Regional Safety Action Plan

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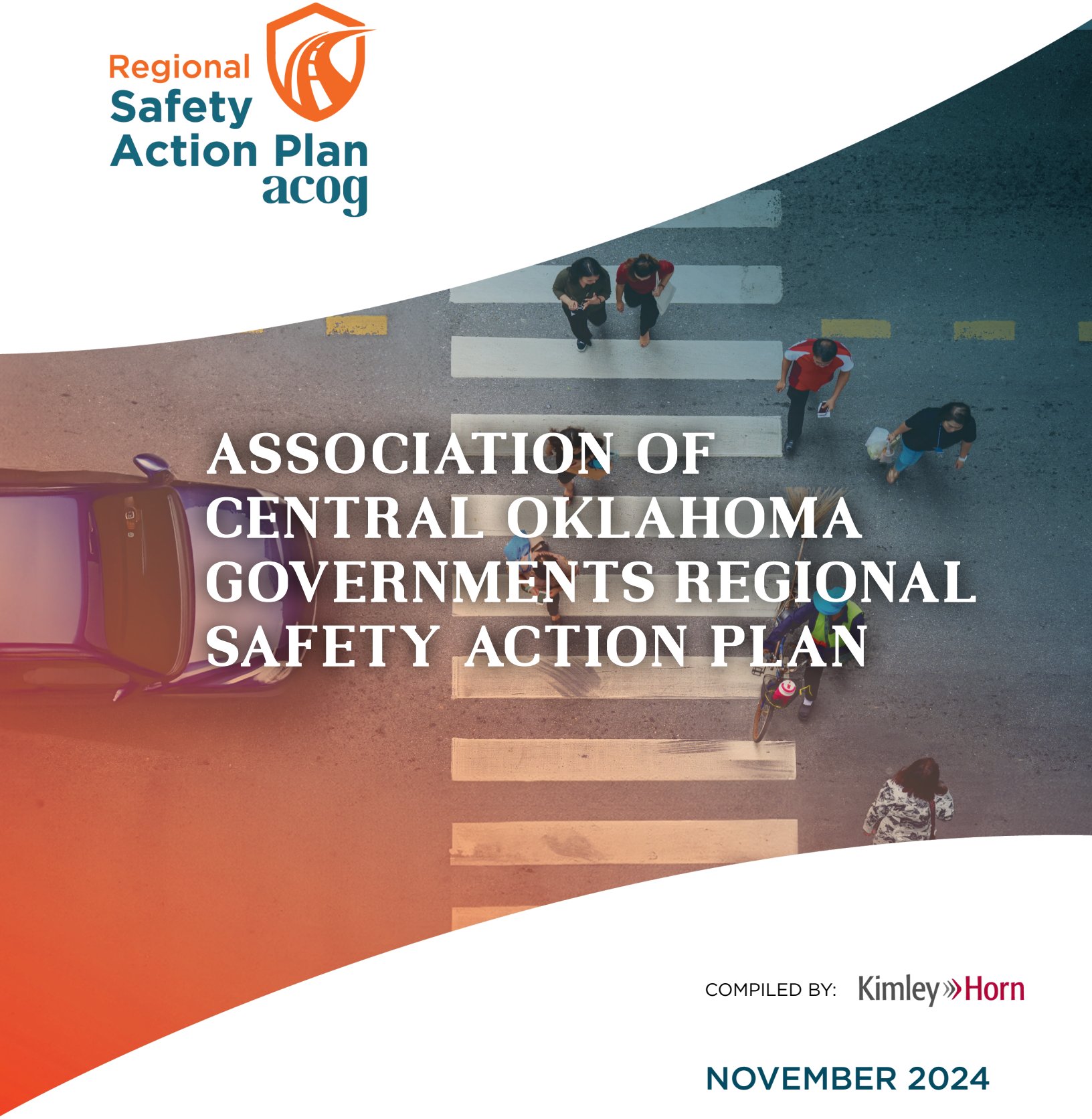

ASSOCIATION OF CENTRAL OKLAHOMA GOVERNMENTS REGIONAL SAFETY ACTION PLAN

COMPILED BY: Kimley»Horn

NOVEMBER 2024

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GLOSSARY

911 ACOG – 911 Association of Central Oklahoma Governments
ACOG – Association of Central Oklahoma Governments
ATV – All-Terrain Vehicles
A – Suspected Severe Injury Crash
B – Suspected Minor Injury Crash
CED – ACOG Community & Economic Development Department
CHBP – Competitive Highway Bridge Program
CMF – Countermeasure Modification Factor
CMV – Commercial Motor Vehicle
DDI – Diverging Diamond Interchange
ETC – USDOT Equitable Transportation Community Explorer
FHWA – Federal Highway Administration
FMCSA – Federal Motor Carrier Safety Administration
HIN – High Injury Network
INCOG – Indian Nations Council of Governments
INFRA – Infrastructure for Rebuilding America
KABs – High Injury Crashes
K – Fatal Crash
LPI – Leading Pedestrian Interval
MPO – Metropolitan Planning Organization
NBFR – Northbound Frontage Road
ODOT – Oklahoma Department of Transportation
OHSO – Oklahoma Highway Safety Office
OU – University of Oklahoma
PHB – Pedestrian Hybrid Beacon
PIDP – Port Infrastructure Development Program
RAISE – Rebuilding American Infrastructure with Sustainability and Equity
RCUT – Reduced Left-Turn Conflict Intersections
RRFB – Rectangular Rapid Flashing Beacon
RPAC - Regional Planning and Advisory Committee
RSAP – Regional Safety Action Plan
SBFR – Southbound Frontage Road
SHSP – Strategic Highway Safety Plan
SMART – Strengthening Mobility and Revolutionizing Transportation
SS4A – Safe Streets and Roads for All
STBG-UZA – Surface Transportation Block Grant Program Procedures for the Oklahoma City Urbanized Area Funds
TAP – Transportation Alternative Program
TMA – Transportation Management Area
TWLTL – Two-Way Left Turn Lane
USDOT – U.S. Department of Transportation
VMT – Vehicle Miles Traveled
VRUs – Vulnerable Road Users
WIC – Special Supplemental Nutrition Program for Women, Infants, and Children

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CHAPTER 1.

THE CASE FOR A SAFETY ACTION PLAN

INTRODUCTION

The Association of Central Oklahoma Governments (ACOG) Regional Safety Action Plan (RSAP) was developed using several guiding principles. This chapter outlines all the guiding principles and their role in the Safe Streets for All (SS4A) campaign and initiatives. The mission statement and project timeline are also discussed within Chapter 1.

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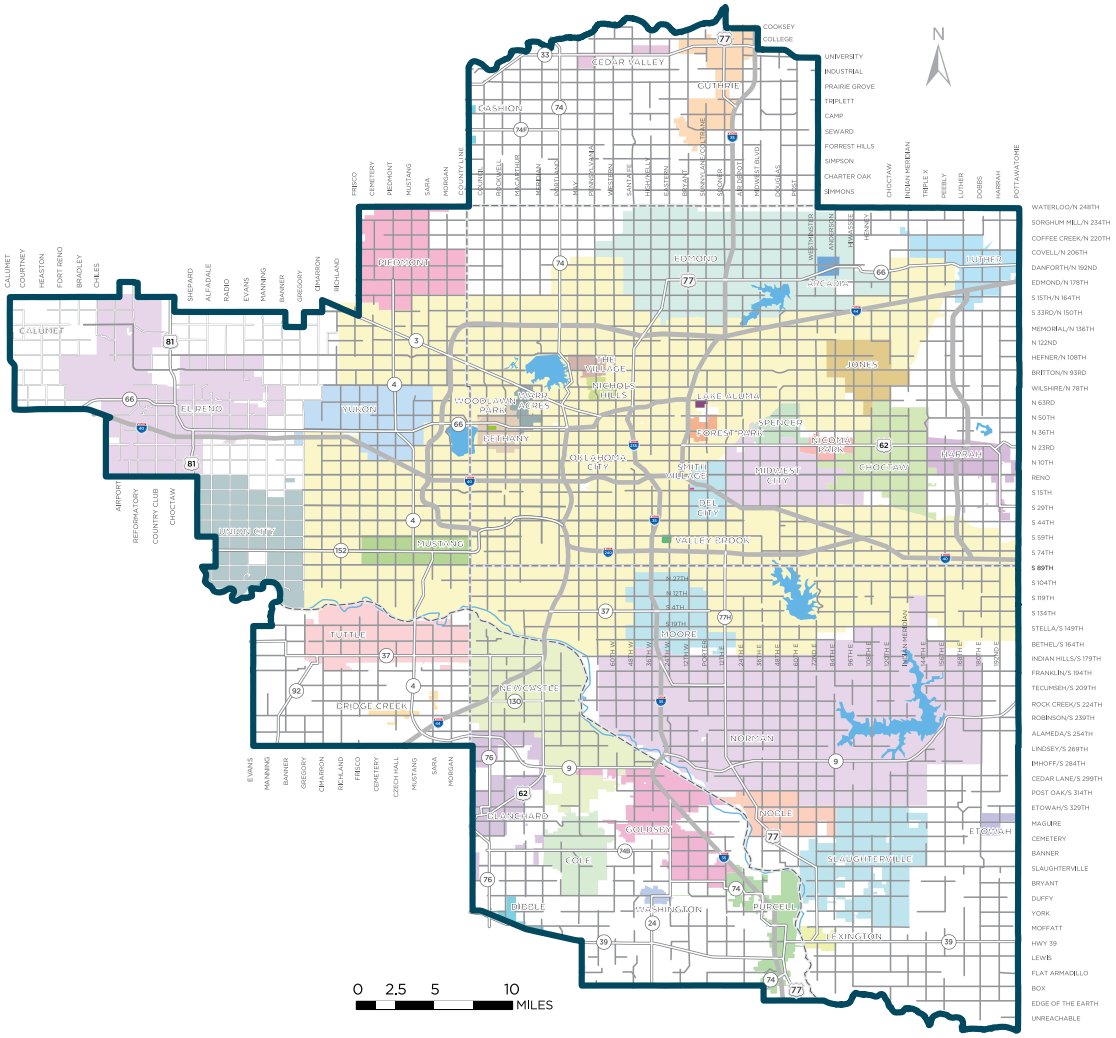
CHAPTER 1. THE CASE FOR A SAFETY ACTION PLAN

The ACOG Regional Safety Action Plan is set in place to ensure that the Central Oklahoma Region is safe for people of all ages and abilities. Through the development of this plan, ACOG acknowledges that safety is an important factor to its people, communities, and cities. Crash analysis for all roads provides a data driven look into what is happening and assists in the identification of countermeasures and policy recommendations that will begin addressing safety. This plan will help coordinate resources among cities, communities, and organizations to work toward a shared goal of eliminating traffic deaths and serious injuries in Central Oklahoma.

The RSAP for the Central Oklahoma Region will assist ACOG staff, local governments, and other partners in making informed decisions when identifying projects that will improve the safety of all roadway users in the region. This chapter details the plan's purpose, process, and why the RSAP is important. Additionally, this action plan will introduce Vision Zero to the region with the goal of achieving zero traffic deaths in Central Oklahoma.

The ACOG RSAP was developed from February 2024 to November 2024 to help the ACOG Region achieve safer roads for all, with their goal of reducing traffic related fatalities in the region. ACOG has a long history of bringing communities together to solve the common issues facing the residents of Central Oklahoma. ACOG was established to aid local governments in planning for common needs, cooperating for mutual benefit, coordinating for sound regional development, and to serve as a clearinghouse for state and federal funds. A map of the ACOG transportation management area (TMA) is shown in **Figure 1** below. A Transportation Management Area (TMA) is an urbanized area with a population of at least 200,000 that is designated by the U.S. Secretary of Transportation.

Figure 1. ACOG Transportation Management Area



MISSION STATEMENT

During the first meeting with the RSAP Planning Team, a mission statement was developed to articulate the core purpose, values, and aspirations for this action plan. Through the brainstorming exercises and input from committee members, the following mission statement was established for the ACOG RSAP:

> **"All people deserve to live without the devastating effects of severe injuries and fatal crashes in our region. The ACOG Regional Safety Action Plan aims to promote a culture of safety by implementing policies, educating and engaging with the public, and improving infrastructure to create a safer road network for everyone."**

PROJECT TIMELINE

Kicking off in January 2024, the ACOG RSAP planning process spanned 11 months. Through collaborative efforts with ACOG, Central Oklahoma cities, and various stakeholders, ACOG has taken the lead in safety initiatives for the region. A timeline for the RSAP Planning Team Meeting and engagement efforts is presented in Figure 2 below.

Figure 2. Project Timeline

	2024										
	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV
RSAP Team Meetings	●				●		●	●		●	●
Safety Launch	●										
Regional Safety Summit		●									
Public Engagement					Public Pop-Ups and Workshops						
Draft/Final RSAPs										●	●

GUIDING PRINCIPLES

SAFE SYSTEM APPROACH

The Safe System Approach was pioneered in the 1990's by Swedish road safety expert, Claes Tingvall. The Safe System Approach is the framework and mechanism by which this Safety Action Plan can be implemented.

The Safe System Approach is a principles-based approach intended to eliminate serious and fatal injuries. This approach relies on accommodating human mistakes and keeping potential impacts on the human body at tolerable levels. Accommodating human mistakes can be accomplished through roadway design features and technological advancements in vehicles (lane departure assist, autonomous emergency braking, etc.). There are five complementary objectives outlined by the U.S. Department of Transportation (USDOT) that correspond and support implementation of the Safe System Approach as provided in Figure 3.

1. **Safe road users** bear the burden of responsibility for complying with rules and regulations of the roadway.
2. **Safe vehicles** are responsible for mitigating or preventing the potential impacts of crashes. Active safety measures can help prevent crashes from occurring, while passive measures can lessen the implications of a crash.
3. **Safe speeds** have a direct correlation with an increased rate of survival in crashes. Reducing speeds reduces impact force, improves visibility, and affords drivers additional breaking and reaction time.
4. **Safe roads** are not defined by their design alone. Rather, the road design, construction, maintenance, operation, and countermeasures work collaboratively to improve safety.
5. **Post-crash care** accounts for the actions of those that respond to a crash, whether it be emergency service, law enforcement, or clean up.

Figure 3. The Safe System Approach

Source: FHWA

THE SIX Es OF SAFETY

Similar to the Safe System Approach, the Six Es of Safety are part of an integrated and comprehensive framework. While every community embodies its own understanding of safety, the Six Es can be implemented at all levels to enhance the user experience and improve safety. The Action Plan in **Chapter 6** of this report utilizes each of the Six Es as an organizing approach to implementation.

Engineering	Engineering projects and interventions in support of Vision Zero may be implemented through the built environment to improve safety. Calming traffic and improving safety for all users is the primary goal. Examples of engineering projects proven to improve safety include implementation of safety countermeasures or traffic calming measures that reduce speeding.
Education	Education can improve safety by raising awareness of transportation choices, furthering, or establishing the benefits of multimodal transportation, and demonstrating the proper way to utilize the system, thus reducing the margin of error.
Evaluation	Evaluation can support both proactive and responsive measures. Understanding the when, where, and why of crashes allows us to respond to historical trends and adjust to improve future safety. Similarly, careful evaluation can help head off potential issues before they reach greater severity.
Equity	Equity efforts must be made to acknowledge and rectify the imbalance and additional burden that disadvantaged populations carry. Vulnerable and disadvantaged populations have been historically left out of community planning decisions and deserve access to the same information and infrastructure as everyone else.
Enforcement	Enforcement can ensure that traffic laws and regulations are being followed by system users, while also ensuring positive relations between law enforcement officers and the community. Enforcement can also target and prioritize problem behaviors like speeding, red light running, and other dangerous behavior over minor infractions.
Encouragement	Encouraging the community to further their knowledge and understanding of safety principles can be fun and interactive. Events and activities can support and promote better behavior.

VISION ZERO

Vision Zero is an initiative that aims to create a transportation network with zero traffic fatalities and severe injuries while increasing safe, healthy, equitable mobility for all. Prioritizing safer road design, enforcement, education, and increased community engagement is vital to achieving the Vision Zero goal. A holistic approach to transportation safety is required to improve the quality of life, safety, and mobility of communities through the reduction of fatal and severe injury crashes. Figure 4 shows different aspects of creating a safe system. Vision Zero is not a slogan, not a tagline, not even just a program. It is a fundamentally different way to approach traffic safety.

Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all.

Why Vision Zero?

Unlike the traditional approach to safety, Vision Zero takes a significantly different approach to traffic safety as shown in Figure 5. Vision Zero recognizes that human error is inevitable; therefore, the road system and associated policies help minimize the possibilities of a fatal or severe injury crash. Additionally, although not the norm, it is emphasized that getting to zero requires a multidisciplinary approach. While Vision Zero's goal of zero traffic fatalities and severe injuries seems lofty, even one loss of life takes a large toll on the community; therefore, a fundamentally different way to approach traffic safety is needed.

Figure 4. Vision Zero Viewpoint

Source: Vision Zero Network

Figure 5. Traditional vs. Vision Zero Approach

Traditional Approach		Vision Zero
Traffic deaths are **INEVITABLE**	VS	Traffic deaths are **PREVENTABLE**
PERFECT human behavior		Integrate **HUMAN FAILING** in approach
Prevent **COLLISIONS**		Prevent **FATAL AND SEVERE CRASHES**
INDIVIDUAL responsibility		**SYSTEMS** approach
Saving lives is **EXPENSIVE**		Saving lives is **NOT EXPENSIVE**

Communities that strive for zero traffic deaths must acknowledge that business as usual is not enough and that systemic changes are needed to create a safer road network. **The goals of Vision Zero are summarized below:**

Reduce traffic fatalities and injuries

Promotes improved road design, traffic engineering, and community engagement

Enhanced quality of life

Fosters pedestrian-friendly environments, promoting active transportation, and reducing traffic stress

Equity

Addresses disparities in traffic safety outcomes across different demographics and neighborhoods

Economic benefits

Lowers healthcare costs, reduced property damage, and increased productivity and commercial spending

Sustainable and smart urban planning

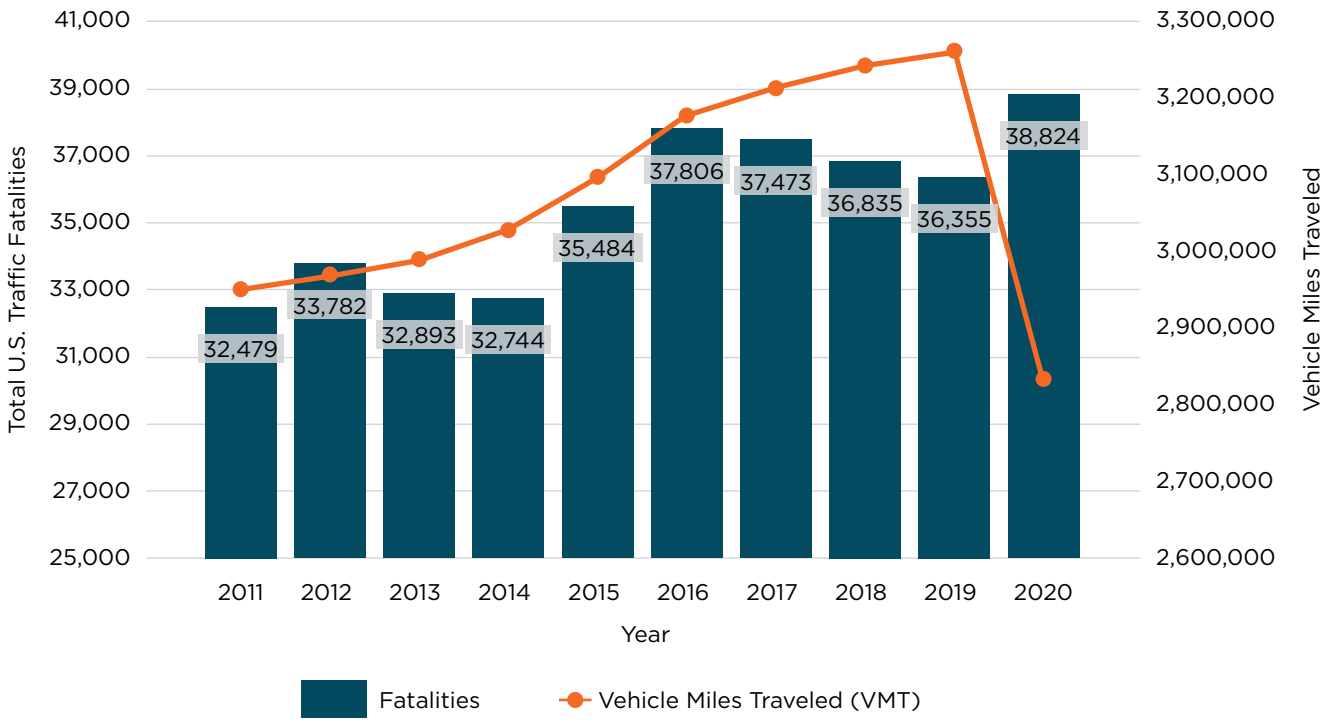
Encourages sustainable transportation choices, such as walking, cycling, and public transit, reducing dependence on single-occupancy vehicles

STATEWIDE AND NATIONAL SAFETY TRENDS

This section of the ACOG RSAP is intended to shed light on safety trends happening around the United States, Oklahoma, and the Central Oklahoma region. Analyzing crash trends is an important step in the development of the ACOG RSAP because it assists in recognizing safety problems. Trends also confirm the need for Safety Action Plans and identification of corridors and areas in the region to implement targeted countermeasures that have proven safety benefits for the betterment of communities.

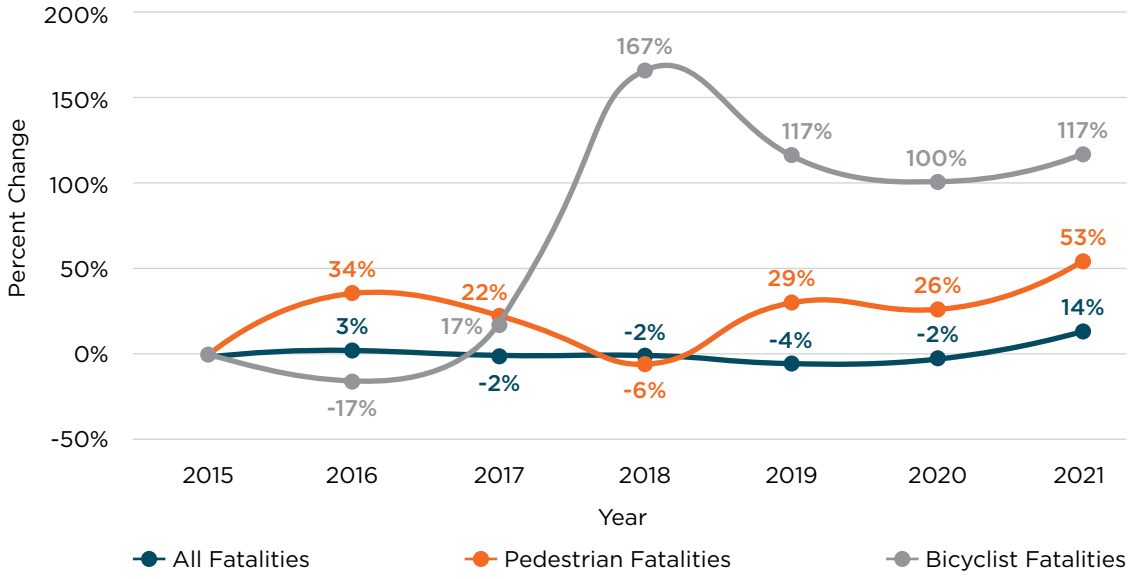
Figure 6 below shows the total number of traffic fatalities in the United States from 2011-2020. It is important to note the drastic decrease in vehicle miles traveled (VMT) in 2020, yet traffic fatalities were highest during this 10-year stretch. This decrease is VMT is largely due to the COVID-19 pandemic.

Figure 6. Total U.S. Traffic Fatalities and Vehicle Miles Traveled (VMT) from 2011-2020



Another emphasis area of trends studied for the ACOG RSAP is bicyclist and pedestrian-related crashes and fatalities. Active transportation is an important mode for many residents in Oklahoma. Figure 7 graphs bicycle and pedestrian fatalities by percent change since 2015 in Oklahoma. Since 2015 bicyclist fatalities have seen a dramatic increase, while pedestrian fatalities have been rising more slowly since 2018.

Figure 7. Oklahoma Bicycle and Pedestrian Fatalities: Percent Change Since 2015



The final trend that is important to analyze is the societal cost of crashes. The societal cost of crashes involves putting a monetary value on the impact of crashes. Crash costs are a blend of economic costs and the monetized value of intangible impacts. The monetized values used in this analysis derives from the Highway Safety Benefit–Cost Analysis Guide from the Federal Highway Administration (FHWA) Safety Program.

Crash data from 2017-2021 was obtained from the Oklahoma Highway Safety Office (OHSO) for the ACOG RSAP and used to calculate the total societal cost of crashes during those five years. The total cost of crashes for Central Oklahoma from 2017-2021 is over $15 billion. This calculation can be seen in Table 1 below.

Table 1. Total Societal Cost of Crashes in ACOG TMA (2017-2021)

CRASH SEVERITY	SOCIETAL COST PER CRASH	ACOG CRASHES	SOCIETAL COST OF CRASHES
No Apparent Injury	$12,108	72,543	$878,350,644
Possible Injury	$129,001	24,252	$3,128,532,252
Minor Injury	$204,143	10,579	$2,159,628,797
Severe Injury	$674,353	2,321	$1,565,173,313
Fatal	$11,637,947	629	$7,320,268,663
Total Societal Cost of Crashes in ACOG Region			**$15,051,953,669**


BRAVO

CHAPTER 2.

SAFETY EFFORTS TO DATE

This chapter of the ACOG RSAP details the safety efforts that have been made in Central Oklahoma. The efforts described in this chapter involve a variety of organizations striving for a safer road network including ACOG, Oklahoma Department of Transportation (ODOT), Oklahoma Highway Safety Office (OHSO), and all the cities and counties in the ACOG region.

Regional Safety Summits
Watch For Me OK Education Campaign
Oklahoma's Work Zone Safe Program
Oklahoma Child Passenger Safety Program

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CHAPTER 2. SAFETY EFFORTS TO DATE

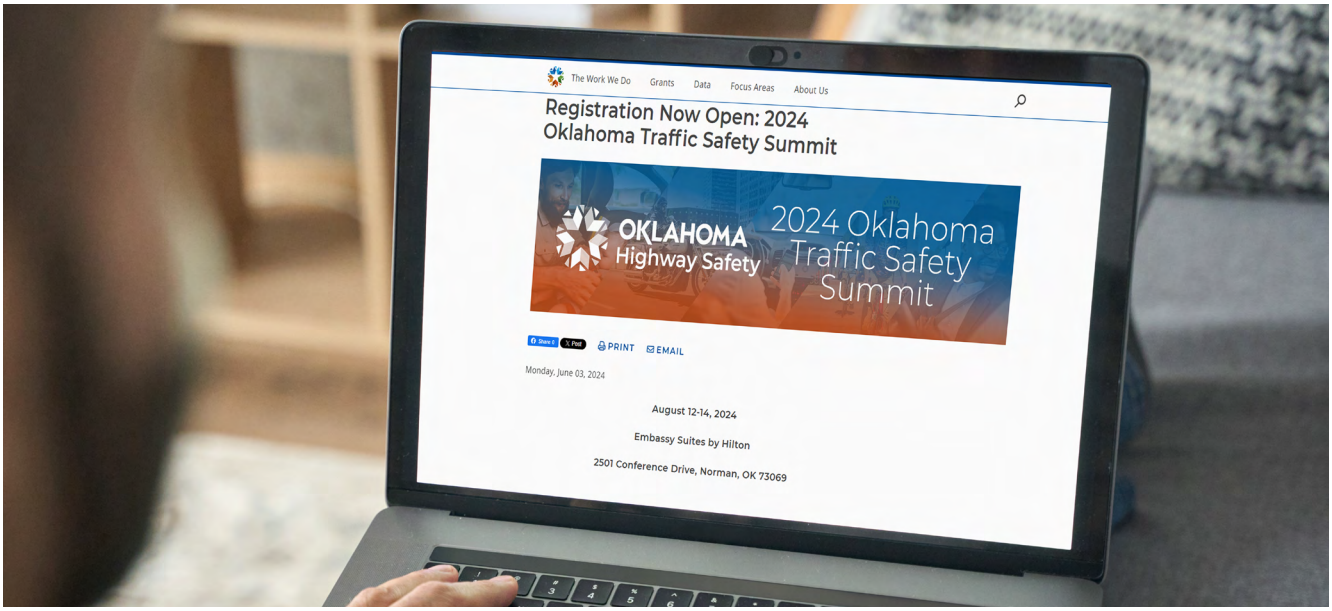
REGIONAL SAFETY SUMMITS

During the development of the RSAP, two safety summits were conducted by ODOT and OHSO, respectively. ODOT hosted the Safe Oklahoma Summit (Figure 8) on April 17 in Midwest City, Oklahoma, and OHSO hosted the 2024 Oklahoma Traffic Safety Summit (Figure 9) on August 12-14 in Norman, Oklahoma. Each Summit aimed to find solutions for traffic safety deficiencies in Oklahoma.

The summits addressed various traffic safety topics, providing valuable educational and networking opportunities for stakeholders from Oklahoma committed to ensuring road safety. These collaborative events brought together multiple focus areas, serving as a comprehensive platform for promoting roadway safety.

Figure 8. Safe Oklahoma Summit Logo

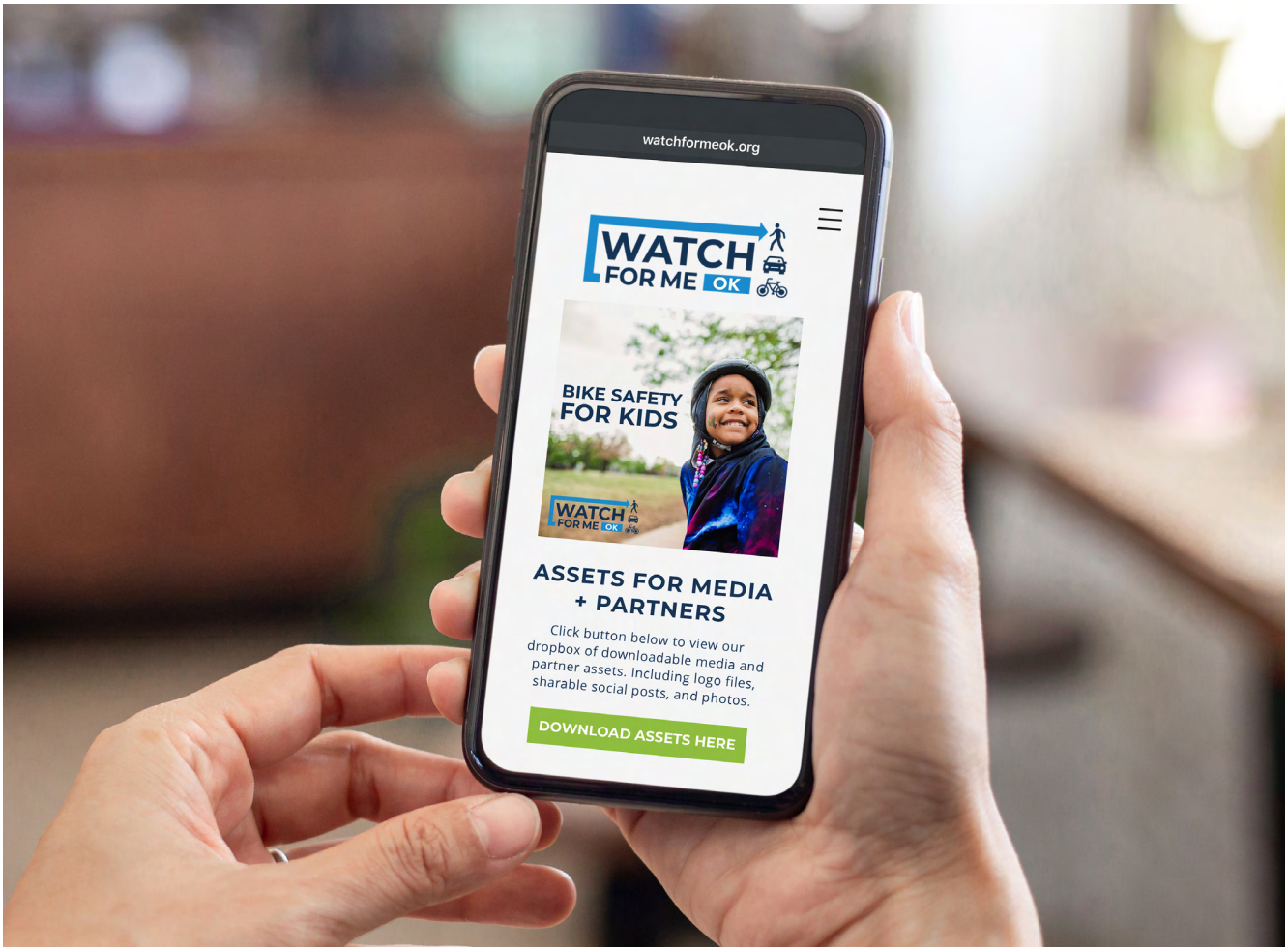
Figure 9. 2024 Oklahoma Traffic Safety Summit Banner



WATCH FOR ME OK EDUCATION CAMPAIGN

With Oklahoma ranking as the 15th most dangerous state for pedestrians, Watch For Me OK, an awareness campaign from ACOG and OHSO, aims to raise awareness of all road users and educate the public on how to stay safe. This campaign uses education and encouragement to enhance safety for all users whether they are walking, rolling, biking, or driving. The program provides educational and promotional materials to area leaders such as government officials, city planners, pedestrian and bicyclist advocates, and many more. Materials created for the campaign include radio public service announcements, social media posts (Figure 10), and general informational flyers. Not only does Watch For Me OK remind drivers and vulnerable road users of existing Oklahoma laws, the campaign also gives several tips to both drivers and vulnerable road users on how to travel more safely along the transportation network. Ultimately, this campaign's goal is to reduce the total number of pedestrians and bicycle crashes and fatalities in Central Oklahoma by reminding all roadway users of the shared responsibility of watching out for each other and follow roadway rules.

Figure 10. Watch For Me OK Ad



To learn more about Watch For Me OK, scan or click the QR code.

OKLAHOMA'S WORK ZONE SAFE PROGRAM

Work Zone Safe is a required course for new teen drivers to educate them on work zone safety and basic safe driving habits. The course teaches young drivers how to navigate common work zone scenarios and to recognize different traffic control devices found in work zones. In addition to providing educational information, this course also reminds new drivers that there are people behind the flags, cones, and flashing lights through real-life stories and testimonies (Figure 11). Although this course is required to receive an Oklahoma intermediate driver's license, there are rewards associated with completing the course; every teen is entered to win a monthly $500 educational scholarship, and an insurance discount is available with Rondon Insurance. This course aims to prevent injuries and fatalities caused by work zone related crashes by instilling safe driving habits in drivers from a young age. Although this program was created by a private individual, the program is supported by the following state agencies:

- Oklahoma Highway Patrol
- Oklahoma Department of Transportation
- Oklahoma Highway Safety Office
- Oklahoma Turnpike Authority
- Service Oklahoma

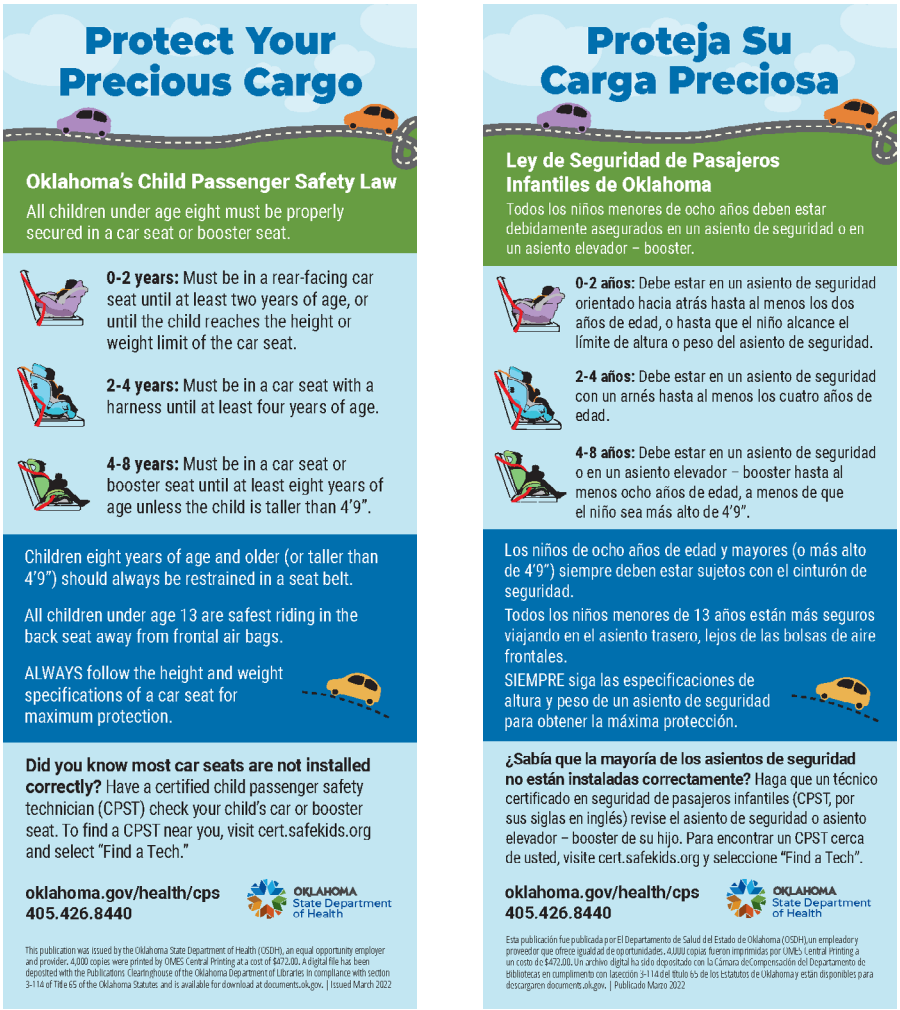
Figure 11. Work Zone Safe Class

To learn more about Work Zone Safe, scan or click the QR code.

OKLAHOMA CHILD PASSENGER SAFETY PROGRAM

Although proper child restraint use greatly decreases the risk of death in young children, incorrect installation and use of child safety seats are common. Furthermore, access to proper child restraint systems can be financially inaccessible to parents. To ensure children are being properly protected, OHSO and Safe Kids Oklahoma have partnered to develop and provide several resources. A car/booster seat program was implemented across the state through the county health departments. Through this program families can schedule an appointment with certified child passenger safety technicians at their county health department where the technician can ensure any car seat or booster seat is properly installed free of charge. Additionally, families who are eligible for Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) benefits or who receive other forms of government assistance are eligible to receive a free car or booster seat if available. There are also several print resources available in various languages (Figure 12) to educate all people about the importance of proper child restraint systems and existing Oklahoma laws.

Figure 12. Child Passenger Safety Pamphlet in English and Spanish



To learn more about Oklahoma's Child Passenger Safety Program, scan or click the QR code.


RIVERWIND CASINO
RIVERWIND CASINO

CHAPTER 3.

ENGAGING THE COMMUNITY

For the ACOG RSAP to take a holistic approach in enhancing traffic safety, public engagement is an integral part of the plan's development. Chapter 3 describes the public engagement efforts and resulting feedback incorporated into the development of the RSAP.

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CHAPTER 3. ENGAGING THE COMMUNITY

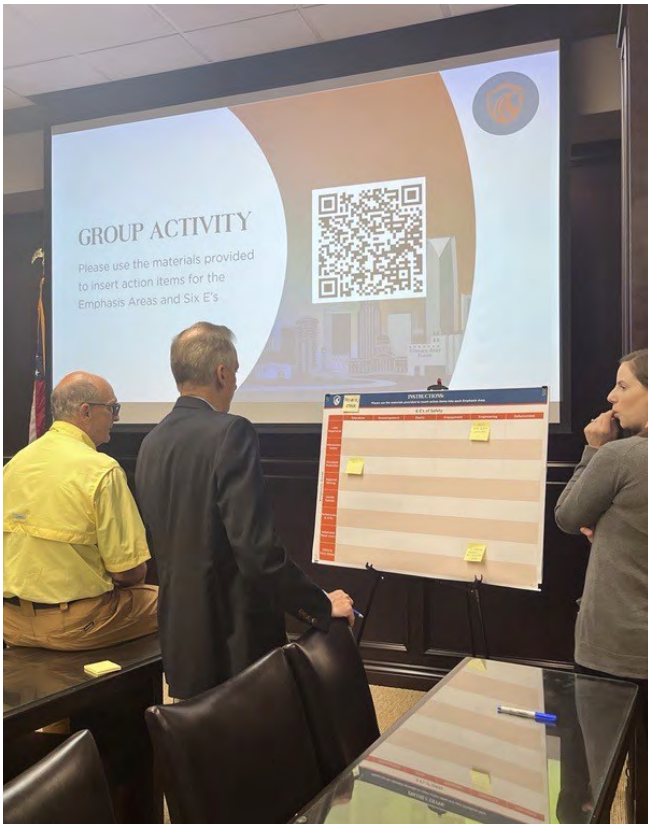
RSAP PLANNING TEAM

The RSAP Planning Team is comprised of a variety of stakeholders throughout the Central Oklahoma Region designated with being champions of safety over the course of the development of the Regional Safety Action Plan. The Planning Team is responsible for ensuring that the process and outcomes of the project align with the needs of the communities that fall within the ACOG boundary. This stakeholder committee was established to help guide the planning process, build consensus and ownership of the plan, and provide critical feedback at major milestones. The Planning Team was tasked with attending six progress meetings, providing feedback on countermeasures and policy recommendations, assisting in public outreach, and aiding in implementation efforts. **Figure 13** shows the RSAP Planning Team participating in an activity in which they suggested policy recommendations based on the safety emphasis areas.

RSAP Planning Team Meetings

Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5	Meeting 6
Kick-Off and Goal Setting January 8th, 2024	Crash Analysis and High Injury Network May 7th, 2024	Policy Review/ Action Plan July 2nd, 2024	Draft RSAP Review August 28th, 2024	Final RSAP Review October 15th, 2024	Plan Adoption, Annual Reporting, Next Steps TBD

Figure 13. RSAP Planning Team Activities



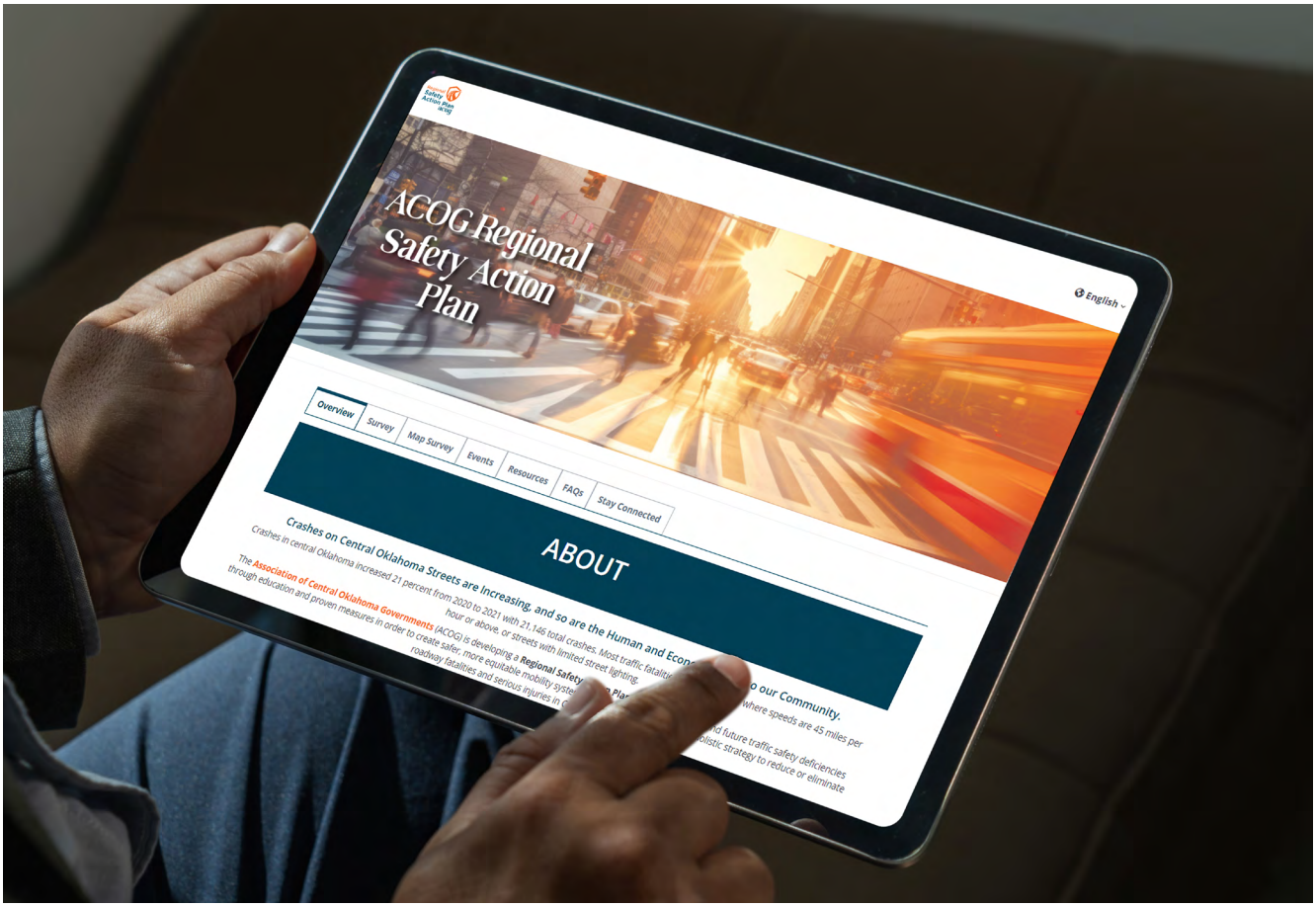
PUBLIC ENGAGEMENT

Public Engagement for the RSAP involved online engagement, pop-up events, and the distribution of promotional materials and advertisements. To ensure that the RSAP effectively addresses the safety concerns of all road users in Central Oklahoma, residents, community leaders, and other key stakeholders were actively involved throughout the project. Additionally, to ensure a more equitable public experience, all online engagement was provided in English and Spanish.

PROJECT WEBSITE

Social Pinpoint was utilized for community involvement throughout the Plan's development. This site was used to communicate what the Plan is and why it is important, while serving as a data collection agent (**Figure 14**). An interactive map and online survey were used to gather opinions from the public on traffic safety concerns in the region. This was critical in providing insight into the community. Additionally, the site included information about upcoming public events, frequently asked questions, links to helpful information, key dates, and contact information. This effort received helpful feedback from impacted members of the Central Oklahoma Region with 2,192 site visits and 564 total contributions.

Figure 14. RSAP Project Website

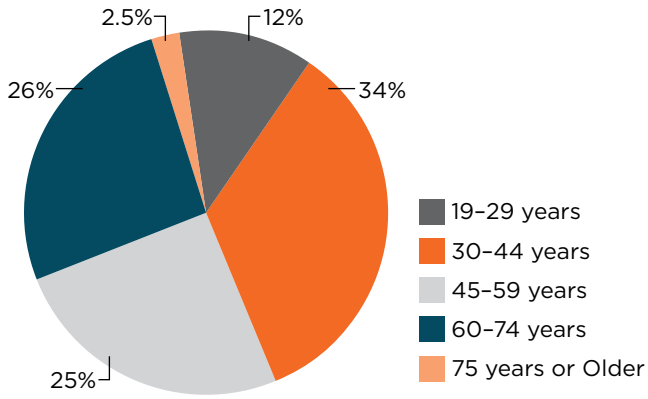


To view the project website, scan or click the QR code.

SURVEY

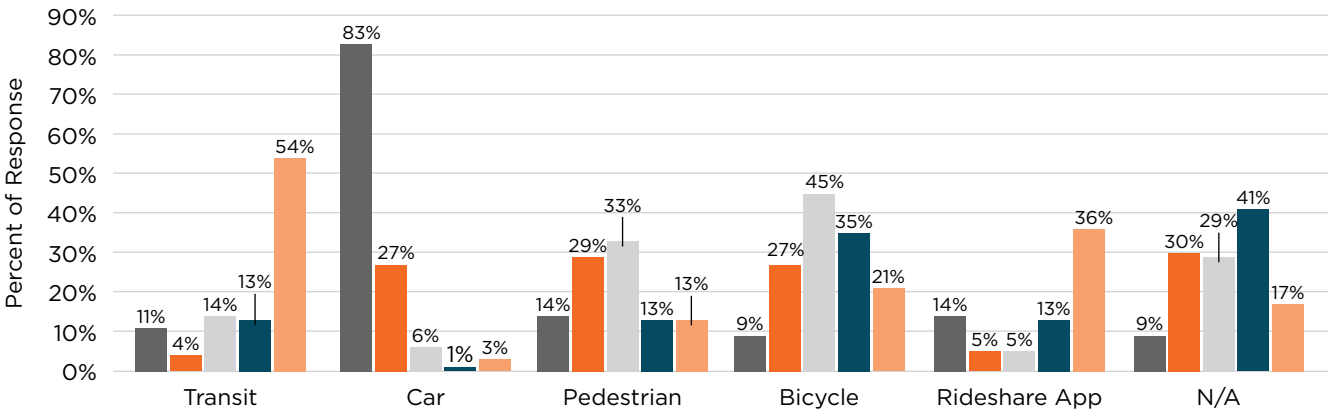
Data was collected from the public through an online survey. This Safety Survey was available to the public from February 26 – July 5, 2024 and received 278 contributions. The survey was compromised of 31 questions used to collect information on demographics, transportation mode choice, and roadway safety concerns. Survey respondents primarily resided in Oklahoma City (36%), Norman (21%), and Edmond (11%). The top age contributors were the 30-34 range with 34% of respondents in that age group (Figure 15). The vast majority of survey respondents' primary mode of transportation is by car (71%).

Figure 15. Age Distribution of Respondents



Although most of the respondents' primary mode of transportation is a car, approximately 78% of respondents stated they would walk or bike more if they felt it were safer (Figure 16). This indicates that infrastructure should be further improved to foster a safer walking and bicycling environment in Central Oklahoma. Support for these endeavors is highly supported as 87% of respondents support investing in making walking safer while 80% support investing in making bicycling safer.

Figure 16. Sentiments by Transportation Mode

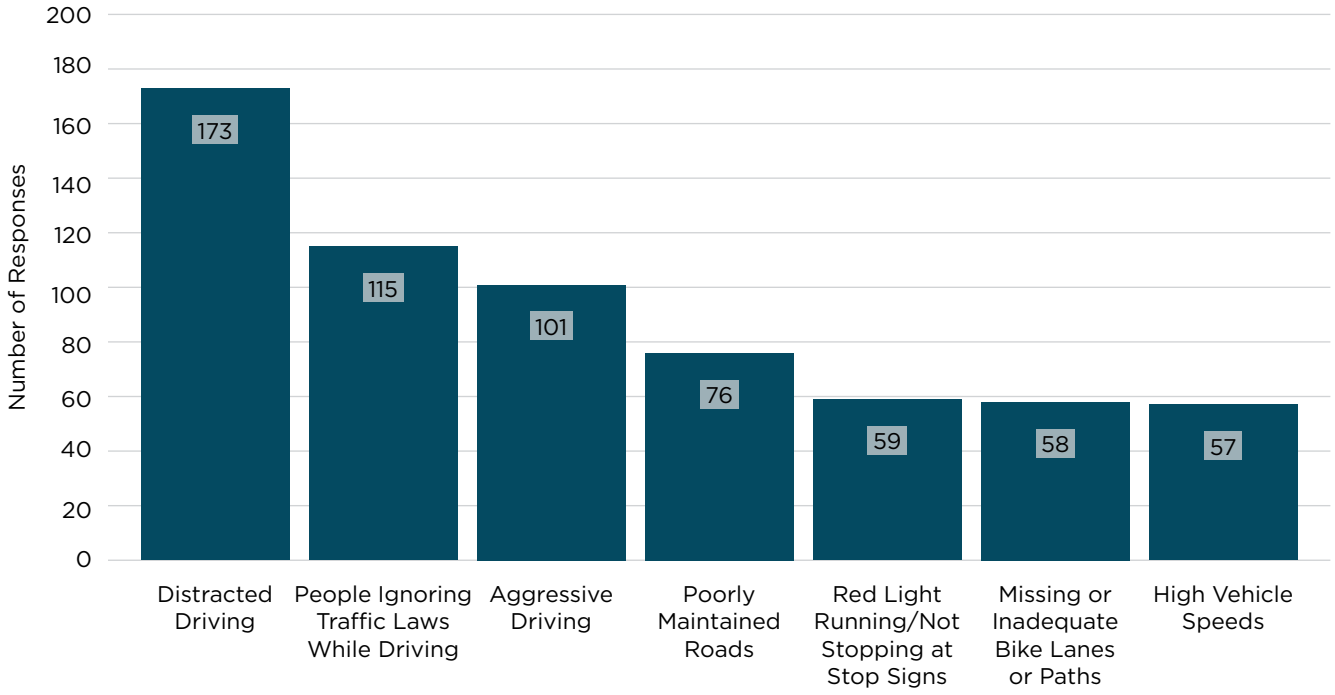


Modes do not equal 100%

I use this mode often and feel safe doing so
I use this mode often, but do not feel safe doing so
I would use this mode more often if it were safer
I do not use this mode because I do not always feel safe
I do not use this mode but not for safety reasons

For Central Oklahoma, there were three safety concerns that were the most common within respondents' answers: distracted driving, motorists ignoring traffic law, and aggressive driving as shown in Figure 17. To help mitigate the safety deficiencies these law(s) cause, enhanced enforcement and/or an increase in educational programs could be created to encourage drivers to use safer driving habits. Approximately 76% of respondents support funding these types of education programs and enhanced enforcement efforts.

Figure 17. Top Safety Concerns



A clear demand for a more pedestrian-friendly, less car-centric region with diverse and efficient transportation options is evident from the survey responses. Respondents expressed a desire for significant investments in public transit and infrastructure to enhance safety and accessibility for all.

78% of respondents "support the creation of protected and/or dedicated facilities for multiple modes of travel (pedestrians, bicycles, transit)."

INTERACTIVE MAP SURVEY

Using an interactive online map, respondents provided location-specific feedback on safety concerns in Central Oklahoma. Contributors were able to either place a new point and comment or like a comment from another contributor. This allowed for feedback to be ranked by top concern. The interactive map had 286 contributions with 60% of respondents living in Oklahoma City and 37% in Edmond. A map of all the comments received on the Interactive Map Survey can be seen in Exhibit 1.

The top safety concerns on the interactive map were pedestrian safety, bicycle safety, and other traffic safety (other does not include red light running, intersection safety, speeding or signage). This is reflective of the online survey, in which the top traffic safety concerns are pedestrian safety and bicycle safety as well as additional and improved infrastructure to accommodate each mode (Figure 18).

The top concerns by location are:

- **Edmond** (34 comments)
  - Pedestrian Safety
  - Other Traffic Safety
- **Yukon/Mustang** (9 comments)
  - Red Light Running
  - Other Traffic Safety
- **Central OKC** (155 comments)
  - Pedestrian Safety
  - Bicycle Safety
  - Red Light Running
- **Norman** (30 comments)
  - Pedestrian Safety
  - Bicycle Safety

Figure 18. Distribution of Upvotes

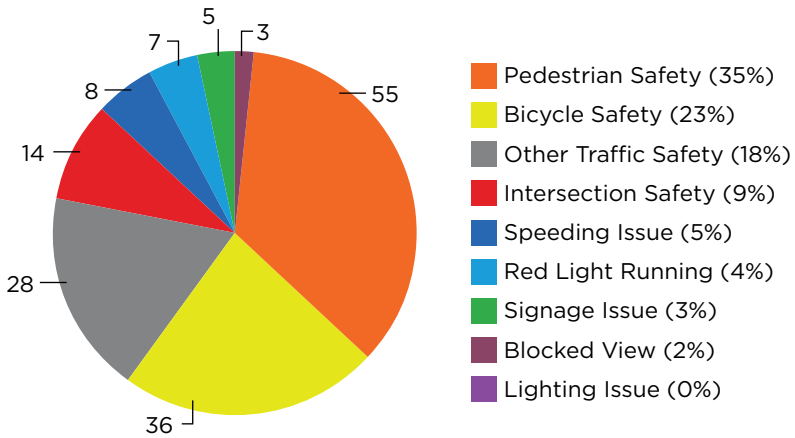
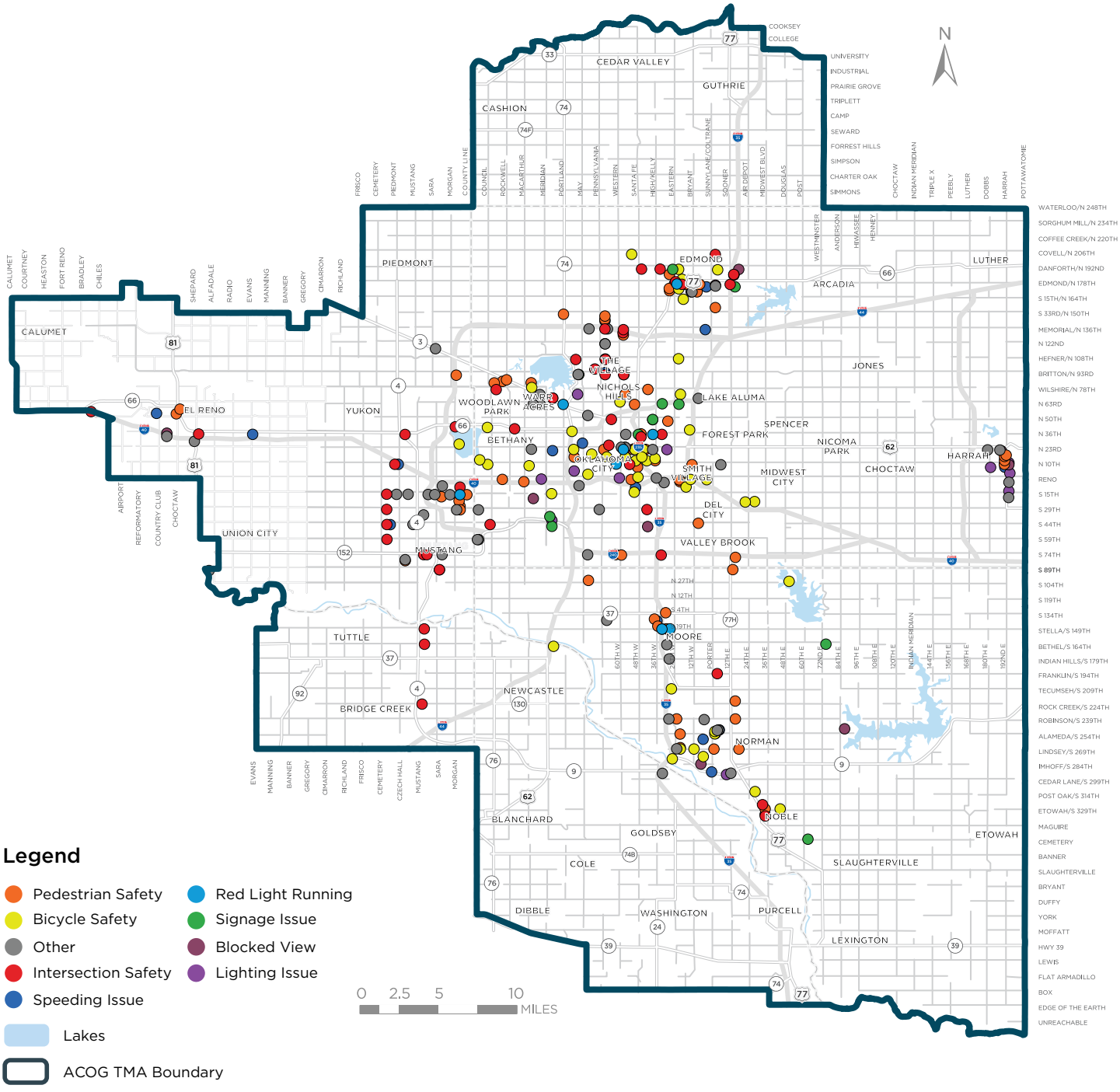


Exhibit 1. Interactive Map Survey Comments



PUBLIC EVENTS

Another method used to engage the public in the planning process was through an in-person Regional Safety Summit, public workshops, and pop-up events. These events gave residents the opportunity to interact with the project team, understand the importance of road safety in Central Oklahoma, and learn about what residents can do to improve safety in their own communities. Ultimately, these events were held in public settings intended to spread awareness about the ACOG Regional Safety Action Plan and Vision Zero.

Regional Safety Summit

On February 28, 2024, ACOG and the City of Oklahoma City held a collaborative Regional Safety Summit to raise awareness of road safety in Central Oklahoma and the efforts for safety that were to be developed over the course of the year. During the summit, participants and stakeholders came together to learn about the state of roadway safety within their community and explored new solutions through policy, education, and countermeasures (**Figure 20**).

This event was a great way to spread word of the Action Plans being developed by ACOG and OKC. To gather input, Regional Safety Summit attendees were asked to identify specific areas where they recognized safety issues throughout the region. This feedback was used in the planning process in the ACOG RSAP to ensure the needs of the public were heard and being addressed in this plan. The summit concluded with a panel of trusted leaders in the ACOG TMA to talk about safety and how they relate to the Six Es of Safety.

Figure 19. ACOG and Oklahoma City Regional Safety Summit Website Post

Figure 20. ACOG and Oklahoma City Regional Safety Summit Photos

Norman Farm Market

The ACOG RSAP team attended the Norman Farm Market on May 11, 2024, to share the survey and information about the project and gather input from residents on safety in the ACOG region. This event was a great opportunity for residents in the ACOG TMA to give feedback on the state of safety throughout Central Oklahoma. Many attendees at the Farm Market stopped by the RSAP booth to learn more about safety and provide their insights on the things that they would like to see fixed.

Figure 21. Farm Market Logo

Bethany Library Public Workshop

On July 2, 2024, ACOG hosted a public workshop for residents to learn more about the Regional Safety Action Plan and provide input on the future of transportation safety in Central Oklahoma. Attendees had opportunities to talk to the project team and discuss future recommendations for transportation safety improvements.

This workshop included activities such as boards for attendees to provide input on safety countermeasures, drunk goggles, kids station, and opportunities to write down policy recommendations for the ACOG RSAP (Figure 22).

Figure 22. Bethany Library Public Workshop

Rose State College Public Workshop

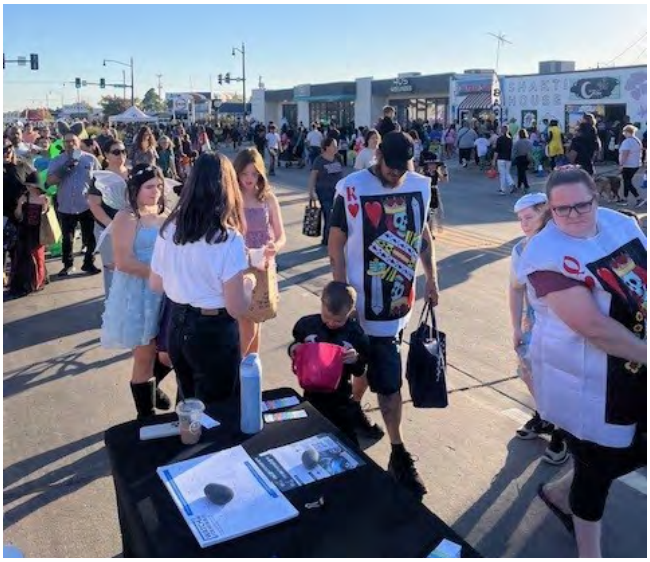
ACOG hosted a Public Workshop for the Regional Safety Action Plan at Rose State College on October 23, 2024. This workshop was intended to highlighted the draft RSAP and receive feedback from the community on their thoughts on the plan. Many student were engaged and interested in the progress of the plan and the recommendations in the draft report. Additionally, staff from local municipalities and other planning professionals in Central Oklahoma came to provide meaningful feedback to the project team about the plan. ACOG is continuing to inform the public of the importance of safety through policy recommendations and countermeasures that have derived from the analysis conducted.

Figure 23. Rose State College Public Workshop

Haunting on Howard Street

On October 26, 2024, ACOG hosted a booth at the Haunting on Howard Street Trunk or Treat event held in Moore, Oklahoma. This event had a great turnout and the project team had the opportunity to talk to Central Oklahoma residents of all ages and abilities about safety in the region. Over a thousand safety promotional materials such as information pages, stickers, reflective lights, coloring pages, and more. The project team encouraged participants to visit the project website to view the plan and provide feedback.

Figure 24. Haunting on Howard Street



VIRTUAL WORK SESSIONS

To ensure cohesiveness between ACOG, the Planning Team, and communities within the ACOG boundary, nine virtual work sessions were conducted.

COUNTERMEASURE WORK SESSIONS

Seven out of the nine meetings focused on safety countermeasures and involved coordination with the individual cities where the study corridors are located (See Creating a Safer System). These meetings were derived with the intent of ensuring the planning process and countermeasure analysis as a part of the ACOG RSAP aligned with the respective cities' priorities and needs. The ACOG project team received valuable insight on topics such as their take on safety in the region, current local and planned projects, and countermeasures feedback.

The stakeholders directly involved in the countermeasure virtual work sessions include:

- City of Del City
- Town of Goldsby
- City of Moore
- City of Newcastle
- City of Norman
- City of Tuttle
- City of Warr Acres
- City of Yukon
- Oklahoma Department of Transportation (ODOT)
- Chickasaw Nation Division of Commerce

POLICY WORK SESSIONS

The Policy Work Sessions for the ACOG RSAP involved presenting the policy recommendations developed during the planning process to the communities and municipalities directly affected by the recommendations and listening to their input. The input received during these work sessions ultimately influenced additions and changes to the policy recommendation found in **Chapter 5** (Promoting a Culture of Safety).

The work sessions were broken down by rural and urban/suburban communities to ensure all voices from cities throughout the ACOG TMA were heard. ACOG recognizes that not all member cities have the same concerns regarding safety and the policies impacting safety. Therefore, the Policy Work Sessions were established to ensure that the proposed policies reflect the needs of both urban and rural communities in Central Oklahoma.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CHAPTER 4.

SAFETY NEEDS OF CENTRAL OKLAHOMA

Improving safety in Central Oklahoma is a high priority for ACOG, the RSAP Planning Team, and the public. This chapter of the RSAP provides a detailed analysis of the region's crash history, Safety Emphasis Areas, equity, and the High Injury Network (HIN). This chapter is intended to serve as the foundation for the reasoning behind the need for safety improvements in Central Oklahoma as well as provide a base understanding of the types of safety issues that are occurring in the region.

Crash Analysis
Oklahoma Safety Emphasis Areas
Equity Considerations
High Injury Network

Regional Safety Action Plan
acog

CHAPTER 4. SAFETY NEEDS OF CENTRAL OKLAHOMA

CRASH ANALYSIS

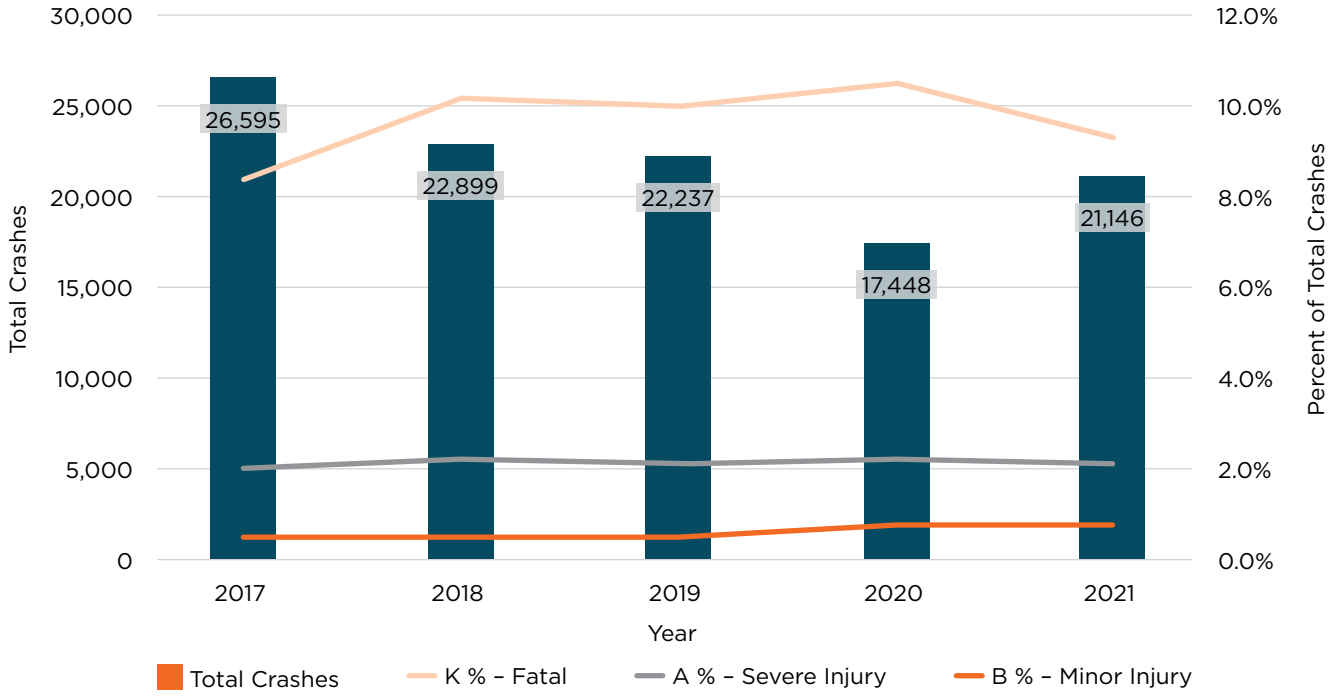
This section highlights the crash history analysis conducted for the ACOG region. Based on available data, the RSAP used crash data from the Oklahoma Highway Safety Office for the years 2017-2021. This crash data was analyzed throughout the planning process to guide decision making and understand the areas in Central Oklahoma where safety should be prioritized.

Over the course of five years, there were a total of 110,325 crashes in Central Oklahoma, with 629 of them resulting in a fatality. The year 2017 had the highest number of crashes, with 26,595 reported. In 2021, the ACOG TMA saw 142 fatal crashes, the highest number during this five-year period. It is important to note that in 2020, total crashes decreased, yet the number of fatalities increased. Table 2 shows the crashes that occurred from 2017-2021 within the ACOG boundary by crash severity. In this five-year span, the severities largely stayed the same, except for a slight increase in fatalities between 2020 to 2021.

Table 2. ACOG Crash Trends (2017-2021)

YEAR	TOTAL CRASHES	K – FATAL		A – SEVERE INJURY		B – MINOR INJURY	
2017	26,595	129	0.5%	531	2.0%	2,223	8.4%
2018	22,899	114	0.5%	508	2.2%	2,325	10.2%
2019	22,237	115	0.5%	463	2.1%	2,242	10.1%
2020	17,448	129	0.7%	384	2.2%	1,824	10.5%
2021	21,146	142	0.7%	435	2.1%	1,965	9.3%

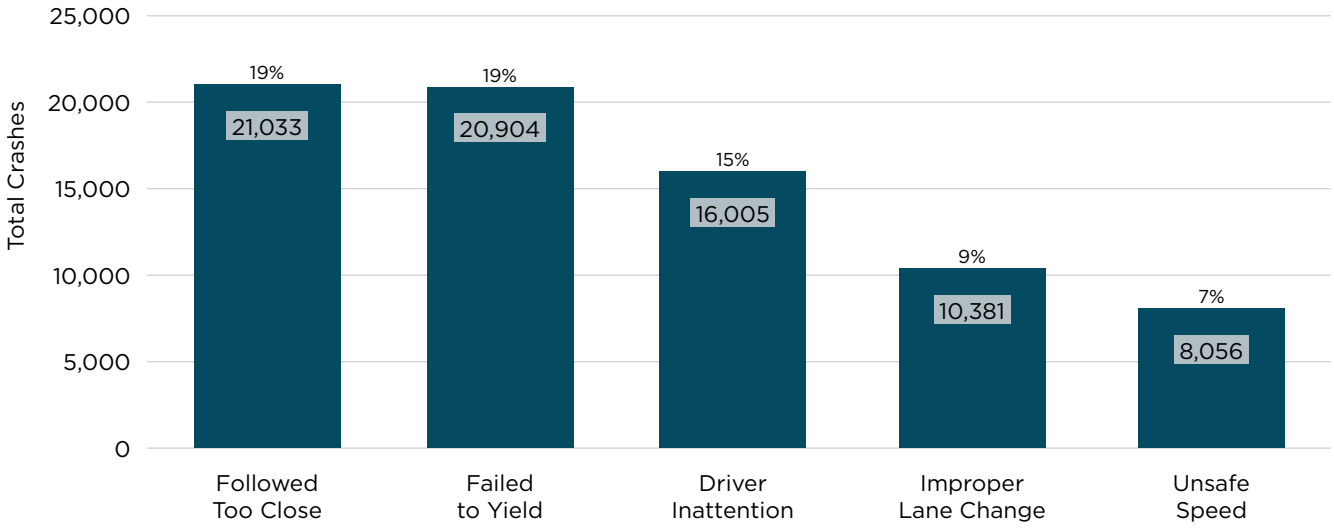
Figure 25. ACOG Crash Trends (2017-2021)



TOP CONTRIBUTING FACTORS

For the years 2017-2021, the top reported contributing factors for crashes as reported by police in Central Oklahoma are displayed in **Figure 26** below. 'Followed Too Close' and 'Failed to Yield' are the top contributing factor for all crashes in the ACOG boundary covering approximately 38% of collisions. Other major contributing factors to crashes in the region include 'Driver Inattention', 'Improper Lane Change', and 'Unsafe Speed'. It is also important to note that 'Driver Inattention' related crashes often require an admission of guilt which leads to skewed data.

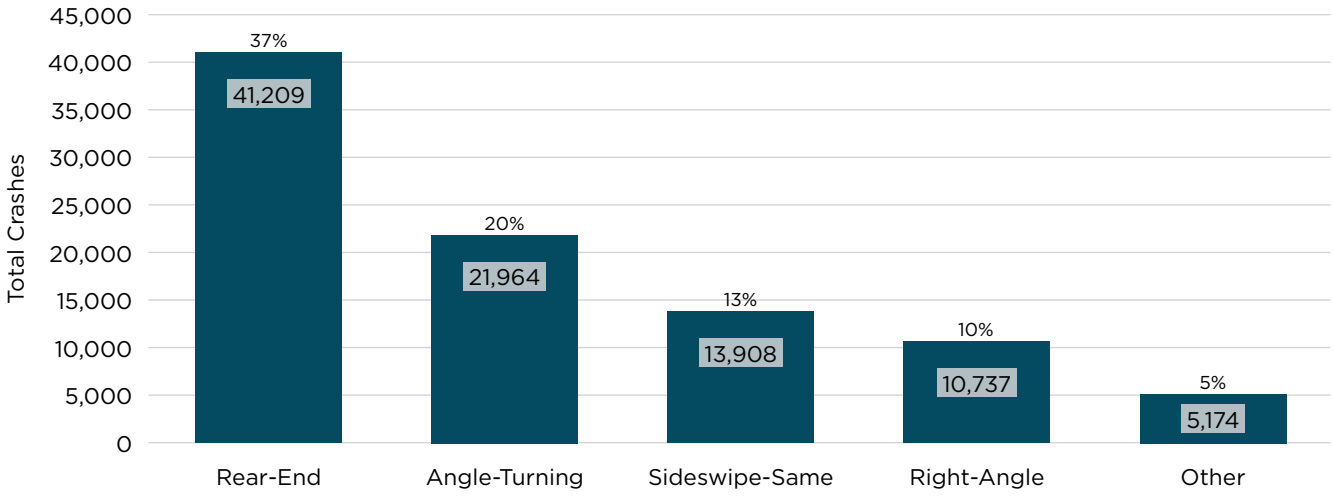
Figure 26. Top Contributing Factors



TOP MANNERS OF COLLISION

Manner of collision describes how the crash occurred. The top four manners of collision in the ACOG TMA from 2017-2021 were 'Rear-End' (37%), 'Angle-Turning' (20%), 'Sideswipe-Same' (13%), and 'Right-Angle' (10) as shown in **Figure 27**. 'Rear-End' crashes frequently occur when following too close to the vehicle in front or sudden stops, typically at intersections. An 'Angle-Turning' collision refers to vehicles hitting at or near right angles, with the front of one vehicle striking the side of the other vehicle. A 'Sideswipe-Same' crash occurs when two vehicles collide side-to-side. Finally, 'Right-Angle' crashes occur at intersections when vehicles arrive on perpendicular roads and collide.

Figure 27. Top Manners of Collision



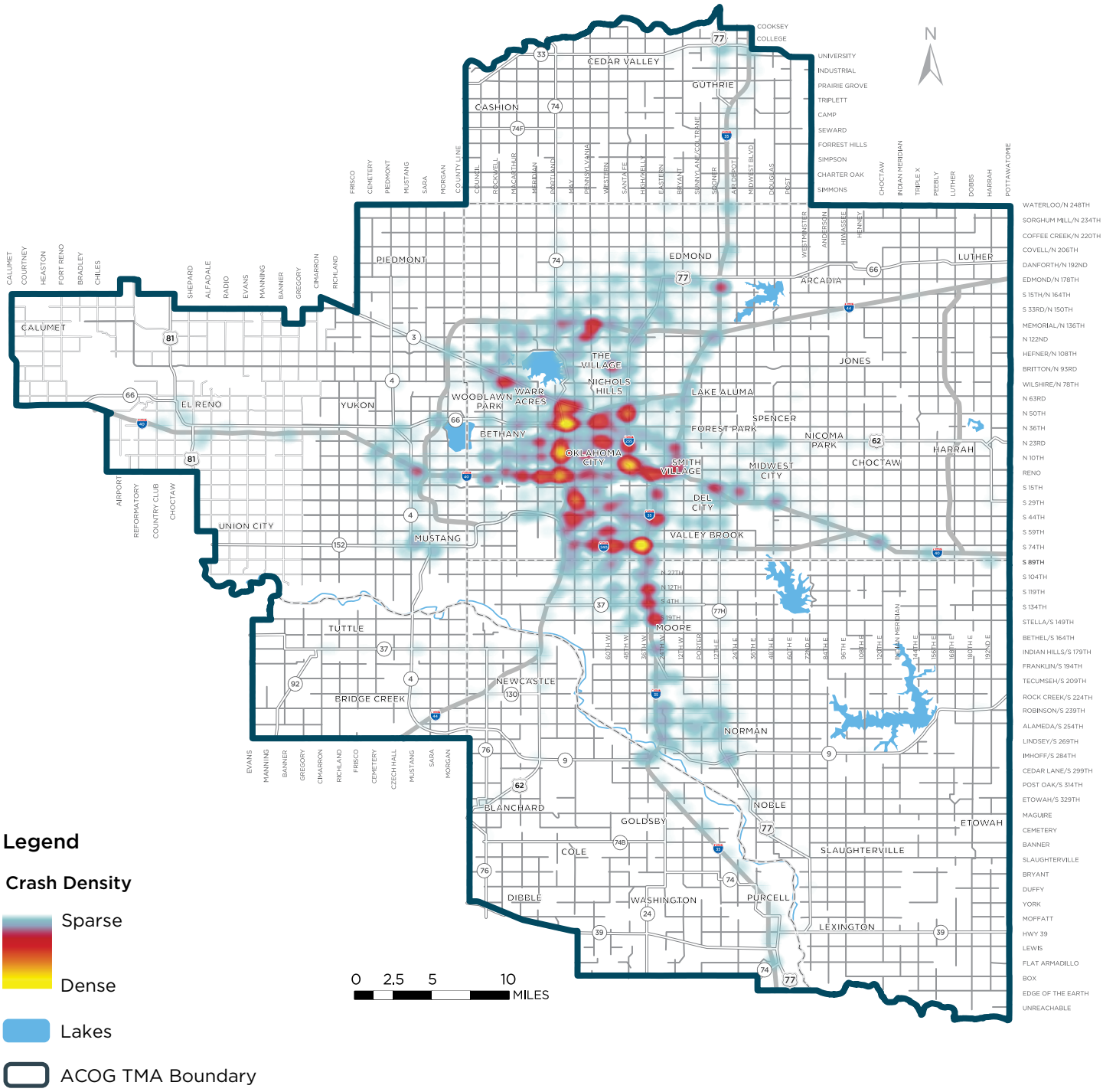
CRASH HEAT MAP

Exhibit 2 displays a crash heat map that highlights the density of crashes within the ACOG boundary from 2017-2021. The crash heat map visualizes the pure density of crash counts at various locations in the region and does not consider specific roadway or crash characteristics such as functional classification, traffic volumes, context, and crash severity. Each of these factors, though, contribute to the frequency of crashes.

The highest densities of crashes are at intersections where the traffic volumes are the highest. The crash heat map displays a high density of crashes in the more urban areas in the region. Cities in the ACOG TMA with the highest overall crash density include:

- Oklahoma City
- Moore
- Norman
- Edmond

Exhibit 2. Crash Heat Map (2017-2021)



Legend

Crash Density

- Sparse
- Dense
- Lakes
- ACOG TMA Boundary

BICYCLE AND PEDESTRIAN CRASHES

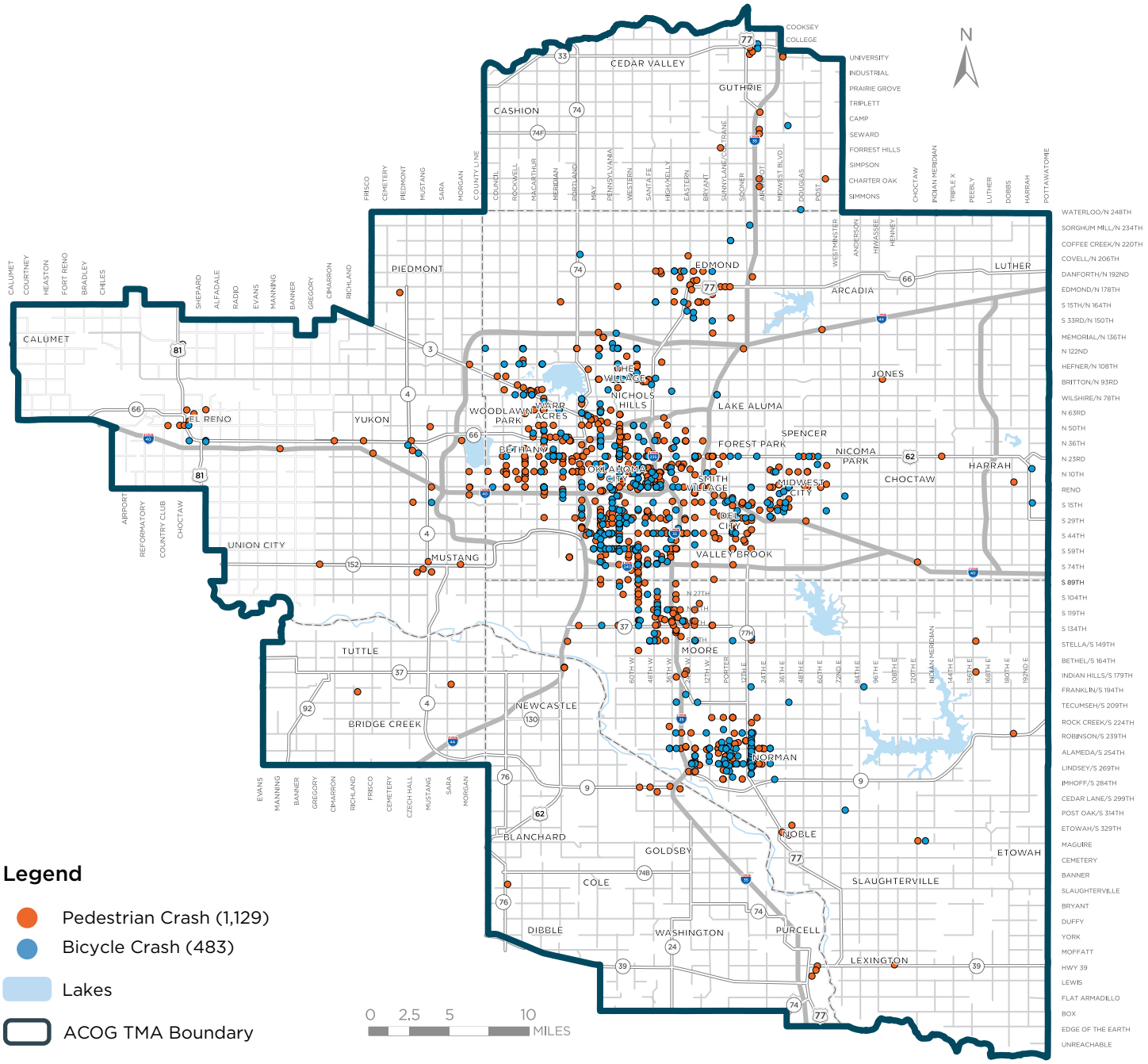
Bicyclists and pedestrians are the most vulnerable road users to fatal or serious injuries in the event of a crash. From 2017-2021, Central Oklahoma had 1,129 pedestrian crashes and 483 bicycle crashes. Of the 1,129 pedestrian-related crashes, 710 resulted in a fatal, severe, or minor injury (KAB) crash, or approximately 62.9%. Of the 483 bicycle-related crashes, 245 resulted in a fatal, severe, or minor injury (KAB) crash, or approximately 50.7%. Bicycle and pedestrian related crashes are 4-5 times more likely to result in a KAB. Protecting these vulnerable road users is an important safety need for the Central Oklahoma region. Urban areas throughout the region such as Oklahoma City, Edmond, and Norman experience a higher number of pedestrian and bicycle-related crashes as seen in Exhibit 3.

Table 3. Bicycle and Pedestrian Crash Data (2017-2021)

CRASH TYPE	TOTAL CRASHES	HIGH INJURY CRASHES (KABS)	PERCENT KABS
Pedestrian Related Crashes	1,129	710	62.9%
Bicycle Related Crashes	483	245	50.7%
All Crashes	110,325	13,529	12.3%

K – Fatal A – Severe Injury B – Minor Injury

Exhibit 3. Bicycle and Pedestrian Crashes (2017-2021)



Legend

- Pedestrian Crash (1,129)
- Bicycle Crash (483)
- Lakes
- ACOG TMA Boundary

UNSAFE SPEED CRASHES

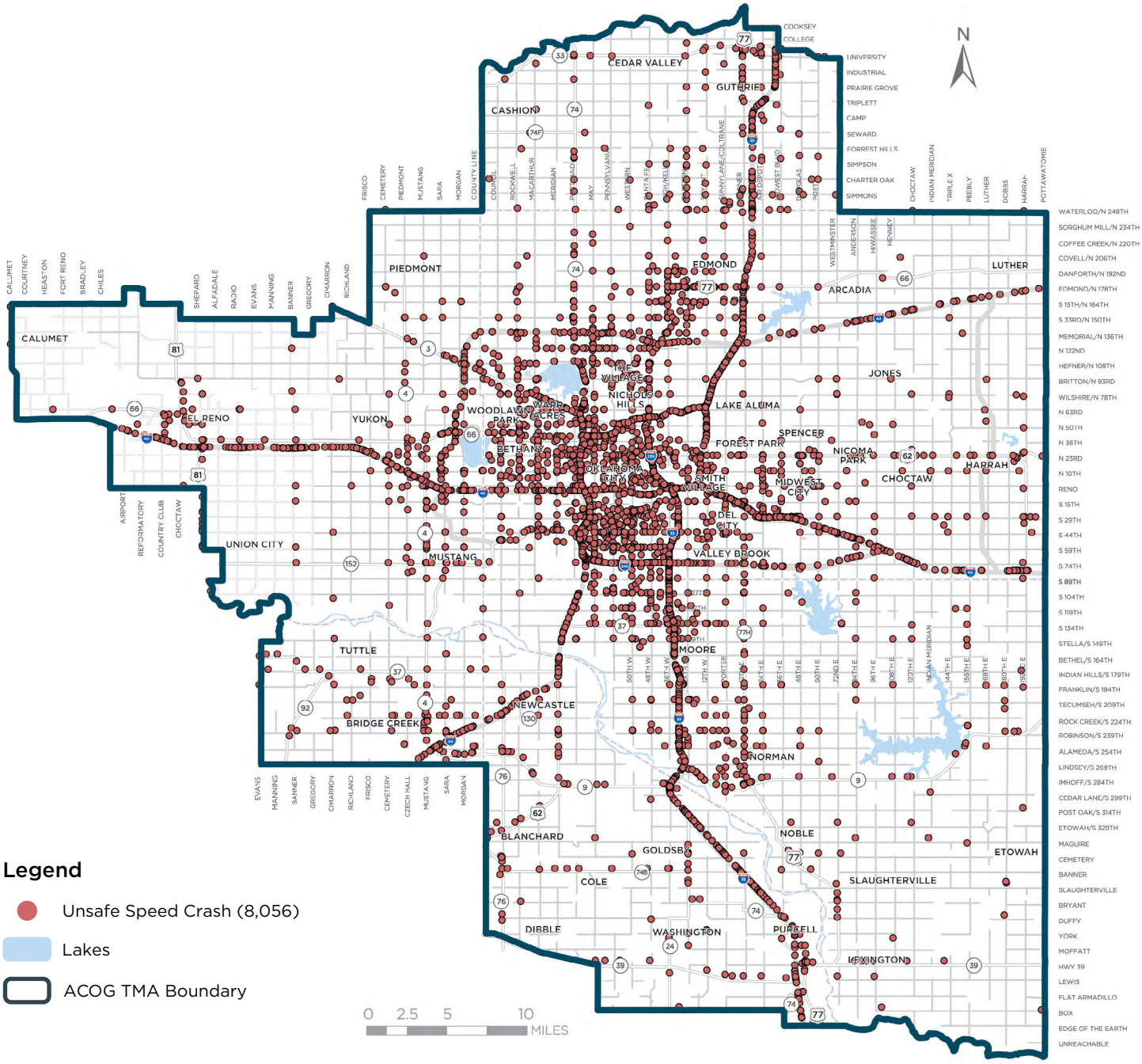
Speeding is a common safety concern for citizens and stakeholders in Central Oklahoma. From 2017-2021, the region saw 8,056 total speed-related crashes and 107 (1.3%) speeding fatalities. Speeding is a leading cause of traffic collisions and greatly increases the risk of death or injury for motorists, bicyclists, and pedestrians. According to the OHSO crash data, an unsafe speed-related crash is 37% more likely to result in an injury or fatality. Additionally, 10.1% percent of all high injury crashes during this five-year span were correlated with unsafe speeds. **Exhibit 4** displays the locations of all speed-related crashes that occurred in the ACOG boundary from 2017-2021.

Table 4. Unsafe Speed Crash Data (2017-2021)

CRASH TYPE	TOTAL CRASHES	HIGH INJURY CRASHES (KABS)	PERCENT KABS
Unsafe Speed Related Crashes	8,056	1,360	16.9%
All Crashes	110,325	13,529	12.3%

K – Fatal A – Severe Injury B – Minor Injury

Exhibit 4. Unsafe Speed Crash Data (2017-2021)



IMPAIRED DRIVING CRASHES

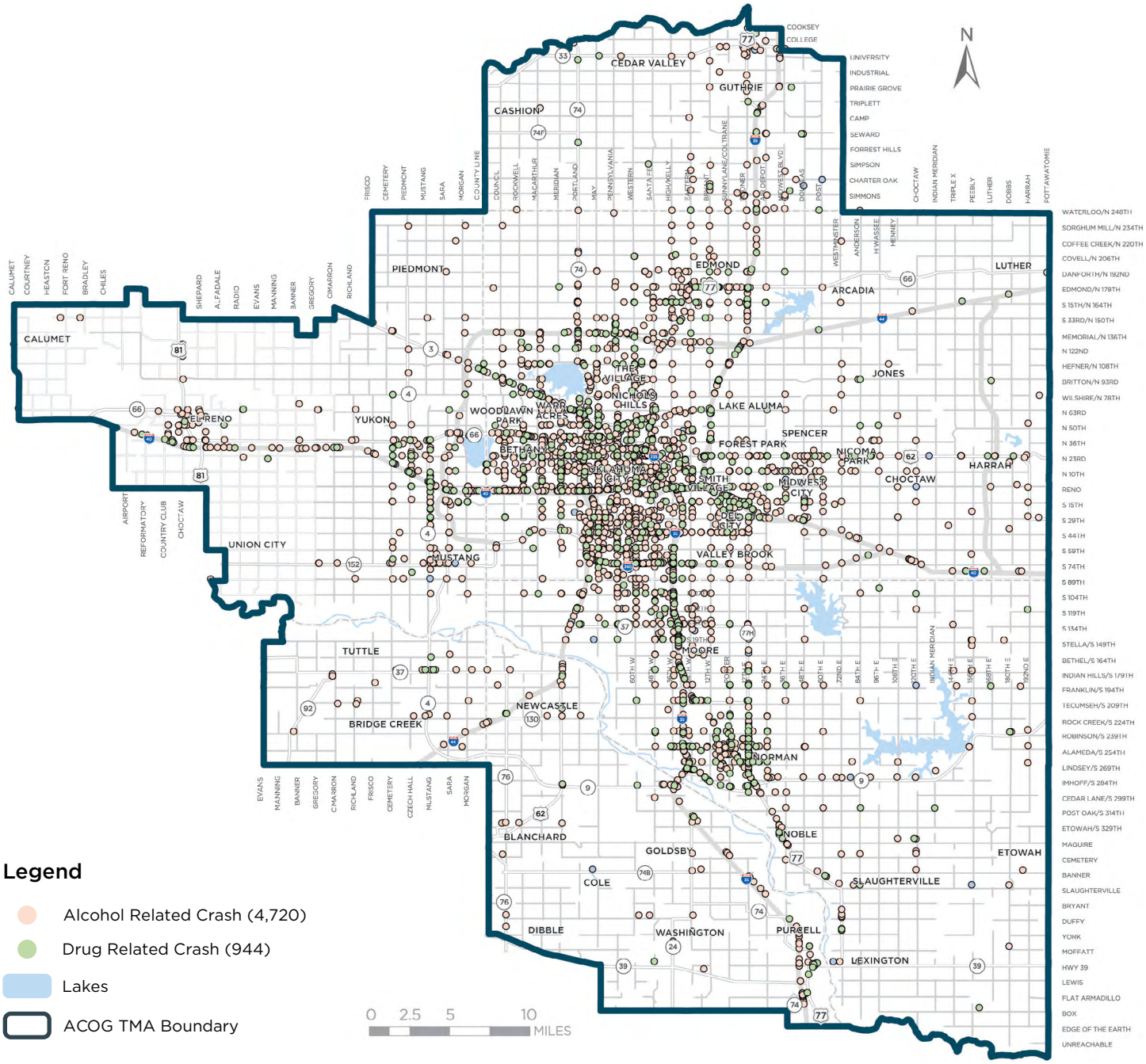
Impaired driving is a significant safety concern that affects not only the person driving under the influence of alcohol or drugs, but also, innocent parties such as passengers, other drivers, and vulnerable road users. From 2017-2021, Central Oklahoma experienced 5,016 total impaired driving-related crashes with 1,200, or 23.9%, of those resulting in a KAB per Table 5 – fatality, serious injury, or minor injury. According to the OHSO crash data, an impaired driving crash is 94% more likely to result in an injury or fatality. Exhibit 5 displays the locations of all impaired driving crashes that occurred in the ACOG boundary from 2017-2021.

Table 5. Impaired Driving Crash Data (2017-2021)

CRASH TYPE	TOTAL CRASHES	HIGH INJURY CRASHES (KABS)	PERCENT KABS
Alcohol Related Crashes	4,072	974	23.9%
Drug Related Crashes	944	226	23.9%
All Impaired Driving Crashes	5,016	1200	23.9%
All Crashes	110,325	13,529	12.3%

K – Fatal A – Severe Injury B – Minor Injury

Exhibit 5. Impaired Driving Crash Data (2017-2021)



Legend

- Alcohol Related Crash (4,720)
- Drug Related Crash (944)
- Lakes
- ACOG TMA Boundary

ROADWAY DEPARTURE CRASHES

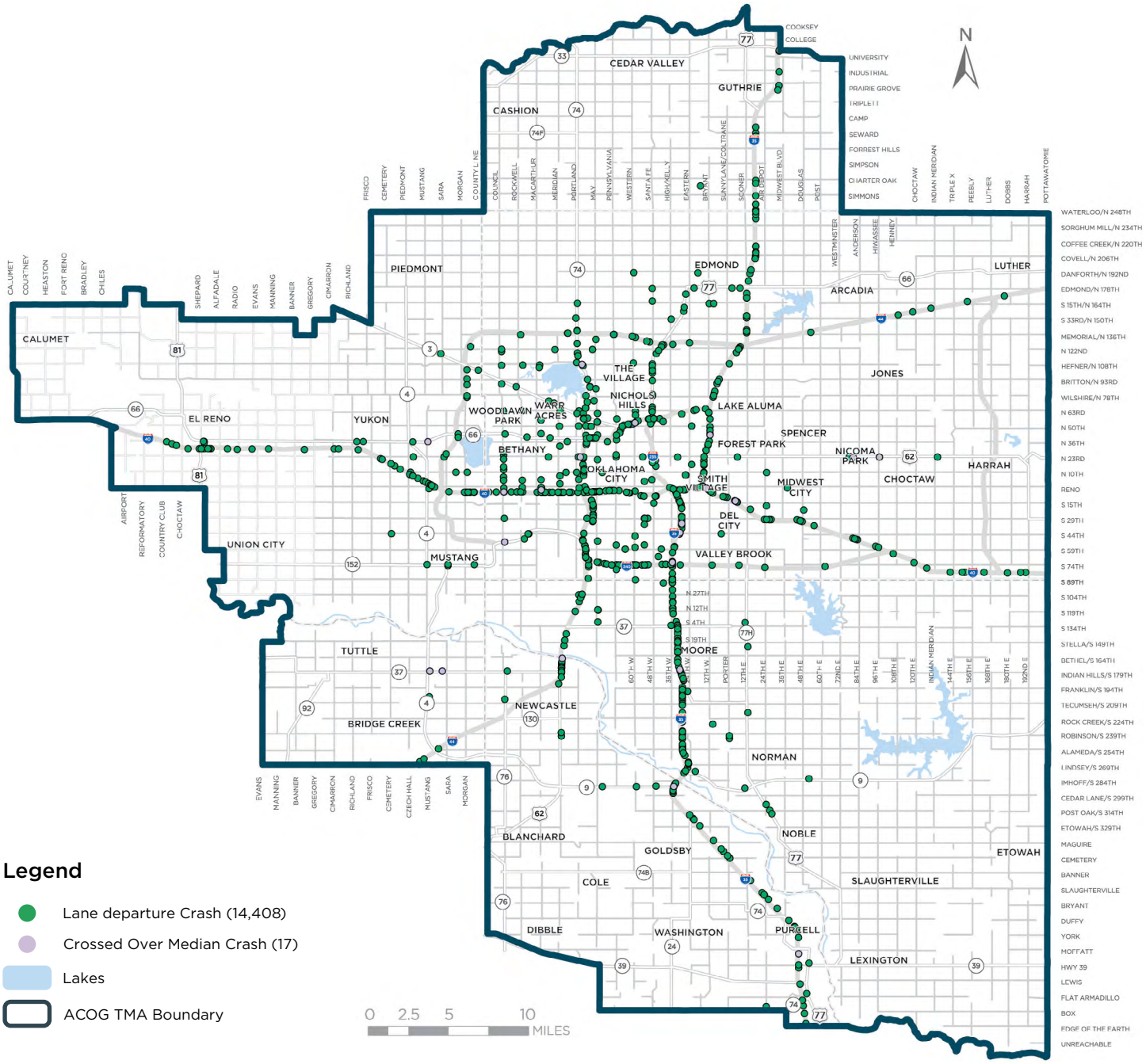
Roadway departures are another top contributing factor for crashes on Central Oklahoma roads. These types of crashes are most commonly occurring on highways and high-volume corridors such as I-35, I-40, I-240, US 77, and I-44. Roadway departure crashes commonly involve crossing a center line or median resulting in manners of collisions such as head-on crashes which had a 38.6% high injury crash rate in Central Oklahoma from 2017-2021. During this five-year span, the region experienced 14,578 total roadway departure related crashes and 2,997 high injury or fatal roadway departure crashes. According to the OHSO crash data, a roadway departure collision is 67% more likely to result in an injury or fatality. **Exhibit 6** displays the locations of all roadway departure crashes that occurred in the ACOG boundary from 2017-2021.

Table 6. Roadway Departure Crash Data (2017-2021)

CRASH TYPE	TOTAL CRASHES	HIGH INJURY CRASHES (KABS)	PERCENT KABS
Crossed Over Median Crashes	170	31	18.2%
Lane Departure Crashes	14,408	2,966	20.6%
All Roadway Departure Crashes	14,578	2,997	20.6%
All Crashes	110,325	13,529	12.3%

K – Fatal A – Severe Injury B – Minor Injury

Exhibit 6. Roadway Departure Crashes (2017-2021)



EQUITY CONSIDERATIONS

Equity is an important consideration in determining how ACOG and organizations in Central Oklahoma should prioritize future investments. Equity involves shaping resources and interventions to meet the specific needs of all people, ensuring that vulnerable communities have the necessary support and investment to achieve similar safety outcomes. Through prioritizing equity, ACOG recognizes and addresses access to safety measures among diverse populations, leading to more effective and inclusive safety countermeasures.

The U.S. Department of Transportation (USDOT) defines disadvantaged census tracts based on criteria such as poverty levels, median household income, and access to transportation services. These tracts typically exhibit higher rates of poverty, unemployment, lower median incomes, and limited access to public transit. Additionally, disadvantaged census tracts may experience higher rates of traffic incidents and have inadequate infrastructure for vulnerable road user safety. The identification of these tracts played a large role in the analysis of corridors for this action plan. This allowed the project identification process to not only look at the crash history, but also equity opportunities for the region in terms of safety.

DISADVANTAGED CENSUS TRACTS

The census tracts within the ACOG area that are considered 'Overall' and 'Transportation' disadvantaged are primarily located in the more rural sections of the region as seen in the maps below. This analysis played a significant role in the selection of study corridors during the planning process. This provides historically underserved communities the opportunity to see infrastructure and policy improvements in their areas. It is encouraged that future safety considerations in Central Oklahoma beyond the ACOG RSAP use the equity analysis as a scoring criterion during project selection.

According to the USDOT Equitable Transportation Community (ETC) Explorer, approximately 424,400 Central Oklahoma residents, or 35% of the population, live in disadvantaged census tracts (**Figure 28**). **Exhibit 7** displays the Disadvantaged Census Tracts in the ACOG region.

Figure 28. Overview of the Disadvantaged Population in Central Oklahoma

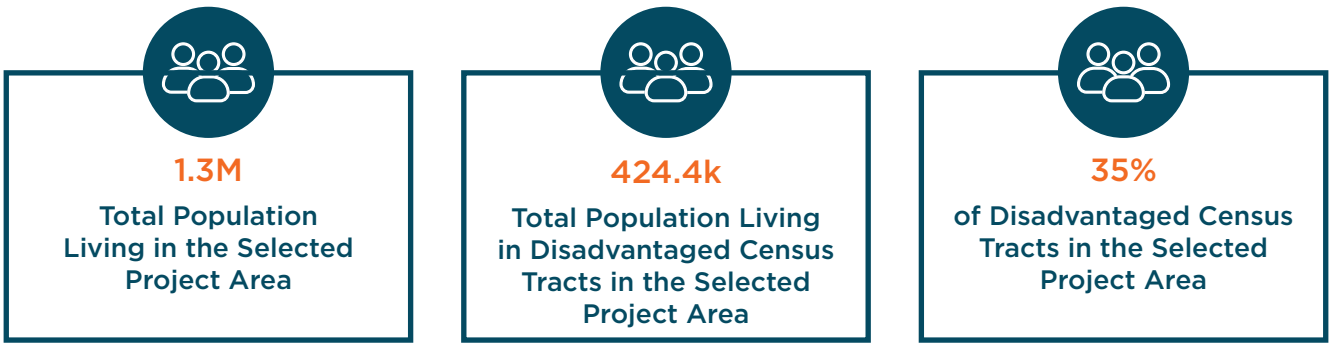
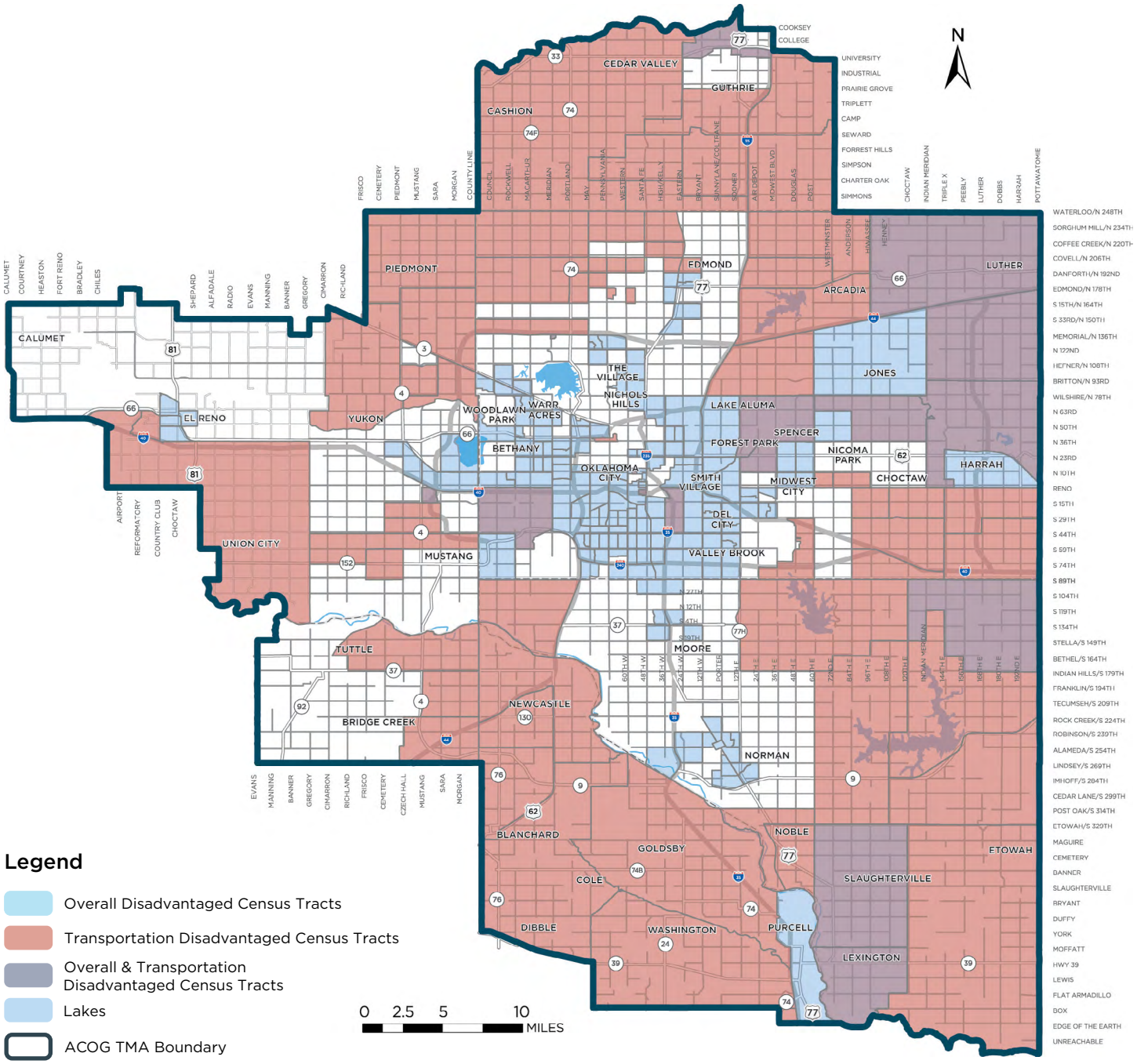


Table 7. Disadvantaged Census Tracts Crashes

CRASH TYPE	TOTAL CRASHES	HIGH INJURY CRASHES (KABS)	PERCENT KABS
Fatal Injury	0.7%	0.4%	0.3%
Suspected Serious Injury	2.3%	2.0%	0.3%
Suspected Minor Injury	9.9%	10.4%	-0.5%
Possible Injury	21.6%	22.5%	-1.0%
No Injury	65.6%	64.7%	0.9%
Unknown	0.002%	0%	0.0%

K – Fatal A – Severe Injury B – Minor Injury

Exhibit 7. Disadvantaged Census Tracts



Legend

- Overall Disadvantaged Census Tracts
- Transportation Disadvantaged Census Tracts
- Overall & Transportation Disadvantaged Census Tracts
- Lakes
- ACOG TMA Boundary

HIGH INJURY NETWORK

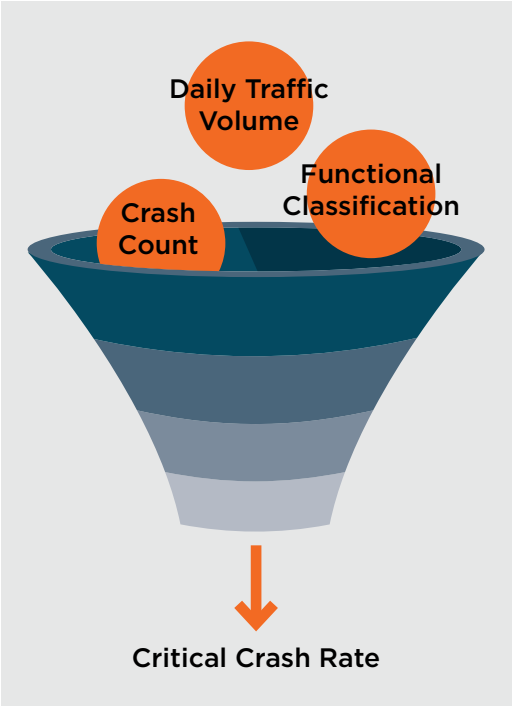
The high injury network (HIN) consists of road segments in the ACOG TMA that experience a higher-than-average rate of crashes resulting in injuries or fatalities. The purpose of the HIN is to assist ACOG and cities in Central Oklahoma in prioritizing future transportation projects and investments. Identifying road segments in the region that experience the most severe and frequent traffic crashes is the first step in developing countermeasure and policy recommendations to improve safety.

CRITICAL CRASH RATE METHOD

The method for calculating critical crash rates involves comparing road segments with similar roadway functional classification and context (Figure 29). Daily traffic volumes are normalized to calculate crash rates on an even foundation. If the observed crash rate exceeds the expected crash rate, the roadway segment is considered to have a critical crash rate and is considered for the HIN.

An ArcGIS Pro model was created to calculate the critical crash rate and supporting calculations for each roadway segment in the ACOG region. The model assigns crashes, weighted by the severity of the crash, to an adjacent segment and performs the calculations in the order outlined by the FHWA. The following section outlines the process used in the calculation of the critical crash rate using fatal and severe injury crashes from the years 2017-2021 in Central Oklahoma.

Figure 29. Critical Crash Rate Inputs



CRITICAL CRASH RATE CALCULATION

The critical crash rate was calculated for each road segment in the ACOG TMA using the following three steps:

1 Assigning Data to Road Segments

Calculating the critical crash rate requires four data inputs: roadway functional classification, context, daily traffic volumes, and weighted crash counts. Due to the variance of roadway context throughout the ACOG TMA, road segments were categorized as “Urban” or “Rural” based on the ACOG MPO Adjusted Urbanized Area. Additionally, crashes were weighted by severity to ensure that areas where fatal and severe injury crashes are occurring are prioritized in the development of the HIN.

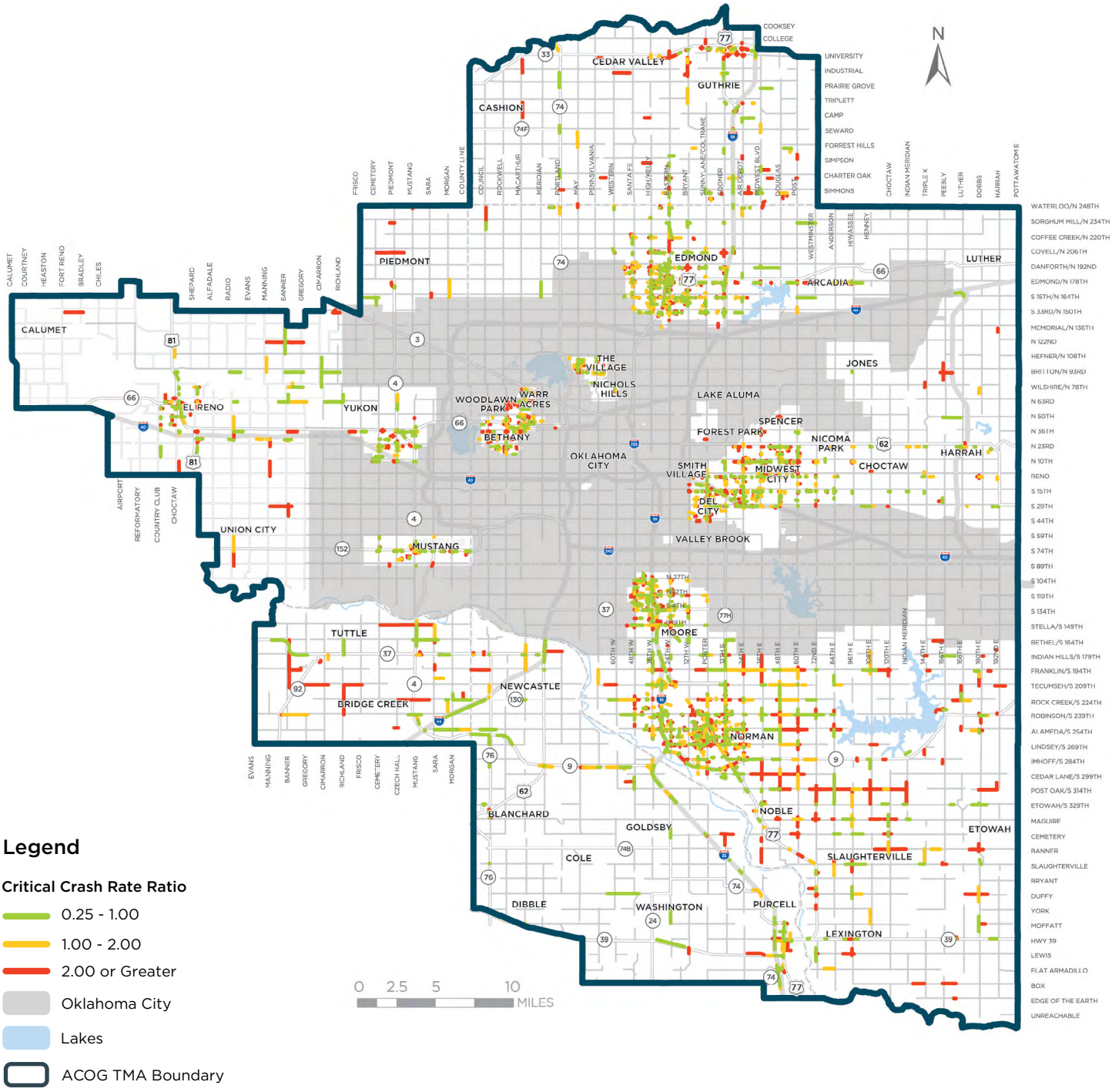
2 Calculate Variables of Critical Crash Rate

The variables of the critical crash rate were calculated using the equations specified in the FHWA Highway Safety Manual. The critical crash rate compares the difference between the observed crash rate and the expected crash rate. The observed crash rate is the existing crashes at each road segment per 100 million vehicle-miles traveled. The expected average crash rate per 100 million vehicle-miles traveled normalizes the daily volumes for each functional class. Once calculated, the equation highlights segments that experience a higher crash rate than what is expected based on the similar functional classifications, context, traffic volumes, and weighted crash counts.

3 Calculate Critical Crash Rate Ratio

Once the variables are input, a ratio is calculated to identify segments experiencing higher severe injury and fatal crash rates than expected. If the ratio is greater than 1.0, or if the observed crash rate is higher than the critical crash rate, then the road segment’s crash history was higher than other road segments of similar functional classification and context. Segments with a ratio of 1.0 or greater were flagged as potential HIN segments. Exhibit 8 displays the results of the critical crash rate analysis. It is important to note that the City of Oklahoma City was not included in the analysis due the development of their own Vision Zero Action Plan in concurrence with this plan.

Exhibit 8. Critical Crash Rate Analysis Results



Legend

Critical Crash Rate Ratio

- 0.25 - 1.00
- 1.00 - 2.00
- 2.00 or Greater
- Oklahoma City
- Lakes
- ACOG TMA Boundary

HIGH INJURY NETWORK RESULTS

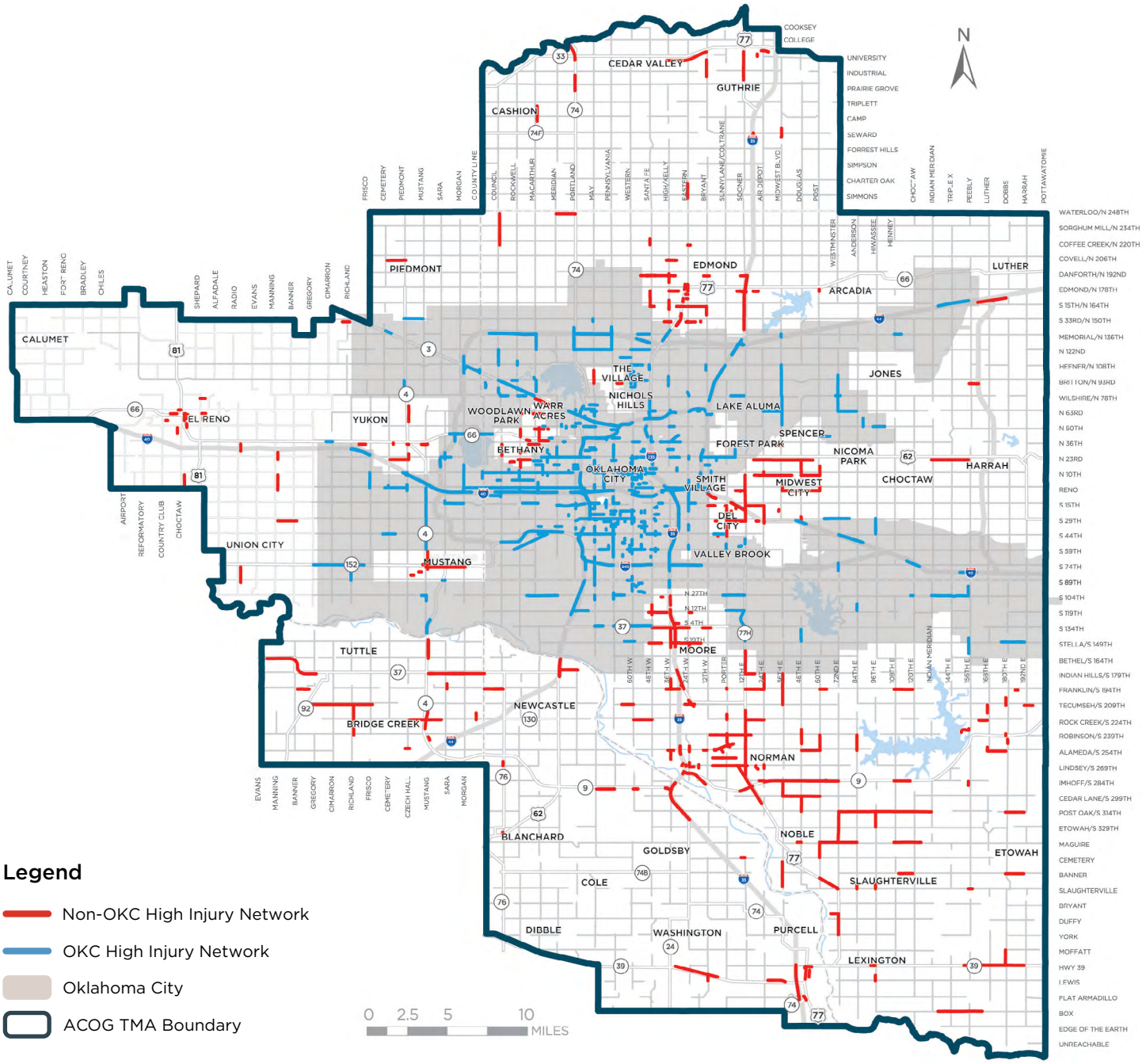
The process to select segments for the HIN is a data-driven effort combined with a qualitative look at the model results. The goal of the HIN selection process is to maximize the total fatal, severe injury, and possible injury crashes on the least amount of ACOG roads.

To refine and clean the model results, one-crash segments that resulted in a greater than 1.0 ratio were removed to prioritize corridors experiencing high severity crashes. The remaining segments observed more than one high injury crash between 2017 and 2021 and had a crash rate higher than expected. Gaps between flagged segments were linked or filled with the intent of creating a consistent and contiguous HIN.

The resulting HIN for the ACOG RSAP consists of 3.3% of the total ACOG road network, while also capturing 53% of fatal, severe injury, and possible injury crashes, and 63% of fatal crashes. The HIN corridors for the ACOG TMA can be seen in **Exhibit 9**.

Oklahoma City has developed an HIN as a part of their Vision Zero Action Plan which can be seen in **Exhibit 9** as well.

Exhibit 9. ACOG and OKC High Injury Network




HISTORIC
OKLAHOMA
US
66
ROUTE

CHAPTER 5.

CREATING A SAFER SYSTEM

This chapter outlines the eight highest priority corridors that were chosen for further examination for the ACOG Regional Safety Action Plan. The targeted recommendations on the chosen study corridors entail specific countermeasures based on the crash history, roadway geometry, intersection control, and context. Additionally, this chapter of the ACOG RSAP provides a Systemic Countermeasure Toolbox consisting of a variety of roadway countermeasures that may be used by cities and organizations throughout the region to further mitigate safety beyond the eight corridors in this study. It is encouraged for cities within the ACOG boundary to use this document and its countermeasures as a foundation of improving safety in all of Central Oklahoma and eliminating all traffic fatalities and injuries.

Crash reports and in-field observations were studied to understand existing conditions and crash locations on the study corridors. These observations were the initial step in understanding the state of safety on the eight study corridors and led to the targeted countermeasures.

Study Corridors

- Corridor 1: Lindsey Street
- Corridor 2: Robinson Street
- Corridor 3: N MacArthur Boulevard
- Corridor 4: E Reno Avenue
- Corridor 5: E Highway 9
- Corridor 6: W Vandament Avenue
- Corridor 7: SW 19th Street
- Corridor 8: E Highway 37

Systemic Countermeasure Toolbox

Regional Safety Action Plan acog

CHAPTER 5. CREATING A SAFER SYSTEM

STUDY CORRIDORS

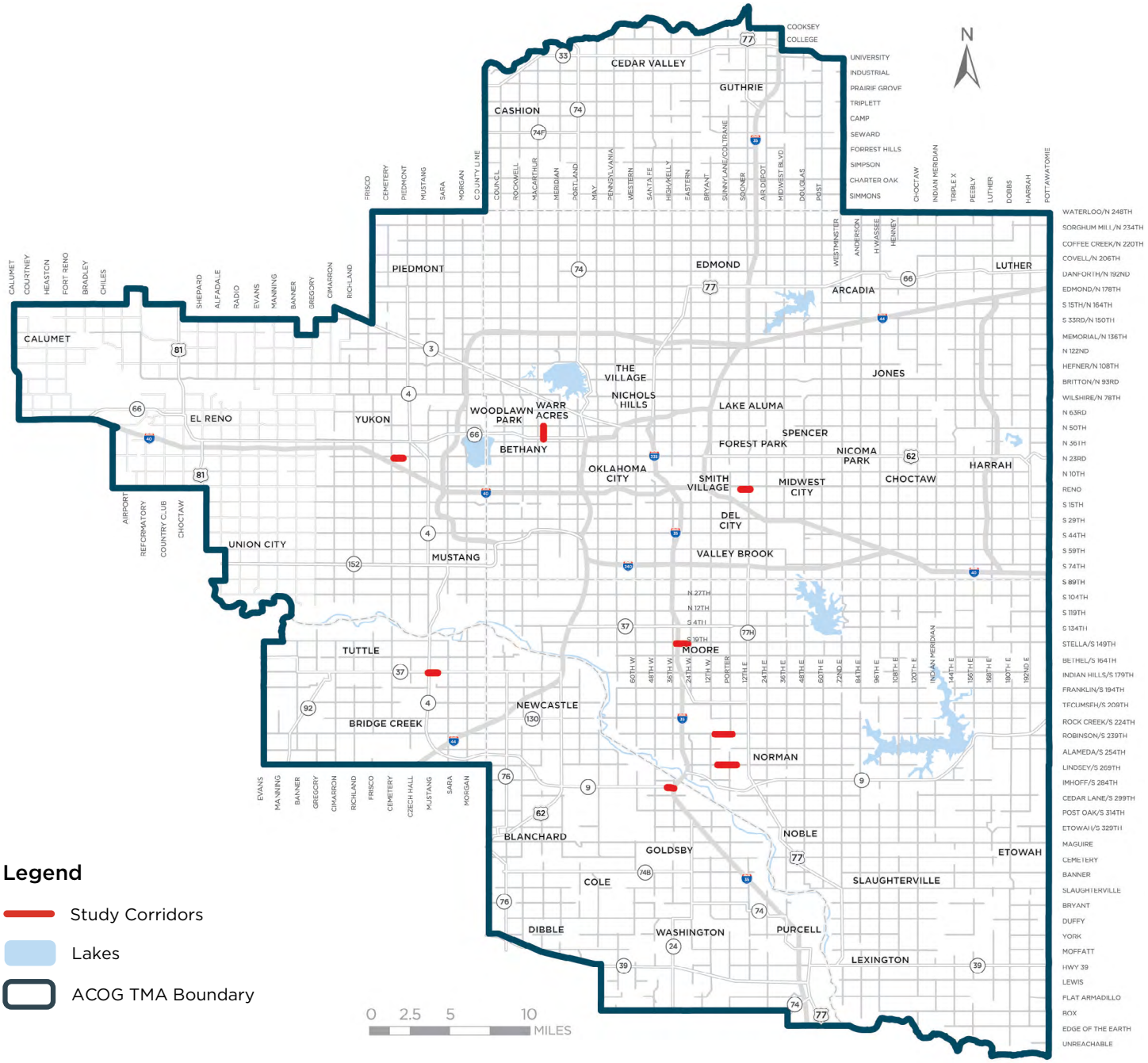
Eight road segments on the High Injury Network were selected as priority corridors for countermeasure recommendations that improve safety on the TMA's most unsafe roadways. The highest priority study corridors were selected with input from ACOG staff and scored based on equity, engagement, feasibility, and crash severity. Table 8 and Exhibit 10 display the chosen study corridors and their limits.

Table 8. Study Corridors

STUDY CORRIDOR	CITY	LIMITS		LENGTH (mi)	CRASHES	
		FROM	TO		KABs	TOTAL
Lindsey St	Norman	S Pickard Ave	George Ave	1	34	141
Robinson St	Norman	Highland Pkwy	N Porter Ave	0.9	33	233
N MacArthur Blvd	Warr Acres	NW 51st St	NW 39th St	0.84	29	125
E Reno Ave	Del City	N Vickie Dr	Sooner Rd	0.51	14	63
E Highway 9	Goldsby/ Newcastle	Bankers Ave	I-35 SBFR	0.35	12	144
W Vandament Ave	Yukon	Garth Brooks Blvd	S Holly Ave	0.5	12	91
SW 19th St	Moore	S Telephone Rd	Crystal Dr	0.5	46	250
E Highway 37	Tuttle	Cherrywood	Cedar Springs Dr	0.5	8	69

K – Fatal A – Severe Injury B – Minor Injury

Exhibit 10. Study Corridors



CORRIDOR 1: LINDSEY STREET

CONTEXT

Lindsey St is a two-lane minor arterial roadway located in Norman, Oklahoma. This segment of Lindsey St selected for this study is 1-mile long and spans from S Pickard Ave to George Ave. This corridor bisects the University of Oklahoma and is adjacent to the university's athletic facilities on campus. This road segment is prone to heavy foot traffic during the school year due to students crossing the street. Lindsey Street has a posted speed limit of 20 - 30 MPH and a volume of 13,200 vehicles per day. It is one of the few roads in Norman that can be traversed east to west without turns.

CRASH HISTORY

There were 141 total crashes on this segment of Lindsey St from 2017-2021. Of these total collisions, 34 were high injury crashes (KABs). Key takeaways for crash trends along Lindsey St include:

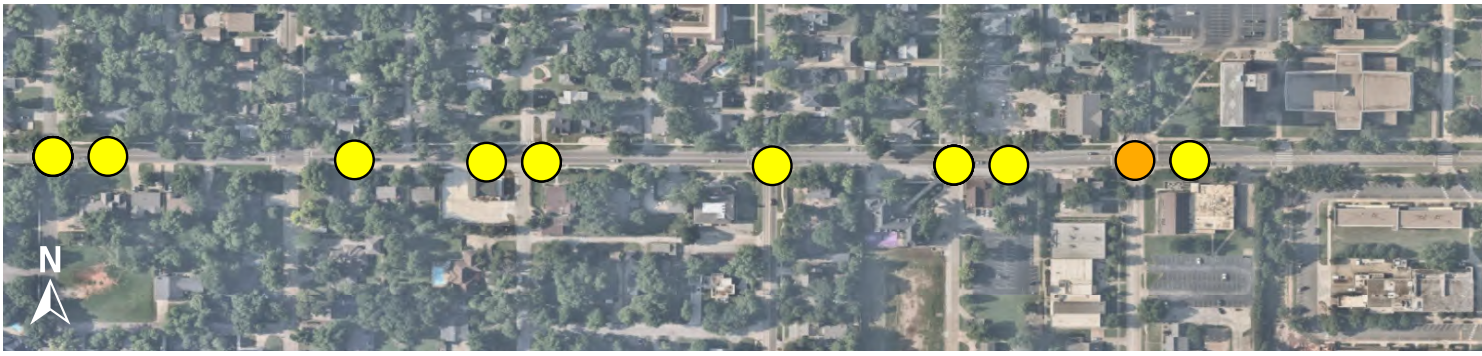
- 100% of KAB crashes were intersection-related
- The top manner of collision was 'Rear-End crashes, which contributed to 96 of the 141 total crashes (68.1%)
- The top contributing factor of crashes in was 'Driver Inattention', which contributed to 52 of the 141 total crashes (36.9%)

Exhibit 11 shows existing conditions of Lindsey Street.

Exhibit 11. Existing Conditions for Corridor 1

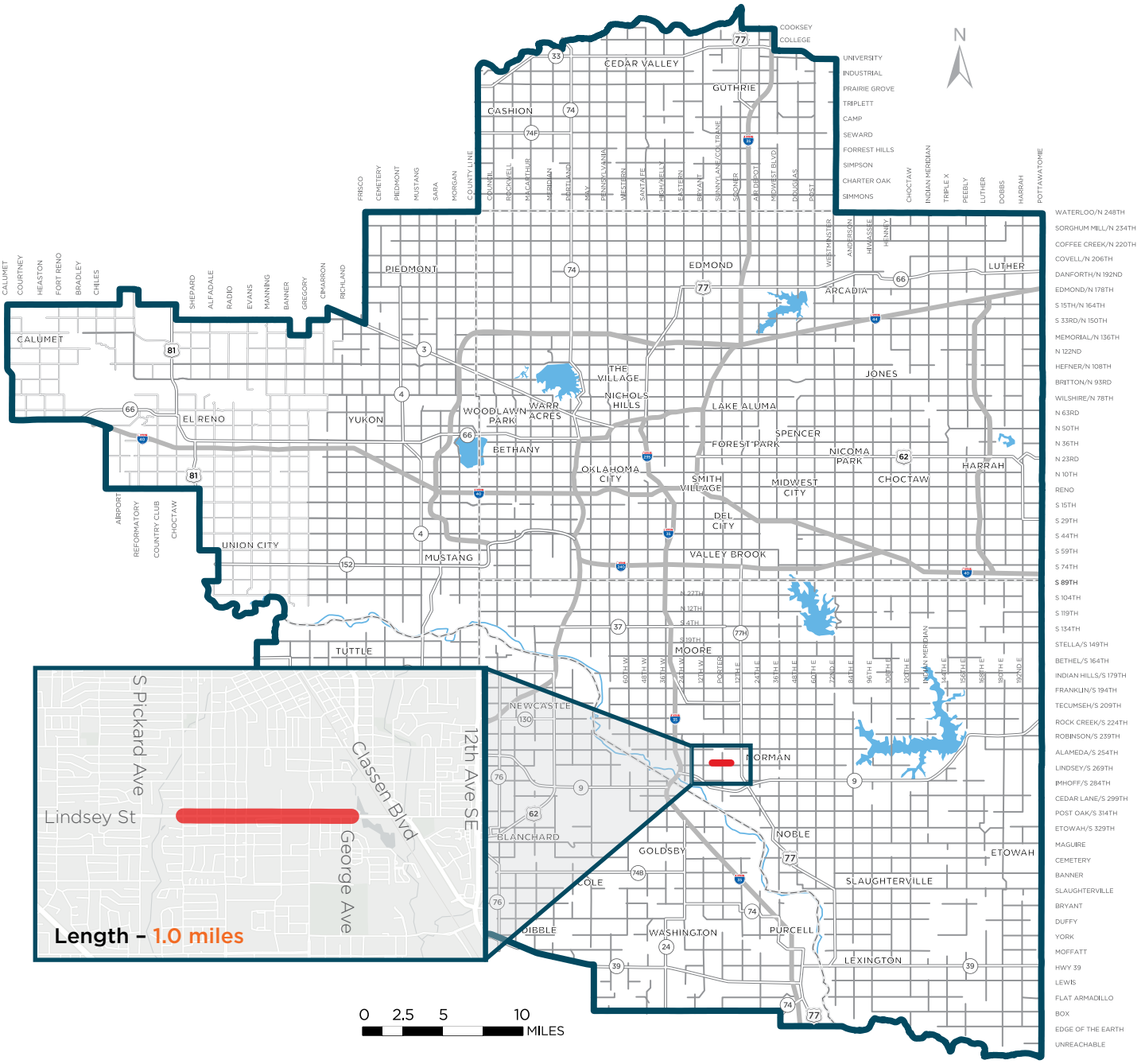
EMPHASIS AREAS (% OF KABs)	TOP CONTRIBUTING FACTORS	TOP MANNERS OF COLLISION
Intersection Related 100%	Driver Inattention 52 Crashes (36.9%)	Rear-End 96 Crashes (68.1%)
Vulnerable Road Users 23.5%	Failed to Yield or Stop 28 Crashes (19.9%)	Angle-Turning 16 Crashes (11.3%)
Lane Departure 5.9%	Followed Too Close 26 Crashes (18.4%)	Right-Angle 13 Crashes (9.2%)
Impaired Driving 2.9%		

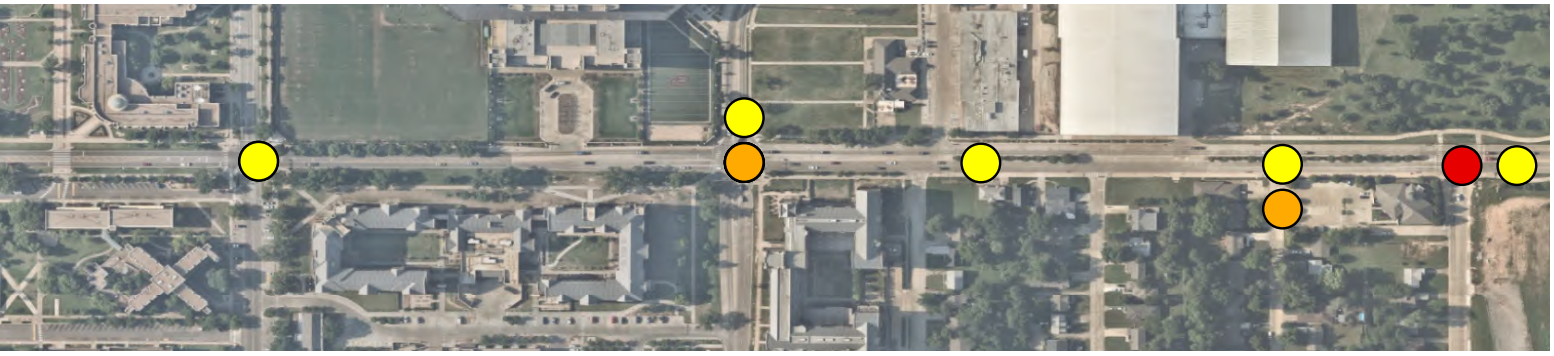
Exhibit 11. Corridor 1 High Injury Crash Locations (continued)



Fatal Crash (K) – 1 Severe Injury (A) – 3 Possible Injury (B) – 30

Exhibit 11. Corridor 1 Location Map (continued)





CORRIDOR RECOMMENDATIONS

To enhance pedestrian connectivity and safety, it is recommended that sidewalk gaps be filled along Lindsey St from S Pickard Ave to Elm Ave. It is also recommended that all pedestrian ramps along the corridor be ADA compliant.

To decrease the number of rear-end crashes occurring on Lindsey St, it is recommended that the road from S Pickard Ave to Elm Ave be reconfigured to three lanes with a center left-turn lane. Along with the road reconfigurations, the traffic signal heads should be updated to allow protected left-turns.

Additionally, to mitigate speeding concerns on the corridor, it is recommended that speed feedback signs be placed below speed limit signs to notify drivers of their speed and encourage them to slow down.

INTERSECTION SPECIFIC RECOMMENDATIONS

For intersections along Lindsey St, intersection-specific recommendations were made that will increase traffic safety. Listed below are the intersections along with their specific recommendations:

S Pickard Ave

- Remove closed transit stop

S Lahoma Ave

- Trim vegetation to improve visibility
- Add a luminaire to improve visibility

College Ave

- Install high-visibility crosswalks on the remaining three legs of the intersection
- Install stop bars on the remaining three legs of the intersection

Midblock Crossings Between Elm Ave and Asp Ave

- Raise the mid-block crossings to sidewalk level

Asp Ave

- Implement a leading pedestrian interval into the signal timing to allow for better pedestrian visibility
- Install high-visibility crosswalks
- Upgrade all ramps to be ADA-compliant

S Jenkins Ave

- Move the utility box on the southeast corner of the intersection to help visibility
- Implement a leading pedestrian interval into the signal timing to better protect pedestrians
- Add a “No Right On Red” sign

Lincoln Ave

- Install a hooded left-turn median opening for vehicles traveling westbound

Garfield Ave

- Extend existing median to decrease access points

George Ave

- Construct a pedestrian refuge island to allow pedestrians to cross Lindsey Street safely
- Narrow the travel lanes to slow drivers down
- Stripe high-visibility crosswalks
- Place a “Left Turn Yield to Pedestrians” sign

Exhibit 19 on page 89 visually summarizes all the listed recommendations.

COUNTERMEASURE APPLICATION RESULTS

All recommendations for E Lindsey Street are listed in Table 9 with the assigned countermeasure and crash modification factor. The countermeasures with the highest reduction rate are installing sidewalks, installing a two-way left turn lane on a two-lane road, and removing or relocating fixed objects outside of clear zone.

Table 9. Countermeasure Application Results for Corridor 1: Lindsey Street

ID	LOCATION	RECOMMENDATION	COUNTERMEASURE	CMF	CRASH TYPE	CRASHES REDUCE OVER 20-YEAR PERIOD
1.1	S Pickard Ave to Elm Ave	Install Sidewalks	Install Sidewalk	0.598	Vehicle/Ped	129
1.2	S Pickard Ave to Elm Ave	Roadway Reconfiguration from Two Lanes to Three Lanes	Install TWLTL (two-way left turn lane) on two lane road	0.739	All	51
1.3	Corridor-wide	Place Speed Feedback Signs	Install Dynamic Speed Feedback Sign	0.95	All	29
1.4	Between Elm Ave and Asp Ave	Install Raised Midblock Crossings	Install raised pedestrian crosswalks	0.7	All	16
1.C.1	S Lahoma Ave	Add Luminaire	Install Lighting	0.68	Night	0
1.C.2	S Lahoma Ave	Trim Vegetation	Remove or Relocate Fixed Objects Outside of Clear Zone	0.62	All	11
1.E.1	College Ave	Stripe High Visibility Crosswalks	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	20
1.E.2	College Ave	Refresh Stop Bars	Implement Systemic Signing and Marking Improvements at Stop-Controlled Intersections	0.917	All	4
1.G.1	Asp Ave	Install Leading Pedestrian Interval (LPI)	Modify signal phasing (implement a leading pedestrian interval)	0.9	All	7
1.G.2	Asp Ave	Stripe High Visibility Crosswalks	Implement Systemic Signing and Visibility Improvements at Signalized Intersections	0.732	All	19
1.H.1	S Jenkins Ave	Move Utility Box Obstructing Sight Distance	Remove or Relocate Fixed Objects Outside of Clear Zone	0.62	All	43
1.H.2	S Jenkins Ave	Install Leading Pedestrian Interval (LPI)	Modify signal phasing (implement a leading pedestrian interval)	0.9	All	12
1.H.3	S Jenkins Ave	Place “No Right On Red” Signage	Implement Systemic Signing and Visibility Improvements at Signalized Intersections	0.732	All	31
1.I.1	Lincoln Ave	Construct Hooded Left-Turn Median Opening	Introducing zero or positive offset left-turn lane on crossing roadway	0.74	Angle	2
1.J.1	Garfield Ave	Median Extension	Install Raised Median	0.29	All	0

Table 10. Countermeasure Application Results for Corridor 1: Lindsey Street (continued)

ID	LOCATION	RECOMMENDATION	COUNTERMEASURE	CMF	CRASH TYPE	CRASHES REDUCE OVER 20-YEAR PERIOD
1.L.1	George Ave	Install Pedestrian Refuge Island	Median Treatment for Ped/Bike Safety	0.86	All	6
1.L.2	George Ave	Narrow Travel Lanes	Convert 12-foot lanes to 11-foot lanes	0.76	All	10
1.L.3	George Ave	Stripe High Visibility Crosswalks	Implement Systemic Signing and Visibility Improvements at Signalized Intersections	0.732	All	11

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CORRIDOR 2: ROBINSON STREET

CONTEXT

Robinson St is a four-lane principal arterial roadway in Norman, Oklahoma. The 0.9-mile-long segment of Robinson St chosen for this study spans from Highland Pkwy to N Porter Ave. The context of this segment mostly consists of residential and commercial land uses. The westernmost portion of this segment also includes a parkway feel on the north end due to the presence of the Max Westheimer Airport. Robinson St includes sidewalks on both sides of the roadway for pedestrians to safely travel east-west. This segment has a posted speed limit of 25 - 35 MPH and a volume of 23,300 vehicles per day.

CRASH HISTORY

From 2017-2021, there were 233 total crashes on this segment of Robinson St, and 33 of the total crashes were high injury crashes, or KABs. Key takeaways for crash trends along Robinson St include:

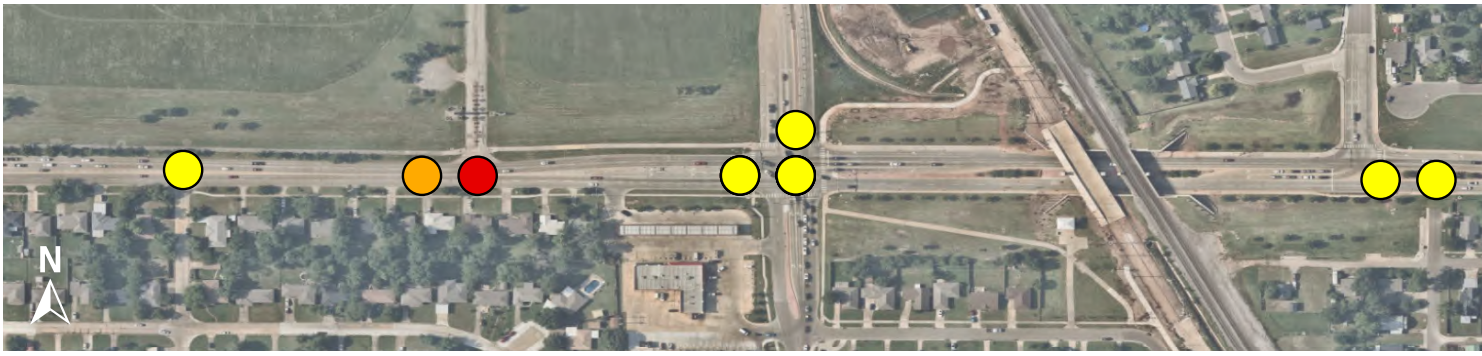
- 100% of KAB crashes were intersection-related
- The top manner of collision was 'Rear-End' crashes, which contributed to 146 of the 233 total crashes (62.7%)
- The top contributing factor of crashes in was 'Driver Inattention', which contributed to 73 of the 233 total crashes (31.3%)

Exhibit 12 shows existing conditions of Robinson Street.

Exhibit 12. Existing Conditions for Corridor 2

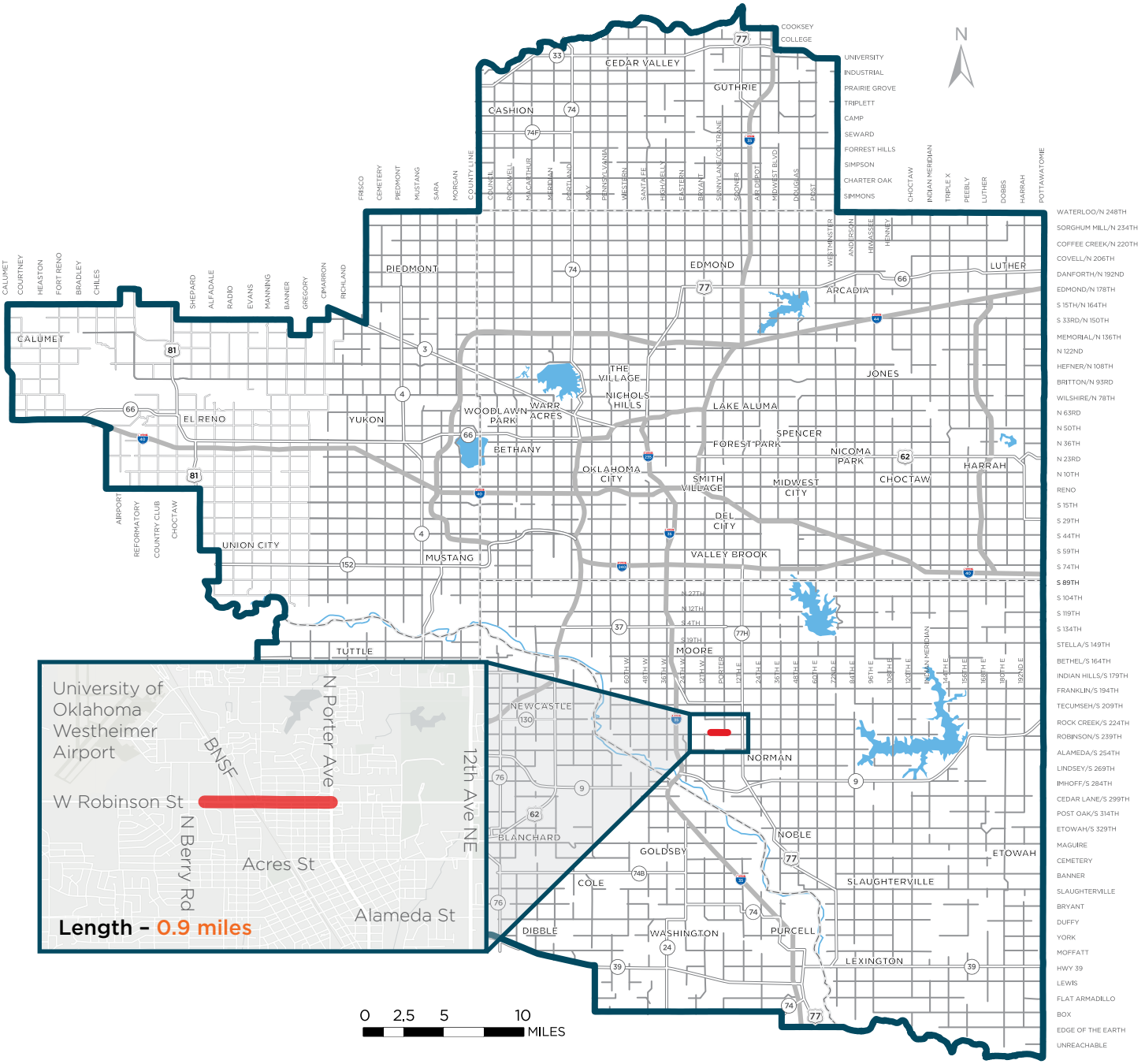
EMPHASIS AREAS (% OF KABs)	TOP CONTRIBUTING FACTORS	TOP MANNERS OF COLLISION
Intersection Related 100%	Driver Inattention 73 Crashes (31.3%)	Rear-End 146 Crashes (62.7%)
Impaired Driving 2.9%	Failed to Yield or Stop 54 Crashes (23.2%)	Angle-Turning 66 Crashes (28.3%)
	Followed Too Close 43 Crashes (18.5%)	Right-Angle 11 Crashes (4.7%)

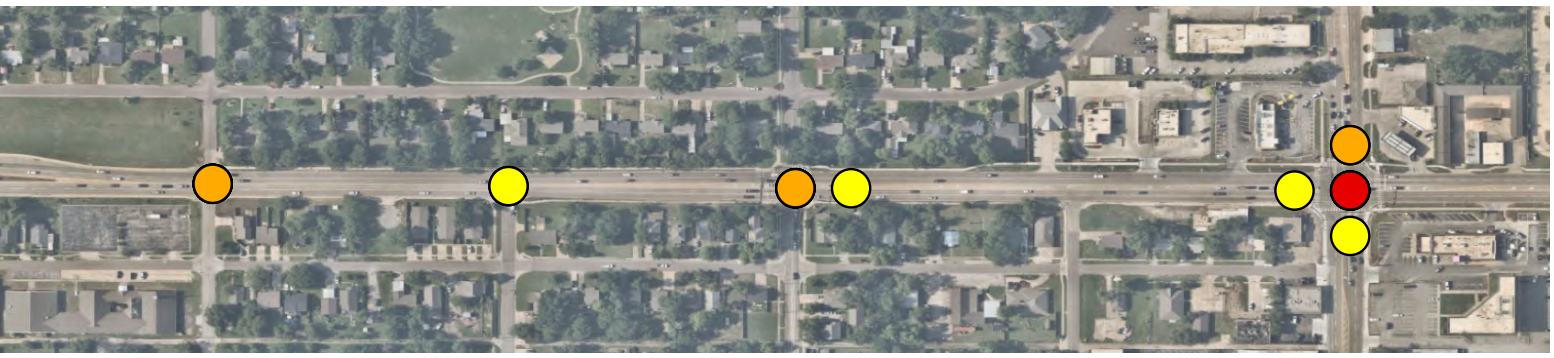
Exhibit 12. Corridor 2 High Injury Crash Locations (continued)



Fatal Crash (K) – 2 Severe Injury (A) – 4 Possible Injury (B) – 27

Exhibit 12. Corridor 2 Location Map (continued)





CORRIDOR RECOMMENDATIONS

Upon examination of Robinson St between Highland Parkway and Newton Drive on, it was determined that constructing a center left turn lane would improve road user safety and help prevent rear-end crashes. This countermeasure would provide eastbound vehicles on Robinson Dr a refuge for turning left onto Newton Dr, as well as increase safety for the residential houses on the south side of this segment.

Additionally, speeding is a concern along the entirety of the study area on Robinson St. It is recommended to include speed feedback signs under the posted speed limit signs.

INTERSECTION SPECIFIC RECOMMENDATIONS

For intersections along Robinson Street, intersection-specific recommendations were made that could increase traffic safety. Listed below are the intersections along with their specific recommendations:

N Flood Ave

- Install retroreflective backplates

Stubbeman Ave

- Install retroreflective backplates

Fay Ave

- Install high visibility crosswalks to better protect pedestrians
- Refresh stop bars
- Install a rectangular rapid flashing beacon (RRFB) to allow safe access across the roadway

N Jones Ave

- Trim vegetation to improve visibility

N Peters Ave

- Add a “Left Turn Yield on Green” sign
- Install retroreflective backplates
- Add a luminaire to improve visibility

N Crawford Ave

- Install a hooded left-turn
- Add school zone pavement markings to remind drivers to drive cautiously in an area with vulnerable road users

N Porter Ave

- Install retroreflective backplates
- Install high visibility crosswalks on all four legs of the intersection

Exhibit 20 on page 90 visually summarizes all the listed recommendations.

COUNTERMEASURE APPLICATION RESULTS

All recommendations for Robinson Street are listed in Table 10 with the assigned countermeasure and crash modification factor. The countermeasures with the highest reduction rate are installing a two-way left turn lane on a two-lane road, installing high visibility crosswalks, and adding 3-inch yellow retroreflective sheeting to signal backplates.

Table 10. Countermeasure Application Results for Corridor 2: Robinson Street

ID	LOCATION	RECOMMENDATION	COUNTERMEASURE	CMF	CRASH TYPE	CRASHES REDUCE OVER 20-YEAR PERIOD
2.1	Highland Pkwy to Newton Dr	Stripe Center Left Turn Lane	Install TWLTL (Two-Way Left Turn Lane) On Two Lane Road	0.739	All	124
2.2	Corridor-wide	Place Speed Feedback Signs	Install Dynamic Speed Feedback Sign	0.95	All	47
2.C.1	N Flood Ave	Update Signal Head to Include Retroreflective Backplates	Add 3-Inch Yellow Retroreflective Sheeting To Signal Backplates	0.85	All	52
2.D.1	Stubbeman Ave	Update Signal Head to Include Retroreflective Backplates	Add 3-Inch Yellow Retroreflective Sheeting To Signal Backplates	0.85	All	11
2.E.1	Fay Ave	Install Rectangular Rapid Flashing Beacon	Install Rectangular Rapid Flashing Beacon (RRFB)	0.31	Vehicle/Ped	45
2.E.2	Fay Ave	Stripe High Visibility Crosswalk	Install High Visibility Crosswalk	0.6	Vehicle/Ped	26
2.E.3	Fay Ave	Refresh Stop Bar	Implement Systemic Signing and Marking Improvements at Stop-Controlled Intersections	0.917	All	6
2.F.1	N Jones Ave	Trim Vegetation	Remove or Relocate Fixed Objects Outside of Clear Zone	0.62	All	14
2.G.1	N Peters Ave	Add Luminaire	Install Lighting	0.68	Night	7
2.G.2	N Peters Ave	Update Signal Head to Include Retroreflective Backplates	Add 3-Inch Yellow Retroreflective Sheeting to Signal Backplates	0.85	All	14
2.G.3	N Peters Ave	Place “Left Turn Yield on Green” Sign	Implement Systemic Signing and Visibility Improvements at Signalized Intersections	0.732	All	24
2.H.1	N Crawford Ave	Construct Hooded Left-Turn Median Opening	Introduce Raised/Curb Left-Turn Channelization	0.87	All	4
2.H.2	N Crawford Ave	Refresh Pavement Markings	Upgrade Intersection Pavement Markings	0.75	All	6
2.I.1	N Porter Ave	Update Signal Head to Include Retroreflective Backplates	Add 3-Inch Yellow Retroreflective Sheeting to Signal Backplates	0.85	All	40
2.I.2	N Porter Ave	Stripe High Visibility Crosswalk	Install High Visibility Crosswalk	0.6	Vehicle/Ped	106

CORRIDOR 3: N MACARTHUR BOULEVARD

CONTEXT

N MacArthur Blvd is a five-lane principal arterial roadway located in Warr Acres, Oklahoma. The segment chosen for this study spans from NW 51st St to NW 39th St and is 0.84 miles long. N MacArthur Blvd is a commercial corridor and serves as a key roadway connection for the region. This corridor is home to a variety of businesses, restaurants, and a childcare facility. N MacArthur Blvd includes sidewalks on both sides of the roadway for pedestrians to safely travel north-south. This corridor experiences a posted speed limit of 40 MPH with from NW 39th St to NW 41st St and a volume of 13,400 vehicles per day. Aside from the posted speed limit, from NW 39th St to NW 41st St there is a 25 MPH school zone due to Central Elementary School and Putman City Academy being in close proximity to the corridor.

CRASH HISTORY

From 2017-2021, N MacArthur Blvd experienced 125 total crashes. 29 of the total crashes were high injury crashes (KABs). Key takeaways for the five-year crash history along N MacArthur Blvd include:

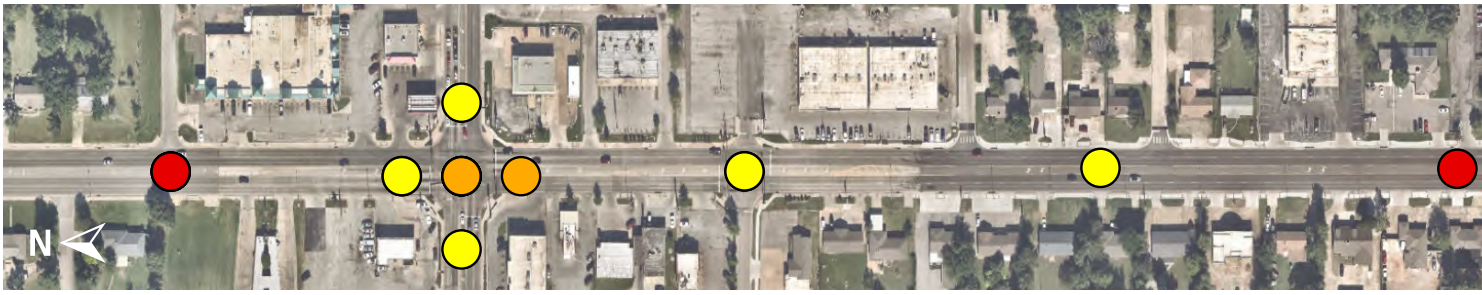
- 100% of KAB crashes were intersection-related
- The top manner of collision was 'Rear-End' crashes, which contributed to 48 of the 125 total crashes (38.4%)
- The top contributing factor of crashes in was 'Failed to Yield or Stop', which contributed to 43 of the 125 total crashes (34.4%)

Exhibit 13 on shows existing conditions of N MacArthur Blvd.

Exhibit 13. Existing Conditions for Corridor 3

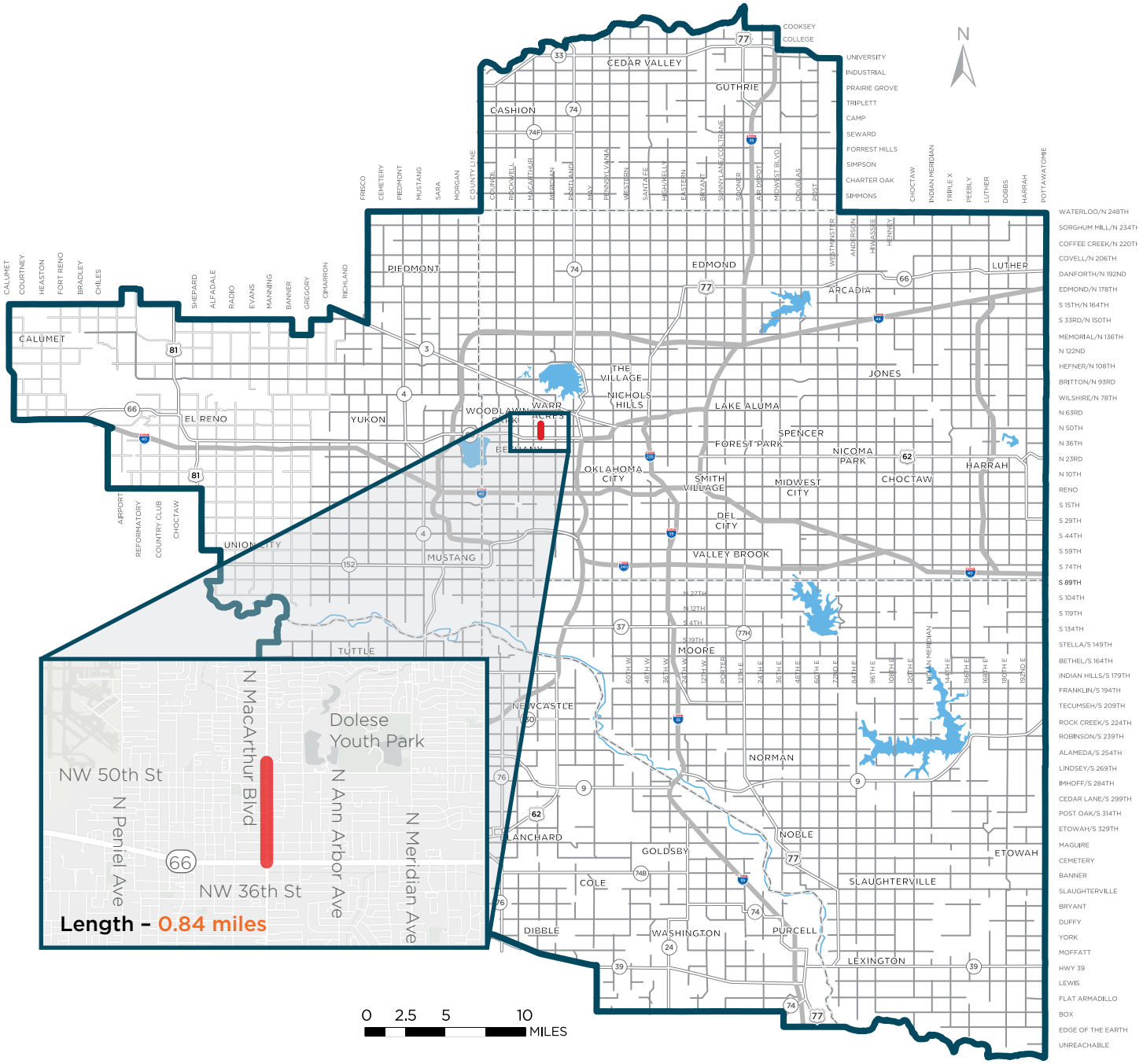
EMPHASIS AREAS (% OF KABs)	TOP CONTRIBUTING FACTORS	TOP MANNERS OF COLLISION
Intersection Related 100%	Failed to Yield or Stop 43 Crashes (34.4%)	Rear-End 48 Crashes (38.4%)
Vulnerable Road Users 9.4%	Followed Too Close 24 Crashes (19.2%)	Angle-Turning 44 Crashes (35.2%)
Lane Departure 6.3%	Improper Turn 14 Crashes (11.2%)	Right-Angle 13 Crashes (10.4%)
Work Zone Related 6.3%		

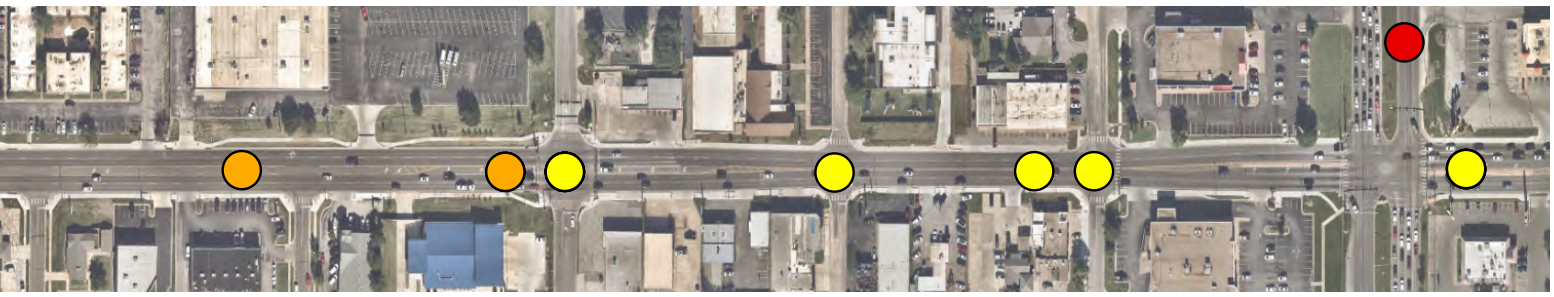
Exhibit 13. Corridor 3 High Injury Crash Locations (continued)



Fatal Crash (K) – 3 Severe Injury (A) – 3 Possible Injury (B) – 23

Exhibit 13. Corridor 3 Location Map (continued)





CORRIDOR RECOMMENDATIONS

N MacArthur Blvd stood out as a candidate for constructing a raised median with full access at intersections and right-in, right-out only access at driveways and businesses due to the large number of conflict points present throughout the corridor. Concurrently, the following unsignalized intersections are recommended to be right-in, right-out only:

- NW 40th St
- NW 41st St
- NW 43rd St
- NW 45th St
- NW 46th St
- NW 47th St
- NW 51st St

INTERSECTION SPECIFIC RECOMMENDATIONS

For intersections along N MacArthur Boulevard, intersection-specific recommendations were made that could increase traffic safety. Listed below are the intersections along with their specific recommendations:

NW 39th St

- Install high visibility crosswalks to increase pedestrian visibility

NW 40th St

- Repair the existing rapid-flashing beacon

NW 42nd St

- Update the signal head to include a flashing yellow arrow to allow for protected-permitted left turns
- Install high visibility crosswalks to increase pedestrian visibility

NW 49th St

- Install high visibility crosswalks to increase pedestrian visibility
- Ensure pedestrian facilities are ADA-compliant

NW 50th St

- Install high visibility crosswalks to increase pedestrian visibility

Exhibit 21 on page 91 visually summarizes all the listed recommendations.

COUNTERMEASURE APPLICATION RESULTS

All recommendations for N MacArthur Boulevard are listed in Table 11 with the assigned countermeasure and crash modification factor. The countermeasures with the highest reduction rate are installing a raised median, installing high visibility crosswalks, and installing a rectangular rapid flashing beacon (RRFB).

Table 11. Countermeasure Application Results for Corridor 3: N MacArthur Boulevard

ID	LOCATION	RECOMMENDATION	COUNTERMEASURE	CMF	CRASH TYPE	CRASHES REDUCE OVER 20-YEAR PERIOD
3.1	Corridor-wide	Install Raised Median	Install Raised Median	0.29	All	355
3.A.1	NW 39th St	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	21
3.B.1	NW 40th St	Install Rectangular Rapid Flashing Beacon	Install Rectangular Rapid Flashing Beacon (RRFB)	0.31	Vehicle/Ped	25
3.D.1	NW 42nd St	Updated Signal Head to Include Flashing Yellow Arrow	Change From Permissive Only to Flashing Yellow Arrow Protected/Permissive Left Turn	0.598	Left Turn	4
3.D.2	NW 42nd St	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	29
3.I.1	NW 49th St	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	12
3.J.1	NW 50th St	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	92

CORRIDOR 4: E RENO AVENUE

CONTEXT

E Reno Ave is a four-lane major collector roadway located in Del City, Oklahoma. This 0.51-mile-long segment spans from N Vickie Dr to Sooner Rd. E Reno Ave experiences a more suburban context. This corridor's adjacent land uses are primarily residential, but also includes some commercial uses such as storage units, a gas station, and a commercial center. E Reno Ave is missing pedestrian facilities along most of this study segment and does not have safe crosswalks. This corridor has a posted speed limit of 40 MPH and a volume of 17,900 vehicles per day.

CRASH HISTORY

From 2017-2021, E Reno Ave experienced 63 total crashes, and 14 of the total crashes were high injury crashes (KABs). Key takeaways for the five-year crash history along E Reno Ave include:

- 100% of KAB crashes were intersection-related
- The top manner of collision was 'Rear-End' crashes, which contributed to 29 of the 63 total crashes (46.0%)
- The top contributing factor of crashes in was 'Driver Inattention', which contributed to 18 of the 63 total crashes (28.6%)

Exhibit 14 shows existing conditions of E Reno Ave.

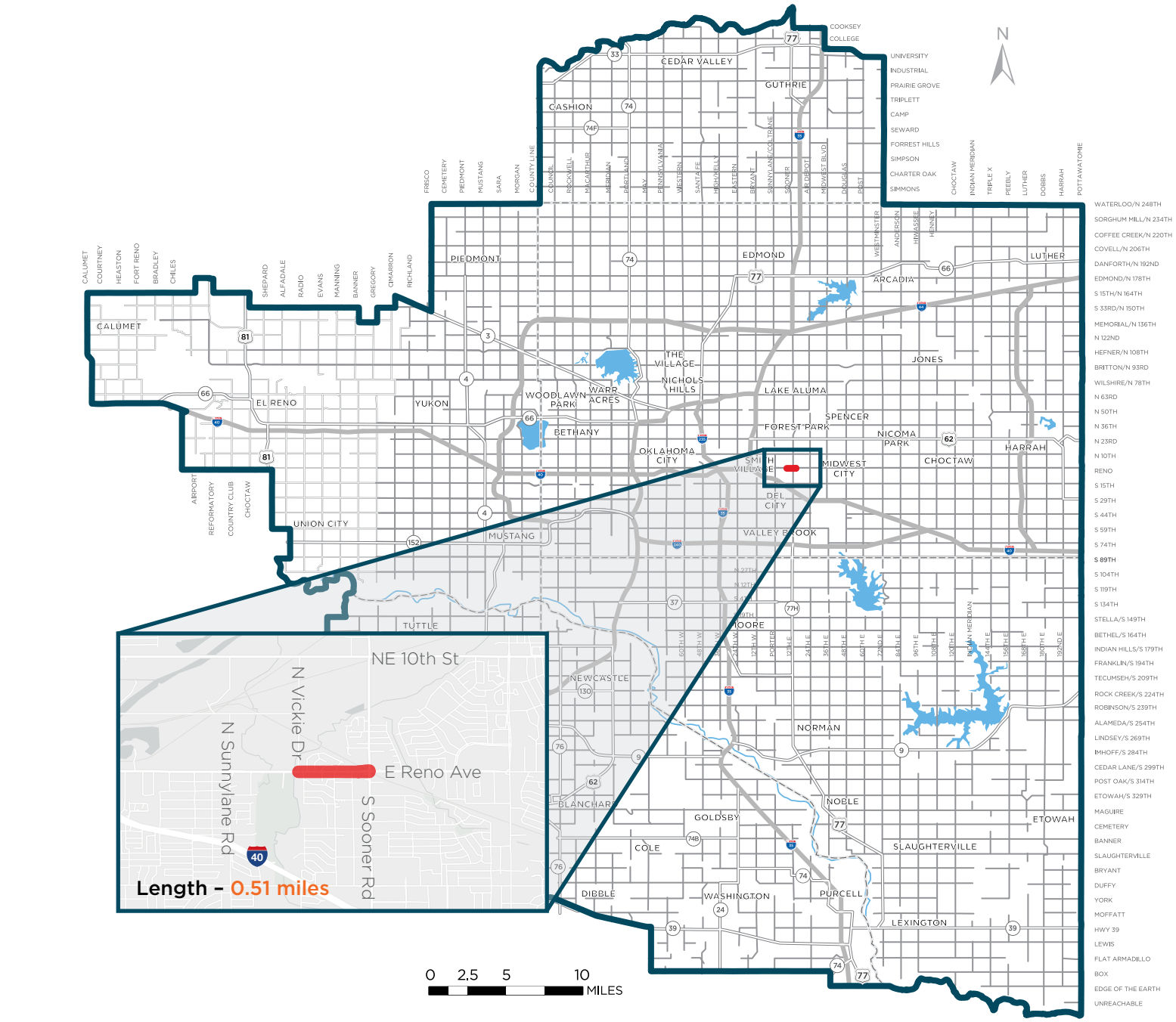
Exhibit 14. Existing Conditions for Corridor 4

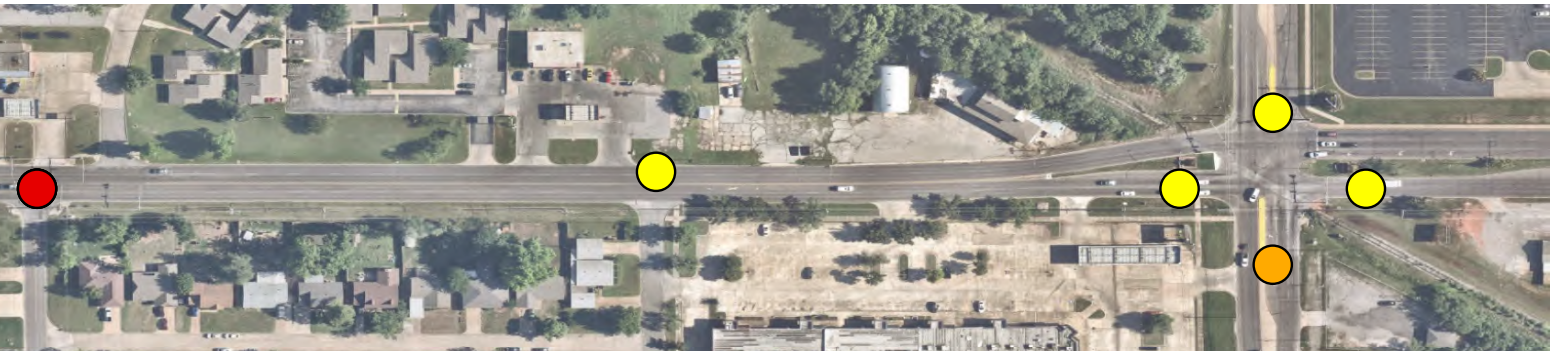
EMPHASIS AREAS (% OF KABs)	TOP CONTRIBUTING FACTORS	TOP MANNERS OF COLLISION
Intersection Related 100%	Driver Inattention 18 Crashes (28.6%)	Rear-End 29 Crashes (46.0%)
Lane Departure 21.4%	Followed Too Close 14 Crashes (22.2%)	Angle-Turning 21 Crashes (33.3%)
Impaired Driving 14.3%	Improper Turn 7 Crashes (11.1%)	Fixed Object – Traffic Sign 2 Crashes (3.2%)
Vulnerable Road Users 7.1%		

Exhibit 14. Corridor 4 High Injury Crash Locations (continued)

Fatal Crash (K) – 1 Severe Injury (A) – 2 Possible Injury (B) – 11

Exhibit 14. Corridor 4 Location Map Location Map (continued)





CORRIDOR RECOMMENDATIONS

It is recommended that sidewalks be constructed to enhance the pedestrian experience and connectivity along E Reno Ave. Furthermore, to improve accessibility, ADA-compliant curb ramps and high visibility crosswalks are recommended to be installed at intersections along the E Reno Ave. Due to the roadway's context and crash history, it is recommended that rumble strips be implemented along the centerline to decrease lane departure collisions. An additional recommendation is to increase lighting along the entire corridor to help address night crashes caused by a lack of visibility.

INTERSECTION SPECIFIC RECOMMENDATIONS

For intersections along E Reno Ave, intersection-specific recommendations were made that could increase traffic safety. Listed below are the intersections along with their specific recommendations:

Howard Dr

- Close the easternmost driveway at the gas station to decrease conflict points
- Install retroreflective backplates
- Install high visibility crosswalks to increase pedestrian visibility
- Ensure pedestrian facilities are ADA-compliant

N Sooner Road

- Add luminaires to improve visibility
- Install retroreflective backplates
- Install high visibility crosswalks to increase pedestrian visibility
- Ensure pedestrian facilities are ADA-compliant

Exhibit 22 on page 92 visually summarizes all the listed recommendations.

COUNTERMEASURE APPLICATION RESULTS

All recommendations for E Reno Avenue are listed in Table 12 with the assigned countermeasure and crash modification factor. The countermeasures with the highest reduction rate are installing sidewalk, striping high visibility crosswalks, and installing centerline rumble strips.

Table 12. Countermeasure Application Results for Corridor 4: E Reno Avenue

ID	LOCATION	RECOMMENDATION	COUNTERMEASURE	CMF	CRASH TYPE	CRASHES REDUCE OVER 20-YEAR PERIOD
4.1	Corridor-wide	Construct Sidewalk	Install Sidewalk	0.598	Vehicle/Ped	102
4.2	Corridor-wide	Add Luminaires	Install Lighting	0.68	Night	17
4.3	Corridor-wide	Add Rumble Strips to Centerline	Install Centerline Rumble Strips	0.89	All	28
4.E.1	Howard Dr	Close Driveway	Presence Of Driveway on An Intersection Approach Corner	0.79	All	9
4.E.2	Howard Dr	Update Signal Head to Include Retroreflective Backplate	Add 3-Inch Yellow Retroreflective Sheeting to Signal Backplates	0.85	All	9
4.E.3	Howard Dr	Stripe High Visibility Crosswalks	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	24
4.G.1	Sooner Rd	Add Luminaire	Install Lighting	0.68	Night	8
4.G.2	Sooner Rd	Update Signal Head to Include Retroreflective Backplates	Add 3-Inch Yellow Retroreflective Sheeting to Signal Backplates	0.85	All	23
4.G.3	Sooner Rd	Stripe High Visibility Crosswalks	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	58

CORRIDOR 5: E HIGHWAY 9

CONTEXT

E Highway 9 is a five-lane principal arterial roadway located between Goldsby and Newcastle, Oklahoma. The segment of E Highway being studied for the ACOG RSAP is 0.35 miles long, spanning from Bankers Ave to the I-35 southbound frontage road (SBFR). E Highway 9 encounters a rural context with a Sonic Drive-In and Love's on the northside of the corridor, and the Riverwind Casino to the south. E Highway 9 does not provide pedestrian facilities. There is currently construction for a diverging diamond interchange (DDI) being implemented at I-35 and E Highway 9. Just east of the study segment. This project is likely to affect the traffic on this study corridor once completed. There is an additional roadway, Harvey Rd, being constructed directly east of the Love's and will intersect E Highway 9. This corridor has a posted speed limit of 45 MPH and a volume of 21,400 vehicles per day.

CRASH HISTORY

From 2017-2021, E Highway 9 experienced 144 total crashes, and 12 of the total crashes were high injury crashes (KABs). Key takeaways for the five-year crash history along E Highway 9 include:

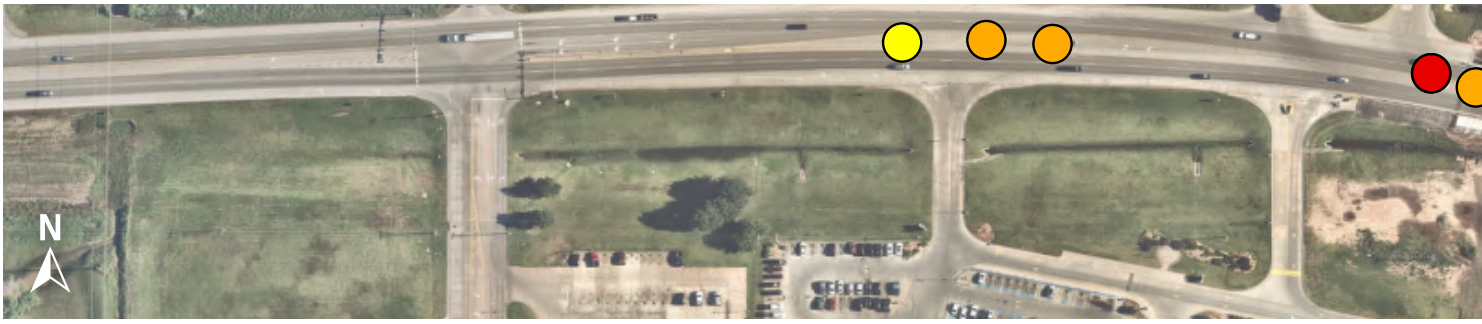
- 50% of KAB crashes were intersection-related
- The top manner of collision was 'Rear-End' crashes, which contributed to 77 of the 144 total crashes (53.3%)
- The top contributing factor of crashes in was 'Followed Too Close', which contributed to 53 of the 144 total crashes (36.8%)

Exhibit 15 shows existing conditions of E Highway 9.

Exhibit 15. Existing Conditions for Corridor 5

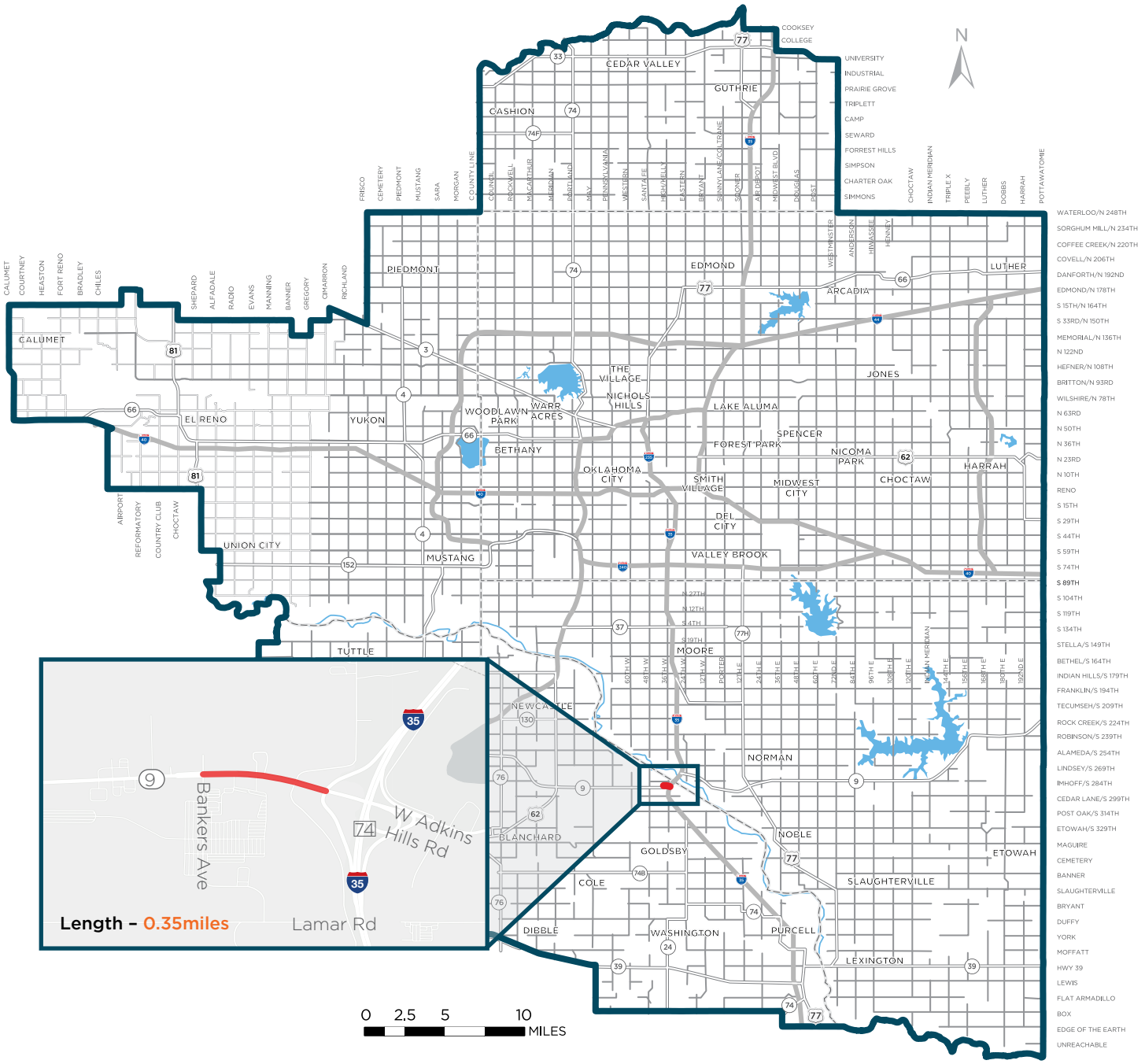
EMPHASIS AREAS (% OF KABs)	TOP CONTRIBUTING FACTORS	TOP MANNERS OF COLLISION
Intersection Related 50%	Followed Too Close 53 Crashes (36.8%)	Rear-End 77 Crashes (53.5%)
Lane Departure 16.7%	Improper Turn 36 Crashes (25.0%)	Angle-Turning 40 Crashes (27.8%)
Impaired Driving 8.3%	Driver Inattention 17 Crashes (11.8%)	Sideswipe – Same 15 Crashes (10.4%)
Vulnerable Road Users 8.3%		

Exhibit 15. Corridor 5 High Injury Crash Locations (continued)



Fatal Crash (K) – 1 Severe Injury (A) – 4 Possible Injury (B) – 7

Exhibit 15. Corridor 5 Location Map (continued)



CORRIDOR RECOMMENDATIONS

Due to the crashes related to drivers coming to and leaving the Riverwind Casino, it is recommended to construct a raised median from Bankers Ave to I-35 SBFR to manage access and reduce conflict points.

E Highway 9 from Bankers Ave to I-35 SBFR lacks illumination on a corridor level. Luminaires are at the Bankers Ave intersection but not anywhere along the road segment. Due to the casino's presence, many drivers are on E Highway 9 at night. Additional lighting should be added along the corridor to improve visibility and reduce nighttime crashes.

INTERSECTION SPECIFIC RECOMMENDATIONS

For intersections along E Highway 9, intersection-specific recommendations were made that will increase traffic safety. Listed below are the intersections along with their specific recommendations:

Bankers Ave

- Update signal heads with new LED displays to improve traffic signal visibility

Riverwind Casino Driveways

- Add "Right-In, Right-Out Only" signage to aid drivers in navigating new infrastructure

Love's Driveway

- Close the easternmost driveway of the Love's gas station due to construction of a new roadway

Exhibit 23 on page 93 visually summarizes all the listed recommendations.

COUNTERMEASURE APPLICATION RESULTS

All recommendations for E Highway 9 are listed in Table 13 with the assigned countermeasure and crash modification factor. Of all the countermeasure recommendations for this corridor, installing a raised median would have the largest impact with a reduction of 409 crashes over a 20-year period.

Table 13. Countermeasure Application Results for Corridor 5: E Highway 9

ID	LOCATION	RECOMMENDATION	COUNTERMEASURE	CMF	CRASH TYPE	CRASHES REDUCE OVER 20-YEAR PERIOD
5.1	Corridor-wide	Install Raised Median	Install Raised Median	0.29	All	409
5.2	Corridor-wide	Add Luminaires	Install Lighting	0.68	Night	40
5.A.1	Bankers Ave	Replace Signal Head Lights	Improve Signal Visibility, Including Signal Lens Size Upgrade, Installation of New Back-Plates, Addition of Reflective Tapes to Existing Back-Plates, And Installation Of Additional Signal Heads	0.902	Night	1
5.D.1	Love's Driveway	Close Driveway	Presence of Driveway on An Intersection Approach Corner	0.79	All	3

CORRIDOR 6: W VANDAMENT AVENUE

CONTEXT

W Vandament Ave is a five-lane minor arterial roadway located in Yukon, Oklahoma. This corridor spans a total of 0.5 miles from Garth Brooks Blvd to S Holly Ave. W Vandament Ave serves as a primary east-west connection for Yukon residents. The context of the adjacent land uses on this segment includes a mix of residential and commercial uses. There are currently pedestrian facilities on most of the roadway. This corridor has a posted speed limit of 35 MPH and a volume of 11,000 vehicles per day.

CRASH HISTORY

From 2017-2021, W Vandament Ave experienced 91 total crashes with 12 of them being high injury crashes (KABs). Key takeaways for the five-year crash history along W Vandament Ave include:

- 100% of KAB crashes were intersection-related
- The top manner of collision was 'Rear-End' crashes, which contributed to 38 of the 91 total crashes (41.8%)
- The top contributing factor of crashes in was 'Failed to Yield or Stop', which also contributed to 38 of the 91 total crashes (41.8%)

Exhibit 16 shows existing conditions of W Vandament Ave.

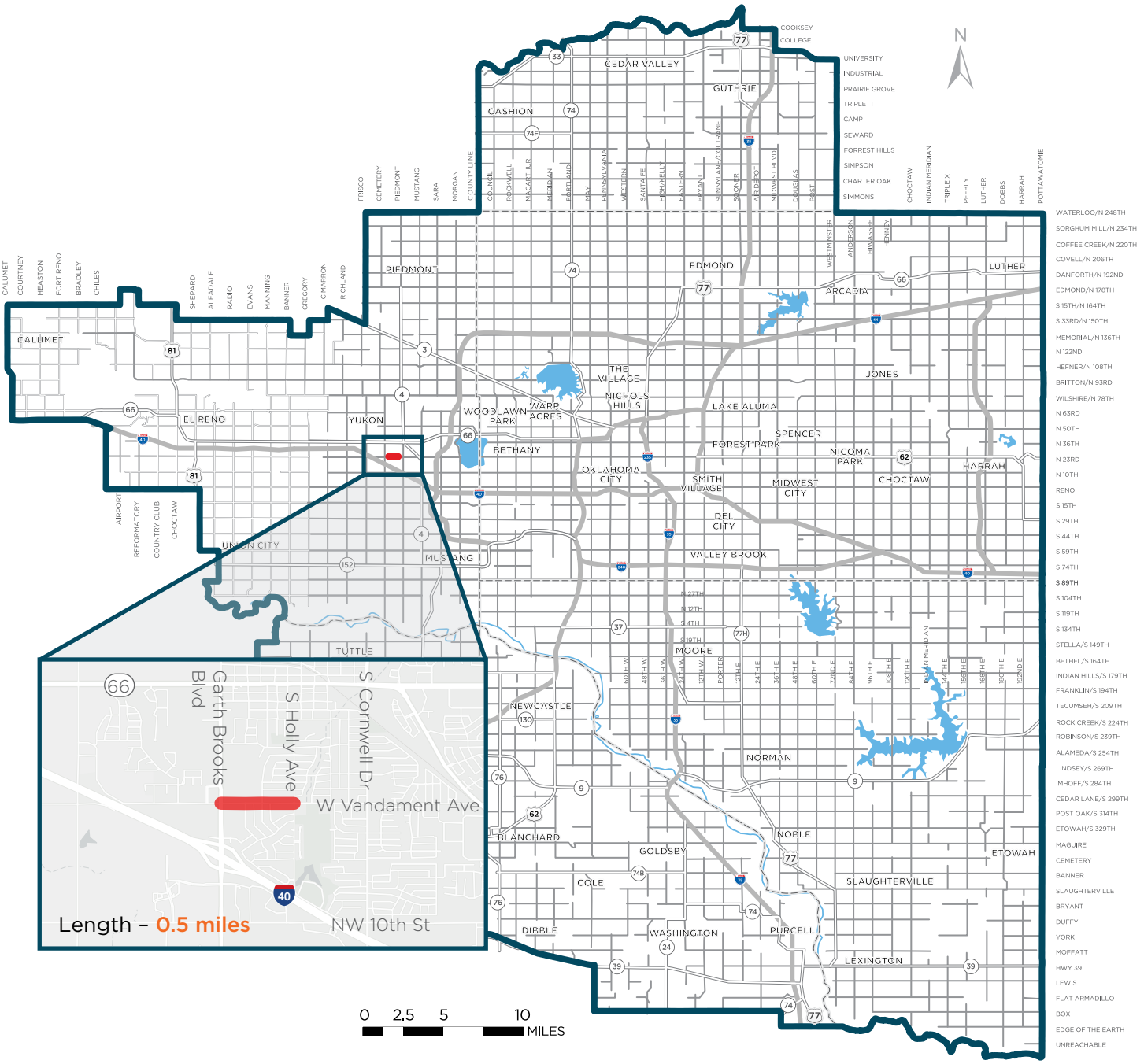
Exhibit 16. Existing Conditions for Corridor 6

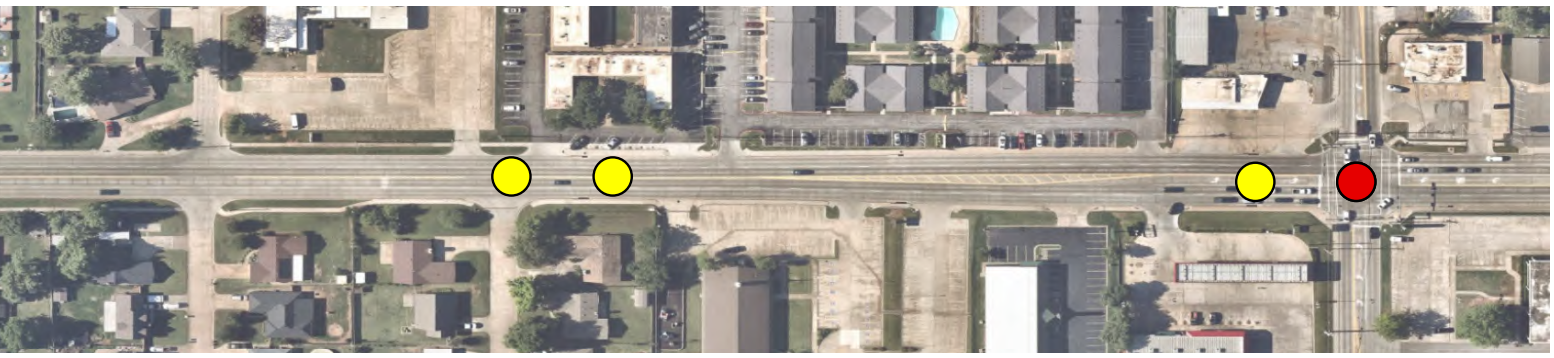
EMPHASIS AREAS (% OF KABs)	TOP CONTRIBUTING FACTORS	TOP MANNERS OF COLLISION
Intersection Related 100%	Failed to Yield or Stop 38 Crashes (41.8%)	Rear-End 38 Crashes (41.8%)
Lane Departure 16.7%	Driver Inattention 19 Crashes (20.9%)	Angle-Turning 32 Crashes (35.2%)
Impaired Driving 8.3%	Followed Too Close 9 Crashes (9.9%)	Right-Angle 11 Crashes (12.1%)

Exhibit 16. Corridor 6 High Injury Crash Locations (continued)

Fatal Crash (K) – 1 Severe Injury (A) – 0 Possible Injury (B) – 11

Exhibit 16. Corridor 6 Location Map (continued)





CORRIDOR RECOMMENDATIONS

The corridor's current lighting conditions are a safety concern. Implementing addition luminaires along the corridor, specifically in intersections and areas with high vehicular and pedestrian concentrations, is recommended for safety improvements.

In the short term, it is recommended to place rumble strips along the centerline of the corridor to mitigate lane departure crashes. Long-term, it is recommended that W Vandament be converted to a five-lane road, with 10' for through lanes and a 12' center two-way left-turn lane. This countermeasure would mitigate many rear-end and other turn-related collisions by allowing vehicles to use the center turn lane to turn left and providing a refuge area for cars turning left onto W Vandament Ave.

Additionally, to notify drivers of their speeds, speed feedback signs should be placed along the corridor with the speed limit signs.

It was identified that the intersecting streets on W Vandament Ave do not include striped crosswalks and stop bars. Including these inexpensive markings increases vehicular and pedestrian safety by alerting drivers of pedestrians and designating a safe location for vehicles to stop as they approach the stop sign. It is recommended that all unsignalized intersections be modified to include crosswalks and stop bars.

INTERSECTION SPECIFIC RECOMMENDATIONS

For intersections along W Vandament Ave, intersection-specific recommendations were made that will increase traffic safety. Listed below are the intersections along with their specific recommendations:

Garth Brooks Blvd

- Install retroreflective backplates
- Install high visibility crosswalks to improve pedestrian safety

Summerton Pl, Winnipeg Dr, Kingston Dr, and Queensboro Pl

- Install high visibility crosswalks at each of the intersections to improve pedestrian safety
- Add stop bars at each of the intersections

S Holly Ave

- Install retroreflective backplates
- Consolidate driveways to decrease conflict points
- Add luminaires to improve visibility
- Install high visibility crosswalks to improve pedestrian safety
- Update pedestrian crossings to include ADA-compliant ramps

Exhibit 24 on page 94 visually summarizes all the listed recommendations.

COUNTERMEASURE APPLICATION RESULTS

All recommendations for W Vandament Avenue are listed in Table 14 with the assigned countermeasure and crash modification factor. The countermeasures with the highest reduction rate are striping high visibility crosswalks, striping a center left turn lane, and installing centerline rumble strips.

Table 14. Countermeasure Application Results for Corridor 6: W Vandament Avenue

ID	LOCATION	RECOMMENDATION	COUNTERMEASURE	CMF	CRASH TYPE	CRASHES REDUCE OVER 20-YEAR PERIOD
6.1	Corridor-wide	Stripe Center Left Turn Lane	Install TWLTL (Two-Way Left Turn Lane) On Two Lane Road	0.739	All	33
6.2	Corridor-wide	Place Speed Feedback Signs	Install Dynamic Speed Feedback Sign	0.95	All	19
6.3	Corridor-wide	Add Luminaires	Install Lighting	0.68	Night	21
6.4	Corridor-wide	Add Rumble Strips to Centerline	Install Centerline Rumble Strips	0.89	All	41
6.A.1	Garth Brooks Blvd	Update Signal Head to Include Retroreflective Backplates	Add 3-Inch Yellow Retroreflective Sheeting to Signal Backplates	0.85	All	28
6.A.2	Garth Brooks Blvd	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	74
6.B.1	Summerton Pl	Refresh Stop Bar	Implement Systemic Signing and Marking Improvements at Stop-Controlled Intersections	0.917	All	2
6.B.2	Summerton Pl	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	10
6.C.1	Winnipeg Dr	Refresh Stop Bar	Implement Systemic Signing and Marking Improvements at Stop-Controlled Intersections	0.917	All	1
6.C.2	Winnipeg Dr	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	4
6.D.1	Kingston Dr	Refresh Stop Bar	Implement Systemic Signing and Marking Improvements at Stop-Controlled Intersections	0.917	All	2
6.D.2	Kingston Dr	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	8
6.E.1	Queensboro Pl	Trim Vegetation	Remove Or Relocate Fixed Objects Outside of Clear Zone	0.62	All	7
6.E.2	Queensboro Pl	Refresh Stop Bar	Implement Systemic Signing and Marking Improvements at Stop-Controlled Intersections	0.917	All	2
6.E.3	Queensboro Pl	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	7
6.F.1	S Holly Ave	Add Luminaire	Install Lighting	0.68	Night	8
6.F.2	S Holly Ave	Update Signal Head to Include Retroreflective Backplates	Add 3-Inch Yellow Retroreflective Sheeting to Signal Backplates	0.85	All	17
6.F.3	S Holly Ave	Consolidate Driveways Near Intersection	Presence Of Driveway on An Intersection Approach Corner	0.79	All	7

CORRIDOR 7: SW 19TH STREET

CONTEXT

SW 19th St is a five-lane principal arterial located in Moore, Oklahoma. The segment limits are from S Telephone Rd to Crystal Dr and cover 0.5 miles. This stretch of SW 19th St crosses over I-35 and the adjacent land uses are commercial. SW 19th St provides pedestrian facilities west of Riverwalk Dr and east of S Boardwalk Ave. The overpass at I-35 does not include sidewalks due to right-of-way constraints. This corridor has a posted speed limit of 35 MPH and a volume of 27,000 vehicles per day.

CRASH HISTORY

From 2017-2021, SW 19th St experienced 250 total crashes with 46 of them being categorized as high injury crashes (KABs). Key takeaways for the five-year crash history along SW 19th St include:

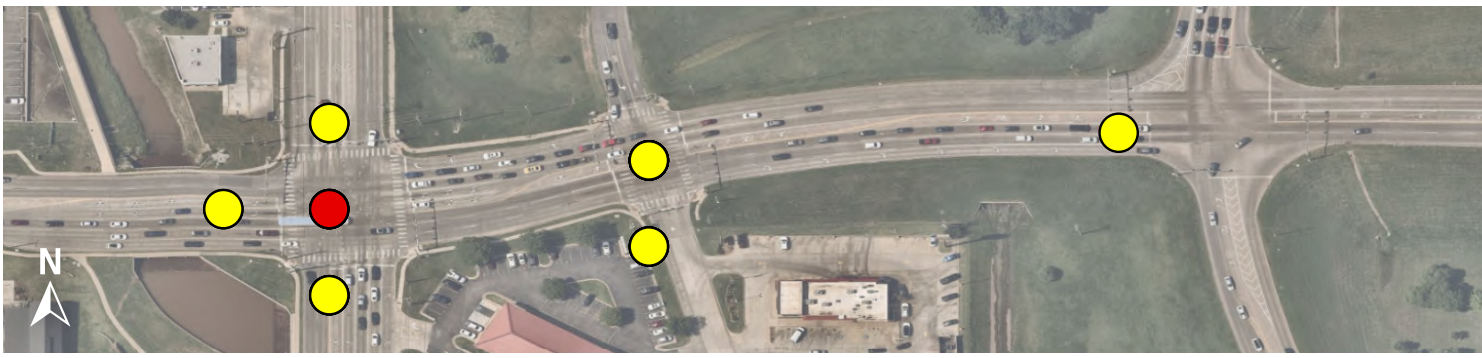
- 100% of KAB crashes were intersection-related
- The top manner of collision was 'Angle-Turning' crashes, which contributed to 124 of the 250 total crashes (49.6%)
- The top contributing factor of crashes in was 'Failed to Yield or Stop', which also contributed to 86 of the 250 total crashes (34.4%)

Exhibit 17 shows existing conditions of SW 19th St.

Exhibit 17. Existing Conditions for Corridor 7

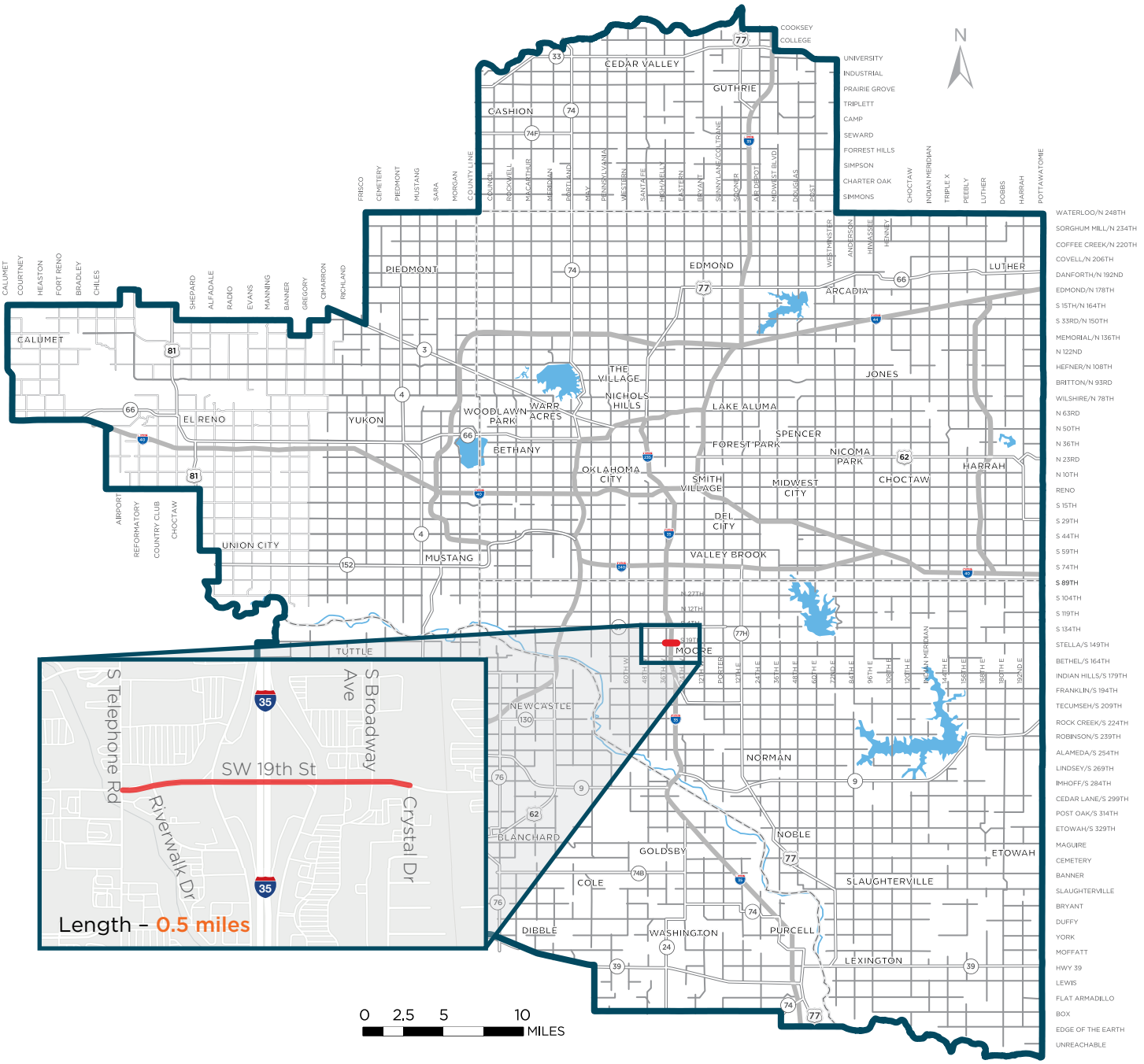
EMPHASIS AREAS (% OF KABs)	TOP CONTRIBUTING FACTORS	TOP MANNERS OF COLLISION
Intersection Related 100%	Failed to Yield or Stop 86 Crashes (34.4%)	Angle-Turning 124 Crashes (49.6%)
Lane Departure 8.7%	Improper Turn 51 Crashes (20.4%)	Rear-End 76 Crashes (30.4%)
Impaired Driving 6.5%	Followed Too Close 37 Crashes (14.8%)	Right-Angle 27 Crashes (10.8%)
Unsafe Speed 2.2%		

Exhibit 17. Corridor 7 High Injury Crash Locations (continued)



Fatal Crash (K) – 2 Severe Injury (A) – 2 Possible Injury (B) – 42

Exhibit 17. Corridor 7 Location Map (continued)



INTERSECTION SPECIFIC RECOMMENDATIONS

For intersections along SW 19th St, intersection-specific recommendations were made that will increase traffic safety. Listed below are the intersections along with their specific recommendations:

S Telephone Rd

- Install high visibility crosswalks to increase pedestrian safety
- Update crosswalk ramps to be ADA-compliant
- Trim vegetation to increase drivers' sight distance
- Install retroreflective backplates to increase the visibility of traffic signal heads

Riverwalk Dr

- Remove signal to mitigate congestion issues at this intersection
- Construct a hooded left turn heading westbound on SW 19th St

I-35 Frontage Roads

- Construct roundabouts to decrease speeds to help mitigate the issues creates by the poor vertical sight distance between the two frontage roads

Sam's Club, McDonald's, and Braum's Driveway

- Install a raised median to aid in resolving congestion issues
- Limit these businesses' driveways to right-in, right-out only

S Broadway St

- Install high visibility crosswalks to improve pedestrian safety
- Install retroreflective backplates to increase the visibility of traffic signal heads

Exhibit 25 on page 95 visually summarizes all the listed recommendations.

COUNTERMEASURE APPLICATION RESULTS

All recommendations for SW 19th Street are listed in Table 15 with the assigned countermeasure and crash modification factor. The countermeasures with the highest reduction rate are striping high visibility crosswalks, trimming vegetation to improve sight-distance, and installing ADA compliant curb ramps.

Table 15. Countermeasure Application Results for Corridor 7: SW 19th Street

ID	LOCATION	RECOMMENDATION	COUNTERMEASURE	CMF	CRASH TYPE	CRASHES REDUCE OVER 20-YEAR PERIOD
7.A.1	S Telephone Rd	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	136
7.A.2	S Telephone Rd	Install ADA Compliant Curb Ramps	Implement Systemic Signing and Visibility Improvements at Signalized Intersections	0.732	All	92
7.A.3	S Telephone Rd	Trim Vegetation	Remove or Relocate Fixed Objects Outside of Clear Zone	0.62	All	130
7.A.4	S Telephone Rd	Update Signal Head to Include Retroreflective Backplates	Add 3-Inch Yellow Retroreflective Sheeting to Signal Backplates	0.85	All	51
7.B.1	Riverwalk Dr	Close Signal, Hooded Left Turn for Westbound Left	Introduce Raised/Curb Left-Turn Channelization	0.87	All	25
7.B.2	Riverwalk Dr	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	77
7.C.1	I-35 SBFR	Construct Roundabout	Conversion Of Signal-Controlled Intersection to Roundabout	0.783	All	7
7.D.1	I-35 NBFR	Construct Roundabout	Conversion Of Signal-Controlled Intersection to Roundabout	0.783	All	0
7.E.1	Sam's Club, McDonald's, and Braum's Driveway	Place Median Barrier	Install Raised Median	0.29	All	0
7.F.1	Broadway St	Update Signal Head to Include Retroreflective Backplates	Add 3-Inch Yellow Retroreflective Sheeting to Signal Backplates	0.85	All	59
7.F.2	Broadway St	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	156

CORRIDOR 8: E HIGHWAY 37

CONTEXT

E Highway 37 is a five-lane minor arterial roadway located in Tuttle, Oklahoma. This 0.5-mile segment is primarily rural in context, with most of its adjacent land uses consisting of businesses such as a gas station, convenience store, restaurants, and other commercial uses. E Highway 37 and N Mustang Rd intersect along this study area and is the focal point of many of the safety concerns. This corridor has a posted speed limit of 55 MPH and a volume of 13,000 vehicles per day.

CRASH HISTORY

From 2017-2021, E Highway 37 experienced 69 total crashes. Eight of the total crashes were high injury crashes (KABs). Key takeaways for the five-year crash history along E Highway 37 include:

- 57.1% of KAB crashes were intersection-related
- The top manner of collision was 'Rear-End' crashes, which contributed to 34 of the 69 total crashes (49.3%)
- The top contributing factor of crashes in was 'Failed to Yield or Stop', which also contributed to 29 of the 69 total crashes (42.0%)

Exhibit 18 shows existing conditions of E Highway 37.

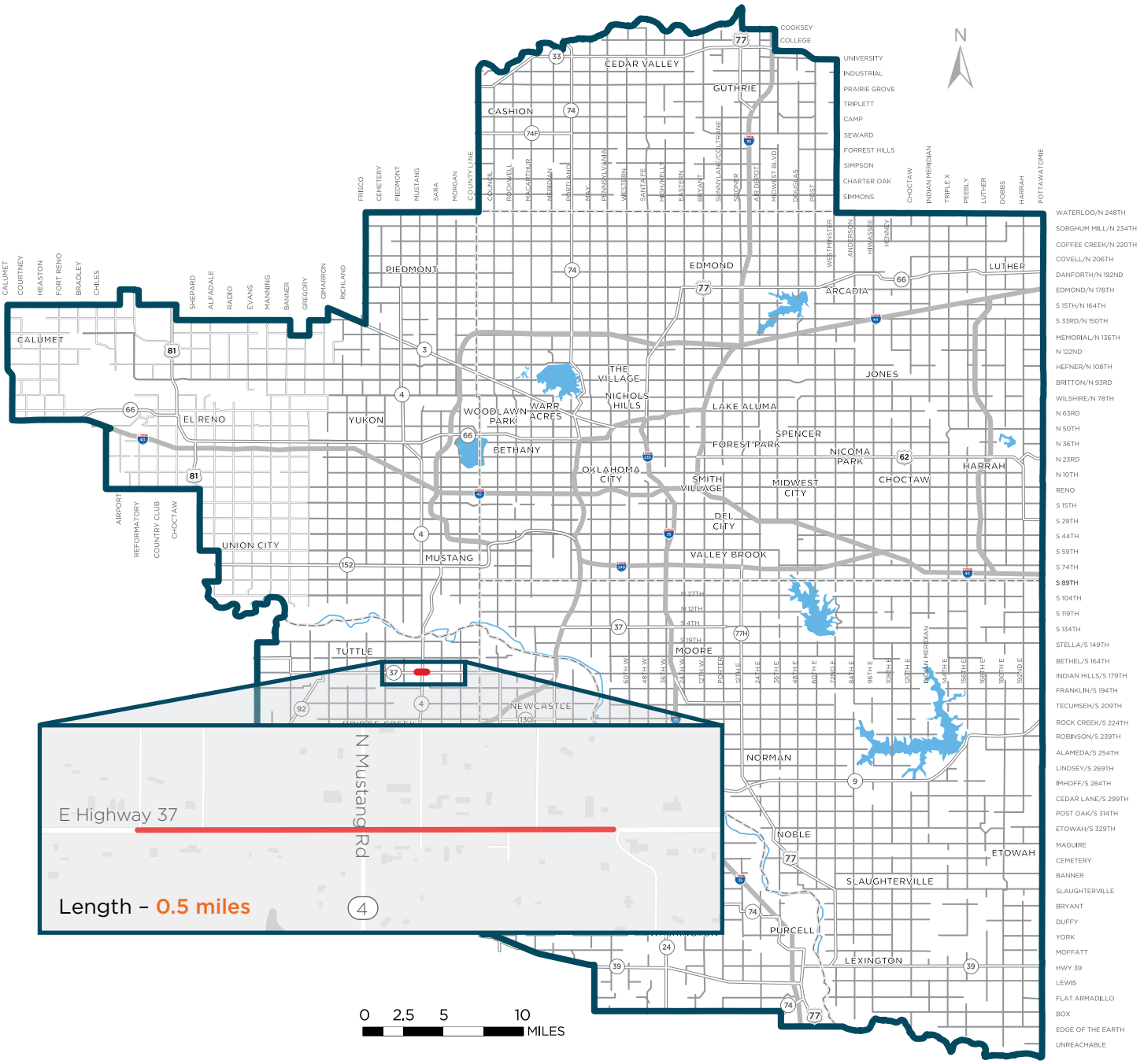
Exhibit 18. Existing Conditions for Corridor 8

EMPHASIS AREAS (% OF KABs)	TOP CONTRIBUTING FACTORS	TOP MANNERS OF COLLISION
Intersection Related 57.1%	Failed to Yield or Stop 29 Crashes (42.0%)	Rear-End 34 Crashes (49.3%)
Vulnerable Road Users 23.5%	Driver Inattention 15 Crashes (21.7%)	Angle-Turning 13 Crashes (18.8%)
Lane Departure 5.9%	Followed Too Close 6 Crashes (8.7%)	Right-Angle 10 Crashes (14.5%)
Impaired Driving 2.9%		

Exhibit 18. Corridor 8 High Injury Crash Locations (continued)

Fatal Crash (K) – 1 Severe Injury (A) – 1 Possible Injury (B) – 6

Exhibit 18. Corridor 8 Location Map (continued)



CORRIDOR RECOMMENDATIONS

To mitigate crashes related to speeding and following too close, it is recommended to implement transverse rumble strips and advanced warning signage to alert drivers on E Highway 37 of the downstream N Mustang Rd intersection. Transverse rumble strips are usually milled into the pavement and vibrate vehicles as they drive over them to alert drivers of the upcoming intersection.

Additionally, E Highway 37 proves to be a candidate for access management through driveway consolidation. Many commercial businesses currently exhibit two or more driveways. It is recommended that some driveways be considered for closing to reduce conflict points.

Cherrywood

- Add luminaires to improve visibility

N Mustang Rd

- Refresh roadway striping
- Add luminaires to improve visibility
- Install retroreflective backplates to improve traffic signal visibility
- Install high visibility crosswalks to increase pedestrian visibility
- Install crosswalk signals to improve pedestrian safety

Fawn

- Add luminaires to improve visibility

Exhibit 26 on page 96 visually summarizes all the listed recommendations.

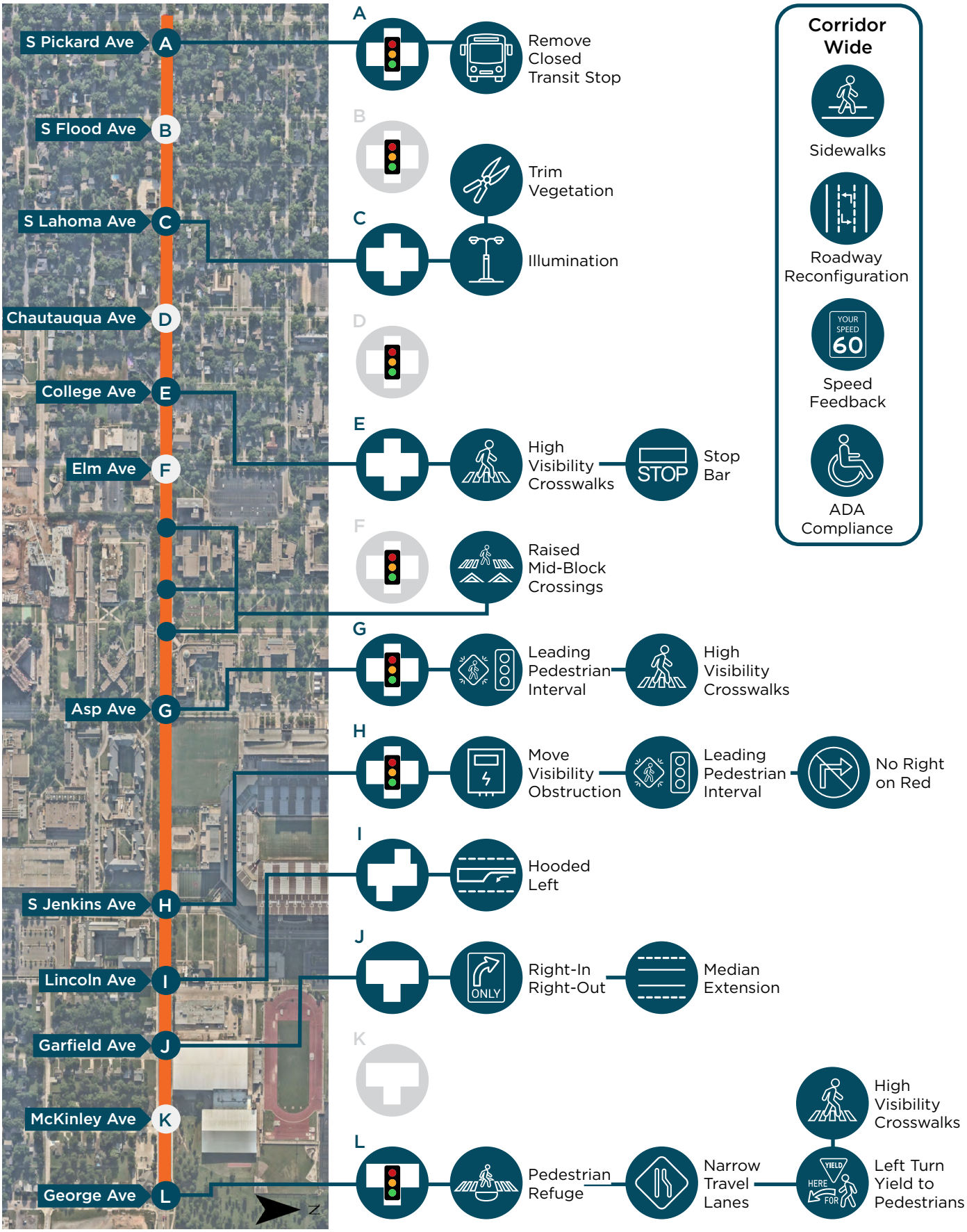
COUNTERMEASURE APPLICATION RESULTS

All recommendations for this corridor are listed in Table 16 with the assigned countermeasure and crash modification factor. The countermeasures with the highest reduction rate are installing Transverse Rumble Strips, striping high visibility crosswalks, and pedestrian signals.

Table 16. Countermeasure Application Results for Corridor 8: E Highway 37

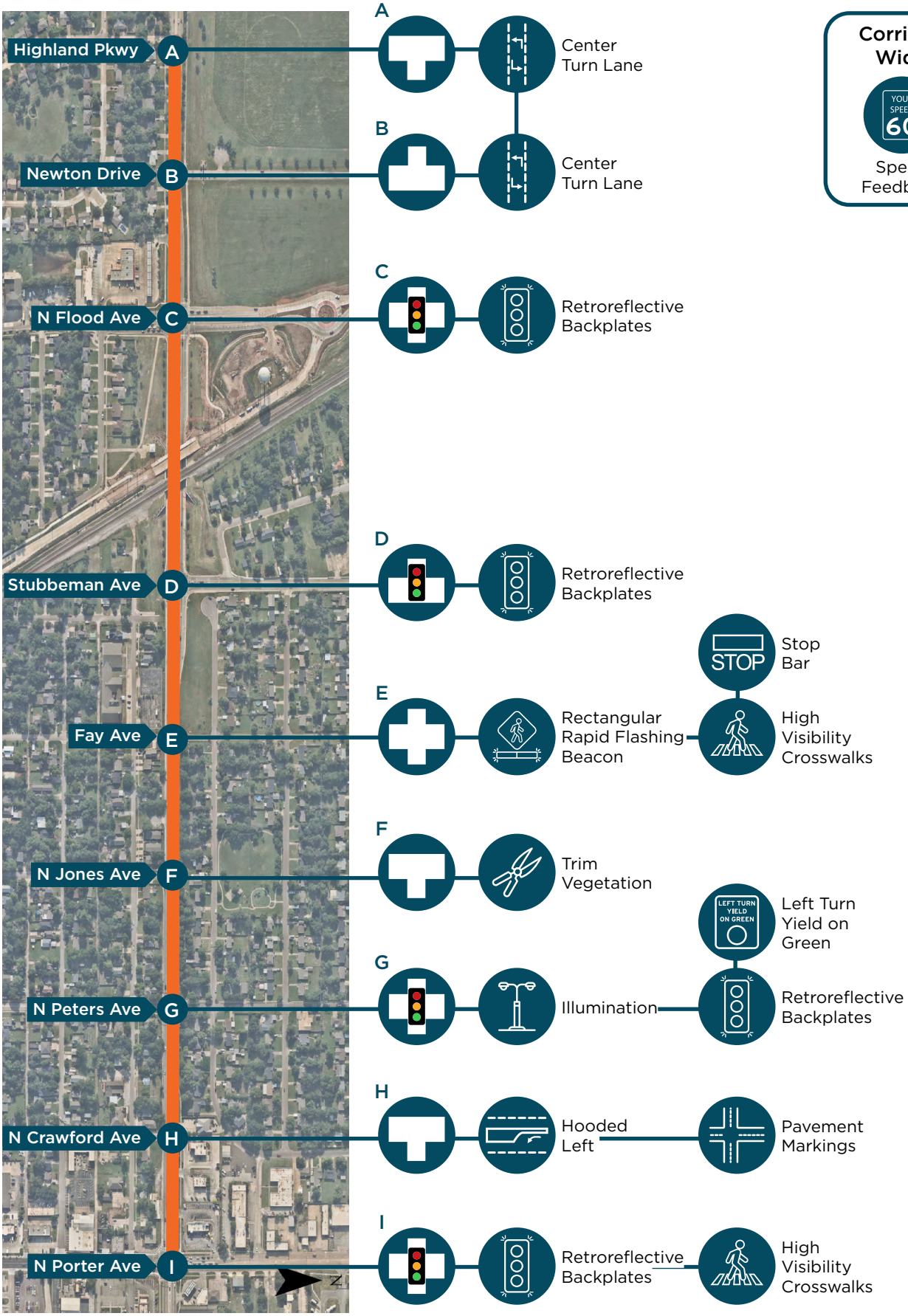
ID	LOCATION	RECOMMENDATION	COUNTERMEASURE	CMF	CRASH TYPE	CRASHES REDUCE OVER 20-YEAR PERIOD
8.1	Corridor-wide	Place Transverse Rumble Strips	Install Transverse Rumble Strips as Traffic Calming Device	0.66	All	94
8.2	Corridor-wide	Consolidate Driveway at Businesses with Multiple Driveways	Presence Of Driveway on An Intersection Approach Corner	0.79	All	16
8.A.1	Cherrywood	Install Luminaire	Install Lighting	0.68	Night	0
8.C.1	Mustang Rd	Stripe High Visibility Crosswalk	Install High-Visibility Crosswalk	0.6	Vehicle/Ped	24
8.C.2	Mustang Rd	Install Pedestrian Signals	Implement Systemic Signing and Visibility Improvements at Signalized Intersections	0.732	All	17
8.C.3	Mustang Rd	Update Signal Head to Include Retroreflective Backplates	Add 3-Inch Yellow Retroreflective Sheeting to Signal Backplates	0.85	All	9
8.C.4	Mustang Rd	Install Luminaire	Install Lighting	0.68	Night	4
8.C.5	Mustang Rd	Restripe Pavement Markings	Upgrade Intersection Pavement Markings	0.75	All	15
8.E1	Fawn	Install Luminaire	Install Lighting	0.68	Night	4

Exhibit 19. Recommendations for Corridor 1



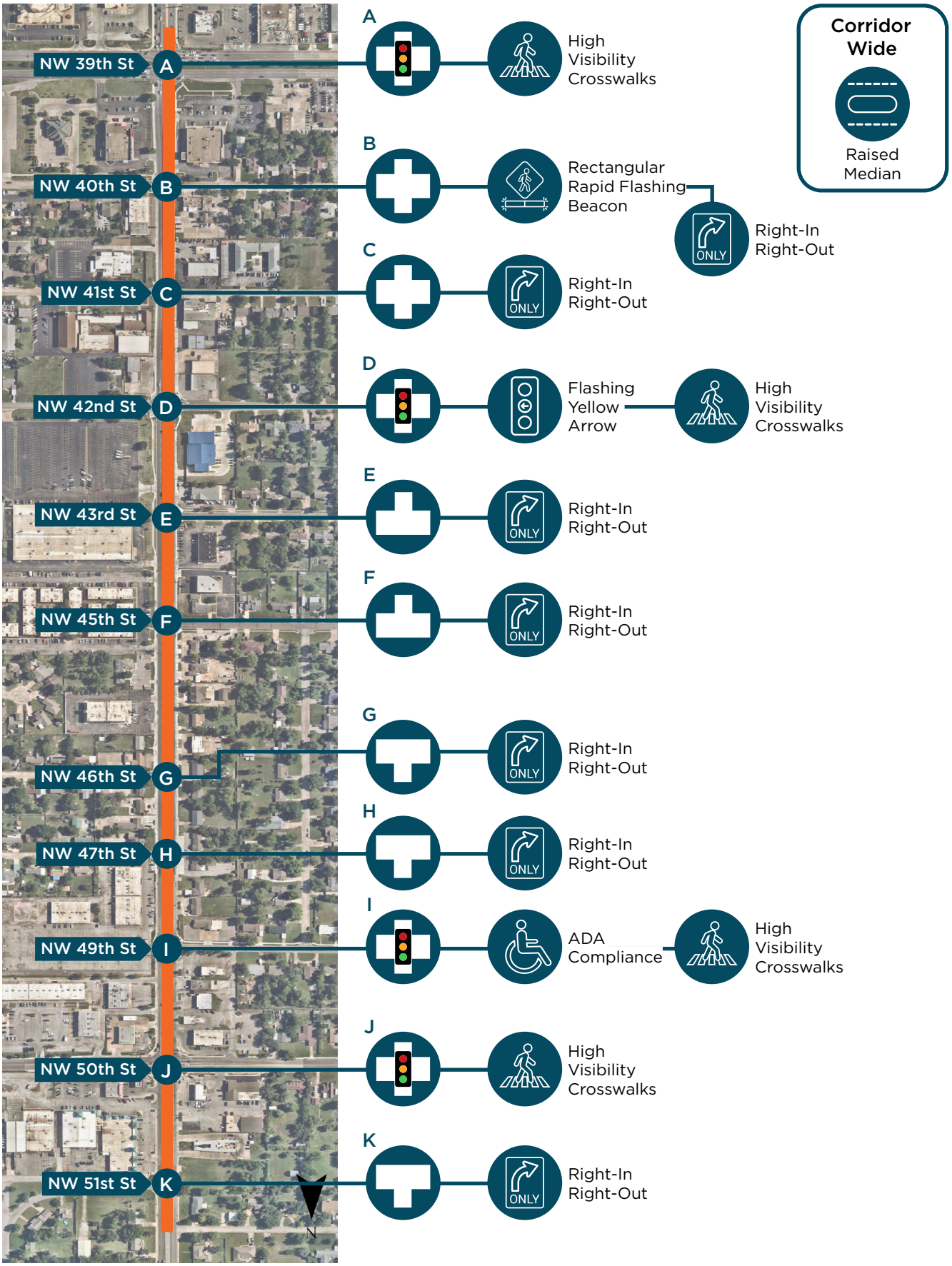
Click here to return to Corridor 1

Exhibit 20. Recommendations for Corridor 2



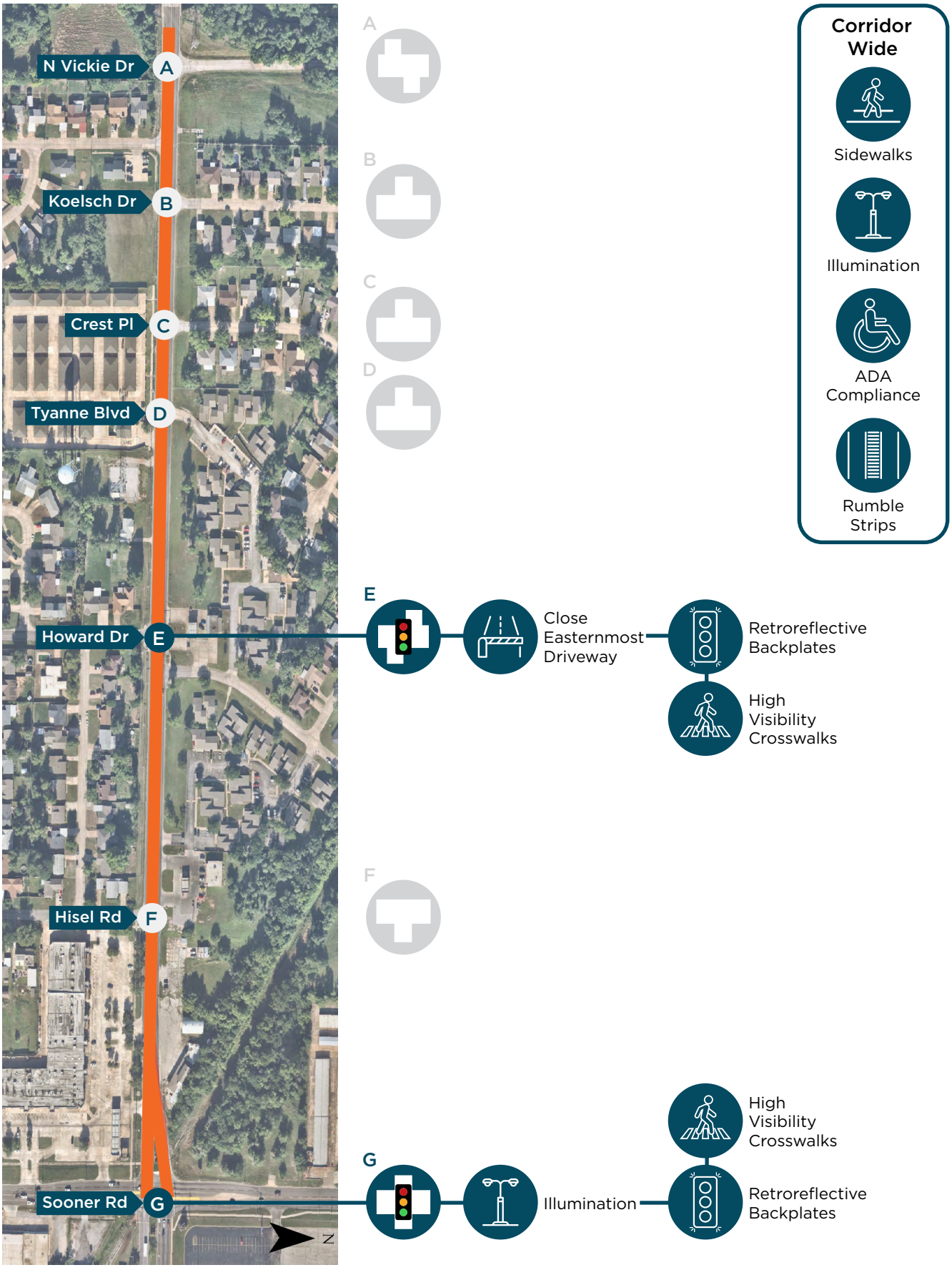
Click here to return to Corridor 2

Exhibit 21. Recommendations for Corridor 3



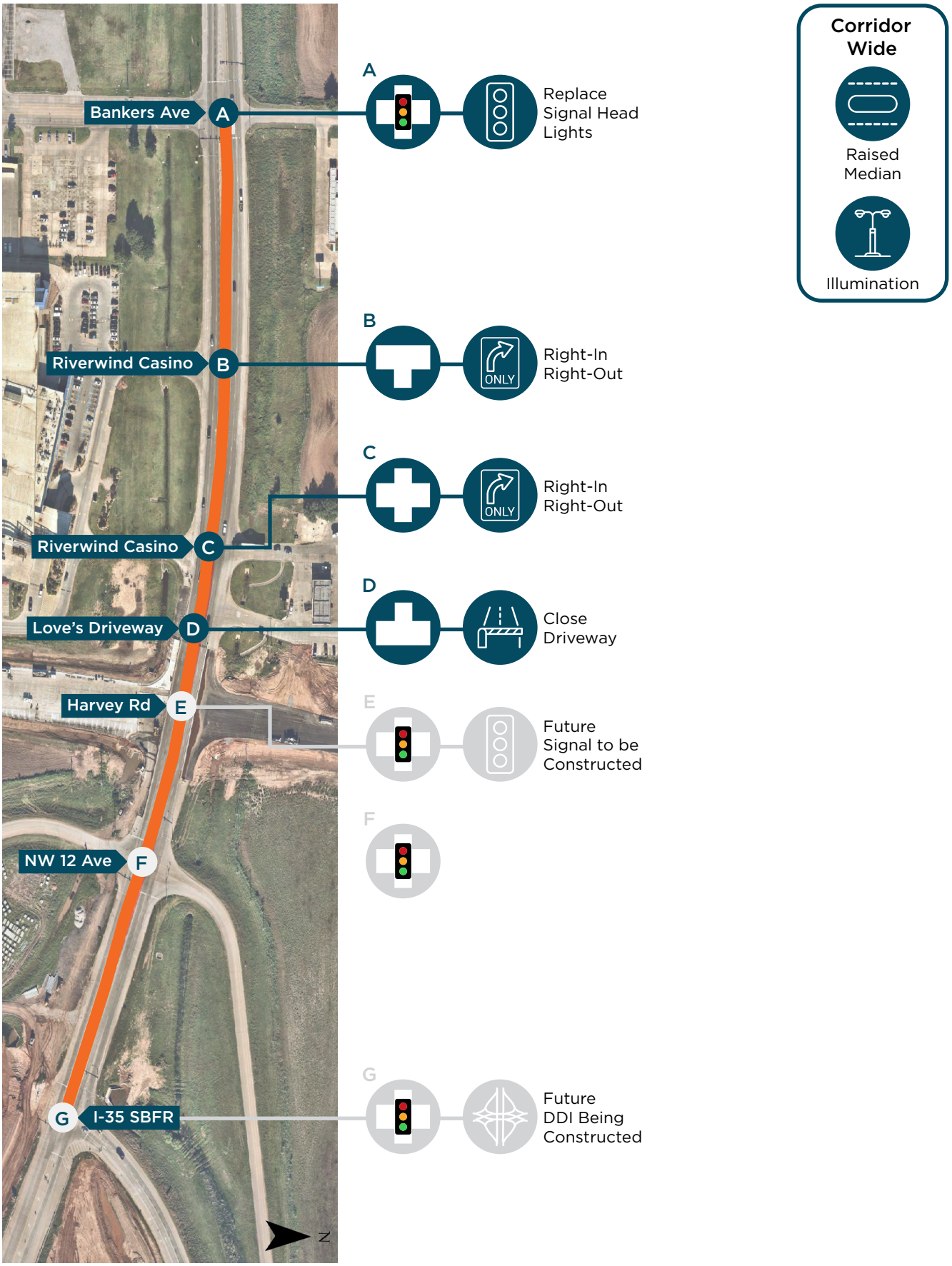
Click here to return to Corridor 3

Exhibit 22. Recommendations for Corridor 4



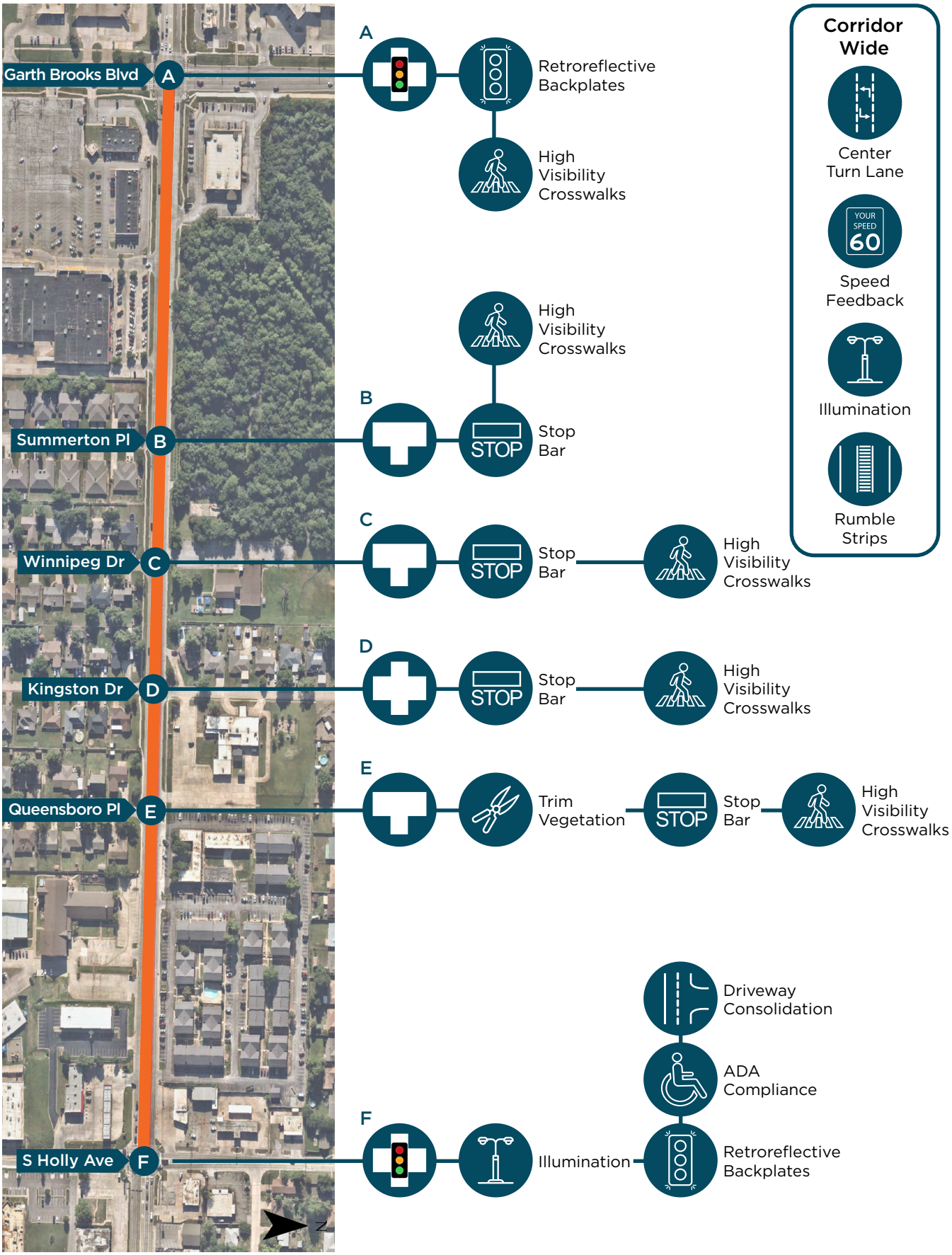
Click here to return to Corridor 4

Exhibit 23. Recommendations for Corridor 5



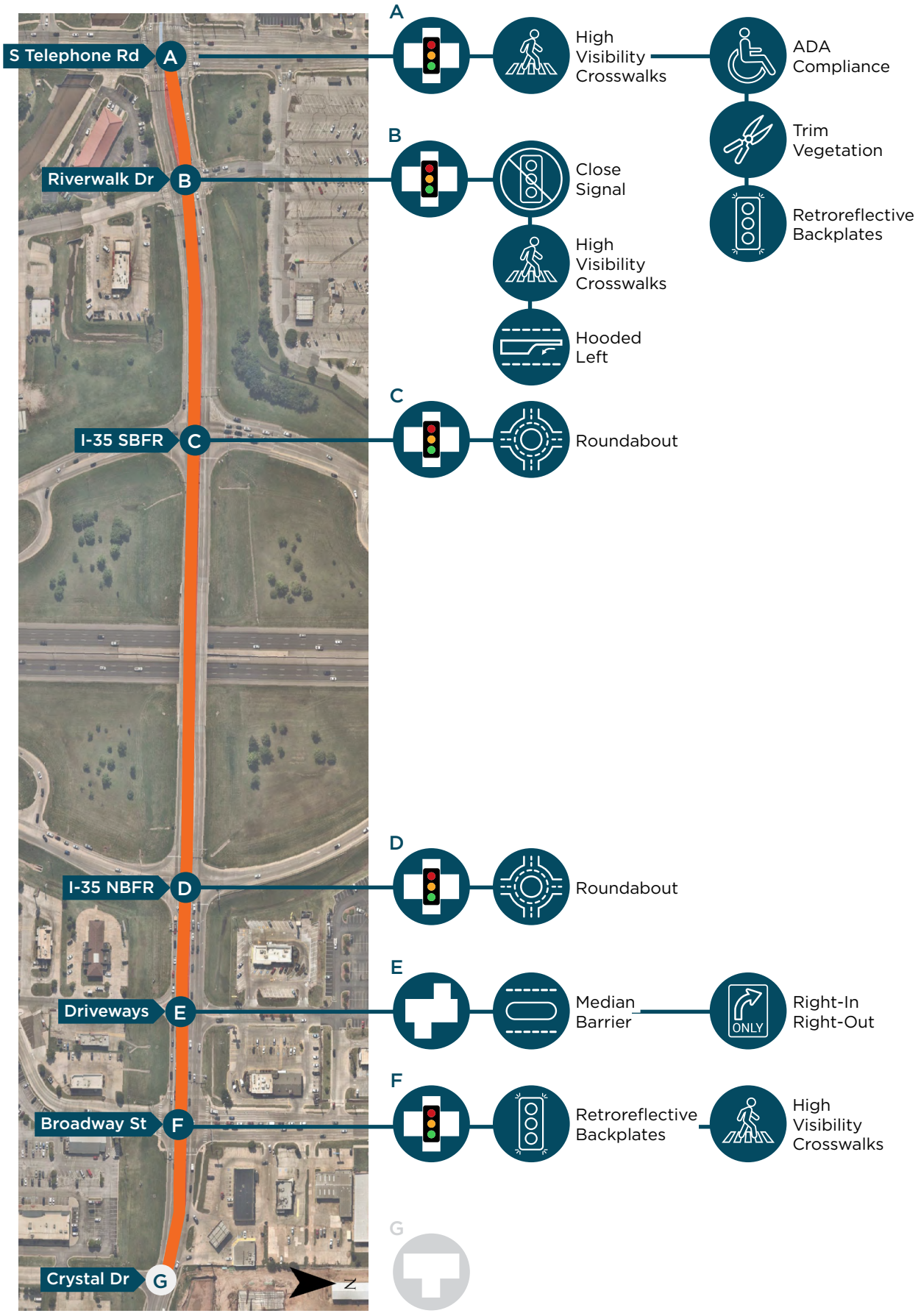
Click here to return to Corridor 5

Exhibit 24. Recommendations for Corridor 6



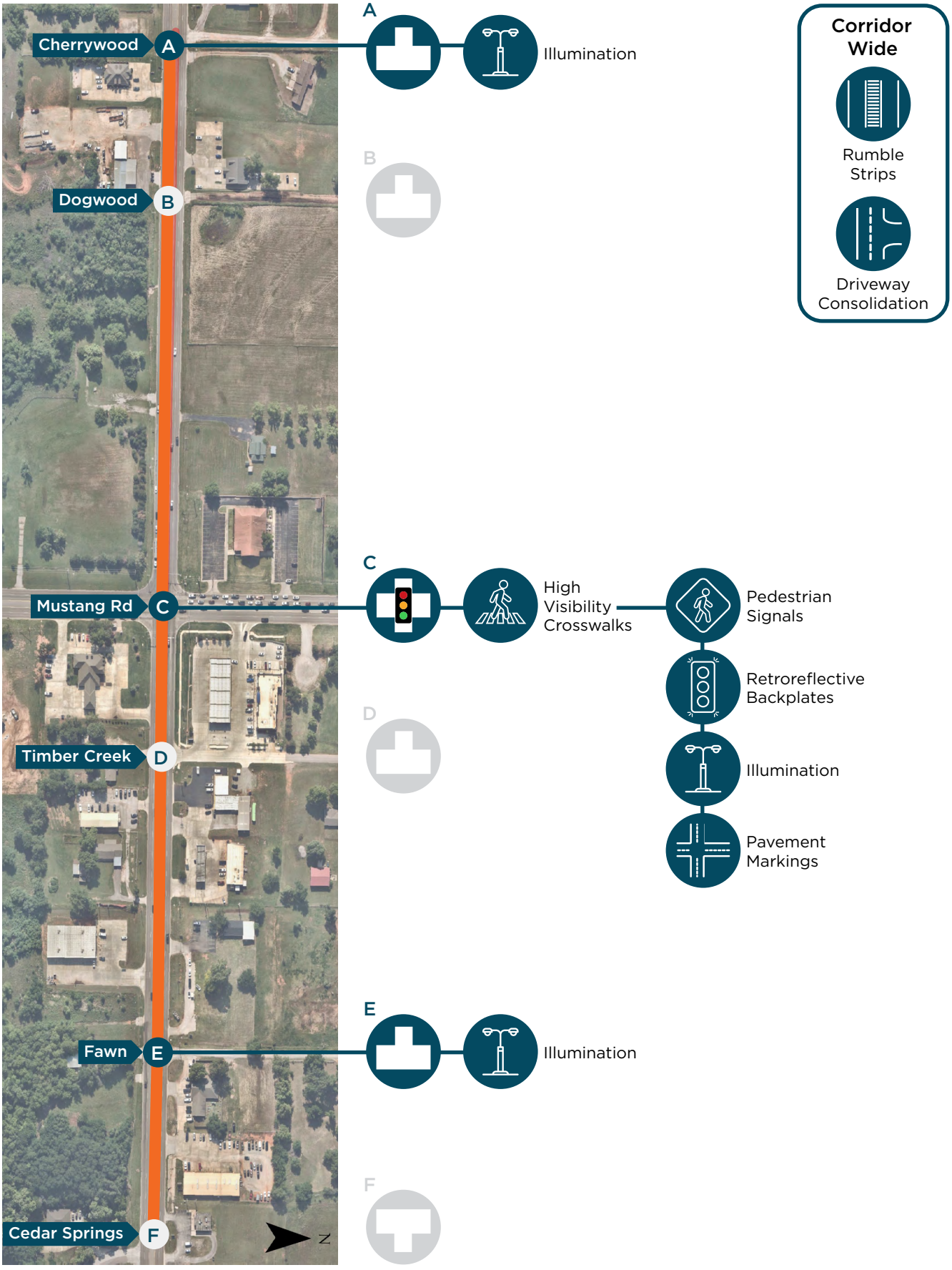
Click here to return to Corridor 6

Exhibit 25. Recommendations for Corridor 7



Click here to return to Corridor 7

Exhibit 26. Recommendations for Corridor 8



Click here to return to Corridor 8

SYSTEMIC COUNTERMEASURE TOOLBOX

This section of the ACOG RSAP details systemic countermeasures that can be implemented in all cities of the region to improve safety, not limited to previous recommendations and selected study corridors. The ACOG systemic countermeasure toolbox is organized by safety emphasis area as seen in the table below. Priority should be given to roads along the HIN and disadvantaged census tracts to lessen severity among crashes.

A countermeasure toolbox is a comprehensive collection of strategies and countermeasures designed to address specific traffic safety concerns. This toolbox provides cities and organization in Central Oklahoma with a range of options and resources to effectively improve safety and enhance the overall performance of roadways and transportation systems. As the countermeasure toolbox is implemented, educational campaigns will be needed to inform the public on proper and safe use of certain countermeasures. The systemic countermeasure toolbox for ACOG is detailed in **Table 17**.

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

Table 17. Systemic Countermeasure Toolbox

COUNTERMEASURES	CMF	CONTEXT (URBAN/RURAL)
Appropriate Speed Limits	0.856	Both
Bike Lanes	0.435	Both
Crosswalk Visibility Enhancements	0.6	Both
Leading Pedestrian Interval	0.9	Urban
Medians and Pedestrian Refuge Islands	0.29	Urban
Pedestrian Hybrid Beacons	0.883	Urban
Rectangular Rapid Flashing Beacons (RRFB)	0.31	Both
Roadway Reconfiguration	0.53	Urban
Sidewalks	0.598	Both
Enhanced Delineation for Horizontal Curves	0.82	Rural
Longitudinal Rumble Strips and Stripes on Two-Lane Roads	0.745	Rural
Median Barriers	0.29	Both
Wider Edge Lines	0.97	Both
Retroreflective Backplates	0.85	Both
Corridor Access Management	0.93	Both
Dedicated Left- and Right-Turn Lanes at Intersections	0.52 – 0.86	Both
Reduced Left-Turn Conflict Intersections	0.7029	Both
Roundabouts	0.59	Both
Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections	0.732	Both
Yellow Change Intervals	0.99	Both
Targeted Lighting	0.68	Both

CMF – Countermeasure Modification Factor

APPROPRIATE SPEED LIMITS

Posted speed limits are often the same as the legislative statutory speed limit (Figure 30). 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 30. Speed Limit Sign

Source: Adobe Stock

CMF: 0.856

Safety Emphasis Area Addressed:

Occupant Protection, Unsafe Speed, Commercial Motor Vehicles and Work Zones, Motorcycles and All-Terrain Vehicles, Vulnerable Road Users

BIKE LANES

A bike lane is a designated area of a roadway that is reserved for bicycles, typically marked with pavement markings and signage (Figure 31). 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. As a resource, the ACOG Regional Active Transportation Plan provides an analysis of which types of bike facilities should be implemented based on speed. **Bike Lane Additions can reduce crashes by up to 49% for total crashes on urban 4-lane undivided collectors and local roads and 30% for total crashes on urban 2-lane undivided collectors and local roads.**

Figure 31. Bike Lane

Source: Adobe Stock

CMF: 0.435

Safety Emphasis Area Addressed:

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

CROSSWALK VISIBILITY 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 or pavement markings (Figure 32). **High-visibility crosswalks can reduce pedestrian injury crashes up to 40%.**

Figure 32. Crosswalk Visibility Enhancement

Source: Adobe Stock

CMF: 0.6

Safety Emphasis Area Addressed:

Distracted Driving, Intersections, Vulnerable Road Users

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 (Figure 33). 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% reduction in pedestrian-vehicle crashes at intersections.**

Figure 33. Leading Pedestrian Interval

Source: sangabrielcity.com

CMF: 0.9

Safety Emphasis Area Addressed:

Intersections, Vulnerable Road Users

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 (Figure 34). **A median with marked crosswalks can lead to a 46% 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% reduction in pedestrian crashes.**

Figure 34. Median and Pedestrian Refuge Island

Source: Adobe Stock

CMF: 0.29

Safety Emphasis Area Addressed:

Roadway and Lane Departures, Impaired Driving, Occupant Protection, Unsafe Speed, Motorcycles and All-Terrain Vehicles, Vulnerable Road Users

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 (Figure 35). 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% reduction in pedestrian crashes.**

Figure 35. Pedestrian Hybrid Beacon

Source: Adobe Stock

CMF: 0.883

Safety Emphasis Area Addressed:

Roadway and Lane Departures, Distracted Driving, Unsafe Speed, Vulnerable Road Users

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 (Figure 36). 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 36. Rectangular Rapid Flashing Beacon

Source: FHWA

CMF: 0.31

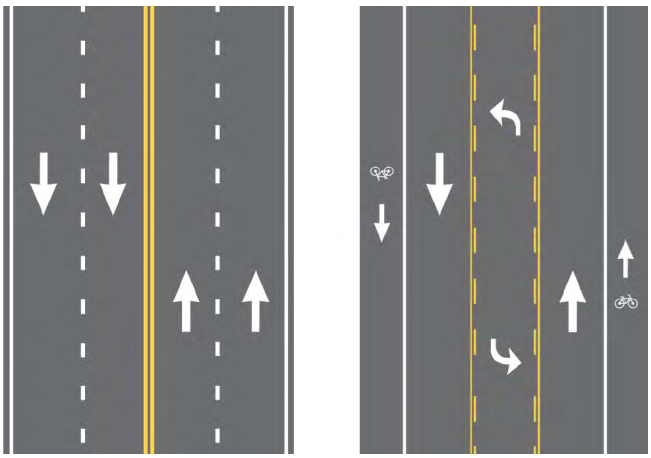
Safety Emphasis Area Addressed:

Intersections, Vulnerable Road Users

ROADWAY RECONFIGURATION

A roadway reconfiguration usually involves converting an existing four-lane roadway into a three-lane roadway (Figure 37). 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% reduction in total crashes.**

Figure 37. Roadway Reconfiguration



Source: FHWA

CMF: 0.53

Safety Emphasis Area Addressed:

Roadway and Lane Departures, Occupant Protection, Unsafe Speed, Motorcycles and All-Terrain Vehicles, Vulnerable Road Users

SIDEWALKS

A sidewalk is a designated pathway alongside a road or street intended for pedestrian use (Figure 38). 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% reduction in crashes involving pedestrians walking along roadways.**

Figure 38. Sidewalk

Source: Adobe Stock

CMF: 0.598

Safety Emphasis Area Addressed:

Vulnerable Road Users

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 (Figure 39). 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% reduction in fatal and injury crashes.**

Figure 39. Enhanced Delineation for Horizontal Curves

Source: Adobe Stock

CMF: 0.82

Safety Emphasis Area Addressed:

Roadway and Lane Departures, Distracted Driving, Unsafe Speed, Commercial Motor Vehicles and Work Zones, Motorcycles and All-Terrain Vehicles

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 (Figure 40). 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 ASHTO and other safety guidelines for VRU safety. **Longitudinal rumble strips can result in a 44-64% reduction in head-on fatal and injury crashes on two-lane rural roads.**

Figure 40. Rumble Strips

Source: Adobe Stock

CMF: 0.745

Safety Emphasis Area Addressed:

Roadway and Lane Departures, Impaired Driving, Occupant Protection, Unsafe Speed, Commercial Motor Vehicles and Work Zones, Motorcycles and All-Terrain Vehicles, Vulnerable Road Users

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 (Figure 41). 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% reduction in cross-median crashes.**

Figure 41. Median Barrier

Source: Adobe Stock

CMF: 0.29

Safety Emphasis Area Addressed:

Roadway and Lane Departures, Impaired Driving, Occupant Protection, Unsafe Speed, Commercial Motor Vehicles and Work Zones, Motorcycles and All-Terrain Vehicles, Vulnerable Road Users

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 (Figure 42). 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% for fatal and injury crashes on rural freeways.**

Figure 42. Wider Edge Lines

Source: FHWA

CMF: 0.97

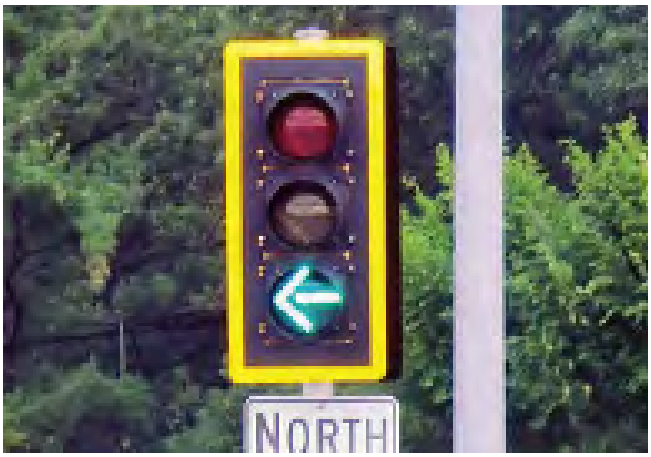
Safety Emphasis Area Addressed:

Roadway and Lane Departures, Impaired Driving

RETROREFLECTIVE BACKPLATES

A retroreflective backplate is a backplate made by framing traffic signals with a 1-to-3-inch yellow retroreflective border (Figure 43). 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% reduction in total crashes.**

Figure 43. Retroreflective Backplates



Source: FHWA

CMF: 0.85

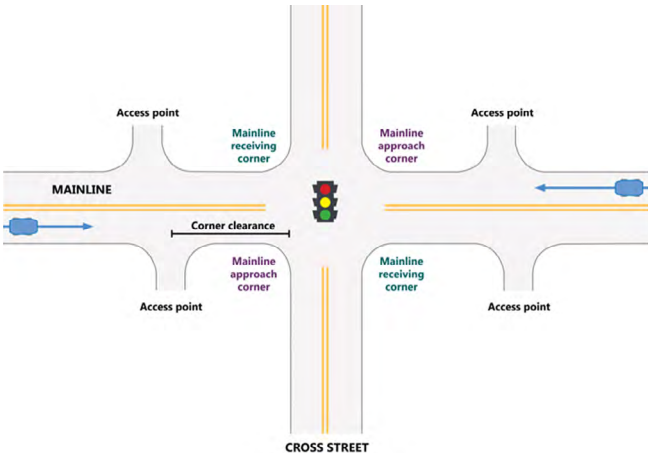
Safety Emphasis Area Addressed:

Impaired Driving, Intersections

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 (Figure 44). Access management should also depend on the built environment context. **Safety benefits include a 25 to 31% reduction in fatal and injury crashes along urban/suburban arterials.**

Figure 44. Access Management



Source: FHWA

CMF: 0.93

Safety Emphasis Area Addressed:

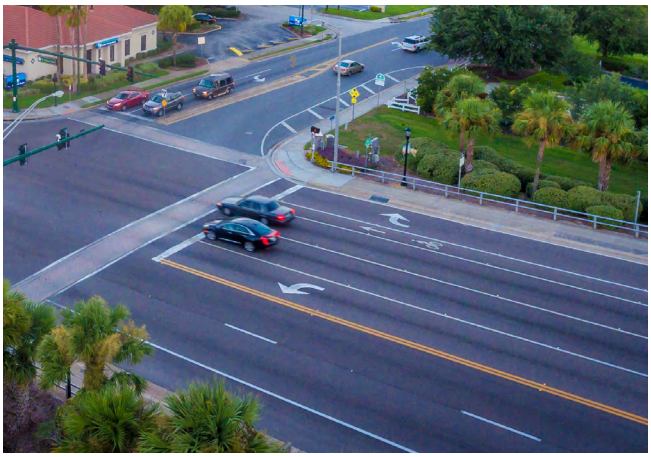
Intersections

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 (Figure 45). 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% reduction in total crashes.**

Figure 45. Dedicated Left- and Right-Turn Lanes



Source: Adobe Stock

CMF: 0.52 – 0.86

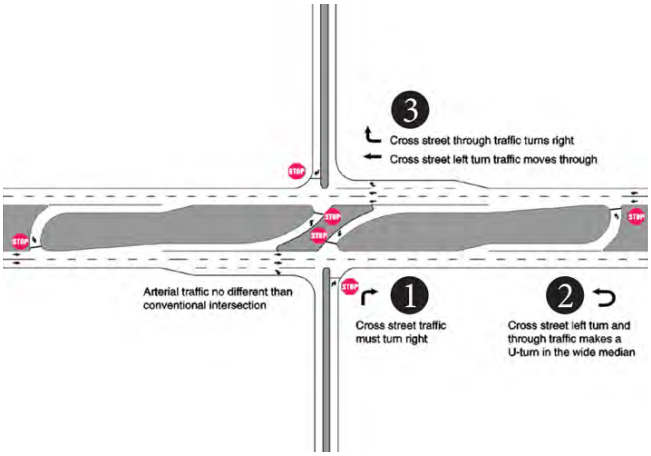
Safety Emphasis Area Addressed:

Intersections

REDUCED LEFT-TURN CONFLICT INTERSECTIONS

Reduced left-turn conflict intersections (RCUT) are geometric designs that alter how left-turn movements occur (Figure 46). 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% reduction in fatal and injury crashes.**

Figure 46. Reduced Left-Turn Conflict Intersection Example



Source: FHWA

CMF: 0.7029

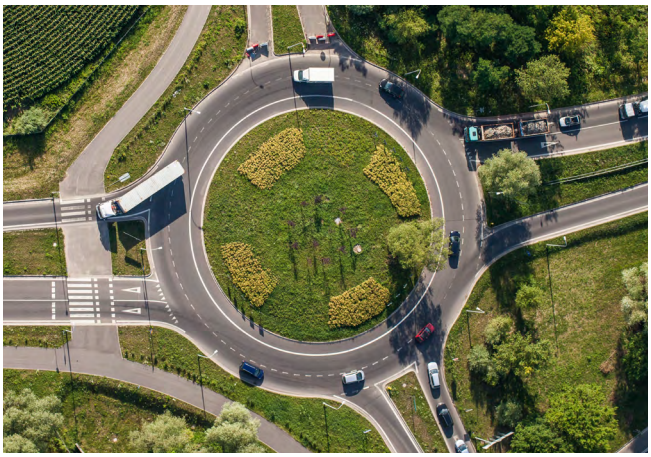
Safety Emphasis Area Addressed:

Intersections

ROUNDABOUTS

A roundabout is a type of circular intersection where traffic flows continuously around a central island (Figure 47). 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% reduction in fatal and injury crashes.**

Figure 47. Roundabout



Source: Adobe Stock

CMF: 0.59

Safety Emphasis Area Addressed:

Intersections

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% reduction of fatal and injury crashes at all locations/types/areas.**

Figure 48. Stop-Controlled Intersections

Source: FHWA

CMF: 0.732

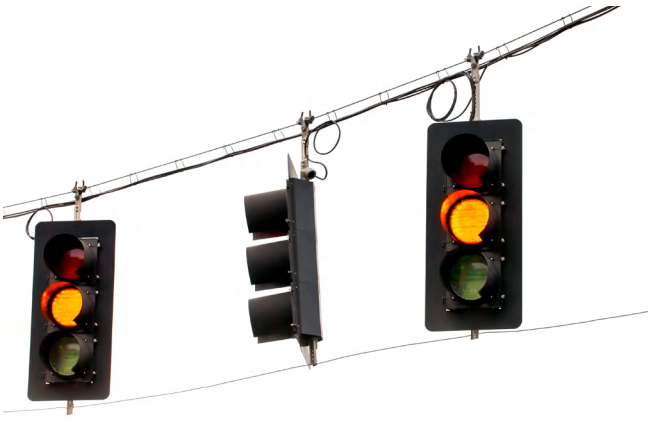
Safety Emphasis Area Addressed:

Intersections

YELLOW CLEARANCE INTERVALS

The yellow clearance interval is the time the yellow signal indication is displayed following a green light signal indication (**Figure 49**). 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% reduction in red light running when timed appropriately.**

Figure 49. Yellow Light at a Signal



Source: Adobe Stock

CMF: 0.99

Safety Emphasis Area Addressed:

Intersections

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 illum4inance 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 (**Figure 50**) depending on the needs of the community. **Lighting can reduce pedestrian nighttime crashes by up to 42%.**

Figure 50. Corridor Lighting

Source: Adobe Stock

CMF: 0.68

Safety Emphasis Area Addressed:

Roadway and Lane Departures, Intersections, Commercial Motor Vehicles and Work Zones, Motorcycles and All-Terrain Vehicles, Vulnerable Road Users

CHAPTER 6.

PROMOTING A CULTURE OF SAFETY

Creating safer roadways in the Region requires a shift towards prioritizing the safety of all users in the transportation network; therefore, a set of actions has been recommended to aid in this endeavor. In this chapter, the actions will be outlined and organized within the Action Plan. Within the Action Plan, details regarding the timeframe, partners, and funding needed to execute these actions are described. Furthermore, the 52 recommended actions are organized by the nine safety emphasis areas previously discussed. Each set of actions aims to help solve the safety deficiencies most associated with each of the safety emphasis areas through different methods. The actions utilize a varying number of methods to enhance traffic safety in the region; while some utilize engineering solutions, others take an educational approach.

Regional Safety Action Plan acog

CHAPTER 6. PROMOTING A CULTURE OF SAFETY

ACOG POLICY REVISIONS

As a component of the RSAP, the project team reviewed three documents relevant to ACOG; the ACOG Complete Streets Policy, Encompass 2045 Metropolitan Transportation Plan, and Surface Transportation Block Grant Program Procedures for the Oklahoma City Urbanized Area Funds (STBG-UZA) Scoring Criteria. The first step of the revision process was to complete a comprehensive analysis of how each document contributes to safety priorities. The review considers how these documents mention safety and how policies add to safety planning initiatives. Through the utilization of information collected during the document analysis phase, the project team compiled a table of suggested policy revisions, which are displayed in the Appendix.

These policy revisions suggest areas of the documents in which edits could consider safety elements such as bicyclist and pedestrian infrastructure, transit safety, design standards, and a greater sensitivity to the context of transportation projects. The key takeaway was that these documents already incorporate safety, but that additions or revisions could be made to make safety a greater priority when outlining guidelines for best practices and decision-making.

The revisions are important as they provide the framework for decisions regarding safety to be made upon the next update of these documents. By incorporating changes that emphasize safety, ACOG can appropriately address current safety planning concerns while aiming to draft a future-facing document that is adaptable to issues that may arise in the future.

ACTION PLAN

SAFETY EMPHASIS AREAS AND SIX Es OF SAFETY

The first two components of the Action Plan are the Oklahoma Safety Emphasis Areas and the Six "Es" of Safety. While the policies and programs are organized by which safety emphasis area they address, the Six Es of Safety describe the methods in which the policy or program is doing so.

Figure 51. Safety Emphasis Areas and Six Es of Safety

Safety Emphasis Areas	Six Es of Safety
Lane Departures	Engineering
Impaired Driving	Education
Occupant Protection	Evaluation
Unsafe Speed	Equity
Intersections	Enforcement
CMVs and Work Zones	Encouragement
Motorcycles and ATVs	
Vulnerable Road Users	

TIMEFRAME

For each action, there is an estimated timeframe for implementation provided. The estimated timeframes aid in more thoughtful decision making and fund allocation to ensure the strategies are executed in a timely manner. The timeframes given are categorized into the following:

- **Short (<2 years):** This action is a priority and can be completed quickly.
- **Medium (2 – 5 years):** This action could take more time to complete but could still be completed before the next RSAP update.
- **Long (>5 years):** This action will have a significant impact but will require many years to complete.
- **Ongoing:** This action does not have a set timeframe but should be an ongoing effort

IMPLEMENTATION PARTNERS

These departments and organizations have been identified as having an important role to play in the implementation of the ACOG RSAP. In the matrices, under the column "Partners" includes all agencies that should be consulted during the implementation of the corresponding action in addition with the ACOG Transportation Planning Services Department. Below lists a key for the partners identified in Action Plan tables:

- Oklahoma Department of Transportation (ODOT)
- Oklahoma Highway Safety Office (OHSO)
- 911 Association of Central Oklahoma Governments (911 ACOG)
- ACOG Community & Economic Development Department (CED)
- EMBARK
- Member Agencies and their respective departments (Cities or Counties)
- Uber/Lyft
- CarFit
- Local Businesses (Businesses)
- Indian Nations Council of Governments (INCOG)
- University of Oklahoma (OU)
- Other Higher Education Institutions (Colleges)
- Watch For Me OK

FUNDING SOURCES

Funding sources are an important step in implementing the action plan for the ACOG RSAP. The matrices for each emphasis area provides the information on how the actions presented in this plan may be funded. The funding sources are categorized into three options:

- Existing Funds (Existing)
- Reallocation of Funds (Reallocate)
- Grant Acquisition (Grants)

GRANT OPPORTUNITIES

In addition to all the countermeasure and policy recommendations provide in the ACOG RSAP, it is important for ACOG's member agency to understand the grant opportunities available to them. The following list includes local match-funding opportunities for municipalities in Central Oklahoma as well as federal grant opportunities for funding.

Local Match Funding Opportunities

- Surface Transportation Block Grant Program Procedures for the Oklahoma City Urbanized Area Funds (STBG)
- Transportation Alternative Program (TAP)

Federal Grants

- Infrastructure for Rebuilding America (INFRA) (previously FASTLANE)
- Competitive Highway Bridge Program (CHBP)
- Rebuilding American Infrastructure with Sustainability and Equity (RAISE) (Previously BUILD)
- Port Infrastructure Development Program (PIDP)
- Multimodal Projects Discretionary Grant
- Bridge Investment Program
- Reconnecting Communities Pilot
- Railroad Crossing Elimination Grant Program
- Strengthening Mobility and Revolutionizing Transportation (SMART)
- Active Transportation Infrastructure Investment Program
- Highway Safety Improvement Program (HSIP)

OKLAHOMA SAFETY EMPHASIS AREAS

INTRODUCTION

In November 2023, the Oklahoma Department of Transportation (ODOT) updated their Strategic Highway Safety Plan (SHSP). The SHSP is a comprehensive plan detailing strategies and initiatives geared toward reducing traffic-related fatalities and injuries on Oklahoma roadways. Oklahoma crash data was analyzed to identify high-risk contributing factors in fatal and serious crashes. These high-risk contributing factors are the eight safety emphasis areas detailed in this section. All data regarding the emphasis areas are from the ODOT Strategic Highway Safety Plan Update (2023).

LANE DEPARTURES

A lane departure is when a vehicle departs from the traveled way – crossing center or edge lines. Lane departures are the most reported contributing factor to crashes. Lane departure crashes resulting in fatalities or serious injuries most commonly occur on highways with dry roadway conditions in daylight. Unsafe driver behavior is a primary factor in lane departure crashes. Unsafe speeds and impaired driving are often the main factors leading lane departure crashes. Lane departure crashes are extremely dangerous due to the manner of collision that they can lead to such as head-on collision and rollovers.

Table 18. Lane Departure Policy Recommendations

ACTION	WHICH SIX Es OF SAFETY	TIMEFRAME	PARTNERS	FUNDING
Partner with ODOT to identify and promote the awareness of public rest stops in the Central Oklahoma region.	Encouragement	Short (<2 years)	ODOT	Reallocate
Encourage the use of vehicles with in-vehicle lane departure warning systems for publicly owned vehicles.	Encouragement	Short (<2 years)	Cities, Counties, ODOT, OHSO	Existing
Update design standards to include rumble strips to help decrease lane departure crashes.	Engineering	Short (<2 years)	Cities, Counties	Grants
Update design standards to foster safer roadways for all.	Engineering	Short (<2 years)	Cities, Counties	Grants
Apply for traffic enforcement grants to aid in enforcement efforts.	Enforcement	Ongoing	Cities, Counties, OHSO	Grants
Develop a system that would help the sharing of notifications of violations between municipalities in the region.	Enforcement	Medium (2 – 5 years)	Cities, Counties, OHSO	Reallocate

IMPAIRED DRIVING

Impaired Driving is driving with any physical impairments or reduced cognitive abilities. Impaired driving can be alcohol use, drug use, drowsy driving, or poor vision. Impaired driving crashes most commonly occur with dry roadway conditions on highways in dark unlit conditions. When a person chooses to drive with any impairment(s) it endangers all roadway users. Driving impaired slows reaction time and motor skills reducing a driver's window of time to safely react to a potentially dangerous situation. The most common form of impaired driving is driving while intoxicated which is, having a blood alcohol content of between 0.05 and 0.08. These types of crashes disproportionately affect individuals aged 16-30.

Table 19. Impaired Driving Policy Recommendations

ACTION	WHICH SIX Es OF SAFETY	TIMEFRAME	PARTNERS	FUNDING
Create materials advertising rideshare companies as an alternative transportation option.	Encouragement	Short (<2 years)	Uber/Lyft, CED, OHSO	Reallocate
Increase the number of transit options in the region to discourage impaired driving.	Encouragement	Long (>5 years)	EMBARK	Grants
Partner with OHSO and INCOG to expand "Safe Ride Oklahoma" to all cities and provide more credit opportunities.	Equity	Short (<2 years)	OHSO, INCOG	Reallocate
Create an incentive program for local restaurants and bars to encourage sober ride behavior.	Encouragement	Short (<2 years)	CED, Businesses, Uber/Lyft, OHSO	Grants
Encourage all higher education campuses to provide "safe ride home" programs for students.	Encouragement	Short (<2 years)	OHSO, Colleges	Reallocate
Partner with OU and Norman On Demand to further advertise "SafeRide"	Education	Short (<2 years)	OU, Cities	Reallocate
Partner with the 911 RPAC to share methods and resources across the region for more effective impaired driving enforcement.	Enforcement	Short (<2 years)	911 ACOG	Reallocate

OCCUPANT PROTECTION

Occupant Protection crashes are crashes involving unrestrained persons. NHTSA reports that, "wearing a seatbelt reduced the risk of fatal injury in a crash by nearly 50% (Strategic 29). A crash is an Occupant Protection crash if even one occupant of a vehicle is not wearing a seatbelt. When even one occupant is not restrained, they can be a risk to themselves as well as others in the vehicle. It is important to ensure that seatbelts and child safety seats are used properly. Fatal occupant protection crashes are typically linked to other unsafe driver behaviors such as unsafe speeds and driving while intoxicated. Additionally, more rural communities typically see lower rates of seatbelt use.

Table 20. Occupant Protection Policy Recommendations

ACTION	WHICH SIX Es OF SAFETY	TIMEFRAME	PARTNERS	FUNDING
Partner with counties that have Child Passenger Safety Technicians (CPSTs) to provide car seat inspections.	Education	Short (<2 years)	Cities, Counties,	Existing
Implement roadway safety programming for young students and new drivers.	Education	Medium (2 – 5 years)	Cities, OHSO	Reallocate
Partner with health departments to connect people with child restraint resources.	Encouragement	Short (<2 years)	SKO, OHSO, Cities, Counties	Reallocate
Increase the public's awareness of the County Health Department's Car Seat Program for low-income residents.	Equity	Short (<2 years)	Cities, Counties	Existing
Partner with the Older Adult Car Safety Program (CarFit) to provide safer driving tips to older motorists.	Equity	Short (<2 years)	CarFit	Reallocate
Ensure all local agency-owned vehicles have a 5-star safety rating.	Engineering	Long (>5 years)	Cities, Counties, ODOT, OHSO	Grants
Increase existing fine for no seatbelt usage.	Enforcement	Short (<2 years)	ODOT, OHSO	Existing
Create a law that would require seatbelt use for all vehicle passengers.	Enforcement	Medium (2 – 5 years)	ODOT, OHSO	Reallocate

UNSAFE SPEED

Unsafe Speed is when a driver exceeds the posted speed limit, drives too slow for conditions, or drives too fast for conditions. Unsafe speed crashes often go underreported, and the true impact of unsafe speed is more than likely greater than shown in collected data. Unsafe speed crashes resulting in a fatality or serious injury most often occur on highways with dry road conditions in daylight. Exceeding the posted speed limit can increase severe injury and fatality rate of all types of collisions, making unsafe speed a top safety emphasis area. If speed is safely reduced the force of impact will be far less, particularly as vehicles become larger and heavier - increasing survival rate of collisions. The top two contributing factors to making an unsafe speed crash fatal are lane departures and occupant protection. Additionally, unsafe speeding has the greatest impact on VRUs.

Table 21. Unsafe Speed Policy Recommendations

ACTION	WHICH SIX Es OF SAFETY	TIMEFRAME	PARTNERS	FUNDING
Educate drivers on minimal time savings when speeding compared to safe speed.	Education	Short (<2 years)	OHSO	Existing
Partner with insurance companies to encourage driver continuing education and insurance bonuses.	Encouragement	Medium (2 – 5 years)	Businesses	Grants
Implement speed cameras at school zones to help prevent unsafe speeding.	Enforcement	Medium (2 – 5 years)	Cities, Colleges	Grants
Establish a targeted enforcement program for speeding.	Enforcement	Medium (2 – 5 years)	Cities, OHSO	Grants
Implement harsher penalties and decrease the number of warnings given to discourage speeding.	Enforcement	Short (<2 years)	Cities, OHSO	Existing
Develop a preventative policing strategy for speeding.	Enforcement	Medium (2 – 5 years)	Cities, OHSO	Reallocate

INTERSECTIONS

Intersection related crashes are common due to the amount of conflict points available at a signalized and non-signalized intersection. Fatal and serious injury intersection related crashes most commonly occur on highways and city streets with dry road conditions in daylight. Intersection crashes can occur due to low visibility traffic lights/stop signs causing drivers to be unable to react in time to oncoming traffic. Lack of or low visibility pavement markings can also make turning at an intersection hazardous. Proper driver education about signage and traffic laws can increase safety, especially at stop-controlled intersections. Distracted driving and impaired driving increase safety risk at intersections for all roadway and sidewalk users.

Table 22. Intersection Policy Recommendations

ACTION	WHICH SIX Es OF SAFETY	TIMEFRAME	PARTNERS	FUNDING
Increase awareness about upcoming intersection design changes and other construction projects.	Education	Ongoing	ODOT, Cities	Existing
Update design standards to encourage the creation of Complete Streets.	Encouragement	Short (<2 years)	ODOT, Cities	Grants
Increase the amount of materials advertising intersection design changes for the public.	Equity	Ongoing	ODOT, Cities	Reallocate
Engage with local communities to identify dangerous intersections.	Equity	Ongoing	ODOT, Cities	Existing
Develop or update design standards to promote Complete Streets.	Engineering	Short (<2 years)	ODOT, Cities	Grants
Update design standards to allow for the use of roundabouts.	Engineering	Short (<2 years)	ODOT, Cities	Reallocate
Encourage communities to develop a communication system for residents to submit sight distance/vegetation obstructions.	Engineering Encouragement	Short (<2 years)	Cities, 911 ACOG	Reallocate

COMMERCIAL MOTOR VEHICLES AND WORK ZONES

A Commercial Motor Vehicle is described by the Federal Motor Carrier Safety Administration (FMCSA) as a vehicle with a gross weight of 10,001 pounds or more. Due to the weight of a Commercial Motor Vehicle (CMV) the force of impact in any crash can be fatal especially for bicyclist and pedestrians. CMV related crashes result from CMV driver and non-CMV driver behaviors such as distracted driving, impaired driving, speeding, unsafe lane changes, and following too closely. Fatal and severe injury CMV crashes primarily occur on highways with dry roadway conditions in the daylight. Work zone related crashes are any crash occurring where there is roadway construction, maintenance, or utility work occurring. Work zones should be clearly marked and have reduced speed limits. Work zones may have reduced lane number, reduced lane width, improper pavement markings, heavy machinery, as well as workers present. Driver inattention due to impairment or distraction in a work zone is extremely hazardous.

Table 23. Commercial Motor Vehicle and Work Zones Policy Recommendations

ACTION	WHICH SIX Es OF SAFETY	TIMEFRAME	PARTNERS	FUNDING
Promote Work Zone Safe enrollment for young students and new drivers.	Education	Short (<2 years)	ODOT, OHSO	Existing
Partner with ODOT to create more state supported truck rest stops.	Encouragement	Long (>5 years)	ODOT	Grants
Enhance inspection resources for work zones to ensure they are following their traffic control plan and enforce stricter penalties.	Enforcement	Medium (2 – 5 years)	ODOT, Cities, Counties	Reallocate
Partner with communities without designated freight routes in the region to identify a local network.	Engineering	Medium (2 – 5 years)	ODOT, Cities	Reallocate
Expand the double fine penalty to apply to all traffic violations in active work zones.	Enforcement	Short (<2 years)	ODOT, OHSO	Reallocate

MOTORCYCLES AND ALL-TERRAIN VEHICLES

Motorcycles and All-Terrain Vehicles are at increased risk when it comes to collisions, due to the lack of protection in the event of a crash. The lack of structural protection or airbags makes protective equipment, such as helmets, and traffic safety critical for motorcyclist and all-terrain vehicle (ATV) users. Fatal motorcycle crashes primarily occur in daylight on highways, while fatal ATV crashes are relatively split between daylight and dark unlit conditions on county roads. Unsafe speed when operating a motorcycle or ATV significantly decreases the survival rate of crashes.

Table 24. Motorcycles and ATV Policy Recommendations

ACTION	WHICH SIX Es OF SAFETY	TIMEFRAME	PARTNERS	FUNDING
Promote safety best practices for ATV and non-ATV users (off-roading, roadway safety and laws, helmets, and gear).	Education	Short (<2 years)	OHSO, Cities	Reallocate
Identify champions for motorcycle helmet safety throughout the Central Oklahoma Region.	Encouragement	Short (<2 years)	ODOT, Cities	Existing
Pass a mandatory helmet law for drivers and riders of motorcycles and ATVs.	Enforcement	Medium (2 – 5 years)	ODOT, OHSO	Reallocate
Enforce road-legal ATV laws (lights, wipers, blinkers, etc.).	Enforcement	Ongoing	ODOT, OHSO	Existing
Enforce ATV laws (e.g., you can't cross divided highways, you can't cross at night, helmets are required for minors on public land, etc.).	Enforcement	Ongoing	Cities, Counties	Existing
Create a law that does not allow ATVs to be used on roadways with posted speed limits.	Enforcement	Medium (2 – 5 years)	ODOT, OHSO	Reallocate

VULNERABLE ROAD USERS

Vulnerable Road Users (VRUs) include people walking, rolling, or riding a bicycle. Fatal and serious injury crashes involving VRUs occur more often during weekday commuting hours. Commuting hours bring more vehicle and VRU traffic, if there is not proper infrastructure and public education this can result in higher crash rates. Distracted driving and driving impairment also pose a large concern for VRUs, particularly involving alcohol and phone usage. Crashes resulting in a fatality or serious injury primarily occur in dark unlit conditions on city streets.

Table 25. Vulnerable Road User Policy Recommendations

ACTION	WHICH SIX Es OF SAFETY	TIMEFRAME	PARTNERS	FUNDING
Implement new driver training on VRU safety.	Education	Medium (2 – 5 years)	OHSO, WFM	Reallocate
Promote share the road policies to educate drivers that roads are not just for cars.	Education	Short (<2 years)	OHSO, Cities, WFM	Existing
Create a Safe Routes to School Partnership Program.	Education	Medium (2 – 5 years)	Cities, Colleges	Grants
Encourage Watch for Me OK education at schools and public events.	Education	Ongoing	Cities, WFM, Colleges	Existing
Encourage vulnerable road users to wear high-visibility safety vests.	Encouragement	Ongoing	Cities, OHSO, ODOT	Existing
Increase the number of investments in environmental justice areas based on the ACOG specific scoring criteria.	Equity	Ongoing	CED, Cities, Counties	Reallocate
Encourage all municipalities within the ACOG TMA to prepare the federally required ADA Transition Plans.	Equity	Long (>5 years)	Cities, Counties	Grants
Create opportunities for residents to comment on the transportation network and provide feedback on projects that affect them.	Equity	Ongoing	Cities, Counties	Reallocate
Develop incentives for road users who choose to cycle or walk to promote active modes of transportation.	Enforcement	Short (<2 years)	Cities, Counties, Businesses, CED, OHSO	Reallocate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