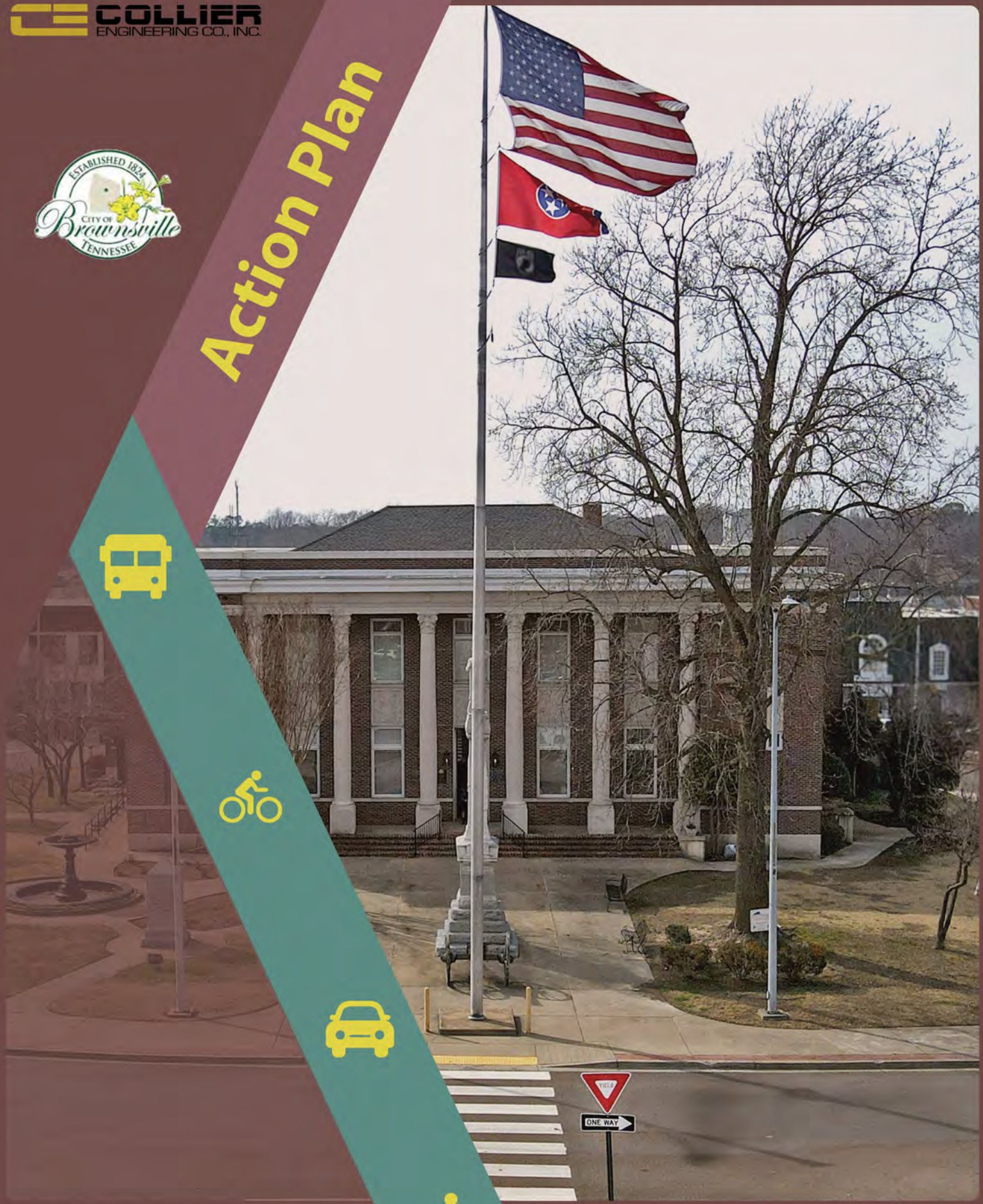
COLLIER ENGINEERING CO., INC.

Safe Streets For All

Action Plan



City of Brownsville

January 2025

LEADERSHIP COMMITMENT

Amie Marsh, Haywood County Schools Superintendent

Kelvin Evans, Brownsville Police Department Chief

Lynn Sanders, Brownsville Fire Department Chief

Cordrecus Steward, Sanitation Crew Leader

Shelton I. Merrell, City Planner

RESOLUTION LETTER

Date:

Resolution:

The City of Brownsville in The State of Tennessee unanimously resolves to embrace the Comprehensive Safety Action Plan and pursue the elimination of all traffic fatalities and serious injuries on the city's roadways by the year 2045. Following complete review of the Comprehensive Safety Action Plan, the following matters will be settled:

WHEREAS, Vision Zero stands as a federally-endorsed strategy with the aim of eradicating all traffic-related fatalities and severe injuries while promoting safe, healthy, and equitable mobility for all.

WHEREAS, the City of Brownsville has successfully developed a Comprehensive Safety Action Plan to address the safety concerns of all road users in the City of Brownsville, Tennessee;

WHEREAS, the Comprehensive Safety Action Plan is grounded in the fundamental principles that acknowledge human fallibility and vulnerability, deem fatalities and serious injuries as unacceptable, advocate for shared and proactive responsibility in preventing such tragedies, and recognize that enhanced redundancy in infrastructure can provide additional layers of protection, known as the Safe Systems Approach;

WHEREAS, the Comprehensive Safety Action Plan utilized historical crash data and engaged the public, stakeholders, and a steering committee to identify a High Injury Network comprising the most injury-prone roads and intersections in the City of Brownsville; and

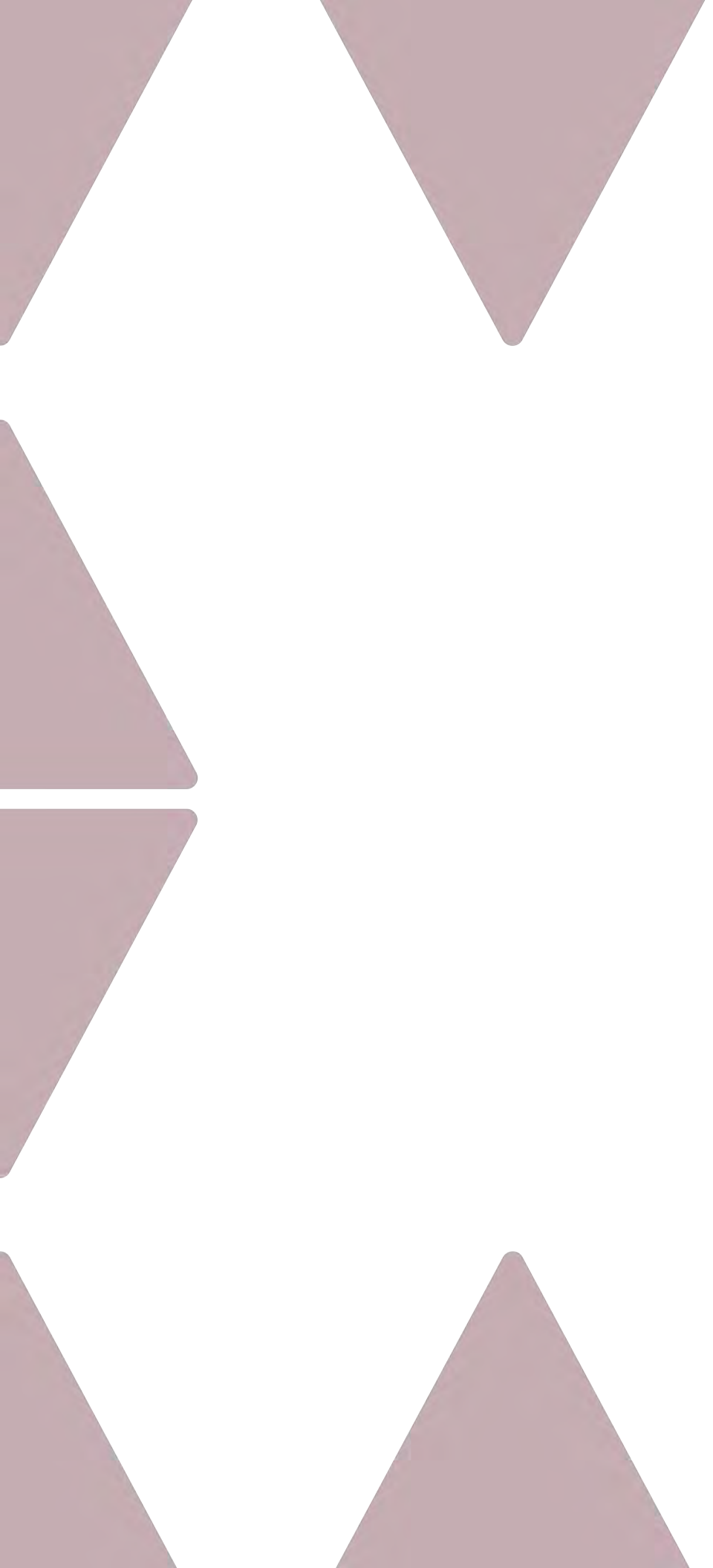
WHEREAS, the Comprehensive Safety Action Plan encompasses a multi-faceted approach to address safety concerns, including the identification of 10 High Injury Network locations, with the ultimate goal of eliminating fatalities and serious injuries.

NOW, THEREFORE, BE IT RESOLVED by the City of Brownsville in Tennessee to adopt the objective of eliminating traffic deaths and serious injuries by 2045, endorsing Vision Zero as a comprehensive and holistic approach towards achieving this goal.

BE IT FURTHER RESOLVED that the Comprehensive Safety Action Plan, detailed in Exhibit A, is hereby granted approval.

BE IT FINALLY RESOLVED that this resolution becomes effective from and after the date of its passage, in accordance with the welfare of the city.

X 



EXECUTIVE SUMMARY

From 2019-2023, there were 947 crashes throughout The City of Brownsville. Of those crashes, 513 occurred on city-maintained roads. Tragically, the crashes throughout the city resulted in the loss of 4 lives and the incapacitation of 25 individuals. These deaths and serious injuries occurred as people were going about their daily routines: commuting to school or work, meeting friends, or running errands. They were entirely preventable and should not be tolerated. The City of Brownsville has produced this Comprehensive Safety Action Plan (CSAP) to combat increases in vehicular crashes, traffic congestion, and inaccessibility to safe roads. The goal of this plan is to identify steps that will bring the city closer to zero roadway fatalities and serious injuries. This goal upholds Tennessee's dedication to the Towards Zero Deaths (TZD) vision which uses education, enforcement, engineering, and emergency response initiatives to reduce the amount and severity of crashes on Tennessee roadways. To achieve this goal, The City of Brownsville will incorporate the following components into this plan:

- **Leadership Commitment, Goal Setting & Goal Timeline**
- **Policy & Process Changes**
- **Safety Analysis**
- **Strategy & Project Selections**
- **Engagement & Collaboration with the Public**
- **Progress & Transparency Methods**
- **Equity Considerations**

This CSAP is the city's initial step towards documenting our steadfast dedication to eliminating severe and fatal traffic crashes and outlining the essential partners and resources required to achieve our objective.

Following in-depth data analysis and community engagement, a High Injury Network (HIN) was defined, and various locations were identified as top priorities for improvement and investment. In addition to the data-driven approach and public feedback, this CSAP is founded on extensive policy and process reviews, identification of insufficient and inequitable access to safe and reliable transportation, and the prioritization of locations that pose risks for further safety issues.

The physical, emotional, and economic impacts that result from traffic crashes serve as reminders for the necessity of this plan. The strategic recommendations presented here will benefit the communities in The City of Brownsville by addressing the most significant safety risks on our roadways. This plan is dedicated to the safety and well-being of all Brownsville residents and visitors.

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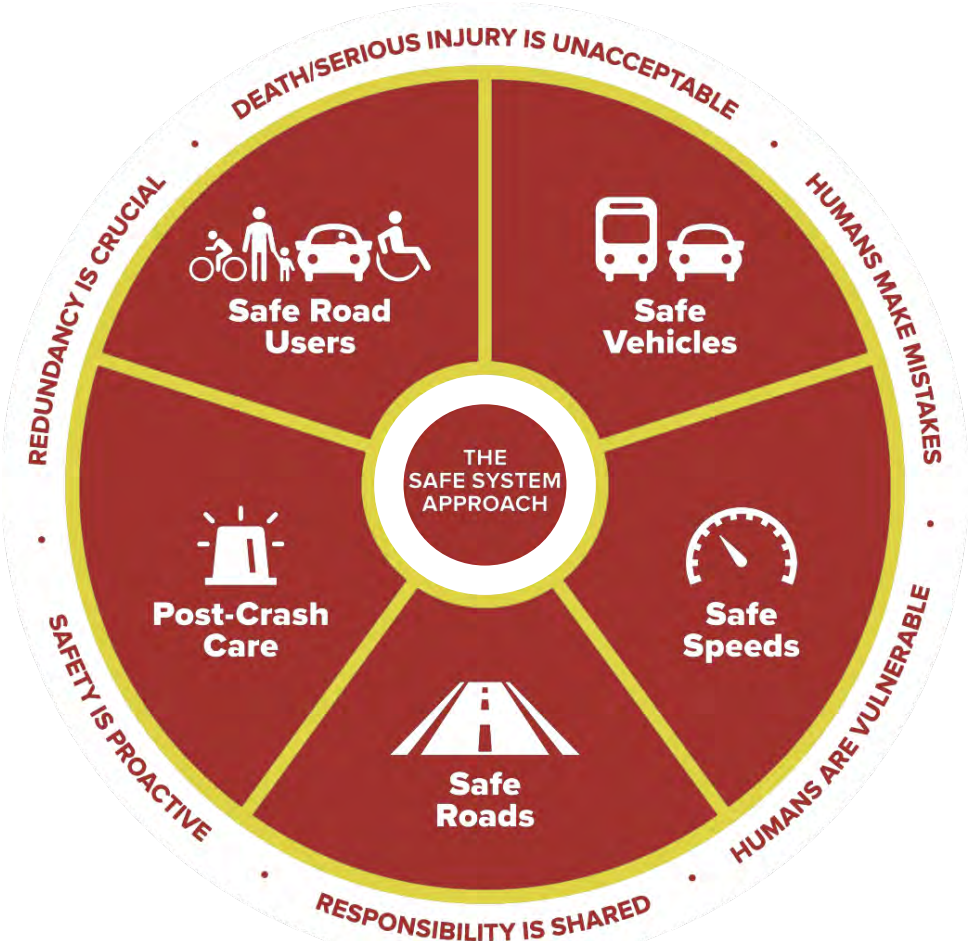

DEATH/SERIOUS INJURY IS UNACCEPTABLE
HUMANS MAKE MISTAKES
HUMANS ARE VULNERABLE
RESPONSIBILITY IS SHARED
SAFETY IS PROACTIVE
REDUNDANCY IS CRUCIAL
THE SAFE SYSTEM APPROACH
Safe Road Users
Safe Vehicles
Safe Speeds
Safe Roads
Post-Crash Care

OVERVIEW

The City of Brownsville is located in Haywood County in west Tennessee.

To ensure the safety of all residents and visitors, the county has set an ambitious target of eliminating fatal and serious injuries from its roadways by 2045. This objective is in line with the U.S. Department of Transportation's National Road Safety Strategy (NRSS), which hold that no death on our transportation systems is acceptable.

The NRSS uses the Safe Systems Approach, emphasizing the inevitability of human error and the need for transportation systems with robust safety features designed to protect all users. The following principles guide this approach:

- *Death and serious injuries are unacceptable.*
- *Transportation systems should be designed to avoid fatal and serious injuries when crashes do occur and to prepare for inevitable human mistakes.*
- *Transportation systems should be designed to accommodate the physical limits and vulnerabilities of humans.*
- *All stakeholders of the transportation system share responsibility for keeping our roadways safe.*
- *Safety issues in the transportation system should be addressed proactively.*
- *A system with redundancy will reduce risks and strengthen the transportation system.*

These principles are carried out through five complementary objectives of the Safe Systems Approach:

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

Why is the Safe Systems Approach Important?

Because every life is important, and every life faces risk on the transportation network. From 2019-2023, 4 people lost their lives in fatal traffic collisions in The City of Brownsville, while 25 people faced incapacitation and other serious injuries. With a population of only 10,300 individuals, these alarming statistics demand answers.

The Safe Systems Approach is an initiative that supports "Vision Zero" which is a concept that was first adopted in Sweden in 1997 but has since reached many transportation departments and has established zero deaths as the main objective of transportation safety plans. The City of Brownsville pledges to abide by this commitment.

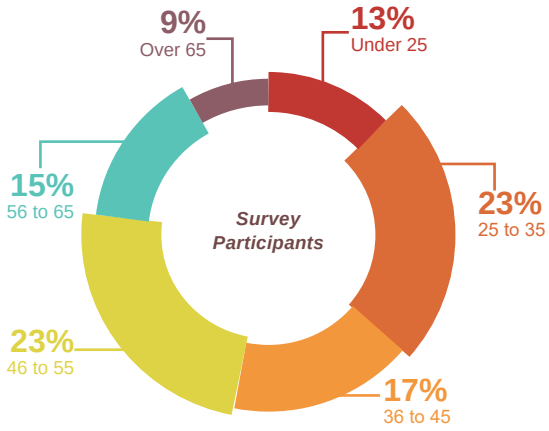
Within the safe system approach, transportation safety entails a collective responsibility among planners, constructors, operators, and users of the road network. It adopts a comprehensive perspective on road infrastructure, considering the dynamics between roads, travel speeds, vehicles, and road users. The City of Brownsville has every intention to be proactive about the current safety issues present on our roadways and to champion our bold goal of bringing the number of deaths and serious injuries in our city to zero.

COMMUNITY ENGAGEMENT

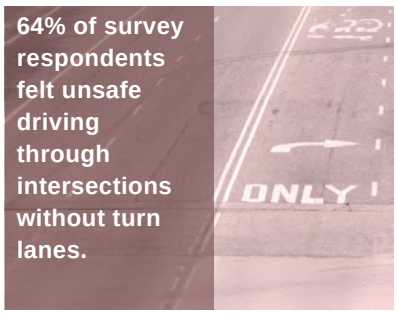
Public involvement regarding a community's transportation network is essential in the decision-making process. While engineering judgement and data provide objective analyses, community input offers context to ensure that the proposed transportation improvements are aligned with the needs and values of those who will be directly affected.

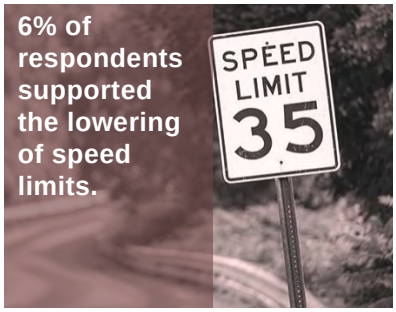
The City of Brownsville prioritized community engagement by conducting a comprehensive survey to gather resident and visitor input on transportation issues and priorities. From March 24th to September 23rd of 2024, a public survey was made available online and on-site at the Brownsville City Hall. The survey was crafted to capture a wide range of perspectives, incorporating both quantitative and qualitative questions to ensure a thorough understanding of community needs and preferences. The results were analyzed, providing valuable insights that informed strategic decision-making and fostered a sense of inclusion, transparency, and community.

The survey prompted 47 respondents, 66% of whom reside in Brownsville, as shown in the chart below. Age demographic information gathered from the survey is also shown below.

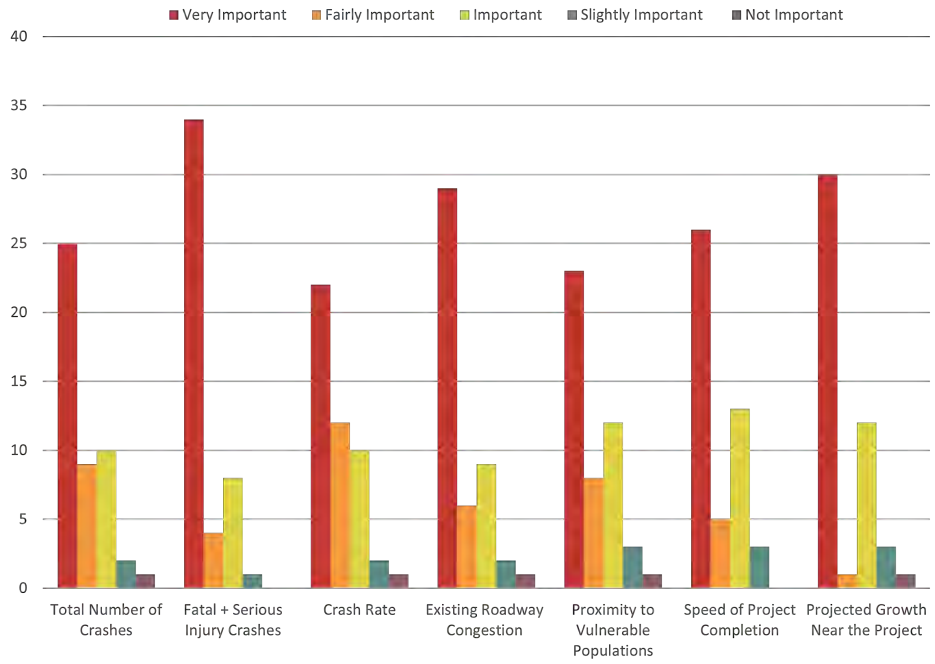


The survey included a question designed to uncover respondents' views on the top 4 types of transportation safety projects they believe are most needed on Brownsville roads. The survey responses offered the following results:

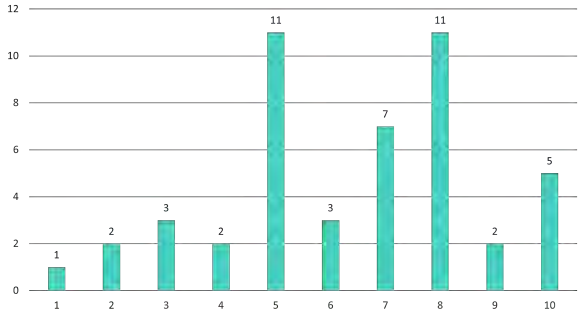




Additionally, participants were asked to prioritize the criteria they believe should guide the selection of transportation projects, results are shown in the bar chart below. This provided insight into both the key safety issues and the factors that are most important to the community when addressing these concerns.

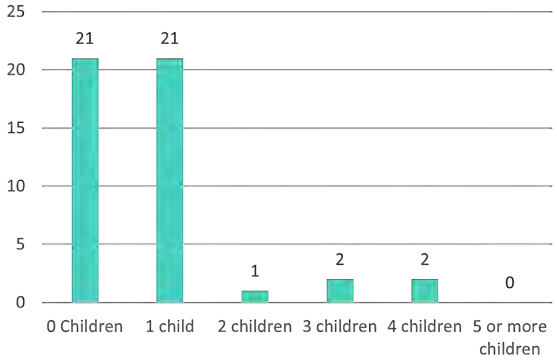


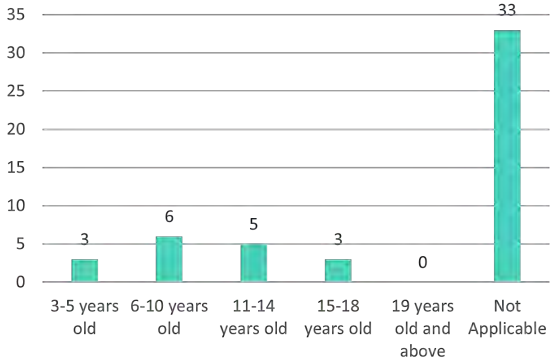
As Brownsville's population and economy continue to grow, the community must address the realities of increased vehicle traffic on pedestrian safety. In response, one of the survey questions asked participants to rank how vulnerable they felt while walking on Brownsville roads. The ranking was based on a scale from 1 to 10, where 1 indicates feeling extremely vulnerable to traffic hazards and 10 represents a strong sense of safety while walking throughout the city's roadways. The results are summarized in the chart below, where an average rating of 6.38 was collected.



Community engagement is vital to The City of Brownsville, especially regarding transportation safety. The commission regards resident and visitor feedback as a key priority in the decision-making process, as it creates an action plan tailored toward the community's needs. To ensure continuous improvement, the Commission will monitor progress following the implementation of this CSAP. Regular progress reports will be made publicly available to keep the community informed and involved.

Given concerns about limited sidewalk access to schools and high congestion near school zones, survey participants were asked about the number of children they have enrolled in the school system and the age range of their children attending school in Brownsville.





EQUITY CONSIDERATIONS

Equity considerations are a crucial part of transportation planning because they ensure that safety improvements address the needs of all community members, particularly those who are most vulnerable or underserved, including pedestrians, cyclists, the elderly population, users with disabilities, and others who are at risk on the roadways. By incorporating equity into this CSAP, we can identify and prioritize areas where traffic safety issues disproportionately affect marginalized populations. This approach creates a more inclusive strategy that not only aims to eliminate traffic fatalities and serious injuries but also reduces disparities and ensures that all individuals have equal access to safe transportation infrastructure.

According to the USDOT Equitable Transportation Community (ETC) Explorer, the total population of The City of Brownsville is approximately 10, 300 with 6,400 of the population living in disadvantaged census tracts.

The CIty of Brownsville Population: 10,300

67% of the population lives in a disadvantaged area

18% of the population is over 65 years old

67% of the census tracts in Brownsville suffer from at least one of the disadvantages outlined by the Climate and Economic Justice Screening Tool (CEJST). Figure 1 shows each census tract in The City of Brownsville and the categories of burden that are exhibited in each one.

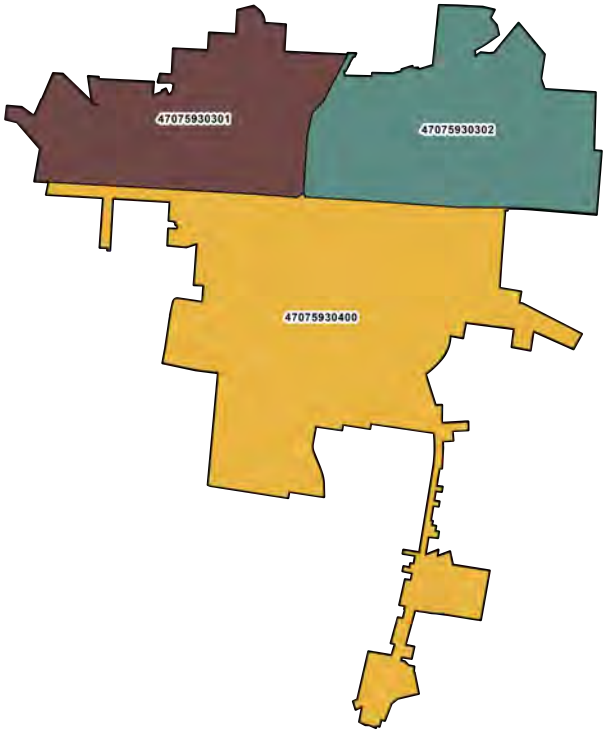


Figure 1: The City of Brownsville Census Tracts

Tract	Identified as Disadvantaged	Climate Change Burden	Energy Cost Burden	Health Vulnerability	Housing Vulnerability	Legacy Pollution	Transportation Vulnerability	Water and Wastewater	Workforce Development
47075930301	•			•	•				
47075930302	•			•	•				
47075930400	•			•	•				

Categories of Burden as Outlined by the CEJST:

1. **Climate Change Burden**: Census tracts that are at or above the 90th percentile for expected agriculture loss rate or expected building loss rate or expected population loss rate or projected flood risk or projected wildfire risk and are at or above the 65th percentile for low income
2. **Energy Cost Burden**: Census tracts that are at or above the 90th percentile for energy cost or PM2.5 in the air and are at or above the 65th percentile for low income.
3. **Health Vulnerability**: Census tracts that are at or above the 90th percentile for asthma or diabetes or heart disease or low life expectancy and are at or above the 65th percentile for low income
4. **Housing Vulnerability**: Census tracts that experienced historic under investment or are at or above the 90th percentile for housing cost or lack of green space or lack of indoor plumbing or lead paint and are at or above the 65th percentile for low income.
5. **Legacy Pollution**: Census tracts that have at least one abandoned mine land or Formerly Used Defense Sites or are at or above the 90th percentile for proximity to hazardous waste facilities or proximity to Superfund sites (National Priorities List (NPL)) or proximity to Risk Management Plan (RMP) facilities and are at or above the 65th percentile for low income.
6. **Transportation Vulnerability**: Census tracts that are at or above the 90th percentile for diesel particulate matter exposure or transportation barriers or traffic proximity and volume and are at or above the 65th percentile for low income.
7. **Water and Wastewater Burden**: Census tracts that are at or above the 90th percentile for underground storage tanks and releases or wastewater discharge and are at or above the 65th percentile for low income.
8. **Workforce Development Burden**: Census tracts that are at or above the 90th percentile for linguistic isolation or low median income or poverty or unemployment and more than 10% of people ages 25 years or older whose high school education is less than a high school diploma.

The census tracts that have been identified as disadvantaged meet at least one of the following requirements:

- At or above the threshold for one or more environmental, climate, or other burdens.
- At or above the threshold for an associated socioeconomic burden.
- A census tract that is surrounded by disadvantaged communities and is at or above the 50% percentile for low income is also considered disadvantaged.

Incorporating equity considerations into this CSAP is essential for fostering inclusive access to mobility and resources. By prioritizing the needs of underserved communities, The City of Brownsville can address disparities in transportation access that disproportionately affect low-income, disadvantaged, and marginalized groups. Equity-driven planning ensures that all community members benefit from transportation investments, leading to improved social cohesion, economic opportunities, and overall quality of life. Ultimately, considering equity in transportation planning not only enhances the effectiveness of infrastructure projects but also promotes a more just and sustainable future for all residents of The City of Brownsville.

POLICY AND PROCESS REVIEWS

An evaluation process for assessing current policies, plans, guidelines, and standards was conducted by The City of Brownsville to identify opportunities to enhance transportation safety.

Several agencies hold accountability for the safety and accessibility of Brownsville's transportation system, including The Tennessee Department of Transportation (TDOT), The Haywood County Highway Department, The City of Brownsville and more. On a local level, there are few existing plans devoted to safety issues in The City of Brownsville, but this CSAP has been developed to address that gap by providing a framework for prioritizing and enhancing safety measures. It marks the beginning of a structured approach to improving transportation safety throughout the city.

The following transportation plans have been reviewed and will serve to address issues in The City of Brownsville as well as the entire state of Tennessee:

Brownsville Transportation Planning Grant

The City of Brownsville developed a corridor study plan in 2019 that is dedicated to identifying the needs of several corridors throughout the city to enhance the safety and efficiency of the entire community. The following corridors and their adjacent properties were analyzed for improvements and collaboration:

- Anderson Avenue
- Dupree Street
- Mercer Road

TDOT 25-Year Long-Range Transportation Policy Plan: Safety, Security, and Transportation Resilience

The TDOT 25-Year Long-Range Transportation Policy Plan outlines a strategic vision for advancing safety, security, and resilience across Tennessee's transportation system. The plan focuses on integrating advanced safety technologies, such as automated traffic management and real-time incident detection, to reduce accidents and enhance overall road safety. It also emphasizes strengthening infrastructure against natural and human-caused threats, including upgrading critical roadways and bridges to withstand extreme weather and other potential threats. Additionally, the plan advocates for comprehensive risk management strategies and emergency response frameworks to ensure quick recovery and minimal disruption during unforeseen events. By establishing clear long-term goals and implementing proactive measures, this policy paper aims to create a robust and adaptive transportation network that meets the evolving needs of the state.

TDOT Strategic Highway Safety Plan (SHSP)

The Tennessee Department of Transportation's Strategic Highway Safety Plan (SHSP) aims to reduce traffic fatalities and serious injuries by using data-driven strategies to address key issues like impaired driving, speeding, and pedestrian safety. The plan focuses on targeted actions, collaboration with various stakeholders, and ongoing evaluation to improve road safety across the state.

TDOT Highway Safety Improvement Program (HSIP) Annual Report

The Tennessee Department of Transportation's Highway Safety Improvement Program (HSIP) Annual Report highlights the program's efforts to enhance roadway safety through targeted projects and funding. It includes details on the implemented safety measures, performance metrics showing their impact on reducing crashes, and any challenges encountered. The report also outlines future goals and plans to further improve road safety across the state.

ANALYSIS OF EXISTING CONDITIONS AND HISTORICAL TRENDS

The historical crash data from The City of Brownsville speaks for itself – 947 crashes occurred from 2019 through 2023. In this same period, 4 lives were lost due to fatal traffic collisions and another 25 individuals suffered from incapacitating injuries. In a small community like Brownsville, with a population of approximately 10,300, these incidents highlight the need for improved safety measures.

The crash data presented throughout this report was collected utilizing the Tennessee Department of Transportation's Enhanced Tennessee Roadway Information Management System (E-TRIMS), which is a database that includes all traffic safety data collected by law enforcement agencies throughout the state.

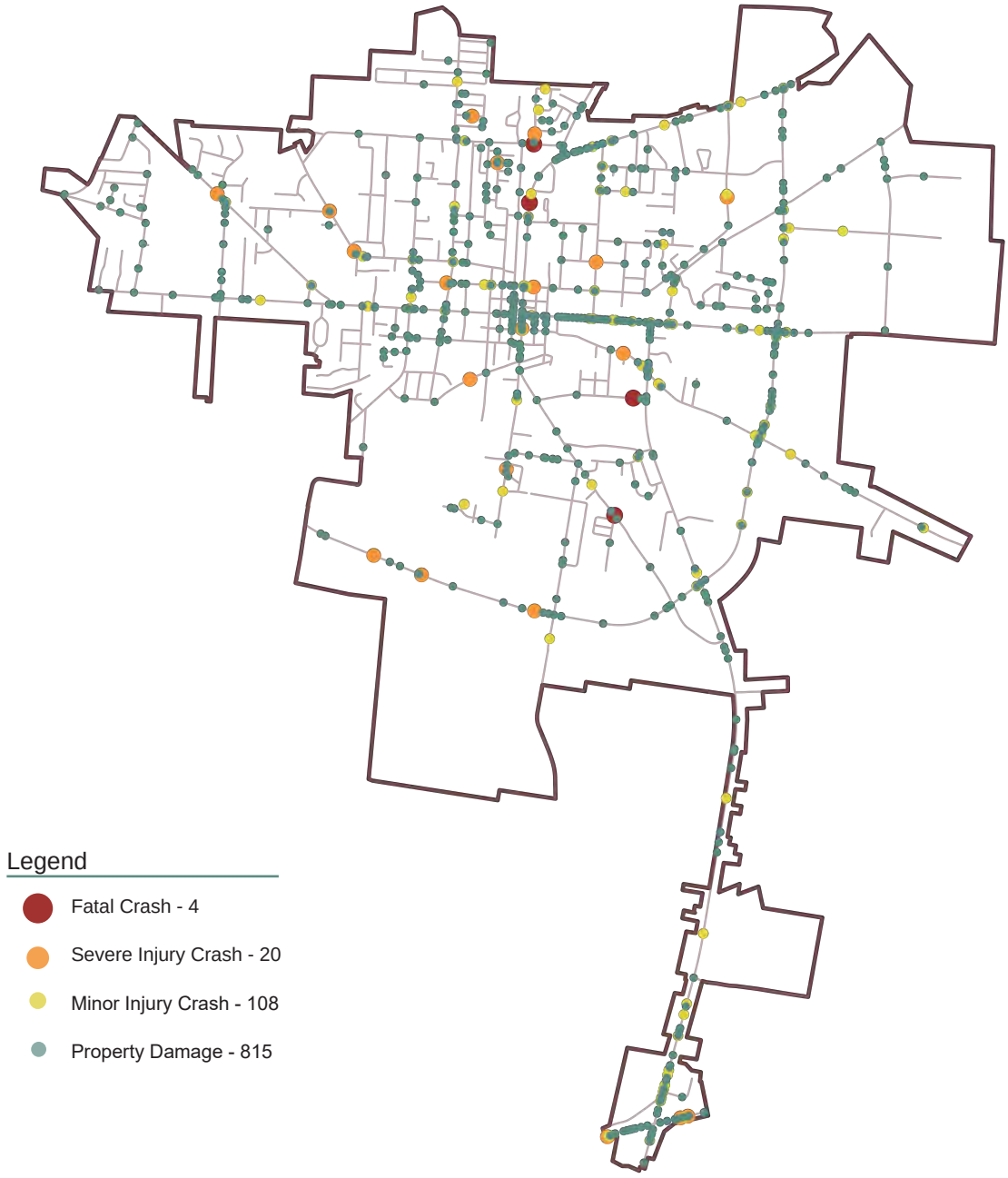


Figure 2 illustrates all crashes that have occurred throughout The City of Brownsville from 2019 to 2023, highlighting their severity with distinct markers that indicate the extent of each accident.

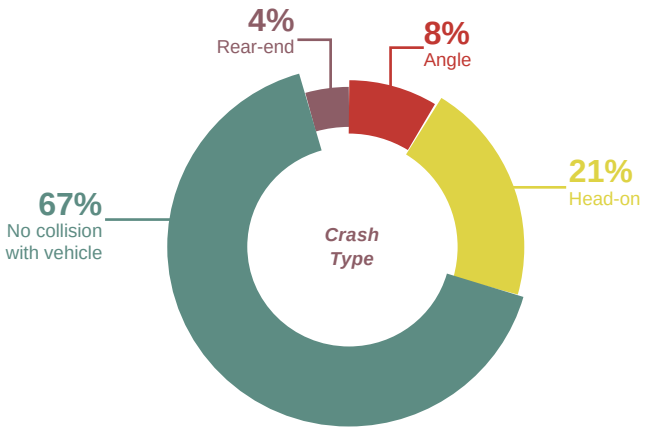
To understand the deeper narrative, we must investigate the context of these accidents. Are they caused by factors inherent to city driving—like heavy traffic, pedestrian crossings, or cyclist interactions? Or are there systemic issues at play—like road maintenance, signage, or enforcement?

In the 5-year span from 2019 to 2023, the following roadway users lost their life or were severely injured:

25 individuals driving **2 individuals walking** **2 individual biking**

Crashes resulting in fatality and severe injuries included the following crash types:

- The data shows that approximately 60% of all fatal and severe injury crashes were non-collision crashes which involved drivers colliding with non-vehicular objects. The crash types that accounted for the remaining crashes are shown below.



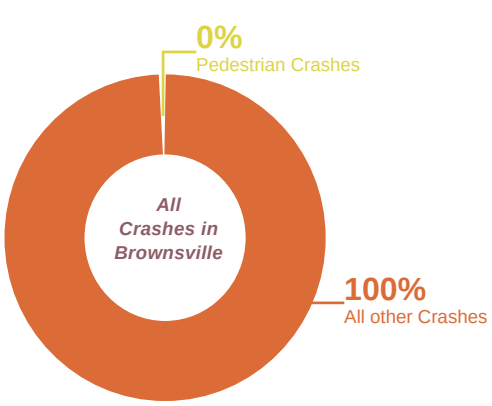
No collision with vehicle crashes were attributed to the following initial events:

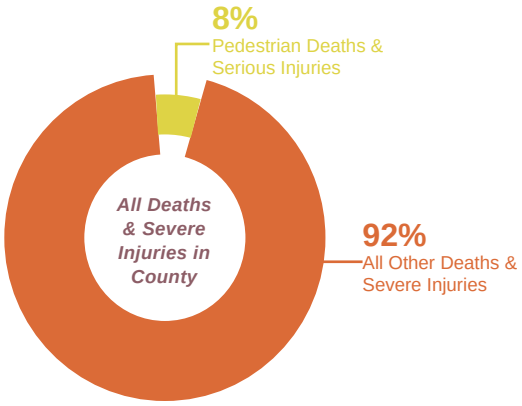
- Non-collision crashes accounted for 67% of all fatal and serious crashes (as displayed above), highlighting a significant concern. The initial events leading to these non-collision incidents include overturns, impacts with pedestrians and cyclists, encounters with utility poles, etc.
- Two of these crashes involved vehicles striking and killing pedestrians, which is particularly alarming. These results suggest a need for increased attention to roadside safety features and pedestrian protection measures, echoing the concerns received during community engagement. The events that culminated in these non-collision crashes are summarized below.

Overturn	4
Ditch	2
Pedalcycle	2
Pedestrian	2
Utility Pole	2
Culvert	1
Guradrail Face	1
Other Post, Pole, Support	1
Standing Tree	1
TOTAL	16

Individuals walking on The City of Brownsville roads are most at risk of death and severe injuries:

- The data shows that while pedestrian-related crashes accounted for less than 0.5% of all crashes, they resulted in 8.3% of the fatal and serious injuries throughout the city.
- Due to the unpredictability of traffic, it is crucial to The City of Brownsville to prioritize the safety of vulnerable users through measures such as improved crosswalk visibility, efficient traffic calming strategies, and strict enforcement of speed limits to mitigate the risks of deaths and serious injuries.





The City of Brownsville conducted further analysis by examining minor injury and property damage crashes in addition to fatal and serious injury crashes. By investigating low severity crashes, we can identify trends where roadway safety issues exist and mitigate those issues before they escalate. Brownsville strives to allocate resources effectively and understanding where and why various types of crashes are occurring throughout the city supports our objective. The chart below shows each crash type occurrence by year from 2019-2023.

All Crash Types in Brownsville (2019-2023)

Injury Type	2019	2020	2021	2022	2023	Total
Fatal	0	1	2	0	1	4
Severe	5	0	3	7	5	20
Minor	19	26	25	22	16	108
Property Damage	162	160	170	177	146	815
						947

The crashes throughout The City of Brownsville can be attributed to the following driver actions:

- Human vulnerability is a significant cause of traffic crashes. Driver behavior can greatly influence the severity of accidents. Vulnerabilities like impaired reaction times, distraction, and fatigue increase the likelihood of collisions and can intensify their consequences.
- The data reveals that approximately 49% of all crashes occurred due to no contributing actions. The following table outlines the other driver actions involved in these fatal and serious injury crashes:

Driver Action	Percentage of Total Fatal & Severe Crashes
No Contributing Actions	49.19%
Unknown/Other	16.79%
Failure to Yield Right of Way	9.04%
Following Improperly	4.74%
Improper Backing	4.49%
Driver Distracted	2.57%
Lane Departure	2.57%
Improper Turn	1.98%
Failure to Obey Traffic Controls	1.43%
Swerved or Avoided	1.09%
Reckless Negligent Driving	0.94%
Exceeding Posted Speed Limit	0.84%
Improper Passing	0.84%
Vision Obstructed	0.59%
Improper Lane Changing	0.54%
Over Correcting	0.49%
Driving Left of Center	0.40%
Failure to Observe Warnings or Instructions	0.35%
Operator Inexperience	0.30%
Careless Erratic Driving	0.25%
Interfered with by Passenger	0.20%
Driving Wrong Way on One-Way Road	0.10%
Driverless	0.05%
Failure to Use Lights	0.05%
GPS Distractions	0.05%
Improper Loading of Vehicle Cargo or Passengers	0.05%
Improperly Carrying Hazardous Cargo	0.05%
Speed too Slow	0.05%

Speed Management Concerns and Speed Studies:

Although speeding was reported as a driver characteristic in less than 1% of the crashes throughout Brownsville, it may still present a potential risk in safety and contribute to crashes. Taking a proactive approach to speed related issues enhances road safety for all residents and creates redundancies to protect drivers, pedestrians, and other road users from potential injuries and fatalities. Speed studies were conducted on various roads that residents reported as areas of concern due to speeding. The results of those studies are summarized below:

Road Name	Posted Speed Limit (mph)	Total Crashes (2019-2023)	Total Fatalities	Total Incapacitations	AADT	Percent of Vehicles Driving over Posted Speed Limit	
						Northbound & Eastbound Traffic	Southbound & Westbound Traffic
W. Cooper St.	25	6	0	0	893	69.9	83.2
W. College St.	30	20	0	1	1,144	3.8	2.7
E. College St.	30	7	0	1	1,099	0	72.6
Thomas St.	30	10	1	0	5,017	88.34	87.74
Haywood St.	30	4	1	0	406	68.62	55.16
Berrywood Ave.	30	6	0	0	489	0	9.7
Reverend Hill Ln.	30	2	1	1	185	3.2	10.5

With over 50% of vehicles driving over the speed limit on several of these roads, it is important to further assess these areas and consider potential speed management mitigations such as speed limit reductions, speed humps, speed safety cameras, etc.

HIGH INJURY NETWORK

A high injury network (HIN) is a strategic selection of road segments and intersections within a region that have consistently high rates of severe injuries and fatalities resulting from traffic crashes. This network is identified through comprehensive analysis of crash data, focusing on areas where vulnerable road users such as pedestrians, cyclists, and motorcyclists are particularly at risk. The selection process involves evaluating factors such as crash frequency, severity, and specific contributing factors like speeding or inadequate infrastructure. By pinpointing these critical locations, transportation authorities can prioritize resources and interventions to address safety deficiencies and implement targeted improvements. The goal of establishing a high injury network is to reduce the incidence of severe injuries and fatalities on these identified roadways, ultimately creating safer environments for all road users.

The HIN that has been carefully selected for The City of Brownsville is shown below on Figure 3. The City of Brownsville's HIN consists of 7 roadway segments and 3 spot locations.

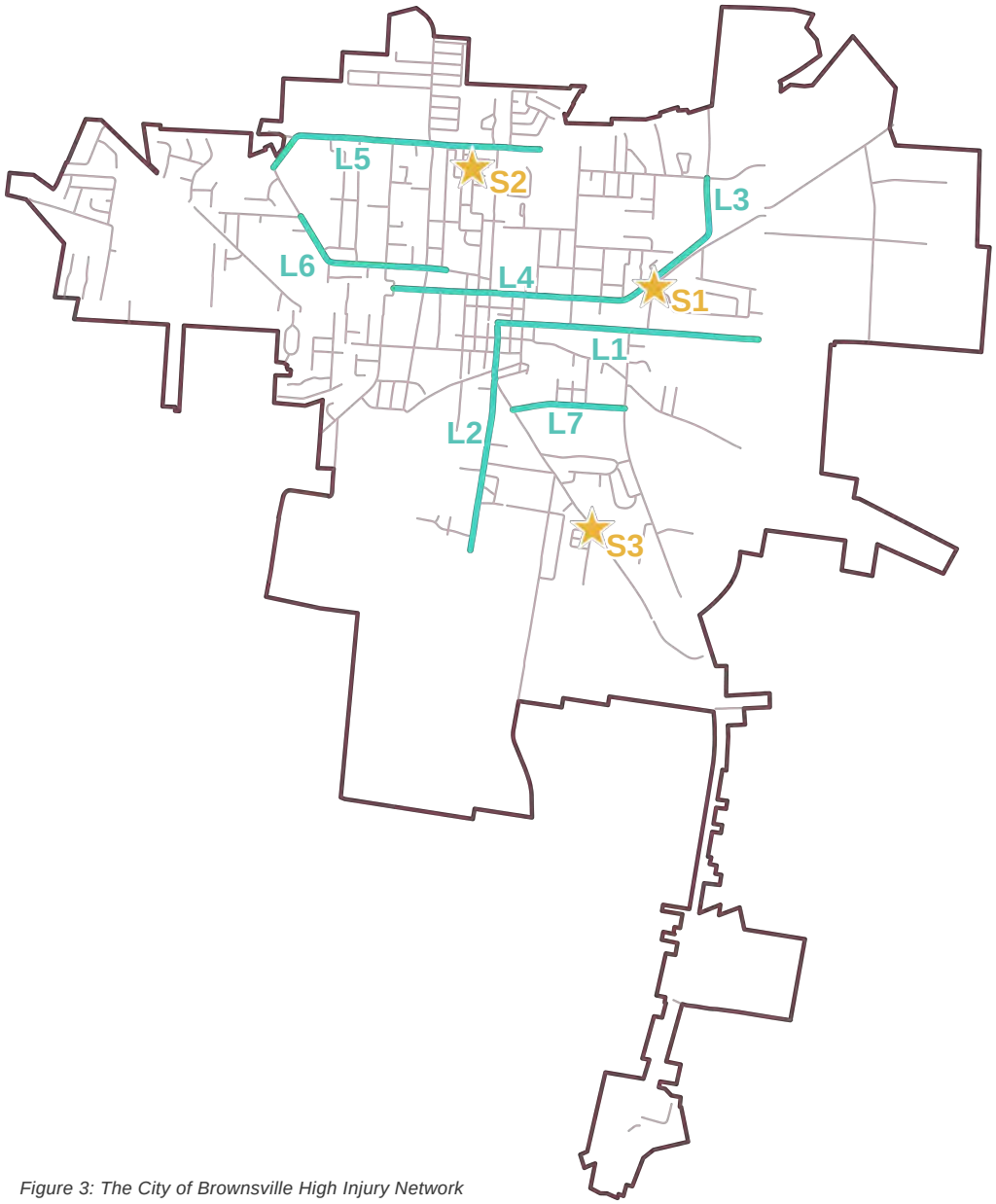


Figure 3: The City of Brownsville High Injury Network

Map Label	Road Name	Total Crashes	Total Fatalities	Total Severe Injuries	AADT
L1	East Main Street	95	0	0	9,482
L2	South Washington Avenue	30	0	2	3,179
L3	East College Street	7	0	1	1099
L4	West College Street	20	0	1	N/A
L5	West and East Thomas Street	10	1	0	5,017
L6	Key Corber Street	11	0	1	1,095
L7	Haywood Street	4	1	0	406
S1	East College Street and Boyd Avenue	7	0	0	1,099 East College Street N/A Boyd Avenue
S2	Norris Street and Coach Street	2	0	1	N/A
S3	Reverend Hill Lane and Hatchie Street	1	1	0	N/A Reverend Hill Lane 1,088 Hatchie Street

The City of Brownsville's HIN accounts for:

10+ **Miles of city-maintained roads throughout the city**

> 47% **Of all the Fatal / Severe Crashes reported on city-maintained roads**

> 36% **Of all the Total Crashes reported on city-maintained roads**

The HIN was carefully selected on Brownsville's city-maintained roads to target areas with the highest incidence of accidents, ensuring that the planned improvements will significantly enhance safety and reduce injuries, ultimately fostering a safer environment for all road users and contributing to the Vision Zero goal.

SAFETY ENHANCEMENT SUGGESTIONS

The Federal Highway Administration (FHWA) has published a list of 28 countermeasures and strategies that have proven to be effective in reducing roadway fatalities and incapacitating injuries throughout the United States. The countermeasure categories include the following safety focus areas: speed management, intersections, roadway departures, or pedestrians/bicyclists, and crosscutting.

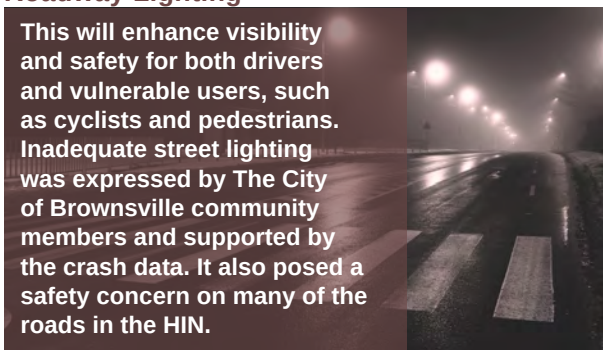
Most crashes in Brownsville were reported as having no contributing actions by the driver, suggesting that external issues may have played a significant role in these incidents. In mitigating the impacts of these crashes throughout The City of Brownsville, the following countermeasures have been outlined:

- **Appropriate Speed Limits for All Road Users**
- **Crosswalk visibility enhancements**
- **Bicycle Lanes**
- **Leading Pedestrian Interval**
- **Medians and Pedestrian Refuge Islands in Urban and Suburban Areas**
- **Walkways**
- **Dedicated Left- and Right-Turn Lanes at Intersections**
- **Backplates with Retroreflective Borders**
- **Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections**
- **SafetyEdge^{SM}**
- **Wider Edge Lines**

The City of Brownsville has an ambitious goal of implementing more safety throughout each location on the HIN. In addition to the HIN recommendations made by The City of Brownsville, the following city-wide solutions should be implemented to enhance the safety of roadways on the HIN and throughout the city regardless of their inclusion in the HIN.

Based on the community feedback received, the crash data analysis, and the HIN, The City of Brownsville believes that these roadway safety enhancements will yield a safer transportation system by managing vehicle speeds, sight visibility, warning signs, and creating a safe space for vulnerable users. These city-wide safety enhancements include:

Roadway Lighting

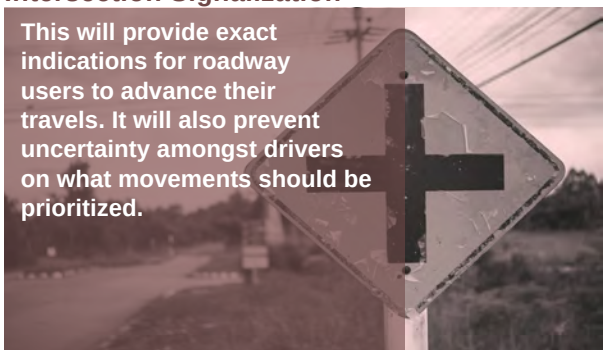


This will enhance visibility and safety for both drivers and vulnerable users, such as cyclists and pedestrians. Inadequate street lighting was expressed by The City of Brownsville community members and supported by the crash data. It also posed a safety concern on many of the roads in the HIN.

Bicycle Lanes

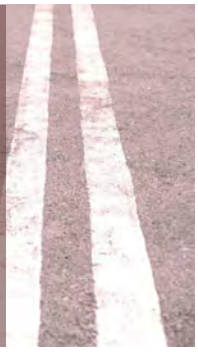
This will provide designated areas for cyclists which will reduce the likelihood of crashes with motor vehicles. By clearly marking and defining where cyclists should be on the roadway, conflicts between both motorists and pedestrians will be reduced.

Intersection Signalization



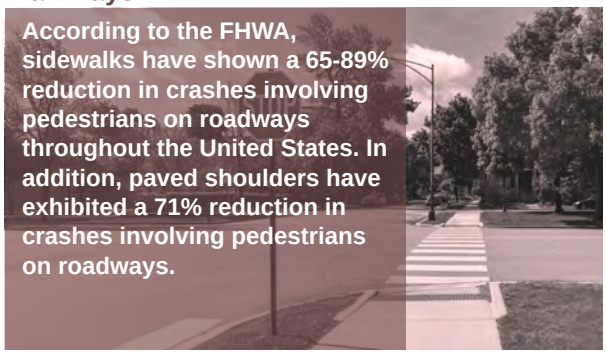
This will provide exact indications for roadway users to advance their travels. It will also prevent uncertainty amongst drivers on what movements should be prioritized.

Pavement Markings



Refreshing existing pavement markings and adding them in areas where they are lacking will reduce driver and vulnerable user confusion and clearly define lanes, increasing guidance on the road.

Walkways



According to the FHWA, sidewalks have shown a 65-89% reduction in crashes involving pedestrians on roadways throughout the United States. In addition, paved shoulders have exhibited a 71% reduction in crashes involving pedestrians on roadways.

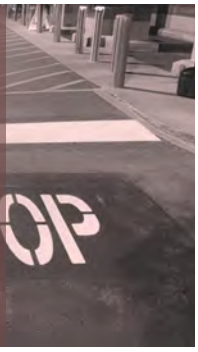
Dedicated Left- and Right-Turn Lanes

These enhance safety at intersections by reducing conflicts between turning vehicles and through traffic. They provide a physical separation between turning traffic and adjacent through traffic and provide for deceleration prior to turning.

High Visibility Crosswalks

These create more visibility for drivers and inform them that a crosswalk and/or pedestrians are ahead. It also provides a sense of comfort to pedestrians that are crossing roads.

High Visibility Stop Bars



Adding this will alert drivers more easily that they have a stop ahead. This can potentially reduce collisions with other vehicles and roadway users.

Backplates with Retroreflective Borders

Backplates added to traffic signal heads enhance visibility by providing a contrasting background. This visibility is enhanced by framing the backplate with a 1- to 3-inch yellow reflective border. Signal heads with these features stand out better during both day and night time.

Low-Cost Countermeasures

This approach to intersection safety involves deploying a package of multiple low-cost countermeasures, including enhanced signing and pavement markings, at many stop-controlled intersections. This increases driver awareness and recognition of the intersections and potential conflicts.

REFERENCES

To promote transparency on the progress of this CSAP, The City of Brownsville will publish clear and accessible traffic crash trend information online. The data will allow anyone to view and explore safety trends and project data to better understand our progress on achieving our Vision Zero goals and addressing our actions. This transparency will help keep us accountable in our bold approach towards improving safety on our streets and supporting equitable and healthy mobility for all.

The City of Brownsville is dedicated to involving communities throughout the implementation of this CSAP's diverse strategies and actions. Our approach will involve collaborating with transportation advocates and a range of community-based organizations, including those serving vulnerable populations, as well as residents and businesses. By leveraging these partnerships, we will gather ongoing feedback on safety priorities to inform our Vision Zero projects. We are committed to maintaining strong community relationships and conducting inclusive outreach at every stage of our planning process. We look forward to working together with the community to achieve our Vision Zero goal.

REFERENCES

Electronic Tennessee Roadway Information Management System (E-TRIMS). https://e-trims.tdot.tn.gov

Climate and Economic Justice Screening Tool (CEJST). https://screeningtool.geoplatform.gov

FHWA Guardrail 101 (Purpose, Function, and Crashworthiness of Guardrails). Guardrail 101 (dot.gov)

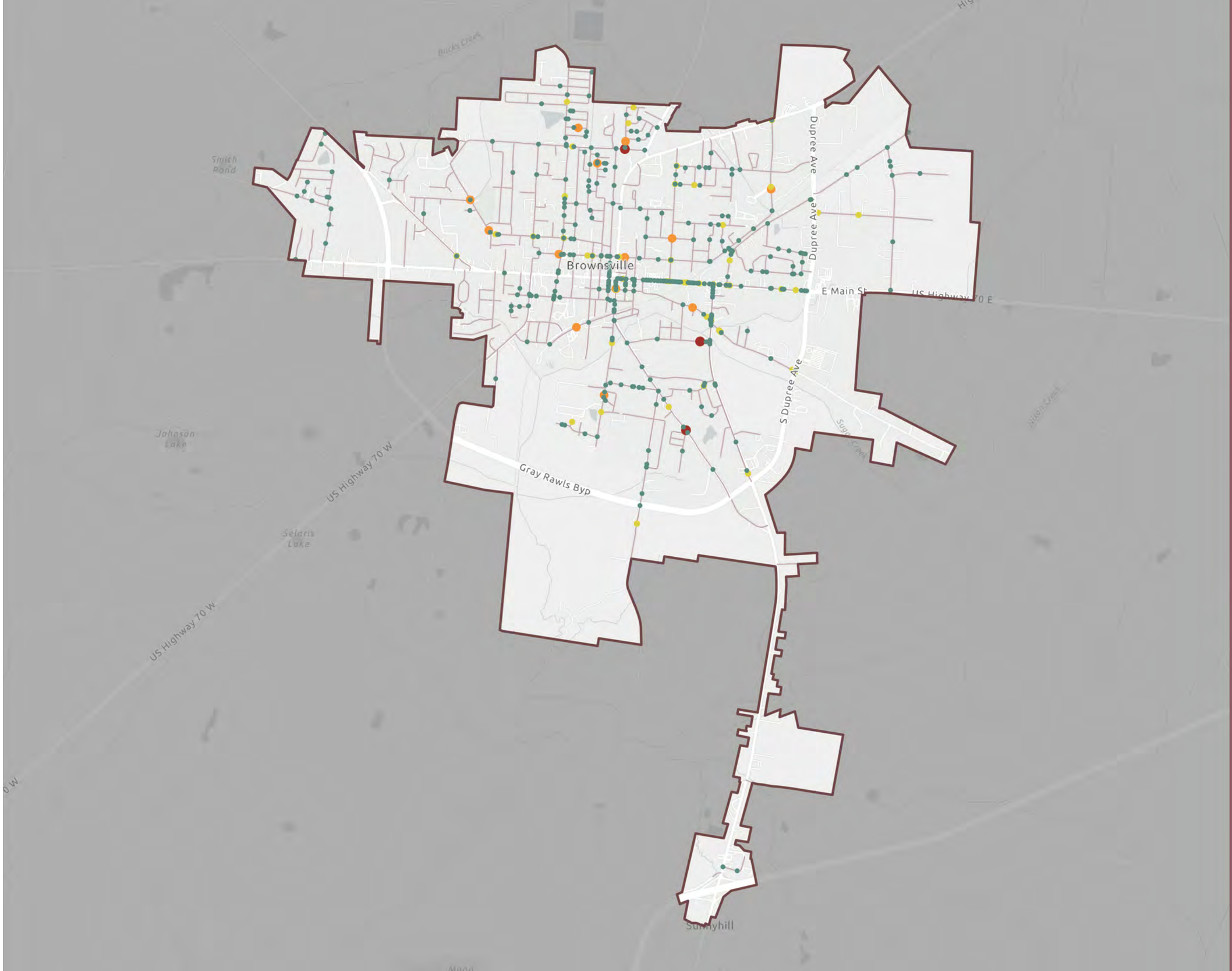
FHWA W-beam Guardrail Repair Guide – Safety. W-beam Guardrail Repair Guide - Safety | Federal Highway Administration (dot.gov)

State Traffic Safety Information (STSI). https://cdan.dot.gov/STSI/stsi.htm

USDOT Equitable Transportation Community (ETC) Explorer. https://experience.arcgis.com/experience/0920984aa80a4362b8778d779b090723/page/Applicant-Explorer

APPENDIX A

All crashes on Brownsville Maintained roads 2019 to 2023



Brownsville

Brownsville Maintained Road

Type of Crash

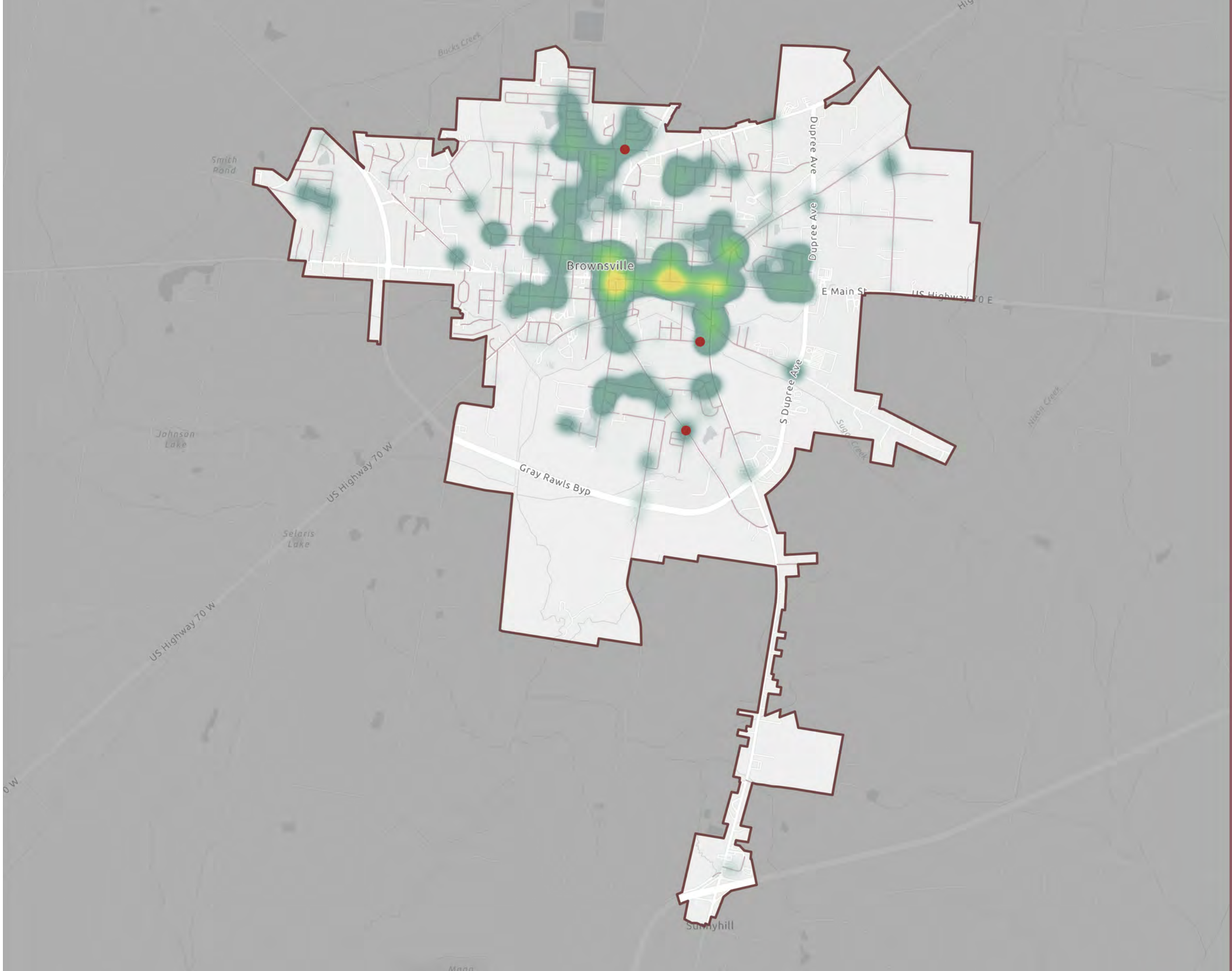
- Fatal
- Suspected Severe Injury
- Suspected Minor Injury/ Possible Injury
- Property Damage

N
W E
S

0 0.23 0.45 Miles

1 inch equals 1 miles

Heatmap of All crashes on Brownsville Maintained roads 2019 to 2023



Brownsville

Brownsville Maintained Road

Fatal Crash

Crash Density

Sparse

Dense

N

W E

S

0 0.23 0.45 Miles

1 inch equals 1 miles

APPENDIX B

Map Label	Road Name	Length of Road (Miles)	Total Crashes	Total Fatalities	Total Severe Injuries	Property Damage Crashes	AADT	Posted Speed Limit (MPH)	Observed 85th Percentile Speed (MPH)	Roadway Enhancement Suggestions	Notes	Average Crash Rate Per Year	Safety Countermeasure	CMF Applied (CMF ID)	CMF	Expected crash reduction per year
L1	East Main Street	1.57	95	0	0	86	9,482	30	-	◦Relocate stop sign at E. Main St. & Church to the right side of the road. ◦Install speed safety cameras for improved enforcement. ◦Enhance visibility of crosswalks for pedestrian safety. ◦Improve pavement marking visibility.	43% of crashes are rear-end crashes 10% of crashes occured due to improper following 42% occurred at an intersection	19	Implement mobile automated speed enforcement system	7679	0.86	2.66
L2	South Washington Avenue	1.054	30	0	2	23	3,179	30	-	◦Improve visibility of pavement markings for better road clarity. ◦Add stop bars at all intersection roads. ◦Address lack of shoulders on roadways. ◦Realign intersection with Hatchie St. for improved traffic flow. ◦Install pavement markings and parking spaces beyond the RR crossing. ◦Add pedestrian signage for enhanced safety and guidance.	31% of crashes are rear-end crashes 36% of crashes are angled crashes	6	Implement mobile automated speed enforcement system	7679	0.86	0.84
L3	East College Street	0.93	7	0	1	4	1,099	30	36	◦Enhance visibility of pavement markings for improved road clarity. ◦Upgrade traffic signal at Bradford St. intersection for better traffic flow. ◦Implement intersection improvements at the RR crossing on Boyd Ave. for safety and efficiency.	67% of crashes are rear-end crashes	1.4	Implement mobile automated speed enforcement system	7679	0.86	0.196
L4	West College Street	0.5	20	0	1	17	N/A	30	28	◦Improve visibility of pavement markings for clearer road guidance. ◦Install a crosswalk at McLemore Ave. for enhanced pedestrian safety.	15% of crashesoccured due to a failure to yield ROW 29% of crashes are angled crashes	4	Install high-visibility crosswalk	4124	0.81	0.76
L5	West and East Thomas Street	1.32	10	1	0	8	5,017	30	35	◦Enhance visibility of pavement markings for better road clarity. ◦Increase street lighting for improved safety and visibility.	40% of crashes are angled crashes Bike route Pedestrian fatality Fairground Rd. is in very bad condition	2	Install lighting	7783	0.74	0.52
L6	Key Corner Street	1.277	11	0	1	7	1,095	30	-	◦Enhance visibility of pavement markings for clearer road guidance. ◦Add delineators to separate bike lanes for increased safety and clarity.	60% of crashes are non-collision, 10% are lane departures Bike route	2.2	Implement mobile automated speed enforcement system	7679	0.86	0.308
L7	Haywood Street	0.527	4	1	0	3	406	30	39	◦Enhance visibility of pavement markings for improved road clarity. ◦Add stop bars at intersections for better traffic control. ◦Repave road surface where needed for smoother driving conditions. ◦Increase street lighting for enhanced safety and visibility. ◦Enforce speed limits more effectively to improve traffic safety.	57% of crashes are non-collision, 29% are rear-end, 28% are due to speeding Pedestrian fatality	0.8	Install lighting	7783	0.74	0.208
S1	East College Street and Boyd Avenue	-	7	0	0	-	1,099 East College Street N/A Boyd Avenue	30 MPH East College Street 40 MPH Boyd Avenue	36 MPH East College Street N/A Boyd Avenue	◦Repaint road markings for improved visibility. ◦Add stop bars at intersections for better traffic control.						
S2	Norris Street and Coach Street	-	2	0	1	-	-	30 MPH Norris Street N/A Coach Street	-	◦Repaint road markings and add stop bars for clearer traffic control. ◦Address stop sign visibility issues caused by overgrown vegetation.						
S3	Reverend Hill Lane and Hatchie Street	-	1	1	0	-	N/A Reverend Hill Lane 1,088 Hatchie Street	N/A Reverend Hill Lane 30 MPH Hatchie Street	28 MPH Reverend Hill Lane N/A Hatchie Street	◦Repaint road markings and add stop bars for improved traffic control. ◦Fix pavement rutting issues to ensure a smoother driving surface.						

Safety Countermeasure	Location	CMF	CMF ID	CMF Description	Applicability	Prior Condition Requirement	Volume Requirements
Rumble Strips and stripes	Centerline	0.56	3358	Install centerline rumble strips	All crashes besides property damage	No centerline rumble strips	Not Specified
Rumble Strips and stripes	Edgeline	0.67	3394	Install edgeline rumble strips	Run off road crashes. Applies to K (fatal),A (serious injury),B (minor injury),C (possible injury)	No Prior Condition(s)	Minimum of 180 to Maximum of 12776 Average Daily Traffic (ADT)
Chevron Signs at curves	Horizontal curves	0.82	2431	Install chevron signs on horizontal curves	All crashes besides property damage	No existing sign or sign without fluorescent sheeting	Minimum of 895 to Maximum of 20479 Annual Average Daily Traffic (AADT)
Chevron Signs at curves	Horizontal curves	0.84	2438	Install chevron signs on horizontal curves	All crashes besides property damage	No existing signs	Minimum of 261 to Maximum of 14790 Annual Average Daily Traffic (AADT)
Flatten sideslope from 1V:3H to 1V:4H	Roadside	0.92	4627	Flatten sideslope from 1V:3H to 1V:4H	Single Vehicle Crashes	No Prior Condition(s)	Not Specified
Flatten sideslope from 1V:4H to 1V:6H	Roadside	0.88	4632	Flatten sideslope from 1V:4H to 1V:6H	Single Vehicle Crashes	No Prior Condition(s)	Not Specified
Speed Safety Cameras	Urban Locations	0.632	7718	Installation of automated speed enforcement system. Determines average speed of vehicle over a long distance.	All crashes besides property damage	No Point-to-Point Automated Section Speed Enforcement System	Not Specified
Provide intersection illumination	Intersection	0.58	436	Provide intersection illumination	Nighttime, Vehicle/pedestrian. Applies to A (serious injury),B (minor injury),C (possible injury) crashes	No Prior Condition(s)	Not Specified
Provide intersection illumination	Intersection	0.62	433	Provide intersection illumination	Nighttime crashes, Applies to A (serious injury),B (minor injury),C (possible injury) crashes	No Prior Condition(s)	Not Specified
Provide highway lighting	Intersection	0.72	192	Provide highway lighting	Nighttime crashes, Applies to A (serious injury),B (minor injury),C (possible injury) crashes	No Prior Condition(s)	Not Specified
Provide intersection illumination	Intersection	0.67	2376	Provide intersection illumination	Angled Crashes	Rural 2-lane intersection with no lighting.	Major Road Traffic Volume: Minimum of 420 to Maximum of 15200 Minor Road Traffic Volume: Minimum of 80 to Maximum of 10400
Install safety edge treatment	Shoulder	0.892	9205	The safety edge is a low-cost treatment that is implemented in conjunction with pavement resurfacing and is intended to help minimize drop-off-related crashes.	K (fatal),A (serious injury),B (minor injury) crashes	Drop-off pavement edge	Minimum of 10 to Maximum of 18600 Annual Average Daily Traffic (AADT)
Install safety edge treatment	Shoulder	0.79	9211	The safety edge is a low-cost treatment that is implemented in conjunction with pavement resurfacing and is intended to help minimize drop-off-related crashes.	Run off road crashes	Drop-off pavement edge	Minimum of 10 to Maximum of 18600 Annual Average Daily Traffic (AADT)
Install safety edge treatment	Shoulder	0.813	9217	The safety edge is a low-cost treatment that is implemented in conjunction with pavement resurfacing and is intended to help minimize drop-off-related crashes.	Head on crashes. Excludes intersection-related crashes and animal-related crashes.	Drop-off pavement edge	Minimum of 10 to Maximum of 18600 Annual Average Daily Traffic (AADT)
Introduce TWLTL (two-way left turn lanes) on rural two lane roads	Roadway	0.64	583	Introduce TWLTL (two-way left turn lanes) on rural two lane roads	All crashes	No Prior Condition(s)	Not Specified
Set posted speed limit 5 mph below engineering recommendations	Roadway	0.43	10250	Set posted speed limit 5 mph below engineering recommendations	Property Damage crashes only	Posted speed limit set equal to engineering recommendations	Not Specified
Installation of fixed speed cameras	Roadside	0.78	8183	Installation of fixed speed cameras on arterials limited access freeways	All crashes besides property damage	No speed camera present	8419 Annual Average Daily Traffic (AADT)
Install dynamic speed feedback sign	Roadside- Rural	0.78	10265	System consisting of a speed measuring device and a message sign that displays feedback to those drivers who exceed a predetermined threshold. It may be the actual speed, a message such as SLOW DOWN, or activation of a warning device, such as beacons or a curve warning sign	Crash Type: Other	No dynamic speed feedback sign present	Not Specified
Install a traffic signal	Intersection	0.56	325	Install a traffic signal	All crashes	Stop controlled intersection	Major Road Traffic Volume: Minimum of 3261 to Maximum of 29926 Annual Average Daily Traffic (AADT) Minor Road Traffic Volume: Minimum of 101 to Maximum of 10300 Annual Average Daily Traffic (AADT)
Install a traffic signal	Intersection	0.23	326	Install a traffic signal	Angled Crashes	No Prior Condition(s)	Major Road Traffic Volume: Minimum of 3261 to Maximum of 29926 Annual Average Daily Traffic (AADT) Minor Road Traffic Volume: Minimum of 101 to Maximum of 10300 Annual Average Daily Traffic (AADT)
Install a traffic signal	Intersection	0.4	327	Install a traffic signal	Left-turn crashes	No Prior Condition(s)	Major Road Traffic Volume: Minimum of 3261 to Maximum of 29926 Annual Average Daily Traffic (AADT) Minor Road Traffic Volume: Minimum of 101 to Maximum of 10300 Annual Average Daily Traffic (AADT)
Install lighting	Roadway- Rural	0.46	2870	Install lighting	All nighttime crashes with severity levels: A (serious injury),B (minor injury),C (possible injury)	Unlit roads	Not Specified
Provide 2-ft paved shoulders (both sides)	Shoulder	0.88	10398	Provide 2-ft paved shoulders on both sides of 2-lane rural roads	All run off road crashes	No Prior Condition(s)	Minimum of 30 to Maximum of 15900 Annual Average Daily Traffic (AADT)

Safety Countermeasure	Location	CMF	CMF ID	CMF Description	Applicability	Prior Condition Requirement	Volume Requirements
Presence of a pedestrian crosswalk at midblock locations	Roadway	0.82	11181	Segments with crosswalks and pedestrian countermeasures, such as Traffic Signals (T.S.), Rectangular Rapid Flashing Beacons (RRFBs), Circular Rapid Flashing Beacons (CRFBs), and Pedestrian Flashing Beacons (PFBs)	Pedestrian related crashes	Midblock locations without the presence of a pedestrian crosswalk	Not Specified
Implement mobile automated speed enforcement system	Roadside- Urban	0.859	7679	Mobile unit vans with noticeable markings were parked close to the roadway. Police officers in vans operated laser guns and software. Signage and media campaigns informed drivers of enforcement.	All crashes	No photo radar	Not Specified
Install high-visibility crosswalk	Roadway- Urban	0.81	4124	High-visibility crosswalks aim to increase awareness of pedestrians at intersections by using highly visible marking patterns. The markings used in this study included a series of longitudinal white stripes constructed from thermoplastic material.	All crashes	No Prior Condition(s)	Not Specified
Install lighting	Roadway- Urban	0.74	7783	Install lighting	All crashes	Roadways without street lighting	Not Specified
Install shared path	Roadway- Urban	0.75	9250	Install shared path	All bicycle crashes	No shared path present	Minimum of 5700 to Maximum of 98500 Annual Average Daily Traffic (AADT)