CENTRAL TEXAS

CAMPO

CAPITAL AREA METROPOLITAN PLANNING ORGANIZATION

CALDWELL COUNTY SAFETY ACTION PLAN

PART OF THE GREATER CAMPO REGIONAL SAFETY ACTION PLAN

JUNE 2025

ACKNOWLEDGMENTS

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DISCLAIMER

Under 23 U.S. Code § 148 and 23 U.S. Code § 407, safety data, reports, surveys, schedules, lists, compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

DEDICATION

THIS PLAN IS DEDICATED TO ALL THE LIVES LOST AND TO THOSE WHO HAVE BEEN FOREVER CHANGED BECAUSE OF A TRAFFIC CRASH IN CALDWELL COUNTY. A SINGLE DEATH OR SERIOUS INJURY ON OUR ROADWAYS IS ONE TOO MANY.

LET US ACHIEVE THE ROAD TO ZERO **TOGETHER**.

ACRONYMS

ADA – Americans with Disabilities Act

BUILD – Better Utilizing Investments to Leverage Development

CAMPO – Capital Area Metropolitan Planning Organization

CARTS – Capital Area Rural Transportation System

CRIS – Crash Records Information System

FHWA – Federal Highway Administration

HIN – High Injury Network

HSIP – Highway Safety Improvement Program

ICE – Intersection Control Evaluation

KABCO – Crash Severity Scale

- **K –** Fatal Injury
- **A –** Suspected Serious Injury
- **B –** Suspected Minor Injury
- **C –** Possible Injury
- **O –** Non-injury
- **KA –** Combined Fatal and Serious Injury

RSAP – Regional Safety Action Plan

SHSP – Strategic Highway Safety Plan

SAP – Safety Action Plan

SS4A – Safe Streets and Roads for All

MUTCD – Manual on Uniform Traffic Control Devices

TxDOT – Texas Department of Transportation

USDOT – United States Department of Transportation

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1
- THE ROAD SAFETY CHALLENGE IN CALDWELL COUNTY 1
- THE SAFETY ACTION PLAN 2
- A SAFER FUTURE AHEAD 4

INTRODUCTION 5
- CALL TO ACTION 5
- PLAN PURPOSE 6
- PLAN DEVELOPMENT 6

LEADERSHIP COMMITMENT AND GOAL SETTING 7
- ROAD TO ZERO COMMITMENT 7
- A VISION FOR THE COUNTY 7
- ROAD TO ZERO SAFETY GOALS 7
- ROAD TO ZERO SAFETY OBJECTIVES 8

SAFETY ANALYSIS 10
- HISTORICAL CRASH ANALYSIS 11
- EMPHASIS AREA ANALYSIS 15
- SYSTEMIC SAFETY ANALYSIS 17
- HIGH INJURY NETWORK ANALYSIS 20

ENGAGEMENT AND COLLABORATION 22
- PUBLIC ENGAGEMENT 22
- COLLABORATION 28

POLICY AND PROCESS CHANGES 30
- EXISTING POLICY REVIEW 30
- POLICY AND PROCESS RECOMMENDATIONS 30

SAFETY STRATEGIES AND PROJECTS 35
- SAFETY COUNTERMEASURES TOOLBOX 35
- SYSTEMIC SAFETY COUNTERMEASURE PACKAGES 43
- TARGETED SAFETY PROJECTS 43

IMPLEMENTATION PLAN 52
- IMPLEMENTATION SCHEDULE 52
- FUNDING SAFETY IMPROVEMENTS 52
- CHAMPIONING POLICY CHANGES 53
- MEASURING PROGRESS 53

LIST OF FIGURES

FIGURE 1. SAP DEVELOPMENT PROCESS 6
FIGURE 2. SAFETY ANALYSIS COMPONENTS 10
FIGURE 3. CRASHES BY YEAR AND SEVERITY IN CALDWELL COUNTY (2019-2023) 11
FIGURE 4. FATAL AND SERIOUS INJURY CRASHES BY TYPE (2019-2023) 12
FIGURE 5. COMMON CONTRIBUTING FACTORS FOR FATAL AND SERIOUS INJURY CRASHES (2019-2023) .. 12
FIGURE 6. UNDERSERVED COMMUNITIES IN CALDWELL COUNTY 13
FIGURE 7. CRASH RATES BY LAND AREA, POPULATION, AND ROADWAY LANE MILES IN UNDERSERVED COMMUNITIES (2019-2023) 14
FIGURE 8. STATEWIDE AND LOCAL EMPHASIS AREAS FOR CALDWELL COUNTY SAP 15
FIGURE 9. EMPHASIS AREAS WITH THE MOST REPORTED FATAL AND SERIOUS INJURY CRASHES IN CALDWELL COUNTY (2019-2023) 16
FIGURE 10. SYSTEMIC CRASH TRENDS FOR INTERSECTION CRASHES 17
FIGURE 11. SYSTEMIC CRASH TRENDS FOR ROADWAY AND LANE DEPARTURE CRASHES 18
FIGURE 12. SYSTEMIC CRASH TRENDS FOR ROADWAY AND LANE DEPARTURE CRASHES ON CURVES 18
FIGURE 13. SYSTEMIC CRASH TRENDS FOR DARK CONDITION CRASHES 19
FIGURE 14. SYSTEMIC CRASH TRENDS FOR PEDESTRIAN AND BICYCLIST-INVOLVED CRASHES 19
FIGURE 15. HIGH INJURY NETWORK INTERSECTIONS IN CALDWELL COUNTY (2019-2023) 20
FIGURE 16. HIGH INJURY NETWORK ROAD SEGMENTS IN CALDWELL COUNTY (2019-2023) 21
FIGURE 17. PROJECT WEBSITE HOMEPAGE 23
FIGURE 18. ONLINE OPEN HOUSE EXHIBIT FOR CALDWELL COUNTY 23
FIGURE 19. POP-UP EVENTS AT FIRST FRIDAY LOCKHART 24
FIGURE 20. EXAMPLE SOCIAL MEDIA POST 25
FIGURE 21. ROUND 1 SURVEY RESPONSES FOR CALDWELL COUNTY 26
FIGURE 22. MAJOR TRANSPORTATION ISSUES IN CALDWELL COUNTY 26
FIGURE 23. ROUND 2 SURVEY RESPONSES FOR CALDWELL COUNTY 27
FIGURE 24. CALDWELL COUNTY SAFETY TASK FORCE MEMBER AGENCIES 28
FIGURE 25. CALDWELL COUNTY SAP TASK FORCE MEETINGS 29
FIGURE 26. POLICY AND PLAN REVIEW FOR CALDWELL COUNTY 30
FIGURE 27. SAFE SYSTEM APPROACH 30
FIGURE 28. EXAMPLE SEGMENT-RELATED COUNTERMEASURES 37
FIGURE 29. EXAMPLE INTERSECTION-RELATED COUNTERMEASURES 39
FIGURE 30. EXAMPLE VULNERABLE ROAD USER COUNTERMEASURES 41

FIGURE 31: TARGETED CORRIDOR PROJECT LOCATIONS 45
FIGURE 32: TARGETED INTERSECTION PROJECT LOCATIONS 49
FIGURE 33. POTENTIAL PERFORMANCE MEASURES FOR SAP 53

LIST OF TABLES

TABLE 1. BASELINE FATAL AND SERIOUS INJURY CRASH TRENDS (2019-2023) 11
TABLE 2. REGIONAL AND LOCAL ADVERTISEMENTS 25
TABLE 3. POLICIES AND PROCESSES ADDRESSING SAFE ROAD USERS 31
TABLE 4. POLICIES AND PROCESSES ADDRESSING SAFE VEHICLES 32
TABLE 5. POLICIES AND PROCESSES ADDRESSING SAFE SPEEDS 32
TABLE 6. POLICIES AND PROCESSES ADDRESSING SAFE ROADS 32
TABLE 7. POLICIES AND PROCESSES ADDRESSING POST CRASH CARE 34
TABLE 8. POLICIES AND PROCESSES ADDRESSING SAFETY LEADERSHIP AND CULTURE 34
TABLE 9. PRIORITIZATION CRITERIA FOR TARGETED SAFETY PROJECTS 44
TABLE 10. TARGETED CORRIDOR PROJECTS 46
TABLE 11: TARGETED INTERSECTION PROJECTS 50

Executive Summary

The Road Safety Challenge in Caldwell County

Every day, residents and visitors travel on Caldwell County's roads with the expectation of arriving safely. However, recent years have shown a troubling reality. From 2019 to 2023, Caldwell County experienced 59 fatal crashes and 155 serious injury crashes, resulting in the loss of 63 lives and leaving 222 people with serious, life-changing injuries. These individuals are our families, friends, and neighbors, and the impacts of these tragedies ripple through every community in the county.

A comprehensive safety analysis has identified key factors contributing to these severe and fatal crashes. There is hope: these crashes are preventable, and Caldwell County is committed to making meaningful progress toward reducing and eventually eliminating fatalities and serious injuries on our roadways.

The Caldwell County Safety Action Plan (SAP) is a strategic effort focused on creating a safer transportation system for all. Developed through detailed safety analysis, robust community engagement, collaboration with safety partners, and comprehensive policy review, the SAP presents a comprehensive set of policy recommendations, evidence-based safety strategies, targeted infrastructure improvements, and behavioral interventions. Targeted improvements are identified for eight corridors and seven intersections.

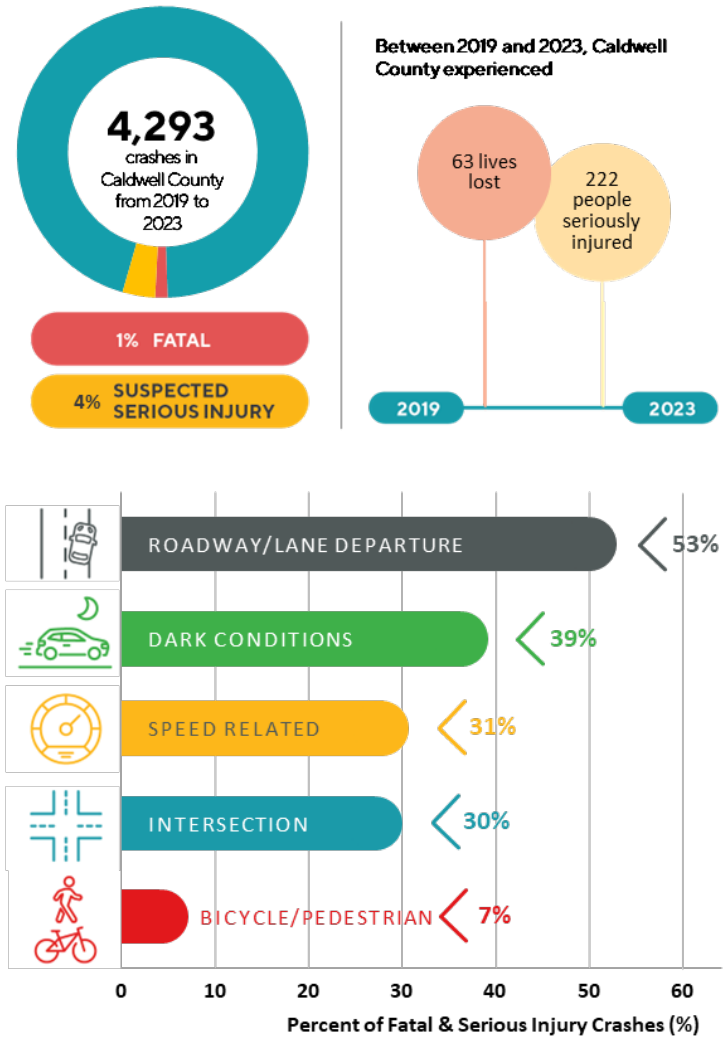


FIGURE ES-1. CRASH TRENDS IN CALDWELL COUNTY

Each component is designed to address the county's most pressing safety challenges and reduce serious and fatal crashes. Our goal is to ensure that everyone – whether living, working, or visiting here – can travel safely on our roadways.

The Safety Action Plan

Caldwell County and its member jurisdictions have joined forces with regional and federal partners to tackle the traffic safety issue directly. The Caldwell County SAP is a strategic initiative to establish a safer transportation system. Embracing the vision that "All streets and roads in Caldwell County are safe, accessible, and well-connected for all road users of all abilities – pedestrians, cyclists, transit users, and drivers," the SAP aspires to cut roadway fatalities and serious injuries in half by 2035 and eliminate them entirely by 2050. Simply put, everyone traveling in Caldwell County should be able to reach their destination safely every time.

This plan is part of the broader Capital Area Metropolitan Planning Organization's (CAMPO) Regional Safety Action Plan (RSAP), which aims to enhance traffic safety across the region by addressing systemic safety needs and facilitating access to funding. Each member agency, including Caldwell County and its cities, contributes a county-level plan that aligns with the overarching goals of CAMPO and the statewide Road to Zero initiative. This means our communities are not working alone. We are coordinating with neighboring counties and aligning with national best practices.

The core outcomes of the SAP include key strategies, community actions, countermeasure identification and prioritization, and accountability and transparency.

KEY STRATEGIES

Achieving safer travel in Caldwell County requires a comprehensive, multi-faceted approach. The SAP outlines a range of proven strategies that address roadway safety from different angles:

Safer Roads. Improving the design and operation of our roadways involves engineering solutions like better signage, pavement markings, lighting, and intersection upgrades, as well as innovative designs such as roundabouts and safer crosswalks. Many of these measures are low-cost, high-impact changes that can dramatically reduce risk for all road users.

Safer Road Users. Fostering a culture of safety supports educational campaigns and law enforcement to encourage responsible driving behavior and protect vulnerable road users. This means expanding public outreach – from school programs for young drivers to awareness campaigns about distracted and impaired driving – so that everyone understands their role in keeping our roads safe.

Safer Alternatives. Providing and promoting safe options other than driving reduces exposure to high-speed traffic, which reduces the risk of fatal and serious injury. Treatments include expanding sidewalks, bike lanes, and trails; developing and expanding Safe Routes to School programs; and enhancing public transit services and facilities to make travel safer and more accessible for those who walk, bike, and roll.

COMMUNITY ACTIONS

The Caldwell County SAP is community focused. It was shaped by local input and calls for ongoing collaboration with cities, law enforcement, schools, businesses, and residents to ensure the solutions make sense for our community. Community engagement and underserved community considerations are foundational to the SAP. Public outreach was conducted to gather input on safety priorities, revealing concerns about aggressive and distracted driving, speeding, and insufficient infrastructure for pedestrians and cyclists. The underserved communities analysis ensures that safety improvements are prioritized in high-risk areas disproportionately affecting underserved populations.

Crucially, the plan brings everyone to the table. Engineers, law enforcement, first responders, health professionals, educators, local officials, and residents are all partners in this effort. This collaboration combines local knowledge with broad buy-in, making safety initiatives more effective and reflective of community needs.

COUNTERMEASURE IDENTIFICATION AND PRIORITIZATION

By understanding where and why crashes happen, we can take targeted action before the next tragedy occurs, rather than simply reacting afterward. The SAP employs a data-driven, systemic safety approach, recommending strategies aligned with the Texas Strategic Highway Safety Plan (SHSP) and the associated Road to Zero framework.

Proposed countermeasures include low-cost systemic safety treatments such as signing and pavement markings; behavior-focused initiatives including public education, enforcement programs, and community engagement; and policy and program recommendations like developing a Safe Routes to School program or a Complete Streets policy. These over-arching programs are supported with high-impact capital project recommendations at those intersections and roadway segments exhibiting the most severe crash history.

Implementing the SAP involves prioritizing projects based on factors such as potential for crash reduction, cost-effectiveness, benefits to vulnerable road users (e.g., bicyclists and pedestrians), and readiness for implementation. Funding strategies encompass federal grants like the Safe Streets and Roads for All (SS4A) program, Texas Department of Transportation (TxDOT)-administered funds from the Highway Safety Improvement Program (HSIP), and other state, regional, and local sources. Collaborative efforts with entities such as TxDOT, CAMPO, local jurisdictions, transit agencies, law enforcement, and community organizations are essential to the plan's success.

ACCOUNTABILITY AND TRANSPARENCY

To ensure accountability, the SAP includes a performance measurement and evaluation framework that tracks the funding, design, and construction of safety strategies over time, policy revisions implemented, and the resulting changes in the number and severity of crashes on city, county, and state roads. This approach ensures that all actions are clearly communicated, progress is tracked and shared, and the community remains informed and involved throughout the implementation process.

A Safer Future Ahead

The Caldwell County SAP is a commitment to action and a roadmap to a safer future. By fully understanding our safety challenges and working together on proven countermeasures, we are improving communities, so no family fears a preventable, life-altering crash. We acknowledge that the challenge is serious, but we approach it with hope and determination, knowing that even one death on our roads is one too many.

> THE JOURNEY TOWARD ZERO FATALITIES AND SERIOUS INJURIES WILL NOT BE EASY OR IMMEDIATE, **BUT IT IS ACHIEVABLE**.

With strong leadership, engaged community partners, and a focus on saving lives, Caldwell County, its cities, and all safety stakeholders, are on a clear path toward safer roads for all residents and visitors. Each step we take – every intersection improved, every safety campaign launched, every risky behavior changed – makes Caldwell County a safer place for *all*.

Introduction

In 2023, not a single day passed without a traffic fatality on Texas roads[1]. Right here in Caldwell County, there were 59 fatal crashes and 155 serious injury crashes from 2019 to 2023, resulting in 63 lives lost and 222 people who sustained serious, life-altering injuries. These are not just numbers; they are our friends, our family, our neighbors. Every loss is a tragedy, and as a community, we must refuse to accept this as the norm.

The safety of Caldwell County's roadways is a critical concern for the Capital Area Metropolitan Planning Organization (CAMPO), county and local transportation agencies, and other transportation stakeholders. In 2023, the U.S. Department of Transportation (USDOT) awarded CAMPO funding from the Safe Streets for All (SS4A) grant program to develop a Regional Safety Action Plan (RSAP) to improve roadway safety for all users.

CAMPO's RSAP specifically aims to decrease and eventually eliminate fatal and serious injury crashes in the region through the development of a data-driven, comprehensive plan of action. The plan is being developed using a bottom-up planning approach, beginning with safety planning initiatives at the county level. Each county within the CAMPO region – Bastrop, Burnet, Caldwell, Hays, Travis, and Williamson – is developing its own county-level Safety Action Plan (SAP). The localized safety needs, priorities, and solutions for each county will then be aggregated to inform broader regional strategies for inclusion within the larger CAMPO RSAP. The Caldwell County SAP was developed as part of this broader regional effort and is included as a chapter in the RSAP.

> The Safe Streets for All (SS4A) grant program is guided by the Safe System Approach, which involves a paradigm shift to improve safety culture, increase collaboration across all safety stakeholders and refocus transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives.

Call to Action

The Caldwell County SAP represents a strategic commitment that extends far beyond a mere regulatory checklist. It embodies a county-wide dedication to protecting lives and fostering a culture of safety for all road users. Now is the time for the County and its safety partners to come together and implement a comprehensive plan addressing the most critical safety risks on its roadways. By demonstrating strong leadership, setting clear, measurable goals and assigning specific responsibilities, the County can proactively mitigate risks, ensure accountability, and foster a culture of safety that benefits everyone.

This is the moment for action. Every stakeholder in Caldwell County – including government agencies, business leaders, nonprofits, and residents – must come together to support and advance the Caldwell County SAP. Active participation is essential to achieving the shared Road to Zero goal: eliminating fatalities and serious injuries on Caldwell County roads by 2050. By working together, sharing best practices, and continuously monitoring our progress, County leaders can inspire others and drive significant change. Let's prioritize roadway safety and take decisive steps to protect lives and build a safer future for everyone in Caldwell County.

[1] Texas Motor Vehicle Traffic Crash Facts Calendar Year 2023: https://www.txdot.gov/data-maps/crash-reports-records/motor-vehicle-crash-statistics.html

Plan Purpose

With a diverse network of rural roads, state highways, and local streets, Caldwell County faces unique transportation safety challenges that require a comprehensive, localized approach to reduce the frequency of fatal and serious injury crashes. The purpose of the Caldwell County SAP is to:

- Identify and analyze significant roadway safety concerns specific to Caldwell County;
- Present comprehensive safety data that informs the selection of strategies;
- Develop evidence-based strategies and targeted projects for improving safety across the County's roadway network; and
- Engage and collaborate with the community and safety partners in ongoing efforts.

Through the implementation of the projects and strategies in this plan, Caldwell County joins broader regional, statewide, and national efforts to create a positive traffic safety culture and move towards a future where every journey on our roadways ends safely.

Plan Development

The SAP has been developed with valuable input from multiple safety partners and stakeholders in the county, reflecting a collaborative effort to address the county's transportation challenges. Public engagement and collaboration were important components of the plan development. Public engagement efforts included two rounds of outreach to maximize regional outreach and impact, particularly among residents who may live and work in different parts of the CAMPO region. In addition, a Safety Task Force comprised of state, regional and local transportation agencies across the county was formed to guide the development of the plan and provide input at key project milestones.

A data-driven safety analysis was conducted to identify high-risk areas and systemic safety needs, while also addressing safety needs in underserved communities. Other plan components included setting ambitious safety goals and objectives, analyzing current policies and standards, selecting evidence-based safety projects and strategies, and establishing a method for evaluating progress. The final plan aligns with the Safe System Approach, focusing on multidisciplinary activities and effective interventions to improve overall roadway safety.

Figure 1 provides details on the project development timeline and key milestones. The development timeline for the SAP began in July 2024 and concluded in June 2025 with plan adoption by the Caldwell County Commissioners Court.

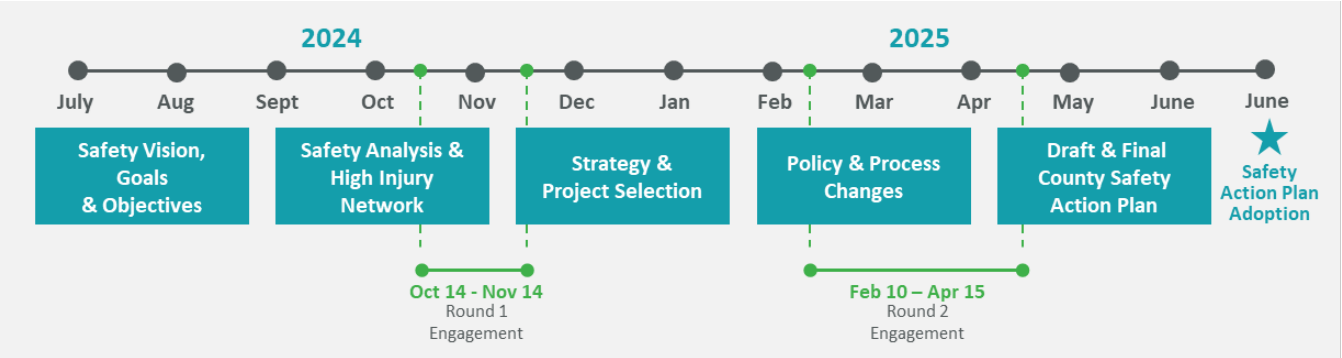


FIGURE 1. SAP DEVELOPMENT PROCESS

Leadership Commitment and Goal Setting

Road to Zero Commitment

Caldwell County is committed to improving transportation safety with an ultimate goal of reducing fatal and serious injury crashes in half by 2035 and eliminating all fatal and serious injury crashes on our roadways by 2050. The Caldwell County SAP serves as a roadmap to achieve this ambitious yet crucial goal. This commitment is further formalized through adoption of a Regional Safety Commitment Resolution (included in **Appendix A**) and the Caldwell County SAP in June 2025 by the Caldwell County Commissioners Court.

A Vision for the County

Everyone traveling on streets and roads in Caldwell County should be able to reach their destination safely every time. This guiding principle inspired the County's roadway safety vision statement, which was developed through public engagement and close collaboration with the Caldwell County Safety Task Force.

Road to Zero Safety Goals

Caldwell County's transportation safety goals to align with the Texas Transportation Commission's Road to Zero Goal to reduce the number of deaths on Texas streets and roads by half by the year 2035 and to zero by the year 2050. The Road to Zero goal is the first statewide, official roadway safety goal in Texas. Multiple regional, county, and local agencies in Texas have since adopted the same or similar goals to support these statewide efforts.

Road to Zero Safety Objectives

Achieving the goal of eliminating all fatal and serious injury crashes by 2050 requires that we set specific, measurable objectives and a strategic plan of action. The county's safety objectives are organized around three categories.

SAFER ROADS

The county's road safety objectives aim to improve street and roadway safety to better serve all road users, including pedestrians, cyclists, and transit users throughout communities in Caldwell County.

Road Safety Objectives:

1. Reduce the number of fatal and serious injuries related to **roadway and lane departure crashes** in rural areas throughout the county.
2. Reduce the number and severity of crashes **at or related to intersections**, particularly those resulting from a failure to follow traffic rules.
3. Reduce the number and severity of crashes in **dark, inadequately lit conditions**.
4. Reduce the number and severity of crashes involving **distracted driving** or **driving under the influence** of alcohol or other drugs, especially during the late nights and early mornings.
5. Conduct **cross-jurisdictional coordination** with adjacent counties to facilitate consistent design, operations, and road user accommodations on roadways near the county's geographical boundaries.
6. Coordinate with TxDOT to reduce the number and severity of crashes on **on-system facilities** and along the major highways and at intersections involving on-system roadways.
7. Reduce the number of **bicycle and pedestrian** fatal and serious injury crashes.
8. Reduce **emergency and incident response times** to crash events throughout the county.
9. Reduce the number and severity of crashes at **railroad crossings**.

SAFER ROAD USERS

Fostering a culture of road user safety comes through shifting our focus from a driver-centric culture to one with a greater focus on all road users, particularly those that are most vulnerable.

Road User Safety Objectives:

1. Introduce **enforcement and educational campaigns** to reduce the number of people who choose to drive under the influence of alcohol or other drugs.
2. Reduce **distracted driving, driving under the influence of alcohol or other drugs, aggressive driving, and speeding** throughout the county.
3. Educate the public on their role and **shared responsibility** in keeping streets and roads safe.
4. Educate **younger and older drivers** and **active transportation users** on safe transportation practices.
5. Educate transportation professionals and decision-makers on **best practices** related to traffic safety.
6. Ensure cross-jurisdictional coordination throughout the county to **align on key traffic safety messaging** for enforcement and educational campaigns.

SAFER ALTERNATIVES

These objectives aim to improve transit and active modes of transportation, since shifting more trips to these modes can reduce the risk of being involved in a crash (by reducing exposure), which can help reduce and eventually eliminate the number of fatal and serious injury crashes. Additionally, everyone can enjoy even greater safety benefits by using non-driving travel alternatives, especially as these modes are enhanced and expanded across the county.

Safer Alternatives Objectives:

1. Improve the **sidewalk network** throughout the county by adding more sidewalks and connectivity to the network and maintaining existing sidewalks.
2. Improve the **bicycle network** throughout the county by adding more connections and increasing the mileage of protected and separated bicycle facilities.
3. Provide and maintain a safe, efficient, reliable, and well-connected **transit system** by expanding CARTS interurban and connector services throughout the county.

Safety Analysis

This section provides a safety analysis of historical crash patterns, systemic safety issues, and high-risk locations across Caldwell County's roadway network. The safety analysis was conducted through the following activities, as illustrated in **Figure 2**, each of which identified key safety needs within the county:

- **Historical Crash Analysis.** Analysis of crash data over the past five years (2019-2023) to establish a baseline of fatal and serious injury crashes across the County's roadway network. The analysis identifies common risk factors, crash location and density, and crash rates in underserved communities.
- **Emphasis Area Analysis.** Analysis of contributing factors, such as lighting and weather conditions and impaired driving, and crash types by road user group. This analysis is structured around the Texas Strategic Highway Safety Plan (SHSP) emphasis areas and also identifies additional areas of focus specific to local crash trends in the County.
- **Systemic Safety Analysis.** Identification of patterns that indicate systemic locations at high risk for fatal and serious injury crashes. This approach proactively targets roadway features and conditions associated with severe crashes, rather than relying solely on past crash history, to prioritize cost-effective safety improvements across the network.
- **High Injury Network (HIN) Analysis.** Development of a HIN to pinpoint roadway segments and intersections that have the highest concentrations of fatal and serious injury crashes. This geospatial network is used to prioritize locations most in need of safety interventions and to guide targeted investments in roadway safety.

FIGURE 2. SAFETY ANALYSIS COMPONENTS

The historical crash analysis draws on crash data from the Texas Department of Transportation's (TxDOT) Crash Records Information System (CRIS) for the most recent five-year period, 2019 to 2023. CRIS uses the KABCO scale[2] to classify crash severity: fatal injury (K), suspected serious injury (A), suspected minor injury (B), possible injury (C), non-injured (O), and unknown. The safety analysis focuses on "KA" crashes – those resulting in fatal or suspected serious injuries – across all public roadways throughout the County, without regard to ownership. The findings guide the identification of targeted countermeasures aimed at reducing the severity of crashes and enhancing overall roadway safety for all users in Caldwell County.

A detailed overview of the safety analysis methodology and results is provided in **Appendix B**.

[2] The KABCO scale, developed by the Federal Highway Administration (FHWA), is a standardized system used by law enforcement to classify traffic crash injuries, ranging from K (fatal injury), A (serious injury), B (minor injury), C (possible injury), to O (property damage only, no injury).

Historical Crash Analysis

Between 2019 and 2023, there were 4,293 total crashes that occurred in Caldwell County. Of these, there were 59 crashes that resulted in 63 lives lost, and 155 crashes that resulted in 222 people who sustained serious injuries. Over the 5-year period, the total number of crashes varied slightly with the highest number of crashes, 962, occurring in 2022. There has been a fluctuating but generally upward trend in KA crashes, as shown in **Figure 3**. Baseline crash trends indicate that Caldwell County experiences an average of 27.5 deaths and 96.8 serious injuries per 100,000 people annually, as summarized in **Table 1**.

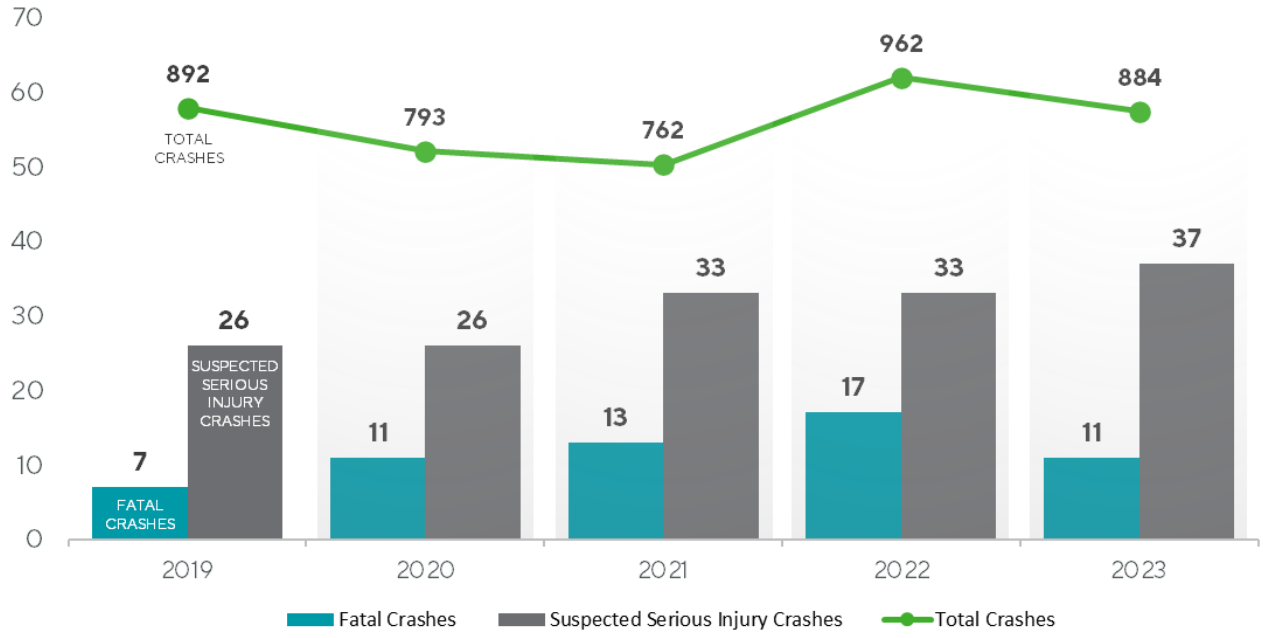


FIGURE 3. CRASHES BY YEAR AND SEVERITY IN CALDWELL COUNTY (2019-2023)

Fatal & Serious Injury Crashes (2019-2023)	Baseline Trends
Total Number of Fatal Crashes	59
Total Number of Fatalities	63
Total Average Annual Fatality Rate (per 100,000 Population)[1]	27.5
Total Number of Suspected Serious Injury Crashes	155
Total Number of Suspected Serious Injuries	222
Total Average Annual Suspected Serious Injury Rate (per 100,000 Population)[2]	96.8

Notes:

[1] 5-year annual average calculated as the total count of fatalities 2019-2023, divided by the jurisdiction's 2020 U.S. Census population (45,883).

[2] 5-year annual average calculated as the total count of serious injuries 2019-2023, divided by the jurisdiction's 2020 U.S. Census population (45,883).

TABLE 1. BASELINE FATAL AND SERIOUS INJURY CRASH TRENDS (2019-2023)

CRASH TYPES AND CONTRIBUTING FACTORS

The most common crash types and contributing factors for KA crashes are shown in **Figure 4** and **Figure 5**. Roadway and lane departure crashes are the most prevalent types of crashes. While they make up 31% of total crashes, they account for 53% of KA crashes, highlighting the severe risks associated with these crashes.

Several behavioral factors stand out as problematic. **Speed related** factors such as traveling at unsafe speeds or failure to control speed are the most prevalent, contributing to 22% of KA crashes and serving as the leading cause of same direction crashes. **Failure to drive in a single lane** was a factor in 13% of KA crashes, and it was the leading cause of roadway and lane departure crashes. **Failure to yield right of way** was a factor in 11% of KA crashes, and it was the leading cause of angle crashes. Together, these factors accounted for 46% of all KA crashes in Caldwell County.

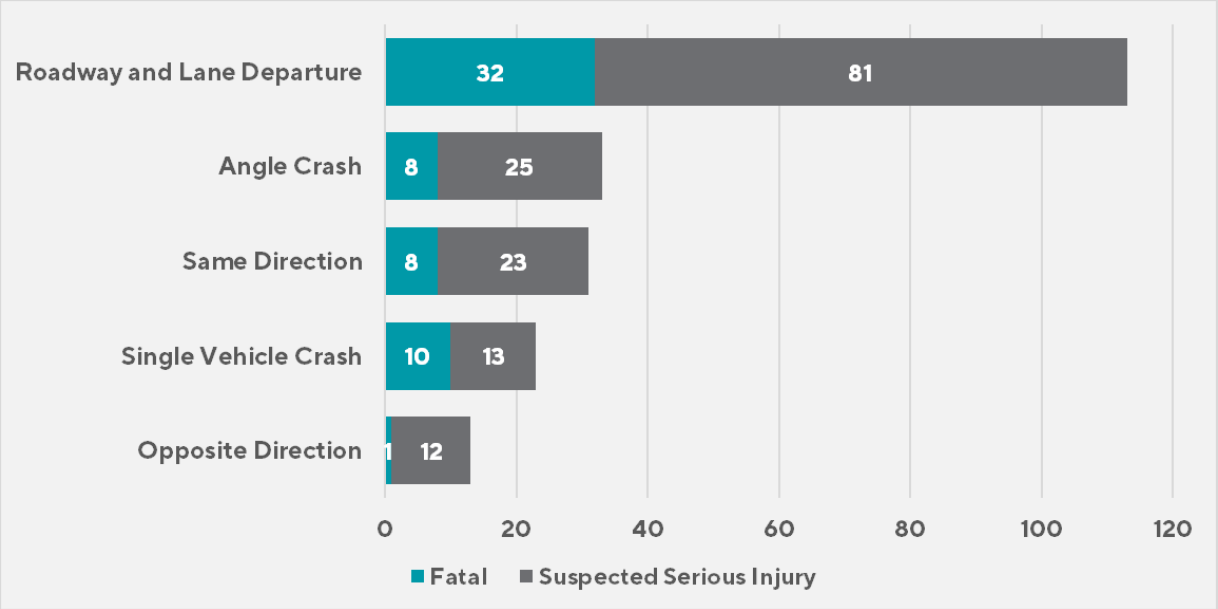


FIGURE 4. FATAL AND SERIOUS INJURY CRASHES BY TYPE (2019-2023)

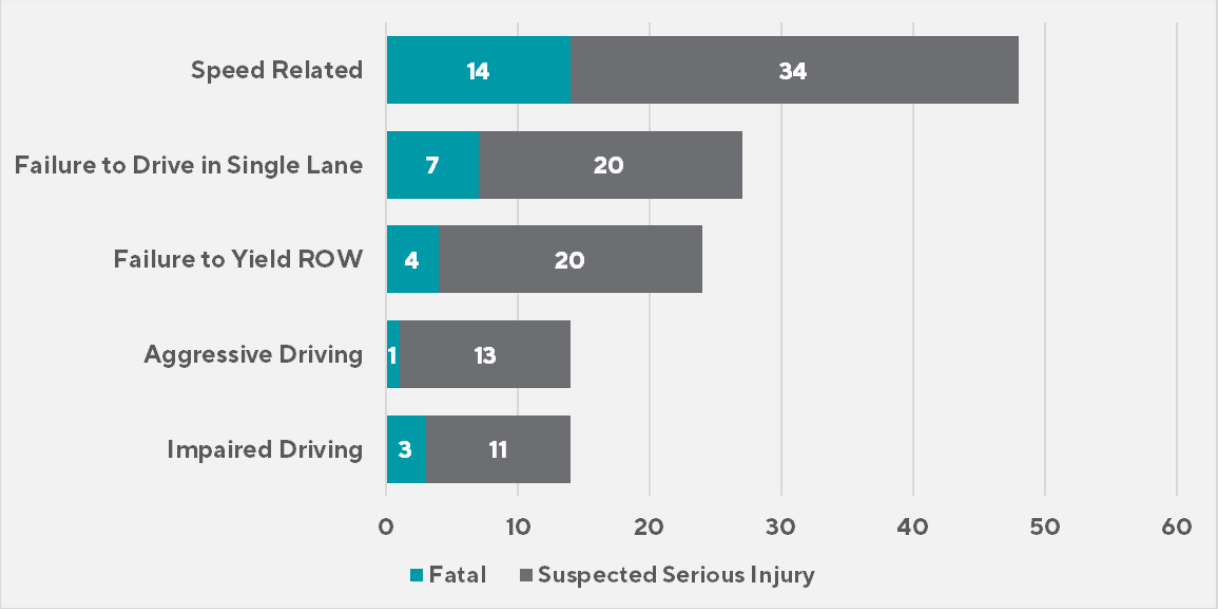


FIGURE 5. COMMON CONTRIBUTING FACTORS FOR FATAL AND SERIOUS INJURY CRASHES (2019-2023)

UNDERSERVED COMMUNITIES

Underserved communities are areas where residents face higher transportation safety risks due to factors such as persistent poverty, demographic vulnerability, or limited mobility options. These conditions may make residents more sensitive to the negative impacts of crashes and other roadway safety issues. This assessment aligns with the CAMPO RSAP and identifies underserved communities using the following criteria:

1. **Areas of Persistent Poverty.** Census tracts with a poverty rate of at least 20% as defined by the U.S. Department of Transportation.
2. **Title VI Areas.** Census tracts where less than 50% of the population identifies as "White, non-Hispanic" according to the latest American Community Survey.
3. **Areas with Vulnerable Populations.** Census block groups and tracts identified as socially vulnerable based on characteristics such as low-income, minority status, age (school-aged or elderly individuals), disability, limited English proficiency, and households without vehicles. This aligns with federal planning guidance, including Title VI of the Civil Rights Acts of 1964.

Areas overlapping with at least one of these datasets were identified as underserved communities, as shown in **Figure 6**. Most of the land area in northern and western Caldwell County, including the cities of Lockhart, Luling, and Martindale, is characterized as underserved. Together, these communities comprise 65% of the county's total land area, house 94% of its population, and contain 79% of its roadway lane miles.

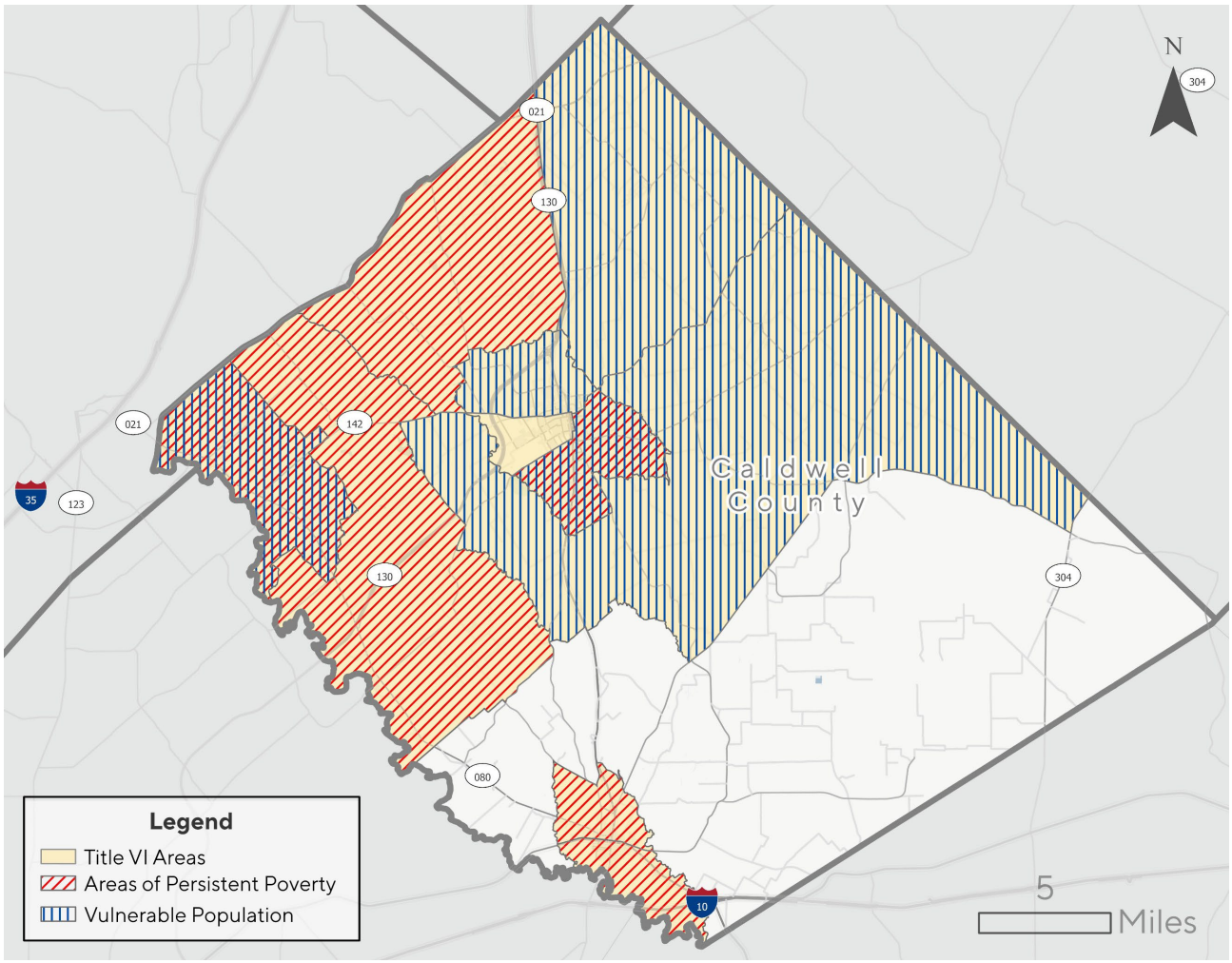


FIGURE 6. UNDERSERVED COMMUNITIES IN CALDWELL COUNTY

Crashes of all severity types were disproportionately high in underserved communities for the analysis period between 2019 and 2023. Countywide, 87% of total crashes and 85% of KA crashes occurred in underserved communities. **Figure 7** shows the rate of KA crashes by land area, population, and roadway lane miles. The crash rate per square mile was three times higher in underserved communities, and the rate per roadway lane mile was one and a half times higher compared to other areas. However, when measured by population, crashes were underrepresented in these communities. KA crashes involving vulnerable road users, intersections, and construction zones were especially overrepresented.

These trends mirror those seen throughout the CAMPO region, where KA crashes were four times higher in underserved communities compared to other areas. While this analysis relied on available data and may not capture every aspect of transportation risk in these communities, it provides a valuable framework for guiding safety investments and strategies.

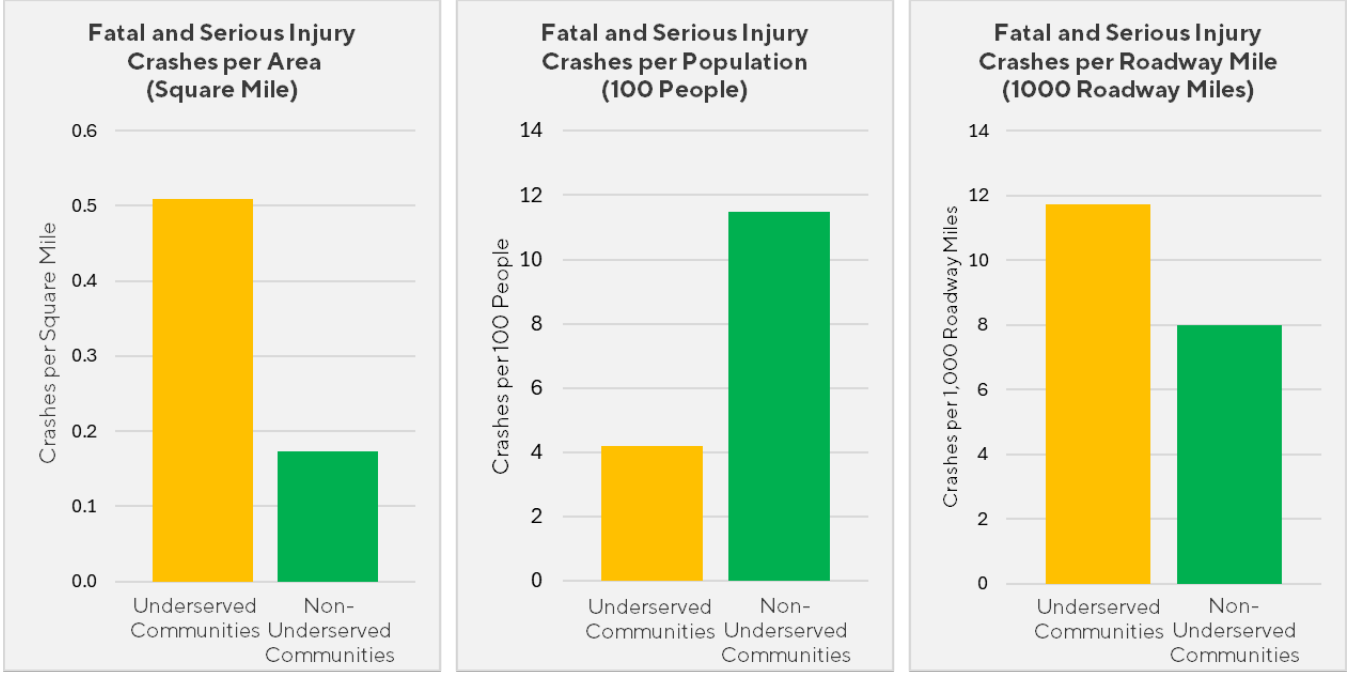


FIGURE 7. CRASH RATES BY LAND AREA, POPULATION, AND ROADWAY LANE MILES IN UNDERSERVED COMMUNITIES (2019-2023)

Emphasis Area Analysis

The Texas SHSP serves as a comprehensive, data-driven framework for improving roadway safety by identifying and prioritizing "emphasis areas" or key safety issues contributing to fatalities and serious injuries on Texas roadways. The Texas SHSP identifies eleven statewide emphasis areas that target the most prevalent safety issues on Texas roadways. These emphasis areas were selected based on detailed analysis of statewide crash data, emerging trends, risks associated with specific travel modes and user groups, and overarching safety objectives. By focusing resources and strategies on these priority areas, agencies aim to achieve the greatest impact in reducing traffic deaths and severe injuries.

The SHSP encourages counties and municipalities to analyze their own crash data using the same framework, ensuring consistency with statewide safety goals. In cases where local crash data reveals unique patterns or risks not fully captured by the statewide emphasis areas, additional emphasis areas may be identified. These local emphasis areas allow for targeted interventions that address the specific roadway characteristics and challenges unique to the county. Three local emphasis areas were identified for Caldwell County: **Dark Conditions**, **Roadway Departure on Curves**, and **Motorcycles**.

Figure 8 summarizes the statewide and local emphasis areas for the SAP.

FIGURE 8. STATEWIDE AND LOCAL EMPHASIS AREAS FOR CALDWELL COUNTY SAP

Figure 9 highlights the ten emphasis areas associated with the highest numbers of KA crashes within the county between 2019 and 2023. The most frequent factors in fatal and serious injury crashes included roadway and lane departures, crashes occurring in dark conditions, crashes involving younger or older drivers, speed-related crashes, and intersection crashes. Note that not all KA crashes are attributed to an emphasis area, and some crashes may involve multiple emphasis areas.

Notably, certain types of crashes were disproportionately represented in fatal and serious injury statistics compared to their frequency among all crashes. These included crashes involving roadway departures, dark conditions, intersections, lack of occupant protection, impaired driving, roadway departures on curves, and motorcycles. Roadway and lane departure crashes were particularly significant, accounting for over half of KA crashes over the 5-year study period. This overrepresentation indicates that these crash types and contributing factors carry a substantially higher risk of fatal or serious injury.

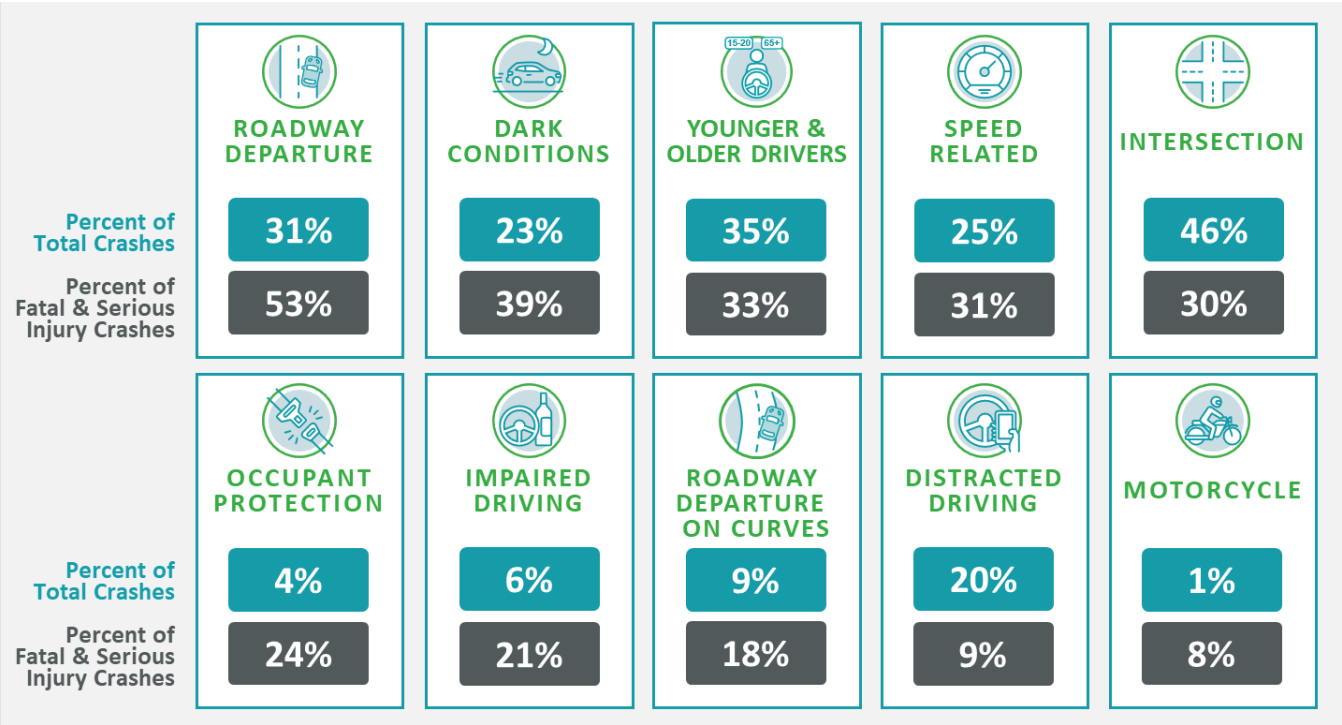


FIGURE 9. EMPHASIS AREAS WITH THE MOST REPORTED FATAL AND SERIOUS INJURY CRASHES IN CALDWELL COUNTY (2019-2023)

Systemic Safety Analysis

Systemic safety analysis enhances traditional crash assessments by examining both crash history and critical site characteristics such as traffic volume, roadway design, surrounding land use, and cross-sectional features. This comprehensive approach identifies inherently unsafe locations, even in areas where few crashes have been recorded.

By examining the relationship between site characteristics and crash factors, this method reveals connections between environmental contexts and the risk of fatal or severe crashes. These insights enable the identification of systemic crash profiles that capture the fundamental factors contributing to the most serious accidents.

The true strength of systemic analysis lies in its proactive nature. Rather than concentrating resources solely on high-crash locations, this approach allows the County to implement cost-effective safety improvements across numerous sites sharing similar risk characteristics. This strategy maximizes safety benefits by addressing potential hazards before crashes occur, creating a more comprehensive safety management system. By addressing root causes across entire road systems, Caldwell County can potentially reduce risks by 3 to 5 times more per dollar invested compared to traditional spot improvements[3].

Five systemic crash profiles were identified for Caldwell County. Systemic safety countermeasures were developed for each of the five systemic crash profiles based on guidance from TxDOT's Highway Safety Improvement Program (HSIP). These countermeasures are presented in the **Safety Strategies and Projects** section of this SAP.

SYSTEMIC CRASH PROFILE #1: INTERSECTION CRASHES

Intersection crashes represented the largest share of crashes in Caldwell County, accounting for 46% of all crashes, as shown in **Figure 10**. These crashes accounted for 15 fatal crashes (25% of all fatal crashes) and 65 KA crashes (30% of all KA crashes). The complexity of intersections, where multiple traffic movements converge, leads to a higher frequency of collisions. This underscores the need for systemic safety improvements to reduce the number of conflict points and enhance overall intersection safety.

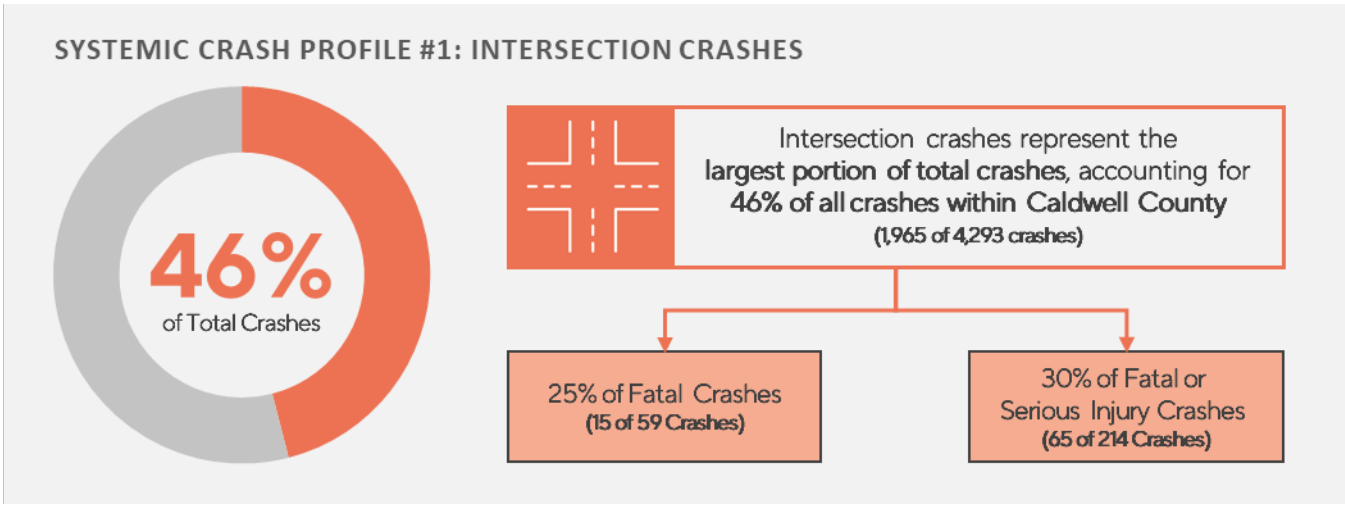


FIGURE 10. SYSTEMIC CRASH TRENDS FOR INTERSECTION CRASHES

[3] FHWA-SA-20-001 Selecting Projects and Strategies to Maximize Highway Safety Improvement Program Performance, March 2021.

SYSTEMIC CRASH PROFILE #2: ROADWAY AND LANE DEPARTURE CRASHES

Roadway and lane departure crashes, which occur when vehicles unintentionally leave their designated lanes, accounted for 31% of all crashes in the county, as shown in **Figure 11**. These crashes were notably severe, accounting for 32 fatal crashes (54% of all fatal crashes) and 113 KA crashes (53% of all KA crashes). This high proportion of fatalities and serious injuries highlights lane departures as one of the most dangerous crash types in the county. Lane departure crashes are often severe because they typically occur at higher speeds and can involve vehicles leaving the roadway entirely or crossing into oncoming traffic, increasing the risk of catastrophic outcomes.

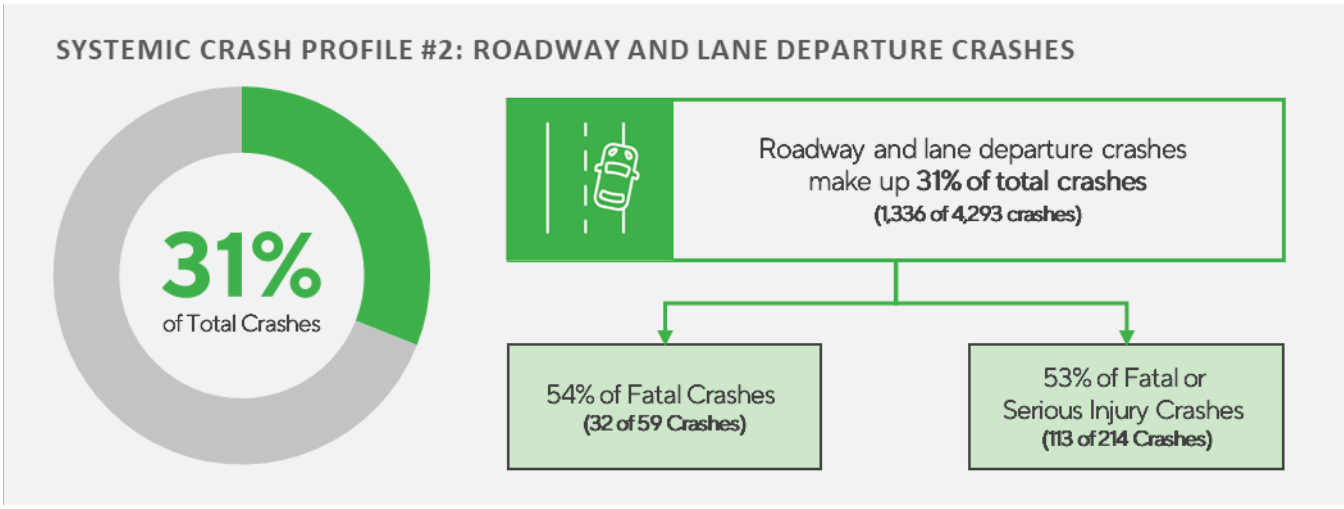


FIGURE 11. SYSTEMIC CRASH TRENDS FOR ROADWAY AND LANE DEPARTURE CRASHES

SYSTEMIC CRASH PROFILE #3: ROADWAY AND LANE DEPARTURE CRASHES ON CURVES

Roadway and lane departure crashes on curves, which occur when vehicles leave their designated lanes while navigating curved sections, made up 9% of total crashes, as shown in **Figure 12**. These crash types were also severe, accounting for 10 fatal crashes (17% of total fatal crashes) and 38 KA crashes (18% of KA crashes). The elevated risk on curves highlights the need for targeted safety measures, as the combination of curvature and loss of lane control significantly increases the likelihood of serious or fatal outcomes.

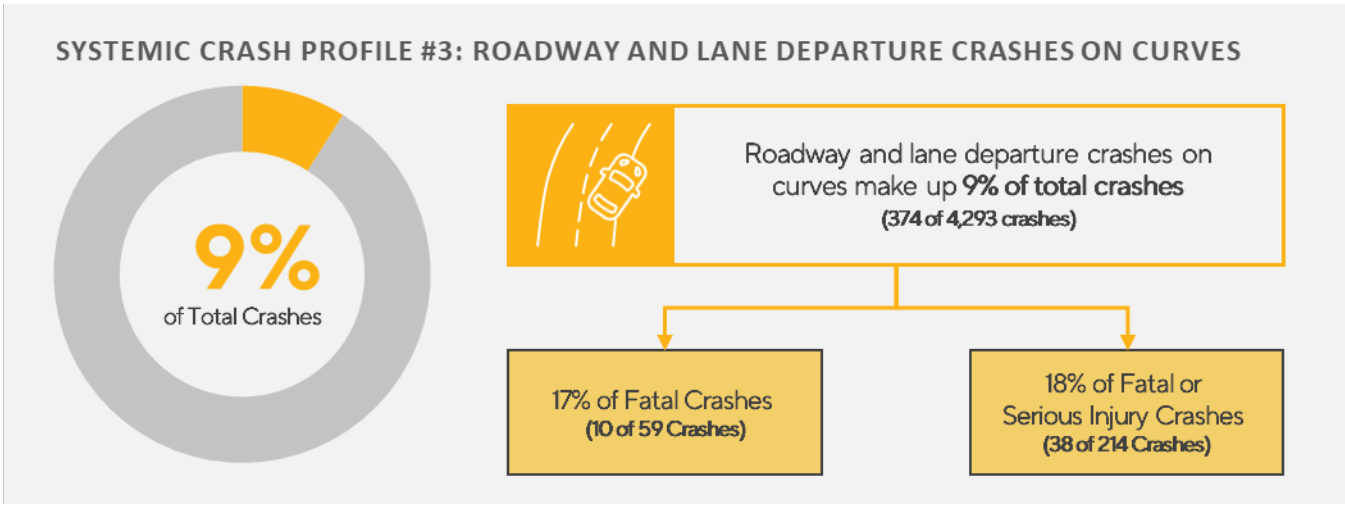


FIGURE 12. SYSTEMIC CRASH TRENDS FOR ROADWAY AND LANE DEPARTURE CRASHES ON CURVES

SYSTEMIC CRASH PROFILE #4: DARK CONDITIONS CRASHES

Crashes occurring in dark conditions represented 23% of all crashes in Caldwell County, as shown in **Figure 13**. Low visibility during these conditions is a significant factor, contributing to 30 fatal crashes (51% of all fatal crashes) and 83 KA crashes (39% of all KA crashes). These statistics highlight the heightened risk associated with nighttime driving and underscore the importance of improving roadway and intersection lighting. Enhanced illumination in dark areas can greatly improve visibility, helping to reduce the frequency and severity of nighttime crashes.

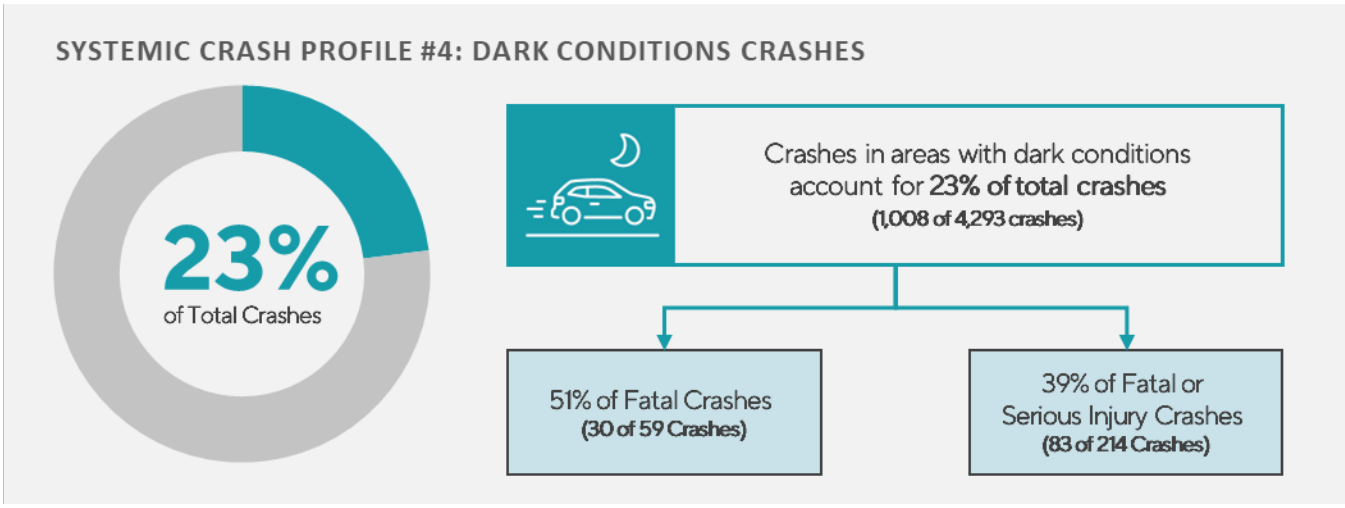


FIGURE 13. SYSTEMIC CRASH TRENDS FOR DARK CONDITION CRASHES

SYSTEMIC CRASH PROFILE #5: PEDESTRIAN AND BICYCLIST-INVOLVED CRASHES

Although crashes involving pedestrians and bicyclists make up just 1% of all crashes in Caldwell County, they are linked to significantly higher crash severity. These incidents account for 7 fatal crashes (12% of all fatal crashes) and 14 KA crashes (7% of all KA crashes). This disproportionate impact highlights the vulnerability of pedestrians and bicyclists and underscores the need for targeted safety measures to protect these road users.

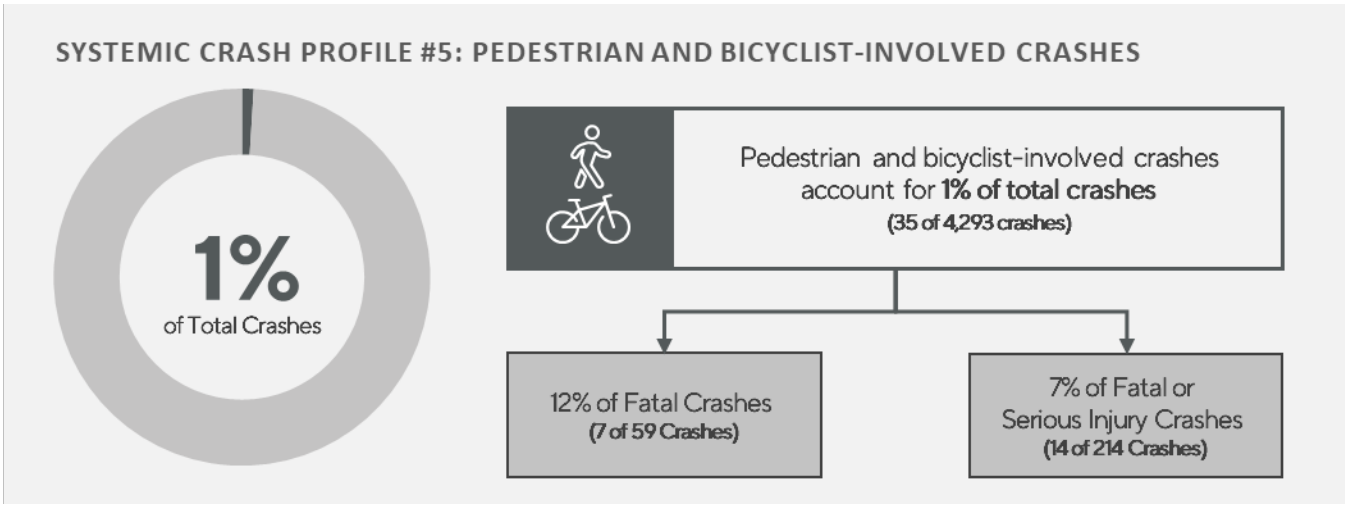


FIGURE 14. SYSTEMIC CRASH TRENDS FOR PEDESTRIAN AND BICYCLIST-INVOLVED CRASHES

High Injury Network Analysis

A HIN was developed to identify locations with the highest concentrations of KA crashes. This process involves geospatial mapping of crashes to roadways in the County, calculating a weighted crash score based on crash severity, and ranking the roadways accordingly. These networks help prioritize locations where the most severe crashes occur, ensuring resources are focused where they will have the greatest safety impact.

An online GIS webmap was developed to represent the HIN of intersections and road segments in Caldwell County, using crash data from 2019-2023. The webmap displays detailed information about crash severity, roadway ownership, and segment lengths for both intersections and roadway segments. Given the level of technical detail, the webmap was provided to and are managed by stakeholders for a more in-depth review. The webmap is not included directly in this plan, but it serves as a key resource to guide ongoing safety efforts. Additional details on the HIN are provided in **Appendix B**.

HIGH INJURY NETWORK INTERSECTIONS

Figure 15 depicts all the intersections in Caldwell County categorized as "high injury," showcasing the small percentage of the total intersection network where most severe crashes occurred. These locations represent 7% of the total intersection network that experienced at least one crash (44 out of 633 total intersections) and account for 100% of all KA intersection crashes in the County.

100% of all fatal and serious injury intersection crashes in Caldwell County occurred at only 7% of the County's intersections.

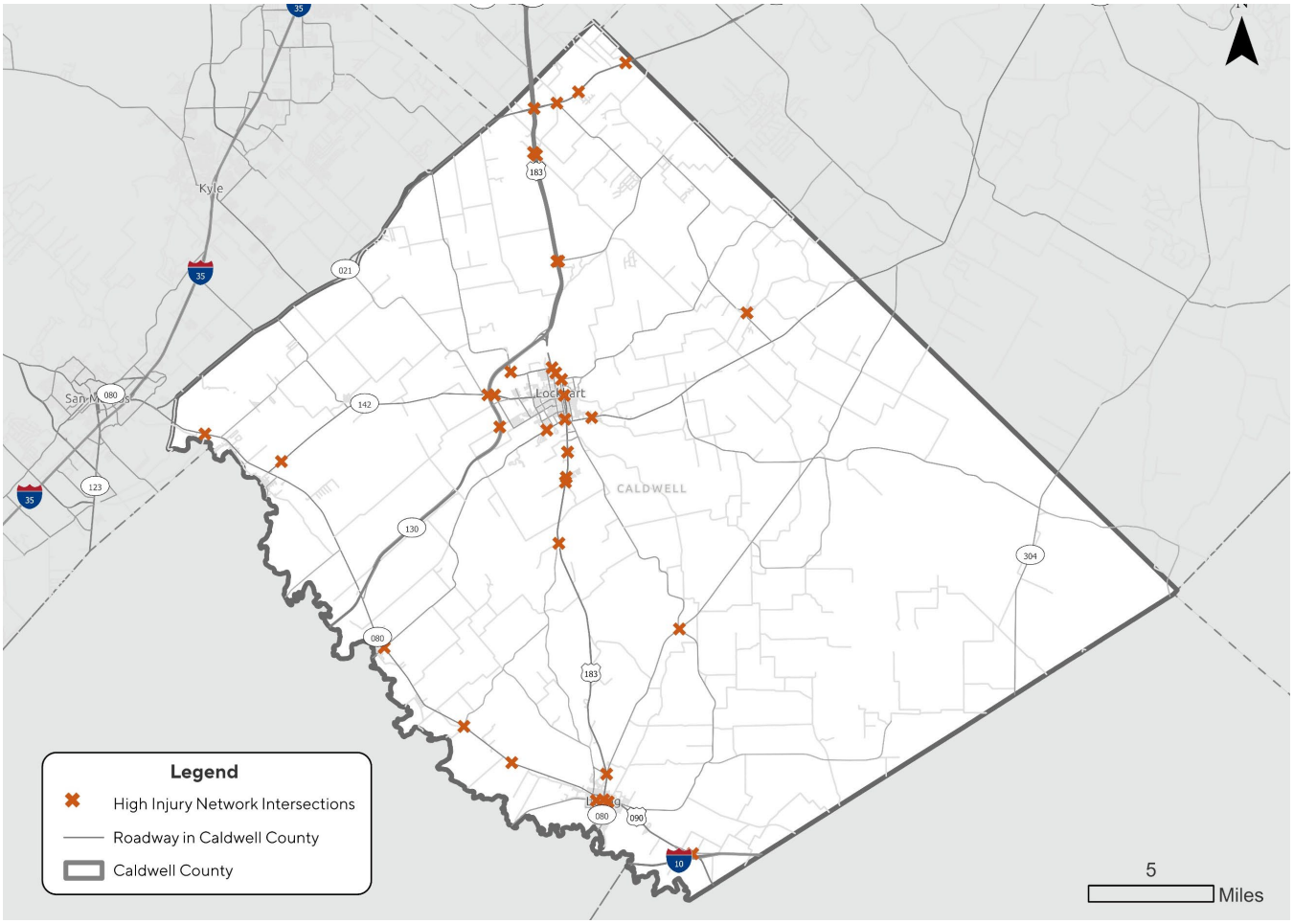
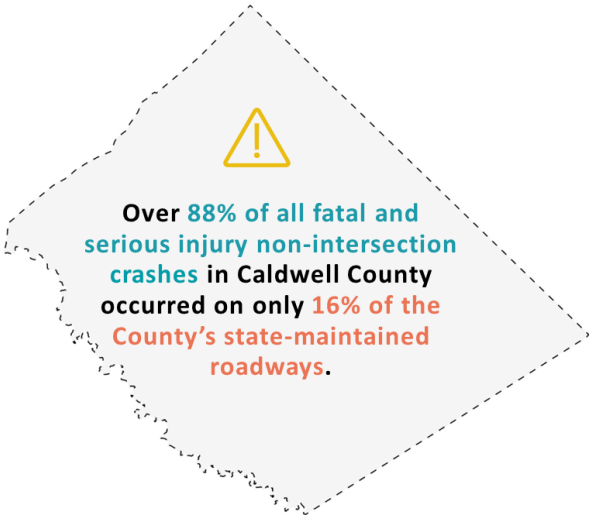


FIGURE 15. HIGH INJURY NETWORK INTERSECTIONS IN CALDWELL COUNTY (2019-2023)

HIGH INJURY NETWORK ROAD SEGMENTS

Figure 16 represents all the non-intersection locations (road segments) in Caldwell County classified as "high injury." A small portion of the roadway network accounted for a disproportionate share of crashes. These locations represent 16% of the county's state-maintained roadway miles[4] that experienced at least one crash and account for over 91% of all fatal non-intersection crashes and 88% of all KA non-intersection crashes in the County.

This indicates a strong concentration of severe safety issues on a limited portion of the network. The HIN segments provide insight into the locations most in need of traffic safety interventions, helping prioritize where improvements can have the greatest impact on reducing severe crashes.



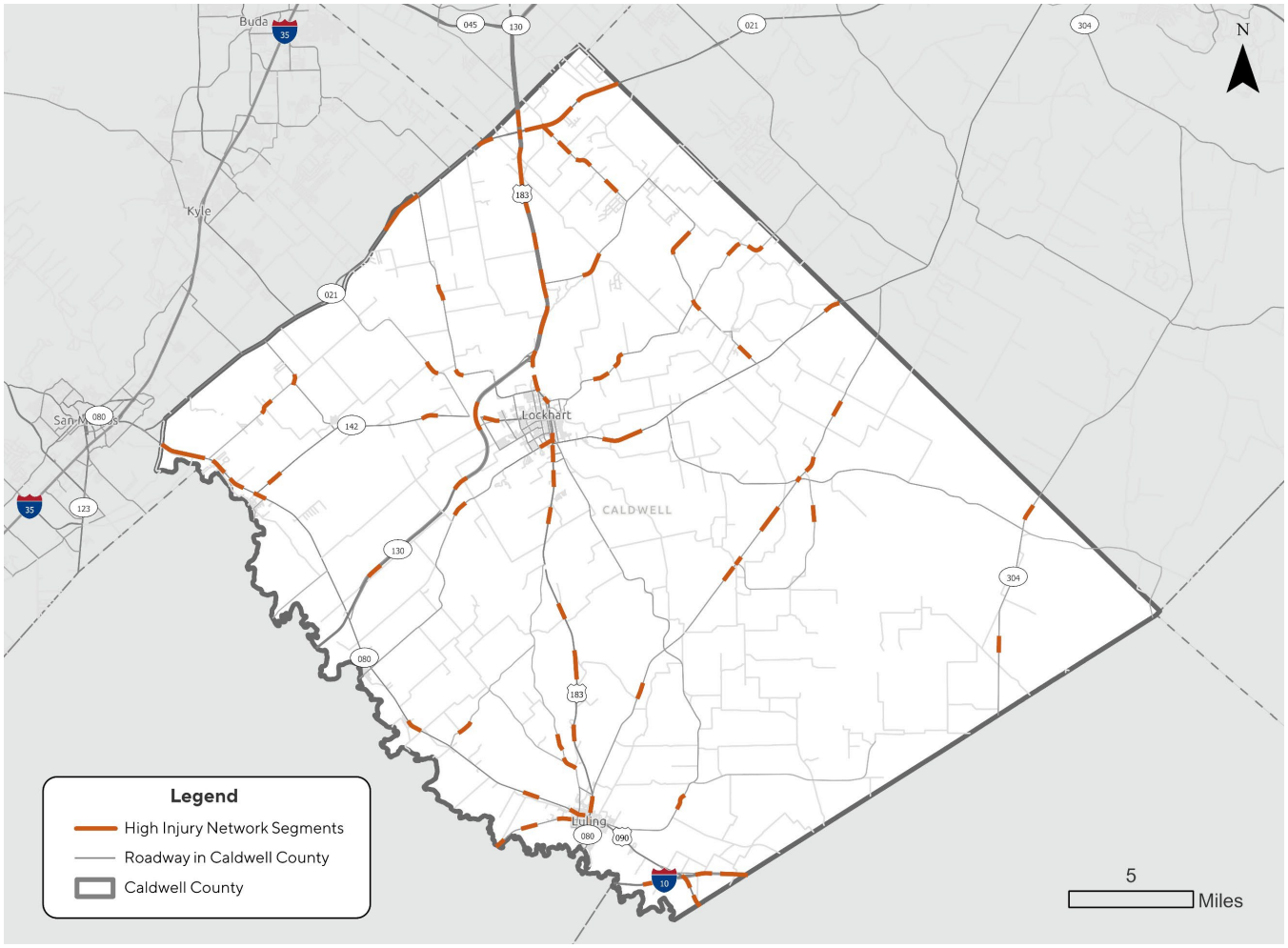


FIGURE 16. HIGH INJURY NETWORK ROAD SEGMENTS IN CALDWELL COUNTY (2019-2023)

[4] At present, the High Injury Network Road Segments focus on state-maintained roadways due to limited roadway inventory data availability; future SAP updates will incorporate local and other non-TxDOT maintained roads as data and resources allow.

Engagement and Collaboration

A robust outreach effort was conducted as part of the broader CAMPO RSAP to maximize regional participation and impact, particularly among residents who may live and work in different parts of the CAMPO region. Outreach included a **public engagement** component designed to solicit feedback from a broad range of residents and partner agencies, with an emphasis on underserved communities, as well as a **collaboration** component designed to engage county safety task forces throughout the development of the county-level SAPs.

Public Engagement

The outcomes of the RSAP and Caldwell County SAP will impact all travelers in the CAMPO region, prompting the engagement of a diverse group of stakeholders. The project team used a wide range of activities and tools to facilitate convenient access to information and gather public input. Feedback from each phase of engagement was summarized and used to inform the development of the regional and county-level SAPs.

ENGAGEMENT APPROACH AND TIMELINE

Two rounds of public engagement events were conducted at key milestones throughout the study to help shape the development of the county-specific and regional plans. These events were conducted concurrently with engagement for the CAMPO 2050 Regional Transportation Plan.

Round One – Fall 2024. The initial round of engagement included one in-person pop-up event in each county with a concurrent online open house available from October 14 to November 27, 2024. The purpose of this engagement was to introduce the regional and county SAPs to the public and seek community input on the most urgent roadway safety issues and locations of concern.

Round Two – Spring 2025. During the second round of engagement, two in-person pop-up events were held in each county with a concurrent online open house available from February 14 to April 15, 2025. The purpose of this engagement was to present the county-level SAP projects and offer the opportunity to provide input on potential projects.

COMMUNITY ENGAGEMENT TOOLS

A variety of tools and strategies were developed to effectively engage a broad range of stakeholders and collect meaningful input. Both online and traditional print communication tools were tailored to stakeholders with different communication preferences and needs. Study materials and web content were designed to be accessible to people with disabilities. Study materials were provided in both English and Spanish and translated to additional languages as needed, and every reasonable effort was made to accommodate requests for additional translation or interpretation services.

Project Website

A RSAP webpage on the CAMPO website was used to share information about the planning effort, as shown in **Figure 17**. Webpage content and graphic elements adhered to the Americans with Disabilities Act (ADA) and Web Content Accessibility Guidelines. The webpage included a description of the initiative and planning process, presentations and meeting materials, maps and exhibits, information about engagement opportunities, contact information for questions and comments, as well as Public Safety Campaign information.

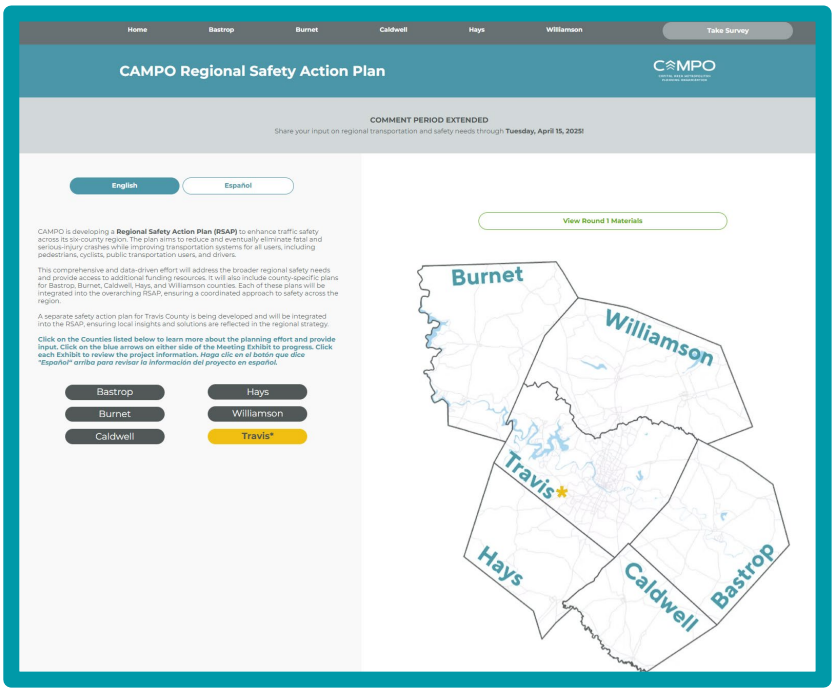


FIGURE 17. PROJECT WEBSITE HOMEPAGE

Online Open House Events

CAMPO hosted online open house events during each round of engagement. Open house materials included downloadable exhibits summarizing key milestone results for each county, a fact sheet, and online input opportunities through online surveys and interactive mapping engagement tools. **Figure 18** shows an example exhibit from the online open house. There were 471 virtual open house site sessions during Round 1 engagement and 450 sessions during Round 2.

FIGURE 18. ONLINE OPEN HOUSE EXHIBIT FOR CALDWELL COUNTY

Pop-up Events in Caldwell County

Five in-person pop-up events were held in Bastrop, Burnet, Caldwell, Hays, and Williamson counties during Round 1 engagement, with an estimated 651 people engaging with the project team. During Round 2 engagement, ten pop-up events took place regionwide, with an estimated 450 people participating.

The Round 1 pop-up event for Caldwell County was held at the First Friday Lockhart event on Friday, November 1, 2024. Round 2 events occurred at the Lockhart First Friday Downtown event on Friday, March 7, 2025, and at the Luling Artisan's Market on Saturday, March 15, 2025. The project team collected comments about safety concerns, promoted the survey and mapping tool, and distributed push cards with additional information about the online open house and comment period.

An estimated 26 people engaged with the project team during the Round 1 pop-up for Caldwell County, and 83 people engaged during Round 2.

FIGURE 19. POP-UP EVENTS AT FIRST FRIDAY LOCKHART

NOTIFICATION METHODS

The planning team developed a social medial plan to promote participation for each round of engagement and to promote awareness of the safety campaign. Engaging content with strong calls to action and compelling graphics were developed and shared through CAMPO social media platforms and with partner organizations to share with their networks through their platforms, as shown in **Figure 20**. Media releases were prepared with information about community engagement opportunities and the public safety campaign. The team also leveraged community partner communication tools such as newsletters and bulletins to share project updates and promote events, as summarized in **Table 2**.

The outreach team made direct phone calls and emails throughout the comment period for each round of engagement to promote and encourage the distribution of online open house materials. Push cards were distributed to local jurisdictions, schools, Meals on Wheels deliveries throughout the CAMPO region, health centers, libraries, senior centers, churches, and CARTS stations throughout the comment period. The outreach team shared a social media toolkit, including a newsletter blurb and social media content with task force members, regional public information officers, local jurisdictions, and community partners.

FIGURE 20. EXAMPLE SOCIAL MEDIA POST

Community Impact Regional Advertisements	
Region	**Run Dates**
Leander/Liberty Hill	October 15, 2024 February 21, 2025
San Marcos/Buda/Kyle	October 16, 2024 February 25, 2025
Georgetown	October 16, 2024 February 27, 2025
Bastrop/Cedar Creek	October 31, 2024 March 3, 2025
Cedar Park/Far Northwest Austin	November 2, 2024 February 19, 2025
Round Rock	November 5, 2024
Pflugerville	November 8, 2024

Local Newspaper Advertisements	
Publication	**Run Dates**
Elgin Courier	October 16, 2024 February 19, 2025
Burnet Bulletin	October 16, 2024 February 14, 2025
Williamson County Sun	October 16, 2024 February 14, 2025
Hays Free Press	October 16, 2024 February 19, 2025
Lockhart Post Register	October 17, 2024 February 20, 2025
El Mundo Newspaper (Spanish-speaking regional newspaper)	October 17, 2024 February 20, 2025
Marble Falls Highlander	October 18, 2024 February 19, 2025

TABLE 2. REGIONAL AND LOCAL ADVERTISEMENTS

WHAT WE HEARD FROM THE COMMUNITY

Round 1 Engagement Feedback

During the Round 1 engagement, CAMPO received 42 survey submissions. Of these, 28% of respondents noted they lived, worked, or traveled to Caldwell County, as shown in **Figure 21**. The most frequently cited transportation issues affecting safety in Caldwell County were aggressive driving, speeding, distracted driving, and poor or unsafe street conditions.

Few respondents felt safe engaging in active transportation in Caldwell County. Only 8% of respondents reported feeling "safe," while 33% felt "unsafe" or "very unsafe" during these activities, as shown in **Figure 22**. Additionally, 85% of survey respondents indicated they use a personal vehicle every day instead of alternative transportation modes. Respondents noted the need for improved street conditions, stricter enforcement of road safety laws, and better sidewalk conditions.

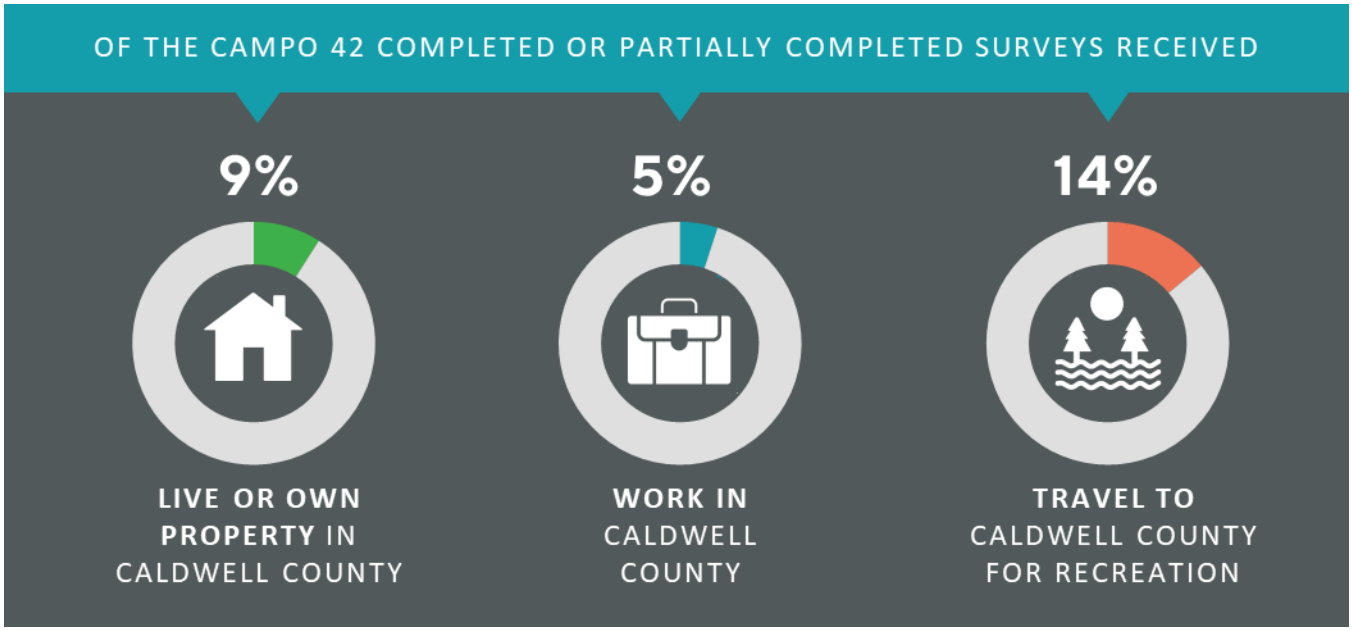


FIGURE 21. ROUND 1 SURVEY RESPONSES FOR CALDWELL COUNTY

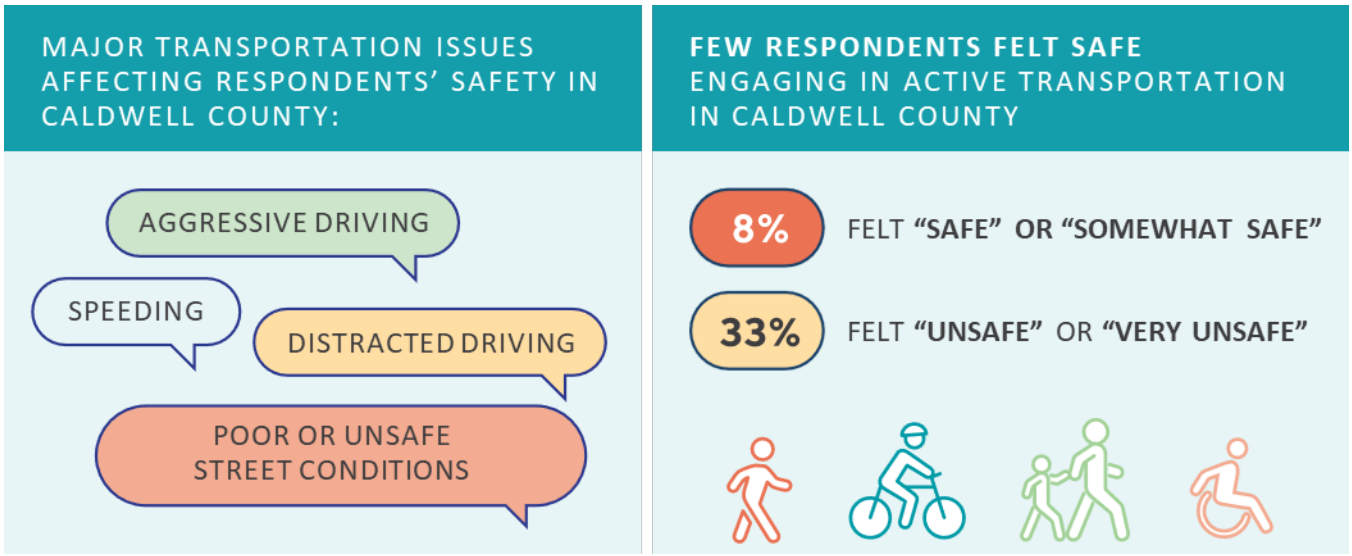


FIGURE 22. MAJOR TRANSPORTATION ISSUES IN CALDWELL COUNTY

CAMPO received 71 comments through the online mapping engagement tool, including 10 comments noting specific safety concerns in Caldwell County. The overarching themes of comments within the County included the following:

- Need to reduce unexpected lane reductions to address hazardous and unpredictable driving behaviors
- Need for traffic signal synchronization
- Need for dedicated turn lanes
- Lack of safe pedestrian crossings, especially near recreational areas

Round 2 Engagement Feedback

CAMPO received 297 survey submissions during the Round 2 outreach efforts. Of these, nearly 26% noted that they lived, worked, or traveled to Caldwell County, as shown in **Figure 23**.

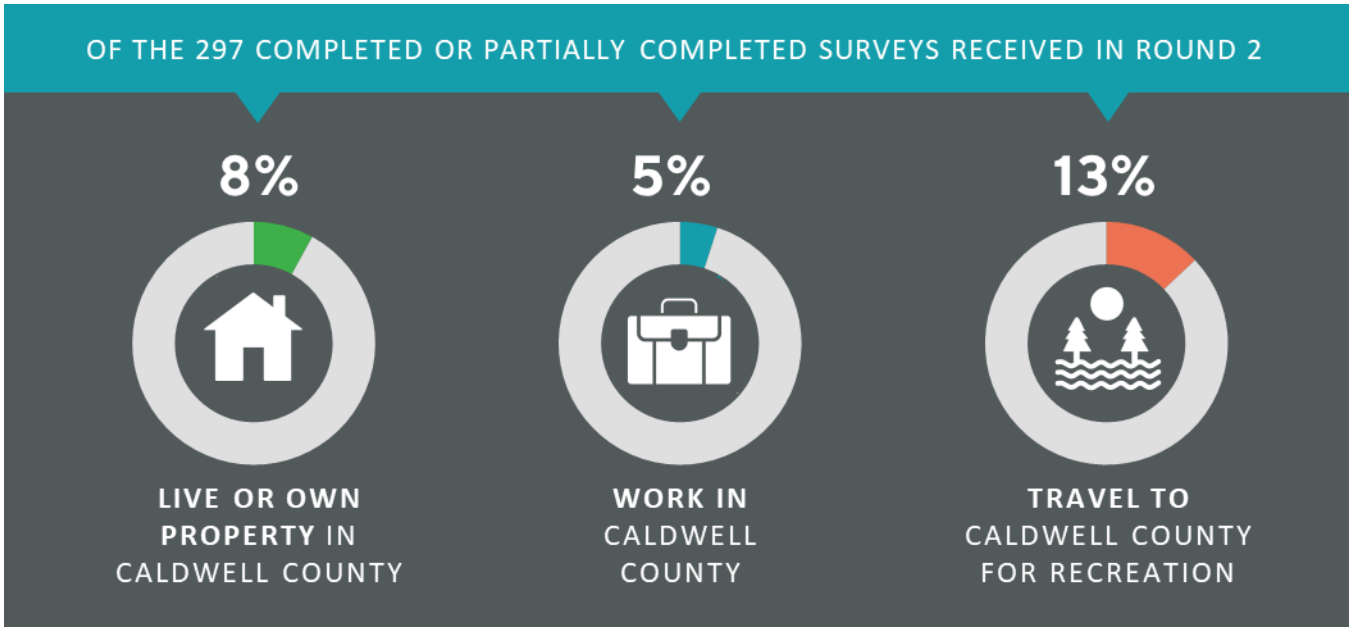


FIGURE 23. ROUND 2 SURVEY RESPONSES FOR CALDWELL COUNTY

In the survey, community members were asked whether the identified safety countermeasures adequately addressed their roadway safety concerns. If they felt the measures were insufficient, respondents were prompted to give specific feedback on their areas of concern. The overarching themes of feedback within the County included the following:

- Need strategies to address traffic and truck congestion in the Luling area
- Need additional improvements at intersections along Texas 80 west of Martindale
- Need safety-focused road expansions
- Need better roadway lighting and signage
- Need stronger enforcement and education to address reckless driving and speeding, particularly in work zones

In response, the project team identified additional targeted projects, behavioral strategies, and policy recommendations for incorporation into the plan. These include targeted safety improvements to address specific congestion and freight concerns, expanded driver education and enforcement initiatives, and policy refinements aimed at broader roadway safety enhancements – except in areas where existing or planned projects are already mitigating the identified concerns.

Collaboration

A Caldwell County Safety Task Force was formed to guide the development of the plan and provide input at key project milestones. The Task Force was comprised of community and industry leaders from state, regional, and local transportation agencies and jurisdictions across the county, as shown in **Figure 24**.

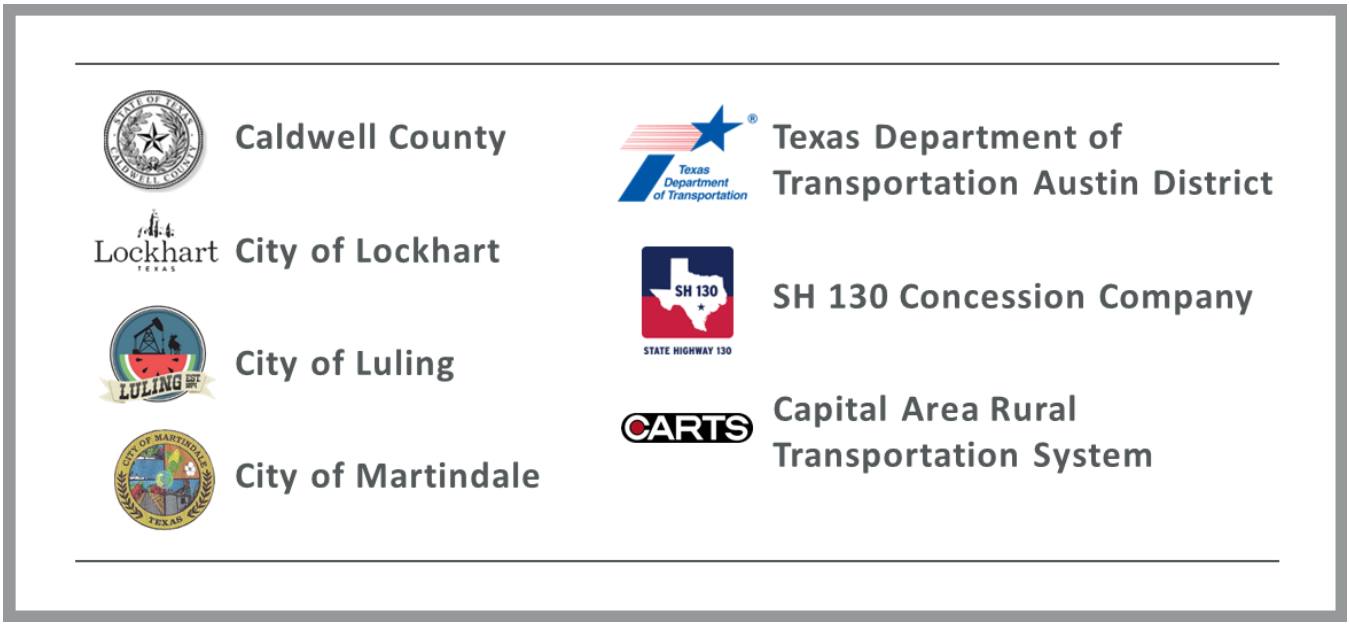


FIGURE 24. CALDWELL COUNTY SAFETY TASK FORCE MEMBER AGENCIES

Task force members were engaged early in the planning process, and they guided plan development by:

- Assisting in reaching out to stakeholders throughout the public engagement process
- Consulting at key milestones to review and confirm planning approach and results
- Providing feedback and guidance on project prioritization

Figure 25 provides details on the timeline and key milestones discussed at each Task Force meeting. The Task Force met four times throughout development of the plan and independently reviewed the draft SAP. The project team also met individually with Task Force members (as requested) to discuss the safety projects and strategies specific to their respective jurisdictions. Task Force members provided vital feedback about recent roadway improvements and maintenance activities within their jurisdictions, as well as the potential for these activities to address the identified safety issues on targeted corridors and at specific intersection locations. As a result of these meetings, the project team made refinements and finalized the list of targeted safety projects for the plan.

The Task Force will continue their safety leadership efforts by overseeing the implementation and monitoring of the SAP.

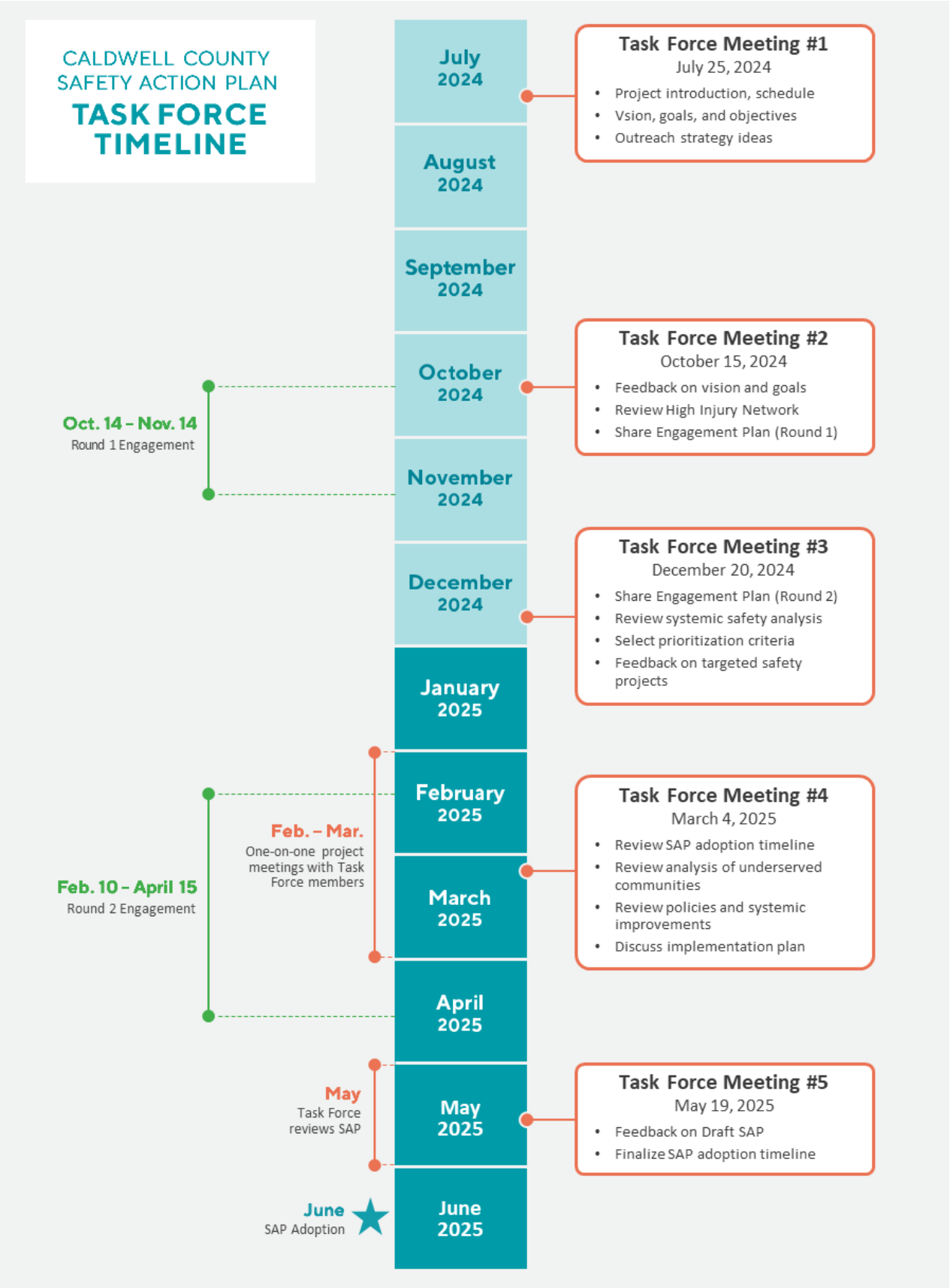


FIGURE 25. CALDWELL COUNTY SAP TASK FORCE MEETINGS

Policy and Process Changes

An assessment was conducted to evaluate existing policies, guidelines, standards, and plans related to transportation planning and safety prioritization. The assessment focused on key county and city documents impacting the safety of roadways, sidewalks, trails, and other transportation facilities within Caldwell County. This process established a baseline and identified additional opportunities and policy recommendations to enhance transportation safety for all road users, especially the most vulnerable. The policy focus underscores a commitment to public safety and enhancements that better protect and serve the transportation network and its users.

Existing Policy Review

A review of sample local and regional policies and plans within the CAMPO region – including Caldwell County – was conducted to identify and assess existing safety-related concepts and guidelines. The key search terms included the following: *safe, traffic, signal, intersection, speed, calming, crash, seatbelt, texting, stop sign, construction zone, safe routes, light and signal synchronization, speed bumps, pedestrian, bike or bicycle, driver safety, complete streets, curb cuts,* and *access management*. The assessment provided insight into the current safety initiatives and measures already established in Caldwell County and its cities, serving as a foundation for identifying additional policies and process changes that could improve roadway safety.

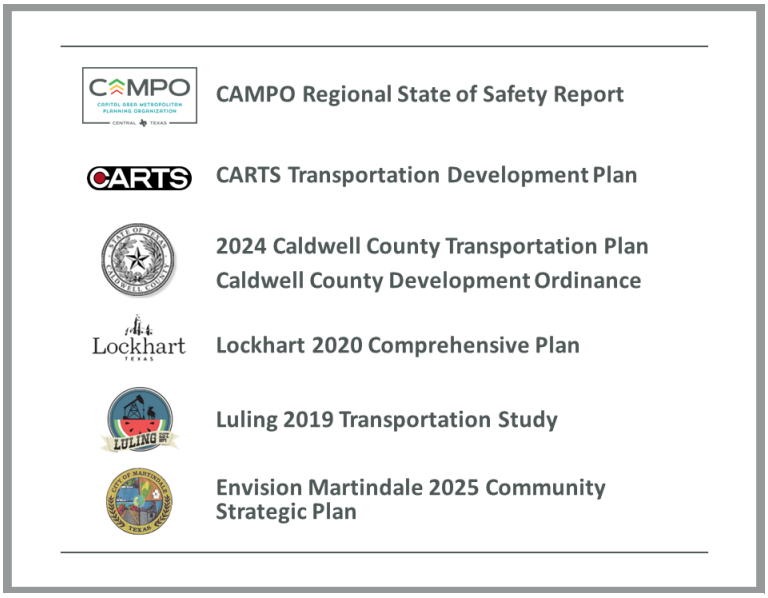


FIGURE 26. POLICY AND PLAN REVIEW FOR CALDWELL COUNTY

Policy and Process Recommendations

Tables 3 through 8 present a set of targeted policy and process recommendations that were formulated based on the existing policy review and consideration of safety needs identified through safety analysis, public engagement, and collaboration efforts. These recommendations focus on closing communication gaps, promoting collaboration among local agencies, schools, and law enforcement, reducing fatal and serious injuries, and ensuring safer travel for everyone on the road.

The recommendations are organized around the core principles of the Safe System Approach, depicted in **Figure 27**, and align with the emphasis areas of the Texas Road to Zero effort as described in the Texas SHSP. Additional recommendations are provided to promote safety leadership and enhance safety culture. By aligning with these frameworks, the recommendations aim to create a transportation system that is safe, reliable, and resilient, emphasizing both proactive measures and system-level improvements.

FIGURE 27. SAFE SYSTEM APPROACH

TABLE 3. POLICIES AND PROCESSES ADDRESSING SAFE ROAD USERS

POLICY OR PROCESS RECOMMENDATION	DESCRIPTION	EMPHASIS AREA	LEAD	SUPPORT
Safety Awareness Campaigns	Leverage City, County, and civic communications to publicize TxDOT's safety campaigns to increase public awareness of traffic safety issues. Target safety campaign materials to meet the needs of underserved communities.	Applicable to All Emphasis Areas	City and County Staff	TxDOT CAMPO
Educational Programs	Partner with local organizations to pursue funding and implement educational programs in additional settings such as schools and workplaces.	Applicable to All Emphasis Areas	Task Force	City and County Staff CAMPO
Enforcement Program	Utilize Texas' Law Enforcement Liaisons to improve participation from law enforcement in conducting coordinated high-visibility enforcement activities addressing high-risk driving behavior, particularly on weekends and evenings.	Speed Related, Impaired Driving	City and County Staff	Texas Municipal Police Association CAMPO
Enforcement + Public Information Campaigns	Conduct focused intersection enforcement patrols in conjunction with high-visibility behavioral campaigns (e.g., impaired driving, occupant protection, distracted driving).	Applicable to All Emphasis Areas	City and County Staff	TxDOT Texas Municipal Police Association CAMPO
Work Zone Safety Enhancement Policy	Establish comprehensive safety protocols aligned with TxDOT's work zone safety regulations, using Work Zone Intelligent Transportation Systems.	Speed Related	TxDOT	City and County Staff CAMPO
Safe Routes to Schools	Ensure all schools are participating in the Safe Routes to School program and ensure all communities in the county have passed a safe passing ordinance.	Pedestrians, Bicyclists	City and County Staff	TxDOT School Districts CAMPO
Sponsorship of Safety Events	Host City- and County-sponsored safety-related events and education campaigns to raise awareness and encourage safe road behavior.	Applicable to All Emphasis Areas	Task Force	City and County Staff CAMPO

TABLE 4. POLICIES AND PROCESSES ADDRESSING SAFE VEHICLES

POLICY OR PROCESS RECOMMENDATION	DESCRIPTION	EMPHASIS AREA	LEAD	SUPPORT
Truck/Freight Route Policy	Develop a policy in accordance with TxDOT's guidelines on truck routes and truck parking restrictions. Consider local ordinances for designated truck routes and parking to identify areas where freight routes and active transportation facilities intersect and implement measures such as designated truck lanes or time-based restrictions to enhance safety.	Applicable to All Emphasis Areas	Task Force	TxDOT
Vehicle Advancement (V2X) Program	Follow TxDOT's initiatives on connected and autonomous vehicles to provide the necessary infrastructure and facility upgrades (striping, signing, lighting, vehicle-to-everything (V2X) communication) and maintain awareness of new/upcoming technologies.	Applicable to All Emphasis Areas	Task Force	TxDOT

TABLE 5. POLICIES AND PROCESSES ADDRESSING SAFE SPEEDS

POLICY OR PROCESS RECOMMENDATION	DESCRIPTION	EMPHASIS AREA	LEAD	SUPPORT
Procedure for Establishing Speed Zones	Develop a speed limit policy and procedures based on the Manual on Uniform Traffic Control Devices (MUTCD) (11th Edition) that include contextual factors and aligns with TxDOT's Speed Zone Manual.	Speed Related	City and County Staff	TxDOT CAMPO
School Zone Enhancement Program	Develop a program that collaborates with local schools and parent-teacher associations to identify areas of enhanced safety improvements (rapid flashing beacons, speed feedback signs, enhanced crossings, etc.) in designated school zones.	Speed Related	City and County Staff	Schools / School Districts CAMPO

TABLE 6. POLICIES AND PROCESSES ADDRESSING SAFE ROADS

POLICY OR PROCESS RECOMMENDATION	DESCRIPTION	EMPHASIS AREA	LEAD	SUPPORT
Complete Streets Policy	Adopt City and County Complete Streets policies to provide designs that accommodate all road users in future transportation investments.	Speed Related, Pedestrians, Bicyclists	City and County Staff	Task Force CAMPO
Traffic Signal Timing Policy and Procedures	Review and update traffic signal timing policies and procedures. Institute regular evaluation and adjustment protocols for existing traffic signal timing and yellow change intervals.	Intersection Safety	TxDOT, City and County Staff	Task Force CAMPO
Street Lighting Policy	Develop a policy consistent with TxDOT's guidelines for roadway lighting installation focusing on systemic intersections, curves, or active transportation locations.	Roadway & Lane Departures, Intersection Safety	City and County Staff	TxDOT CAMPO

TABLE 6 (CONTINUED). POLICIES AND PROCESSES ADDRESSING SAFE ROADS

POLICY OR PROCESS RECOMMENDATION	DESCRIPTION	EMPHASIS AREA	LEAD	SUPPORT
Intersection Control Policy	Develop an Intersection Control Evaluation (ICE) policy consistent with TxDOT's ICE framework to determine appropriate intersection improvements.	Intersection Safety	City and County Staff	TxDOT CAMPO
Active Transportation Plan	Develop a County Active Transportation Plan to achieve a complete network for walking, biking, and emerging micromobility options.	Pedestrians, Bicyclists	City and County Staff	TxDOT CAMPO
Access Management Standards	Develop access management guidelines for driveway location/spacing, driveway design (width and radii), and turn lane warrant requirements.	Applicable to All Emphasis Areas	City and County Staff	TxDOT CAMPO
Traffic Impact Analysis Standards	Amend Caldwell County Development Ordinance Traffic Impact Assessment requirements to include criteria and standards for driveway design and spacing, turn lane warrants, and pedestrian facilities.	Applicable to All Emphasis Areas	Task Force	City and County Staff
Asset Management Program	Develop a systematic approach to scheduling roadway maintenance, focusing on making timely repairs, following TxDOT's maintenance guidelines, and prioritizing systemic safety treatments such as signs, pavement markings, and rumble strips.	Applicable to All Emphasis Areas	TxDOT	City and County Staff
Community Input Webpage Development	Implement a feedback mechanism for road users to report maintenance issues, such as potholes, lighting concerns, and road sign maintenance needs, in real time. Provide updates on the resolution of submitted concerns.	Applicable to All Emphasis Areas	Task Force	City and County Staff CAMPO
Advanced Traffic Management System Implementation	Explore the creation of an Advanced Traffic Management System to monitor and manage traffic flow using real-time data that is compatible with existing infrastructure and adheres to TxDOT's Regional Intelligent Transportation System architecture.	Applicable to All Emphasis Areas	TxDOT, City and County Staff	TxDOT CAMPO
Railroad Crossing Standards	Develop railroad crossing standards consistent with USDOT/TxDOT/MUTCD guidelines, which may include advanced warning systems, railroad crossing pavement markings, and enhanced warning signs and signals.	Railroad Safety	City and County Staff	TxDOT Railroad Companies
Road Safety Audits	Adopt policy to conduct systematic safety evaluation and Road Safety Audits to identify areas in need of spot safety treatments and create dedicated funding sources for these improvements.	Roadway & Lane Departures	Task Force CAMPO	City and County Staff

TABLE 7. POLICIES AND PROCESSES ADDRESSING POST CRASH CARE

POLICY OR PROCESS RECOMMENDATION	DESCRIPTION	EMPHASIS AREA	LEAD	SUPPORT
Emergency Response Protocols	Develop and implement protocols that ensure rapid response times by emergency services in the event of a crash. This could include but is not limited to identification of infrastructure barriers and problematic routes, evaluation of railroad-generated crossing status data, and potential infrastructure improvements and/or use of technology such as emergency preemption and/or blocked crossing warning systems to improve emergency response times.	Post Crash Care	Task Force	City and County Staff CAMPO
Traffic Signal Improvement Program	Follow TxDOT's Traffic and Safety Analysis Procedures Manual guidelines for using adaptive signal control technologies to enhance traffic flow and emergency response times.	Post Crash Care	TxDOT	City and County Staff
Crash Database Program	Develop a centralized database to track crash data and response outcomes, aligning with local emergency response protocol and data-sharing agreements.	Post Crash Care	Task Force CAMPO	City and County Staff

TABLE 8. POLICIES AND PROCESSES ADDRESSING SAFETY LEADERSHIP AND CULTURE

POLICY OR PROCESS RECOMMENDATION	DESCRIPTION	EMPHASIS AREA	LEAD	SUPPORT
Road to Zero Commitment	Publicly adopt a commitment to reduce the number of traffic fatalities and serious injuries by half by 2035 and eliminate all by 2050.	Applicable to All Emphasis Areas	City and County Staff	Task Force CAMPO
Road to Zero Task Force	Support a permanent Caldwell County Task Force and expand membership to ensure county-wide coordination in safety planning and management.	Applicable to All Emphasis Areas	Task Force	City and County Staff CAMPO
Public Awareness Campaigns	Incorporate Road to Zero messages and education campaigns into City and County communications and events to increase public awareness of traffic safety issues.	Applicable to All Emphasis Areas	City and County Staff	Task Force CAMPO
Pursue Funding Opportunities	Apply for implementation funding for projects on the High Injury Network and for systemic safety improvements (USDOT grants, Safe Routes to Schools, Highway Safety Improvement Program)	Applicable to All Emphasis Areas	City and County Staff	CAMPO
Progress Reporting	Report on the progress of Safety Action Plan implementation to provide transparency to local stakeholders.	Applicable to All Emphasis Areas	Task Force	City and County Staff TxDOT CAMPO

Safety Strategies and Projects

This section presents a comprehensive toolbox of safety strategies designed to address critical safety issues identified in this plan. Local jurisdictions can use this resource to select and implement strategies to address behavioral issues and high-risk crash locations on the High Injury Network. In addition, groupings (or packages) of systemic safety countermeasures are recommended to address the systemic crash patterns revealed by the safety analysis. These systemic countermeasures could be implemented across numerous sites sharing similar risk profiles – offering a proactive means to address potential hazards before crashes occur. Finally, a targeted project list has been developed for Caldwell County's most hazardous areas, as well as other priority sites identified by the Task Force and public feedback, ensuring that resources are directed where they will have the greatest impact on community safety.

Safety Countermeasures Toolbox

A safety countermeasures toolbox was developed to provide a range of safety countermeasures tailored to Caldwell County's specific needs. The toolbox is a collection of safety strategies and interventions that have been proven effective in reducing roadway fatalities and serious injuries.

These countermeasures are drawn from Federal Highway Administration's (FHWA) Proven Safety Countermeasures and other resources (listed at right), each backed by extensive research and real-world results demonstrating significant, measurable safety improvements. They are designed to address common roadway safety issues, including speeding, intersection crashes, roadway departures, and pedestrian or bicyclist incidents. Some strategies are crosscutting, meaning they target multiple types of safety challenges simultaneously.

SAFETY COUNTERMEASURES RESOURCES

- FHWA Proven Safety Countermeasures
- FHWA Proven Safety Countermeasures in Rural Communities
- NHTSA Traffic Safety Countermeasures that Work in Rural Communities
- Texas Strategic Highway Safety Plan Strategies

In certain situations, more extensive roadway redesigns may be necessary to address persistent crash problems along a corridor. The toolbox approach allows local jurisdictions to select interventions tailored to the specific safety challenges identified through the safety analysis. This enables a targeted, data-driven approach to safety planning, moving beyond generic solutions to implement context-sensitive measures that improve safety for all road users-including those on rural roadways.

The toolbox is organized to help local jurisdictions match countermeasures to their unique needs and roadway contexts. Countermeasures are grouped by application: segment-related (non-intersection), intersection-related, vulnerable road users, and non-engineering strategies that focus on influencing driver behavior. Each entry includes a description of the types of crashes addressed, and a high-level categorization of cost magnitude.

See **Appendix C** for a detailed list of the safety countermeasures described in this section.

SEGMENT-RELATED COUNTERMEASURES

Segment-related countermeasures focus on strategies designed to prevent crashes along non-intersection road segments, addressing issues such as head-on crashes, lane departures, speeding, and roadside hazards. Below is a sample of potential countermeasures organized by key safety objectives.

1. **Physical Separation and Hazard Elimination.** Countermeasures that remove severe conflicts by separating users or redirecting vehicles, including:
   - **Median Barriers:** Install cable barriers in medians or roadside areas to prevent cross-median head-on collisions and reduce KA crashes on rural highways.
   - **Roadside Clear Zones:** Improve the width and slope of the traversable roadside area and remove obstacles such as trees or poles to allow drivers the opportunity to recover safely after leaving the roadway, reducing rollovers and collisions.
   - **Super 2 Design:** Add periodic passing lanes to two-lane rural highways, minimizing risky overtaking maneuvers and improving traffic flow.
   - **Lane Repurposing:** Re-stripe existing roadway facilities to designate a centerline buffer, center turn lanes, or bicycle lanes.

2. **Roadway and Lane Departure Prevention.** Countermeasures addressing roadway departure crashes, including:
   - **Shoulder Enhancements:** Implement enhanced shoulder treatments to allow drivers the opportunity to recover safely if they veer out of their travel lane.
   - **Rumble Strips:** Installed rumble strips on centerlines or shoulders to alert inattentive drivers when they drift out of their lane.
   - **SafetyEdge™:** Install pavement features that shape the pavement edge at an approximate 30° angle to help vehicles recover safely if they veer off the roadway.
   - **High-Friction Surface Treatments:** Apply these treatments to increase the skid resistance and friction of road surfaces in areas where vehicles are more likely to lose traction, such as sharp curves, steep grades, intersections, ramps, and bridge decks.

3. **Enhanced Delineation and Visibility.** Countermeasures improving guidance and visibility, including:
   - **Enhanced Delineation for Curves:** Implement enhanced curve treatments – either individually or in combination – to alert drivers about upcoming curves, the direction and sharpness of the curve, and appropriate operating speed.
   - **Road Design Improvements at Curves:** Realign roadways, widen clear zones, flatten side slopes, or enhance shoulders to allow motorists the opportunity to recover safely.
   - **Improved Pavement Markings.** Widen pavement markings to 6 inches or install raised profile pavement markings to improve nighttime and wet weather navigation.
   - **Roadway Lighting:** Install continuous or spot roadway lighting to enhance visibility on high-risk segments.

4. **Speed Management.** Countermeasures that reduce vehicle speeds through self-enforcing designs, including:
   - **Appropriate Speed Limits:** Set appropriate speed limits that consider the road segment's design, vulnerable users, traffic operations, land use, and environmental conditions.
   - **Speed Feedback Signs:** Install portable or permanent speed feedback signs that alert drivers of their current speed (and posted speed limit), providing a cue for drivers to slow down.

Examples of segment-related countermeasures are illustrated graphically in **Figure 28**, and a detailed list is provided in **Appendix C.**

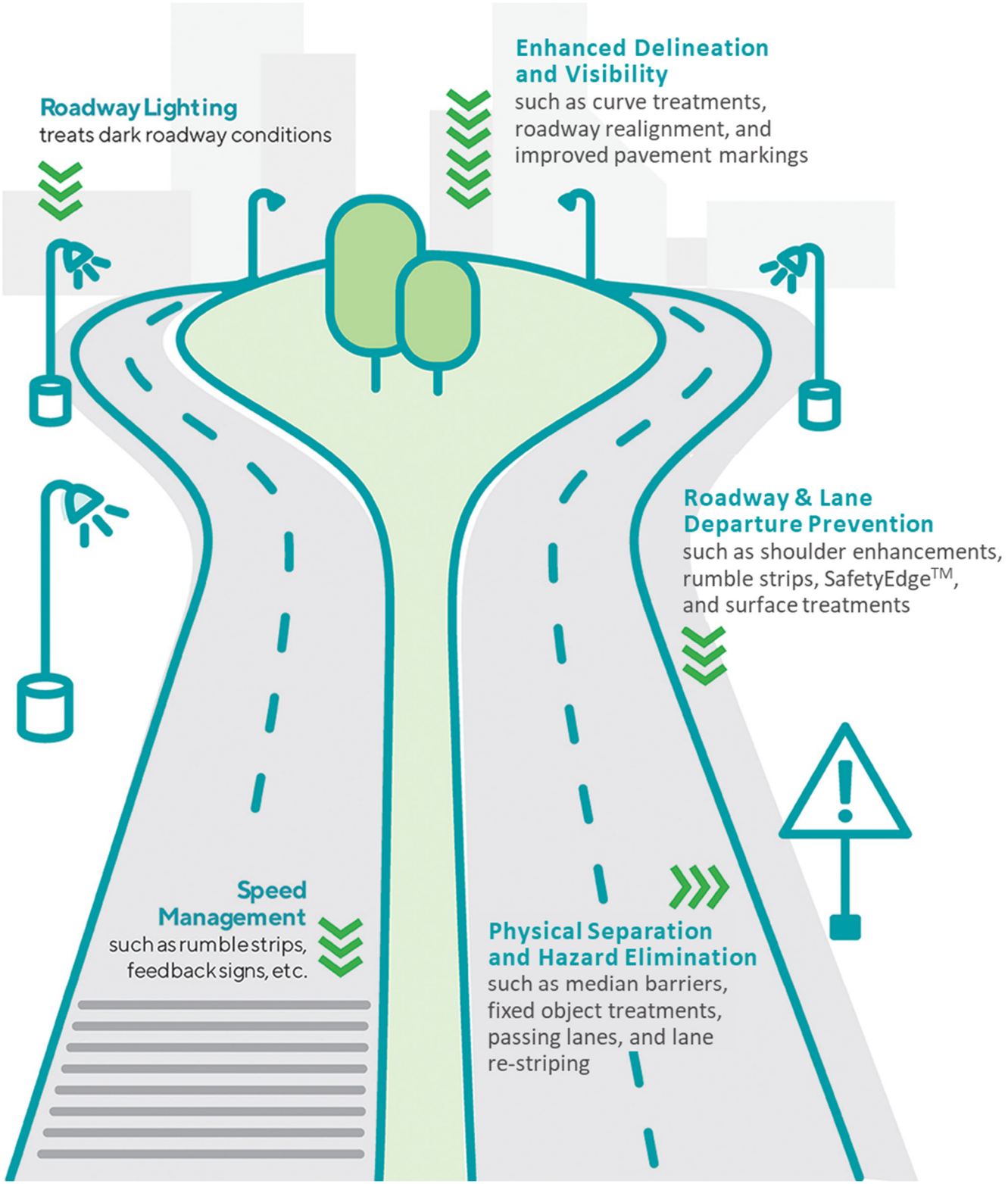


FIGURE 28. EXAMPLE SEGMENT-RELATED COUNTERMEASURES

INTERSECTION-RELATED COUNTERMEASURES

Intersection-related countermeasures focus on strategies designed to prevent crashes at signalized and unsignalized intersections, addressing issues related to geometric design, traffic control, intersection visibility, and speed management. Below is a sample of potential countermeasures organized by key safety objectives.

1. **Geometric Design Improvements.** Countermeasures that reconfigure intersection layouts to reduce conflict points, including:
   - **Roundabouts and Traffic Circles:** Install or convert intersections to roundabouts or traffic circles to reduce conflict points.
   - **Dedicated Turn Lanes:** Add dedicated turn lanes to physically separate turning vehicles from through traffic at intersection approaches.
   - **Access Management:** Implement access management treatments such as driveway consolidation, turn restrictions, or raised medians to manage turning movements and reduce conflict points near intersections.
   - **Intersection Realignment.** Reconstruct irregular or skewed intersections to improve visibility for all road users.

2. **Signal Improvements.** Improvements to signage, signals, and markings, including:
   - **Enhanced Pavement Markings:** Install enhanced pavement markings such as wider stop bars, lane use markings, dotted line extensions, and high-visibility crosswalks to improve visibility and guidance for road users at intersections.
   - **Left Turn Operation:** Implement appropriate left turn control (permitted, protected, or flashing yellow arrow) based on the results of an Intersection Control Evaluation.
   - **Yellow and All-Red Clearance Intervals:** Optimize yellow and all-red clearance intervals to reduce red-light running.
   - **Traffic Signals:** Install new traffic signals at existing uncontrolled intersections, if warranted by traffic conditions.

3. **Intersection Visibility Enhancements.** Countermeasures improving guidance and visibility, including:
   - **Signal Backplates:** Add traffic signal backplates and/or retroreflective borders to improve signal visibility.
   - **Sight Distance Obstruction Removal:** Improve driver sight lines by trimming vegetation, removing or relocating signs, or restricting on-street parking near intersections (also called “daylighting”).
   - **Advance Warning Signs with Flashing Beacons:** Alert drivers to upcoming intersections, especially in rural areas.
   - **Lighting Improvements:** Install or improve roadway lighting to enhance visibility at intersections.

4. **Speed Management.** Countermeasures to reduce approach speeds, including:
   - **Signal Interconnectivity and Coordination.** Optimize signal coordination along corridors to maintain consistent traffic flow at target speeds and reduce abrupt stopping.
   - **Appropriate Speed Limits:** Set appropriate speed limits that consider the road segment’s design, vulnerable users, traffic operations, land use, and environmental conditions.
   - **Speed Feedback Signs:** Install portable or permanent speed feedback signs that alert drivers of speeding and encourage drivers to slow down.
   - **High-Friction Surface Treatments:** Apply treatments on intersection approaches to reduce skidding.

5. **Technology.** Countermeasures that leverage data and automation, including:
   - **Connected Vehicle Alerts:** Pilot systems that warn drivers of potential traffic conflicts at rural intersections.

Examples of intersection-related countermeasures are illustrated graphically in **Figure 29**, and a detailed list is provided in **Appendix C.**

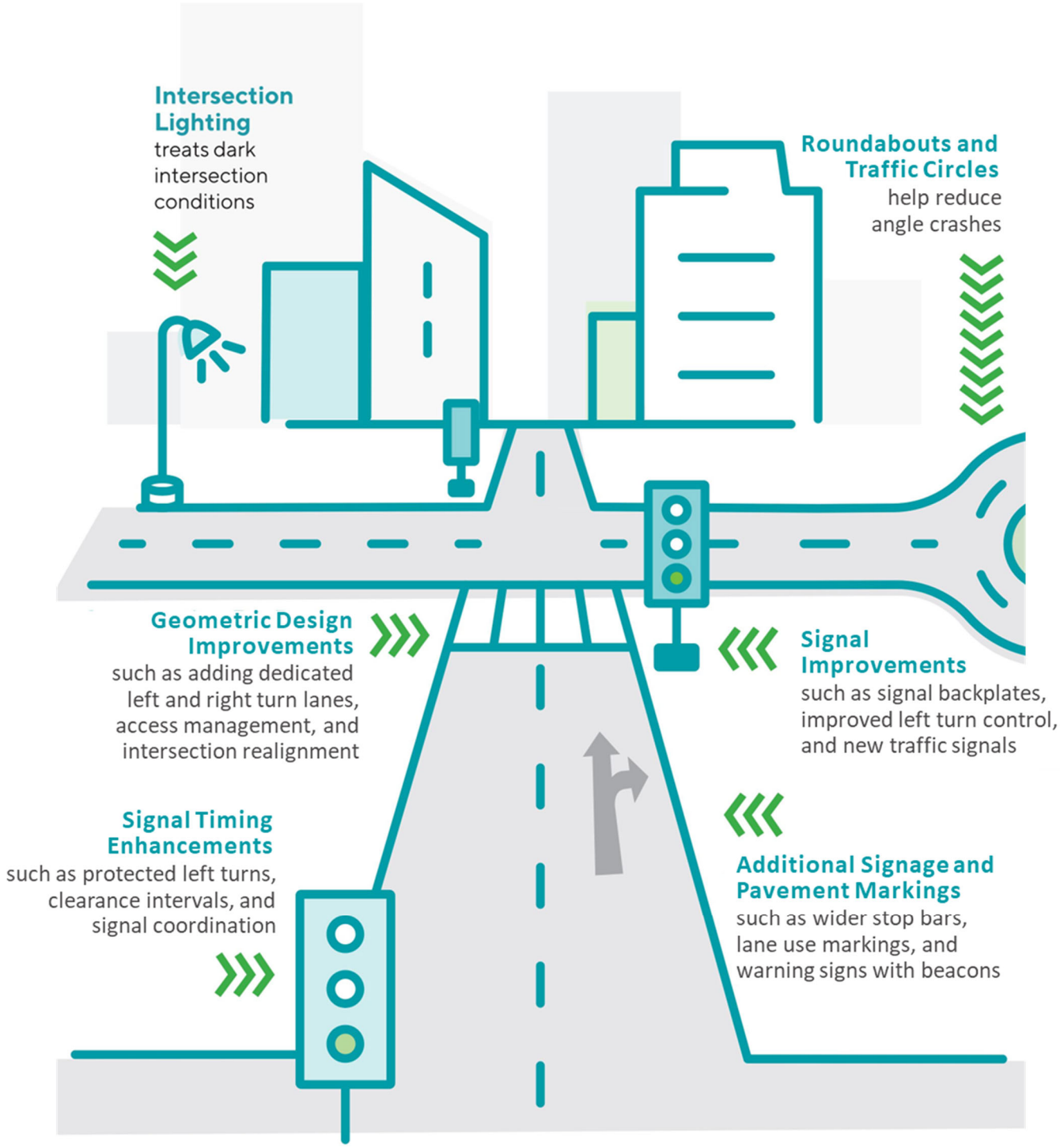


FIGURE 29. EXAMPLE INTERSECTION-RELATED COUNTERMEASURES

VULNERABLE ROAD USER COUNTERMEASURES

Vulnerable road user countermeasures focus on strategies designed to prevent pedestrian- and bicyclist-related crashes. These strategies aim to expand the pedestrian and bicycle network, as well as enhance pedestrian crossings. Below is a sample of potential countermeasures organized by key safety objectives.

1. **Pedestrian & Bicycle Network.** Countermeasures that prioritize expansion of the sidewalk and bicycle network, including:
   - **Sidewalks:** Provide sidewalks to create a dedicated, separate space for people to walk safely along roadways.
   - **Bicycle Lanes:** Provide bicycle lanes clearly marked with symbols and signs specifically for bicyclists. Incorporate barriers or buffers to enhance safety.
   - **Shared Use Paths:** Widen separated facilities to a width of 8 to 12 feet to safely accommodate bicyclists, pedestrians, and other vulnerable road users.

2. **Midblock Crossing Enhancements.** Countermeasures improving midblock crossings for vulnerable road users, including:
   - **Rapid Rectangular Flashing Beacons:** Implement pedestrian-activated lights at crosswalks.
   - **Pedestrian Hybrid Beacons:** Implement mid-block overhead signals alerting drivers to crossing pedestrians.
   - **Pedestrian Crossing Islands:** Install mid-crossing pedestrian islands to shorten crossing distances and improve visibility.
   - **Lighting Improvements:** Install roadway lighting to enhance visibility at pedestrian crossings.

3. **Intersection Crossing Enhancements.** Countermeasures improving intersection crossings for vulnerable road users, including:
   - **Remove Sight Distance Obstructions or "Daylighting":** Remove on-street parking or obstacles near crossings to improve sight lines between drivers and vulnerable road users.
   - **Pedestrian Signals:** Install pedestrian signals with countdown timers and audible push buttons, in compliance with ADA requirements.
   - **High-Visibility Crosswalks:** Install retroreflective markings and continental-style patterns to improve nighttime visibility.
   - **Leading Pedestrian Intervals:** Improve motorist awareness of vulnerable road users at intersections.

4. **Speed Management.** Strategies to reduce vehicle speeds in high-risk areas, including:
   - **Appropriate Speed Limits:** Implementing appropriate speed limits in urban and school areas.
   - **Speed Feedback Signs:** Install dynamic displays that show real-time vehicle speeds to encourage driver compliance.

5. **Technology & Enforcement.** Leveraging automation and data-driven tools, including:
   - **Connected Vehicle Alerts:** Implement systems that warn drivers of nearby vulnerable road users through onboard displays.

Examples of vulnerable road user countermeasures are illustrated graphically in **Figure 30**, and a detailed list is provided in **Appendix C.**

FIGURE 30. EXAMPLE VULNERABLE ROAD USER COUNTERMEASURES

NON-ENGINEERING RELATED COUNTERMEASURES

Non-engineering countermeasures focus on influencing road user behavior, improving safety data and analysis, and supporting roadway safety without physical changes to roadway infrastructure. These strategies are essential complements to engineering solutions and can often be implemented quickly and cost-effectively. Below is a sample of potential countermeasures organized by key safety objectives. A detailed list is provided in **Appendix C**.

1. Education and Outreach

- **Safety Awareness Campaigns.** Launch media campaigns (e.g., television, radio, social media, billboards) that address issues such as distracted driving, impaired driving, speeding, and seat belt use. Tailor messages to specific age groups or communities for greater impact.
- **School-Based Education Programs.** Implement youth-focused campaigns in schools covering topics such as pedestrian safety, bicycle safety, micromobility safety (e.g., scooters, e-bikes), and the dangers of impaired or distracted driving. Engage both students and parents for broader influence.
- **Community Safety Events.** Partner with local organizations to host bicycle safety fairs, car seat checks, safety walks, and other events that provide hands-on learning and resources for safe travel behaviors.
- **Targeted Outreach for Vulnerable Groups.** Develop educational materials and outreach tailored to populations overrepresented in crash data, including older adults, vulnerable road users, and underserved communities.

2. Enforcement and Deterrence

- **High-Visibility Enforcement.** Conduct well-publicized law enforcement campaigns to encourage seat belt usage and discourage impaired driving, speeding, and other unsafe driver behaviors. Use checkpoints, saturation patrols, and increased officer presence, combined with media coverage to maximize impact.
- **Training for Law Enforcement.** Conduct impaired driving training for law enforcement personnel, including Drug Recognition Expert and Advanced Roadside Impaired Driving Enforcement training programs.

3. Data and Evaluation

- **Improved Crash Data Collection.** Enhance the quality and consistency of crash data by developing standardized electronic reporting, creating near-miss and unreported crash databases, and encouraging multi-agency data sharing.
- **Crash Data Analysis for Targeted Interventions.** Use crash data to identify high-risk locations, behaviors, and populations, and focus on education and enforcement efforts accordingly.
- **Post Implementation Evaluation.** Evaluate the efficacy of safety improvement implementation through before-and-after studies and public surveys.

Systemic Safety Countermeasure Packages

Systemic safety packages are composed of multiple low-cost, high-impact countermeasures that can be implemented across numerous locations with similar risk characteristics. By focusing on these strategies, Caldwell County can proactively mitigate potential hazards before crashes occur, establishing a more robust and comprehensive safety management system. This approach often yields a greater reduction in crash risk per dollar invested compared to traditional spot improvements.

Appendix D outlines potential systemic safety packages tailored to each of the County's systemic crash profiles. These countermeasures are consistent with TxDOT's HSIP guidelines and include specific HSIP work codes to facilitate efficient planning and implementation. Systemic packages are grouped by systemic crash profile and include a description, the types of crashes to be addressed, targeted deployment locations, and implementation considerations. When several safety countermeasures are suitable for locations with shared characteristics, bundled treatment packages are proposed to create more holistic and effective safety projects.

Targeted Safety Projects

Targeted safety projects focus on specific corridors and intersections on the HIN where the severity and frequency of crashes are most concentrated. By focusing on these high-risk locations, Caldwell County can direct its limited resources toward immediate, life-saving interventions where they will have the greatest impact.

The Safety Countermeasures Toolbox was used to identify proven strategies tailored to the unique crash patterns and roadway characteristics of these sites, incorporating feedback from both the Caldwell County Safety Task Force and the public. These evidence-based countermeasures were selected for their effectiveness in reducing crashes, as documented through crash modification factors and other evaluation methods.

Corridor and intersection projects were then prioritized to ensure the greatest alignment with the vision, goals, and objectives of the Caldwell County SAP. Input from Task Force members was used to develop prioritization criteria based on the County's specific needs, and to validate the project selection and prioritization results. This framework enabled the County to prioritize implementation of safety projects, leveraging multiple funding sources at the local, regional, state, and national levels.

Each project was evaluated using seven criteria, as summarized in **Table 9**, with a maximum possible score of 50 points. Projects are then organized into three tiers based on these scores: Tier 1 is the highest priority (30 points or higher), Tier 2 is medium priority (20 to 29 points), and Tier 3 is lowest priority (Less than 20 points). This tiered system supports effective allocation of resources, ensuring that funding is directed toward projects with the greatest potential to reduce KA crashes, while maintaining flexibility for implementation as needs and opportunities evolve.

The locations of targeted corridor and intersection safety improvements are shown in **Figure 31** and **Figure 32**, respectively. The corresponding targeted safety project lists are provided in **Table 10** and **Table 11**. The project lists include both low-cost, quick-build safety projects that could be constructed within one to five years, as well as longer-term capital improvement needs for each corridor. The actual timeframe for implementation will depend on grants and other funding opportunities available to implement the projects.

These targeted safety improvements were developed from a planning perspective and are intended as preliminary recommendations. Caldwell County and its safety partners should carefully review and refine these proposed improvements before moving forward with implementation. Other safety countermeasures that support the Safe System approach and the goals of the SAP may also be appropriate for consideration.

TABLE 9. PRIORITIZATION CRITERIA FOR TARGETED SAFETY PROJECTS

CRITERIA	DESCRIPTION	POINTS (50 MAX)	SCORING RUBRIC
High Risk Crash Location	This criterion prioritizes projects located at high-risk crash locations, with greater weight given to locations with higher density and severity of crashes. Points are awarded to projects on a sliding scale, with the highest points awarded to locations with the most injury crashes and the most severe crashes.	10	Number of Injury (KABC) Crashes: 5 pts – 36 or more 3 pts – 11 to 35 1 pt – 10 or fewer Number of KA Crashes: 5 pts – 6 or more 3 pts – 3 to 5 1 pt – 2 or fewer
Crash Reduction Potential	This criterion assesses the percent crash reduction that might be expected after implementing the project, with greater weight given to projects that provide the highest anticipated reduction in crashes. Crash reduction factors are based on TxDOT's HSIP Guidelines.	10	Anticipated Percent Reduction in Crashes 10 pts – 65% or greater 8 pts – 50-64% 6 pts – 35-49% 4 pts – 20-34% 2 pts – Less than 20%
Traffic Operations & Congestion Impact	This criterion provides a qualitative assessment of the project's anticipated impact on traffic flow and congestion. Projects with the potential to significantly reduce traffic congestion or improve traffic flow are awarded the highest points.	10	10 pts - Project provides direct solutions expected to significantly reduce traffic congestion (e.g., turn lanes, traffic signal timing, etc.). 5 pts - Project includes indirect improvements that may moderately reduce traffic congestion (e.g., lighting, shoulders, guide signage, medians). 0 pts - No anticipated impact
Multimodal Benefits	This criterion provides a qualitative assessment of the project's ability to improve safety for people walking, cycling, or using public transit and other non-vehicle modes. Projects that significantly enhance multimodal safety or connectivity are awarded the highest points.	5	5 pts - Project provides direct solutions with significant anticipated multimodal benefits (e.g., sidewalks, bike lanes, crosswalks, traffic calming, lighting). 3 pts - Project includes indirect improvements with moderate anticipated multimodal benefits (e.g., shoulders, medians, signage, pavement marking). 0 pts - No anticipated impact.
Environmental Impact	This criterion provides a qualitative assessment of the project's potential impact on the environment, such as air quality, emissions, noise pollution, wildlife, wetlands, etc.	5	5 pts - Project has potential positive impacts. 3 pts - Project has a neutral impact. 0 pts - Project has potential negative impacts.
Underserved Community Benefit	This criterion prioritizes projects benefiting underserved communities.	5	5 pts - Majority of project (50% or more) is located in an underserved community 3 pts - Project limits partially overlap with an underserved community 0 pts – Project has no overlap with an underserved community
Project Cost Magnitude	This criterion categorizes projects based on cost magnitude, providing an indicator of constructability and long-term maintenance requirements. Short-term, low-cost projects that could advance to construction quickly are awarded the highest points.	5	Estimated Project Cost: 5 pts - $100,000 or less 4 pts - $100,000 to $250,000 3 pts - $250,001 to $500,000 2 pts - $500,001 to $1,000,000 1 pt - Greater than $1,000,000

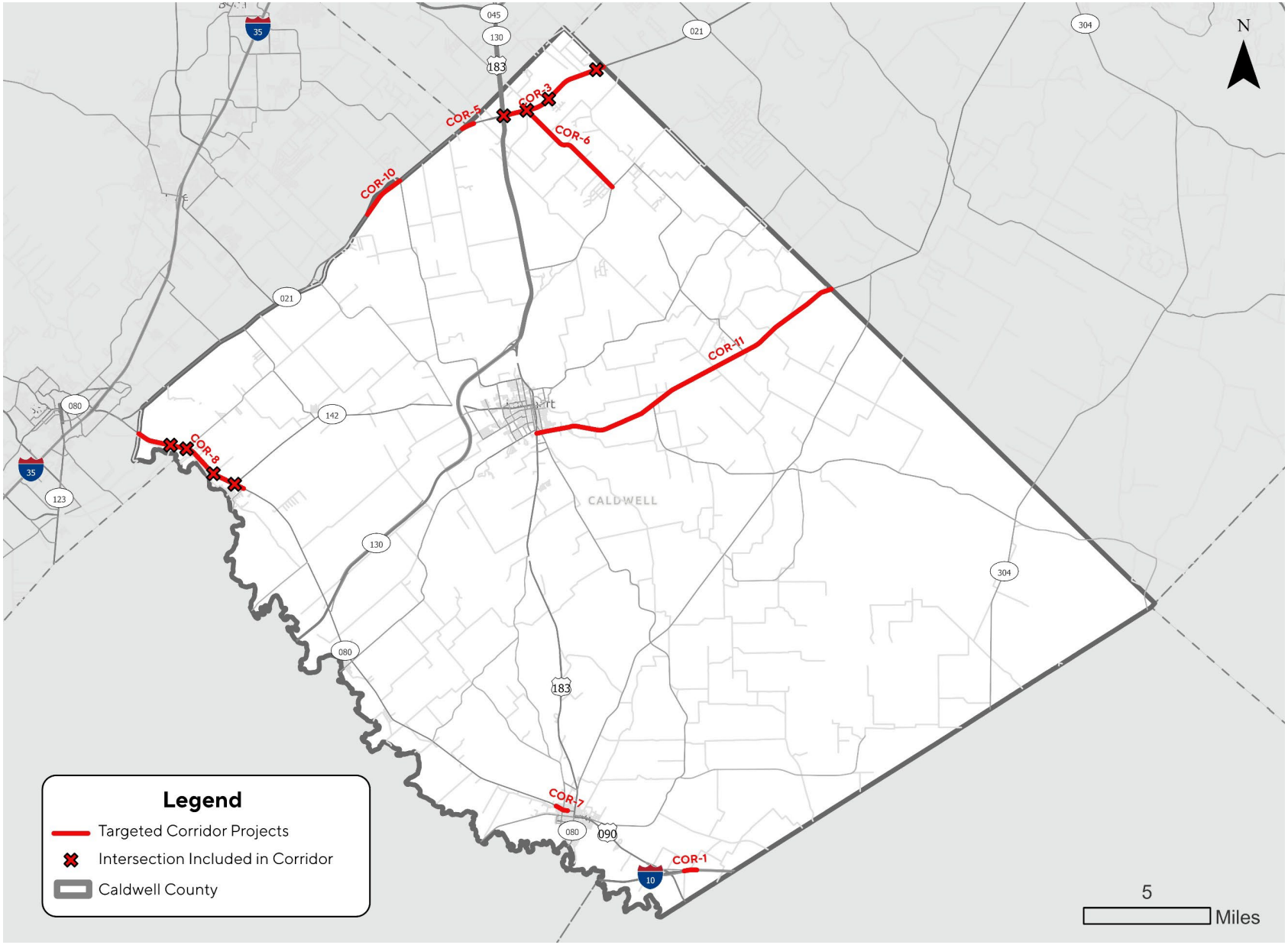


FIGURE 31: TARGETED CORRIDOR PROJECT LOCATIONS

TABLE 10. TARGETED CORRIDOR SAFETY PROJECTS

ID	ROADWAY NAME	LIMITS FROM	LIMITS TO	SAFETY IMPROVEMENT DESCRIPTION	SAFETY ISSUES	LEAD AGENCY	TIER
COR-1	IH 10	2,900' east of US 183 (MP 633.0)	5,650' east of US 183 (MP 633.4)	**Short term:** • Install lighting in vicinity of IH 10 at US 183 interchange. • Designate additional shoulder length for deceleration lane & add additional 12' shoulder width on westbound I-10 for US 183 exit. **Long term:** • On eastbound I-10, relocate the entrance ramp further east so that the merge point is located outside of the curved section of I-10.	Single vehicle roadway departure Dark condition	TxDOT (Yoakum District)	Tier 3
COR-3	SH 21	US 183 (MP 18.0)	Bastrop County Line (MP 22.0)	**Short term:** • Add lighting in vicinity of intersections. • Evaluate need for speed limit reduction on SH 21 between US 183 and Bastrop County Line. • Synchronize traffic signals. • Regulate roadside commercial activity throughout corridor. • Add flashing beacon to Signal Ahead warning signs on SH 21 on approach to FM 1854/E Lone Star Dr. • Add Left Turn Signal overhead sign on westbound approach of SH 21 at FM 1854/E Lone Star Dr intersection. • Regulate roadside commercial activity at FM 1854/E Lone Star Dr (remove old pavement at CR 176 closure, add grass/sod, fencing). • Add Intersection Ahead warning signs on intersection approaches. **Long term:** • Replace bridges at multiple locations east of FM 1854. • Add turn lanes on SH 21 for safety purposes. • Evaluate need for new interchange at SH 21 and US 183.	Single vehicle roadway departure Rear end Head on	TxDOT	Tier 1
COR-5	SH 21	Hays County Line (MP 16.6)	775' east of Candide Lane (MP 17.0)	**Short term:** • Install 2-4' center buffer with 2 sets of rumble strips. • Install lighting in vicinity of intersections.	Head on Rear end Dark condition Young driver Wet weather	TxDOT	Tier 2
COR-6	FM 1854	SH 21	FM 1185	**Short term:** • Enhance delineation on curved segments, including edge line/centerline pavement markings, raised retroreflective pavement markers, chevron/curve warning signs/advisory speed plaques. • Install shoulder enhancements for safety purposes. • Add centerline and edgeline rumble strips. *Note: Project type aligns with Systemic Crash Profiles #2 (Road & Lane Departure Crashes) and #3 (Road & Lane Departure Crashes on Curves).*	Single vehicle roadway departure Head on	TxDOT	Tier 2

ID	ROADWAY NAME	LIMITS FROM	LIMITS TO	SAFETY IMPROVEMENT DESCRIPTION	SAFETY ISSUES	LEAD AGENCY	TIER
COR-7	SH 80	650' east of Oleander Ave.	80' east of N. Walnut Ave	**Short term:** • Install dynamic speed feedback signs. • Improve street lighting between Hackberry and Cypress. • Replace existing markings with 6" centerline and edgeline pavement markings with retroreflectivity. Add double striped centerline throughout the corridor. Stripe out 12' lane lines and shoulder to visually narrow corridor and slow down speeds. • Improve pavement markings at SH 80 and Hackberry to delineate edge lines and visually reduce size of intersection. • Prohibit on-street parking.	Single vehicle roadway departure (mostly eastbound) Dark condition	TxDOT	Tier 2
COR-8	SH 80	Hays County Line (MP 6.5)	FM 1979 (MP 10.4)	**Short term:** • Synchronize traffic signals. • Replace existing pavement markings w/raised profile edge line and raised profile centerline (6") pavement markings. • Add rumble strips inside of existing center turn lane and on shoulders. • Add lighting through curved sections (e.g., east of Old Bastrop Road). • Add flashing beacons on Signal Ahead warning signs. • At FM 110: Install flashing yellow beacons above existing Signal Ahead warning signs on all approaches, conduct traffic study to evaluate need to convert FYA to protected left turn operation. • At Quail Run: Evaluate need to add eastbound right turn lane on SH 80 at Quail Run, add "Intersection Ahead" warning signs on SH 80 and "Cross Traffic Does Not Stop" plaque on Stop sign on Quail Run. • At SH 142: Implement various pedestrian improvements (e.g., leading pedestrian interval, high visibility crosswalks, move crosswalks further away from edge of travel lane), add deceleration lane for westbound channelized right turn lane, relocate wayfinding sign in advance of channelized right turn lane, add left turn arrow pavement markings, refresh pavement markings, and add additional lighting on all intersection approaches. • At FM 1984: Refresh pavement markings, evaluate feasibility of restriping westbound approach of SH 80 to shared thru/right turn configuration on approach to intersection, add left turn arrow pavement markings, revisit lane use designation on southbound approach of FM 1984, evaluate need to convert from FYA to protected left turn operation. • Add turn lanes on SH 80 between FM 1984 and SH 142 for safety purposes.	Single vehicle roadway departure Rear end Dark condition	TxDOT Caldwell County	Tier 1

ID	ROADWAY NAME	LIMITS FROM	LIMITS TO	SAFETY IMPROVEMENT DESCRIPTION	SAFETY ISSUES	LEAD AGENCY	TIER
				Long term: • Evaluate need for overpass on SH 80 at SH 142 once SH 142 is widened (as part of TxDOT & bond fund projects). • At FM 1984: Improve alignment of FM 1984 approaches.			
COR-10	SH 21	1400' south of Ganado Dr (MP 12.2)	FM 2001 (MP 13.8)	**Short term:** • Add additional lighting.	Single vehicle roadway departure Dark condition	TxDOT	Tier 1
COR-11	FM 20	US 183 (MP 27.9)	Bastrop County Line (MP 39.5)	**Short term:** • Install shoulder enhancements for safety purposes. • Add milled centerline and edgeline rumble strips. • Install safety edge treatment. • Improve clear zone. *Note: Project type aligns with Systemic Crash Profile #2 (Road & Lane Departure Crashes).*	Single vehicle roadway departure Dark condition	TxDOT	Tier 2

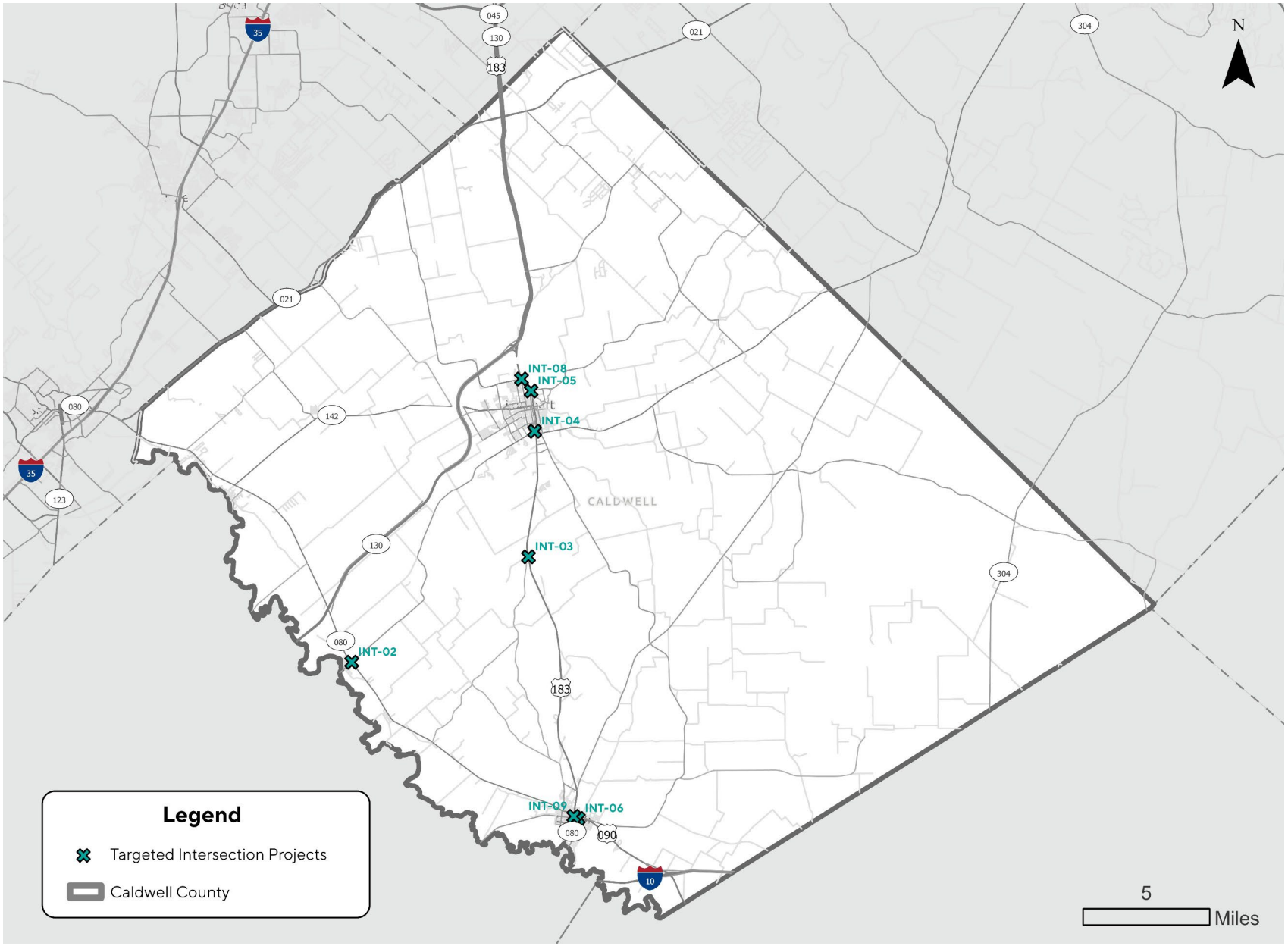


FIGURE 32: TARGETED INTERSECTION PROJECT LOCATIONS

TABLE 11: TARGETED INTERSECTION SAFETY PROJECTS

ID	LOCATION	SAFETY IMPROVEMENT DESCRIPTION	SAFETY ISSUES	LEAD AGENCY	TIER
INT-02	SH 80/San Marcos Hwy @ FM 20/State Park Rd	**Short term:** • Evaluate need for speed limit reduction. • Upgrade flashing beacons to oversized to improve visibility. • Continue monitoring need for traffic signal and install if warranted. • Refresh center line and edge line pavement markings (6" raised profile markings) on SH 80. Re-stripe existing center two-way left turn lane to designate a left turn lane at intersection. • Refresh pavement markings (6" raised profile markings) and add edge line pavement markings on State Park Road approach. • Add "Intersection Ahead" warning signs with flashing beacons on SH 80 approaches. • Add "Stop Ahead" warning signs with flashing beacons on State Park Road approach. • Add turn lanes for safety purposes.	Angle crashes	TxDOT	Tier 1
INT-03	US 183 @ FM 671/ Henderson Ln	**Short term:** • Relocate roadway guide signs on US 183 just north and south of the intersection to improve sight distance. • Curve study to see if treatment needed on curved approach of FM 671 (chevron signs, speed reduction sign). • Additional lighting through curved section of FM 671. • Additional lighting at the intersection. • Add Intersection Ahead warning signs on US 183. • Add guide sign "← Stairtown" on the northbound approach. • Traffic signal warrant study. Consider flashing signal if not warranted. • Evaluate need for turn lanes for safety on US 183. • Install left turn lane on US 183 (if warranted).	Angle crashes Left turn related crashes	TxDOT	Tier 1
INT-04	FM 20/State Park Rd @ S Main St	**Short term:** • Conduct traffic signal warrant to evaluate the need for a traffic signal. • Install temporary signal as an interim improvement (if warranted). • Conduct additional planning to assess the safety impacts of potential realignment options for FM 20 between Lion County Drive and S. Commerce Street. Include safety assessment of both existing and proposed conditions at FM 20/State Park Road at S. Main Street, US 183 at State Park Road, US 183 at Blackjack Street, and FM 20 at S. Commerce Street, as well as the segment of US 183 between State Park Road and Blackjack Street.	Angle crashes	TxDOT Caldwell County Lockhart	Tier 1

ID	LOCATION	SAFETY IMPROVEMENT DESCRIPTION	SAFETY ISSUES	LEAD AGENCY	TIER
INT-05	US 183 @ FM 672/Flores St	**Short term:** • Install impact attenuator on barrier rail. • Install yield markings on channelized right turn lane. • Refresh pavement markings. • Conduct a traffic study to evaluate the need to convert FYA to protected left turn operation on NB and SB approaches. Convert to protected left turn if warranted. • Evaluate need for split phasing on FM 672/Flores St approaches. Implement split phasing if needed.	Angle crashes Rear end crashes Left turn crashes	TxDOT Caldwell County	Tier 2
INT-06	US 90/E Pierce St @ N Cedar Ave	**Short term:** • Install stop bar on Cedar Ave approaches. • Replace stop signs with larger, reflective signs to increase visibility. • Replace existing Low Ground Clearance signs on Cedar Ave with 36x36 signs & add Low Ground Clearance plaque. • Install railroad crossing pavement markings on each approach on Cedar Ave. • Conduct sight distance study to evaluate need to remove trees potentially blocking sight distance.	Angle crashes	TxDOT Luling	Tier 1
INT-08	US 183 @ FM 2001/Silent Valley Rd	**Short term:** • Assess need for speed limit reduction on US 183 in advance of intersection. • Conduct traffic study to evaluate need to convert FYA to protected left turn operation. Signal modification to convert to protected left if warranted. • Install flashing yellow beacons above existing Signal Ahead warning signs on all approaches. • Refresh pavement markings on FM 2001. • Install Chevron/Two-Direction Large Arrow sign for FM 2001 approach.	Angle crashes Left turn crashes Rear end crashes	TxDOT Caldwell County Lockhart	Tier 2
INT-09	US 183 @ E Davis St	**Short term:** • Conduct access management & planning study to assess access management alternatives (e.g., raised median on US 183) & impacts on local business. • Add Do Not Block Intersection signs and pavement markings. • Consider gateway treatments such as Downtown District signage, raised crosswalks, curb extensions, tight curb radii on Davis.	Angle crashes Left turn crashes	TxDOT Luling	Tier 1

Implementation Plan

The recommended improvements, safety countermeasures, and policy updates outlined in the Caldwell County SAP are supported by a transparent and structured implementation process. The Implementation Plan provides guidance on pursuing various funding sources to advance project strategies, outlines methods for advocating and enacting policy updates, and establishes a framework for measuring and monitoring progress toward the Road to Zero goal. This approach ensures that all actions are clearly communicated, progress is tracked and shared, and the community remains informed and involved throughout the implementation process.

Implementation Schedule

Implementation of the Caldwell County SAP will begin soon after the plan is adopted. The highest priorities will be launching the plan and communicating its key elements to the public and key stakeholders. Within the first three months, the plan should be publicly announced, and a summary of priority projects and their expected outcomes should be distributed to safety partners throughout the county. Implementation teams should be established and project leads assigned for the priority projects identified.

While the targeted safety projects are a significant part of the SAP, they may require extensive planning, environmental review, and design, which means some may not be feasible to implement in the short term. As a result, the initial focus will be on detailed design and engineering for quick-build or low-cost safety improvements, such as new signage or pavement markings, while simultaneously pursuing funding and grant opportunities for larger infrastructure projects.

Within three to six months of plan adoption, the focus should shift to ongoing community engagement and initial monitoring efforts. CAMPO will be conducting a third round of public outreach as part of the RSAP to update the community and gather feedback on initial actions. Public awareness campaigns will also be launched to educate residents about new safety measures. CAMPO will additionally establish a monitoring system to track project progress and measure early impacts.

Ongoing implementation efforts should include regular reviews of project progress with the Caldwell County Safety Task Force and community representatives, with strategies adjusted as needed based on feedback and data. This approach ensures clear communication, rapid implementation of quick-win projects, efficient resource allocation, and sustained engagement with the community and stakeholders.

Funding Safety Improvements

To qualify for funding from most sources, it is essential that recommended improvements, safety countermeasures, and policy updates are documented in a publicly accessible plan, an objective achieved by this SAP. Projects and strategies outlined in this SAP will have a greater chance of securing funding if they are also incorporated into other planning documents, such as local agency long-range transportation plans or capital improvement programs. By integrating these improvements across multiple plans, agencies can broaden their eligibility for a wider array of funding opportunities.

Implementation of the recommended projects, strategies, and policy updates may be supported through a variety of federal, regional, state, and local funding sources. At the state level, programs such as the HSIP and the Transportation Alternatives Set-Aside Program are available to support roadway safety enhancements. Regionally, agencies can pursue funding through opportunities through the CAMPO call for projects. Additionally, improvements identified in this SAP can serve as the basis for applications to federal grant programs like the Safe Streets and Roads for All (SS4A) and Better Utilizing Investments to Leverage Development (BUILD), TxDOT-administered funds from the HSIP, and other state,

regional, and local sources. By leveraging these diverse funding streams, agencies can more effectively advance the safety initiatives outlined in this plan.

Championing Policy Changes

Policy changes and adoption can often be challenging, with much of the effort falling to dedicated advocates who may feel isolated in their pursuit. Advancing roadway safety policy updates in Caldwell County requires strong advocacy and robust collaboration across multiple agencies and departments, including planning, public works, zoning, public health, transit, school boards, and city councils. To help achieve Caldwell County's Road to Zero goals and move these policy changes forward, Task Force members can play a pivotal role by:

- Identifying a governing body or official with a demonstrated commitment to transportation or roadway safety.
- Engaging with this governing body or official to share information about the SAP, highlight the recommended policy improvements, and encourage the development, legislation, and adoption of these updates.
- Promoting the proposed policy changes publicly and building support among other advocates.
- Facilitating a visible commitment to the Road to Zero goal by encouraging the adoption of key policy updates across the county.

By fostering cross-departmental collaboration and leveraging the collective influence of Task Force members, Caldwell County can build the broad-based support necessary to advance meaningful safety policy reforms and make progress toward eliminating roadway fatalities and serious injuries on its roadways.

Measuring Progress

Caldwell County will partner with CAMPO to ensure that updates on project and strategy progress, as well as their impacts, are communicated clearly and accessibly. CAMPO is establishing a systematic process to monitor the implementation of recommended safety projects and policy updates, with the goal of evaluating project effectiveness and achieving desired safety outcomes. Caldwell County and its cities will continue partnering with CAMPO to assess and track progress. The monitoring process will gauge the extent to which the SAP goals and objectives are being met – specifically, reductions in the number and severity of roadway crashes in pursuit of the Road to Zero objective.

PROJECT TRACKING TOOLKIT

As part of future work under the RSAP, CAMPO is establishing a comprehensive Safety Planning Program framework and project tracking toolkit. These resources will support the measurement of both output (actions taken) and outcome (results achieved) over time. Potential SAP performance measures are listed in **Figure 33**. CAMPO will maintain the progress-tracking tools, while Caldwell County and its jurisdictions will regularly provide relevant data on policy and project implementation. Tracking project progress will involve documenting milestones such as securing funding, completing plans and construction, and implementing new policies. For policy changes, this includes policy assessment, drafting and approval by governing bodies, and final enactment.

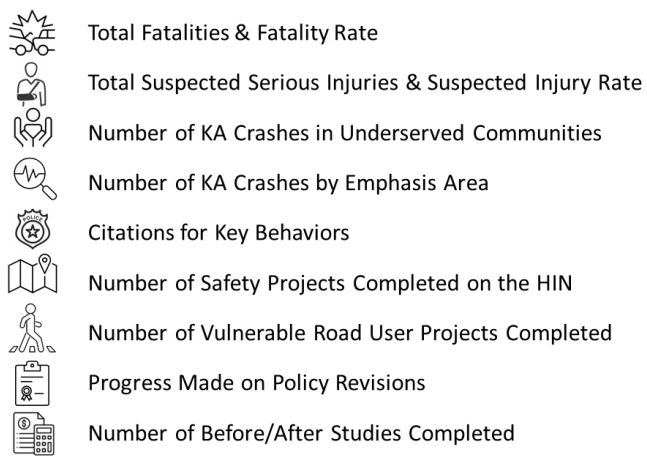


FIGURE 33. POTENTIAL PERFORMANCE MEASURES FOR SAP

DATA ACCESSIBILITY AND DASHBOARDS

CAMPO will continue to maintain a publicly accessible CRIS Dashboard, providing up-to-date crash data for Caldwell County and other member jurisdictions. Additional datasets from the RSAP may be integrated into these dashboards. Caldwell County will assess the effectiveness of implemented safety projects and strategies using available data. For example, before-and-after studies can help determine the impact of an intersection improvement, while surveys can gauge the effectiveness of behavior-based strategies or public outreach campaigns.

This transparent, data-driven approach ensures that all stakeholders can track progress, understand outcomes, and remain engaged in the ongoing effort to achieve safer roadways throughout Caldwell County.

CAMPO

CAPITAL AREA METROPOLITAN PLANNING ORGANIZATION

APPENDIX

CONTENTS

APPENDIX A. CALDWELL COUNTY SAFETY COMMITMENT RESOLUTION

APPENDIX B. CALDWELL COUNTY SAFETY ANALYSIS

APPENDIX C. CALDWELL COUNTY SAFETY COUNTERMEASURES TOOLBOX

APPENDIX D. CALDWELL COUNTY SYSTEMIC SAFETY PACKAGES

Appendix A

CALDWELL COUNTY SAFETY COMMITMENT RESOLUTION

RESOLUTION 15-2025
AUTHORIZING CALDWELL COUNTY TO APPLY FOR
THE USDOT FY25 SAFE STREETS AND ROADS FOR ALL FUNDING

WHEREAS, the Office of the Secretary of Transportation, U.S. Department of Transportation (DOT) made a Notice of funding Opportunity (NOFO) in the amount of $982,260,494 for FY 2025 Safe Streets for All (SS4A) grants; and

WHEREAS, funding for the 2025 SS4A grant program are to be awarded on a competitive basis to support planning, infrastructure, and behavioral and operational initiatives to prevent fatalities and serious injuries on roads and streets involving all roadway users, including pedestrians, bicyclists, public transportation, motorists, and commercial vehicle operators; and

WHEREAS, Caldwell County is an eligible political subdivision of the State of Texas.

NOW THEREFORE, BE IT RESOLVED BY THE CALDWELL COUNTY COMMISSIONERS COURT THAT:

(1) The County Judge is authorized to request grant funding under Section 130.191, Texas Local Government Code;
(2) The County Judge is designated as the grant's "Authorized Official," and authorized to apply for, accept, decline, modify, or cancel the grant, and execute contract documents required for the award of this grant;
(3) The County Auditor is designated as the grant's "Financial Official," and authorized to execute all financial transactions pertaining to the execution of this grant;

RESOLVED this the 22nd day of April, 2025.

Hoppy Haden
Caldwell County Judge

B.J. Westmoreland
Commissioner, Precinct 1

Rusty Horne
Commissioner, Precinct 2

Ed Theriot
Commissioner, Precinct 3

Dyral Thomas
Commissioner, Precinct 4

ATTEST:

Teresa Rodriguez
County Clerk

RESOLUTION 20-2025
ESTABLISHING THE ROAD TO ZERO GOAL AND AUTHORIZING ADOPTION OF THE CALDWELL COUNTY SAFETY ACTION PLAN

WHEREAS, between 2019 and 2023, in Caldwell County, 63 people died and another 222 people were seriously injured due to roadway crashes; and

WHEREAS, Caldwell County recognizes that traffic fatalities and serious injuries are preventable and that no loss of life on our roadways is acceptable; and

WHEREAS, Caldwell County and regional partners participated in development of the Caldwell County Safety Action Plan that identified high-risk areas, analyzed crash data, engaged stakeholders, and outlined strategies to enhance transportation safety; and

NOW THEREFORE, BE IT RESOLVED BY THE CALDWELL COUNTY COMMISSIONERS COURT THAT:

(1) Caldwell County commits to the goal of working towards zero roadway fatalities and serious injuries by the year 2050; and
(2) Caldwell County will monitor and periodically report on progress toward the Road to Zero goal; and
(3) Caldwell County adopts the Caldwell County Safety Action Plan and intends to implement projects, strategies, and policies from the plan.

RESOLVED this the 10th day of June, 2025.

Hoppy Haden
Caldwell County Judge

ABSENT
B.J. Westmoreland
Commissioner, Precinct 1

Rusty Horne
Commissioner, Precinct 2

Ed Theriot
Commissioner, Precinct 3

Dyral Thomas
Commissioner, Precinct 4

ATTEST: Teresa Rodriguez

Teresa Rodriguez
County Clerk
By Dolores Garcia
Deputy

Appendix B

CALDWELL COUNTY SAFETY ANALYSIS

CALDWELL COUNTY SAFETY ANALYSIS TECHNICAL MEMORANDUM

Introduction

The safety of Caldwell County's roadways is a critical concern for the Capital Area Metropolitan Planning Organization (CAMPO), local agencies, and transportation stakeholders. With a diverse network of rural roads, state highways, and local streets, Caldwell County faces unique transportation safety challenges that require a comprehensive, localized approach to reduce the frequency of fatal and serious injury crashes.

This report forms part of the broader county-level safety action plan (CSAP) for Caldwell County, contributing to the ongoing development of CAMPO's Regional Safety Action Plan (RSAP). Utilizing the most recent five years of crash data (2019-2023), this report provides a detailed analysis of historical crash patterns and systemic safety issues while identifying high-risk areas through the development of Hotspot and High-Injury Networks (HIN). By focusing on crash trends specific to Caldwell County, the analysis aims to offer actionable insights for targeted safety improvements.

The objectives of this report are as follows:

- Historical Crash Analysis: Examine crash trends and patterns over the past five years to identify critical safety issues across Caldwell County's roadway network.
- Systemic Safety Analysis: Analyze contributing factors and patterns that predict high-risk locations for fatal and serious injury crashes.
- Hotspot and High-Injury Network (HIN) Development: Geospatially identify road segments and intersections in Caldwell County that are most in need of safety interventions, prioritizing areas with a high likelihood of severe crashes.

This analysis is conducted in line with the methodology and framework established by the Texas Strategic Highway Safety Plan (SHSP) and the RSAP. The findings will support local safety planning efforts and the development of targeted countermeasures to reduce crash severity and improve overall roadway safety for all users in Caldwell County.

Crash Analysis Methodology

Crash analysis is conducted using the most recent five years of crash data from 2019 to 2023 in Caldwell County. The project team obtained crash data from the Texas Crash Records Information System (CRIS) maintained by the Texas Department of Transportation (TxDOT). Crash data was obtained in CSV file format via the public request portal available at https://cris.dot.state.tx.us/. The crash data consist of crashes by severity type: fatal injury (K), suspected serious injury (A), suspected minor injury (B), possible injury (C), non-injured (O), and unknown. This dataset also includes information on various crash contributing factors, the manner of collision, the date, and time, among other details.

A roadway inventory dataset of Caldwell County was downloaded from the TxDOT GIS Portal. The crash data is overlayed on this roadway layer. This layer has information on the name, functional classification, and facility type of the roadway. As

part of the systemic and high injury network (HIN) analysis, crash and roadway inventory datasets are used to conduct the analysis. Crashes are associated with their respective roadway corridors, allowing the project team to understand crash patterns based on different roadway characteristics, such as facility type and corridor length.

As part of the HIN network analysis, crashes with severity are weighted based on the Texas Highway Safety Improvement Program (HSIP) cost per crash. The cost per crash is:

- $4,000,000 for a fatal or suspected serious injury crash.
- $330,000 for a suspected minor injury crash.

Fatal (K) and suspected serious injury (A) crashes are weighted 12 points (approx. $4,000,000 / $330,000) and suspected minor injury (B) and possible injury crashes (C) are weighted 1 point.

Historical Crash Analysis

The Historical Crash Analysis for Caldwell County was conducted using crash data from 2019 to 2023. The analysis examines crash patterns by both on-system and off-system roadways. On-system roadways include state-maintained highways, freeways, and ramps, while off-system roadways consist of locally maintained roadways, such as county roads and local streets. By reviewing crash trends, severity, and key contributing factors, the analysis focuses on areas most vulnerable to fatal and serious injury crashes. Crash trends were studied annually and by severity type, with a focus on Fatal (K) and Suspected Serious Injury (A) crashes to prioritize high-risk areas. This ensures that the most severe crash types receive targeted safety interventions.

STATEWIDE EMPHASIS AREAS

The Texas Strategic Highway Safety Plan (SHSP) identifies key emphasis areas aimed at reducing fatalities and serious injuries across Texas' roadways. These emphasis areas are determined based on statewide crash trends and priority safety issues. Caldwell County's crash data was analyzed following the SHSP framework to ensure consistency with state safety goals. The following emphasis areas were identified:

- Roadway or Lane Departures – Crashes where a vehicle departs from the traveled way by crossing an edge line, a centerline, or otherwise leaving the roadway.
- Occupant Protection – Crashes involving improper or complete lack of vehicle occupant protection such as wearing a seatbelt or using a car seat for children
- Older Drivers – Crashes involving drivers 65 years old or older
- Younger Drivers – Crashes involving drivers between the ages of 15 and 20
- Speed Related – Crashes where speeding was a contributing factor
- Impaired Driving – Crashes involving drug or alcohol impairment
- Intersection Related – Crashes occurring at or near an intersection
- Distracted Driving – Crashes involving inattention or distractions such as use of a cell phone
- Pedestrian – Crashes involving pedestrians
- Pedalcyclist – Crashes involving cyclists
- Post Crash Care – Secondary, tertiary, etc. crashes occurring due to another primary crash

These emphasis areas align with the Texas SHSP (2022-2027) framework, which aims to reduce highway fatalities and serious injuries through targeted countermeasures and strategies.

COUNTY-SPECIFIC EMPHASIS AREAS

In addition to the statewide emphasis areas, the project team identified additional focus areas specific to Caldwell County based on local crash trends. These emphasis areas reflect the county's unique roadway characteristics and safety challenges:

- School Zone Related: Crashes occurring near schools, where children and pedestrians are at higher risk.
- Dark Conditions: Crashes occurring at night or in areas with inadequate lighting.
- Work Zone Related: Crashes within road construction or maintenance areas.
- Time of Day/Day of Week: Specific patterns of crashes related to peak traffic hours, such as morning and evening rush hours or weekend traffic.

Systemic Safety Analysis

The systemic approach in this analysis identifies high-risk roadway features linked to severe crashes, even in areas with low crash frequencies. This proactive approach is designed to mitigate potential crash risks across Caldwell County, focusing on deploying low-cost countermeasures across the network based on prevalent risk factors rather than concentrating only on high-crash locations.

In Caldwell County, the systemic safety analysis follows a series of structured steps aimed at identifying crash types, assessing roadway risk factors, and prioritizing safety interventions:

1. Identifying Target Crash Types: The first step is to define and identify the crash types that offer the highest potential for reduction. Using data from 2019-2023, Caldwell County prioritizes high-severity crashes—specifically fatal (K), suspected serious injury (A) crashes, suspected minor injury (B) and possible injury crashes (C). These are further categorized by types that are frequent in the county, such as intersection-related crashes, roadway/lane departures, speed-related incidents, low ambient lighting, and pedestrian or bicyclist crashes.
2. Screening and Prioritizing Locations Using a Crash Tree: With the identified crash types and risk factors, the next step involves screening the county's roadway network to identify areas where these risk factors overlap. A crash tree is used to systematically break down crash data by severity type and contributing factors, allowing for deeper analysis of their role in crashes. This tool helps prioritize roadway segments and intersections for potential safety interventions based on both risk factors and crash patterns, rather than relying solely on crash history.
3. Countermeasure Selection and Deployment: After identifying target locations, countermeasures are selected for widespread application across Caldwell County, based on Texas Department of Transportation's HSIP standards. For intersection crashes, enhancements include improved signage, retroreflective signal backplates, and flashing yellow arrows. To prevent lane departures, rumble strips, shoulder widening, and safety edges are applied. Improved lighting addresses crashes in low visibility conditions, while pedestrian and bicyclist safety are enhanced with beacons, crosswalks, and protective islands. Each countermeasure is chosen for its suitability to specific crash data characteristics, ensuring it aligns with the county's unique roadway needs.

High Injury Network Analysis

A crucial aspect of regional safety evaluation is the identification of areas that require significant safety enhancements, achieved through the development of a High Injury Network (HIN). To conduct a more precise and localized safety assessment for Caldwell County, the project team developed two separate HINs: one targeting intersections and the other focused on road segments. These networks help identify high-risk intersections and roadway sections, prioritizing locations where safety interventions would have the greatest potential impact.

INTERSECTION HIGH INJURY NETWORK

The following steps outline the methodology used to develop the intersection HIN for Caldwell County:

1. Crash Data Collection: Crash data from 2019 to 2023 was obtained through TxDOT's Crash Records Information System (CRIS). Only crashes that included GPS coordinates (latitude/longitude) were utilized in this analysis, as these coordinates were essential for accurately pinpointing crash locations.
2. Crash Type Filtering: Crashes classified as "Intersection" or "Intersection Related" using the “Intersection Related” field were selected for inclusion in the intersection HIN. This ensured that only crashes relevant to intersections were considered.
3. Roadway Network Alignment: The project team utilized the TxDOT roadway inventory dataset to define the road network within Caldwell County. Intersection crashes were spatially mapped to the roadway layer using the Spatial Join tool within a 250-foot radius of each intersection. This buffer ensured that crashes occurring near intersections were accurately mapped to the appropriate location.
4. Data Summarization: The crash data was then summarized using GIS and exported to Excel for further analysis. Crashes were categorized by severity for each intersection, creating a detailed view of crash frequency and severity.
5. Crash Weighting: The crash data was weighted according to Texas Highway Safety Improvement Program (HSIP) guidelines. Fatal (K) and suspected serious injury (A) crashes were assigned a weight of 12 points, while minor injury (B) and possible injury (C) crashes were given a weight of 1 point. Crashes involving no injuries or with unknown outcomes were excluded from the scoring.
6. Prioritization of High-Severity Intersections: A summarized table was generated, ranking intersections by their total crash score. Intersections with higher crash scores—indicating higher severity—were prioritized, with rankings sorted from highest to lowest severity.

SEGMENT HIGH INJURY NETWORK

To assess the safety of roadway segments in Caldwell County, the team employed the Sliding Window Methodology, a proven technique for analyzing crash data along roadway corridors. This method systematically evaluates segments of roadways to identify areas with a high concentration of crashes, helping prioritize locations for safety improvements. The methodology draws upon research[1] developed by the Texas A&M Transportation Institute (TTI) and has been adapted for this study.

[1] Statewide Implementation of Innovative Safety Analysis Tools in Identifying Highway Safety Improvement Projects: Technical Report. Report FHWA/TX-19/5-6912-01-R1, Texas A&M Transportation Institute, October 2019.

Sliding Window Method

The sliding window technique, as illustrated in Figure 1, involves moving a defined length of roadway (a "window") incrementally along the network, calculating crash data for each segment as the window moves. This enables a thorough assessment of roadway performance, focusing on the identification of high-risk areas.

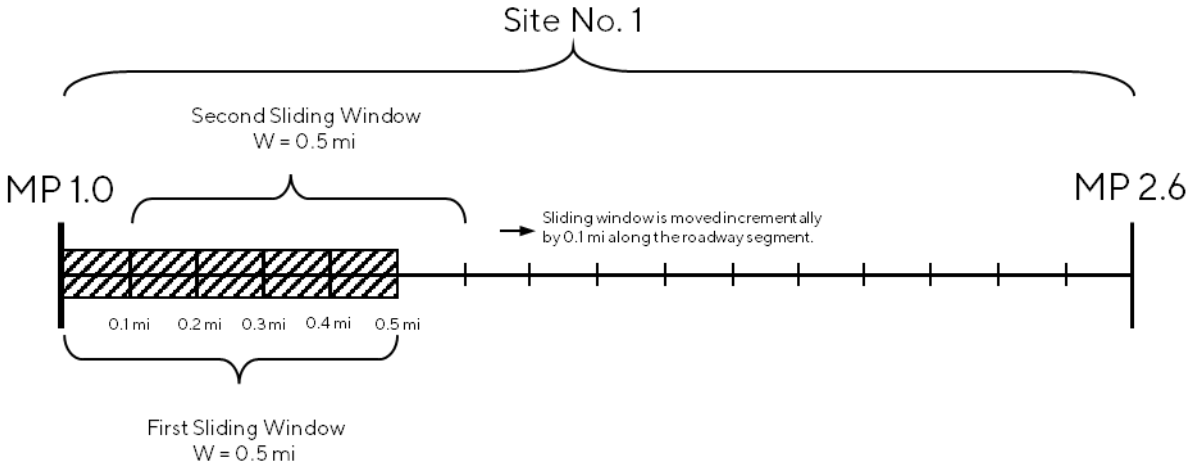


FIGURE 1. SLIDING WINDOW METHOD

Steps for implementing the sliding window method are as follows:

1. Roadway Network Setup: The TxDOT GIS roadway layer was used as the basis for the network analysis. Only centerline roadway segments across Caldwell County were considered for this analysis, ensuring consistency and coverage of all roadways within the county.
2. Segment Creation: Points were generated at 0.1-mile intervals along the roadway centerlines. These points were then used to split the roadways into 0.1-mile segments, which formed the foundation for the sliding window analysis.
3. Crash Data Integration: The analysis focused on non-intersection crashes, such as those involving driveway access and other non-intersection related crashes. Crash data from 2019 to 2023 was spatially joined to the 0.1-mile segments using the Spatial Join tool, ensuring each crash was correctly matched to its roadway segment based on street name and location.
4. Crash Data Summarization: The assigned crash data was exported to Excel for further analysis. Crashes were categorized by severity (fatal (K), serious injury (A), minor injury (B), and possible injury (C)), and summarized for each segment to reflect total crashes by severity type.
5. Weighted Crash Analysis: The crash data was aggregated within GIS across five consecutive 0.1-mile segments, resulting in a 0.5-mile sliding window for analysis. The crashes were weighted according to their severity: fatal (K) and serious injury (A) crashes received a higher weight (12 points), while minor injury (B) and possible injury (C) crashes received a lower weight (1 point). Performance metrics such as equivalent injury rates (KA = 12, BC = 1) and total crashes per mile were calculated within GIS.
6. Final Data Integration: The summarized crash data was joined back to the GIS roadway layer, allowing each 0.1-mile segment to display detailed crash information. This enabled the project team to identify high-risk segments throughout Caldwell County and prioritize them for potential safety interventions.

Historical Crash Analysis

Table 1 summarizes the crashes in Caldwell County by year and severity type from 2019 to 2023. Over this five-year period, a total of 4,293 crashes were reported. Of these, 1% were classified as Fatal Injury (K) crashes, and 4% were classified as Suspected Serious Injury (A) crashes. The largest portion of crashes, 67%, involved drivers classified as Not Injured (O). Additionally, 10% of crashes resulted in Suspected Minor Injury (B), and 12% involved Possible Injury (C). There were 244 crashes (6%) where the severity was Unknown.

The lowest number of crashes occurred in 2020 with 793 crashes, while the highest number was recorded in 2022 with 962 crashes. Between 2020 and 2023, crash numbers rose, peaking in 2022 before slightly decreasing to 884 crashes in 2023. Overall, the data shows a fluctuating but upward trend in total crashes across the five years.

TABLE 1: SUMMARY OF CRASHES (2019-2023) BY SEVERITY TYPE IN CALDWELL COUNTY

YEAR	FATAL INJURY (K)	SUSPECTED SERIOUS INJURY (A)	SUSPECTED MINOR INJURY (B)	POSSIBLE INJURY (C)	NOT INJURED (O)	UNKNOWN	TOTAL
2019	7	26	76	110	610	63	892
2020	11	26	70	118	523	45	793
2021	13	33	80	77	528	31	762
2022	17	33	111	95	643	63	962
2023	11	37	113	108	573	42	884
TOTAL	59	155	450	508	2877	244	4293
PERCENTAGE	1%	4%	10%	12%	67%	6%	100%

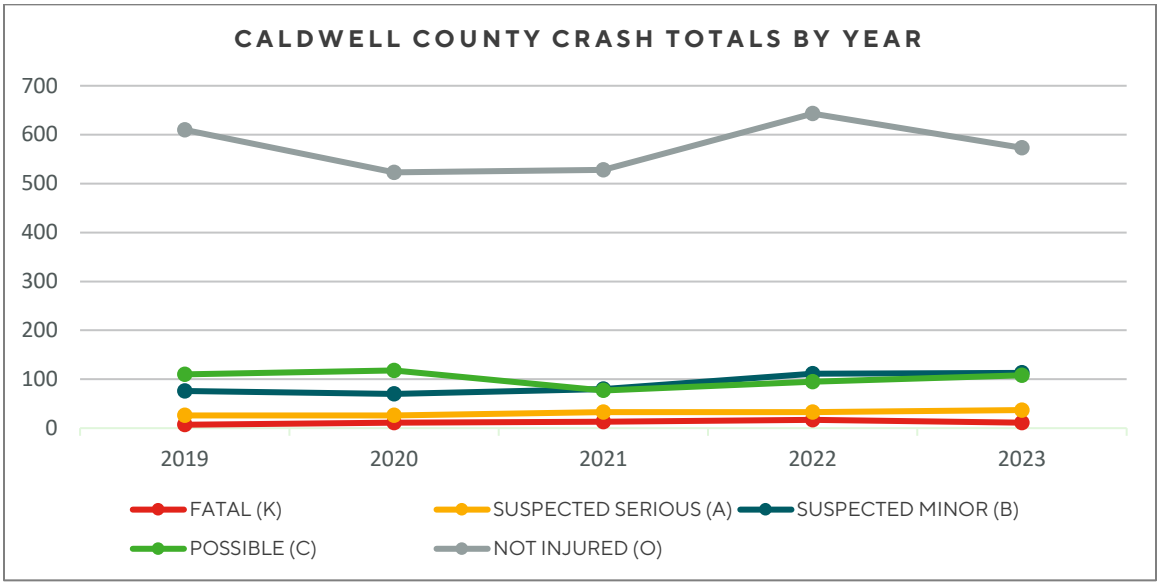


FIGURE 2: CRASHES (2019-2023) BY YEAR IN CALDWELL COUNTY

FATAL AND SERIOUS INJURY CRASHES IN CALDWELL COUNTY

Figure 3 presents the summary of fatal (K) and suspected serious injury (A) crashes in Caldwell County from 2019 to 2023. The highest number of fatal crashes, 17, was observed in 2022, while the lowest number, 7, occurred in 2019. The total number of fatal crashes over the five-year period is 59, accounting for 1% of all crashes.

Suspected serious injury (A) crashes remained relatively stable over the first few years, with 26 recorded in both 2019 and 2020, followed by a slight increase to 33 in both 2021 and 2022, before peaking at 37 in 2023. Over the five-year span, suspected serious injury crashes totaled 155, comprising 4% of the total crashes.

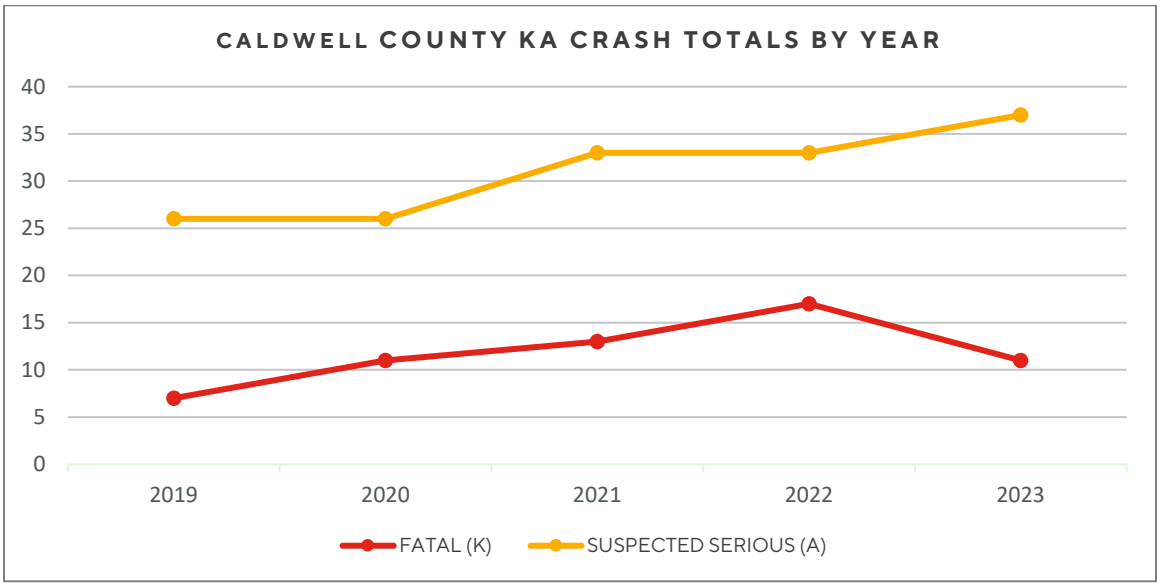


FIGURE 3: FATAL (K) AND SUSPECTED SERIOUS INJURY (A) CRASHES (2019-2023) BY YEAR IN CALDWELL COUNTY

CRASH ANALYSIS BY OTHER FACTORS

Figure 4 presents the percentage distribution of crashes by lighting condition, weather condition, and road surface condition in Caldwell County. More than 60% of the crashes occurred during daylight hours, with 2,603 crashes recorded under this condition. Dark, not lighted conditions accounted for 1,008 crashes, or approximately 23%, while 437 crashes occurred in dark, lighted conditions.

In terms of weather conditions, the majority of crashes (76%) occurred under clear skies, with 3,255 crashes reported. Cloudy conditions contributed to 642 crashes, while rain was a factor in 282 crashes. The remaining crashes occurred under other weather conditions.

When considering road surface conditions, dry roads accounted for the largest share of crashes, with 3,716 crashes, representing more than 86% of the total. Wet road surfaces were involved in 435 crashes, while ice/snow/slush was reported in only 25 crashes during the five-year period.

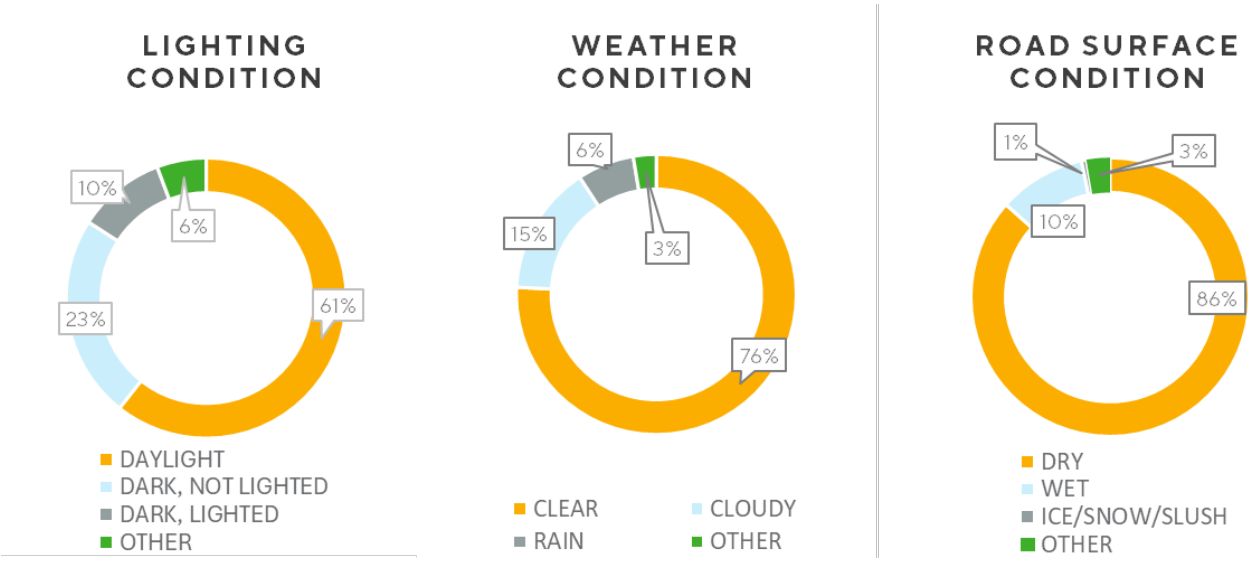


FIGURE 4: PERCENTAGE DISTRIBUTION OF CRASHES FOR LIGHTING CONDITION, WEATHER CONDITION, ROAD SURFACE CONDITION

Table 2 presents a summary of crashes by crash types in Caldwell County from 2019 to 2023. The highest percentage of crashes, 31%, were Roadway and Lane Departure crashes, which also accounted for the majority of high-severity crashes (KA crashes), making up 53% of all fatal and suspected serious injury crashes. Same Direction crashes comprised 26% of total crashes but only contributed to 14% of KA crashes. Angle Crashes made up 21% of total crashes and 15% of the KA crashes.

Single Vehicle Crashes accounted for 15% of total crashes, while contributing to 11% of the KA crashes. Other crash types made up a very small percentage, with 1% of total crashes and almost no contribution to KA crashes.

TABLE 2: SUMMARY OF CRASHES (2019-2023) BY CRASH TYPES

CRASH TYPE	NO. OF CRASHES	%	KA	% KA
ROADWAY AND LANE DEPARTURE	1336	31%	113	53%
SAME DIRECTION	1119	26%	31	14%
ANGLE CRASH	920	21%	33	15%
SINGLE VEHICLE CRASH	627	15%	23	11%
OPPOSITE DIRECTION	262	6%	13	6%
OTHER	29	1%	1	0%
TOTAL	4293	100%	214	100%

The crash types were further analyzed by their contributing factors, as shown in Table 3. These contributing factors were aggregated into 14 key categories. The analysis shows that speed related, failure to yield right of way, aggressive driving, and driver distraction were the top contributing factors, accounting for the majority of crashes in Caldwell County.

Speed related crashes were the most prevalent, contributing to 20% of all crashes, with the majority occurring in same direction crash types. Failure to yield right of way was the second-highest factor, making up 15% of crashes, and it was the leading cause for angle crashes and opposite direction crashes. Aggressive driving and driver distraction followed,

contributing to 12% and 10% of crashes, respectively. Both factors were also prominent in the same direction and roadway and lane departure crashes.

Notably, more than 90% of angle crashes were related to failure to yield right of way, while speed related factors contributed significantly to same direction and roadway lane departure crashes. Aggressive driving and driver distraction were also major contributors to same direction and roadway and lane departure crash types.

TABLE 3: SUMMARY OF CRASHES (2019-2023) BY CRASH TYPES AND CRASH CONTRIBUTING FACTORS

CONTRIBUTING FACTORS	ROADWAY AND LANE DEPARTURE	SAME DIRECTION	ANGLE CRASH	SINGLE VEHICLE CRASH	OPPOSITE DIRECTION	OTHER	TOTAL	%
SPEED RELATED	375	451	19	28	3	1	877	20%
FAILED TO YIELD ROW	5	15	492	6	138	4	660	15%
AGGRESSIVE DRIVING	126	157	106	92	27	9	517	12%
DRIVER DISTRACTION	97	216	55	11	28	1	408	10%
OTHER	49	2	0	330	0	0	381	9%
NONE	97	113	57	53	9	3	332	8%
DISREGARD TRAFFIC SIGN	127	47	37	76	30	10	327	8%
FAILURE TO FOLLOW RULE	217	41	16	12	4	0	290	7%
IMAPIRED/DRUG/DRINKING	135	9	6	13	3	0	166	4%
ANIMAL	9	3	126	1	15	0	154	4%
FATITGUED OR ASLEEP	67	10	2	3	0	0	82	2%
PASSING RELATED	2	53	1	1	4	0	61	1%
WRONG SIDE	30	1	2	0	1	1	35	1%
PEDESTRIAN	0	1	1	1	0	0	3	0%
TOTAL	1336	1119	920	627	262	29	4293	100%
PERCENTAGE	31%	26%	21%	15%	6%	1%	100%	

Table 4 presents a summary of crashes by time of day and day of the week in Caldwell County from 2019 to 2023. Friday had the highest number of crashes, accounting for 17% of the total, while Tuesday had the lowest at 13%. The highest number of crashes during the day occurred between 4 PM and 7 PM, coinciding with the afternoon rush hour. 5 PM recorded the most crashes, particularly on Fridays, with a total of 338 crashes occurring at this time.

Crashes began increasing significantly starting from 6 AM, peaking between 7 AM and 9 AM, representing the morning rush hour. Another notable peak occurred around noon (12:00 PM to 2:00 PM), with 1 PM seeing a slight uptick in crashes. Overall, crashes were more frequent during the afternoon and evening rush hours, particularly on weekdays. Crashes were less frequent during the early morning hours and late evening, especially on weekends.

TABLE 4: SUMMARY OF CRASHES (2019-2023) BY HOUR OF DAY AND DAY OF WEEK

HOUR START	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	TOTAL
12:00 AM	17	3	10	7	6	22	34	99
1:00 AM	3	5	6	8	10	15	20	67
2:00 AM	11	5	8	8	11	16	30	89
3:00 AM	8	14	5	10	10	10	25	82
4:00 AM	7	5	7	11	12	19	21	82
5:00 AM	21	17	14	16	15	13	13	109
6:00 AM	27	33	35	36	24	11	16	182
7:00 AM	43	34	40	30	29	14	16	206
8:00 AM	23	29	26	31	29	23	15	176
9:00 AM	18	24	13	26	17	29	16	143
10:00 AM	14	18	22	21	26	28	16	145
11:00 AM	34	30	24	29	31	30	23	201
12:00 PM	36	34	30	23	41	38	25	227
1:00 PM	37	27	32	40	40	34	24	234
2:00 PM	24	26	20	41	36	35	35	217
3:00 PM	43	34	36	41	48	29	33	264
4:00 PM	35	40	51	53	61	37	36	313
5:00 PM	53	47	47	61	56	43	31	338
6:00 PM	25	41	39	43	65	42	51	306
7:00 PM	25	28	29	30	47	32	32	223
8:00 PM	18	11	26	21	32	40	39	187
9:00 PM	12	17	19	18	35	35	28	164
10:00 PM	19	10	16	13	36	34	19	147
11:00 PM	10	17	11	11	18	19	6	92
Total	563	549	566	628	735	648	604	4,293

Table 5 presents a summary of crashes by time of day and month in Caldwell County from 2019 to 2023. October recorded the highest number of crashes, accounting for 10% of the total, while January and February both had the lowest number of crashes, each contributing to 7% of the total. The months from October to December saw an increase in crashes, particularly during the evening peak hours between 4 PM and 7 PM, which could be attributed to lower lighting conditions during this period.

Throughout the year, crashes were most frequent during the afternoon and evening rush hours, with 5 PM consistently recording the highest crash numbers across months, peaking in October and November. Significant crash activity was also observed during morning hours, between 7 AM and 9 AM, corresponding to rush-hour traffic.

TABLE 5: SUMMARY OF CRASHES (2019-2023) BY TIME OF DAY AND MONTH

HOUR OF DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
12:00 AM	5	7	12	7	9	4	6	5	10	16	10	8	99
1:00 AM	7	7	7	9	4	2	5	1	11	4	8	2	67
2:00 AM	16	8	5	3	5	6	7	3	7	7	6	16	89
3:00 AM	9	5	6	8	3	8	5	4	6	8	7	13	82
4:00 AM	8	5	7	6	6	7	5	4	9	9	4	12	82
5:00 AM	11	8	10	7	8	7	8	8	8	12	16	6	109
6:00 AM	14	17	16	17	17	6	11	10	14	21	19	20	182
7:00 AM	11	23	20	21	9	16	10	12	24	26	17	17	206
8:00 AM	10	11	19	16	16	5	10	19	23	15	11	21	176
9:00 AM	12	5	11	8	15	19	12	14	8	6	19	14	143
10:00 AM	8	5	8	15	12	14	11	16	11	16	20	9	145
11:00 AM	16	15	17	15	17	22	16	13	18	12	17	23	201
12:00 PM	12	14	18	21	17	19	23	20	22	24	22	15	227
1:00 PM	19	14	13	27	21	25	22	18	15	23	16	21	234
2:00 PM	13	11	16	17	20	21	29	19	13	21	19	18	217
3:00 PM	19	11	27	35	28	22	20	17	23	18	21	23	264
4:00 PM	19	27	32	25	16	31	23	37	24	27	20	32	313
5:00 PM	31	25	28	30	24	27	25	33	27	34	36	18	338
6:00 PM	23	21	16	25	29	32	22	21	26	23	39	29	306
7:00 PM	19	23	14	15	14	21	17	19	15	26	23	17	223
8:00 PM	8	15	17	17	12	16	19	11	20	18	19	15	187
9:00 PM	5	13	15	11	15	16	19	15	12	23	10	10	164
10:00 PM	11	6	9	12	18	13	13	11	11	13	14	16	147
11:00 PM	8	3	10	6	10	7	9	5	5	9	10	10	92
Total	314	299	353	373	345	366	347	335	362	411	403	385	4,293

HISTORICAL CRASH ANALYSIS FOR ON-SYSTEM ROADWAYS

Table 6 summarizes on-system roadway crashes by severity type in Caldwell County from 2019 to 2023. A total of 3,324 crashes were recorded on these roadways. Fatal (K) and suspected serious injury (A) crashes accounted for 2% and 4% of the total crashes, respectively, while the majority of crashes (67%) involved no injuries (O).

The combined total for fatal (K) and suspected serious injury (A) crashes is 189, representing 6% of all on-system crashes. The highest number of fatal crashes occurred in 2022, with 17 fatalities, and 2023 saw the most suspected serious injury crashes, with 33 crashes recorded.

In terms of distribution, 2022 recorded the highest percentage of crashes at 23%, followed by 2023 at 21%. Combined fatal (K) and suspected serious injury (A) crashes in 2022 also contributed the highest share of severe crashes, representing 24% of all KA crashes during the five-year period.

Figure 5 illustrates the trend in on-system crashes by severity level (K-A-B-C-O), while Figure 6 highlights fatal (K) and suspected serious injury (A) crashes, showing an upward trend in severe crashes over the five-year period.

TABLE 6: SUMMARY OF ON-SYSTEM ROADWAY CRASHES (2019-2023) BY SEVERITY TYPE IN CALDWELL COUNTY

YEAR	FATAL INJURY (K)	SUSPECTED SERIOUS INJURY (A)	SUSPECTED MINOR INJURY (B)	POSSIBLE INJURY (C)	NOT INJURED (O)	UNKNOWN	TOTAL
2019	7	23	63	88	449	29	659
2020	9	22	56	98	388	16	589
2021	11	29	66	59	423	16	604
2022	17	29	96	76	508	36	762
2023	9	33	96	93	454	25	710
TOTAL	53	136	377	414	2222	122	3324
%	2%	4%	11%	12%	67%	4%	100%

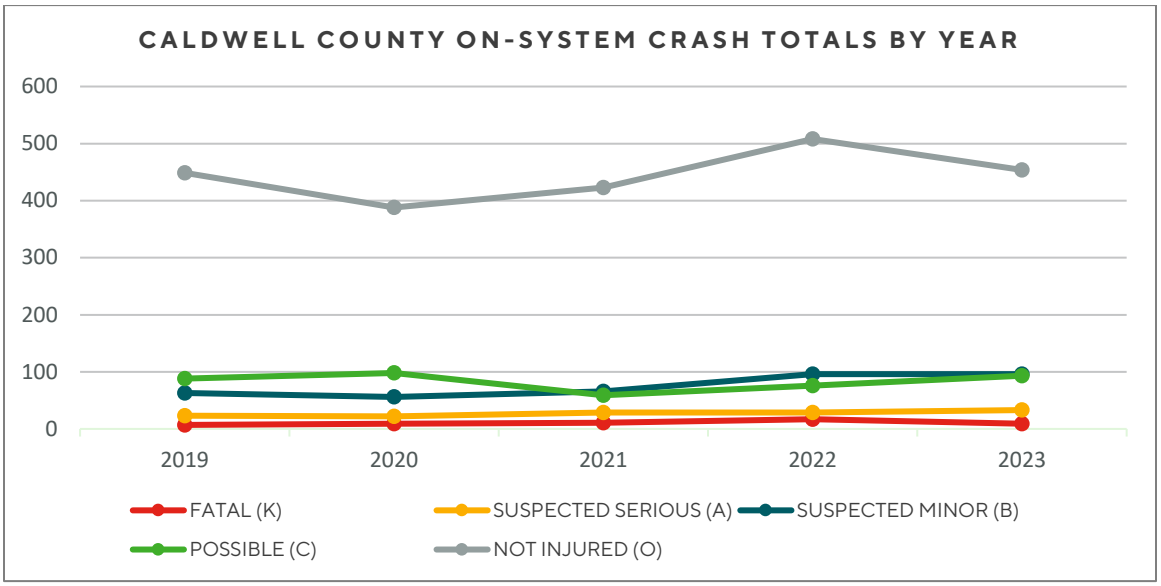


FIGURE 5: ON-SYSTEM CRASHES (2019-2023) BY YEAR IN CALDWELL COUNTY

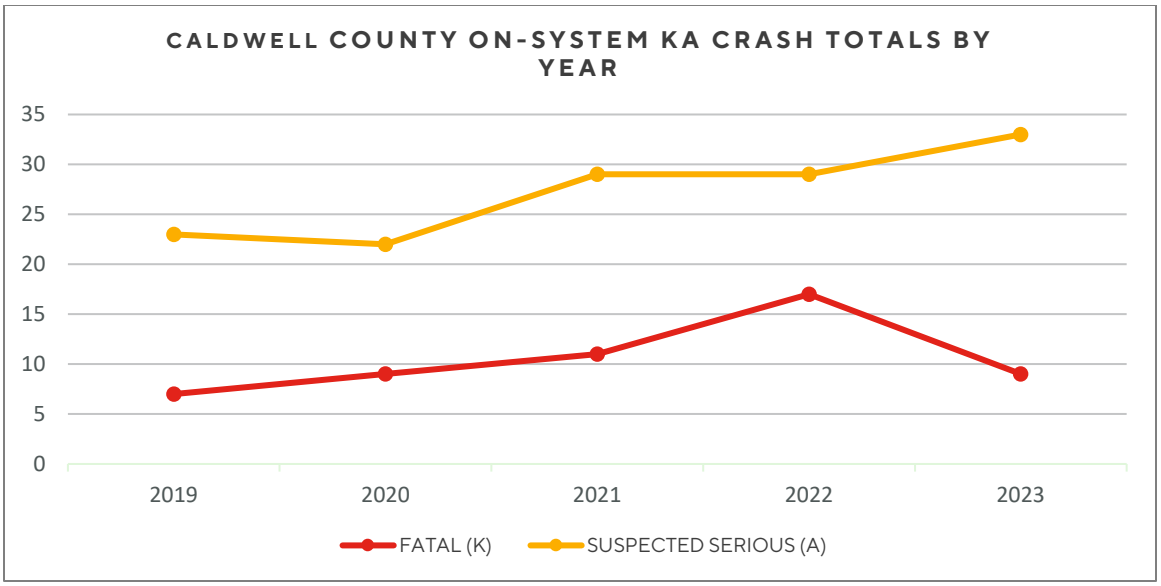


FIGURE 6: ON SYSTEM FATAL (K) AND SUSPECTED SERIOUS INJURY (A) CRASHES IN CALDWELL COUNTY (2019-2023)

HISTORICAL CRASH ANALYSIS FOR OFF-SYSTEM ROADWAYS

Table 7 summarizes crashes on off-system roadways by severity type in Caldwell County from 2019 to 2023. A total of 969 crashes were recorded on these roadways. Fatal (K) and suspected serious injury (A) crashes accounted for 0.6% and 2% of the total crashes, respectively, while the majority of crashes (68%) involved no injuries (O).

The combined total for fatal (K) and suspected serious injury (A) crashes is 25, representing 3% of all off-system crashes. The highest number of fatal crashes occurred in 2020 and 2023, with 2 fatal crash events in each year, while 2023 also saw the highest number of suspected serious injury crashes, with 4 crashes recorded.

In terms of distribution, 2019 saw the highest percentage of crashes on off-system roadways, accounting for 24% of the total, followed by 2020 at 21%. The combined fatal (K) and suspected serious injury (A) crashes in 2020 and 2023 represented the highest share of severe crashes, each contributing 24% of all KA crashes during the five-year period.

Figure 7 illustrates the trend in off-system crashes by severity level (K-A-B-C-O), while Figure 8 highlights fatal (K) and suspected serious injury (A) crashes, showing a fluctuating pattern in severe crashes over the five-year period.

TABLE 7: SUMMARY OF OFF-SYSTEM ROADWAYS CRASHES (2019-2023) BY SEVERITY TYPE IN CALDWELL COUNTY

YEAR	FATAL INJURY (K)	SUSPECTED SERIOUS INJURY (A)	SUSPECTED MINOR INJURY (B)	POSSIBLE INJURY (C)	NOT INJURED (O)	UNKNOWN	TOTAL
2019	0	3	13	22	161	34	233
2020	2	4	14	20	135	29	204
2021	2	4	14	18	105	15	158
2022	0	4	15	19	135	27	200
2023	2	4	17	15	119	17	174
TOTAL	6	19	73	94	655	122	969
%	0.6%	2%	8%	10%	68%	13%	

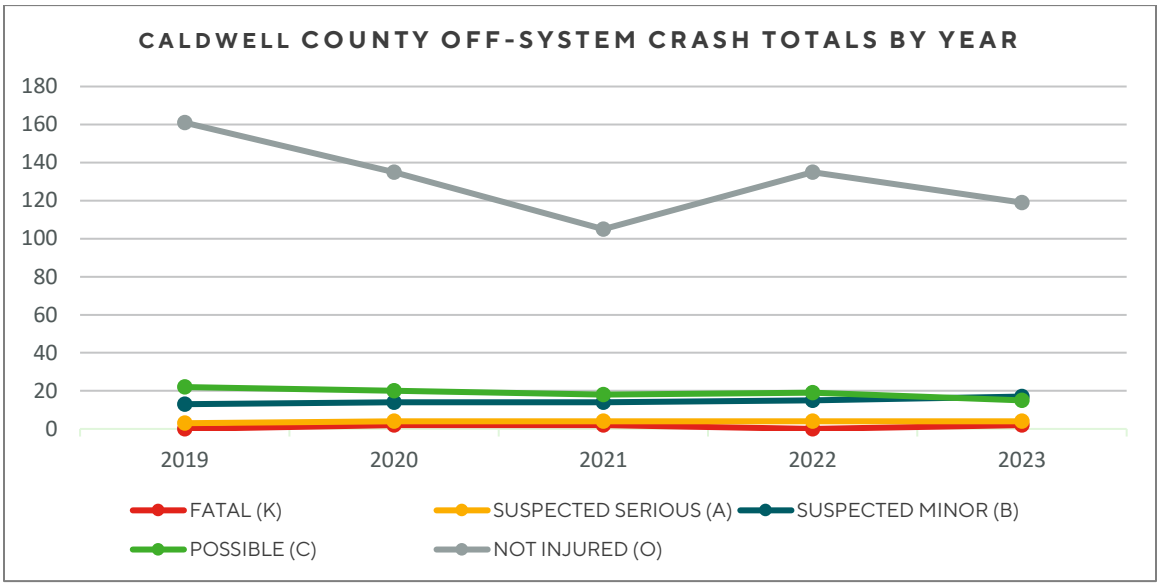


FIGURE 7: OFF-SYSTEM CRASHES (2019-2023) BY YEAR IN CALDWELL COUNTY

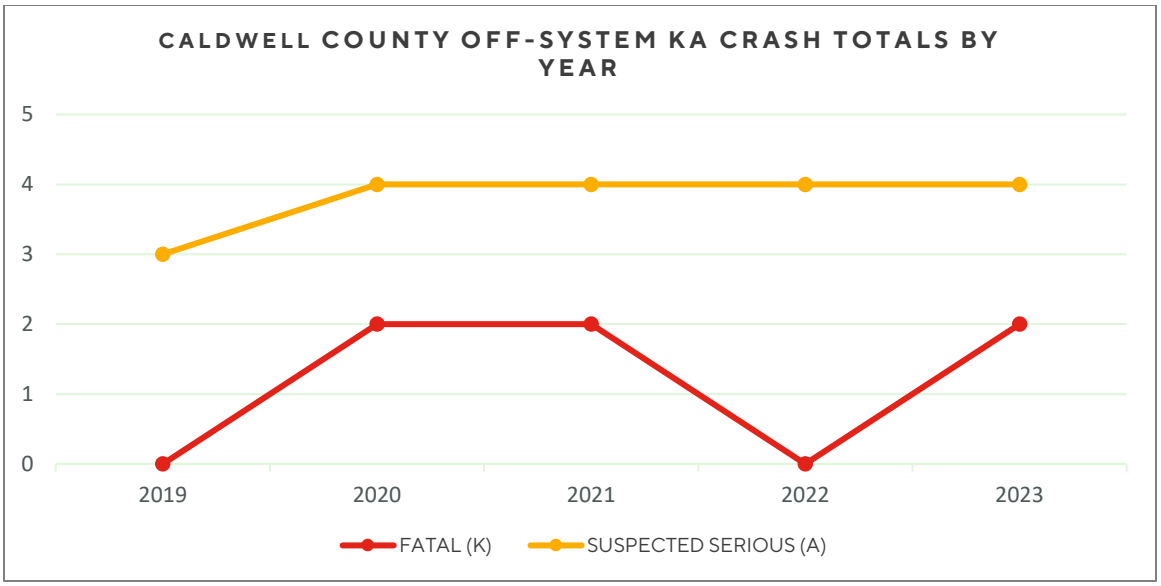


FIGURE 8: OFF SYSTEM FATAL (K) AND SUSPECTED SERIOUS INJURY (A) CRASHES IN CALDWELL COUNTY (2019-2023)

EMPHASIS AREA ANALYSIS

Crash data from 2019 to 2023 is analyzed for the emphasis areas identified in this study. Table 8 summarizes the crashes by year and emphasis area for all public roadways in Caldwell County. The trendline rates in the table represent a linear trendline fitted to the crash data by year, with positive rates indicating an increase in crashes over time.

Intersection related crashes show the highest number of crashes, with 1,965 crashes over the five-year period, and a significant upward trend of 23.1 crashes per year, reflecting a consistent increase. Speed related crashes totaled 1,336, also exhibiting a positive trend, with an increase of 7.1 crashes per year.

Crashes involving both young and older drivers show notable increases. There were 1,008 crashes involving young drivers (trendline: 6.4) and 276 involving older drivers (trendline: 12.7), indicating a rising concern in these categories. Dark conditions contributed to 1008 crashes, with a steady trend increase of 4.3.

On the other hand, emphasis areas like distracted driving and alcohol/drug related driving show a decline. Distracted driving contributed to 848 crashes (trendline: -8.7), while alcohol and drug related driving resulted in 276 crashes (trendline: -5.7).

Additionally, work zone crashes (144 crashes, trendline: 0.8), no seatbelt/child car seat crashes (166 crashes, trendline: 3.6), and motorcycle crashes (49 crashes, trendline: 0.6) display small increases over the five-year period. Crashes related to pedestrians and bicyclists were low in number, with 35 crashes with no trendline changes.

TABLE 8: SUMMARY OF CRASHES BY YEAR (2019 – 2023) AND EMPHASIS AREAS IN CALDWELL COUNTY

EMPHASIS AREAS	2019	2020	2021	2022	2023	TOTAL CRASHES	TRENDLINE RATE OF INCREASE IN CRASHES PER YEAR
INTERSECTION RELATED	362	346	374	465	418	1965	23.1
ROADWAY/LANE DEPARTURES	281	269	225	297	264	1336	-0.6
SPEED RELATED	216	191	202	244	225	1078	7.1
DARK CONDITIONS	199	202	173	225	209	1008	4.3
YOUNG DRIVER INVOLVED (15-20)	166	167	152	175	194	854	6.4
DISTRACTED DRIVING	209	167	129	188	155	848	-8.7
OLDER DRIVER INVOLVED (65+)	118	106	116	161	154	655	12.7
ALCOHOL/DRUG RELATED	75	52	50	53	46	276	-5.7
NO SEATBELT/CHILD CAR SEAT	27	30	28	42	39	166	3.6
WORK ZONE RELATED	19	27	16	31	21	114	0.8
MOTORCYCLE	6	14	7	12	10	49	0.6
PEDESTRIANS/BICYCLISTS	9	3	8	9	6	35	0.0
SCHOOL ZONE RELATED	1	0	1	1	1	4	0.1

Table 9 provides insights into the total number of crashes and the proportion of fatal and suspected serious injury (KA) crashes within each category.

As mentioned in Table 9, intersection related crashes represent the largest share, accounting for 46% of total crashes and contributing to 30% of KA crashes. Roadway/lane departures also make up a significant portion, with 31% of total crashes and 53% of KA crashes, indicating the high severity risk associated with these crashes.

Speed related crashes account for 25% of total crashes but contribute to 31% of KA crashes, highlighting a serious safety concern in this category.

Crashes in dark conditions contribute to 23% of total crashes but account for 39% of KA crashes. Distracted driving contributed to 20% of total crashes, with 9% of KA crashes resulting from this factor.

Crashes involving alcohol/drug related drivers made up 6% of total crashes and 21% of KA crashes, while older drivers accounted for 15% of total crashes but only 13% of KA crashes. No seatbelt/child car seat crashes, though making up only 4% of total crashes, contributed to 24% of KA crashes.

Crashes involving vulnerable users—pedestrians and bicyclists—are relatively low, contributing 1% of total crashes but make up 7% of KA crashes indicating the severity of these crashes.

TABLE 9: SUMMARY OF CRASHES BY EMPHASIS AREA AND COMBINED FATAL AND SUSPECTED SERIOUS INJURY CRASHES IN CALDWELL COUNTY

EMPHASIS AREAS	TOTAL	% TOTAL CRASHES	KA	% KA CRASHES
INTERSECTION RELATED	1965	46%	65	30%
ROADWAY/LANE DEPARTURES	1336	31%	113	53%
SPEED RELATED	1078	25%	66	31%
DARK CONDITIONS	1008	23%	83	39%
YOUNG DRIVER INVOLVED (15-20)	854	20%	42	20%
DISTRACTED DRIVING	848	20%	20	9%
OLDER DRIVER INVOLVED (65+)	655	15%	27	13%
ALCOHOL/DRUG RELATED	276	6%	44	21%
NO SEATBELT/CHILD CAR SEAT	166	4%	52	24%
WORK ZONE RELATED	114	3%	9	4%
MOTORCYCLE	49	1%	18	8%
PEDESTRIANS/BICYCLISTS	35	1%	14	7%
SCHOOL ZONE RELATED	4	0%	0	0%

NOTE – THE PERCENTAGES ARE CALCULATED BASED ON THE COUNTYWIDE TOTAL AND COMBINED KA CRASHES

Table 10 summarizes crashes in Caldwell County across key emphasis areas, comparing total crashes on on-system and off-system roadways from 2019 to 2023.

Most crashes occurred on on-system roadways, with several emphasis areas reporting over 75% of crashes on these roads. For example, intersection related crashes accounted for 84% of the total on on-system roadways, while roadway/lane departures had 69% of their crashes on on-system roads. Similarly, speed related crashes saw 77% of crashes occurring on on-system roads, and dark condition crashes showed the same proportion at 77%.

Some emphasis areas had significant percentages of crashes on off-system roadways. Alcohol/drug related crashes saw 33% of their total on off-system roads, while school zone related crashes had 75% of crashes on off-system roads. Additionally, pedestrian/bicyclist crashes accounted for 26% on off-system roads, and no seatbelt/child car seat crashes had 24% of crashes occurring off-system.

Other categories, such as work zone crashes, were highly concentrated on on-system roads, with 94% of crashes happening there. Older drivers accounted for 82% of crashes on on-system roads, with the remaining 18% occurring off-system. Motorcycle crashes had 69% of crashes on on-system roads, with the remaining 31% on off-system roads.

TABLE 10: SUMMARY OF CRASHES (2019-2023) FOR EMPHASIS AREAS BY ON-SYSTEM AND OFF-SYSTEM ROADWAYS IN CALDWELL COUNTY

EMPHASIS AREAS	TOTAL CRASHES				
	COUNTYWIDE	ON-SYSTEM		OFF-SYSTEM	
	NO. OF CRASHES	NO. OF CRASHES	%	NO. OF CRASHES	%
INTERSECTION RELATED	1965	1657	84%	308	16%
ROADWAY/LANE DEPARTURES	1336	919	69%	417	31%
SPEED RELATED	1078	827	77%	251	23%
DARK CONDITIONS	1008	776	77%	232	23%
YOUNG DRIVER INVOLVED (15-20)	854	673	79%	181	21%
DISTRACTED DRIVING	848	635	75%	213	25%
OLDER DRIVER INVOLVED (65+)	655	536	82%	119	18%
ALCOHOL/DRUG RELATED	276	186	67%	90	33%
NO SEATBELT/CHILD CAR SEAT	166	126	76%	40	24%
WORK ZONE RELATED	114	107	94%	7	6%
MOTORCYCLE	49	34	69%	15	31%
PEDESTRIANS/BICYCLISTS	35	26	74%	9	26%
SCHOOL ZONE RELATED	4	1	25%	3	75%

NOTE:

1. *THE PERCENTAGES FOR ON-SYSTEM AND OFF-SYSTEM ARE CALCULATED BASED ON RESPECTIVE EMPHASIS AREA COUNTYWIDE CRASH NUMBERS*
2. *THE RED FONT INDICATES 10 % OR MORE DIFFERENCE BETWEEN ON-SYSTEM AND OFF-SYSTEM PERCENTAGES. HIGHEST PERCENTAGE IS HIGHLIGHTED.*

Table 11 summarizes fatal and suspected serious injury (KA) crashes across key emphasis areas in Caldwell County, comparing total crashes on on-system and off-system roadways from 2019 to 2023.

Most KA crashes occurred on on-system roadways, with several emphasis areas reporting over 85% of crashes on these roads. For example, of all KA intersection related crashes in the county, 94% occurred on on-system roads. Similarly, roadway/lane departures had 86% of their KA crashes on on-system roads. Similarly, speed related, and distracted driving crashes saw 85% of KA crashes occurring on on-system roads.

Certain categories had notable percentages on off-system roadways. No seatbelt/child car seat crashes saw 15% of KA crashes on off-system roads, while alcohol/drug related crashes had 11% of crashes off-system. Additionally, pedestrian/bicyclists KA crashes occurred 7% of the time on off-system roads.

Other categories were predominantly focused on on-system roadways. Work zone KA crashes, for example, occurred 100% of the time on on-system roads, with no off-system KA crashes reported. Older driver KA crashes also occurred primarily on on-system roads, with 96% happening there. Motorcycle KA crashes occurred 78% of the time on on-system roads.

For dark conditions, 92% of KA crashes were on on-system roads, while 8% were on off-system roads. Similarly, young driver KA crashes accounted for 88% on on-system roads, with 12% occurring on off-system roads.

TABLE 11: SUMMARY OF KA CRASHES (2019-2023) FOR EMPHASIS AREAS BY ON-SYSTEM AND OFF-SYSTEM ROADWAYS IN CALDWELL COUNTY

EMPHASIS AREAS	KA CRASHES				
	COUNTYWIDE	ON-SYSTEM		OFF-SYSTEM	
	NO. OF CRASHES	NO. OF CRASHES	%	NO. OF CRASHES	%
INTERSECTION RELATED	65	61	94%	4	6%
ROADWAY/LANE DEPARTURES	113	97	86%	16	14%
SPEED RELATED	66	56	85%	10	15%
DARK CONDITIONS	83	76	92%	7	8%
YOUNG DRIVER INVOLVED (15-20)	42	37	88%	5	12%
DISTRACTED DRIVING	20	17	85%	3	15%
OLDER DRIVER INVOLVED (65+)	27	26	96%	1	4%
ALCOHOL/DRUG RELATED	44	39	89%	5	11%
NO SEATBELT/CHILD CAR SEAT	52	44	85%	8	15%
WORK ZONE RELATED	9	9	100%	0	0%
MOTORCYCLE	18	14	78%	0	0%
PEDESTRIANS/BICYCLISTS	14	13	93%	1	7%
SCHOOL ZONE RELATED	0	0	0%	0	0%

NOTE:

1. ***THE PERCENTAGES FOR ON-SYSTEM AND OFF-SYSTEM ARE CALCULATED BASED ON RESPECTIVE EMPHASIS AREA COUNTYWIDE KA CRASH NUMBERS***
2. ***THE RED FONT INDICATES 10 % OR MORE DIFFERENCE BETWEEN ON-SYSTEM AND OFF-SYSTEM PERCENTAGES. HIGHEST PERCENTAGE IS HIGHLIGHTED.***

Systemic Safety Analysis Results

FOCUS CRASH TYPES

Based on crash data from 2019-2023, Caldwell County has identified several focus crash types that are significantly associated with severe injuries and fatalities. Each focus area highlights specific conditions and contributing factors that demand targeted safety improvements. A summary of crash severity by focus crash types is provided in Table 12.

TABLE 12: CRASH SEVERITY BY FOCUS CRASH TYPE IN CALDWELL COUNTY

FOCUS CRASH TYPE	K	KA	TOTAL CRASHES
INTERSECTION RELATED	15 (25%)	65 (30%)	1965 (46%)
ROADWAY AND LANE DEPARTURE	32 (54%)	113 (53%)	1336 (31%)
LOW AMBIENT LIGHTING	30 (51%)	83 (39%)	1008 (23%)
PEDESTRIAN AND BICYCLIST	7 (12%)	14 (7%)	35 (1%)

NOTE:

1. ***PERCENTAGES DO NOT SUM TO 100% BECAUSE NOT ALL CRASHES ARE ATTRIBUTED TO A FOCUS CRASH TYPE, AND SOME CRASHES MAY BE ATTRIBUTED TO MULTIPLE FOCUS CRASH TYPES.***

- **Intersection Related**: Intersection-related crashes represent the largest portion of total crashes, accounting for 46% of all incidents within Caldwell County. This crash type accounts for 15 fatal crashes (25% of total fatal crashes) and 65 fatal and suspected serious injury (KA) crashes (30% of KA crashes). Intersections present complex traffic interactions that contribute to higher crash frequencies, warranting interventions to reduce conflict points.
- **Roadway and Lane Departure**: Roadway and lane departure crashes, which occur when vehicles unintentionally leave their designated lanes, make up 31% of total crashes. This crash type accounts for 32 fatal crashes (54% of total fatal crashes) and 113 fatal and suspected serious injury (KA) crashes (53% of KA crashes), marking them as one of the most severe crash types.
- **Low Ambient Lighting**: Crashes in areas with low ambient lighting account for 23% of total crashes. Low visibility conditions contributed to 30 fatal crashes (51% of total fatal crashes) and 83 fatal and suspected serious injury (KA) crashes (39% of KA crashes), emphasizing the need for improved lighting in dark roadway segments and intersections to enhance visibility and reduce nighttime crash risks.
- **Pedestrian and Bicyclist**: Although pedestrian and bicyclist-involved crashes represent only 1% of total crashes, they result in a disproportionately high severity. These crash type account for 7 fatal crashes (12% of total fatal crashes) and 14 fatal and suspected serious injury (KA) crashes (7% of KA crashes).

NETWORK SCREENING: CRASH TREE ANALYSIS

A crash tree analysis was conducted to calculate the distribution of crashes by facility type and harmful event. The crash tree analysis results, displayed in Figure 9 and Tables 13 through 15, were used to identify over-represented crash events across different facilities. For each facility type, over-represented crash events were determined by comparing the proportion of crashes within that facility type to the overall countywide crash proportions. Based on these findings, focus crash types were identified, guiding the selection of appropriate countermeasures. Recommended countermeasures target facilities with the highest concentration of over-represented crash events, ensuring interventions are directed to areas with the greatest safety improvement potential.

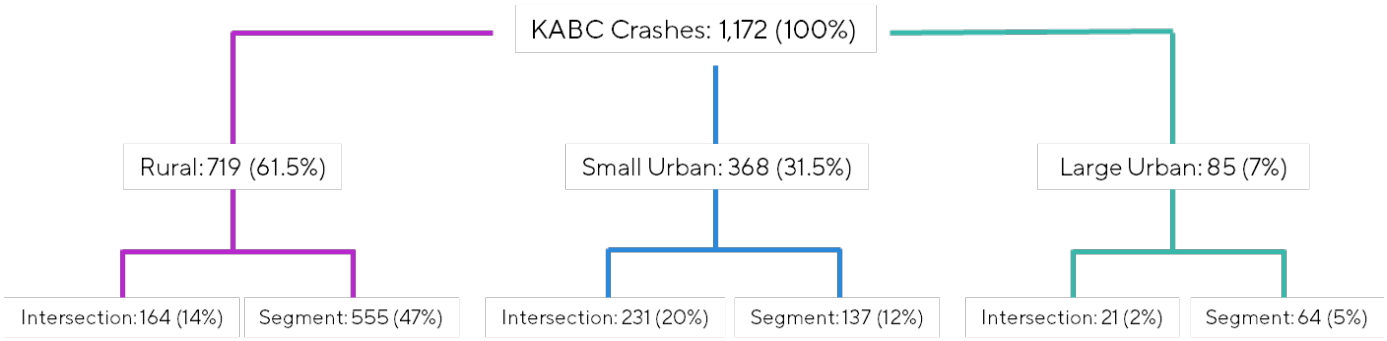


FIGURE 9: CRASH TREE DIAGRAM

TABLE 13: CRASH TREE RESULTS – CRASH TYPE

CRASH TYPE	TOTAL	RURAL INTERSECTION	RURAL SEGMENT	SMALL URBAN INTERSECTION	SMALL URBAN SEGMENT	LARGE URBAN INTERSECTION	LARGE URBAN SEGMENT
ROADWAY/LANE DEPARTURE	446 (38%)	26 (16%)	319 (57%)	14 (6%)	57 (42%)	6 (28.5%)	24 (38%)
SAME DIRECTION	281 (24%)	34 (21%)	131 (24%)	40 (17%)	39 (28%)	6 (28.5%)	31 (48%)
SINGLE VEHICLE CRASH	104 (9%)	5 (3%)	66 (12%)	7 (3%)	24 (18%)	0 (0%)	2 (3%)
ANGLE CRASH	259 (22%)	82 (50%)	23 (4%)	135 (58%)	13 (9%)	4 (19%)	2 (3%)
OPPOSITE DIRECTION	80 (7%)	17 (10%)	15 (3%)	34 (15%)	4 (3%)	5 (24%)	5 (8%)
OTHER	2 (<1%)	0 (0%)	1 (<1%)	1 (<1%)	0 (0%)	0 (0%)	0 (0%)
TOTAL	1,172	164	555	231	137	21	64

NOTE:

1. ***THE SHADED CELLS INDICATE OVERREPRESENTED CRASH TYPES COMPARED TO OVERALL COUNTYWIDE CRASH PROPORTIONS.***

TABLE 14: CRASH TREE RESULTS – FIRST HARMFUL EVENT

FIRST HARMFUL EVENT	TOTAL	RURAL INTERSECTION	RURAL SEGMENT	SMALL URBAN INTERSECTION	SMALL URBAN SEGMENT	LARGE URBAN INTERSECTION	LARGE URBAN SEGMENT
MOTOR VEHICLE IN TRANSPORT	690 (59%)	136 (83%)	220 (40%)	210 (91%)	63 (46%)	16 (76%)	45 (70%)
FIXED OBJECT	277 (24%)	18 (11%)	191 (34%)	13 (6%)	38 (28%)	4 (19%)	13 (20%)
ANIMAL	39 (3%)	1 (1%)	34 (6%)	-	4 (3%)	-	-
PARKED CAR	21 (2%)	1 (1%)	8 (1%)	-	11 (8%)	-	1 (2%)
OVERTURNED	103 (9%)	6 (4%)	81 (15%)	1 (1%)	11 (8%)	1 (5%)	3 (5%)
OTHER OBJECT	4 (0.3%)	-	3 (1%)	-	1 (1%)	-	-
PEDESTRIAN	19 (1.6%)	1 (<1%)	11 (2%)	2 (1%)	4 (3%)	-	1 (1.5%)
BICYCLIST	11 (0.9%)	1 (<1%)	3 (0.5%)	5 (2%)	1 (<1%)	-	1 (1.5%)
OTHER NON COLLISION	4 (0.3%)	-	3 (0.5%)	-	1 (<1%)	-	-
RR TRAIN	4 (0.3%)	-	1 (<1%)	-	3 (2%)	-	-
TOTAL	1,172	164	555	231	137	21	64

NOTE:

THE SHADED CELLS INDICATE OVERREPRESENTED CRASH TYPES COMPARED TO OVERALL COUNTYWIDE CRASH PROPORTIONS.

TABLE 15: CRASH TREE RESULTS – LIGHTING CONDITION

CRASH TYPE	TOTAL	RURAL INTERSECTION	RURAL SEGMENT	SMALL URBAN INTERSECTION	SMALL URBAN SEGMENT	LARGE URBAN INTERSECTION	LARGE URBAN SEGMENT
DAYLIGHT	689 (59%)	104 (63%)	274 (49%)	180 (78%)	88 (64%)	48 (70%)	29 (45%)
DARK, NOT LIGHTED	324 (28%)	34 (21%)	221 (40%)	14 (6%)	28 (20%)	10 (14%)	23 (36%)
DARK, LIGHTED	89 (8%)	15 (9%)	20 (4%)	31 (13%)	18 (13%)	9 (13%)	2 (3%)
DUSK	41 (3%)	6 (4%)	24 (4%)	3 (1%)	1 (1%)	1 (1%)	7 (11%)
DAWN	26 (2%)	5 (3%)	15 (3%)	3 (1%)	1 (1%)	1 (1%)	2 (3%)
UNKNOWN	3 (<1%)	-	1 (0%)	-	1 (1%)	-	1 (2%)
TOTAL	1,172	164	555	231	137	21	64

NOTE:

1. ***THE SHADED CELLS INDICATE OVERREPRESENTED CRASH TYPES COMPARED TO OVERALL COUNTYWIDE CRASH PROPORTIONS.***

COUNTERMEASURE SELECTION

The systemic approach in Caldwell County focuses on deploying countermeasures across the network to address crash types that occur at multiple locations with similar risk characteristics. Unlike hotspot analysis, which identifies site-specific solutions, the systemic approach uses a decision-making process that considers a set of criteria—such as traffic volume, roadway environment, adjacent land use, and roadway cross-section—to select appropriate countermeasures for high-priority locations. This allows Caldwell County to implement cost-effective safety measures across a broader range of sites that share these risk factors, supporting widespread safety improvements.

Countermeasures for Caldwell County's focus crash types were selected based on data-driven analysis and guidance from TxDOT's Highway Safety Improvement Program (HSIP). Systemic countermeasures align with TxDOT's HSIP guidelines, which define each safety countermeasure using specific "work codes" for streamlined planning and deployment. Table 16 provides a summary of the focus crash types and the corresponding systemic countermeasures selected for evaluation across Caldwell County.

TABLE 16: FOCUS CRASH TYPES AND SYSTEMIC COUNTERMEASURES

ROADWAY CRASH TYPE	SYSTEMIC COUNTERMEASURE (HSIP WORK CODE)	PRIMARY FACILITY TYPE
INTERSECTION RELATED	Install Traffic Signal (107), Signal Head Backplates (108), Install Advanced Warning Signals and Signs (124), Safety Lighting at Intersection (305), Transverse Rumble Strips (545), Yellow Change Intervals	Rural Intersection and Small Urban Intersection
ROADWAY AND LANE DEPARTURE	Install Delineators (113), Install Advanced Warning Signals (123), Install Advanced Warning Signals and Signs (125), Install Advanced Warning Signs (130), Install LED Flashing Chevrons (136), Install Chevrons (137), Install Surface Mounted Delineators on Centerline (139), Install Median Barrier (201), Safety Treat Fixed Objects (209), Install Impact Attenuation System (217), Install Pavement Markings (401), Install Edge Marking (402), Install Centerline Striping (404), Install Safety Edge (532), Milled Edgeline Rumble Strips (532), Profile Edgeline Markings (533), Raised Edgeline Rumble Strips (534), Install Milled Centerline Rumble Strips (542), Profile Centerline Markings (543), Raised Centerline Rumble Strips (544).	Rural Segment and Small Urban Segment
LOW AMBIENT LIGHTING	Install Delineators (113), Safety Lighting (304)	Rural Segment and Small Urban Segment
PEDESTRIAN AND BICYCLIST	Install Pedestrian Countdown Timer (115), Pedestrian Hybrid Beacon (143), Install Sidewalks (407), Install Pedestrian Refuge Islands (409), Install Dedicated Bicycle Lanes (410)	Rural Segment and Small Urban Intersection

High Injury Network (HIN) Analysis and Results

INTERSECTION HIGH INJURY NETWORK RESULTS

Table 17 lists the High Injury Network (HIN) for intersections in Caldwell County, showcasing 44 intersections that represent 7% of the total intersections in the county that experienced at least one crash, and account for 75% of the severity-weighted crash score from the dataset. Out of 633 total intersections, these selected intersections are identified based on fatal and severe injury (KA) crashes between 2019 and 2023.

The table provides the weighted crash score, total crashes, and the number of fatal and severe injury crashes for each intersection. In total, there were 1,670 intersection related crashes, defined as crashes marked either "intersection" or "intersection related" in the dataset.

- The highest weighted crash score is at the intersection of US 183 S Frontage Rd and FM 1185, with a score of 62; it experienced 26 total crashes and 4 fatal/serious injury crashes.
- The highest total crashes are observed at the intersection of US 183 and I-10 Frontage, which experienced 54 total crashes, a weighted crash score of 22, and 1 fatal/serious injury crash.
- Two intersections—US 183 S Frontage Rd and FM 1185, and US 183 and FM 86/Lincoln Dr—recorded the highest number of fatal/serious injury crashes, with each location experiencing 4 fatal/serious injury crashes over the study period.

TABLE 17 - INTERSECTIONS INCLUDED IN HIGH INJURY NETWORK

NO.	PRIMARY STREET	CROSS STREET	WEIGHTED CRASH SCORE	TOTAL CRASHES	FATAL AND SEVERE INJURY CRASHES
1	US 183 S Frontage Rd	FM 1185	62	26	4
2	US 183	FM 86/Lincoln Dr	55	30	4
3	TX 21/Camino Real	FM 1854/E Lone Star Dr	30	34	2
4	TX 80/San Marcos Hwy	FM 20/State Park Rd	27	15	2
5	TX 21/Camino Real	Mustang Meadow Run	25	7	2
6	US 183	Old Luling Rd	25	4	2
7	US 183	FM 671/Henderson Ln	24	4	2
8	US 183	I-10 Frontage	22	54	1
9	FM 20/State Park Rd	S Main St	21	41	1
10	TX 130 Frontage Rd	FM 2001/Silent Valley Rd	21	27	1
11	US 183	FM 672/Flores St	19	19	1
12	US 90/E Pierce St	N Cedar Ave	17	15	1
13	US 80/San Marcos Hwy	FM 110	17	14	1
14	US 183	Homannville Trl/Briar Patch Rd	17	12	1
15	US 183	FM 2001/Silent Valley Rd	16	13	1
16	US 183	TX 21/Camino Real	16	9	1
17	US 183	E Davis St	15	32	1
18	FM 1322/S Commerce St	FM 20/Blackjack St	15	20	1
19	US 90/E Pierce St	Connector Rd	15	15	1
20	FM 713	FM 86	15	13	1
21	FM 713	TX 304	15	8	1
22	TX 130 S Frontage Rd	TX 142/W San Antonio St	14	32	0
23	US 90/E Pierce St	N Walnut Ave	14	11	1
24	US 183/S Colorado St	Summerside Ave	14	10	1
25	US 183/S Colorado St	E China St	14	8	1
26	TX 80/San Marcos Hwy	TX 130 N Frontage Rd	14	5	1
27	FM 20/State Park Rd	San Jacinto St	14	5	1
28	FM 86	FM 1322	14	5	1
29	TX 80/San Marcos Hwy	FM 671/Stairtown Rd	14	4	1
30	FM 2001/Silent Valley Rd	Horseshoe Rd	14	3	1
31	US 183/S Colorado St	Chisholm Trl	13	11	1
32	US 183/S Colorado St	E Market St	13	10	1
33	TX 142/W San Antontio St	City Line Rd	13	5	1
34	TX 183 S Frontage Rd	Briar Patch Rd	13	4	1
35	US 80/San Marcos Hwy	Pecan Ct	13	2	1
36	TX 142	Greenhouse Ln	12	4	1
37	SH 130 N Frontage Rd	FM 1185	12	4	1
38	FM 20/Blackjack St	Reed Dr	12	4	1
39	TX 130 S Frontage Rd	Maple St	12	2	1
40	TX 21/Camino Real	Skyline Rd	12	2	1

NO.	PRIMARY STREET	CROSS STREET	WEIGHTED CRASH SCORE	TOTAL CRASHES	FATAL AND SEVERE INJURY CRASHES
41	US 183/E Pierce St	US 90	12	2	1
42	FM 1854	Highland Ranch Way	12	1	1
43	FM 1322	Soda Springs Rd	12	1	1
44	FM 1854	Old Colony Line Rd	12	1	1

The map in Figure 10 visually represents these 44 intersections across Caldwell County, highlighting their locations. The spatial distribution of these intersections provides insight into the areas requiring targeted interventions for traffic safety improvements.

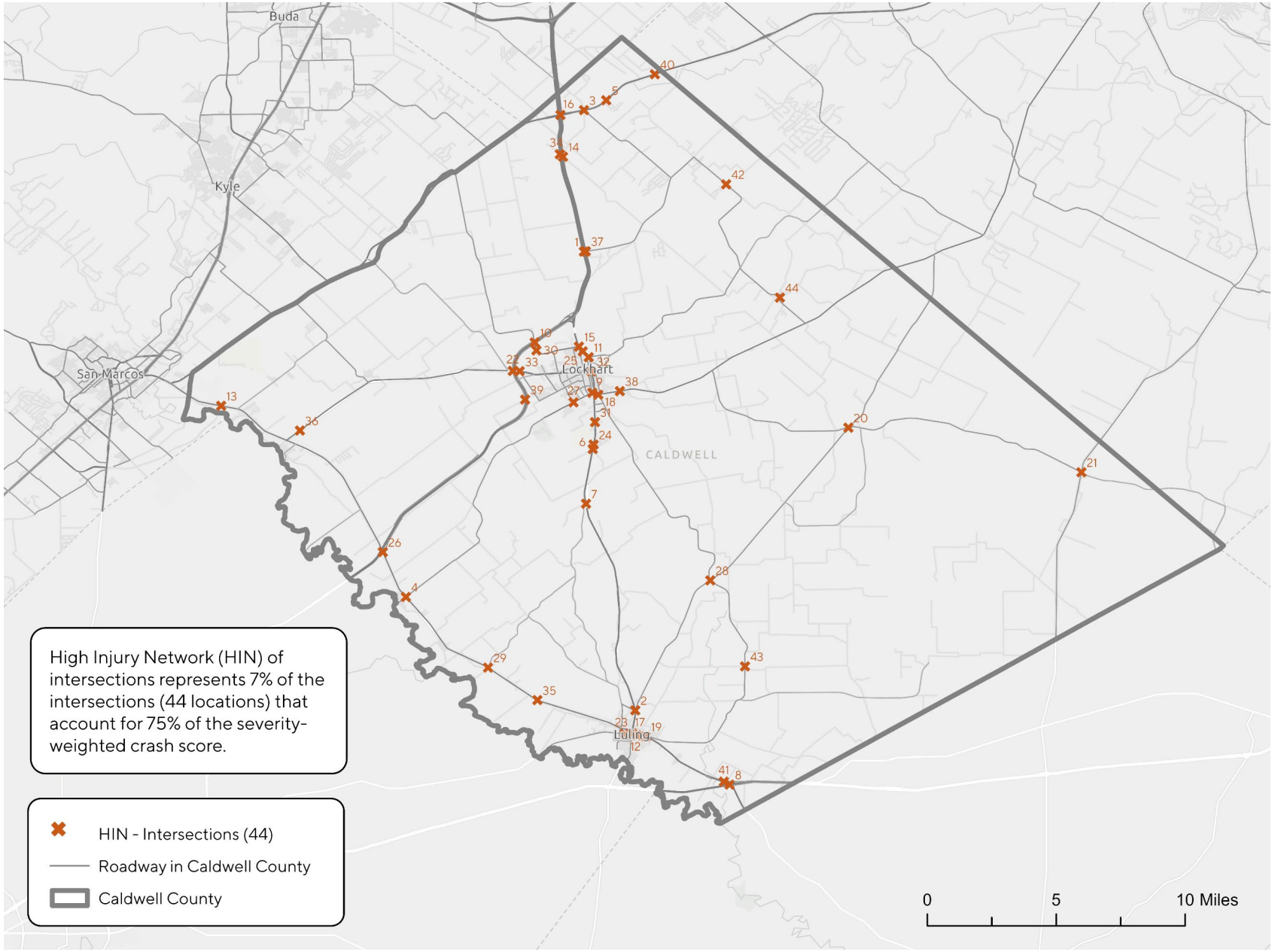


FIGURE 10 - CALDWELL COUNTY INTERSECTION HIGH INJURY NETWORK

SEGMENT HIGH INJURY NETWORK RESULTS

Table 18 lists the High Injury Network (HIN) for road segments in Caldwell County, identifying 106 segments that represent 8% of the county's centerline roadway network (270 miles). These segments account for 86% of the severity-weighted crash score from the dataset. Out of the 1,977 total segments, these 106 are identified based on fatal and serious injury (KA) crashes between 2019 and 2023.

The table provides the weighted crash score, total crashes, and the number of fatal and serious injury crashes for each road segment. In total, 1,776 non-intersection-related crashes were analyzed, as identified from the dataset's "non-intersection" classification.

- The highest weighted crash score was observed along IH 10 between mile markers 633.0 and 633.4, with a score of 54, 19 total crashes, and 4 fatal/severe injury crashes.
- Other segments with notable crash scores include US 183 from mile markers 350.4 to 350.8, and SH 21 from mile markers 18.3 to 18.8, each with scores of 48 and 39, respectively, and multiple fatal or serious injury crashes.
- Several other segments, such as CR 1691 (21.4 to 21.8) and SH 130 (57.0 to 57.5), each recorded significant crash scores and fatal/serious injury crashes, highlighting their high-risk status.

Figure 11 presents a map that visually represents these 106 road segments across Caldwell County. The spatial distribution of these segments provides critical insight into the areas most in need of traffic safety interventions, helping prioritize where improvements can have the greatest impact on reducing severe crashes.

TABLE 18 - SEGMENTS INCLUDED IN HIGH INJURY NETWORK

NO.	ROAD	LIMITS MP (FROM)	LIMITS MP (TO)	WEIGHTED CRASH SCORE	TOTAL CRASHES	FATAL AND SEVERE INJURY CRASHES
1	IH 10	633.0	633.4	54	19	4
2	US 183	350.4	350.8	48	10	4
3	SH 21	18.3	18.8	39	9	3
4	SH 21	21.4	21.8	28	20	2
5	SH 130	57.0	57.5	28	12	2
6	SH 21	16.6	17.0	27	11	2
7	FM 1854	0.8	1.3	27	11	2
8	SH 21	20.9	21.4	27	11	2
9	SH 80	26.4	26.8	27	11	2
10	SH 80	8.2	8.6	27	7	2
11	SH 21	18.9	19.2	26	13	2
12	SH 21	19.6	20.1	26	8	2
13	US 183	361.2	361.6	26	7	2
14	SH 21	12.2	12.5	26	5	2
15	FM 1854	3.0	3.4	26	5	2
16	SH 80	7.4	7.8	25	8	2
17	FM 20	30.2	30.6	24	6	2
18	FM 672	2.0	2.5	24	4	2
19	FM 1854	10.4	10.8	24	3	2
20	FM 86	4.4	4.8	24	3	2

NO.	ROAD	LIMITS MP (FROM)	LIMITS MP (TO)	WEIGHTED CRASH SCORE	TOTAL CRASHES	FATAL AND SEVERE INJURY CRASHES
21	SH 80	6.9	7.3	18	11	1
22	SH 80	6.5	6.9	17	15	1
23	IH 10	631.1	631.6	16	18	1
24	SH 21	13.0	13.4	16	14	1
25	FM 1854	0.0	0.5	16	12	1
26	IH 10	633.9	634.3	16	10	1
27	IH 10	631.6	632.0	15	11	1
28	FM 1854	1.7	2.1	15	11	1
29	SH 130	56.6	57.0	15	8	1
30	SH 130	60.9	61.4	15	5	1
31	SH 80	6.5	6.5	14	9	1
32	US 183	361.6	362.0	14	8	1
33	SH 21	18.8	18.9	14	8	1
34	SH 21	13.4	13.8	14	8	1
35	FM 86	16.5	16.9	14	7	1
36	SH 21	12.5	13.0	14	6	1
37	US 183	353.8	354.3	14	6	1
38	SH 142	6.7	7.1	14	5	1
39	SH 130	61.4	61.8	14	5	1
40	FM 86	9.1	9.6	14	4	1
41	US 183	359.5	359.9	14	4	1
42	US 183	354.7	355.1	13	10	1
43	IH 10	634.3	635.0	13	9	1
44	US 183	351.2	351.7	13	9	1
45	FM 20	29.8	30.2	13	8	1
46	US 183	353.4	353.6	13	8	1
47	SH 21	19.2	19.6	13	7	1
48	US 183	370.7	371.2	13	7	1
49	SH 80	10.0	10.4	13	6	1
50	FM 1185	2.0	2.4	13	6	1
51	SH 80	24.6	25.1	13	5	1
52	FM 86	11.3	11.7	13	5	1
53	SH 21	20.5	20.9	13	4	1
54	SH 21	21.8	22.0	13	4	1
55	FM 1984	2.5	2.9	13	3	1
56	FM 2001	13.6	14.1	13	3	1
57	US 183	367.1	367.2	13	3	1
58	SH 80	9.1	9.5	13	3	1
59	FM 1185	55.3	55.7	13	2	1
60	US 183	371.5	371.9	13	2	1
61	SH 130	49.7	50.1	13	2	1
62	FM 1322	14.7	15.2	13	2	1

NO.	ROAD	LIMITS MP (FROM)	LIMITS MP (TO)	WEIGHTED CRASH SCORE	TOTAL CRASHES	FATAL AND SEVERE INJURY CRASHES
63	FM 2984	3.5	3.9	13	2	1
64	SH 130	51.0	51.4	12	9	1
65	SH 130	52.7	53.1	12	6	1
66	FM 20	27.4	27.8	12	6	1
67	US 183	363.8	364.2	12	6	1
68	US 183	366.4	366.8	12	6	1
69	SH 130	51.9	52.3	12	6	1
70	SH 142	0.6	1.1	12	4	1
71	SH 130	52.3	52.7	12	4	1
72	US 183	356.0	356.4	12	4	1
73	FM 86	6.5	7.0	12	4	1
74	FM 672	351.7	352.2	12	4	1
75	FM 20	23.5	23.9	12	3	1
76	FM 1185	1.5	2.0	12	3	1
77	FM 20	30.6	31.1	12	3	1
78	FM 20	38.8	39.3	12	3	1
79	FM 86	8.7	9.1	12	3	1
80	FM 3158	1.0	1.4	12	3	1
81	SH 80	19.9	20.3	12	2	1
82	FM 671	6.7	7.1	12	2	1
83	SH 130	54.0	54.4	12	2	1
84	SH 130	51.4	51.9	12	2	1
85	SH 130	55.7	56.2	12	2	1
86	SH 130	68.3	68.7	12	2	1
87	SH 130	63.9	64.4	12	2	1
88	FM 2984	4.3	4.8	12	2	1
89	FM 672	2.9	3.3	12	2	1
90	FM 672	9.8	10.2	12	2	1
91	FM 1854	7.7	8.2	12	2	1
92	SH 304	22.5	22.9	12	2	1
93	SH 304	27.2	27.7	12	2	1
94	US 90	507.6	507.8	12	1	1
95	US 90	508.7	509.1	12	1	1
96	SH 142	8.9	9.3	12	1	1
97	FM 2720	4.7	5.2	12	1	1
98	FM 2001	16.6	16.9	12	1	1
99	FM 1854	12.9	13.3	12	1	1
100	US 90	510.0	510.4	12	1	1
101	FM 1966	1.6	1.9	12	1	1
102	SH 130	50.3	50.8	12	1	1
103	FM 672	8.9	9.4	12	1	1
104	FM 1854	8.2	8.6	12	1	1

NO.	ROAD	LIMITS MP (FROM)	LIMITS MP (TO)	WEIGHTED CRASH SCORE	TOTAL CRASHES	FATAL AND SEVERE INJURY CRASHES
105	FM 86	7.4	7.4	12	1	1
106	FM 86	10.5	11.0	12	1	1

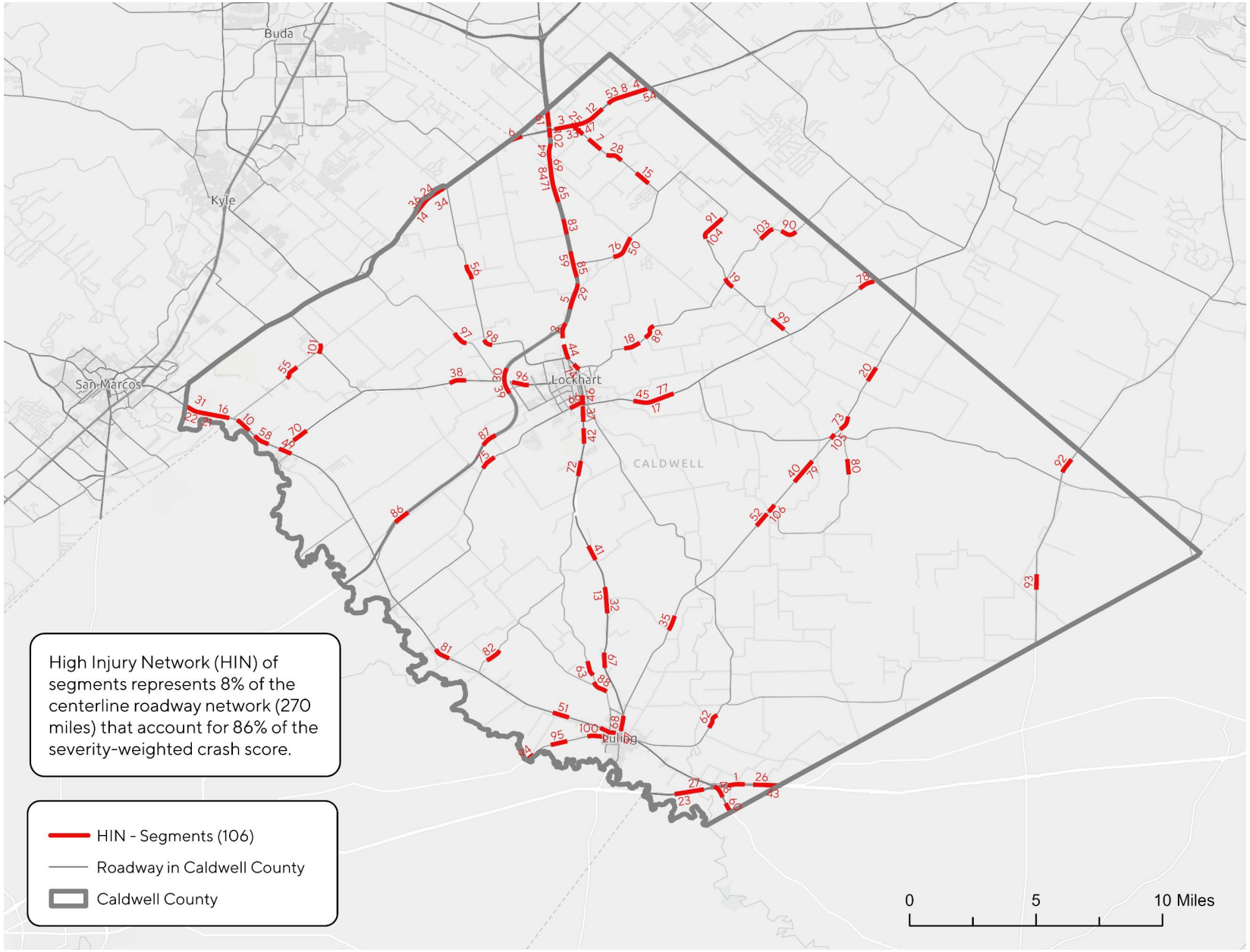


FIGURE 11 - CALDWELL COUNTY SEGMENT HIGH INJURY NETWORK

Appendix C

CALDWELL COUNTY SAFETY COUNTERMEASURES TOOLBOX

CALDWELL COUNTY SAFETY COUNTERMEASURES TOOLBOX

Introduction

A safety countermeasures toolbox was developed to provide a range of safety countermeasures tailored to Caldwell County's specific needs. The toolbox is a collection of safety strategies and interventions that have been proven effective in reducing roadway fatalities and serious injuries. These countermeasures are drawn from FHWA's Proven Safety Countermeasures and other resources (listed at right), each backed by extensive research and real-world results demonstrating significant, measurable safety improvements. They are designed to address common roadway safety issues, including speeding, intersection crashes, roadway departures, and pedestrian or bicyclist incidents. Some strategies are crosscutting, meaning they target multiple types of safety challenges simultaneously.

SAFETY COUNTERMEASURES RESOURCES

- FHWA Proven Safety Countermeasures
- FHWA Proven Safety Countermeasures in Rural Communities
- NHTSA Traffic Safety Countermeasures that Work in Rural Communities
- Texas Strategic Highway Safety Plan Strategies

In certain situations, more extensive roadway redesigns may be necessary to address persistent crash problems along a corridor. The toolbox approach allows local jurisdictions to select interventions tailored to the specific safety challenges identified through the safety analysis. This enables a targeted, data-driven approach to safety planning, moving beyond generic solutions to implement context-sensitive measures that improve safety for all road users-including those on rural roadways.

The toolbox is organized to help local jurisdictions match countermeasures to their unique needs and roadway contexts. Countermeasures are grouped by application: segment-related (non-intersection), intersection-related, vulnerable road users, and non-engineering strategies such as education and enforcement. Each entry generally includes a description, the types of crashes addressed, and a high-level categorization of cost magnitude.

Segment-Related Countermeasures

Segment-related countermeasures focus on engineering strategies designed to prevent crashes along non-intersection road segments, addressing issues such as head-on crashes, lane departures, speeding, and removing roadside hazards. **Table 1** provides a list of potential countermeasures organized by key safety objectives.

TABLE 1: SEGMENT-RELATED COUNTERMEASURES

COUNTERMEASURE	DESCRIPTION	TIMELINE	COST	CRASH TYPES ADDRESSED
Physical Separation and Hazard Elimination				
Median Barriers	Install raised medians or cable barriers in medians or roadside areas to prevent cross-median head-on collisions.	Mid-Term	$$	Lane Departure Head-On Angle Fixed Object
Guardrail	Install guardrails to reduce the severity of lane departure crashes by redirecting vehicles away from fixed objects or roadside hazards such as steep embankments and culverts.	Near-, Mid-Term	$$	Lane Departure Fixed Object
Roadside Clear Zone	Improve the width and slope of traversable roadside area and remove obstacles (such as trees or poles) to allow drivers the opportunity to recover safely after leaving the roadway.	Mid-, Long-Term	$$	Lane Departure Fixed Object
Super 2 Design	Add periodic passing lanes to two-lane rural highways, minimizing risky overtaking maneuvers and improving traffic flow.	Mid-, Long-Term	$$, $$$	Head-On
Lane Repurposing	Re-stripe an existing roadway facility to designate space for a center line buffer, center turn lanes, or bicycle lanes.	Near-, Mid-Term	$$	Head-On Rear End
Roadway and Lane Departure Prevention				
Shoulder Enhancement	Implement enhanced shoulder treatments to allow drivers the opportunity to recover safely if they veer out of their travel lane.	Mid-, Long-Term	$$, $$$	Lane Departure Fixed Object
Rumble Strips	Install rumble strips on centerlines and/or shoulders to alert inattentive drivers when they drift out of their lane. Consider bicycle-friendly design to accommodate bicyclists.	Near-, Mid-Term	$$	Lane Departure Fixed Object Head-On
SafetyEdge^{SM}	Install pavement features that shape the pavement edge at an approximate 30° angle to help vehicles recover safely if they veer off the roadway.	Near-, Mid-Term	$$	Lane Departure Fixed Object

COUNTERMEASURE	DESCRIPTION	TIMELINE	COST	CRASH TYPES ADDRESSED
High Friction Surface Treatment	Install high friction surface treatment to enhance the skid resistance and friction of road surfaces in areas where vehicles are more likely to lose traction, such as sharp curves, steep grades, intersections, ramps, and bridge decks.	Mid-, Long-Term	$$	Lane Departure Fixed Object
Enhanced Delineation and Visibility				
Enhanced Delineation for Horizontal Curves	Implement curve treatments, either in combination, or individually, such as pavement marking improvements (wider or raised profile pavement markings), chevron signs, reflective strips on signposts, delineators (post-mounted or guardrail-mounted), improving curve warning sign conspicuity, posted speed limit reductions, and/or sequential flashing beacons in curves.	Near-, Mid-Term	$$	Lane Departure Fixed Object Curve-Related
Road Design Improvements at Curves	Improve roadside design on curves through treatments such as roadway realignment, vegetation management, delineation/relocation/removal of roadside objects, clear zone widening, flattening of side slopes, adding or widening shoulders, and installing roadside barriers.	Mid-, Long-Term	$$, $$$	Lane Departure Fixed Object Curve-Related
Improve Pavement Markings	Widen pavement markings to 6 inches or install raised profile pavement markings (wide markings with reflectors) to improve visibility of travel lane boundaries, especially on rural roadways and curves.	Near-, Mid-Term	$$	Lane Departure Curve-Related
Segment Lighting	Install continuous or spot lighting to improve visibility on high risk segments.	Near-, Mid-Term	$$	Dark Conditions
Speed Management				
Appropriate Speed Limits	Set appropriate speed limits that consider the road segment's design, vulnerable users, traffic operations, land use, and environmental conditions.	Mid-, Long-Term	$, $$	Speed-Related
Speed Feedback Sign	Install portable or permanent speed feedback sign that alert drivers of their current speed (and posted speed), providing a cue for drivers to slow down.	Near-Term	$	Speed-Related

Sources: FHWA Proven Safety Countermeasures in Rural Communities

NHTSA Traffic Safety Countermeasures that Work in Rural Communities

Intersection-Related Countermeasures

Intersection-related countermeasures focus on engineering strategies designed to prevent crashes at signalized and unsignalized intersections, addressing issues related to geometric design, traffic control, intersection visibility, and speed management. **Table 2** provides a list of potential countermeasures organized by key safety objectives.

TABLE 2: INTERSECTION-RELATED COUNTERMEASURES

COUNTERMEASURE	DESCRIPTION	TIMELINE	COST	CRASH TYPES ADDRESSED
Geometric Design Improvements				
Roundabouts and Traffic Circles	Install or convert intersections to roundabouts or traffic circles to reduce conflict points.	Long-term	$$$	Angle Left Turn Speed-Related
Dedicated Turn Lanes	Add dedicated left- or right-turn lanes to provide physical separation between turning traffic and through traffic on intersection approaches. Positive offset left turn lanes could provide additional safety benefits.	Near-, Mid-Term	$$	Left Turn Rear End
Access Management	Implement access management treatments such as driveway consolidation, turn restrictions, or raised medians to manage turning movements and reduce conflict points near intersections.	Near-. Mid-term	$, $$	Angle
Intersection Realignment	Reconstruct irregular or skewed intersections to improve visibility for all road users.	Mid-, Long-Term	$$, $$$	Angle Left Turn Right Turn
Signal Improvements				
Enhanced Pavement Markings	Install enhanced pavement markings such as wider stop bars, lane use markings, dotted line extensions, and high-visibility crosswalks to improve visibility and guidance for road users at intersections.	Near-, Mid-Term	$, $$	Angle
Stop Bar Placement and Visibility	Ensure clear marking of stopping points.	Near-Term	$	Angle
Left Turn Operation	Implement appropriate left turn control (permitted, protected, or flashing yellow arrow) based on the results of an Intersection Control Evaluation.	Near-. Mid-Term	$$	Left Turn Pedestrian Bicyclist
Yellow & All-Red Clearance Intervals	Optimize yellow and all-red clearance intervals to reduce red light running. Include consideration for leading pedestrian intervals.	Near-. Mid-Term	$	Angle Red Light Running
Advanced Dilemma Zone Detection	Provide advanced dilemma zone detection for high-speed approaches at rural signalized intersections. This system adjusts the start of the yellow signal phase based on observed vehicles locations and speed.	Mid-Term	$$	Speed-Related Angle Red Light Running Rear-End

COUNTERMEASURE	DESCRIPTION	TIMELINE	COST	CRASH TYPES ADDRESSED
Traffic Signals	Install new traffic signals at existing uncontrolled intersections if warranted by traffic conditions.	Near-Term	$$$	Angle Left Turn
Intersection Visibility Enhancements				
Signal Backplates	Add traffic signal backplates and/or retroreflective borders to improve signal visibility.	Near-term	$	Dark Conditions Angle Left Turn
Supplemental Signal Heads	Additional signal heads allow drivers to anticipate signal changes further away from intersections or when there is a visibility issue, such as a curve or bridge structure.	Near-term	$$	Angle Left Turn
Remove Sight Distance Obstructions	Improve driver sight lines by trimming or removing vegetation, removing or relocating signs, or restricting on-street parking near intersections (also called “daylighting”).	Near-. Mid-term	$, $$	Angle
Oversized Signs with Retroreflective Posts	Increase visibility of signals and signs at intersections or double-up intersection warning signs on through and stop approaches.	Near-. Mid-term	$	Dark Conditions
Advance Warning Signs with Flashing Beacons	Install a flashing beacon paired with an advance warning sign to alert drivers to upcoming intersections, especially in rural areas.	Near-, Mid-Term	$, $$	Angle Right Turn
Flashing Signal	Install overhead flashing signal at an existing 2-way or all-way stop-controlled intersection to improve intersection visibility.	Near-Term	$$	Angle
Intersection Lighting	Install or improve roadway lighting at intersections or pedestrian crossing locations.	Mid-, Long-term	$$	Dark Conditions Pedestrian
Speed Management				
Signal Interconnectivity and Coordination	Optimize signal coordination along corridors to maintain consistent traffic flow at target speeds and reduce abrupt stopping.	Near-term	$$	Rear-End Angle Speed-Related
Appropriate Speed Limits	Set appropriate speed limits that consider the intersection design, vulnerable users, traffic operations, land use, and environmental conditions.	Mid-, Long-term	$	Speed-Related
Speed Feedback Signs	Install portable or permanent speed feedback signs that alert drivers of speeding and encourage drivers to slow down. Target areas could include work zones, school zones, or other areas where speed related crashes are a concern.	Near-Term	$	Speed-Related
Transverse Rumble Strips	Install transverse rumble strips in advance of midblock pedestrian crossings or rural stop-controlled approaches.	Near-, Mid-term	$$	Speed-Related Angle

COUNTERMEASURE	DESCRIPTION	TIMELINE	COST	CRASH TYPES ADDRESSED
High Friction Surface Treatments	Apply high friction surface treatments on intersection approaches to reduce skidding.	Near-. Mid-term	$$	Rear-End Angle
Gateway Treatments	Gateway treatments narrow a road entry to alert drivers they are entering a different context and that they should expect pedestrians/bicyclists. Treatments could include curb extensions, signage, pavement markings, and landscaping.	Near-, Mid-Term	$, $$	Speed-Related Pedestrian Bicycle
Technology				
Connected Vehicle Alerts	Pilot connected vehicle systems to warn drivers of potential traffic conflicts at rural intersections.	Mid-, Long-term	$$$	Angle

Vulnerable Road User Countermeasures

Vulnerable road user-related countermeasures focus on engineering strategies designed to prevent pedestrian and bicyclist-related crashes. These strategies aim to expand the pedestrian and bicycle network and enhance pedestrian crossings at midblock crossings and intersections. **Table 3** provides a list of potential countermeasures organized by key safety objectives.

TABLE 3: VULNERABLE ROAD USER COUNTERMEASURES

COUNTERMEASURE	DESCRIPTION	TIMELINE	COST	CRASH TYPES ADDRESSED
Pedestrian & Bicycle Network				
Sidewalk	Provide sidewalks to create a dedicated, separated space for people to walk safely along roadways.	Near-, Mid-Term	$$	Pedestrian Bicycle
Bicycle Lanes	Provide bicycle lanes clearly marked with symbols and signs specifically for bicyclists. Incorporate barriers or buffers to enhance safety.	Mid-Term	$$	Bicycle
Shared Use Path	Widen separated facilities to a width of 8 to 12 feet to safely accommodate bicyclists, pedestrians, and other vulnerable road users.	Long-Term	$$	Pedestrian Bicycle
Midblock Crossing Enhancements				
Rapid Rectangular Flashing Beacons (RRFBs)	Implement pedestrian-activated flashing beacons with signage to alert motorists of a pedestrian crossing.	Near-Term	$$	Pedestrian Bicycle
Pedestrian Hybrid Beacons	Mid-block overhead signal that alerts motorists to the presence of crossing pedestrians.	Mid-Term	$$$	Pedestrian Bicycle
Pedestrian Midblock Crossing	Marked crossings at midblock locations to alert motorists to the presence of crossing pedestrians.	Near-Term	$	Pedestrian Bicycle

COUNTERMEASURE	DESCRIPTION	TIMELINE	COST	CRASH TYPES ADDRESSED
Pedestrian Crossing Islands	Install refuge islands for pedestrians at midblock locations, reducing conflicts and improving visibility. This could also be accomplished by converting a portion of a center two-way left turn lane to a raised median.	Mid-, Long-Term	$$	Pedestrian Bicycle
Lighting Improvements	Install roadway lighting to enhance visibility at pedestrian crossings.	Mid-, Long-Term	$$	Dark Conditions Pedestrian
Intersection Crossing Enhancements				
Curb Extension	Extend the sidewalk or curb line into the street at an intersection to shorten crossing distances and improve pedestrian visibility.	Near-, Mid-Term	$$	Pedestrian
Remove Sight Distance Obstructions (Daylighting)	Remove on-street parking or obstacles near crossings to improve sight lines between drivers and vulnerable road users.	Near-. Mid-Term	$	Angle Pedestrian Bicycle
Pedestrian Signals	Install pedestrian signals with countdown timer and audible push buttons, in compliance with ADA requirements.	Near-, Mid-Term	$$	Pedestrian
High Visibility Crosswalk	Install retroreflective markings and continental-style patterns to improve nighttime visibility.	Near-, Mid-Term	$	Pedestrian
Leading Pedestrian Interval	Modify signal phasing to implement a leading pedestrian interval to improve motorist awareness of vulnerable road users.	Mid-, Long-Term	$	Pedestrian Bicycle
Protected Only Left Turns	Convert a permissive left-turn to a protected left turn phase to reduce conflicts with pedestrian/bicyclist movements.	Near-. Mid-Term	$$	Left Turn Pedestrian
Overhead Signs	Add “No Turn on Red” or “Turning Vehicles Yield to Pedestrians” signs at an existing signalized intersection to improve motorist awareness of vulnerable road users.	Near-Term	$	Right Turn Pedestrian
Bicycle Signal / Exclusive Bicycle Phase	Install bicycle signals with a separate bicycle phase where bicycle lanes are present.	Mid-Term	$$	Bicycle
Pedestrian Crossing Islands	Provide refuge islands for pedestrians, reducing conflicts and improving visibility.	Mid-, Long-Term	$$	Pedestrian Bicycle
Speed Management				
Appropriate Speed Limits	Set appropriate speed limits that take into consideration the intersection design, vulnerable users, traffic operations, land use, and environmental conditions.	Mid-, Long-Term	$$	Speed-Related
Speed Feedback Signs	Install dynamic displays that show real-time vehicle speeds to encourage driver compliance.	Near-Term	$	Speed-Related
Technology				

COUNTERMEASURE	DESCRIPTION	TIMELINE	COST	CRASH TYPES ADDRESSED
Connected Vehicle Alerts	Implement systems that warn drivers of nearby vulnerable road users via onboard displays.	Mid-, Long-Term	$$$	Pedestrian Bicycle

Non-Engineering Countermeasures

Non-engineering countermeasures focus on influencing road user behavior, improving safety data and analysis, and supporting roadway safety without physical changes to roadway infrastructure. These strategies are essential complements to engineering solutions and can often to implemented quickly and cost-effectively. **Table 4** provides a list of potential countermeasures organized by key safety objectives.

TABLE 4. NON-ENGINEERING COUNTERMEASURES

STRATEGY	SEGMENT-RELATED STRATEGIES	TIMELINE	COST	CRASH TYPES ADDRESSED
Education and Outreach				
Safety Awareness Campaigns	Launch media campaigns (e.g., television, radio, social media, billboards) that address issues such as distracted driving, impaired driving, speeding, and seat belt use. Tailor messages to specific age groups or communities for greater impact. Utilize available TxDOT safety campaign resources.	Near-term	$, $$	Lane Departure
School-Based Education Programs	Implement youth-focused campaigns in schools covering topics such as pedestrian safety, bicycle safety, micromobility (e.g., scooters, e-bikes) safety, and the dangers of impaired or distracted driving. Engage both students and parents for broader influence.	Near-, Mid-Term	$, $$	Pedestrian Bicyclist
Community Safety Events	Partner with local organizations to host bicycle safety fairs, car seat checks, safety walks, and other events that provide hands-on learning and resources for safe travel behaviors.	Near-, Mid-Term	$, $$	Pedestrian Bicyclist
Targeted Outreach for Vulnerable Groups	Develop educational materials and outreach tailored to populations overrepresented in crash data, including older adults, vulnerable road users, and underserved communities.	Near-, Mid-Term	$, $$	Pedestrian Bicyclist
Car Seat Checks	Promote to the community to utilize child passenger seats, visit a permanent fitting station and support holding car seat checks at community events.	Near-, Mid-term	$, $$	Occupant
Youth Education	Support and participate in programs and social media messaging to educate younger drivers utilizing a peer-to-peer program supported by organizations such as TxHSO, SADD, and Teens in the Driver Seat®	Near-, Mid-term	$, $$	Young Driver
Older Driver Education	Support programs and social media messaging to educate drivers as they age about the CarFit program	Near-, Mid-term	$, $$	Older Driver

STRATEGY	SEGMENT-RELATED STRATEGIES	TIMELINE	COST	CRASH TYPES ADDRESSED
Pilot Demonstration Safety Projects	Partner with local organizations in the county to host interactive workshops and virtual reality simulations to demonstrate the dangers of impaired driving.	Near-, Mid-term	$, $$	Impairment
Training on Speed Management	Arrange to host a NHTSA Speed Management Program course for local engineers, planners, and law enforcement	Mid- term	$, $$	Lane Departure Speed Management
Multi-Agency Collaboration	Foster partnerships among law enforcement, public health, schools, advocacy groups, and local leaders to coordinate and amplify safety initiatives.	Mid-Term	$, $$	All Crash Types
Enforcement and Deterrence				
High-Visibility Enforcement	Conduct well-publicized law enforcement campaigns to encourage seat belt usage and discourage impaired driving, speeding, and other unsafe driver behaviors. Use checkpoints, saturation patrols, and increased officer presence, combined with media coverage to maximize impact.	Near-, Mid-term	$, $$	Impaired Driving Distracted Driving Speed-Related Restraint Use
High-Visibility Enforcement for Vulnerable Road Users	Conduct high-visibility enforcement of bicyclists, pedestrians, micromobility users (e.g., scooters, etc.), and motorists who are violating traffic safety laws that may endanger them or other multi-model travelers.	Near-, Mid-term	$, $$	Pedestrian Bicycle
Training for Law Enforcement	Conduct impaired driving training for law enforcement personnel, including Drug Recognition Expert (DRE) and Advanced Roadside Impaired Driving Enforcement (ARIDE) training programs.	Near-, Mid-term	$, $$	Impairment
Data and Evaluation				
Improved Crash Data Collection	Enhance the quality and consistency of crash data by developing standardized electronic reporting, creating near-miss and unreported crash databases, and encouraging multi-agency data sharing (e.g., between police, EMS, hospitals)	Mid-term	$, $$	All Crash Types
Crash Data Analysis for Targeted Interventions	Use crash data to identify high-risk locations, behaviors, and populations, and focus on education and enforcement efforts accordingly.	Mid-term	$, $$	All Crash Types
Post Implementation Evaluation	Evaluate the efficacy of safety improvement implementation through before-and-after studies and public surveys.	Mid-term	$, $$	All Crash Types

Appendix D

CALDWELL COUNTY SYSTEMIC SAFETY PACKAGES

CALDWELL COUNTY SYSTEMIC SAFETY PACKAGES

Introduction

Systemic safety packages consist of multiple low-cost, high-impact countermeasures that could be implemented across numerous locations with similar risk characteristics. By prioritizing these strategies, the County can proactively mitigate potential hazards before crashes occur, establishing a more robust and comprehensive safety management system. This approach often yields a greater reduction in crash risk per dollar invested compared to traditional spot improvements.

SYSTEMIC SAFETY RESOURCES

- FHWA Quick Start Guide for Systemic Safety Analysis
- TTI Methodology for Identifying, Evaluating, and Prioritizing Systemic Improvements
- TxDOT Highway Safety Improvement Program Guidelines

This appendix outlines potential systemic safety packages tailored to each of the County's systemic crash profiles. These countermeasures are consistent with TxDOT's Highway Safety Improvement Program (HSIP) guidelines and include specific HSIP work codes to facilitate efficient planning and implementation. Information on the crash reduction factor, service life, maintenance costs, and preventable crash types associated with each countermeasure are available in TxDOT's Highway Safety Improvement Program Guidelines.

Systemic packages are grouped by systemic crash profile and generally include a description, the types of crashes addressed, targeted deployment locations, and implementation considerations. When several safety countermeasures are suitable for locations with shared characteristics, bundled treatment packages are proposed to create more holistic and effective safety projects. Systemic projects should cover multiple locations on a corridor or across a geographic region.

Systemic Profile #1: Intersections

TABLE 1: SYSTEMIC SAFETY PACKAGES FOR INTERSECTIONS

SYSTEMIC COUNTERMEASURE PACKAGE	DESCRIPTION	HSIP WORK CODES	TARGET DEPLOYMENT LOCATIONS	GUIDANCE ON CRASH PATTERNS & CANDIDATE LOCATIONS
Dedicated Right and Left Turn Lanes	Includes adding right and left turn lanes at intersections along an entire corridor where none existed and lengthening existing turn lanes to provide appropriate deceleration and storage on high-speed roadways (>50mph). Include all intersection standard signing and pavement markings.	509, 519, 520, 521, 522	Two-way stop-controlled intersections on high-speed mainline roadways	Addresses rear-end crash patterns involving stopped or slowed vehicles making a turn. Recommended for corridors with posted speeds greater than 50 mph or at other locations as warranted based on AASHTO guidelines. Projects should include all intersection standard signing and pavement markings.
Enhanced Rural Warning Upgrades	Includes systemic signing improvements such as installation of roadside flashers or embedded LEDs for stop signs and transverse rumble strips on strop-controlled approaches.	145, 545	Rural stop-controlled intersections	Addresses crash patterns where drivers fail to stop due to inattentive or drowsy driving. Addresses right-angle crashes at unsignalized intersections.
Enhanced Signal Operation Upgrades	Includes low-cost signal operations improvements such as signal interconnectivity and coordination, signal timing and phasing improvements, or left turn operations (protected left turns or flashing yellow arrow).	111, 138	Urban signalized intersections and corridors	Optimize progression along corridors and addresses left-turn crashes where drivers fail to yield right-of-way.
Install Intersection Lighting	Install safety lighting at intersections	305	Urban signalized intersections	Crash Modification Factors should be applied to individual locations or groups of intersections with a history of nighttime crashes. AASHTO has not established safety lighting warrants for non-freeway locations. FHWA has provided examples of guidance for intersection lighting warrants based upon Functional Class and AADT: https://highways.dot.gov/safety/other/visibility/fhwa-lighting-handbook-august-2012/4-analysis-lighting-needs
Install or Improve Traffic Signals	Includes any combination of installing new traffic signals, replacing flashing beacons with traffic signals, or traffic signal improvements.	107, 108, 118	Rural and urban stop-controlled or signalized intersections	The TxDOT Traffic and Safety Analysis Procedures (TSAP) Manual includes an Intersection Control Selection Matrix for considerations and guidance on the applicable Operational Analysis Tools per each type of signalized intersection

SYSTEMIC COUNTERMEASURE PACKAGE	DESCRIPTION	HSIP WORK CODES	TARGET DEPLOYMENT LOCATIONS	GUIDANCE ON CRASH PATTERNS & CANDIDATE LOCATIONS
Leading Pedestrian Intervals	Implement Leading Pedestrian Interval (LPI) Timing	109	Urban signalized intersections	Prioritize locations with a high volume of pedestrian traffic. Eligible LPI projects will let to contract with the installation of Audible Pedestrian Signals.
Roundabouts	Construct a roundabout	547	Rural and urban stop-controlled or signalized intersections	Limited to conversion of existing intersection to single-lane roundabouts only. Requires Intersection Control Evaluation.
Signalized Intersection Visibility Upgrades	Includes any combination of signal head backplates, doubled-up warning signs, oversized advanced warning signs, street name plaques, enhanced pavement markings, retroreflective sheeting on signposts, sight distance improvements.	108, 119, 122, 124, 128, 401, Other	Rural and urban signalized intersections	Addresses crash patterns where drivers disregard the signal, fail to stop, or fail to yield right-of-way (angle, turning, rear end)
Stop Controlled Visibility Upgrades	Includes any combination of doubled-up signs, oversized advanced warning signs, street name plaques, enhanced pavement markings, stop ahead warning signs, retroreflective sheeting on signposts, stop bars, sight distance improvements, or two-direction large arrow signs at T intersections.	122, 124, 128, 401, Other	Rural and urban stop-controlled intersections	Addresses crash patterns where drivers fail to stop (angle, turning, rear end). Where Overhead Flashing Beacons previously funded by the HSIP are removed due to the installation of roadside flashers or embedded LEDs, the device must have met the 10-year service life.
Positive Offset Left-Turn Lanes	Install positive-offset left turn lanes	203, 519	Rural and urban stop-controlled intersections	Installing left-turn lanes and/or right-turn lanes should be considered for the major road approaches for improving safety at both three- and four-leg intersections with stop control on the minor road, where significant turning volumes exist, or where there is a history of left-turn crashes.
Raised Medians	Install raised medians	203	Urban segments	Raised medians should be considered for replacing two-way left-turn lanes when AADT is approximately 20,000 AADT or more. Medians should also be located where they can also serve as refuge for pedestrian crossings.

SYSTEMIC COUNTERMEASURE PACKAGE	DESCRIPTION	HSIP WORK CODES	TARGET DEPLOYMENT LOCATIONS	GUIDANCE ON CRASH PATTERNS & CANDIDATE LOCATIONS
Two-Way Left Turn Lanes	Install or extend an existing continuous turn lane	518	Urban segments and intersections	Recommended where turn lanes were not previously provided and the stop-control is located at the minor approaches. Existing continuous turn lanes may be extended to accommodate left turning traffic at intersections in the vicinity of an existing continuous turn lane.

Source: TxDOT Highway Safety Improvement Program Guidelines

Systemic Profile #2: Roadway and Lane Departures

TABLE 2: SYSTEMIC SAFETY PACKAGES FOR ROADWAY AND LANE DEPARTURES

SYSTEMIC COUNTERMEASURE PACKAGE	DESCRIPTION	HSIP WORK CODES	TARGET DEPLOYMENT LOCATIONS	GUIDANCE ON CRASH PATTERNS & CANDIDATE LOCATIONS
Medians or Roadside Barriers	Installation of concrete or cable median barrier or impact attenuation system where none currently exists.	201, 217	Urban and rural segments	TxDOT HSIP Guide: • Existing median width must be = 70' • Cable median barriers are for use only on medians 25' in width • Concrete median barriers can be used on all median widths Locations of projects will be prioritized as follows: 1. By Functional Class (Interstate, non-Interstate freeways, other principal arterials, all others) 2. 0-45’ median widths in urban and rural areas 3. Greater than 45' median widths in rural areas 4. Greater than 45' median widths in urban areas AASHTO’s Roadside Design Guide (RDG): • Recommended: High-speed fully controlled-access roadways with median is less than 30' in width and AADT is greater than 20,000. • Optional: Median is greater than 50' and AADT is less than 20,000 • Analysis Required: Median is between 30' and 50' to determine the cost effectiveness of median barrier installation

SYSTEMIC COUNTERMEASURE PACKAGE	DESCRIPTION	HSIP WORK CODES	TARGET DEPLOYMENT LOCATIONS	GUIDANCE ON CRASH PATTERNS & CANDIDATE LOCATIONS
Segment Lighting	Install Safety Lighting	304	Urban and rural segments	Highway Illumination Manual (TxDOT): Continuous lighting is eligible for: 1) Urban Freeways 2) Multi-lane arterials with partial access At least one of four warrants must also be met. https://onlinemanuals.txdot.gov/TxDOTOnlineManuals/TxDOTManuals/hwi/continuous_lighting1.htm
Roadway or Shoulder Widening	Widen undivided roadways and/or add paved shoulders to meet minimum lane width and shoulder width requirements in TxDOT's Roadway Design Manual.	502, 503, 504, 534, 536, 537, 541	Rural two-lane undivided highways	Rural two-lane, two-way undivided highways with a pavement surface less than or equal to 24' in width

Systemic Profile #3: Roadway and Lane Departures on Curves

TABLE 3: SYSTEMIC SAFETY PACKAGES FOR ROADWAY AND LANE DEPARTURES ON CURVES

SYSTEMIC COUNTERMEASURE PACKAGE	DESCRIPTION	HSIP WORK CODES	TARGET DEPLOYMENT LOCATIONS	GUIDANCE ON CRASH PATTERNS & CANDIDATE LOCATIONS
Enhanced Delineation on Curves	Systemically treat curves within a geographical area or roadway type, not single locations Includes pavement markings, raised retroreflective pavement markers, post mounted delineation, larger chevrons/curve warnings signs/advisory speed plaques, or LED chevrons.	113, 123, 125, 130, 137, 136, 139, 401, 402, 404, 532, 533, 534, 542, 543, 544	Curves in rural or urban areas	At advance of or within curves, particularly on rural, two-lane undivided roadways

Systemic Profile #4: Dark Conditions

TABLE 4. SYSTEMIC SAFETY PACKAGES FOR DARK CONDITIONS

SYSTEMIC COUNTERMEASURE PACKAGE	DESCRIPTION	HSIP WORK CODES	TARGET DEPLOYMENT LOCATIONS	GUIDANCE ON CRASH PATTERNS & CANDIDATE LOCATIONS
Enhanced Pavement Markings	Wider pavement markings (6”) or raised profile pavement markings (wide markings with reflectors) to improve visibility of travel lane boundaries.	122, 124, 128, 401, Other	Rural and urban stop-controlled intersections	Addresses crash patterns where drivers fail to stop (angle, turning, rear end). Where Overhead Flashing Beacons previously funded by the HSIP are removed due to the installation of roadside flashers or embedded LEDs, the device must have met the 10-year service life.
Segment lighting	Install Safety Lighting	304	Urban and rural segments	Highway Illumination Manual (TxDOT): Continuous lighting is eligible for: 1) Urban Freeways 2) Multi-lane arterials with partial access At least one of four warrants must also be met. https://onlinemanuals.txdot.gov/TxDOTOnlineManuals/TxDOTManuals/hwi/continuous_lighting1.htm

Systemic Profile #5: Pedestrians and Bicyclists

TABLE 5. SYSTEMIC SAFETY PACKAGES FOR PEDESTRIANS AND BICYCLISTS

SYSTEMIC COUNTERMEASURE PACKAGE	DESCRIPTION	HSIP WORK CODES	TARGET DEPLOYMENT LOCATIONS	GUIDANCE ON CRASH PATTERNS & CANDIDATE LOCATIONS
Uncontrolled Crossing Enhancements	Includes any combination of eligible improvements such as crosswalk pavement markings, lighting at the crosswalk, raised crosswalks, signing, parking restrictions, advance crosswalk warning signs, in-street pedestrian crossing signs, yield here to pedestrian signs, curb extensions, Rectangular Rapid-Flashing Beacon (RRFB), or Pedestrian Hybrid Beacon (PHB).	110, 114, 115, 131, 133, 134, 143, 144, 403, 304, 305, 203, 409, 523	Uncontrolled crossing locations	Per the TxDOT guidelines issued on 9/11/2018, both RRFBs and PHBs must meet the following requirements: • an established crosswalk with adequate visibility, markings and signs • a posted speed limit of 40 mph or less (does not include school speed zones) • 20 pedestrians or more crossing in one hour location deemed as a high risk area (e.g. schools, shopping centers, etc.) • crosswalk is more than 300 ft. from an existing, traffic controlled pedestrian crossing PHBs must also complete an engineering study per Chapter 4F of the Texas MUTCD. https://ftp.txdot.gov/pub/txdot/crossroads/trf/rrfb-and-phb-revised-guidelines-memo-sep-2018.pdf
Medians and Crossing Islands	Install raised medians or crossing islands where none existed previously on curb sections of urban and suburban multilane roadways where there is a significant mix of pedestrian and vehicle traffic and intermediate or high travel speeds. Includes mid-block areas, approaches to multi-lane intersections and areas near transit stops or pedestrian-focused corridors.	203, 409	Signalized and uncontrolled crossing locations	Pedestrian refuge islands should always be considered at a marked uncontrolled crossing on roadways with 4+ lanes without raised medians, as shown in Table 1 of the Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations (FHWA). Raised crosswalks are candidate countermeasures on roadways with 2 or 3 lanes, with or without raised medians, where the posted speed limit is less than or equal to 30 mph. Curb extensions are candidate countermeasures at all marked uncontrolled crossings.
Pedestrian Crossing Deterrents	Installation of attachments to existing concrete barrier systems to deter prohibited pedestrian crossings on divided highways.	225	Rural and urban divided highways	Applicable on segments of divided highways to prohibit pedestrian crossings

SYSTEMIC COUNTERMEASURE PACKAGE	DESCRIPTION	HSIP WORK CODES	TARGET DEPLOYMENT LOCATIONS	GUIDANCE ON CRASH PATTERNS & CANDIDATE LOCATIONS
Safety Lighting	Safety lighting at urban intersections where pedestrian facilities are present, and no lighting is present.	304, 305	Rural and urban pedestrian crossings	These crosswalk visibility enhancements should always be considered or occur at a marked uncontrolled crossing, based upon the roadway configuration, AADT, and posted speed limit, as shown in Table 1 of the Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations (FHWA)
Sidewalks or Shared Use Paths	Install sidewalks or shared-use paths where none existed previously	407, 408	Rural and urban segments	Install sidewalks or shared-use paths where none existed previously on corridors identified as Potential Risk Segments on Focus Facilities in the District-specific summaries of the Texas Pedestrian Safety Action Plan (PSAP): https://www.txdot.gov/about/advisory-committees/bicycle-pedestrian-advisorycommittee/pedestrian-safety-action-plan.html