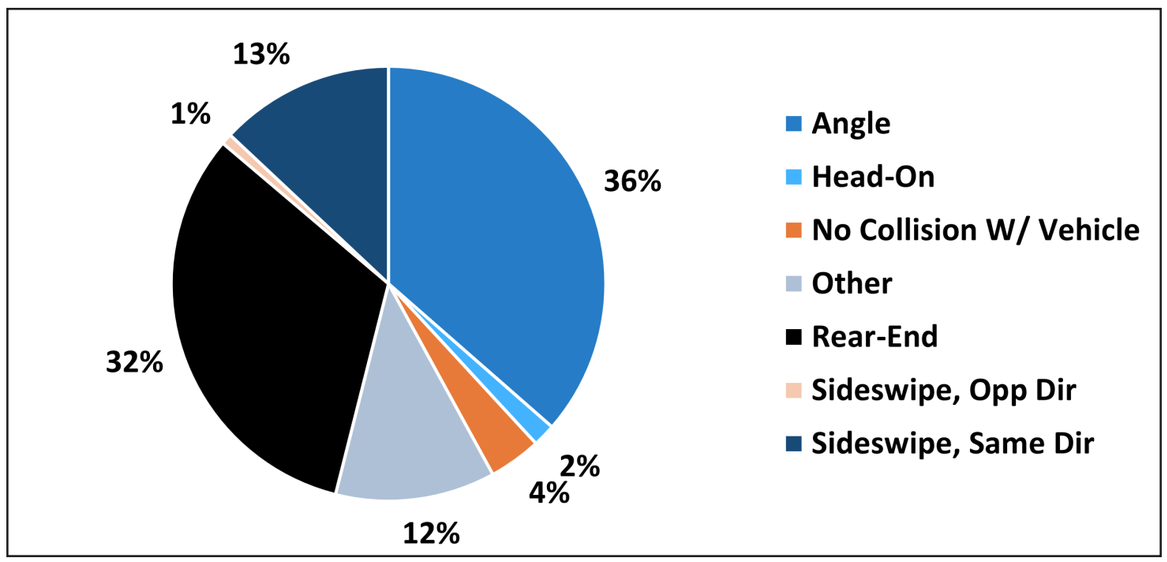
Other Principal Arterial (TDOT)

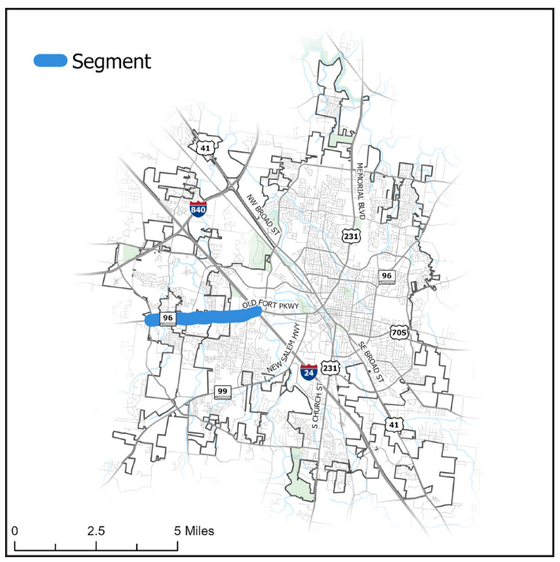
Speed Limit	45 mph
Lanes	4
Vehicles/Day	38,000
Total Crashes	1,361
HIN Intersections	2

Characteristics

This section of Old Fort Parkway (TN-96) is a four-lane roadway through west Murfreesboro, divided by a bi-directional turn lane. This segment follows a lightly curved alignment over generally rolling terrain. The segment travels through largely residential and commercial area, and connects to I-24 at its eastern end.

Along Old Fort Parkway (TN-96), Facing East, Just East of Veterans Parkway





OVERALL RANKING: 2

Ranking Index

Fatal & Serious Injury Crashes: Low — High

Bike/Ped Crashes: Low — High

Crash Rate: Low — High

Risk Index: Low — High

Community Input: Low — High

Community Input

> "Cars will travel in the center lane to turn left onto I-24, but merge into the center lane going straight. No patience and drivers in center lane wait even longer to move forward."

> "We have seen several accidents in the area near the I-24 interchange."

> "Impossible to cross three lanes of traffic, this whole area is a disaster, no designated turning lanes just 6 lanes of straight, no crosswalks, or bike lanes!?"

> "Cason Ln is a terrible intersection. Left turn onto 96 is too short, needing to wait multiple lights. River Rock ending on Cason needs to be rerouted. No double light."

> "We need a right turn lane from southbound Veterans Blvd turning West onto Franklin Rd. Backed up traffic could be reduced with those stuck waiting to turn right onto Franklin Rd."

Old Fort Parkway (TN-96)
from Veterans Parkway to I-24

Old Fort Parkway (TN-96)
from Veterans Parkway to I-24

RECOMMENDED COUNTERMEASURES

			ID	Countermeasure	Cost	Schedule	Project Readiness
			1	Improve Signal Equipment Alignment (Veterans Pkwy)	$$	Short-Term	Ready
	●		2	Flashing Yellow Arrows (FYA) (Veterans Pkwy, Brinkley Rd, Rucker Ln, Fortress Blvd, Gresham Ln, St. Andrews Dr, Cason Ln, I-24 EB Ramps)	$$	Mid-Term	Ready
●	●	●	3	Retroreflective Backplates (Veterans Pkwy, Brinkley Rd, Rucker Ln, Fortress Blvd, St. Andrews Dr, Cason Ln, I-24 EB Ramps)	$	Short-Term	Ready
●	●	●	4	Crosswalk Visibility and Accessibility Enhancements (Veterans Pkwy, Brinkley Rd, Rucker Ln, Fortress Blvd, St. Andrews Dr, Cason Ln, I-24 EB Ramps)	$$	Short-Term	Ready
			5	Conduct Intersection Control & Alignment Evaluation (Cason Ln)	$	Short-Term	Ready
●	●	●	6	Sidewalks and Multi-use Paths	$$	Mid-Term	Ready
	●		7	Retroreflective Pavement Markers	$	Short-Term	Ready
●	●	●	8	Corridor Access Management	$$$$	Long-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

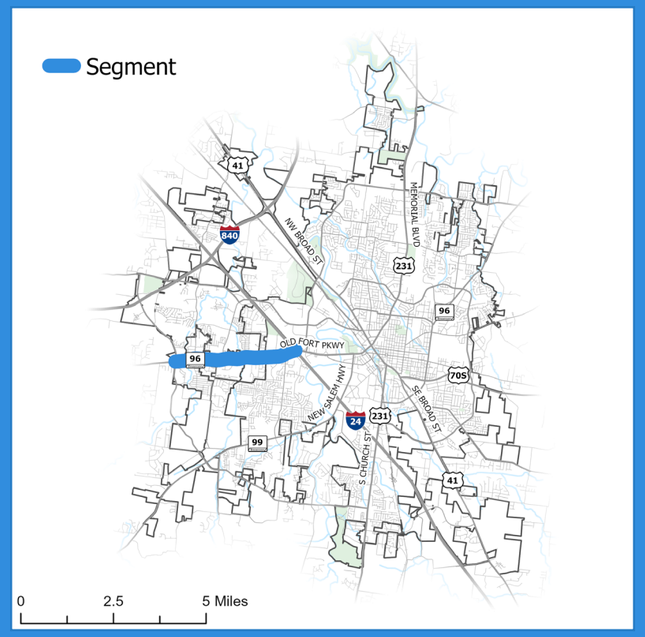
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

● Requires Utility Relocation

Benefit Summary

- **Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter. This enhanced visibility and recognition can lead to a reduction in rearend and angle crashes at signalized intersections.**
- **FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.**
- **Evaluating alternate intersection control or geometry ensures safer, more efficient designs by reducing severe crashes, improving pedestrian safety, and calming traffic.**
- **Proper access management at medians can prevent left-turn and head-on crashes by separating opposing traffic flows. Consolidating driveways can also facilitate better access management by controlling where vehicles can turn, thereby reducing unpredictable movements that can lead to crashes.**



Old Fort Parkway (TN-96)
from Veterans Parkway to I-24

Northfield Boulevard

from Broad Street to Memorial Boulevard

- VRU (7)
- Serious Injury (9)
- Fatal (0)

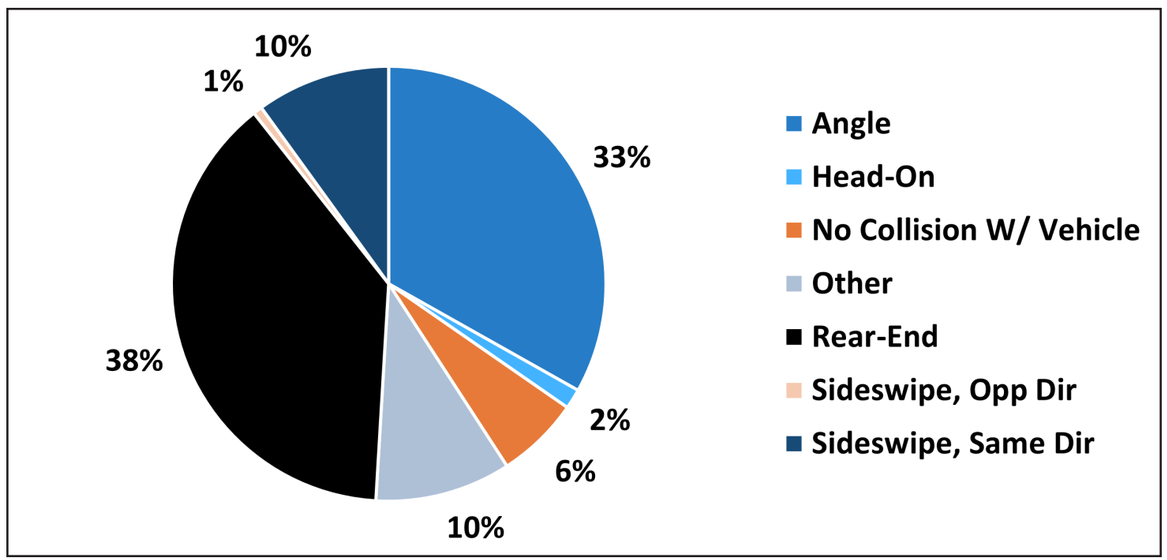
Minor Arterial (Murfreesboro, TN)

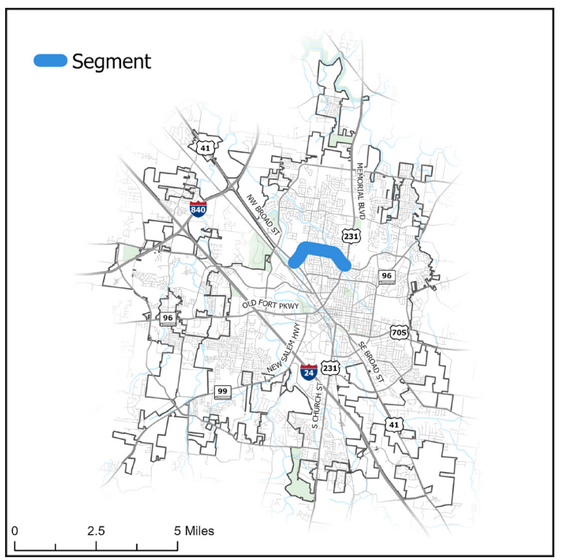
Speed Limit	40 mph
Lanes	4
Vehicles/Day	20,000
Total Crashes	742
HIN Intersections	-

Characteristics

This section of Northfield Boulevard is a four-lane roadway through south Murfreesboro, divided by medians and bi-directional turn lanes. This segment follows a curved alignment over generally rolling terrain. Sidewalks and pedestrian infrastructure can be found throughout this segment, including several mid-block crossings.

Along Northfield Boulevard, Facing West, Just West of Memorial Boulevard





OVERALL RANKING: 3

Ranking Index

Fatal & Serious Injury Crashes: Low — High

Bike/Ped Crashes: Low — High

Crash Rate: Low — High

Risk Index: Low — High

Community Input: Low — High

Community Input

> "Speed lowering measures are needed to slow drivers on Northfield Blvd. near Georgetown Lane that exceed the speed limit in an effort to get in the far right lane at the intersection with Broad St. to turn right onto Broad."

> "Crosswalks and pedestrian signals needed at Broad Street"

> "Cars routinely speed through this stretch, travelling perhaps 15-20 miles per hour over the posted limit, at all hours of the day."

> "There should be more pedestrian facilities here. A protected bike lane perhaps? Speed cushions? Something to ease traffic."

Northfield Boulevard

from Broad Street to Memorial Boulevard

Northfield Boulevard
from Broad Street to Memorial Boulevard

RECOMMENDED COUNTERMEASURES

			ID	Countermeasure	Cost	Schedule	Project Readiness
	●		1	Flashing Yellow Arrows (FYA) (Battleground Dr, Sulphur Springs Rd, Memorial Blvd)	$$	Mid-Term	Ready
●	●	●	2	Retroreflective Backplates (Broad St, Battleground Dr, Sulphur Springs Rd, Memorial Blvd)	$	Short-Term	Ready
●	●	●	3	Crosswalk Visibility and Accessibility Enhancements (Broad St, Battleground Dr, Sulphur Springs Rd, Memorial Blvd)	$$	Short-Term	Ready
	●		4	Smart Channel Right-Turn Lane (Memorial Blvd)	$$$	Long-Term	Ready
	●	●	5	Eliminate Negative Off-sets at Intersections (MTSC Rd and Sulphur Springs Rd)	$$$	Mid-Term	Ready
●	●	●	6	Rectangular Rapid Flashing Beacons (RRFB) (Saddlebrook Dr)	$$	Mid-Term	● ●
	●		7	Retroreflective Pavement Markers	$	Short-Term	Ready
●	●	●	8	Corridor Access Management	$$$$	Long-Term	Ready
	●	●	9	Traffic Calming (Corridor-Wide Speed Management)	$$	Mid-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

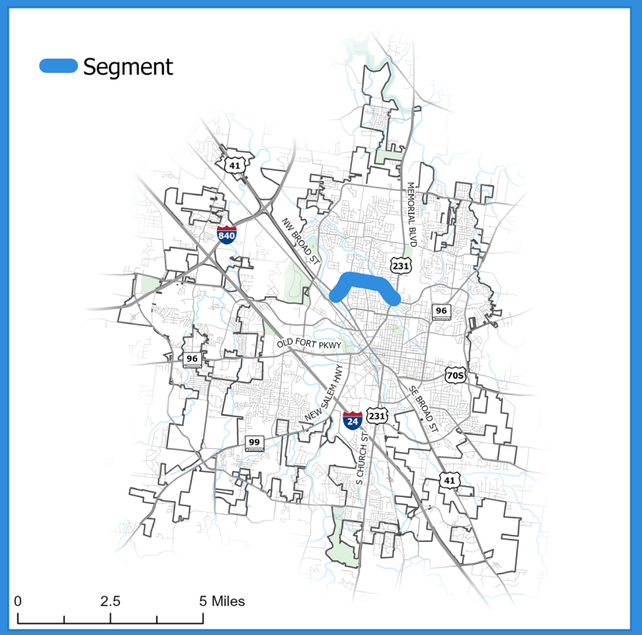
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

● Requires Utility Relocation

Benefit Summary

- **Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter. This enhanced visibility and recognition can lead to a reduction in rearend and angle crashes at signalized intersections.**
- **FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.**
- **By promoting slower turning speeds and better visibility, "smart channel" right turns help reduce the likelihood of collisions at intersections.**
- **RPMs provide continuous lane guidance, which is particularly useful in navigating curves and complex intersections. The reflective properties of RPMs make them highly visible at night, reducing the risk of accidents by guiding drivers safely along the road.**



Northfield Boulevard
from Broad Street to Memorial Boulevard

Memorial Boulevard (US-231)

from Broad Street to Dejarnette Lane

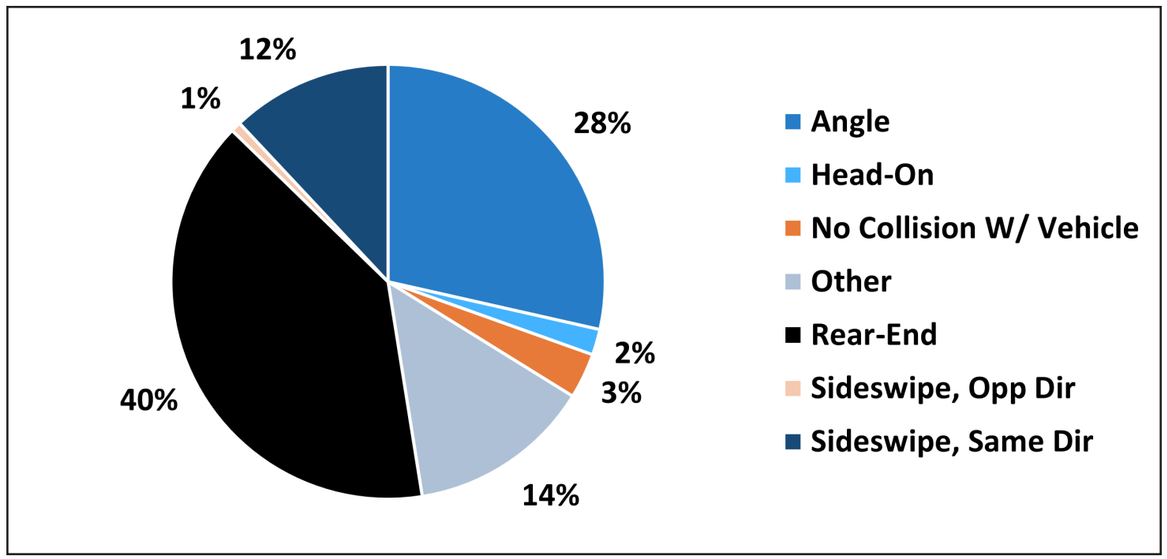
Other Principal Arterial (TDOT)

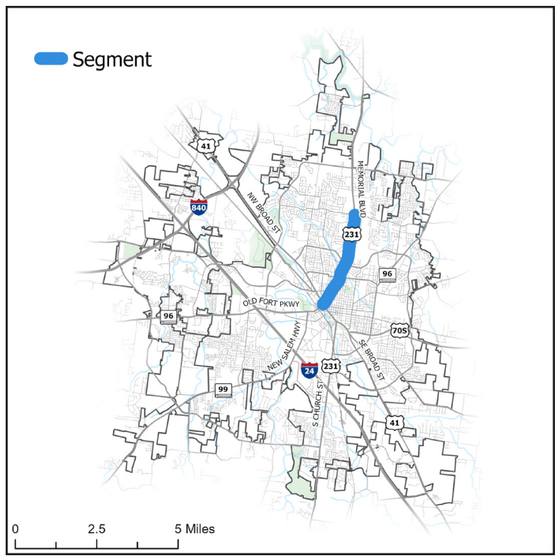
Speed Limit	45 mph
Lanes	4
Vehicles/Day	39,254
Total Crashes	1,984
HIN Intersections	3

Characteristics

This section of Memorial Boulevard (US-231)is a four-lane roadway through north Murfreesboro, divided by a bi-directional turn lane. This segment follows a lightly curved alignment over generally rolling terrain. Multi-modal infrastructure, including sidewalks and bike lanes, can be found throughout

Along Memorial Boulevard (US-231), Facing North, Just South of Dejarnette Lane





OVERALL RANKING: 4

Ranking Index

Fatal & Serious Injury Crashes: Low — High

Bike/Ped Crashes: Low — High

Crash Rate: Low — High

Risk Index: Low — High

Community Input: Low — High

Community Input

> "Pedestrians are struck or almost struck here often because cars have to be aggressive just to get through the intersection, which is almost always blocked"

> "There are several transit stops that need bus shelters and benches"

> "The traffic from Chick-fila-a backs up onto Broad Street"

> "There is a high amount of people who exceed the speed limit of 35 going across the bridge on a daily basis."

> "It's difficult to make a left turn here at Ridgely. There's a tree here that blocks the visibility of oncoming traffic."

> "A pedestrian crosswalk is needed at Medical Center. It is actively very confusing crossing this intersection on foot."

Memorial Boulevard (US-231)

from Broad Street to Dejarnette Lane

Memorial Boulevard (US-231)

from Broad Street to Dejarnette Lane

			ID	Countermeasure	Cost	Schedule	Project Readiness
	●		1	**Flashing Yellow Arrows (FYA)** (Ridgely Rd, Medical Center Pkwy, Clark Blvd, Northfield Blvd, Heritage Park Dr, Airport Rd, Wendelwood Dr, Dejarnette Ln)	$$	Mid-Term	Ready
●	●	●	2	**Retroreflective Backplates** (Ridgely Rd, Medical Center Pkwy, Clark Blvd, Northfield Blvd, Heritage Park Dr, Airport Rd, Wendelwood Dr, Dejarnette Ln)	$	Short-Term	Ready
●	●	●	3	**Crosswalk Visibility and Accessibility Enhancements** (Ridgely Rd, Medical Center Pkwy, Clark Blvd, Northfield Blvd, Heritage Park Dr, Airport Rd, Wendelwood Dr, Dejarnette Ln)	$$	Short-Term	Ready
	●		4	**Smart Channel Right-Turn Lane (Northfield Blvd and Dejarnette)**	$$$	Long-Term	●
●	●	●	5	**Targeted Lighting**	$$	Mid-Term	●
	●		6	**Retroreflective Pavement Markers**	$	Short-Term	Ready
●	●	●	7	**Corridor Access Management**	$$$$	Long-Term	Ready
			8	**Transit Stop Addition/Enhancement**	$$	Mid-Term	●
	●	●	9	**Traffic Calming (Corridor-Wide Speed Management)**	$$	Mid-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

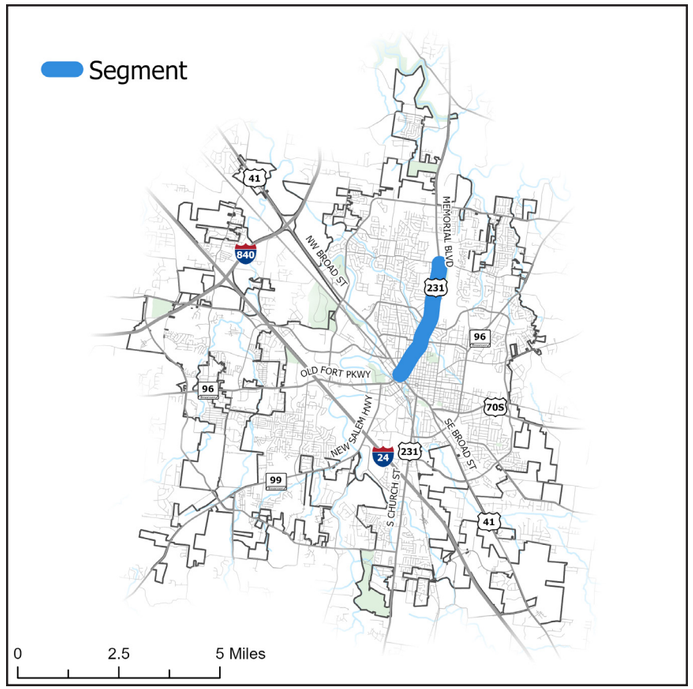
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

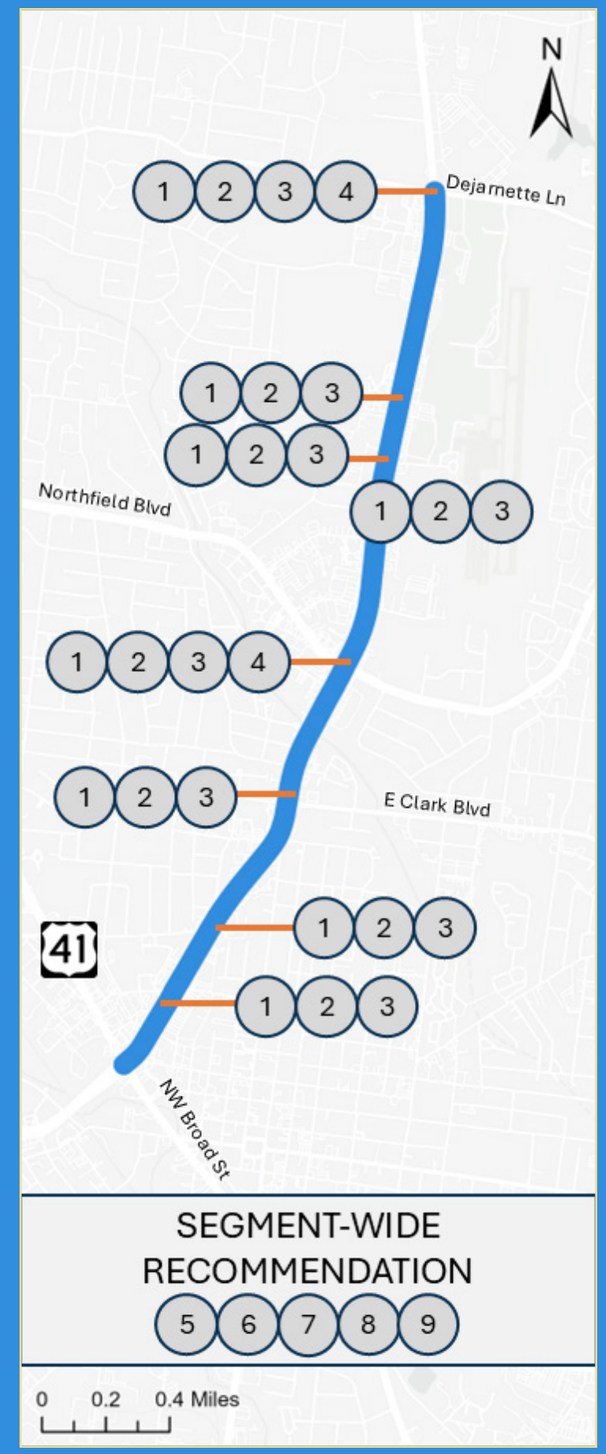
● Requires Utility Relocation

Benefit Summary

- **FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.**
- **Proper access management at medians can prevent left-turn and head-on crashes by separating opposing traffic flows. Consolidating driveways can also facilitate better access management by controlling where vehicles can turn, thereby reducing unpredictable movements that can lead to crashes.**
- **Adding or enhancing transit stop locations provides a safer path for transit user to reach their intended destinations, including accessible sidewalks, curb ramps, detectable warning surfaces, and stop shelters and benches.**
- **RPMs provide continuous lane guidance, which is particularly useful in navigating curves and complex intersections. The reflective properties of RPMs make them highly visible at night, reducing the risk of accidents by guiding drivers safely along the road.**



RECOMMENDED COUNTERMEASURES



Memorial Boulevard (US-231)

from Broad Street to Dejarnette Lane

SE Broad Street (US-41)

from Old Fort Parkway to Martin Luther King Boulevard

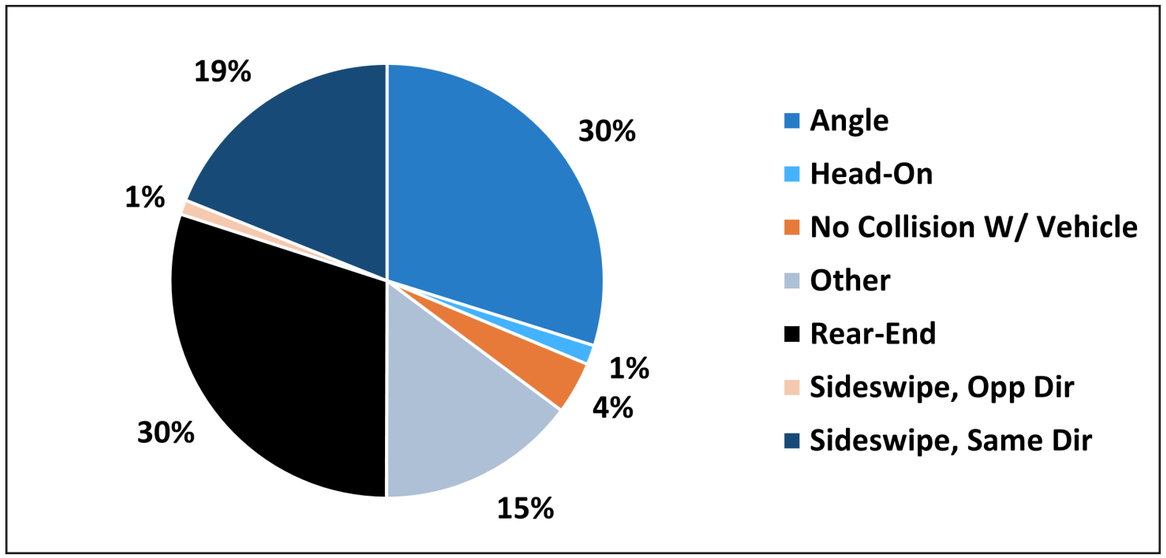
Minor Arterial (TDOT)

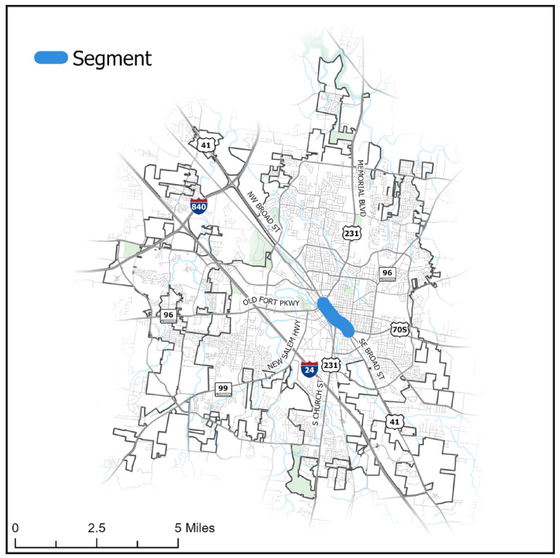
Speed Limit	40 mph
Lanes	6
Vehicles/Day	29,301
Total Crashes	1,103
HIN Intersections	-

Characteristics

This section of SE Broad Street (US-41) is a six-lane roadway through central Murfreesboro, divided by a bi-directional turn lane. This segment follows a lightly curved alignment over generally rolling terrain. This segment flows through largely commercial areas, providing essential non-motorist access throughout downtown Murfreesboro.

Along SE Broad Street, Facing East, Just West of S Maney Ave





OVERALL RANKING: 6

Ranking Index

Fatal & Serious Injury Crashes:
Low — High

Bike/Ped Crashes:
Low — High

Crash Rate:
Low — High

Risk Index:
Low — High

Community Input:
Low — High

Community Input

- "Turning left or crossing NW Broad at Front St is dangerous"
- "Pedestrians frequently cross the road in this spot and refuse to use the crosswalk."
- "People jay walk across Broad constantly."
- "We need safer sidewalk and bike lanes here"
- "Lots of near misses at Old Fort from red light runners and low visibility. consider traffic camera or longer all red times."
- "Narrowing lanes make cars come over the centerline heading outbound and inbound, with many near miss accidents."
- "Have seen many near misses at this intersection with vehicles attempting to turn left from both Vine St & Front St onto Broad."

SE Broad Street (US-41)
from Old Fort Parkway to Martin Luther King Boule-

SE Broad Street (US-41)

from Old Fort Parkway to Martin Luther King Boulevard

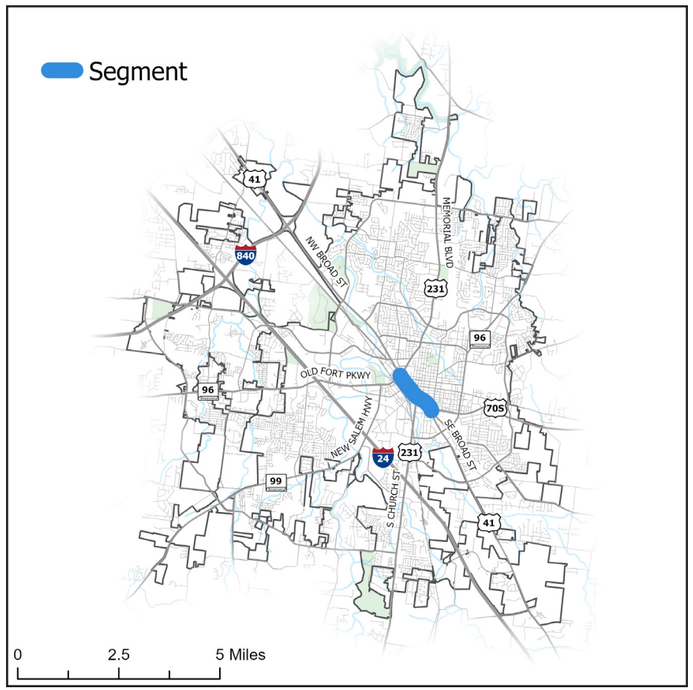
			ID	Countermeasure	Cost	Schedule	Project Readiness
●	●	●	1	**Retroreflective Backplates** (Old Fort Pkwy, W Lytle St, W Main St, S Church St, S Maney Ave, Dr. MLK Jr Blvd)	$	Short-Term	Ready
	●		2	**Flashing Yellow Arrows (FYA)** (Old Fort Pkwy, W Lytle St, W Main St, S Church St, S Maney Ave, Dr. MLK Jr Blvd)	$$	Mid-Term	Ready
●	●	●	3	**Crosswalk Visibility and Accessibility Enhancements** (Old Fort Pkwy, W Lytle St, W Main St, S Church St, S Maney Ave, Dr. MLK Jr Blvd)	$$	Short-Term	Ready
●	●	●	4	**Conduct Intersection Control & Alignment Evaluation (S Church St)**	$	Short-Term	Ready
	●		5	**Corridor Access Management**	$$$$	Long-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure
● Crash Modification Factors Countermeasure
● Vulnerable Road User Related Countermeasure
● Requires ROW Acquisition
● Requires Utility Relocation

Benefit Summary

- **FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.**
- **Clearly marked crosswalks, high-visibility striping, adequate lighting, and advance warning signs help drivers recognize pedestrian crossing areas sooner, reducing the risk of crashes. Accessible features such as curb ramps, tactile warning surfaces, audible signals, and sufficient crossing times ensure that people of all abilitiesare able to cross streets safely and independently.**
- **Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter. This enhanced visibility and recognition can lead to a reduction in rearend and angle crashes at signalized intersections.**
- **Evaluating alternate intersection control or geometry ensures safer, more efficient designs by reducing severe crashes, improving pedestrian safety, and calming traffic.**

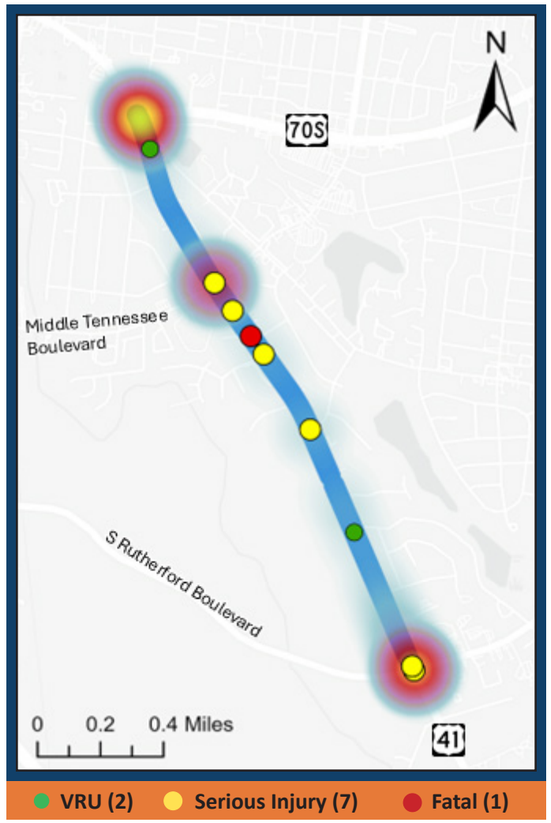


RECOMMENDED COUNTERMEASURES

SE Broad Street (US-41)
from Old Fort Parkway to Martin Luther King Boule-

SE Broad Street (US-41)

from Martin Luther King Boulevard to S Rutherford Boulevard



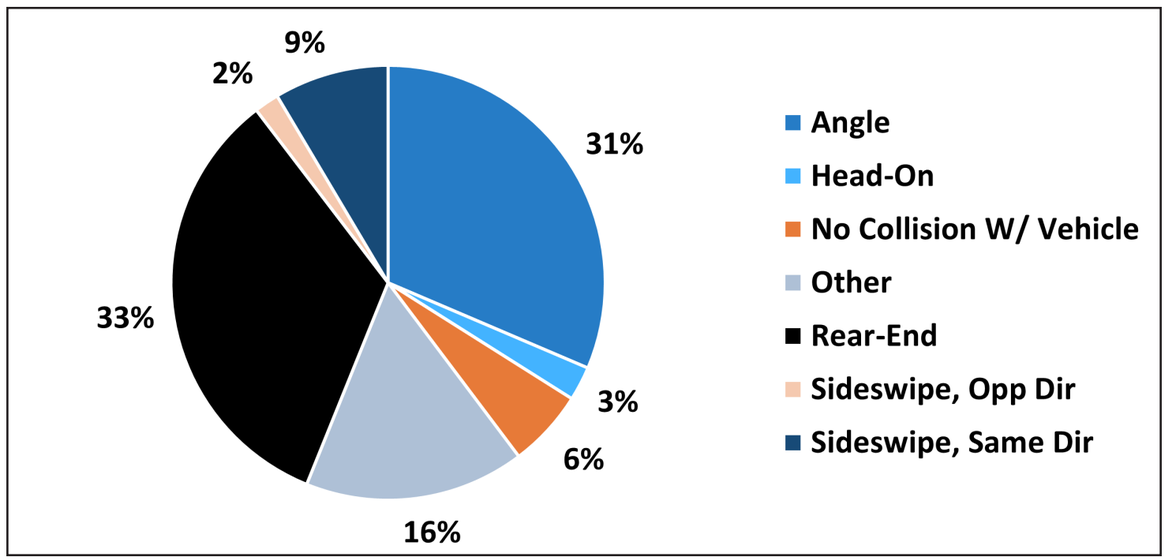
Minor Arterial (TDOT)

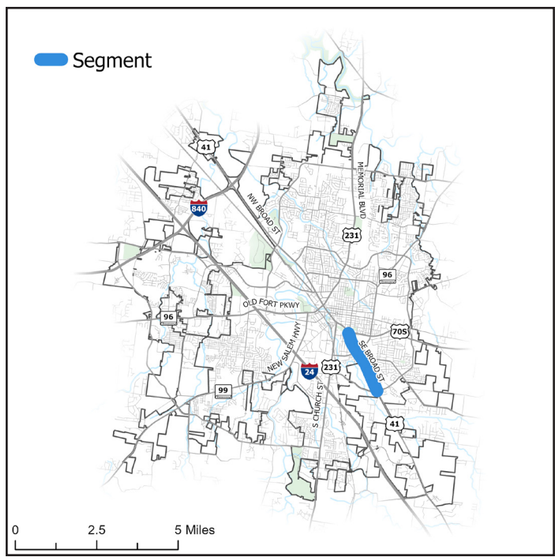
Speed Limit	40 mph
Lanes	4
Vehicles/Day	29,301
Total Crashes	433
HIN Intersections	-

Characteristics

This section of SE Broad Street (US-41) is split between two- and four-lane, undivided roadway through southeast Murfreesboro. This segment follows a straight alignment over generally rolling terrain. Sidewalks are present along the western end of the segment.

Along SE Broad Street, Facing North, Just South of Tremont Drive





OVERALL RANKING: 6

Ranking Index

Fatal & Serious Injury Crashes:
Low — High

Bike/Ped Crashes:
Low — High

Crash Rate:
Low — High

Risk Index:
Low — High

Community Input:
Low — High

Community Input

- "Cars regularly pass cars turning left into Broadlands and Kensington on the right."
- "It is very dangerous for people walking and biking. We have no sidewalks in this area, so walking on the shoulder is our only option."
- "Need separated walking path along Southeast Broad."
- "People run red lights through the Rutherford intersection often"
- "Intersection of Rutherford and Manchester Pike is very dangerous"
- "Please add pedestrian crosses at Rutherford. It is very scary crossing this road on foot."

SE Broad Street (US-41)

from Martin Luther King Boulevard to S Rutherford

SE Broad Street (US-41)

from Martin Luther King Boulevard to S Rutherford Boulevard

			ID	Countermeasure	Cost	Schedule	Project Readiness
●	●	●	1	Retroreflective Backplates (Dr MLK Jr Blvd, Middle Tennessee Blvd, S Rutherford Blvd)	$	Short-Term	Ready
	●		2	Flashing Yellow Arrows (FYA) (Middle Tennessee Blvd, S Rutherford Blvd)	$$	Mid-Term	Ready
●	●	●	3	Crosswalk Visibility and Accessibility Enhancements (Dr MLK Jr Blvd, Middle Tennessee Blvd, S Rutherford Blvd)	$$	Short-Term	Ready
●	●	●	4	Targeted Lighting	$$	Mid-Term	●
●	●	●	5	Roadway Reconfiguration	$$$$	Long-Term	Ready
	●		6	Retroreflective Pavement Markers	$	Short-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

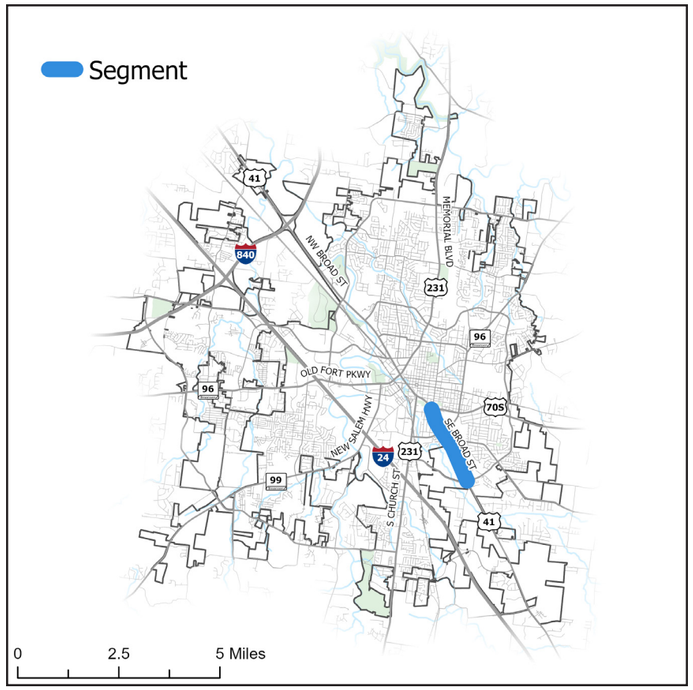
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

● Requires Utility Relocation

Benefit Summary

- Clearly marked crosswalks, high-visibility striping, adequate lighting, and advance warning signs help drivers recognize pedestrian crossing areas sooner, reducing the risk of crashes. Accessible features such as curb ramps, tactile warning surfaces, audible signals, and sufficient crossing times ensure that people of all abilitiesare able to cross streets safely and independently.
- Roadway lighting helps drivers, cyclists, and pedestrians see each other more clearly, especially during nighttime and low-visibility conditions, reducing the likelihood of crashes.
- Roadway reconfigurations, such as a road diet, allow for the addition of non-motorist infrastructure, such as bike lanes and shared turn lanes, while requiring little to no reduction in the capacity of the roadway.
- FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.
- Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter.



RECOMMENDED COUNTERMEASURES

SE Broad Street (US-41)

from Martin Luther King Boulevard to S Rutherford

SE Broad Street/Manchester Pike (US-41)

from S Rutherford Boulevard to City Limits

VRU (1) Serious Injury (6) Fatal (0)

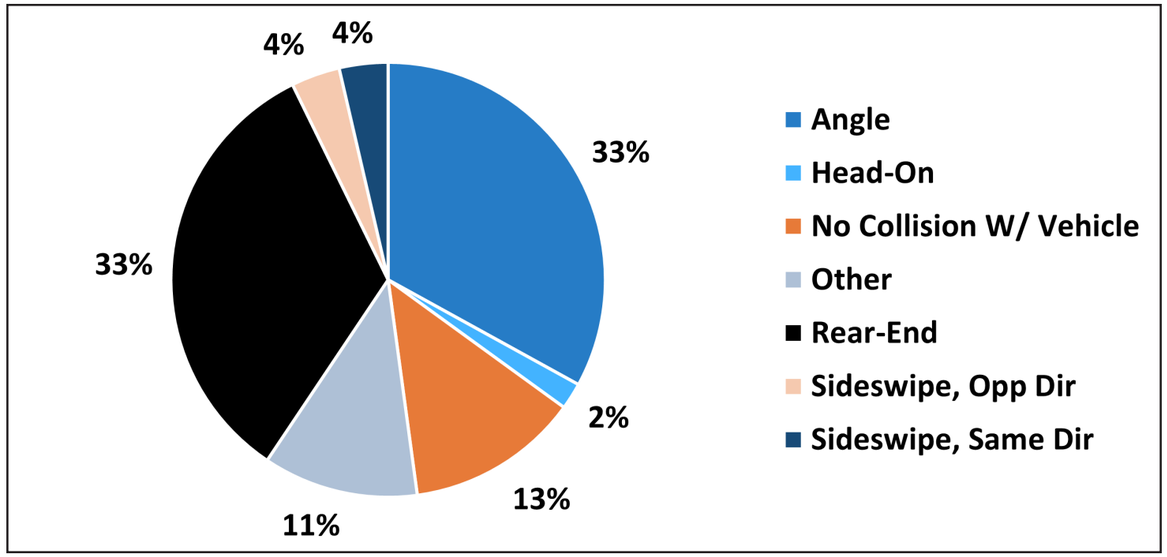
Minor Arterial (TDOT)

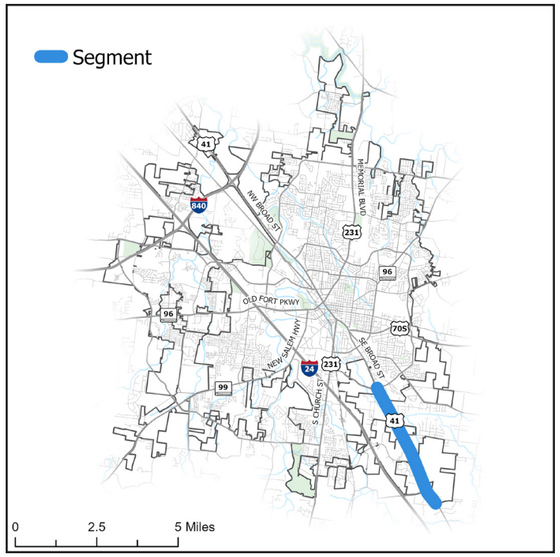
Speed Limit	40 mph
Lanes	2
Vehicles/Day	29,301
Total Crashes	303
HIN Intersections	-

Characteristics

This section of SE Broad Street (US-41) is a two-lane, undivided roadway through rural southeast Murfreesboro. This segment follows a straight alignment over generally rolling terrain. There are no sidewalks along this corridor, however, wide shoulders can be found throughout.

Along SE Broad Street, Facing North, Just South of S Rutherford Boulevard





OVERALL RANKING: 6

Ranking Index

Fatal & Serious Injury Crashes:
Low — High

Bike/Ped Crashes:
Low — High

Crash Rate:
Low — High

Risk Index:
Low — High

Community Input:
Low — High

Community Input

"People run the red lights at Rutherford all the time"

"Cars turning left from Elam onto Broad/Manchester do not yield to cars on Broad"

"Please add pedestrian crossings at Rutherford Blvd"

"I have witnessed many accidents at the intersection at Elam Rd. There needs to be a red light, also we need a shoulder and right turning lane."

"Very unsafe intersection to turn left onto Broad from Elam"

"This red light changes too fast for semis and other large vehicles to stop. I witnessed many of them flying through, running red light."

SE Broad Street/Manchester Pike (US-41)
from S Rutherford Boulevard to City Limits

SE Broad Street/Manchester Pike (US-41)

from S Rutherford Boulevard to City Limits

			ID	Countermeasure	Cost	Schedule	Project Readiness
●	●	●	1	Retroreflective Backplates (S Rutherford Blvd, Dilton Rankin Rd, Joe B Jackson Pkwy)	$	Short-Term	Ready
	●		2	Flashing Yellow Arrows (FYA) (S Rutherford Blvd, Dilton Rankin Rd, Joe B Jackson Pkwy)	$$	Mid-Term	Ready
●	●	●	3	Crosswalk Visibility and Accessibility Enhancements (S Rutherford Blvd, Dilton Rankin Rd, Joe B Jackson Pkwy)	$$	Short-Term	Ready
●	●	●	4	Targeted Lighting	$$	Mid-Term	●
	●		5	Retroreflective Pavement Markers	$	Short-Term	Ready
			6	Conduct Intersection Control & Alignment Evaluation (Elam Rd)	$	Short-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

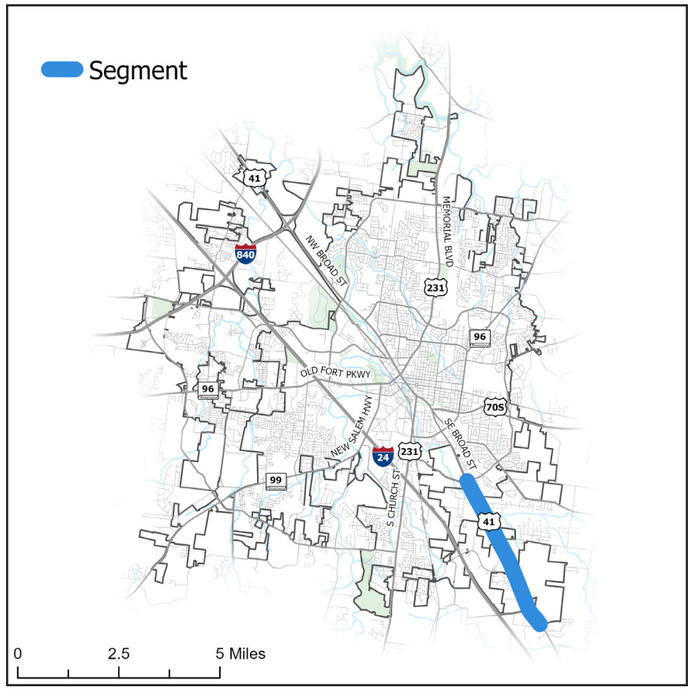
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

● Requires Utility Relocation

Benefit Summary

- Clearly marked crosswalks, high-visibility striping, adequate lighting, and advance warning signs help drivers recognize pedestrian crossing areas sooner, reducing the risk of crashes. Accessible features such as curb ramps, tactile warning surfaces, audible signals, and sufficient crossing times ensure that people of all abilitiesare able to cross streets safely and independently.
- Roadway lighting helps drivers, cyclists, and pedestrians see each other more clearly, especially during nighttime and low-visibility conditions, reducing the likelihood of crashes.
- FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.
- Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter.
- Evaluating alternate intersection control or geometry ensures safer, more efficient designs by reducing severe crashes, improving pedestrian safety, and calming traffic.



RECOMMENDED COUNTERMEASURES

SE Broad Street/Manchester Pike (US-41)
from S Rutherford Boulevard to City Limits

Middle Tennessee Boulevard/Clark Blvd (TN-96)

from Broad Street to Greenland Drive

- VRU (5)
- Serious Injury (11)
- Fatal (3)

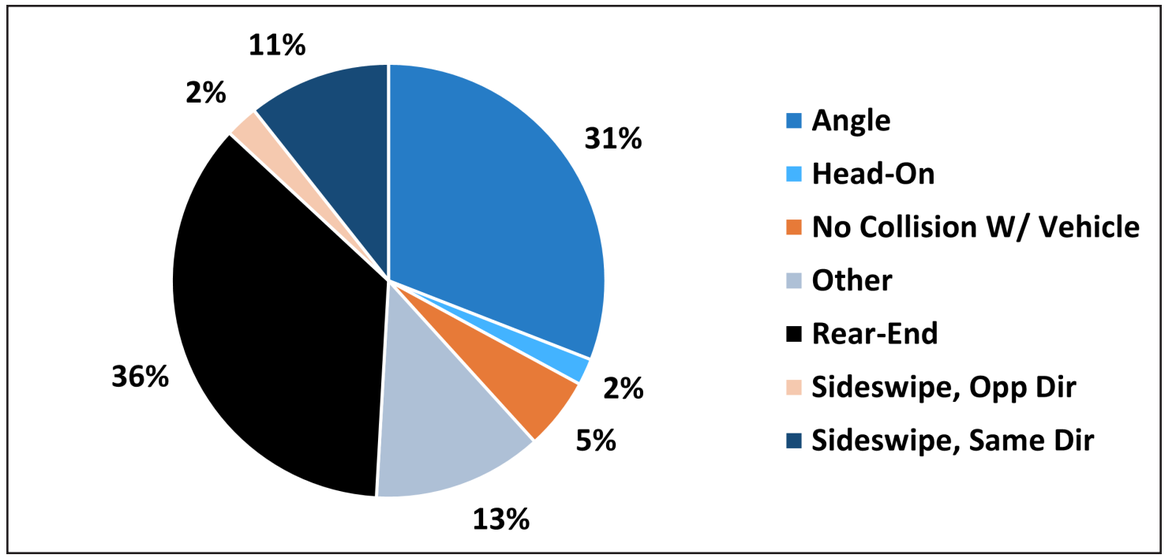
Minor Arterial (TDOT)

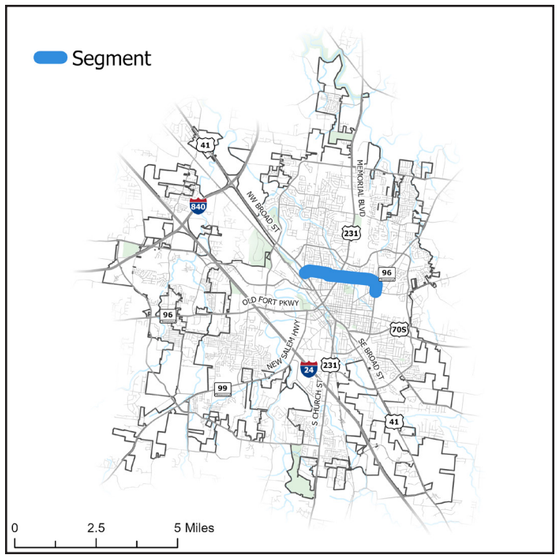
Speed Limit	40 mph
Lanes	4
Vehicles/Day	20,000
Total Crashes	1,061
HIN Intersections	1

Characteristics

This section of Middle Tennessee Boulevard/Clark Boulevard (TN-96) includes a section of four-lane roadway divided by a bi-directional turn lane along the eastern end, with undivided two-lane roadway near the western end. This segment follows a curved alignment over generally rolling terrain. Sidewalks and pedestrian crossings are found throughout this segment.

Along Middle Tennessee Boulevard/Clark Boulevard (TN-96), Facing West, Just West of Woodland St





OVERALL RANKING: 7

Ranking Index

Fatal & Serious Injury Crashes: Low — High

Bike/Ped Crashes: Low — High

Crash Rate: Low — High

Risk Index: Low — High

Community Input: Low — High

Community Input

> When turning left onto Clark from Memorial Blvd: the light is too short. Less than 5 cars from each turn lane can safely make it through intersection before lights turns. Many cars run the light. Some rush through from the left lane and cut too close to the drivers waiting in left turn lane coming off of Clark onto Memorial.

> There are no sidewalks here, people are forced to walk in the street or yards.

> Too many red light runners because you have to sit at the light for 2 to 3 cycles coming off E Clark

> Opportunity to improve pedestrian and vehicle safety. Significant number of vehicle crashes due to confusing traffic signals and driver behavior. Improved signaling, crosswalks, or potential traffic circle could enhance safety and accessibility for the significant number of pedestrians, cyclists and motorists using this intersection.

Middle Tennessee Boulevard/Clark Blvd (TN-96)
from Broad Street to Greenland Drive

Middle Tennessee Boulevard/Clark Blvd (TN-96)

from Broad Street to Greenland Drive

RECOMMENDED COUNTERMEASURES

			ID	Countermeasure	Cost	Schedule	Project Readiness
	●		1	Flashing Yellow Arrows (FYA) (Broad St, Memorial Blvd, N Highland Ave, N Tennessee Blvd, Lascassus Pk)	$$	Mid-Term	Ready
●	●	●	2	Retroreflective Backplates (Broad St, Jones Blvd, Memorial Blvd, N Highland Ave, N Tennessee Blvd, Lascassus Pk)	$	Short-Term	Ready
●	●	●	3	Crosswalk Visibility and Accessibility Enhancements (Broad St, Jones Blvd, Memorial Blvd, N Highland Ave, N Tennessee Blvd, Lascassus Pk)	$$	Short-Term	Ready
●	●	●	4	Rectangular Rapid Flashing Beacons (RRFB) (Woodland St)	$$	Mid-Term	●
			5	Conduct Intersection Control & Alignment Evaluation (Grantland Ave / Woodland St)	$	Short-Term	Ready
●	●	●	6	Corridor Access Management	$$$$	Long-Term	Ready
●	●	●	7	Sidewalks and Multi-use Paths	$$	Mid-Term	●
			8	Widen Shoulders	$$$	Mid-Term	●
●	●		9	Longitudinal Rumble Strips and Stripes on Two-Lane Roads	$	Short-Term	Ready
	●		10	Retroreflective Pavement Markers	$	Short-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

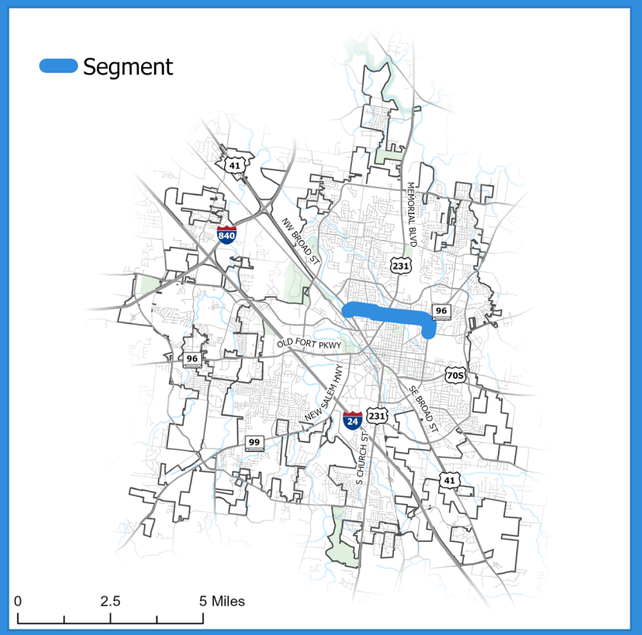
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

● Requires Utility Relocation

Benefit Summary

- Wider shoulders provide additional space for vehicles to maneuver, reducing the likelihood of head-on, sideswipe, and fixed-object crashes.
- Rumble striping along edge/centerlines provide tactile and auditory feedback to drivers when their vehicle strays from the lane, helping to reduce the risk for roadway departure crashes and head-on collisions.
- Installing sidewalks and pedestrian infrastructure dramatically improves safety by reducing pedestrian crashes, separating vulnerable users from traffic, and enhancing visibility and accessibility.
- Clearly marked crosswalks, high-visibility striping, adequate lighting, and advance warning signs help drivers recognize pedestrian crossing areas sooner, reducing the risk of crashes. Accessible features such as curb ramps, tactile warning surfaces, audible signals, and sufficient crossing times ensure that people of all abilitiesare able to cross streets safely and independently.



Middle Tennessee Boulevard/Clark Blvd (TN-96)
from Broad Street to Greenland Drive

NW Broad Street (US-41)

from Florence Road to Old Fort Parkway

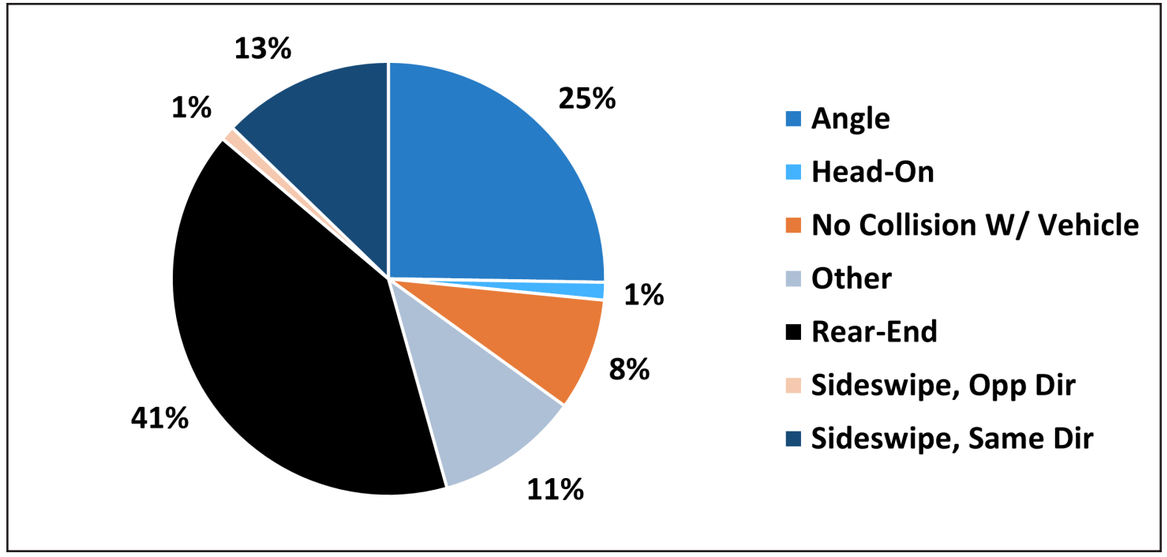
Other Principal Arterial (TDOT)

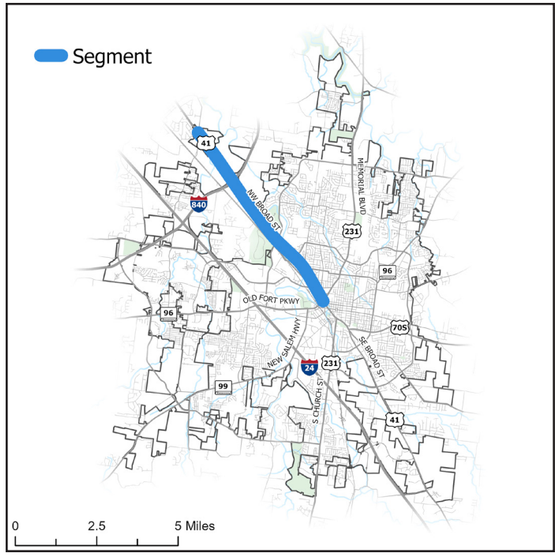
Speed Limit	45 mph
Lanes	4
Vehicles/Day	28,784
Total Crashes	1,746
HIN Intersections	1

Characteristics

This section of NW Broad Street (US-41) is a four-lane roadway through northwest Murfreesboro, divided by medians and bi-directional turn lanes. This segment follows a straight alignment over generally rolling terrain. This corridor acts as a primary thoroughfare between the Murfreesboro and Smyrna areas.

Along NE Broad Street, Facing North, Just South of Medical Center Parkway





OVERALL RANKING: 8

Ranking Index

Fatal & Serious Injury Crashes: Low — High

Bike/Ped Crashes: Low — High

Crash Rate: Low — High

Risk Index: Low — High

Community Input: Low — High

Community Input

- "Consistent near misses taking a left onto Med Center from College St"
- "Crosswalks and pedestrian signals needed at Rutherford"
- "Pedestrian sidewalks are needed on both sides of NW Broad Street"
- "Way too many red light runners."
- "Turning left off of Broad onto Medical Center is a nightmare of long wait lines. This area needs a double turn lane from broad onto medical center to appropriately handle the volume."
- "Lots of near misses at the intersection with Old Fort"
- "It would be great to add a pedestrian crossing at Broad and Van Cleave. A simple wooden ramp could help to cross the railroad tracks to directly connect the Battlefield with McFadden's Farm."

NW Broad Street (US-41)
from Florence Road to Old Fort Parkway

NW Broad Street (US-41)

from Florence Road to Old Fort Parkway

			ID	Countermeasure	Cost	Schedule	Project Readiness
●	●	●	1	Retroreflective Backplates (Florence Rd, N Thompson Ln, Northfield Blvd, Clark Blvd, Medical Center Pkwy, Old Fort Pkwy)	$	Short-Term	Ready
●	●	●	2	Crosswalk Visibility and Accessibility Enhancements (Florence Rd, Singer Rd, N Thompson Ln, Northfield Blvd, Clark Blvd, Medical Center Pkwy, Old Fort Pkwy)	$$	Short-Term	Ready
	●		3	Flashing Yellow Arrows (FYA) (Florence Rd, Singer Rd, Northfield Blvd, Clark Blvd, Medical Center Pkwy, Old Fort Pkwy)	$$	Mid-Term	Ready
			4	Railroad Crossing Enhancements (Van Cleave Ln)	$$$	Mid-Term	●
●	●	●	5	Median and Pedestrian Refuge Island	$$	Mid-Term	Ready
	●		6	Retroreflective Pavement Markers	$	Short-Term	Ready
●	●	●	7	Corridor Access Management	$$$$	Long-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

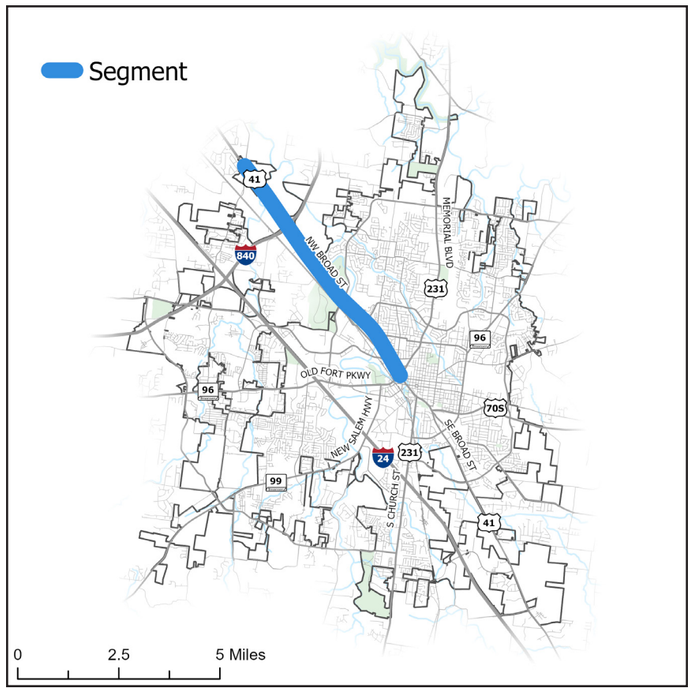
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

● Requires Utility Relocation

Benefit Summary

- Clearly marked crosswalks, high-visibility striping, adequate lighting, and advance warning signs help drivers recognize pedestrian crossing areas sooner, reducing the risk of crashes. Accessible features such as curb ramps, tactile warning surfaces, audible signals, and sufficient crossing times ensure that people of all abilitiesare able to cross streets safely and independently.
- FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.
- Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter.
- Properly-designed crossings—such as those with clear signage, warning lights, gates, and smooth road surfaces—significantly reduce the risk of collisions between trains, vehicles, and pedestrians. They enhance visibility and awareness for all users, helping drivers and walkers make safer decisions.



RECOMMENDED COUNTERMEASURES

NW Broad Street (US-41)
from Florence Road to Old Fort Parkway

Veterans Parkway

from Burnt Knob Road to S Church Street

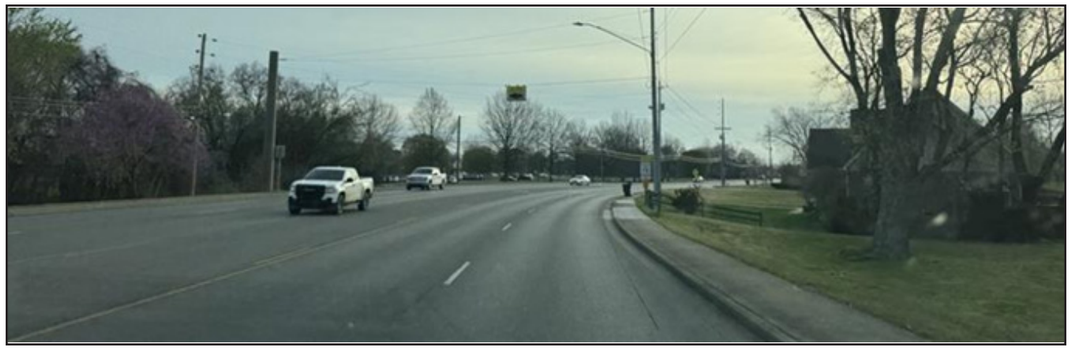
- VRU (2)
- Serious Injury (13)
- Fatal (3)

Minor Arterial (Murfreesboro, TN)

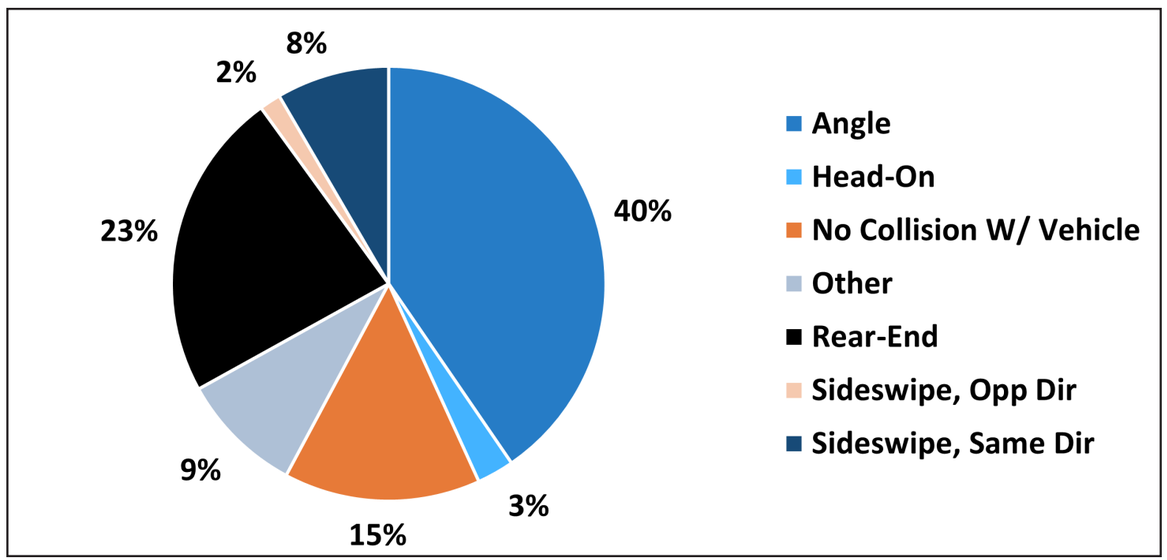
Speed Limit	45 mph
Lanes	4
Vehicles/Day	14,000
Total Crashes	690
HIN Intersections	-

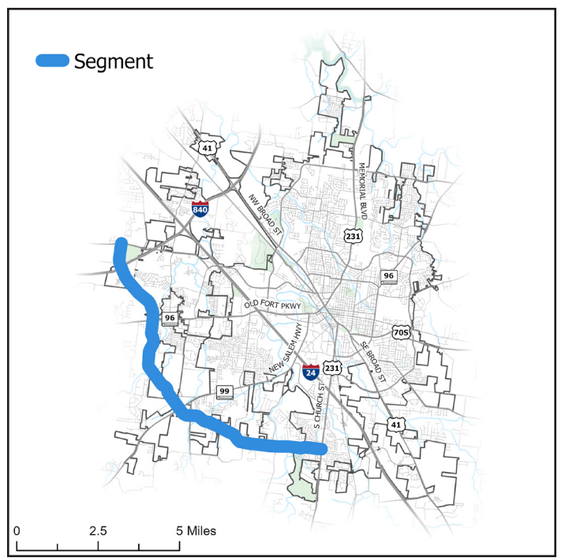
Characteristics

This section of Veterans Parkway is a four-lane roadway through south Murfreesboro, divided by a bi-directional turn lane. This segment follows a curved alignment over generally rolling terrain. Sidewalks and pedestrian infrastructure can be found throughout this segment, with a high presence near Barfield Crescent Park.



Along Veterans Parkway, Facing East, Just West of Jenkins Drive





OVERALL RANKING: 10

Ranking Index

Fatal & Serious Injury Crashes:
Low — High

Bike/Ped Crashes:
Low — High

Crash Rate:
Low — High

Risk Index:
Low — High

Community Input:
Low — High

Community Input

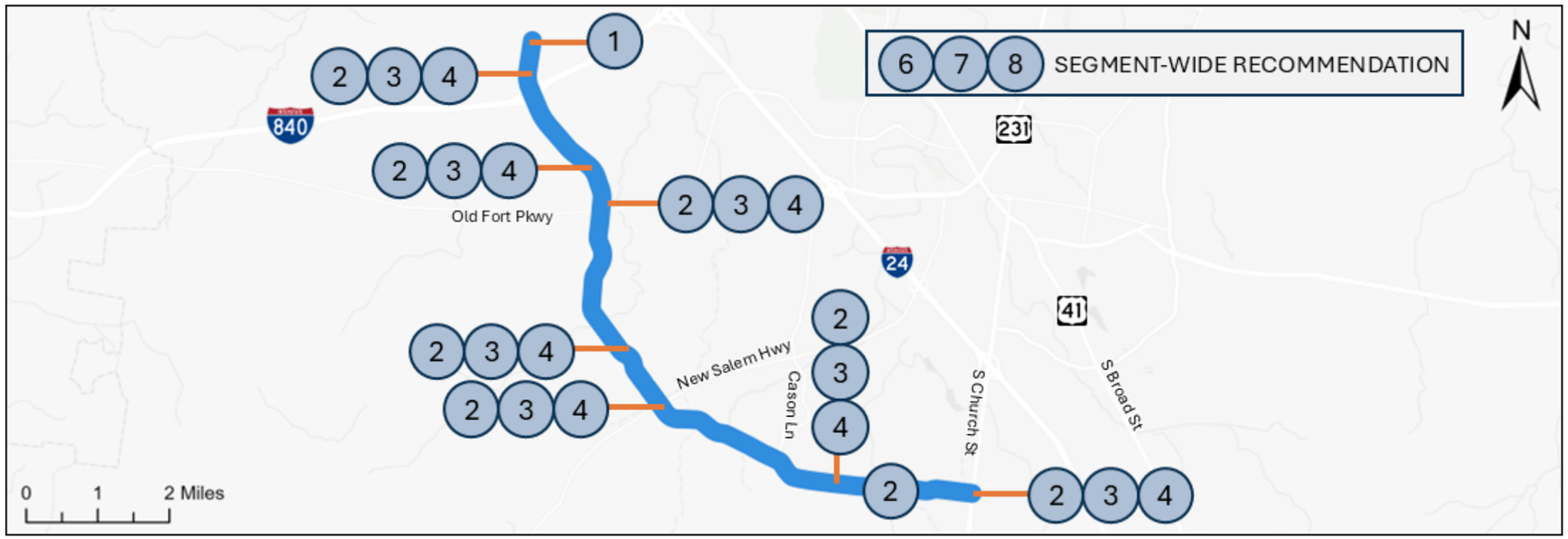
- "Have witnessed near miss crashes at this location more than once. Rucker Lane traffic pulls out in front of traffic traveling on Veterans."
- "Left turns at Barfield is a hazard. Near collisions due to not enough space"
- "Too many people running red lights, especially 18-wheelers."
- "Speeding during peak hours"
- "The intersection at Barfield Crescent Park needs pedestrian accommodations"
- "Many near miss head on collisions in the TWLTL. Consider restricting access or combining driveway locations to reduce risk of crashes."
- "Since the redirection of Rucker Lane to intersect with Veterans Pkwy we have had an issue with turning left from Windrow Rd"

Veterans Parkway
from Burnt Knob Road to S Church Street

Veterans Parkway

from Burnt Knob Road to S Church Street

RECOMMENDED COUNTERMEASURES



			ID	Countermeasure	Cost	Schedule	Project Readiness
●	●	●	1	Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections (Burnt Knob Rd)	$	Short-Term	Ready
●	●	●	2	Retroreflective Backplates (Kroger, Old Fort Pkwy, Rucker Ln, New Salem Hwy, Barfield Rd, S Church St)	$	Short-Term	Ready
	●		3	Flashing Yellow Arrows (FYA) (Westlawn Blvd, Kroger, Old Fort Pkwy, Rucker Ln, New Salem Hwy, Barfield Rd, S Church St)	$$	Mid-Term	Ready
●	●	●	4	Crosswalk Visibility and Accessibility Enhancements (Westlawn Blvd, Kroger, Old Fort Pkwy, Rucker Ln, New Salem Hwy, Barfield Rd, S Church St)	$$	Short-Term	Ready
●	●	●	5	Pedestrian Hybrid Beacons (Barfield Crescent Park)	$$$	Mid-Term	● ●
●	●	●	6	Corridor Access Management	$$$$	Long-Term	Ready
●	●	●	7	Targeted Lighting	$$	Mid-Term	● ●
	●		8	Retroreflective Pavement Markers	$	Short-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

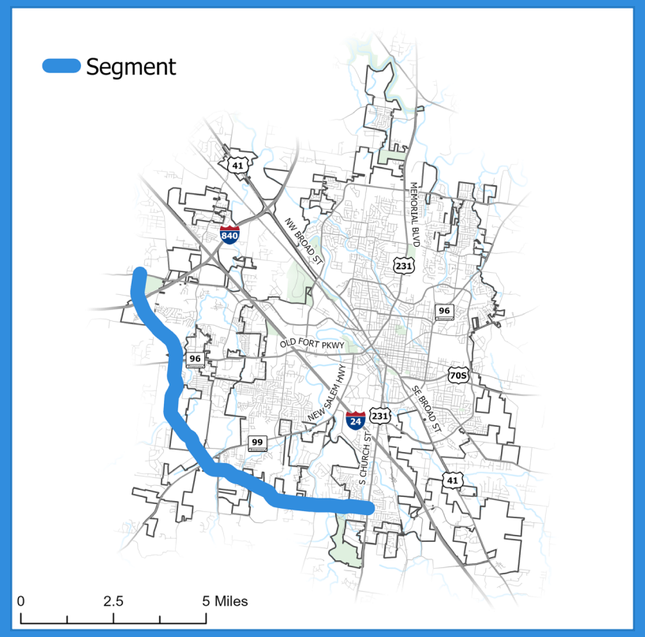
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

● Requires Utility Relocation

Benefit Summary

- **Clearly marked crosswalks, high-visibility striping, adequate lighting, and advance warning signs help drivers recognize pedestrian crossing areas sooner, reducing the risk of crashes. Accessible features such as curb ramps, tactile warning surfaces, audible signals, and sufficient crossing times ensure that people of all abilitiesare able to cross streets safely and independently.**
- **RPMs provide continuous lane guidance, which is particularly useful in navigating curves and complex intersections. The reflective properties of RPMs make them highly visible at night, reducing the risk of accidents by guiding drivers safely along the road.**
- **Roadway lighting helps drivers, cyclists, and pedestrians see each other more clearly, especially during nighttime and low-visibility conditions, reducing the likelihood of crashes.**
- **Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter.**



Veterans Parkway

from Burnt Knob Road to S Church Street

Thompson Lane (TN-268)

from Broad Street to Old Fort Parkway

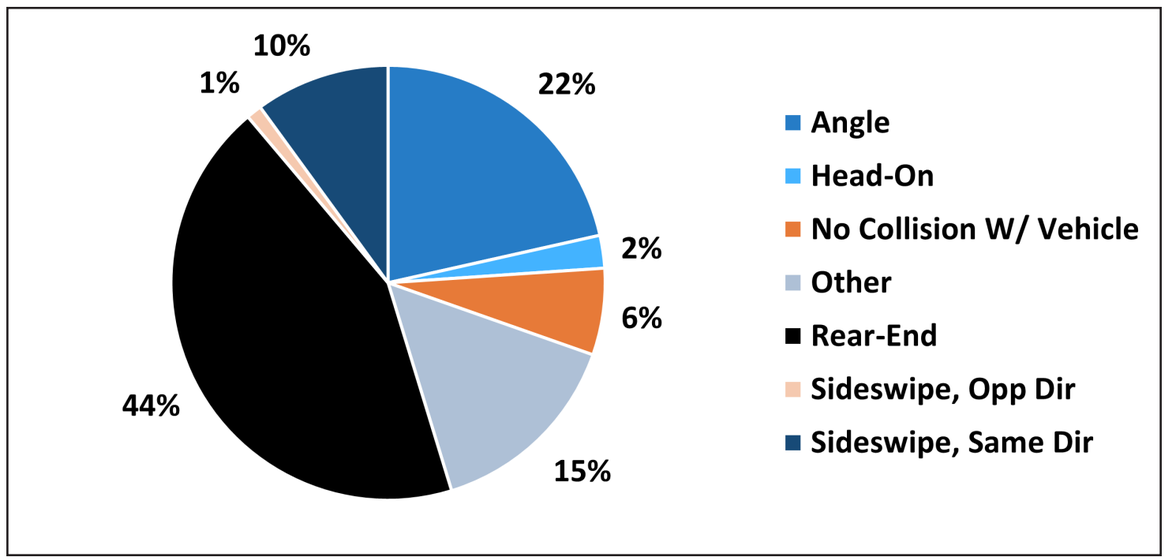
Minor Arterial (TDOT)

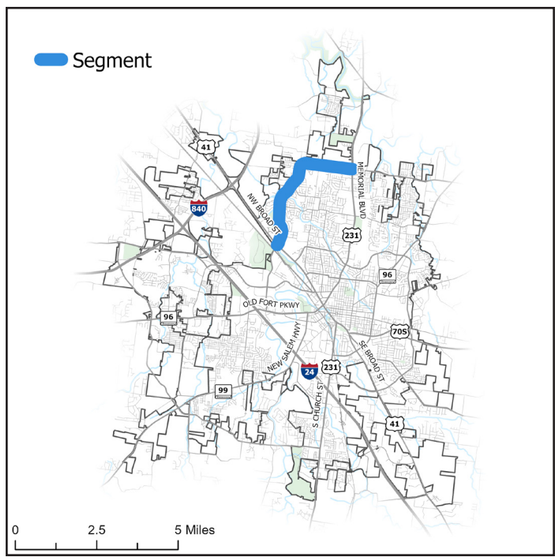
Speed Limit	40 mph
Lanes	4
Vehicles/Day	20,000
Total Crashes	698
HIN Intersections	-

Characteristics

This section of Thompson Lane (TN-268) is a two-lane, divided roadway through northwest Murfreesboro. This segment follows a curved alignment over generally rolling terrain. Bike lanes can be found throughout a majority of this segment.

Along Thompson Lane, Facing East, Just West of Regency Park Drive





OVERALL RANKING: 11

Ranking Index

Fatal & Serious Injury Crashes:
Low — High

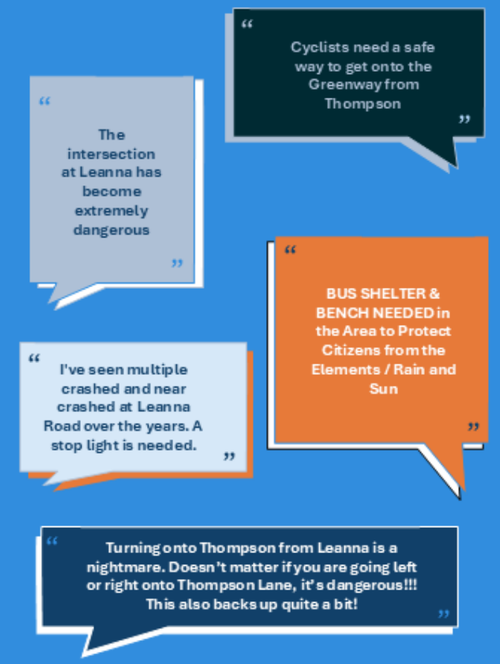
Bike/Ped Crashes:
Low — High

Crash Rate:
Low — High

Risk Index:
Low — High

Community Input:
Low — High

Community Input



Thompson Lane (TN-268)
from Broad Street to Old Fort Parkway

Thompson Lane (TN-268)
from Broad Street to Old Fort Parkway

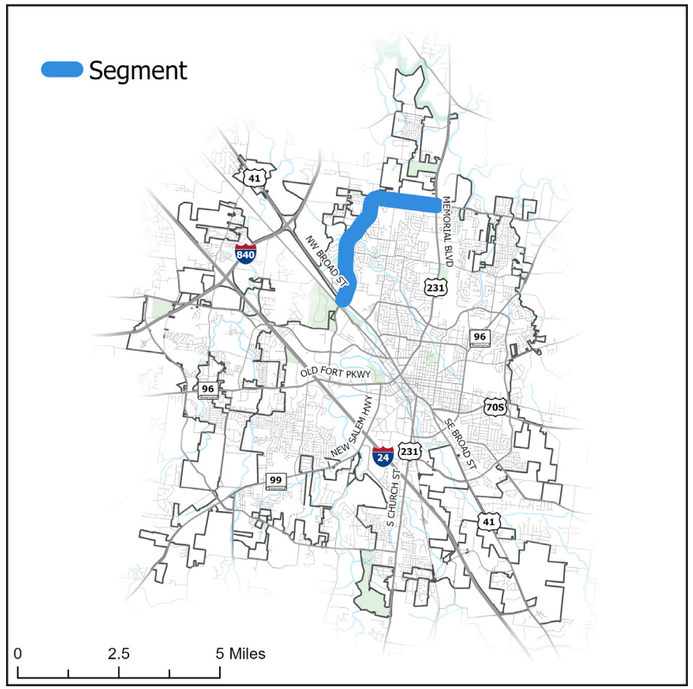
			ID	Countermeasure	Cost	Schedule	Project Readiness
●	●	●	1	Retroreflective Backplates (Broad St, Sulphur Springs Rd, Memorial Blvd)	$	Short-Term	Ready
●	●	●	2	Crosswalk Visibility and Accessibility Enhancements (Broad St, Sulphur Springs Rd, Memorial Blvd)	$$	Short-Term	Ready
	●		3	Flashing Yellow Arrows (FYA) (Haynes Dr, Sulphur Springs Rd, Memorial Blvd)	$$	Mid-Term	Ready
			4	Conduct Intersection Control & Alignment Evaluation (Leanna Rd and Siegel Rd)	$	Short-Term	Ready
●	●	●	5	Enhanced Delineation for Horizontal Curves	$	Short-Term	Ready
●	●	●	6	Appropriate Speed Limits	$	Short-Term	Ready
●	●	●	7	Sidewalks and Multi-use Paths	$$	Mid-Term	●
●	●	●	8	Corridor Access Management	$$$$	Long-Term	Ready
●	●		9	Longitudinal Rumble Strips and Stripes on Two-Lane Roads	$	Short-Term	Ready
	●		10	Retroreflective Pavement Markers	$	Short-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

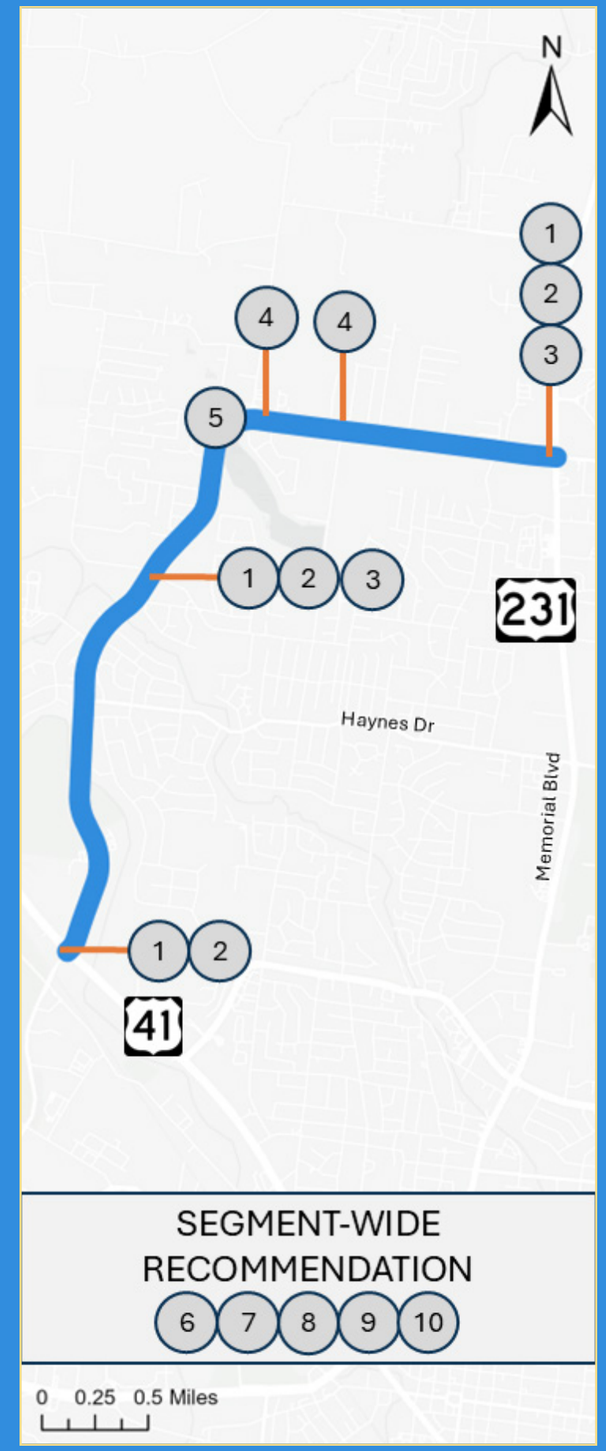
● FHWA Proven Safety Countermeasure
● Crash Modification Factors Countermeasure
● Vulnerable Road User Related Countermeasure
● Requires ROW Acquisition
● Requires Utility Relocation

Benefit Summary

- Rumble striping along edge/centerlines provide tactile and auditory feedback to drivers when their vehicle strays from the lane, helping to reduce the risk for roadway departure crashes and head-on collisions.
- RPMs provide continuous lane guidance, which is particularly useful in navigating curves and complex intersections. The reflective properties of RPMs make them highly visible at night, reducing the risk of accidents by guiding drivers safely along the road.
- Clearly marked crosswalks, high-visibility striping, adequate lighting, and advance warning signs help drivers recognize pedestrian crossing areas sooner, reducing the risk of crashes. Accessible features such as curb ramps, tactile warning surfaces, audible signals, and sufficient crossing times ensure that people of all abilitiesare able to cross streets safely and independently.
- FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.
- Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter.



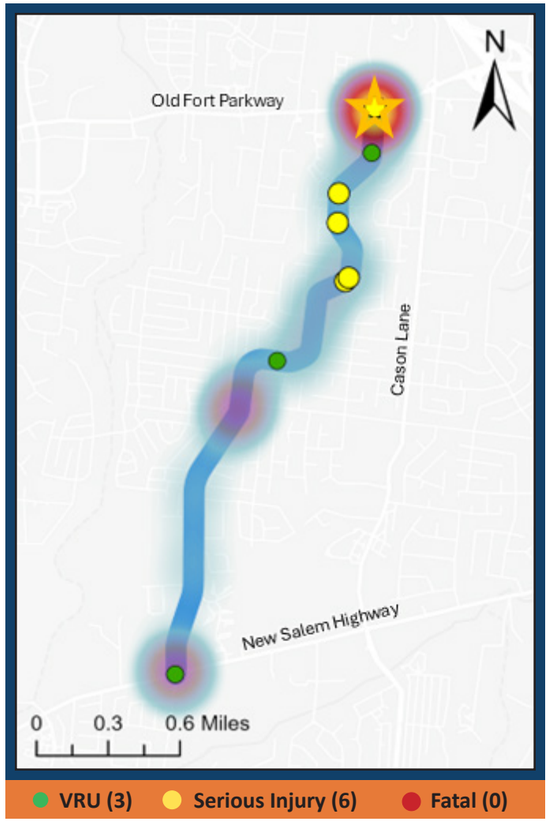
RECOMMENDED COUNTERMEASURES



Thompson Lane (TN-268)
from Broad Street to Old Fort Parkway

Saint Andrews Drive

from Old Fort Parkway to New Salem Highway



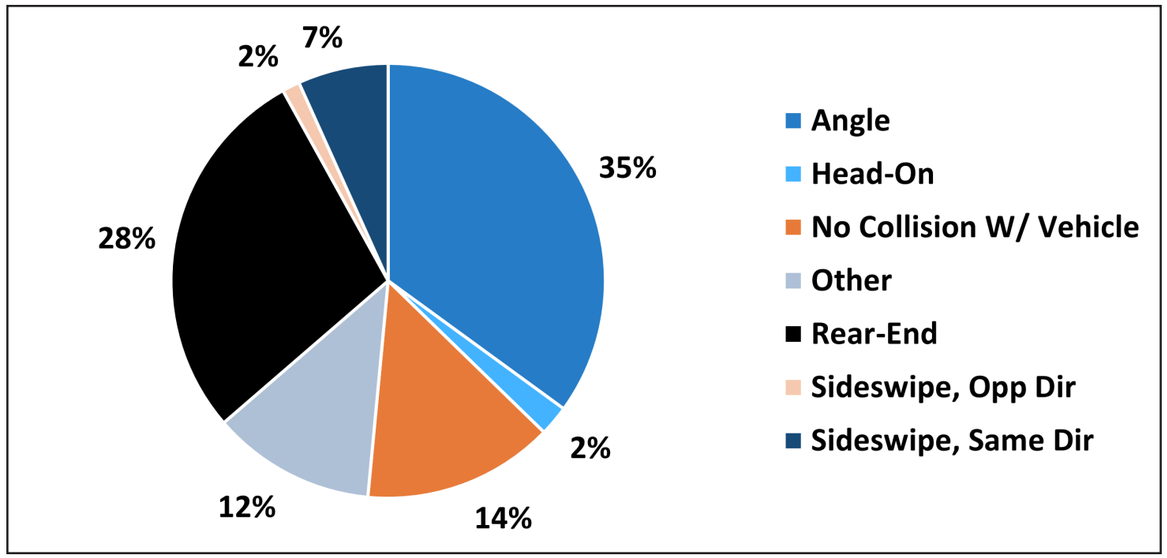
Local (Murfreesboro, TN)

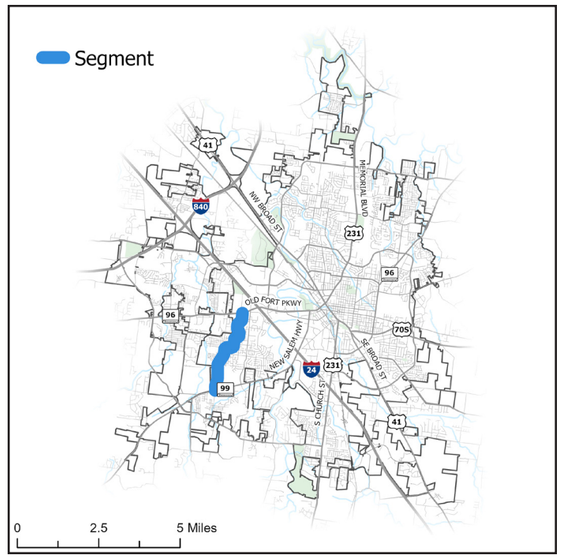
Speed Limit	30 mph
Lanes	2
Vehicles/Day	9,000
Total Crashes	534
HIN Intersections	1

Characteristics

This section of Saint Andrews Drive is a two-lane, undivided roadway through west Murfreesboro. This segment follows a curved alignment over generally rolling terrain. Sidewalks are present throughout this corridor, providing essential access to the large residential neighborhoods along the segment.

Along Saint Andrews Drive, Facing South, Just North of Risen Star Drive





OVERALL RANKING: 12

Ranking Index

Fatal & Serious Injury Crashes: Low — High

Bike/Ped Crashes: Low — High

Crash Rate: Low — High

Risk Index: Low — High

Community Input: Low — High

Community Input

> "Cyclists are nervous riding in this area due to the number of vehicles that drive too fast. Cars hit mailboxes, and speed at night."

> "Wrecks at this intersection ALL the time. Very unsafe for drivers and pedestrians."

> "Trying to cross in the morning or night at the intersection of Cason and Saint Andrews is impossible. People drive fast. There is no crosswalks, or light to let people know people are crossing."

Saint Andrews Drive

from Old Fort Parkway to New Salem Highway

Saint Andrews Drive

from Old Fort Parkway to New Salem Highway

			ID	Countermeasure	Cost	Schedule	Project Readiness
	●		1	Flashing Yellow Arrows (FYA) (New Salem Hwy and Old Fort Pkwy)	$$	Mid-Term	Ready
●	●	●	2	Retroreflective Backplates (New Salem Hwy and Old Fort Pkwy)	$	Short-Term	Ready
●	●	●	3	Crosswalk Visibility and Accessibility Enhancements (New Salem Hwy and Old Fort Pkwy)	$$	Short-Term	Ready
			4	Conduct Intersection Control & Alignment Evaluation (Cason Trl and Wellington Pl)	$	Short-Term	Ready
	●		5	Retroreflective Pavement Markers	$	Short-Term	Ready
			6	Complete Multi-Modal Corridor Evaluation	$$$	Mid-Term	Ready
	●	●	7	Traffic Calming (Corridor-Wide Speed Management)	$$	Mid-Term	Ready
●	●	●	8	Targeted Lighting	$$	Mid-Term	●

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

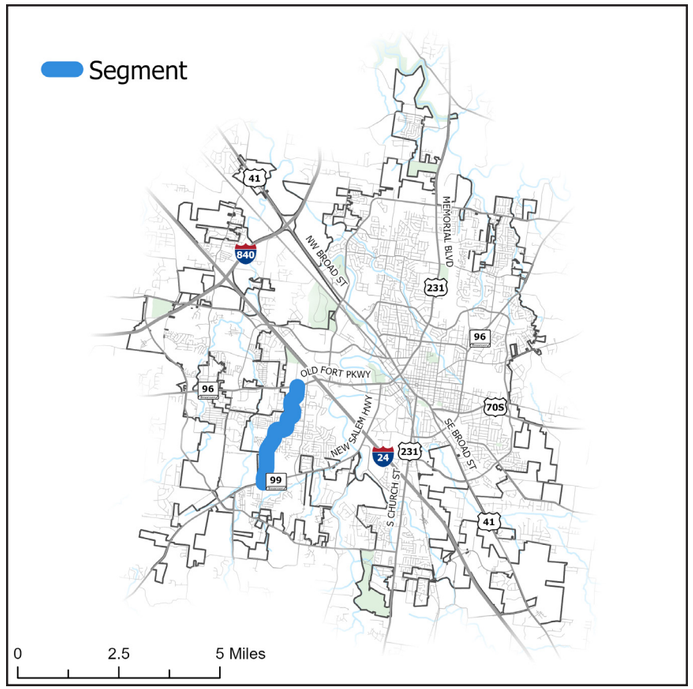
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

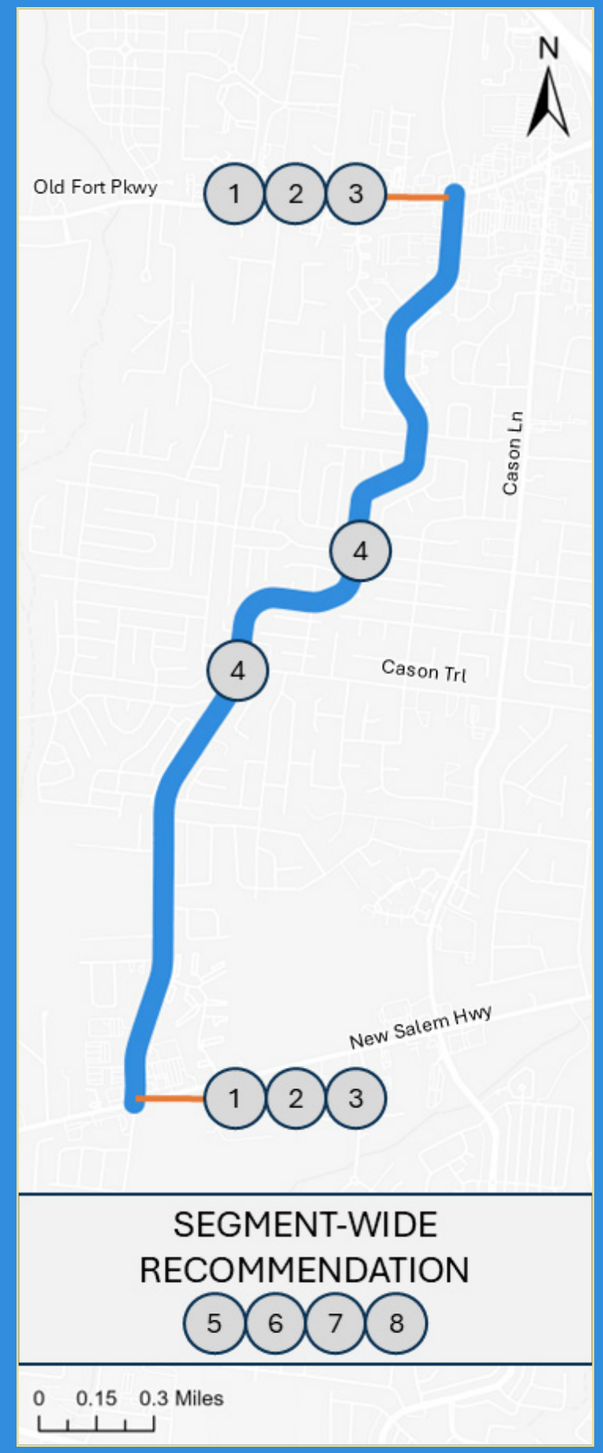
● Requires Utility Relocation

Benefit Summary

- RPMs provide continuous lane guidance, which is particularly useful in navigating curves and complex intersections. The reflective properties of RPMs make them highly visible at night, reducing the risk of accidents by guiding drivers safely along the road.
- Clearly marked crosswalks, high-visibility striping, adequate lighting, and advance warning signs help drivers recognize pedestrian crossing areas sooner, reducing the risk of crashes. Accessible features such as curb ramps, tactile warning surfaces, audible signals, and sufficient crossing times ensure that people of all abilitiesare able to cross streets safely and independently.
- FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.
- Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter.
- Evaluating alternate intersection control or geometry ensures safer, more efficient designs by reducing severe crashes, improving pedestrian safety, and calming traffic.



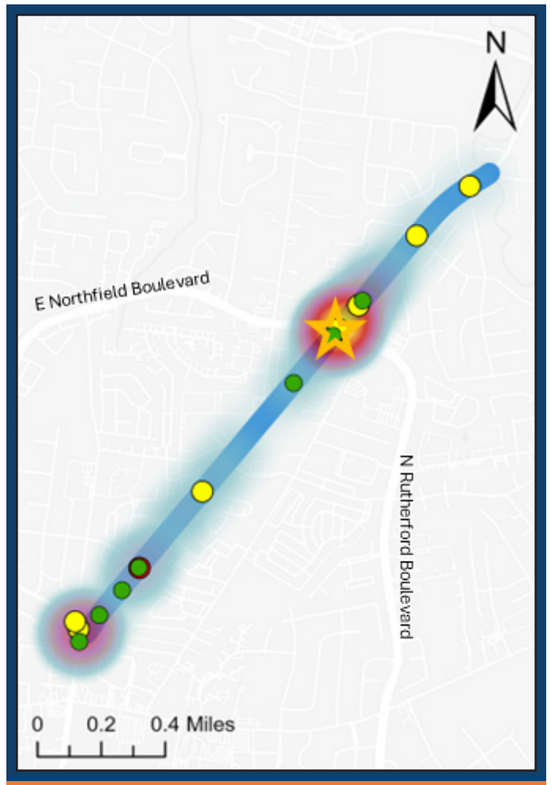
RECOMMENDED COUNTERMEASURES



Saint Andrews Drive
from Old Fort Parkway to New Salem Highway

Lascassas Pike (TN-96)

from E Clark Boulevard to City Limits



VRU (7) Serious Injury (8) Fatal (1)

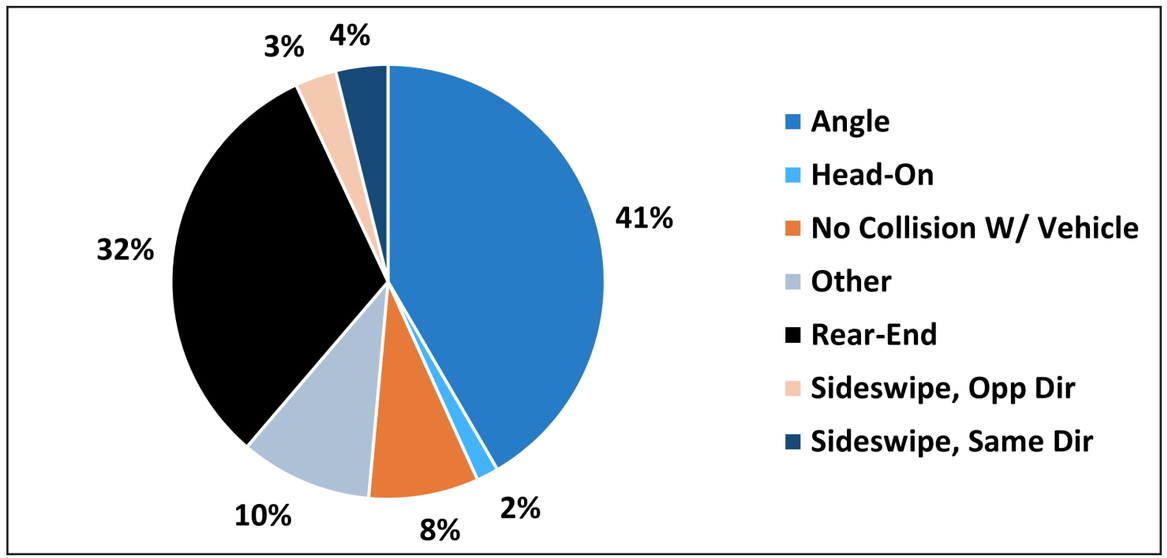
Minor Arterial (TDOT)

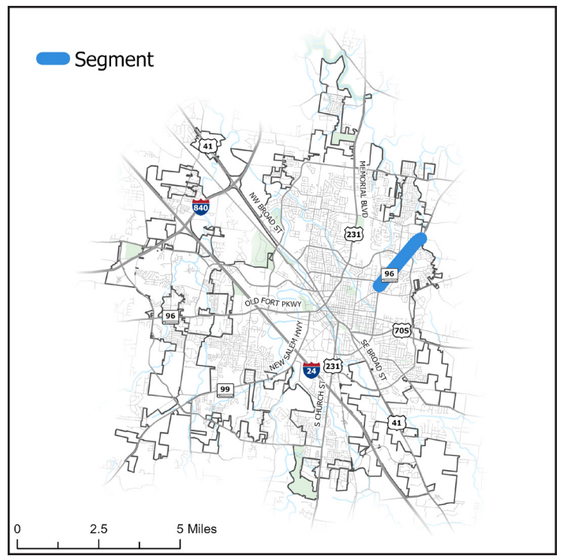
Speed Limit	40 mph
Lanes	2
Vehicles/Day	15,000
Total Crashes	488
HIN Intersections	1

Characteristics

This section of Lascassas Pike (TN-96) is a two-lane, undivded roadway through northeast Murfreesboro. This segment follows a straight alignment over generally rolling terrain. This segment exhibits a high presence of student living related to Middle Tennessee State University.

Along Lascassas Pike (TN-96), Facing west, Just west of Patriot Drive





OVERALL RANKING: 14

Ranking Index

Fatal & Serious Injury Crashes: Low — High

Bike/Ped Crashes: Low — High

Crash Rate: Low — High

Risk Index: Low — High

Community Input: Low — High

Community Input

> There needs to be a light at Hazelwood. There are often several crashes at this intersection and it's also very unsafe for pedestrians to cross. I cross this intersection almost every day to go get groceries.

> This road needs sidewalks. It's very unsafe for pedestrians.

> Lascassas Pike needs a bike lane and sidewalks for all the college students living on this road. I see way too many "near misses" of folks walking to and from campus on this busy road.

> There needs to be a light here. There are often several crashes at this intersection and it's also very unsafe for pedestrians to cross. I cross this intersection almost every day to go get groceries.

> Opportunity to improve pedestrian and vehicle safety. Significant number of vehicle crashes due to confusing traffic signals and driver behavior. Improved signaling, crosswalks, or potential traffic circle could enhance safety and accessibility for the significant number of pedestrians, cyclists and motorists using this intersection. Several student housing and apartment complexes nearby as well as the corridor to the Lascassas community.

Lascassas Pike (TN-96)
from E Clark Boulevard to City Limits

Lascassas Pike (TN-96)

from E Clark Boulevard to City Limits

			ID	Countermeasure	Cost	Schedule	Project Readiness
	●		1	Smart Channel Right-Turn Lane (E Clark Blvd)	$$$	Long-Term	● ●
	●		2	Flashing Yellow Arrows (FYA) (E Clark Blvd and Rutherford Blvd)	$$	Mid-Term	Ready
●	●	●	3	Retroreflective Backplates (E Clark Blvd and Rutherford Blvd)	$	Short-Term	Ready
●	●	●	4	Crosswalk Visibility and Accessibility Enhancements (E Clark Blvd and Rutherford Blvd)	$$	Short-Term	Ready
●	●	●	5	Targeted Lighting	$$	Mid-Term	Ready
	●		6	Retroreflective Pavement Markers	$	Short-Term	Ready
●	●	●	7	Corridor Access Management	$$$$	Long-Term	Ready
			8	Conduct Intersection Control & Alignment Evaluation (Hazelwood St)	$	Short-Term	Ready
●	●	●	9	Sidewalks and Multi-use Paths	$$	Mid-Term	●

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

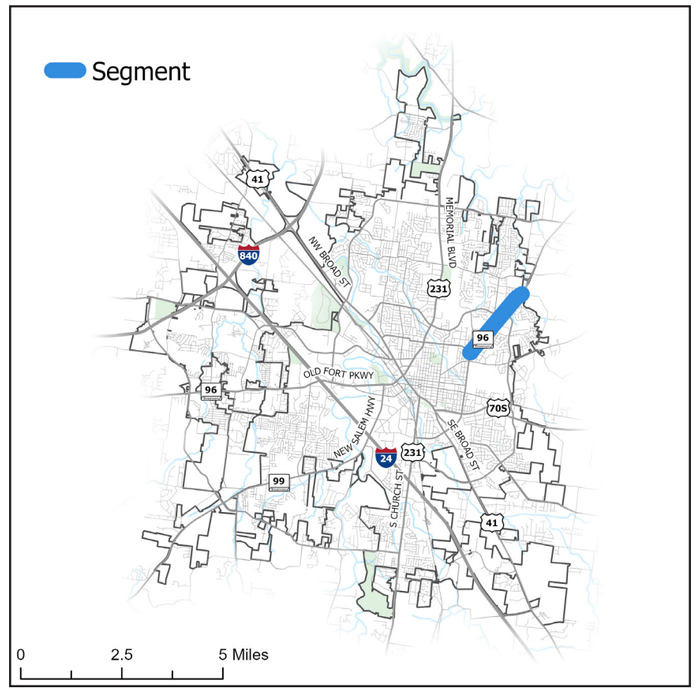
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

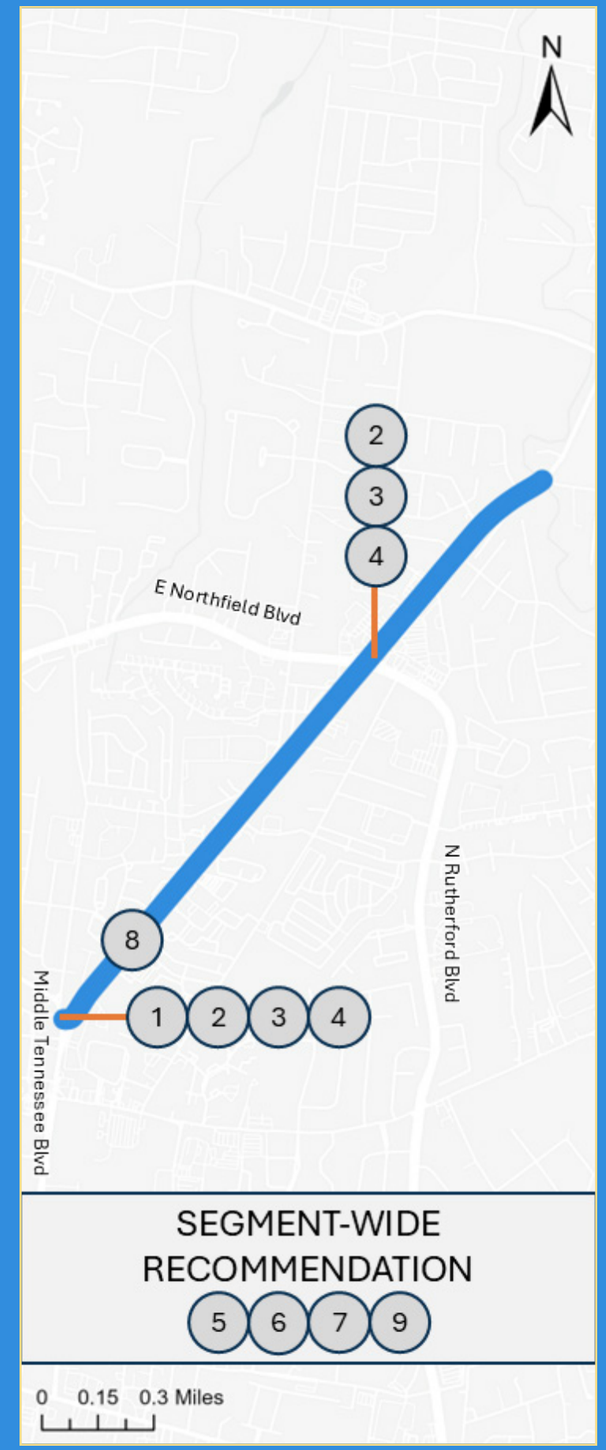
● Requires Utility Relocation

Benefit Summary

- Clearly marked crosswalks, high-visibility striping, adequate lighting, and advance warning signs help drivers recognize pedestrian crossing areas sooner, reducing the risk of crashes. Accessible features such as curb ramps, tactile warning surfaces, audible signals, and sufficient crossing times ensure that people of all abilitiesare able to cross streets safely and independently.
- By promoting slower turning speeds and better visibility, “smart channel” right turns help reduce the likelihood of collisions at intersections.
- Installing sidewalks and pedestrian infrastructure dramatically improves safety by reducing pedestrian crashes up to 88%, separating vulnerable users from traffic, and enhancing visibility and accessibility. These improvements also calm traffic, promote active transportation, and create safer, more livable communities.
- Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter. This enhanced visibility and recognition can lead to a reduction in rearend and angle crashes at signalized intersections.
- FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.



RECOMMENDED COUNTERMEASURES



Lascassas Pike (TN-96)
from E Clark Boulevard to City Limits

Joe B Jackson Parkway

from S Church Street to Broad Street

- VRU (2)
- Serious Injury (8)
- Fatal (1)

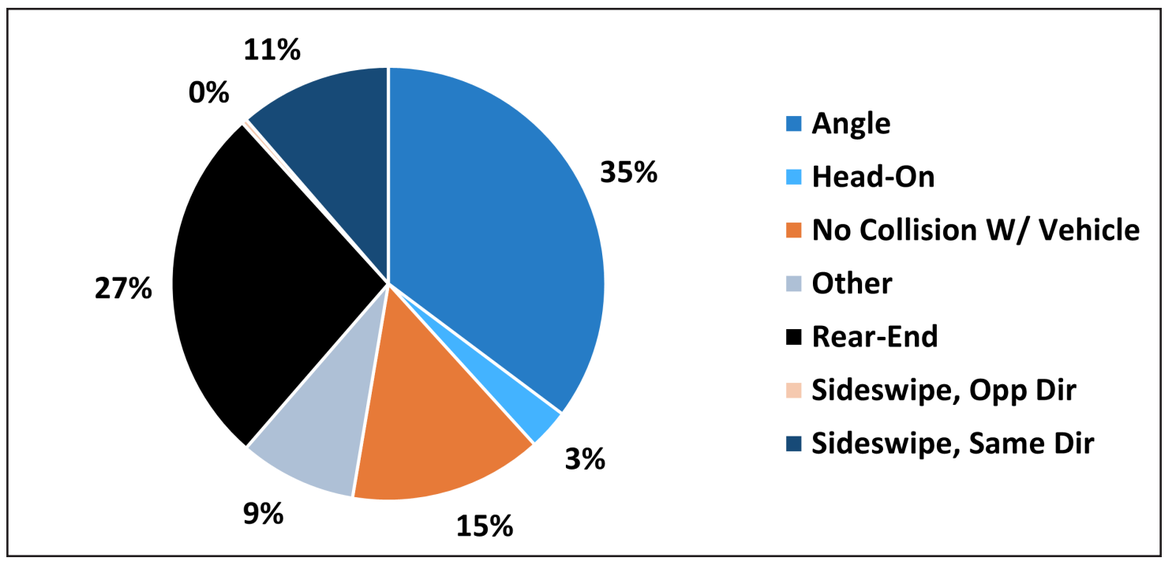
Local (Murfreesboro, TN)

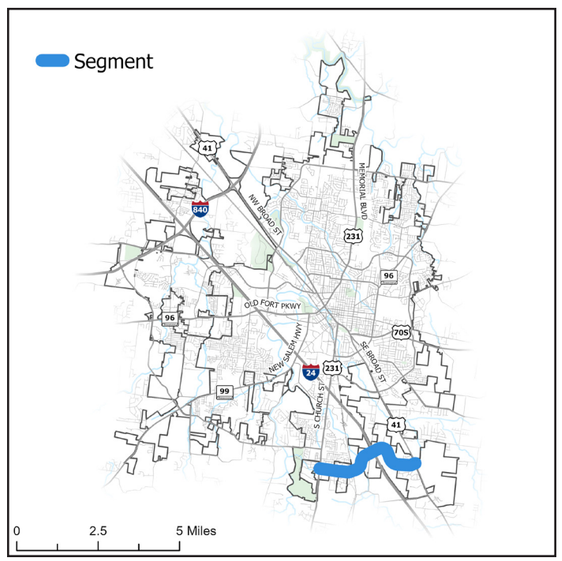
Speed Limit	45 mph
Lanes	4
Vehicles/Day	12,500
Total Crashes	264
HIN Intersections	-

Characteristics

This section of Joe B Jackson Parkway is a four-lane roadway in south Murfreesboro, divided by a bi-directional turn lane. This segment follows a curved alignment over generally rolling terrain. There are no sidewalks or pedestrian infrastructure found along this segment.

Along Joe B Jackson Parkway, Facing East, Just East of Doral Drive





OVERALL RANKING: 15

Ranking Index

Fatal & Serious Injury Crashes: Low — High

Bike/Ped Crashes: Low — High

Crash Rate: Low — High

Risk Index: Low — High

Community Input: Low — High

Community Input

> People make a turnaround here to avoid long turning line to get on 24W.

> Joe B needs red lights at Butler , both I24 interchanges, and Elam rd. There are a number of crash that happen in the area that could be avoided with red lights. With Buc-ees coming traffic will get worse and more accidents will happen with out traffic lights.

> Crossing this highway intersection is really difficult and dangerous for pedestrians and micro-mobility.

> The barrels and signage around the road changes for Bucees are rough. Cars coming from interstate are expecting a merge lane, and push into traffic. I see/experience near-miss crashes here a lot.

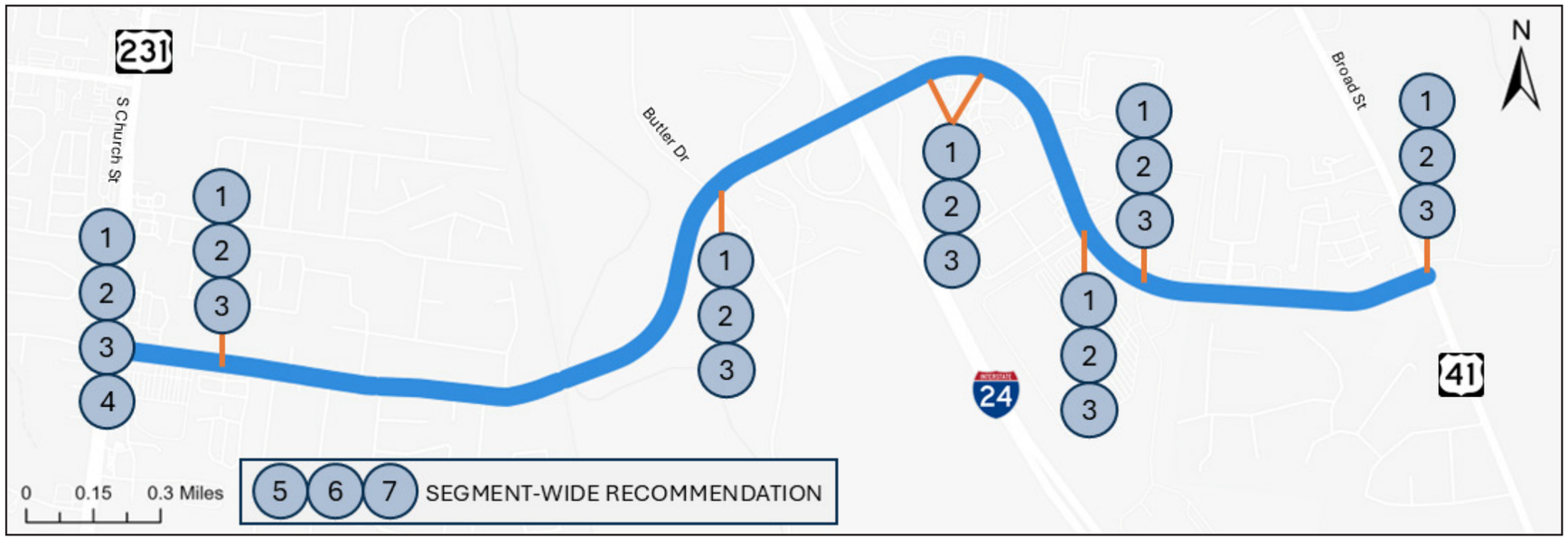
Joe B Jackson Parkway

from S Church Street to Broad Street

Joe B Jackson Parkway

from S Church Street to Broad Street

RECOMMENDED COUNTERMEASURES



			ID	Countermeasure	Cost	Schedule	Project Readiness
	●		1	**Flashing Yellow Arrows (FYA)** (S Church St, Bob Baskin Dr, Elam Rd, Elam Farms Pkwy, Hollis Westbooks Ln, Richard Reeves Dr, S Broad St)	$$	Mid-Term	Ready
●	●	○	2	**Retroreflective Backplates** (S Church St, Bob Baskin Dr, Elam Rd, Elam Farms Pkwy, Hollis Westbooks Ln, Richard Reeves Dr, S Broad St)	$	Short-Term	Ready
●	●	○	3	**Crosswalk Visibility and Accessibility Enhancements** (S Church St, Bob Baskin Dr, Elam Rd, Elam Farms Pkwy, Hollis Westbooks Ln, Richard Reeves Dr, S Broad St)	$$	Short-Term	Ready
●	●	○	4	**Median and Pedestrian Refuge Island** (S Broad St and Butler Dr)	$$	Mid-Term	Ready
●	●	○	5	**Sidewalks and Multi-use Paths**	$$	Mid-Term	Ready
	●		6	**Retroreflective Pavement Markers**	$	Short-Term	Ready
●	●	○	7	**Corridor Access Management**	$$$$	Long-Term	Ready

$ - 0 to 50,000; $$ - 50,001 to 100,000; $$$ 100,001 to 500,000; $$$$ Over 500,000

● FHWA Proven Safety Countermeasure

● Crash Modification Factors Countermeasure

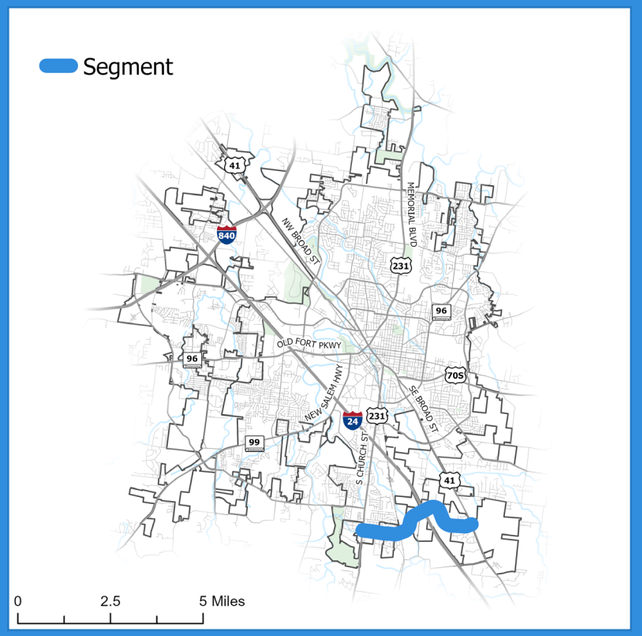
● Vulnerable Road User Related Countermeasure

● Requires ROW Acquisition

● Requires Utility Relocation

Benefit Summary

- **FYAs significantly reduce the number of left-turn crashes by providing a more distinct indication that drivers are required to yield during the permissive phase.**
- **Proper access management at medians can prevent left-turn and head-on crashes by separating opposing traffic flows. Consolidating driveways can also facilitate better access management by controlling where vehicles can turn, thereby reducing unpredictable movements that can lead to crashes.**
- **RPMs provide continuous lane guidance, which is particularly useful in navigating curves and complex intersections. The reflective properties of RPMs make them highly visible at night, reducing the risk of accidents by guiding drivers safely along the road.**
- **Backplates with retroreflective borders increase the conspicuity of traffic signal heads, especially under low-light conditions. They also help drivers quickly and easily identify traffic signals in the presence of visual clutter.**



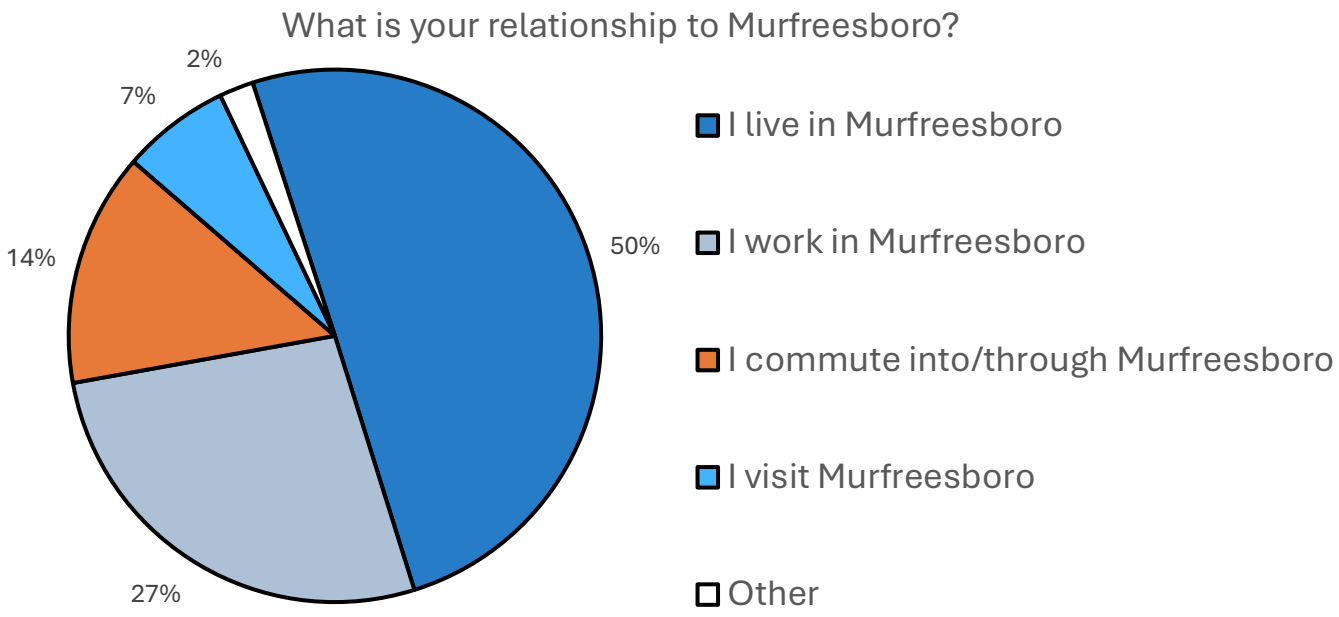
Joe B Jackson Parkway

from S Church Street to Broad Street

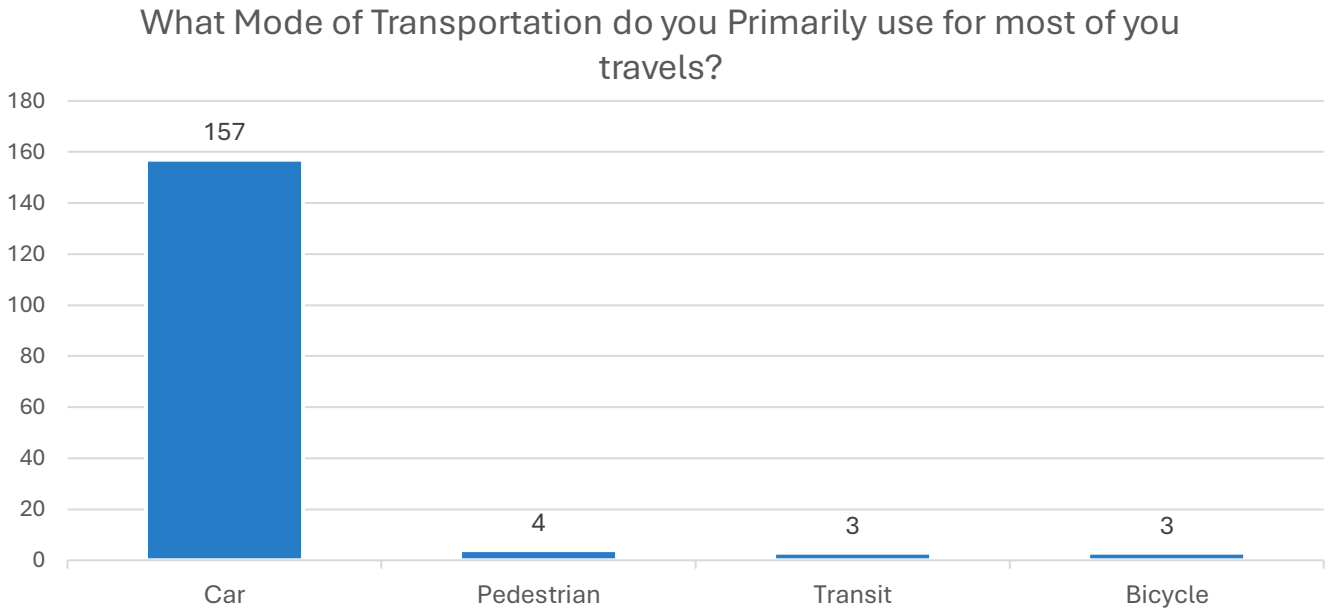
MURFREESBORO SAFE STREETS

Appendix D

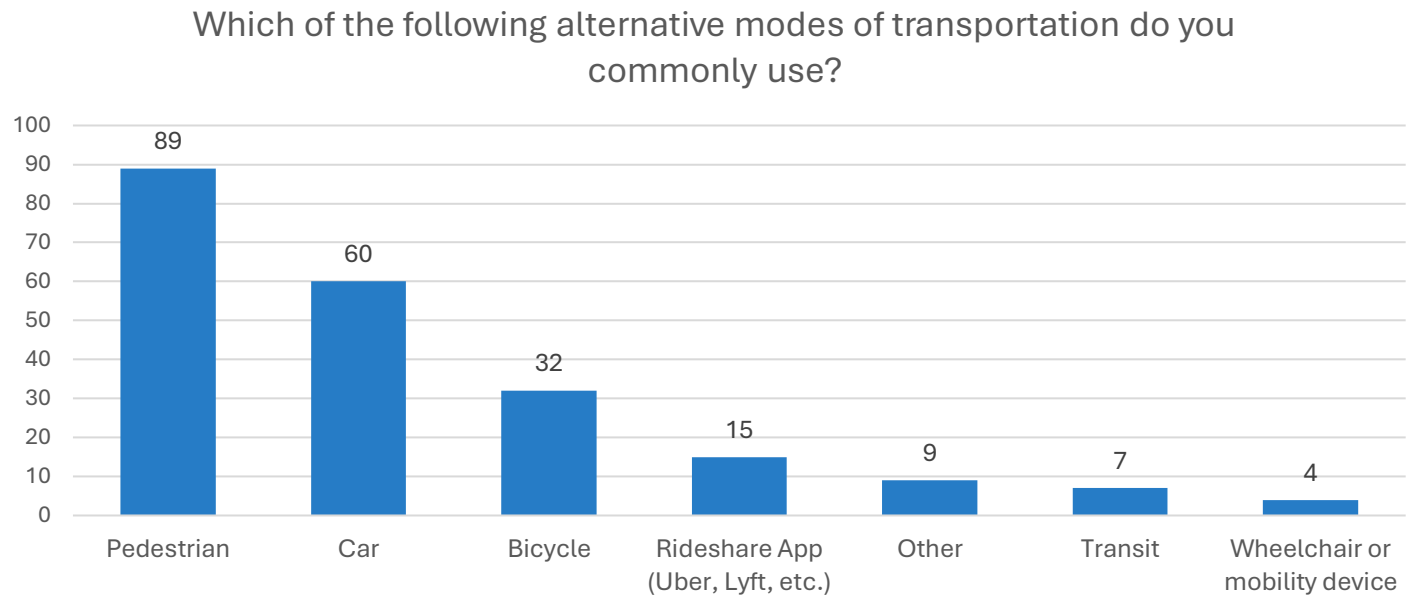
At the beginning of the survey, members were asked what their relationship to Murfreesboro was and whether they live or work in the area. Roughly 78 percent of respondents live or work within the Murfreesboro city limits, further validating that their experiences are focused on areas within the City.



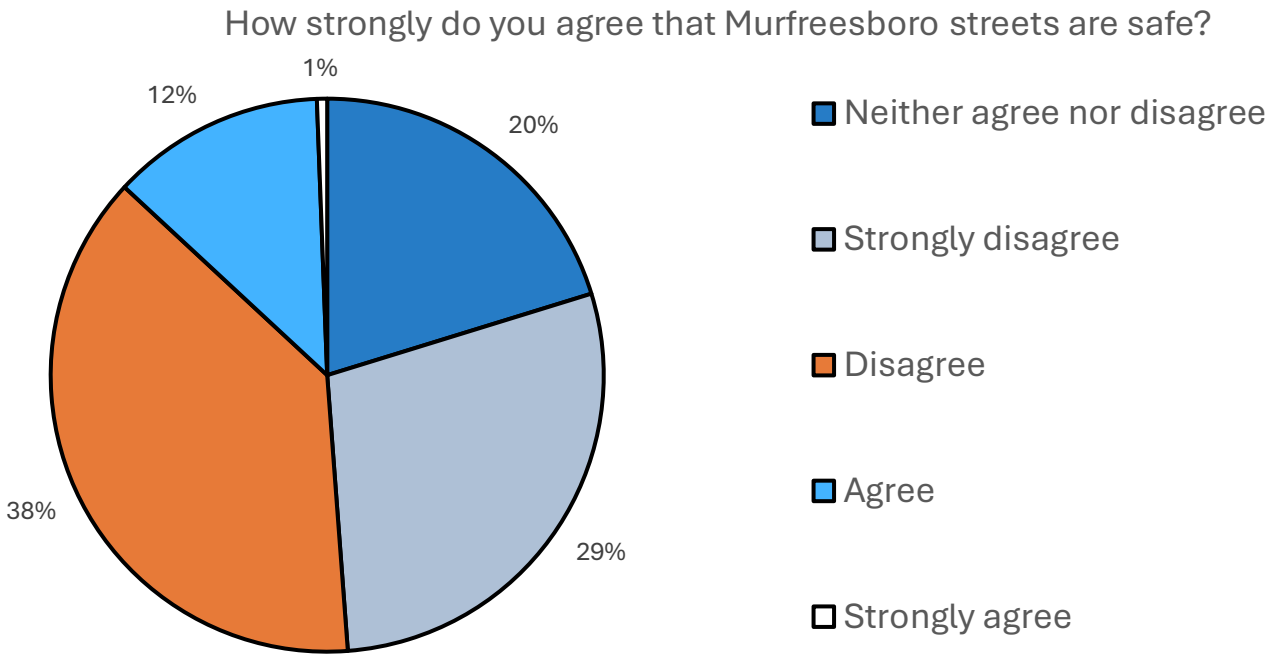
Respondents were asked to provide information on how they travel to Murfreesboro. It is inferred that while a large majority of the population travels by car, respondents have a healthy selection of travel choices. Travelling alone by car (157 responses) was the most popular response, followed by walking (4 responses), bicycle (3 responses), and transit (3 responses).



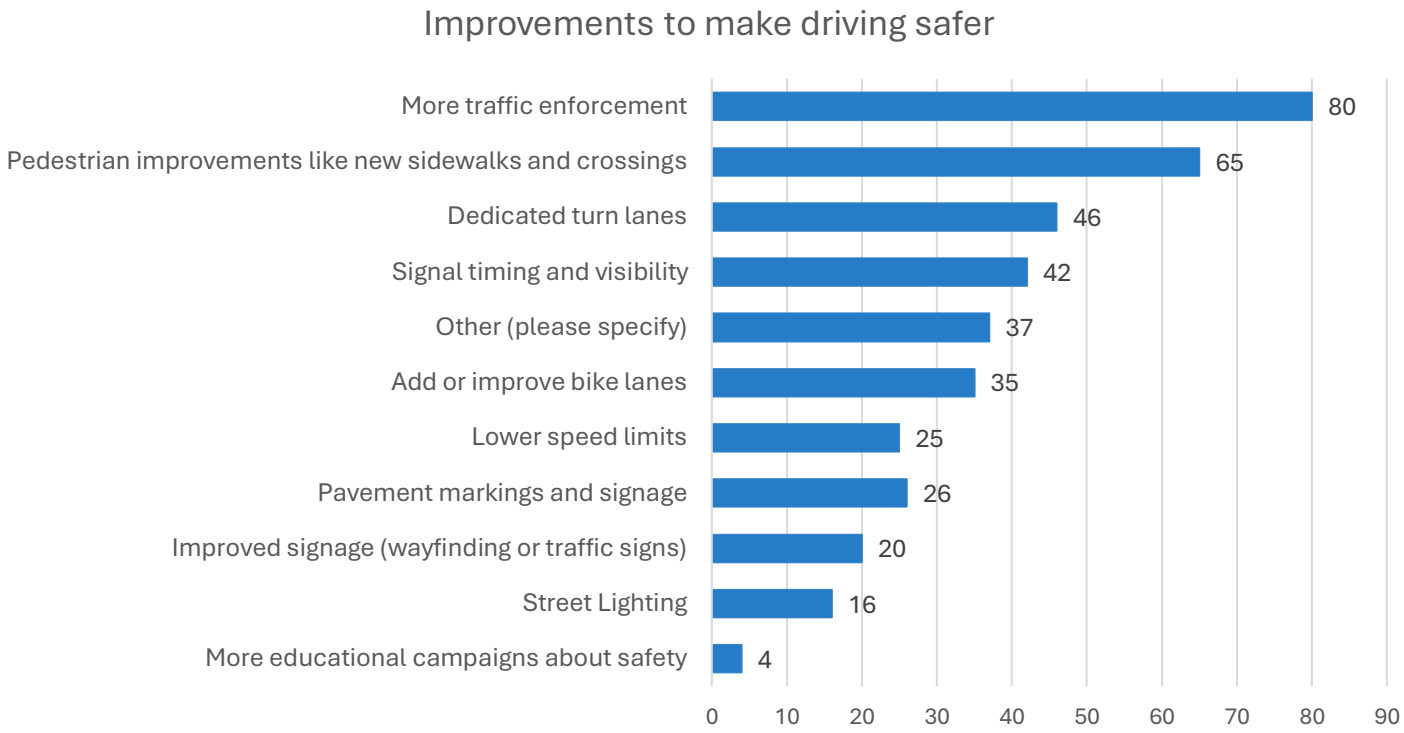
The following questions were to gather information about which alternative mode of transportation community members use. It is assumed that weekday/work transportation modes are not always the same case for things like leisure activities, exercise, weekend travel, etc.



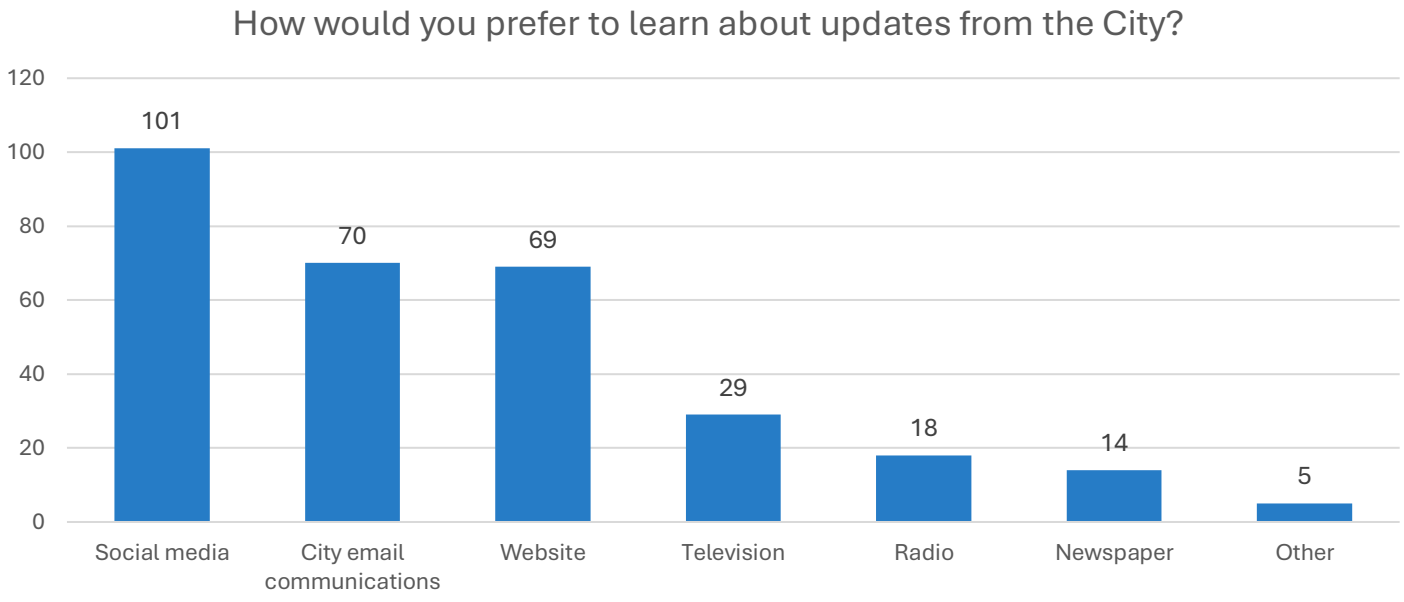
Respondents were also asked how strongly they agree that Murfreesboro streets are safe. About 13 percent of respondents felt that Murfreesboro streets were safe. Around 66 percent of respondents disagree however, indicating that they feel unsafe on the streets in Murfreesboro.



Respondents were asked to select up to three improvements that would make driving in Murfreesboro feel safer. The top three responses were more traffic enforcement, pedestrian improvements, and dedicated turn lanes.

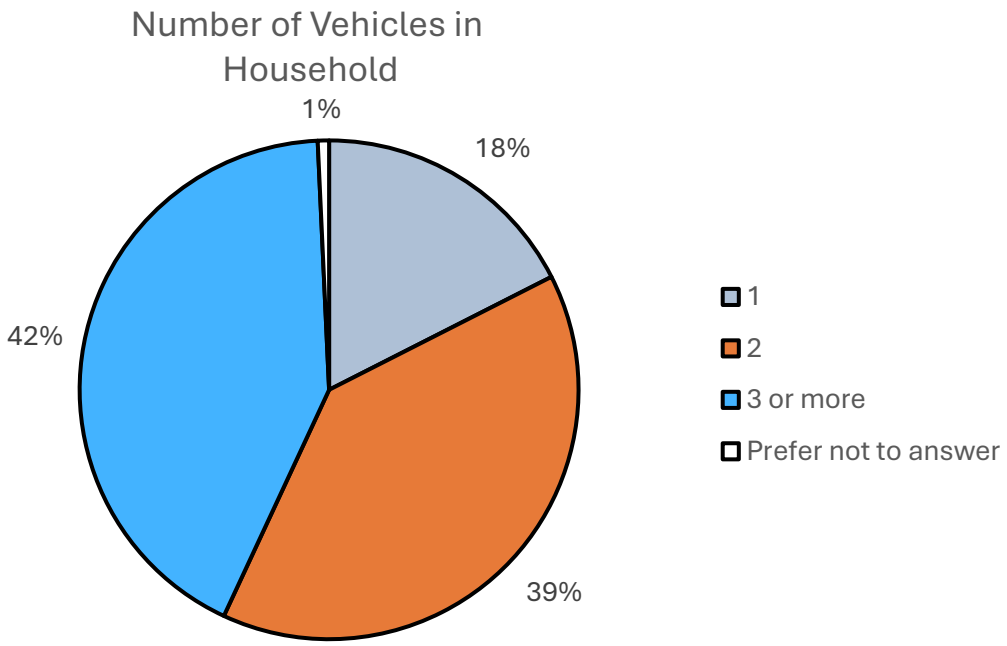


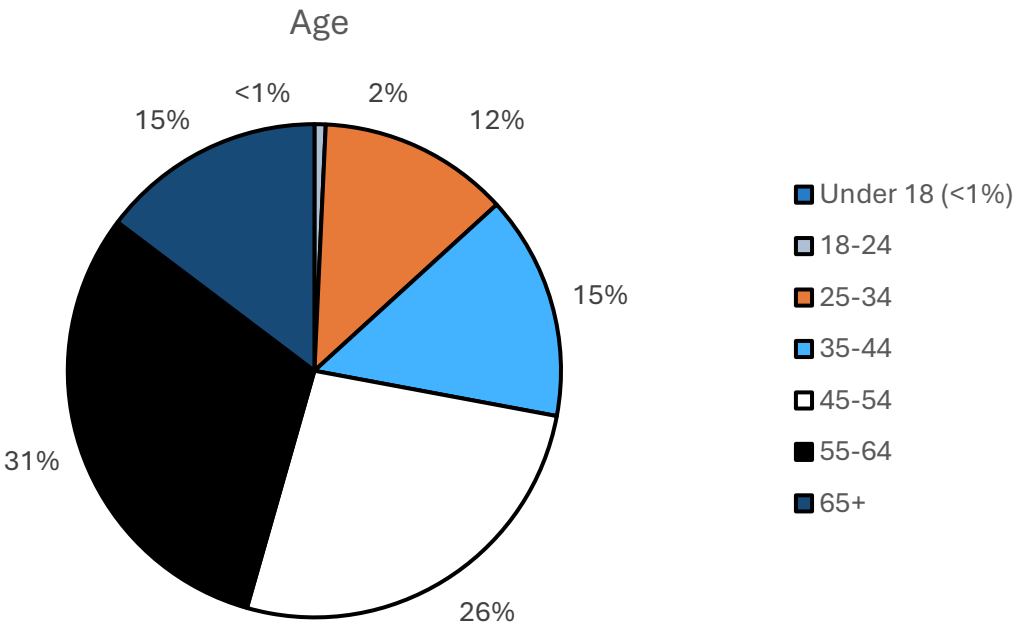
Respondents selected how they would like to hear about updates from the City regarding the Safety Action Plan. The most requested mode of communication was social media and city email communications.

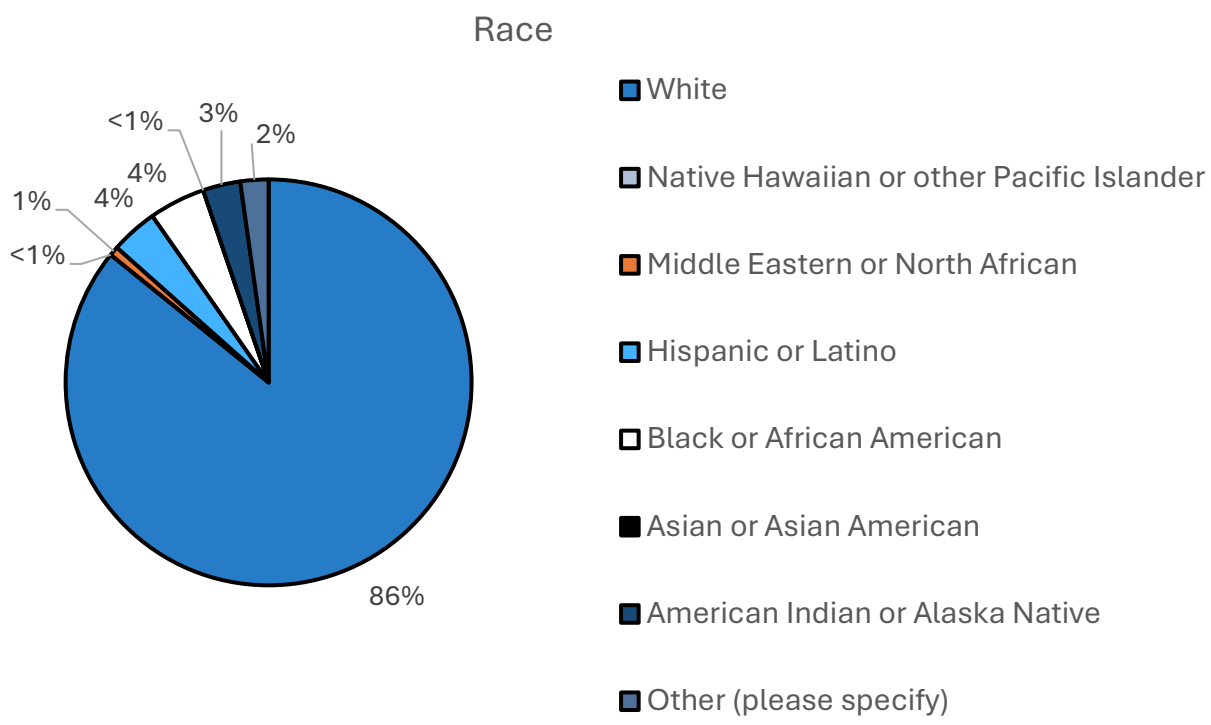


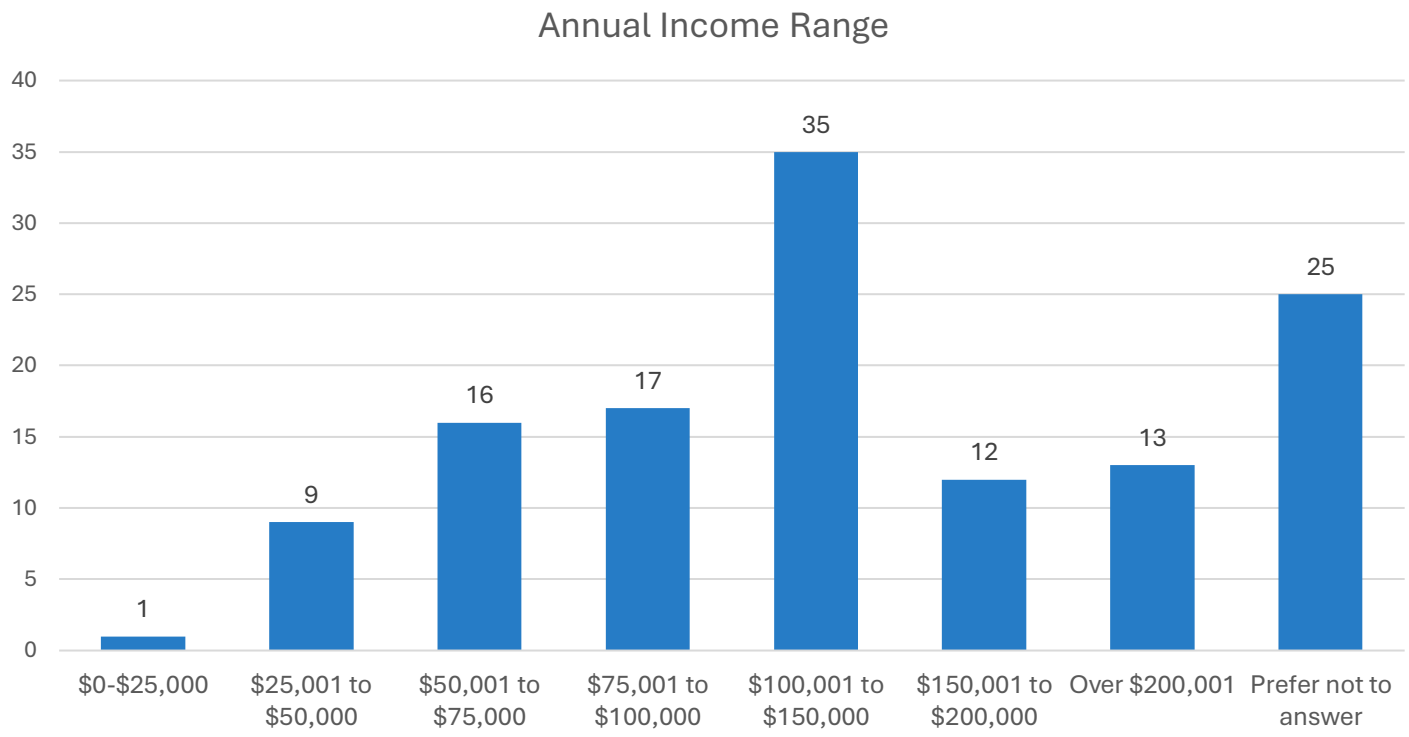
Key Demographics

The survey concluded with demographic questions that respondents could choose to answer. Responses were representative of the community makeup.






Race
<1%
3%
2%
4%
1%
4%
<1%
86%
White
Native Hawaiian or other Pacific Islander
Middle Eastern or North African
Hispanic or Latino
Black or African American
Asian or Asian American
American Indian or Alaska Native
Other (please specify)


Annual Income Range
40
35
30
25
20
15
10
5
0
1
9
16
17
35
12
13
25
$0-$25,000
$25,001 to $50,000
$50,001 to $75,000
$75,001 to $100,000
$100,001 to $150,000
$150,001 to $200,000
Over $200,001
Prefer not to answer

MURFREESBORO SAFE STREETS

Appendix E

COUNTERMEASURE TOOLKIT

This section of the Murfreesboro SAP presents countermeasures that can be implemented in all Agencies within the region to improve safety. Priority should be given to roads along the HIN to lessen severity among crashes.

A countermeasure toolkit is a comprehensive collection of strategies and countermeasures designed to address specific traffic safety concerns. This toolkit provides agencies in the Murfreesboro SAP area with a range of options and resources to effectively improve safety and enhance the overall performance of roadways and transportation systems. As the countermeasure toolkit is implemented, educational campaigns will be needed to inform the public on proper and safe use of certain countermeasures.

For more information on Crash Modification Factors (CMF), please view the CMF Clearinghouse.

Table 1. Countermeasure Toolkit

SOURCE	COUNTERMEASURE	CMF	CONTEXT (URBAN/ RURAL)	TIMEFRAME	COST
● ● ●	APPROPRIATE SPEED LIMITS	0.86	BOTH	SHORT	$
●	CONDUCT INTERSECTION CONTROL & ALIGNMENT EVALUATION	N/A	BOTH	SHORT	$
● ●	ENHANCED DELINEATION FOR HORIZONTAL CURVES	0.82	RURAL	SHORT	$
● ●	EVALUATE PROPER APPROACH LANEAGE	0.40-0.52	BOTH	SHORT	$
●	IMPROVE SIGNAGE	0.65-.84	BOTH	SHORT	$
● ● ●	LEADING PEDESTRIAN INTERVAL	0.90	URBAN	SHORT	$
● ●	LONGITUDINAL RUMBLE STRIPS AND STRIPES ON TWO-LANE ROADS	0.74	RURAL	SHORT	$
● ● ●	RETROREFLECTIVE BACKPLATES	0.85	BOTH	SHORT	$
●	RETROREFLECTIVE PAVEMENT MARKERS	0.54-0.89	BOTH	SHORT	$
●	SIGHT DISTANCE EVALUATION	N/A	BOTH	SHORT	$
● ● ●	SYSTEMIC APPLICATION OF MULTIPLE LOW-COST COUNTERMEASURES AT STOP-CONTROLLED INTERSECTIONS	0.73	BOTH	SHORT	$
● ●	WIDER EDGE LINES	0.97	BOTH	SHORT	$
● ● ●	YELLOW CHANGE INTERVALS	0.99	BOTH	SHORT	$
● ● ●	BIKE LANES	0.43	BOTH	SHORT	$$
● ● ●	CROSSWALK VISIBILITY ENHANCEMENTS	0.60	BOTH	SHORT	$$
	IMPROVE SIGNAL EQUIPMENT ALIGNMENT	N/A	BOTH	SHORT	$$
	UPDATE SPECIAL EVENT TRANSPORTATION MANAGEMENT	N/A	URBAN	SHORT	$$
●	FLASHING YELLOW ARROWS (FYA)	0.52-0.82	BOTH	MID	$$
● ● ●	MEDIAN AND PEDESTRIAN REFUGE ISLAND	0.29	URBAN	MID	$$
● ●	MEDIAN BARRIERS	0.29	BOTH	MID	$$

SOURCE	COUNTERMEASURE	CMF	CONTEXT (URBAN/ RURAL)	TIMEFRAME	COST
🔵🔴🟢	RECTANGULAR RAPID FLASHING BEACONS (RRFB)	0.31	BOTH	MID	$$
🔵🔴🟢	SIDEWALKS AND MULTI-USE PATHS	0.60	BOTH	MID	$$
🔵🔴🟢	TARGETED LIGHTING	0.68	BOTH	MID	$$
🔴🟢	TRAFFIC CALMING (CORRIDOR-WIDE SPEED MANAGEMENT)	0.60	BOTH	MID	$$
	TRANSIT STOP ADDITION/ENHANCEMENT	N/A	BOTH	MID	$$
	COMPLETE MULTI-MODAL CORRIDOR EVALUATION	N/A	URBAN	MID	$$$
🔵🔴	DEDICATED LEFT AND RIGHT-TURN LANES AT INTERSECTIONS	0.52-0.86	BOTH	MID	$$$
🔴🟢	ELIMINATE NEGATIVE OFF-SETS AT INTERSECTIONS	0.60	BOTH	MID	$$$
	FLATTEN MINOR STREET APPROACH	N/A	BOTH	MID	$$$
🔵🔴🟢	PEDESTRIAN HYBRID BEACONS	0.88	URBAN	MID	$$$
	RAILROAD CROSSING ENHANCEMENTS	N/A	BOTH	MID	$$$
🔴	REDUCED LEFT-TURN CONFLICT INTERSECTIONS	0.71	BOTH	MID	$$$
	WIDEN SHOULDERS	N/A	BOTH	MID	$$$
🔴	SMART CHANNEL RIGHT-TURN LANE	0.40	BOTH	LONG	$$$
🔵🔴🟢	CORRIDOR ACCESS MANAGEMENT	0.93	BOTH	LONG	$$$$
🔵🔴🟢	ROADWAY RECONFIGURATION	0.53	URBAN	LONG	$$$$
🔵🔴🟢	ROUNDABOUTS	0.59	BOTH	LONG	$$$$

CMF Crash Modification Factor

🔵 FHWA Proven Safety Counter Measure

🔴 Crash Modification Factors Countermeasure

🟢 Vulnerable Road User Related Countermeasures

$ $0 – $50,000

$$ $50,001 – $100,000

$$$ $100,001 – $500,000

$$$$ > $500,000

1. APPROPRIATE SPEED LIMITS

Posted speed limits are often the same as the legislative statutory speed limit. Agencies with the authority to set speed limits can establish non-statutory speed limits or designate reduced speed zones, and an increasing number are doing so. Roadway safety experts agree that speed control is one of the most important methods for reducing fatal and serious injury crashes.

A driver may not see or be aware of the conditions along a corridor and may drive at a speed that feels reasonable for themselves but may not be for all system users, especially vulnerable road users, such as 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. At 20 miles per hour, that percentage drops to 5 percent.**

Figure 1. Speed Limit Sign

Source: Adobe Stock

CMF: 0.86

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Unrestrained Occupant, Impaired Driving, Younger Drivers, Roadway Departure, Intersections, Local Roads, Work Zone, Motorcycle, Large Trucks, Pedestrian, Bicycle, Animal

Cost: $ | Timeframe: SHORT

2. CONDUCT INTERSECTION CONTROL & ALIGNMENT EVALUATION

This strategy applies FHWA's Intersection Control Evaluation (ICE) framework to objectively screen and compare intersection control and geometric alternatives (e.g., stop control, signalization, roundabout, RCUT/MUT), and integrates a targeted alignment review (approach skew, grades, and turning geometry). Using FHWA tools—SPICE for planning level safety performance and CAP X for operations—alternatives are evaluated on predicted crashes, multimodal performance, operations, costs, and lifecycle impacts. The process yields a transparent, defensible selection of intersection control and an aligned geometric concept that improves safety and consistency for all users.

Figure 2. Example Signalized Intersection

Source: Adobe Stock

CMF: N/A

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Unrestrained Occupant, Impaired Driving, Younger Drivers, Intersections, Motorcycle, Large Trucks, Pedestrian, Bicycle

Cost: $ | Timeframe: SHORT

3. ENHANCED DELINEATION FOR HORIZONTAL CURVES

Enhanced delineation for horizontal curves includes various strategies implemented in advance or within curves. Pavement markings, center, and edge lines help drivers establish their position on the road. In-lane curve warning pavement markings are solid center lines on two-lane roads that warn drivers that a curve is approaching. Retroreflective strips are material on signposts that reflect light back to the driver to help draw attention to the sign during the night. A delineator is a retroreflective device placed on a post or roadside barrier along the side of the road that lets a driver align themselves on the road. Chevron signs placed on the outside of the curve or on the edge of the road inform the driver of the direction of the road. Enhanced visibility at horizontal curves can be improved by adding or upgrading to larger, retroreflective signs. Dynamic curve warnings detect vehicle speeds approaching a curve and alert drivers if the vehicular speed exceeds the speed limit. **Sequential Dynamic Chevrons, a type of enhanced delineation, can lead to a 60 percent reduction in fatal and injury crashes.**

Figure 3. Enhanced Delineation for Horizontal Curves

Source: Adobe Stock

CMF: 0.82

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Unrestrained Occupant, Impaired Driving, Younger Drivers, Roadway Departure, Motorcycle, Large Trucks, Bicycle

Cost: $ | Timeframe: SHORT

4. EVALUATE PROPER APPROACH LANEAGE

This strategy involves assessing and improving intersection approach lane configurations—including adding or extending left or right turn lanes, modifying turn lane geometry, or revising lane alignment—to reduce vehicle conflict points and improve operational efficiency. **Adding left turn lanes on major approaches is a proven safety countermeasure associated with an estimated 48 percent reduction in crashes (CMF = 0.52). Improvements to channelized right turn lanes, such as sharpening approach angles and improving sight distance, can reduce right turn crashes by approximately 60 percent (CMF = 0.397). These laneage modifications reduce rear end, angle, and turning collisions while improving visibility and predictability for all users.**

Figure 4. Lane Alignment Example

Source: Adobe Stock

CMF: – 0.4 to 0.52

Safety Emphasis Area Addressed:

Older Driver (65+), Unrestrained Occupant, Impaired Driving, Younger Drivers, Intersections, Local Roads, , Motorcycle, Large Trucks, Pedestrian, Bicycle

Cost: $ | Timeframe: SHORT

5. IMPROVE SIGNAGE

This strategy enhances driver awareness and decision making by installing or upgrading critical warning and regulatory signs. Improvements may include adding advance warning signs (e.g., SIGNAL AHEAD, STOP AHEAD) and improving retroreflectivity for nighttime visibility. **Crash based evaluations show that installing advance warning signs can reduce angle crashes by 35 percent (CMF = 0.65), and non intersection injury crashes by 16 percent. These low cost signing treatments provide substantial safety benefits by improving driver recognition of upcoming conditions.**

Figure 5. Signal Ahead Signage

Source: Adobe Stock

CMF: 0.65 to 0.84

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Unrestrained Occupant, Impaired Driving, Younger Drivers, Intersections, Local Roads, Work Zone, Motorcycle, Large Trucks, Pedestrian, Bicycle, Animal

Cost: $ | Timeframe: SHORT

6. LEADING PEDESTRIAN INTERVAL

A leading pedestrian interval (LPI) allows pedestrians to enter the crosswalk at an intersection 3-7 seconds before vehicles receive a green indication. An LPI increases pedestrian visibility, aiming to reduce conflict with vehicles. LPI also helps pedestrians who may require more time to cross the street. **Installing an LPI can lead to a 13 percent reduction in pedestrian-vehicle crashes at intersections.**

Figure 6. Leading Pedestrian Interval

Source: Adobe Stock

CMF: 0.9

Safety Emphasis Area Addressed:

Intersections, Pedestrians, Bicycles

Cost: $ | Timeframe: SHORT

7. LONGITUDINAL RUMBLE STRIPS AND STRIPES ON TWO-LANE ROADS

Longitudinal rumble strips are milled or painted installations on the ground that alert a driver through vibration and sound. A longitudinal rumble strip is on the shoulder, edge, or near or at the center line of an undivided roadway. These are intended to warn drivers whose vehicles are crossing centerlines through the creation of noise and vehicular vibration. Rumble strips should be implemented meeting AASHTO and other safety guidelines for VRU safety. **Longitudinal rumble strips can result in a 44-64 percent reduction in head-on fatal and injury crashes on two-lane rural roads.**

Figure 7. Rumble Strips

Source: Adobe Stock

CMF: 0.74

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Impaired Driving, Younger Drivers, Roadway Departure

Cost: $ | Timeframe: SHORT

8. RETROREFLECTIVE BACKPLATES

A retroreflective backplate is a backplate made by framing traffic signals with a 1-to-3-inch yellow retroreflective border. They improve the visibility of the signal by creating an illuminated border to provide greater contrast from the area around the signal. The backplates lead to improvements in both daytime and nighttime conditions. **Safety benefits for retroreflective backplates include a 15 percent reduction in total crashes.**

Figure 8. Retroreflective Backplates

Source: Adobe Stock

CMF: 0.85

Safety Emphasis Area Addressed:

Older Driver (65+), Impaired Driving, Younger Drivers, Intersections, Local Roads

Cost: $ | Timeframe: SHORT

9. RETROREFLECTIVE PAVEMENT MARKERS

This treatment enhances lane visibility, particularly during nighttime and wet weather conditions, by providing continuous retroreflective guidance along the roadway. Improved delineation helps drivers maintain lane discipline and reduces the likelihood of run off road, nighttime, and wet weather crashes. **Based on CMF Clearinghouse studies evaluating wet reflective pavement markings—an analogous visibility enhancement—this countermeasure is associated with approximately an 11 percent reduction in total crashes (CMF = 0.887), with larger reductions on multilane roads (total crashes CMF = 0.825) and significant decreases in nighttime (CMF = 0.696) and run off road crashes (CMF = 0.538).**

Figure 9. Wet Reflective Pavement Markings

Source: Adobe Stock

CMF: 0.54 to 0.89

Safety Emphasis Area Addressed:

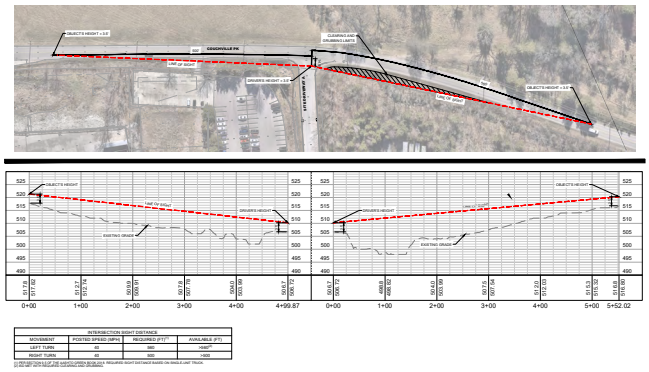
Older Driver (65+), Aggressive/Speed Related, Impaired Driving, Younger Drivers, Roadway Departure, Intersections, Local Roads, Work Zone, Motorcycle, Large Trucks, Pedestrian, Bicycle

Cost: $ | Timeframe: SHORT

10. SIGHT DISTANCE EVALUATION

Conduct a thorough evaluation of available sight distance at intersections, driveways, and roadway segments to ensure compliance with AASHTO, MUTCD, and state design requirements. This includes verifying stopping sight distance, intersection sight distance, and decision sight distance, and identifying sight obstructions caused by vegetation, roadside features, horizontal/vertical geometry, or driveway placement. While no crash modification factor (CMF) is published for sight distance evaluation or correction, geometric design manuals emphasize that adequate sight distance is essential for safe operations. Evaluations should identify deficiencies and recommend corrective actions such as clearing vegetation, regrading approaches, modifying intersection geometry, adjusting corner radii, or applying traffic control to mitigate insufficient visibility.

Figure 10. Sight Distance Evaluation



Source: Kimley-Horn

CMF:N/A

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Younger Drivers, Intersections, Local Roads, Work Zone, Motorcycle, Large Trucks, Pedestrian, Bicycle

Cost: $ | Timeframe: SHORT

11. SYSTEMIC APPLICATION OF MULTIPLE LOW-COST COUNTERMEASURES AT STOP-CONTROLLED INTERSECTIONS

This systemic approach to stop-controlled intersection safety involves deploying a package of multiple low-cost countermeasures, including enhanced signing and pavement markings, at intersections. These countermeasures increase driver awareness and recognition of the intersections and potential conflicts. **This application is associated with a 10 percent reduction of fatal and injury crashes at all locations/types/areas.**

Figure 11. Stop-Controlled Intersections

Source: FHWA

CMF: 0.73

Safety Emphasis Area Addressed:

Older Driver (65+),Impaired Driving, Younger Drivers,Intersections, Local Roads, Motorcycle,Pedestrian, Bicycle,

Cost: $ | Timeframe: SHORT

12. WIDER EDGE LINES

Edge lines are the pavement markings at the edge of travel lanes and are designed to help drivers clearly identify the road alignment ahead. To improve safety, designers increase edge lines from the minimum normal line width of 4 inches to the maximum normal width of 6 inches. Wider edge lines enhance the visibility of travel lane boundaries compared to traditional edge lines. **Wider edge lines can reduce crashes by up to 22 percent for fatal and injury crashes on rural freeways.**

Figure 12. Wider Edge Lines

Source: Adobe Stock

CMF: 0.97

Safety Emphasis Area Addressed:

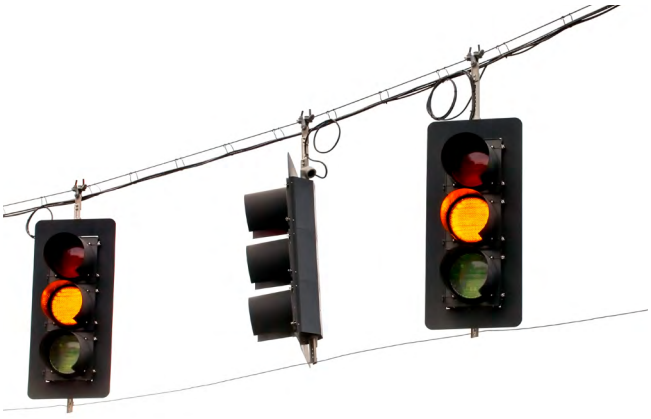
Older Driver (65+), Aggressive/Speed Related, Impaired Driving, Younger Drivers, Roadway Departure

Cost: $ | Timeframe: SHORT

13. YELLOW CLEARANCE INTERVALS

The yellow clearance interval is the time the yellow signal indication is displayed following a green light signal indication. Red light running is a leading cause of crashes and fatalities at intersections, so timing the signal allows drivers to both stop safely without inviting accelerating through a yellow to red light transition. A well-timed yellow clearance interval helps reduce crashes, indicating green has passed and red is following next. This leads to appropriate speeds and speed management at signalized intersections. **Safety benefits include a 36-50 percent reduction in red light running when timed appropriately.**

Figure 13. Yellow Light at a Signal



Source: Adobe Stock

CMF: 0.99

Safety Emphasis Area Addressed:

Older Driver (65+), Younger Drivers, Intersections, Local Roads,Pedestrian, Bicycle

Cost: $ | Timeframe: SHORT

14. BIKE LANES

A bike lane is a designated area of a roadway that is reserved for bicycles, typically marked with pavement markings and signage. Bike lanes provide bicyclists with a dedicated space to ride, improving safety by reducing conflicts with motor vehicles, and encouraging more people to choose bicycling as a mode of transportation. **Bike Lane Additions can reduce crashes by up to 49 percent for total crashes on urban 4-lane undivided collectors and local roads and 30 percent for total crashes on urban 2-lane undivided collectors and local roads.**

Figure 14. Bike Lane

Source: Adobe Stock

CMF: 0.43

Safety Emphasis Area Addressed:

Impaired Driving, Distracted Driving, Occupant Protection, Unsafe Speed, Vulnerable Road Users

15. CROSSWALK VISIBILITY AND ACCESSIBILITY ENHANCEMENTS

Crosswalk visibility enhancements encompass multiple strategies that can be used alone or in combination. High-visibility crosswalks use an inlay or thermoplastic tape patterns that are visible to the driver and pedestrians from far away. Improved lighting illuminates with a positive contrast that makes the pedestrian more visible by placing luminaires in forward locations. Enhanced signage and pavement markings alert the driver in advance that a pedestrian crosswalk is approaching, using either signage, pavement markings, or curb extensions. **High-visibility crosswalks can reduce pedestrian injury crashes up to 40 percent.**

Figure 15. High-Visibility Crosswalk

Source: Adobe Stock

CMF: 0.60

Safety Emphasis Area Addressed:

Distracted Driving, Intersections, Pedestrians, Bicycles

Cost: $$ | Timeframe: SHORT

16. IMPROVE SIGNAL EQUIPMENT ALIGNMENT

This countermeasure improves the visibility and conspicuity of traffic signals by adjusting signal head orientation, repositioning equipment to meet MUTCD visibility requirements, and removing objects or geometric conditions that obstruct a driver's view of the signal. Proper alignment ensures that signal indications are clearly visible to approaching drivers, reducing the risk of red light running, sudden braking, and angle collisions. Although the CMF Clearinghouse does not publish a crash modification factor for signal alignment improvements, the Highway Safety Manual notes that inadequate visibility of traffic control devices contributes to intersection crashes, and correcting alignment issues is considered a critical safety maintenance activity.

Figure 16. Signal Head on Mast Arm

Source: Adobe Stock

CMF: N/A

Safety Emphasis Area Addressed:

Older Driver (65+), Unrestrained Occupant, Impaired Driving, Younger Drivers, Intersections, Motorcycle, Large Trucks, Pedestrian, Bicycle

Cost: $$ | Timeframe: SHORT

17. UPDATE SPECIAL EVENT TRANSPORTATION MANAGEMENT

This strategy involves enhancing the planning, coordination, and operational procedures used to manage traffic and pedestrian activity during large planned special events. Special events—such as sports games, concerts, festivals, and parades—create temporary but significant increases in traffic demand, which can lead to congestion, increased crash risk, pedestrian–vehicle conflicts, and delays for emergency response. Updating special event transportation management includes revising traffic control plans, improving interagency coordination, expanding multimodal travel options, optimizing signal timing, enhancing traveler information through dynamic message signs and digital platforms, and improving pedestrian circulation around event venues. FHWA identifies strong special event planning and coordinated operations as essential elements for maintaining safe and efficient travel during these high impact periods.

Figure 17. Special Event Management

Source: Adobe Stock

CMF: N/A

Safety Emphasis Area Addressed:

Older Driver (65+), Younger Drivers, Intersections, Local Roads, Work Zone, Motorcycle, Large Trucks, Pedestrian, Bicycle

Cost: $$ | Timeframe: MID

18. FLASHING YELLOW ARROWS (FYA)

Flashing Yellow Arrows improve left turn safety by providing a clearer indication of permissive left turn operations and reducing driver confusion compared to the traditional circular green. FYA treatments allow agencies to fine tune left turn control, including time of day operations that reduce conflict risk during off peak conditions. **Crash Modification Factor (CMF) studies show that FYA installation can reduce angle or left turn crashes by 18 percent at dual left turn lane intersections (CMF = 0.82) and by up to 48 percent where time of day FYA operation is used with a single left turn lane (CMF = 0.52).**

Figure 18. Flashing Arrow Signal

Source: Adobe Stock

CMF: – 0.52 to 0.82

Safety Emphasis Area Addressed:

Older Driver (65+), Younger Drivers, Intersections

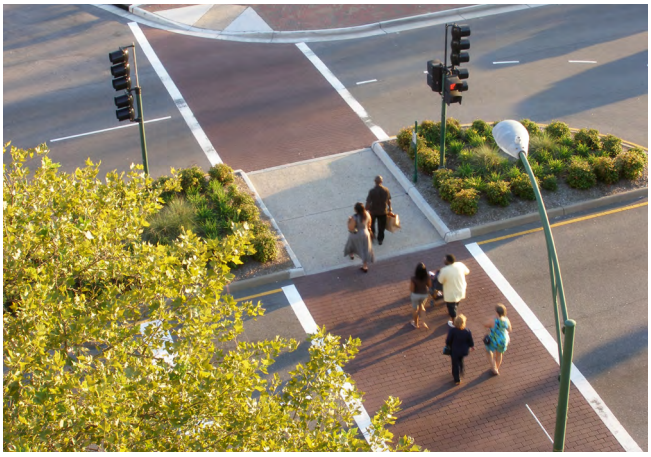
Cost: $$ | Timeframe: MID

19. MEDIANS AND PEDESTRIAN REFUGE ISLANDS

Medians in urban and suburban areas can be defined by pavement markings, raised areas, or islands to separate motorized and non-motorized road users. Medians may also serve as a refuge for pedestrians. **A median with marked crosswalks can lead to a 46 percent reduction in pedestrian crashes, while also making walking a more comfortable experience.**

A pedestrian refuge island is a median with a refuge area that is intended to help protect pedestrians who are crossing a road, while also making walking a more comfortable experience. Pedestrian refuges can also help when crossing large multi-lane roads. **Pedestrian Refuge Islands contribute to a 56 percent reduction in pedestrian crashes.**

Figure 19. Median and Pedestrian Refuge Island



Source: Adobe Stock

CMF: 0.29

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Unrestrained Occupant, Impaired Driving, Younger Drivers, Roadway Departure, Intersections, Local Roads, Work Zone, Motorcycle, Pedestrian, Bicycle

Cost: $$ | Timeframe: MID

20. MEDIAN BARRIERS

Median barriers are longitudinal barriers that separate opposing traffic on a divided highway and are designed to redirect vehicles striking either side of the barrier. These barriers can take the form of cable barriers, concrete barriers, or metal-beam guardrails. Median barriers significantly reduce the number of cross-median crashes. These barriers significantly reduce head-on crashes and fatalities by physically separating the two sides of the road. **Median Barriers Installed on Rural Four-Lane Freeways lead to a 97 percent reduction in cross-median crashes.**

Figure 20. Median Barrier

Source: Adobe Stock

CMF: 0.29

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Impaired Driving, Younger Drivers, Roadway Departure

Cost: $$ | Timeframe: MID

21. RECTANGULAR RAPID FLASHING BEACONS (RRFB)

A rectangular rapid flashing beacon (RRFB) is a pedestrian-activated traffic control device installed at crosswalks to enhance visibility and alert drivers to the presence of pedestrians. When activated, the RRFB emits a rapid, alternating pattern of flashing lights to alert oncoming drivers to yield to pedestrians crossing the street. **According to FHWA, RRFBs can result in motorist yielding rates as high as 98 percent at marked crosswalks with varied speed limits, crossing distances, and number of travel lanes.**

Figure 21. Rectangular Rapid Flashing Beacon (RRFB)

Source: Kimley-Horn

CMF: 0.31

Safety Emphasis Area Addressed:

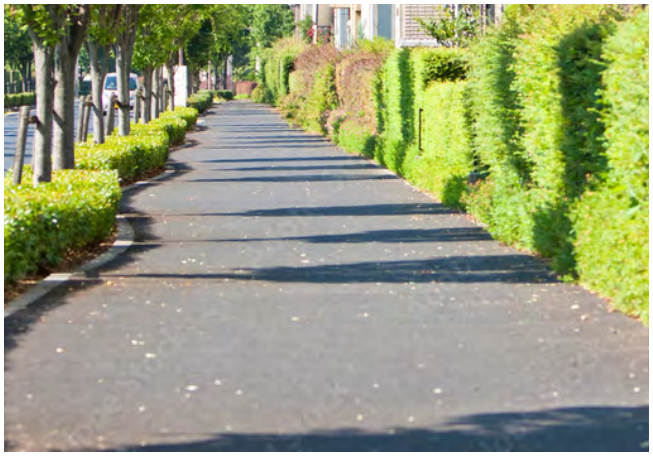
Pedestrian, Bicycle

Cost: $$ | Timeframe: MID

22. SIDEWALKS AND MULTI-USE PATHS

A sidewalk is a designated pathway alongside a road or street intended for pedestrian use. It provides a safe and separate space for pedestrians to walk or roll, separated from vehicular traffic. Sidewalks enhance pedestrian safety by reducing the risk of collisions with vehicles, promoting walking as a mode of transportation, and providing accessible routes for people of all ages and abilities. **Sidewalks can contribute up to a 89 percent reduction in crashes involving pedestrians walking along roadways.**

Figure 22. Sidewalk



Source: Adobe Stock

CMF: 0.60

Safety Emphasis Area Addressed:

Pedestrian, Bicycle

Cost: $$ | Timeframe: MID

23. TARGETED LIGHTING

The number of fatal crashes occurring in daylight is about the same as those in darkness. However, the nighttime fatality rate is three times the daytime rate despite only 25 percent of vehicle miles traveled (VMT) occurring at night. At nighttime, vehicles traveling at higher speeds may not be able to stop once a hazard or change in the road ahead becomes visible by the headlights. Therefore, improvements to the lighting infrastructure of a roadway lead to a highly visible, safer roadway.

Adequate lighting (i.e., at or above minimum acceptable standards) is based on research recommending horizontal and vertical illuminance levels to provide safety benefits to all users of the roadway environment. Adequate lighting can also provide personal security benefits for people walking or rolling as they travel along and across roadways. Increased lighting can come in the form of intersection or corridor lighting depending on the needs of the community. **Lighting can reduce pedestrian nighttime crashes by up to 42 percent.**

Figure 23. Corridor Lighting

Source: Adobe Stock

CMF: 0.68

Safety Emphasis Area Addressed:

Older Driver (65+), Impaired Driving, Younger Drivers, Roadway Departure, Intersections, Local Roads, Work Zone, Motorcycle, Large Trucks, Pedestrian, Bicycle, Animal

Cost: $$ | Timeframe: MID

24. TRAFFIC CALMING (CORRIDOR WIDE SPEED MANAGEMENT)

This strategy involves applying a combination of physical and self enforcing design treatments—such as horizontal deflection, roadway narrowing, or vertical elements—to reduce vehicle speeds and discourage cut through traffic. Traffic calming enhances the safety, comfort, and mobility of pedestrians, bicyclists, and other non motorized users by creating a slower and more predictable operating environment. **These measures support community livability and are widely recognized by FHWA and ITE as effective tools for reducing the negative impacts of motor vehicle traffic** by up to 42 percent.

Figure 24. Traffic Calming Devices

Source: Adobe Stock

CMF: – 0.60

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Impaired Driving, Younger Drivers, Roadway Departure, Intersections, Local Roads, Work Zone, Motorcycle, Large Trucks, Pedestrian, Bicycle

Cost: $$ | Timeframe: MID

25. TRANSIT STOP ADDITION/ENHANCEMENT

Enhance or add transit stops to improve transit user safety, comfort, and accessibility. Improvements include constructing ADA compliant landing pads, providing connected sidewalks, adding safe pedestrian crossings, installing shelters and lighting, improving transit signage, and enhancing bicycle/micromobility access. According to FHWA, transit stops are major pedestrian and bicyclist generators, and agencies must ensure riders feel safe and welcome accessing these facilities. Safety improvements such as connected sidewalks, enhanced crossings, clear sightlines, and well designed waiting areas reduce pedestrian risk at and near transit stops. FHWA's Improving Safety for Pedestrians and Bicyclists Accessing Transit and the Pedestrian Safety Guide for Transit Agencies provide engineering and operational strategies for safer transit access.

Figure 25. Bus Shelter

Source: Kimley-Horn Hennepin Ave Project

CMF: N/A

Safety Emphasis Area Addressed:

Pedestrian, Bicycle

Cost: $$ | Timeframe: MID

26. COMPLETE MULTI MODAL CORRIDOR EVALUATION

Conduct a corridor scale, Complete Streets evaluation that integrates community engagement, multimodal network connectivity analysis, person based performance measures, and Safe System safety diagnostics for all users. The process compiles safety, demand, reliability, access, equity, and curb/freight data; identifies network gaps; develops context sensitive alternatives (projects + operations); and applies FHWA multimodal performance methods to select a preferred program with transparent, lifecycle based criteria. Deliverables include an existing conditions atlas, a connectivity and gap analysis, an alternatives toolbox, a performance evaluation summary, and a phased implementation and monitoring plan.

Figure 26. Multimodal Intersection

Source: Adobe Stock

CMF: N/A

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Younger Drivers, Intersections, Local Roads, Motorcycle, Pedestrian, Bicycle

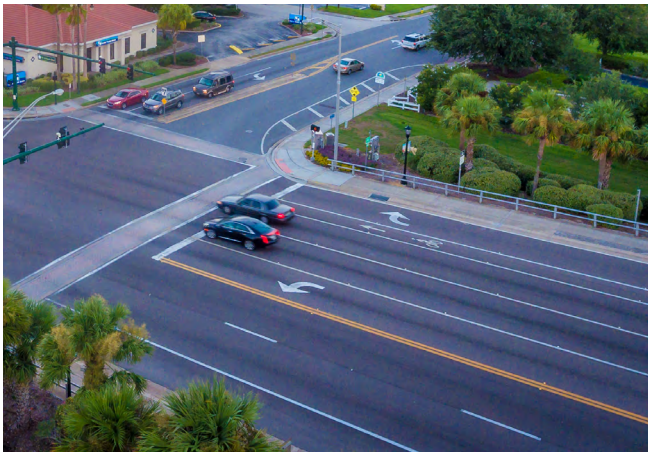
Cost: $$$ | Timeframe: MID

27. 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. It is important to also mention that additional lanes could cause VRUs to be in the roadway longer, and proper signage and safety considerations should be used. **A dedicated turn lane can lead to a 28-48 percent reduction in total crashes.**

Figure 27. Dedicated Left- and Right-Turn Lanes



Source: Adobe Stock

CMF: 0.52 – 0.86

Safety Emphasis Area Addressed:

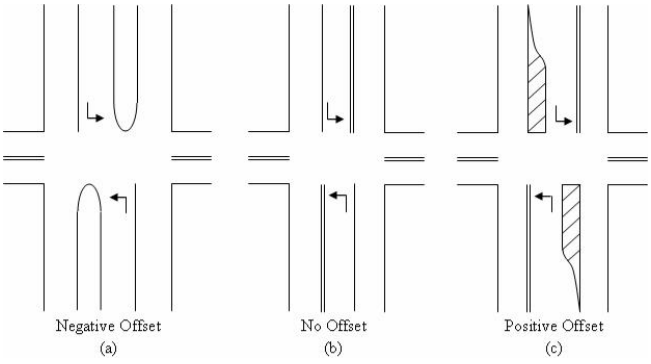
Older Driver (65+), Younger Drivers, Intersections, Large Trucks, Pedestrian, Bicycle

Cost: $$$ | Timeframe: MID

28. ELIMINATE NEGATIVE OFFSETS AT INTERSECTIONS

This countermeasure improves safety by correcting intersection geometry where opposing left turn lanes are laterally aligned in a way that restricts drivers' view of oncoming through traffic. A negative offset limits sight distance, increasing the risk of left turn and angle crashes. By realigning the left turn lanes to achieve a zero or positive offset, driver visibility and judgment of acceptable gaps are significantly improved. **CMF Clearinghouse studies show that improving left turn lane offset can reduce total crashes by approximately 34 percent (CMF = 0.662) and left turn crashes by up to 38 percent (CMF = 0.62). This treatment enhances intersection transparency, reduces conflicts, and improves overall operational safety.**

Figure 28. Negative, No, and Positive Offset Left-Turn Lanes



Source: FHWA

CMF: 0.60

Safety Emphasis Area Addressed:

Older Driver (65+), Impaired Driving, Younger Drivers, Intersections, Motorcycle, Large Trucks, Pedestrian, Bicycle

Cost: $$$ | Timeframe: MID

29. FLATTEN MINOR STREET APPROACH

This countermeasure improves safety by reducing steep grades and vertical curvature on the minor street approach to an intersection. Steep approach grades impair stopping ability, reduce sight distance, increase driver workload, and worsen vehicle acceleration from a stopped condition. Geometric design guidance from AASHTO recommends limiting intersection approach grades to 3 percent or less, with smoother transitions ("warping") into the major roadway profile to maintain visibility and driver comfort. Although no Crash Modification Factor (CMF) exists in the CMF Clearinghouse for this treatment, flattening approach grades is widely recognized as an important measure to improve sight distance, reduce stopping distance, and reduce the likelihood of rear end, run off road, and angle conflicts.

Figure 29. Steep Intersection

Source: Adobe Stock

CMF:N/A

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Impaired Driving, Younger Drivers, Intersections, Local Roads, Work Zone, Motorcycle, Large Trucks, Pedestrian, Bicycle

Cost: $$$ | Timeframe: MID

30. PEDESTRIAN HYBRID BEACONS

The pedestrian hybrid beacon (PHB) is a traffic control device designed to help pedestrians safely cross higher-speed roadways at midblock crossings and uncontrolled intersections. PHBs are typically effective at locations where three or more lanes will be crossed or in areas with high traffic volume. If PHBs are not familiar to a community, agencies and other governmental departments may need to provide education campaigns to ensure proper utilization. **PHBs can lead to a 55 percent reduction in pedestrian crashes.**

Figure 30. Pedestrian Hybrid Beacon

Source: Adobe Stock

CMF: 0.88

Safety Emphasis Area Addressed:

Pedestrian, Bicycle

Cost: $$$ | Timeframe: MID

31. RAILROAD CROSSING ENHANCEMENTS

This strategy improves safety at highway–rail grade crossings through upgrades such as installing active warning devices (flashing lights, gates, cantilevered signals), enhancing signage, adding illumination, improving approach geometry, and incorporating pedestrian trespass deterrent measures. These improvements enhance driver and pedestrian awareness, increase conspicuity of the crossing, and reduce the likelihood of collisions with trains.

Figure 31. Active Railraod Warning Devices

Source: Adobe Stock

CMF: N/A

Safety Emphasis Area Addressed:

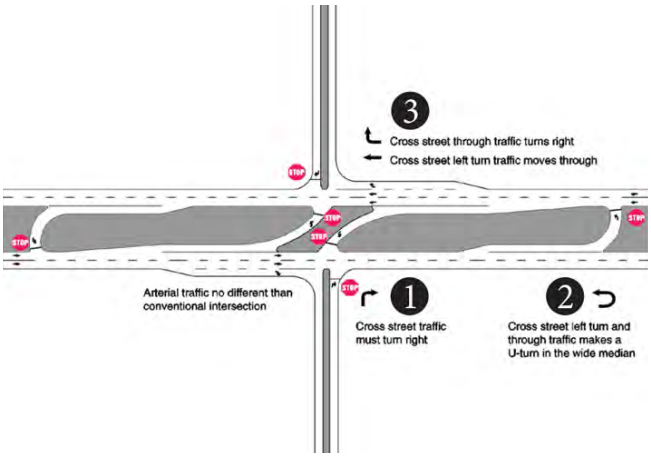
Older Driver (65+), Impaired Driving, Younger Drivers, Intersections, Local Roads, Motorcycle, Large Trucks, Pedestrian, Bicycle

Cost: $$$ | Timeframe: MID

32. REDUCED LEFT-TURN CONFLICT INTERSECTIONS

Reduced left-turn conflict intersections (RCUT) are geometric designs that alter how left-turn movements occur. These intersections simplify drivers' decision-making and minimize the potential for higher-severity crash types, such as head-on and angle. Variations on the U-Turn are typical of these intersections. One type of these intersections, **the RCUT intersection, has been shown to lead to a 54 percent reduction in fatal and injury crashes.**

Figure 32. Reduced Left-Turn Conflict Intersection Example



Source: FHWA

CMF: 0.71

Safety Emphasis Area Addressed:

Older Driver (65+), Younger Drivers, Intersections, Motorcycle, Large Trucks, Pedestrian, Bicycle

Cost: $$$ | Timeframe: MID

33. WIDEN SHOULDERS

Widening paved shoulders can improve vehicle recovery areas, provide space for disabled vehicles and bicyclists, and enhance roadway operations. Shoulder widening is most effective when paired with complementary safety improvements such as rumble strips, slope flattening, clear zone improvements, and access management. Shoulder improvements support multimodal needs and help create a safer, more forgiving roadside environment.

Figure 33. Wide Shoulder

Source: Adobe Stock

CMF: N/A

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Impaired Driving, Younger Drivers, Roadway Departure, Motorcycle, Large Trucks, Bicycle

Cost: $$$ | Timeframe: MID

34. SMART CHANNEL RIGHT TURN LANE

This countermeasure redesigns a traditional, high speed channelized right turn lane into a pedestrian oriented smart channel. Improvements include tightening the turning radius, sharpening the entry angle, repositioning the stop bar, and reshaping the channelizing island to enhance sight distance and reduce vehicular turning speed. These changes reduce conflicts between right turning vehicles and both pedestrians and through traffic.

Figure 34. Smart Channel Right-Turn Lane

Source: Kimley-Horn

CMF: 0.40

Safety Emphasis Area Addressed:

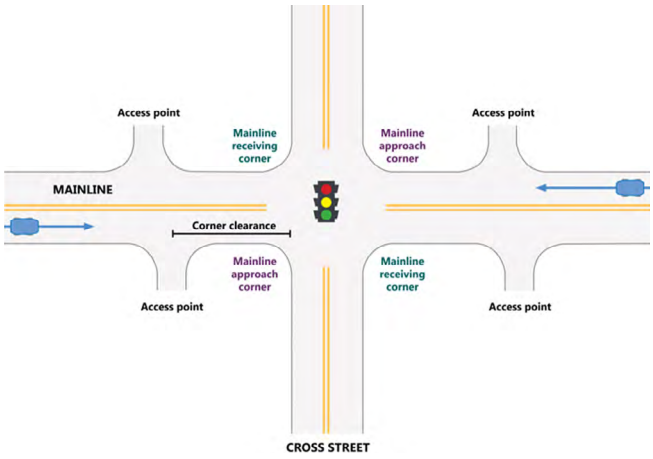
Older Driver (65+), Aggressive/Speed Related, Younger Drivers, Intersections, Local Roads, Motorcycle, Pedestrian, Bicycle

Cost: $$$ | Timeframe: LONG

35. CORRIDOR ACCESS MANAGEMENT

Access management refers to the design, application, and control of entry and exit points along a roadway. This includes intersections with other roads and driveways that serve adjacent properties. Thoughtful access management along a corridor can simultaneously enhance safety for all modes, facilitate walking and biking, and reduce trip delay and congestion. While access management is a broad topic, strategies can include the intentional spacing of intersections, utilizing protected turn lanes, and generally minimizing conflict points on a corridor. Access management should also depend on the built environment context. **Safety benefits include a 25 to 31 percent reduction in fatal and injury crashes along urban/suburban arterials.**

Figure 35. Access Management



CMF: 0.93

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Younger Drivers, Intersections, Pedestrian, Bicycle

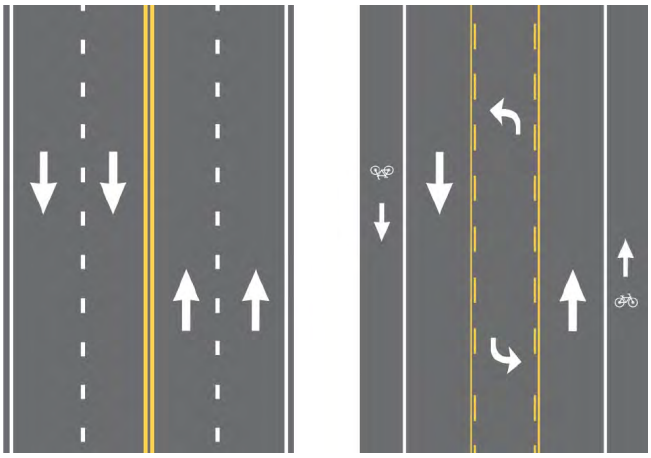
Cost: $$$$ | Timeframe: LONG

Source: FHWA

36. ROADWAY RECONFIGURATION

A roadway reconfiguration usually involves converting an existing four-lane roadway into a three-lane roadway. Implementing a roadway reconfiguration can improve safety, calm traffic, provide better mobility and access for all users, and enhance the quality of life in a community. Roadway reconfigurations make a roadway more "complete" by adding bike lanes or areas for pedestrians. Sometimes, roadway reconfigurations are called road diets and are typically a low cost countermeasure. **In the context of a 4-lane to 3-lane reconfiguration, a road segment can experience up to a 47 percent reduction in total crashes.**

Figure 36. Roadway Reconfiguration



CMF: 0.53

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related, Unrestrained Occupant, Impaired Driving, Younger Drivers, Local Roads, Motorcycle, Pedestrian, Bicycle

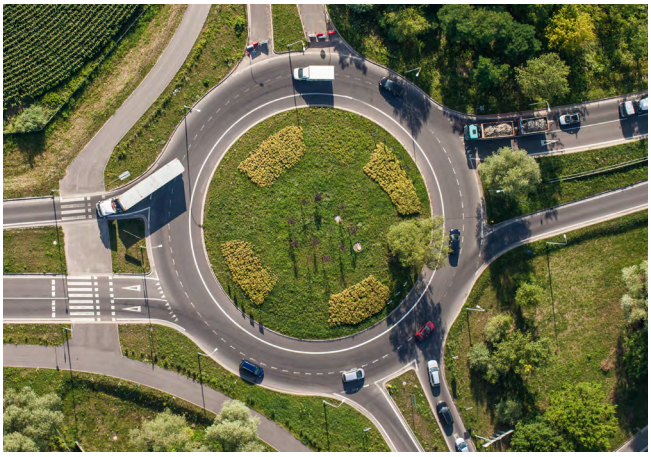
Cost: $$$$ | Timeframe: LONG

Source: FHWA

37. ROUNDABOUTS

A roundabout is a type of circular intersection where traffic flows continuously around a central island. Vehicles entering a roundabout must yield to traffic already circulating within it, promoting a smooth and efficient flow of traffic with reduced conflict points compared to traditional intersections. Roundabouts are designed to improve safety, reduce congestion, and enhance traffic flow. **Roundabouts lead to a 78-82 percent reduction in fatal and injury crashes.**

Figure 37. Roundabout



Source: Adobe Stock

CMF: 0.59

Safety Emphasis Area Addressed:

Older Driver (65+), Aggressive/Speed Related,Younger Drivers Intersections, Local Roads, Motorcycle,Pedestrian, Bicycle

Cost: $$$$ | Timeframe: LONG

MURFREESBORO

SAFE STREETS