Appendices

Appendix A – Public Engagement Summary

Appendix B - Descriptive and Systemic Analysis Summary

Appendix BI - Crash Data Tables

Appendix B2 - High Injury Network (HIN) Maps

Appendix C - Countermeasures Toolbox

Appendix D - Priority Corridors

Appendix E - Priority Intersections

Comprehensive Safety Action Plan
Appendix A

PUBLIC ENGAGEMENT SUMMARY

Prepared for:

Central Iowa Regional Transportation Planning Alliance
939 Office Park Road, Suite 306
West Des Moines, IA 50265

Prepared by:

Felsburg Holt & Ullevig
1300 Walnut Street, Suite 101
Des Moines, IA 50309
515.493.2757

FHU Reference No. 122668-01

Table of Contents

Introduction **1**
Summary of Advertisement **2**
Public Meetings (In-Person Engagement) **2**
Online Engagement **4**
Summary of Public Input by City **6**
Winterset 8
Indianola 8
Newton 8
Perry 8
Boone 8
Adel 8
Nevada 9
Knoxville 9
Pella 9
Huxley 9
Public Survey Reponses **9**
Q1. Which county do you live in? 10
Q2. Which city do you live in? 10
Q3. What is your age group? 11
Q4. How do you feel when using the following modes of transportation? (Personal vehicle, Commercial vehicle, Motorcycle, Bike, Walking, Wheelchair or other mobility assistance device)? 11
Q5. Community Safety Concerns 14
Q6. Roadway Safety Issues 16
Q7. Walk or Bike Preferences 17
Q8. Safety Solutions Priorities 17
Q9. Witnessed or Experienced Incidents 19

List of Figures

Page

Figure A1. CIRTPA Region Map 1
Figure A2. Social Pinpoint Comment Map Highlighted Safety Features 5
Figure A3. Social Pinpoint Comment Map Highlighted Safety Comments 6
Figure A4. Social Pinpoint Comments by City 7
Figure A5. County of Residence 10
Figure A6. Survey Respondents by Age Group 11
Figure A7. Perception of Safety by Mode of Transportation 13
Figure A8. Community Safety Concerns 15
Figure A9. Roadway Safety Issues 16
Figure A10. Walk or Bike Preferences 17
Figure A11. Safety Solution Priorities 18
Figure A12. Witnessed or Experienced Incidents 19

List of Tables

Table A1. Public Meetings Schedule 3
Table A2. City Specific Transportation Concerns and Opportunities 7

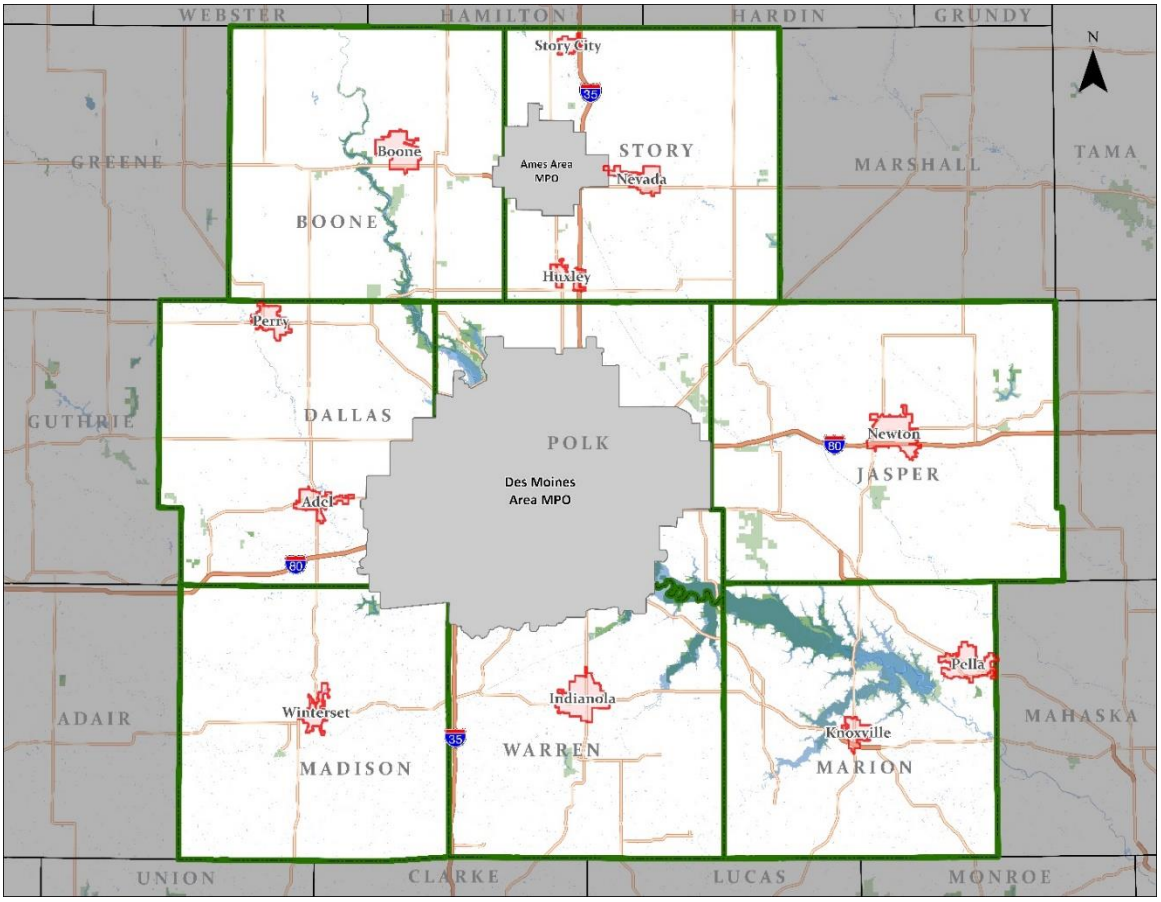
Introduction

This Summary provides an overview of the public engagement activities as part of the Central Iowa Regional Transportation Planning Alliance (CIRTPA) Comprehensive Safety Action Plan (CSAP) development. Between June and August 2024, CIRTPA conducted public engagement activities to solicit input about the safety of the transportation system in the CIRTPA region.

The CIRTPA Safe Streets and Roads for All (SS4A) project aims to enhance transportation safety and accessibility across the region by creating safer, more efficient roadways for pedestrians, cyclists, and motorists. The initiative includes various interventions and strategies to reduce accidents and improve community mobility. The project is funded through a federal SS4A grant to develop a Comprehensive Safety Action Plan (CSAP) that meets the eligibility requirements of the SS4A program. The Action Plan will identify projects that meet the criteria necessary to pursue an SS4A Implementation Grant for potential funding.

The study area for the CIRTPA CSAP includes all incorporated cities within eight counties (Boone, Dallas, Jasper, Madison, Marion, Polk, Story and Warren Counties), excluding the Des Moines Area MPO and the Ames Area MPO regions. The unincorporated portions of the counties are part of a separate study. The CIRTPA region is indicated by the map below in **Figure A1**. Public meetings were held in July 2025 in the CIRTPA member communities (outlined in red), as well as in Earlham and Prairie City. The public was asked to respond to an online survey with safety-related questions and a map, where specific points of concern could be identified, as described later in this Summary.

Figure A1. CIRTPA Region Map



Summary of Advertisement

Advertisement materials for the survey and public meetings were shared with CIRTPA member communities for distribution during late June 2024 with the first round and a second round in early August 2024. The members utilized websites, newsletters and social media to disseminate information to their communities.

Multiple press releases were also sent to each of the host cities, Iowa DOT Central Office, Iowa DOT Districts 1, 4, and 5, Greater Des Moines Partnership, Ames Economic Development Corporation, Newton Chamber of Commerce, Dallas County Development Alliance, Des Moines Register, Ames Tribune, Iowa Public Radio, KWBG (Boone), Raccoon Valley Radio (Perry-Dallas County), KNIA-KRLS (Marion County), KCCI 8, WHO 13, Local-5, and KDSM 17. Local radio outlets, organizations, and individuals carried the story. An interview with CIRTPA Executive Director was aired on KWBG in Boone. Following the public meetings, a final communications push took place in late July and early August to cultivate additional survey responses.

See **Appendix** for media coverage.

Public Meetings (In-Person Engagement)

Thirteen public meetings were held during the second through the fourth weeks of July 2024 in each of the CIRTPA member cities. In addition, meetings were held in Earlham and Prairie City to cover other cities in the region. Meetings were held at accessible community locations, during the evenings or mid-day time periods. In addition, the display was set up at the Perry Farmer's Market, and a pop-up event was held for the Adel Sweet Corn Festival. Attendance varied based on location ranging from no attendance by the public to approximately twenty individuals attending.

Attendees were asked to review a series of boards describing the Safe Streets for All program and approach, crash data for the region and member city, and to identify areas of concern on a city map. Attendees also had the opportunity to complete the public online survey at the meetings (See **Appendix**).

Despite relatively light attendance, the project team gained insights into safety concerns in each community as a result of the meetings. Many identified areas of concern with pedestrian and vehicle traffic near schools. Intersections with safety concerns, particularly along highly traveled streets, including some state highway corridors, were also frequently cited. Opportunities to enhance signage, review speed limits, and identify projects for future study and potential improvements were noted throughout the CIRTPA region.

Prior to the public meetings, individual meetings were held with key city staff from eight of the member cities. These meetings were also highly beneficial in discussing areas of safety concern, as well as future growth locations, and bicycle-pedestrian related issues. Feedback from the stakeholder meetings often mirrored public comments. More specific comments for each community are incorporated in the public input summary described below.

A list of the public meetings follows in **Table A1.**

See **Appendix** and **Appendix** for the public meeting boards and sign-in sheets, respectively.

Table A1. Public Meetings Schedule

Date & Time	City	Location	Address
Tuesday, July 9 12–2 PM	Winterset	Winterset Public Library – Main Meeting Room	123 N. Second Street, Winterset
Tuesday, July 9 4–6 PM	Indianola	Wellness Center	306 E. Scenic Valley Avenue, Indianola
Wednesday, July 10 12–2 PM	Prairie City	Prairie City Community Park Building	503 S. State Street, Prairie City
Wednesday, July 10 4–6 PM	Newton	Newton City Council Chambers	Newton
Thursday, July 11 11:30 AM–1:30 PM	Knoxville	Knoxville Public Library (Weiler Room)	213 E. Montgomery Street, Knoxville
Thursday, July 11 3:30–5:30 PM	Pella	Pella Public Library	603 Main Street, Pella
Tuesday, July 16 12–2 PM	Huxley	Nord Kalsem Community Center	204 W. 5th Street, Huxley
Tuesday, July 16 4–6 PM	Nevada	Nevada City Hall	1209 6th Street, Nevada
Wednesday, July 17 12–2 PM	Story City	Story City Bertha Bartlett Public Library	503 Broad Street, Story City
Wednesday, July 17 4–6 PM	Boone	City Hall Auditorium (2nd Floor)	923 8th Street, Boone
Thursday, July 18 12–2 PM	Adel	Adel Public Library	303 10th Street, Adel
Thursday, July 18 4–7 PM	Perry	Perry Farmer's Market – Josh Davis Plaza	1115 2nd Street, Perry
Tuesday, July 23 12–2 PM	Earlham	Council Chambers	140 S. Chestnut Avenue, Earlham
Saturday, August 10 Afternoon	Adel	Adel Sweet Corn Festival	Adel

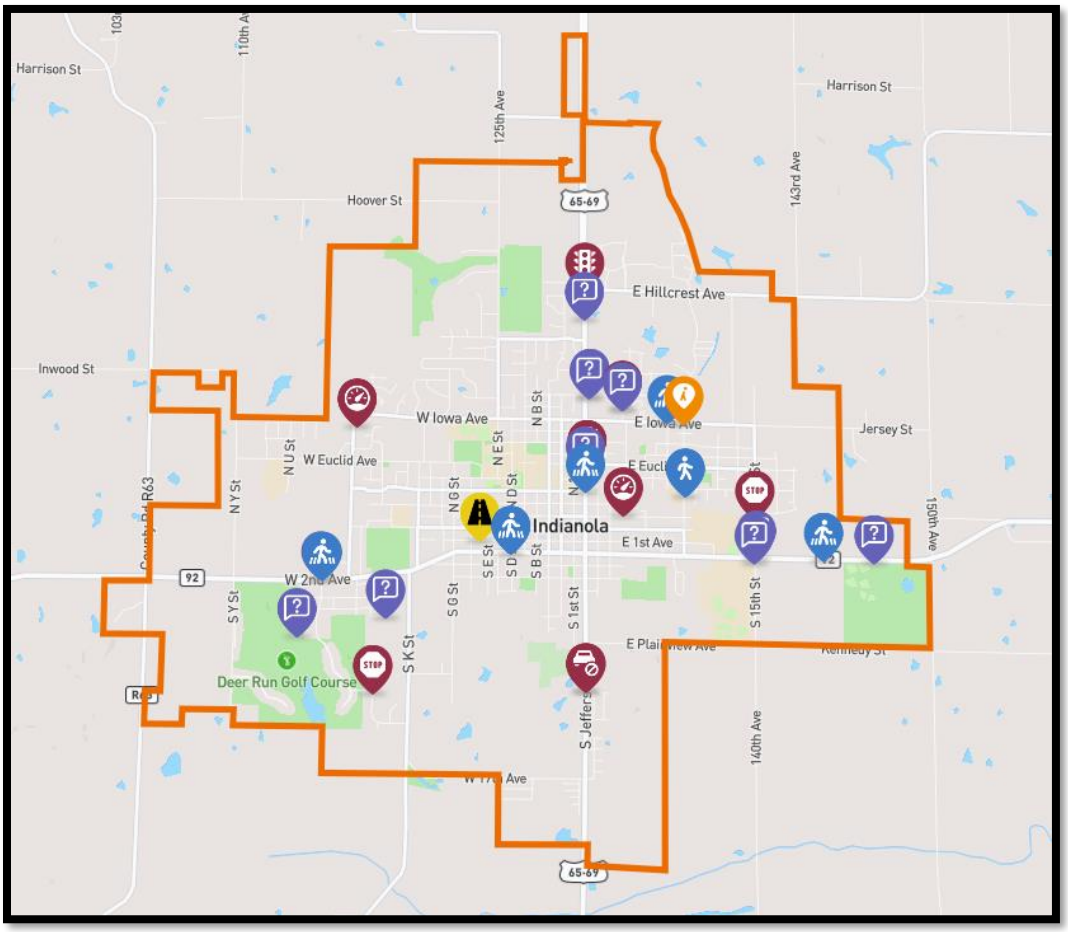
Caption: *Community members actively participating in a public engagement session, reviewing project boards to share feedback and discuss transportation and safety improvements for their area.*

Online Engagement

A project website utilizing the Social Pinpoint platform was created to gather feedback via an interactive commenting map and online survey.[1] Social Pinpoint is an interactive mapping tool that enables users to share their concerns, insights, and challenges related to the project. An example map of Indianola follows below (**Figure A2**) that shows key transportation and safety features, including pedestrian crossings, stop signs, and other transportation challenges that were identified by respondents. This feedback can be utilized potentially for areas to consider for safety improvements.

[1] fhu.mysocialpinpoint.com/central-iowa-safety-action-plan

Figure A2. Social Pinpoint Comment Map Highlighted Safety Features



Users could submit comments by dropping a pin at a specific location (see **Figure A3**). The map illustrates comments related to issues such as speeding, inadequate sidewalks, and traffic signal violations, for example.

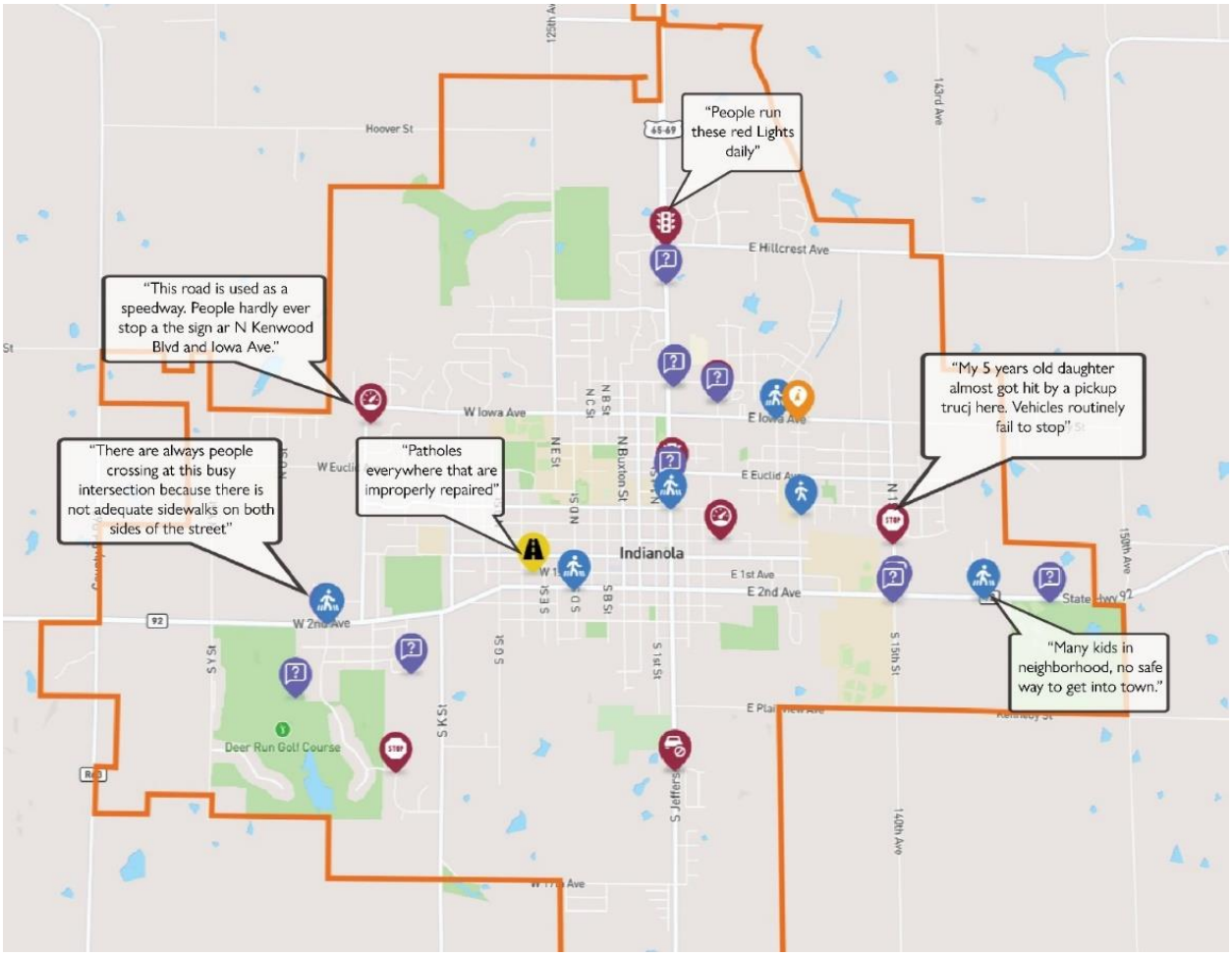
The CIRTPA website also includes a project webpage with a project description, and a link to the Social Pinpoint website (cirtpa.org/cirtpa-ss4a-safety-action-plan/).

Through the public involvement period, which ran from mid-June to the end of August, the Social Pinpoint site garnered **1,211** views, **1,077** visits, and **939** unique visitors. A total of **153** contributions were made, which includes 68 survey responses and 85 map comments made by 50 contributors. Respondents could "like" or "dislike" other comments. Four comments received likes, all of which came from Warren County. The liked comments included:

- This is a highly traveled intersection by students walking to Emerson Elementary and by young drivers headed to the high school. Without a crossing guard this is a very dangerous area before and after school. The temporary 4 way stop due to construction on Hillcrest has helped immensely- please consider making this permanent for the safety of our students. (**2 likes**)
- Potholes everywhere that are improperly repaired. (**1 like**)
- Feel there should be a stop light lots of traffic have had to wait 10-15 to go left off of South R St on Hwy 92. (**1 like**)
- Many kids in neighborhood, no safe way to get into town. (**1 like**)

See **Appendix** for a full set of map comments results.

Figure A3. Social Pinpoint Comment Map Highlighted Safety Comments



Summary of Public Input by City

The public input collected for the development of the CSAP consisted of feedback from across the CRITPA region, with most responses coming from member cities. Additionally, input was gathered from key stakeholders through CIRTPA and stakeholder meetings provided critical insights into the transportation dynamics and opportunities within each community.

Indianola received the highest number of responses with 28 comments, followed by Nevada with 15 and Knoxville with 11. Other cities such as Newton, Perry, and Boone received fewer comments, while De Soto had the least, with only one comment. This distribution of feedback provides valuable information for prioritizing transportation safety issues and addressing community concerns in the planning process.

Figure A4 identifies the Social Pinpoint comments by city, and **Table A2** summarizes the concerns and opportunities identified the principal communities in the CIRTPA region.

Figure A4. Social Pinpoint Comments by City

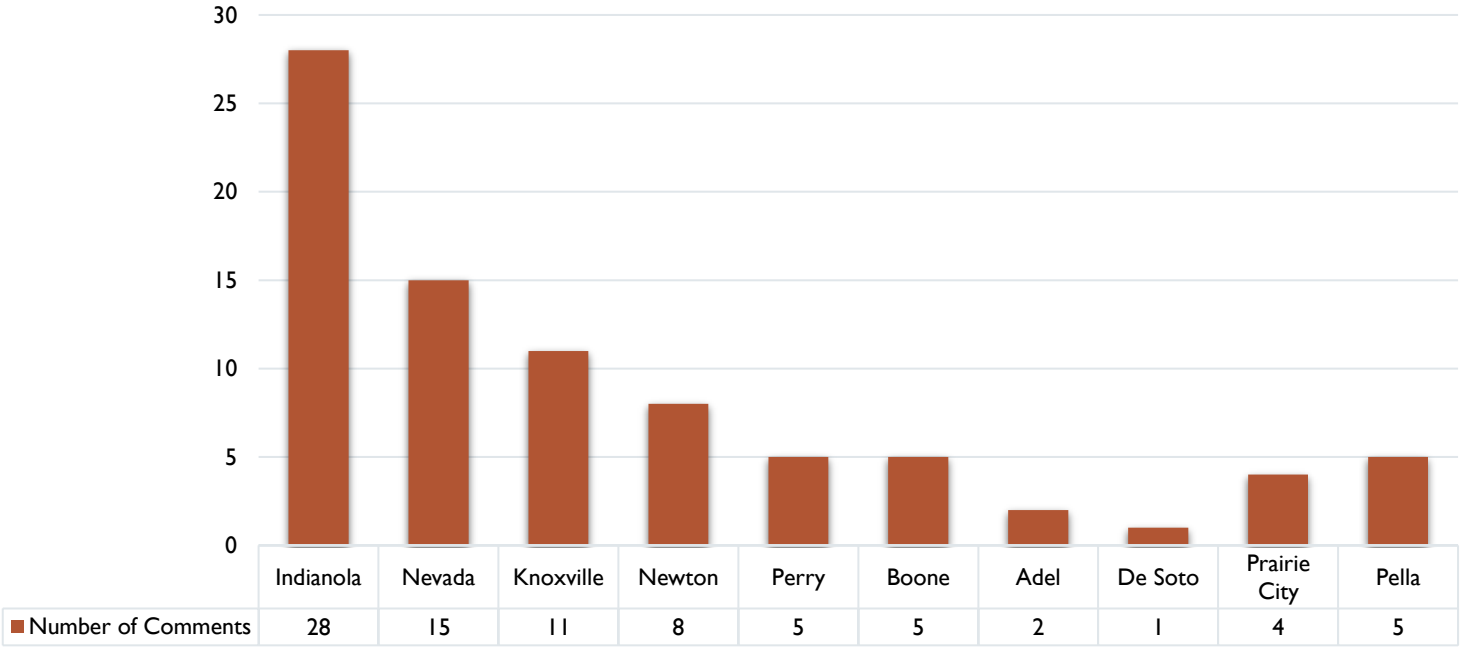


Table A2. City Specific Transportation Concerns and Opportunities

City	Top Concerns and Opportunities
Adel	Traffic Calming, Pedestrian Crossings; Need for traffic calming and crossing improvements
Boone	Speeding, Traffic Control, Intersection Safety; Excessive street widths, potential bicycle boulevard, intersection improvements, railroad crossings.
Huxley	Discontinuous trail segments; Enhanced bicycle-pedestrian safety; Highway 69 and I-35 connections.
Indianola	Traffic Calming, Intersection Safety; High-speed streets, dangerous intersections, need for speed bumps; Traffic issues related to high school; Create new routes around the city. Iowa DOT Highway 65/69 & G-24 intersection noted as very dangerous.
Knoxville	Pedestrian Safety; Speeding; Intersection Improvements and Signalization; Growth areas; Concerns around school areas.
Nevada	Pedestrian and Bicycle Safety, especially for children; Intersection improvements; Connection to Ames. Roundabout / intersection improvement opportunities
Newton	Speeding, Inconsistent Speed Limits, Pedestrian Safety, Road Infrastructure; Unsafe intersections, lack of sidewalks, and traffic control issues
Pella	Rush hour traffic along Highway 163; Safe Pedestrian Traffic and Driver / Pedestrian Expectations; Campus transportation.
Perry	Intersection Safety, Speeding especially on certain corridors, Traffic Control, Pedestrian Safety; Interest in turning lanes, signals, and control infrastructure
Winterset	Pedestrian infrastructure on north side of town; School traffic and student safety; Intersection improvements; Trail system expansion.

Winterset

Pedestrian safety concerns are noted on the northern side of the city near Hy-Vee. Safety concerns related to school traffic on the southern side of the city are highlighted. Residents point out opportunities for various street and intersection improvements. The growth of the trail system and regional connections presents an opportunity that requires planning for safe pedestrian and bicycle connections.

Indianola

Primary themes are **traffic calming**, **intersection safety**, and **pedestrian safety**. Safety concerns were mentioned at intersections along major roads such as Highway 92 due to heavy traffic. Safe roadway crossings for pedestrian-bicycle traffic for the trail system is an interest. Concerns were mentioned about speeding on North Kenwood Boulevard. The intersection of Highway 65/69 and G-24 north of Indianola was noted as extremely dangerous (no right turn lane for southbound traffic and median is too narrow for northbound traffic turning west).

Newton

The key themes are **speeding**, inconsistent speed limits on 1st Avenue (US-6), **pedestrian safety**, and **road infrastructure**. One commenter said they felt safe walking in the Square and immediate area, but not beyond that. Streets like East 7th Street North see frequent speeding in **residential areas**, and there are concerns about the absence of **stop signs** at crucial intersections. Additionally, the lack of **sidewalks** along major pedestrian routes results in the lack of a complete pedestrian network. City staff would like to evaluate the intersection of 12th and Highway 14. 1st Avenue on the southeast side of Newton is a growing area that was also shown as a concern for safety.

Perry

The focus is on **intersection and traffic safety**, particularly along Highway 141, where the lack of **turning lanes** is perceived as a hazard. Highway 141 and Highway 144/1st Avenue has the most crashes. Concerns about speeding, including on Highway 141 were reported. 16th Street was cited as a corridor for improvement. There is interest in exploring the potential for **turning lanes** and **signals**. **Pedestrian safety** is also a concern, with cars failing to yield at crosswalks, indicating a need for better **traffic control infrastructure**.

Boone

The main themes are **speeding**, **traffic control**, and **intersection safety**. Wide streets like Southeast Marshall Street are prone to speeding. A comment was made for improved safety at railroad crossings. High-speed intersections along 4th Street, such as Corporal Roger Snedden Drive and Division Street, may merit intersection improvements, while roads like 220th Street and Crown Flair Drive also highlight safety concerns. City staff are focused on paving **5-Mile Road** to relieve anticipated traffic. Pedestrian access to the city center from residential development near North 22nd Street, particularly for students, is in need of improvement, possibly along Tama Street. Also, the city is preparing for new industry coming east of Airport Road that will attract heavy truck traffic.

Adel

The major themes were speeds and traffic on Highway 6. The intersection of Nile Kinnick Drive and Greene Street/Highway 6 was mentioned as an intersection where improvements could be made to improve driver expectations at the intersection. Westbound Greene Street west of Nile Kinnick Drive has two lanes that quickly drop to one lane after the intersection.

Nevada

Pedestrian and bicycle traffic are increasing with **families** locating in the city. There is concern about continued safety challenges along Highway 30, despite the recent completion of the flyover project along 6th Street/3rd Street. This has resulted in increased traffic on 6th Street. Several recent safety projects have been completed such as H Avenue & 11th Street (stop signs), a school zone and SW 3rd Street. Offset trail crossing on S. 11th Street south of C street could be enhanced. A long-term goal is to improve **safety on the Lincoln Way route to Ames**, especially between 590th Avenue and 600th Avenue where major employers Verbio and Lincolnway Energy are located. 18th Street and Lincoln Way was noted as an opportunity for improvement, such as a possible roundabout.

Knoxville

Growth in the southern part of the city near Lincoln Street/Highway 14 and Bell Avenue presents safety challenges. The high school area was also noted as an area of concern. A **pedestrian crossing** has been installed along Lincoln Street. As additional housing growth is planned, monitoring this part of the city will be a key priority. The intersection of South Attica Road and Main Street was cited as a problematic intersection due to **driver expectations** along Attica Road and cross-traffic on Main Street that does not stop. The recent **road diet** project along Lincoln Street. /Highway 14 remains controversial, but some residents expressed that they think that it works well and support it, noting the safety improvements. A low clearance underpass on North 7th Street at Pleasant Street presents some issues for truck traffic. Speeding was cited as a concern as well as safety of golf carts on the road. As in other cities, city staff expressed concern about the effects of inflation on the cost of paint, which has limited the ability to provide or expand safety markings in the community.

Pella

The top priority is for eastbound traffic during the morning rush hour that currently backs up along Highway 163 approaching Clark Street to access the major employers in the vicinity. A pedestrian fatality occurred on Central College.

Huxley

Would like to continue to extend the system of **trails and side paths**. The mixed-use path along Highway 69 currently stops south of Centennial Drive. The Heart of Iowa Nature Trail has a gap on the southwest side of the town, which forces pedestrians to use 320th Street (E-63/W. 1st Street) where there is no protected shoulder or barrier. Providing additional safe means of non-vehicular travel and recreation is seen as a goal to improve public health for the community.

Public Survey Reponses

The survey was open to the public starting on June 10, 2024. Unfortunately, due to an error by the website provider, some of the data was irretrievably lost. Ultimately, 68 survey responses were available for use.

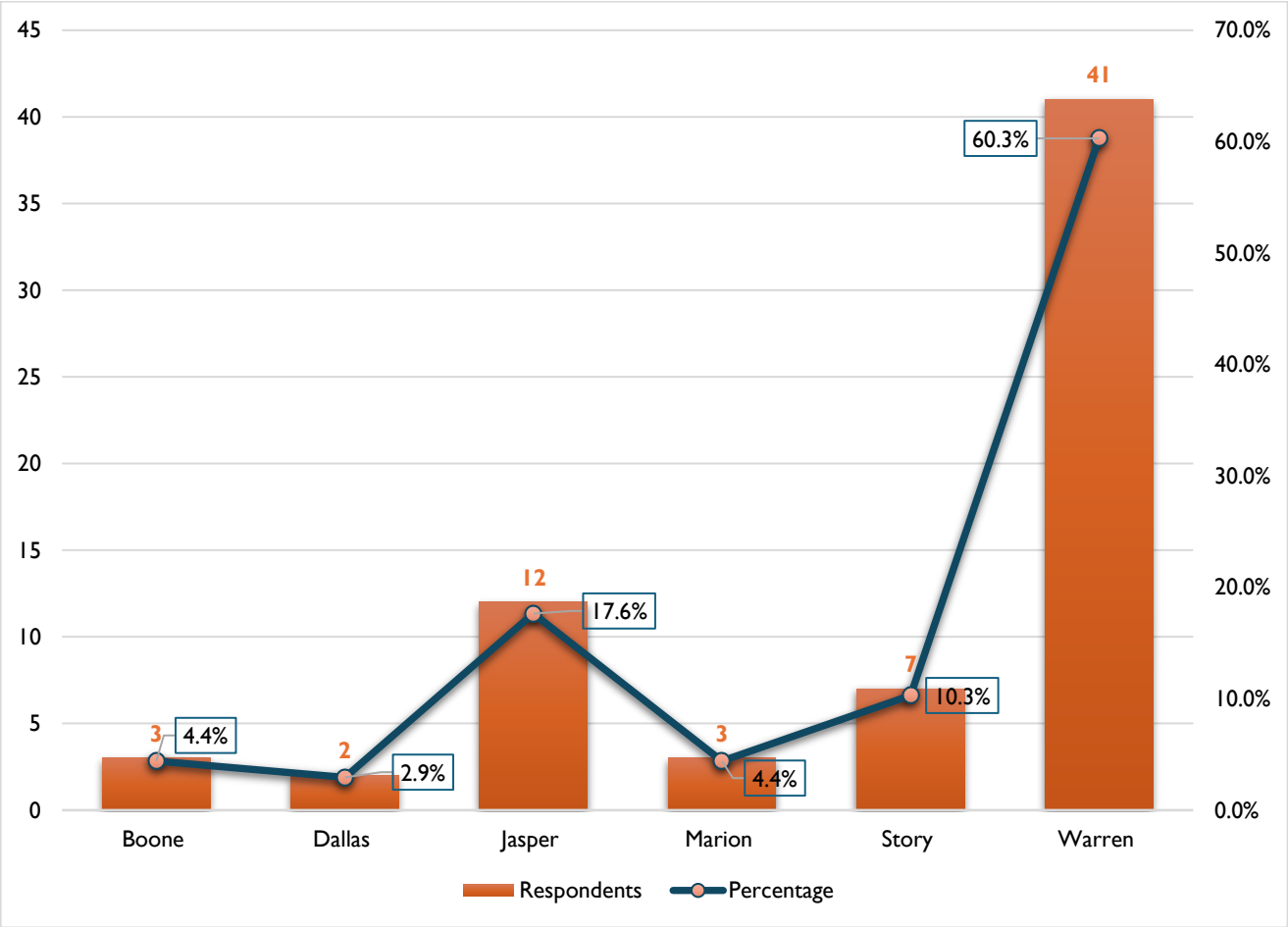
The survey responses were distributed across the CIRTPA region, covering all counties and cities. Warren County had the highest participation, contributing 41 responses.

See **Appendix** for the full set of survey responses.

Q1. Which county do you live in?

The survey responses were collected from six counties, with a total of **68 participants**. **Figure A5** shows the results of each county participants in the Area. This figure highlights that Warren County had the most significant participation, while the other counties provided smaller yet meaningful contributions. Additional data for the was collected through the public outreach activities and stakeholder meetings.

Figure A5. County of Residence



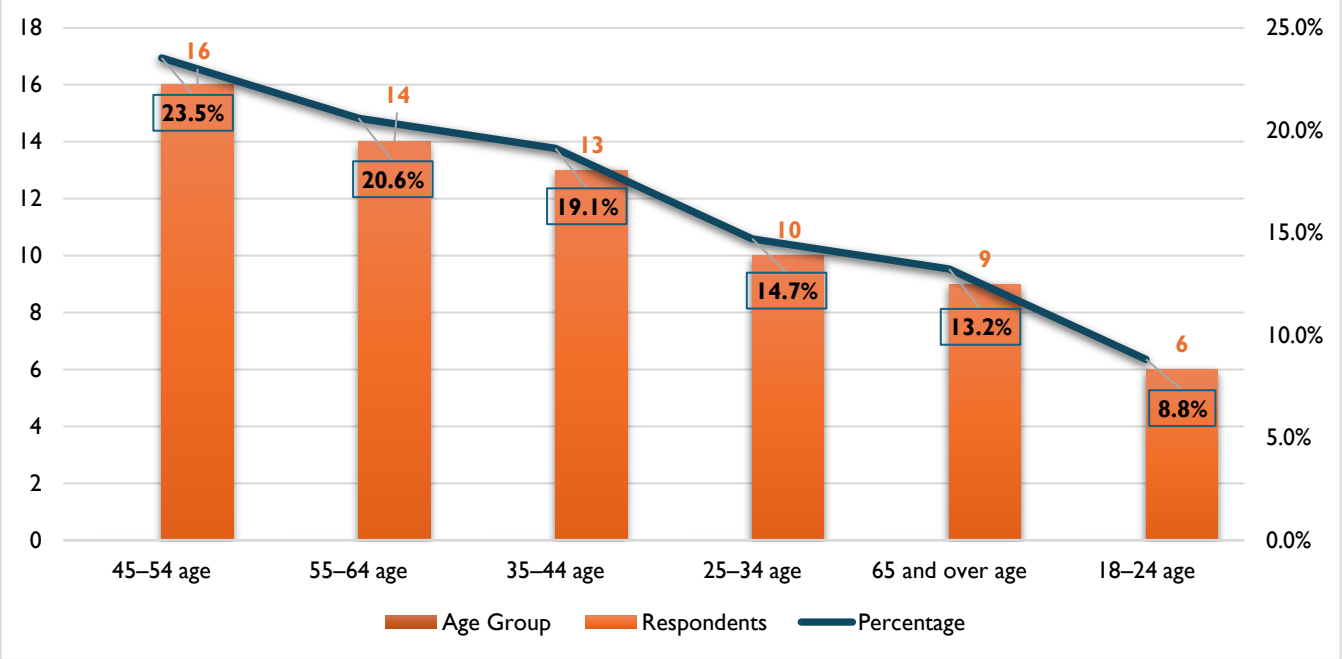
Q2. Which city do you live in?

Regarding the cities in which participants live, responses varied by county. In Boone County (**City of Boone**), most participants either did not specify a city or indicated the City of Boone. In Dallas County, the survey respondents were from **Perry** or did not specify a city. Jasper County (**Newton, Lambs Grove, Monroe, Unincorporated Areas**) had a more diverse response, with participants from four locations. Marion County (**Pella, Knoxville**) listed two cities. Story County (**Nevada**) had responses from one city. In Warren County (**Indianola, Martensdale, Cumming, Milo, Unincorporated Areas**), participants listed multiple cities as well as unincorporated areas.

Q3. What is your age group?

The survey data reveals a broad distribution of age groups among respondents. Notably, Warren County had the highest representation across all age groups, contributing 60.3% (**41 respondents**) of the total responses, while the other counties had a smaller yet significant number of participants. **Figure A6** shows the respondents numbers by age group. This demographic breakdown highlights a diverse range of age groups, with a notable concentration in the middle age ranges.

Figure A6. Survey Respondents by Age Group



Q4. How do you feel when using the following modes of transportation? (Personal vehicle, Commercial vehicle, Motorcycle, Bike, Walking, Wheelchair or other mobility assistance device)?

Across the CIRTPA region, Driving or riding in a personal vehicle emerged as the most positively perceived mode, with **63%** of the total 68 responses rating it as Very Safe or Somewhat Safe. Walking or running also received favorable feedback, with **43%** indicating positive ratings. Motorcycles had the most safety concerns, with **9%** of participants rating them as Somewhat Unsafe or Very Unsafe. Bikes/e-bikes received mixed reviews, with **19%** rating them positively and **31%** feeling uncertain. Mobility devices consistently had high uncertainty, with **59%** of participants selecting "I don't know."

Boone County

Walking or running was the most positively perceived mode, with **58.33%** rating it as **Very Safe** or **Somewhat Safe**, and **8.33%** found it **Somewhat Unsafe** or **Very Unsafe**. Motorcycles and mobility devices had high levels of uncertainty, with **33.33%** selecting **"I don't know."**

Dallas County

Driving or riding in a commercial vehicle was seen as **Somewhat Safe** or **Very Safe** by **45.45%**, while walking or running received positive safety ratings from **36.36%.** However, motorcycles and mobility devices had significant uncertainty, with **54.55%** of respondents selecting **"I don't know."**

Jasper County

Walking or running had **40%** of respondents rating it as **Somewhat Safe** or **Very Safe.** Bikes/e-bikes had **50%** of responses indicating they were **Neither Safe nor Unsafe**, and motorcycles were seen as the least safe, with **40%** rating them as **Very Unsafe.**

Marion County

Walking or running and driving/riding in commercial vehicles were the most positively rated, with **55.56%** marking them as **Somewhat Safe** or **Very Safe.** Motorcycles and mobility devices had high levels of uncertainty, with **44.44%** selecting **"I don't know."**

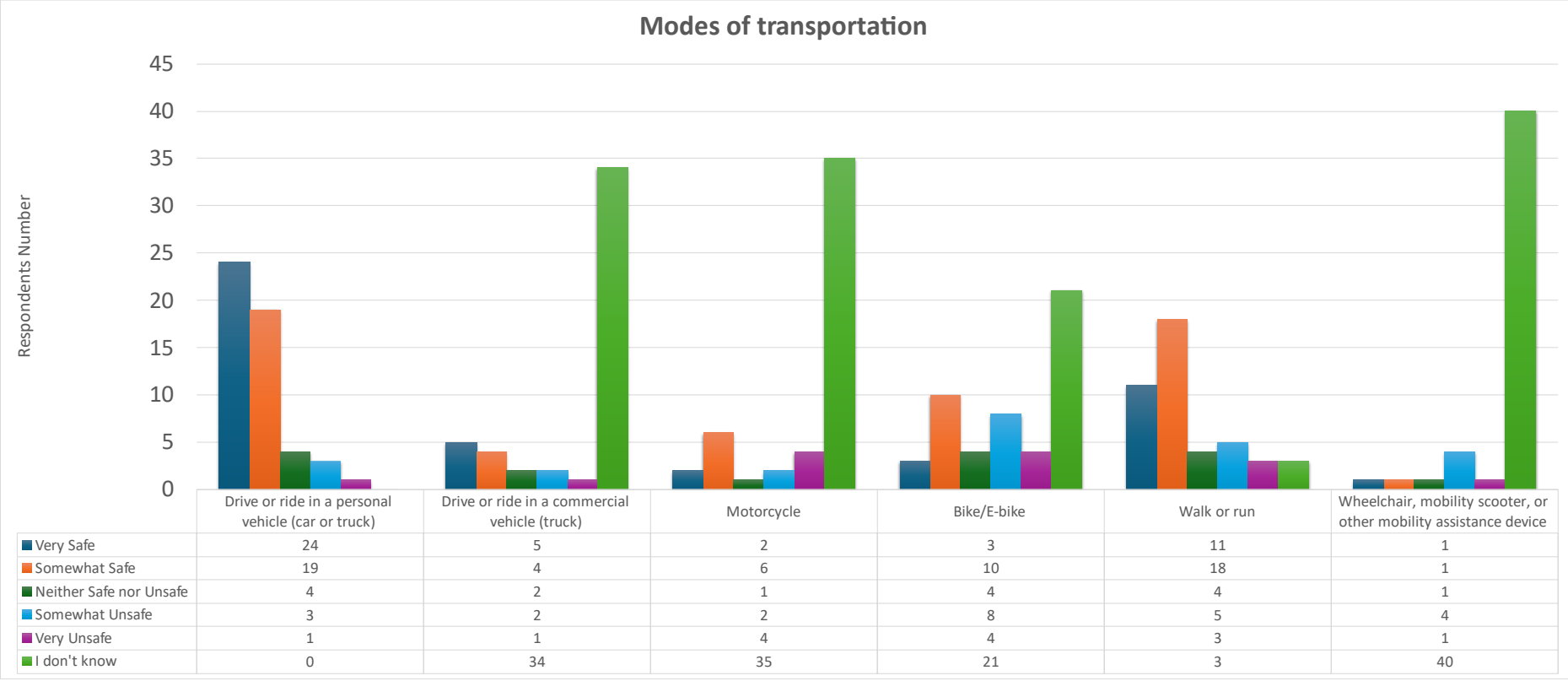
Story County

Walking or running received the highest positive ratings, with **42.86%** marking it as **Very Safe** or **Somewhat Safe.** Motorcycles and bikes/e-bikes were rated as **Neither Safe nor Unsafe** by **35.71%,** and mobility devices were uncertain for **50%** of respondents who selected **"I don't know."**

Warren County

Walking or running and driving/riding in commercial vehicles were positively rated by **41.67%,** while motorcycles and bikes/e-bikes had **50%** of responses indicating they were **Somewhat Unsafe** or **Very Unsafe.** Mobility devices had a high level of uncertainty, with **41.67%** selecting **"I don't know."**

Figure A7. Perception of Safety by Mode of Transportation



	Drive or ride in a personal vehicle (car or truck)	Drive or ride in a commercial vehicle (truck)	Motorcycle	Bike/E-bike	Walk or run	Wheelchair, mobility scooter, or other mobility assistance device
Very Safe	24	5	2	3	11	1
Somewhat Safe	19	4	6	10	18	1
Neither Safe nor Unsafe	4	2	1	4	4	1
Somewhat Unsafe	3	2	2	8	5	4
Very Unsafe	1	1	4	4	3	1
I don't know	0	34	35	21	3	40

Q5. Community Safety Concerns

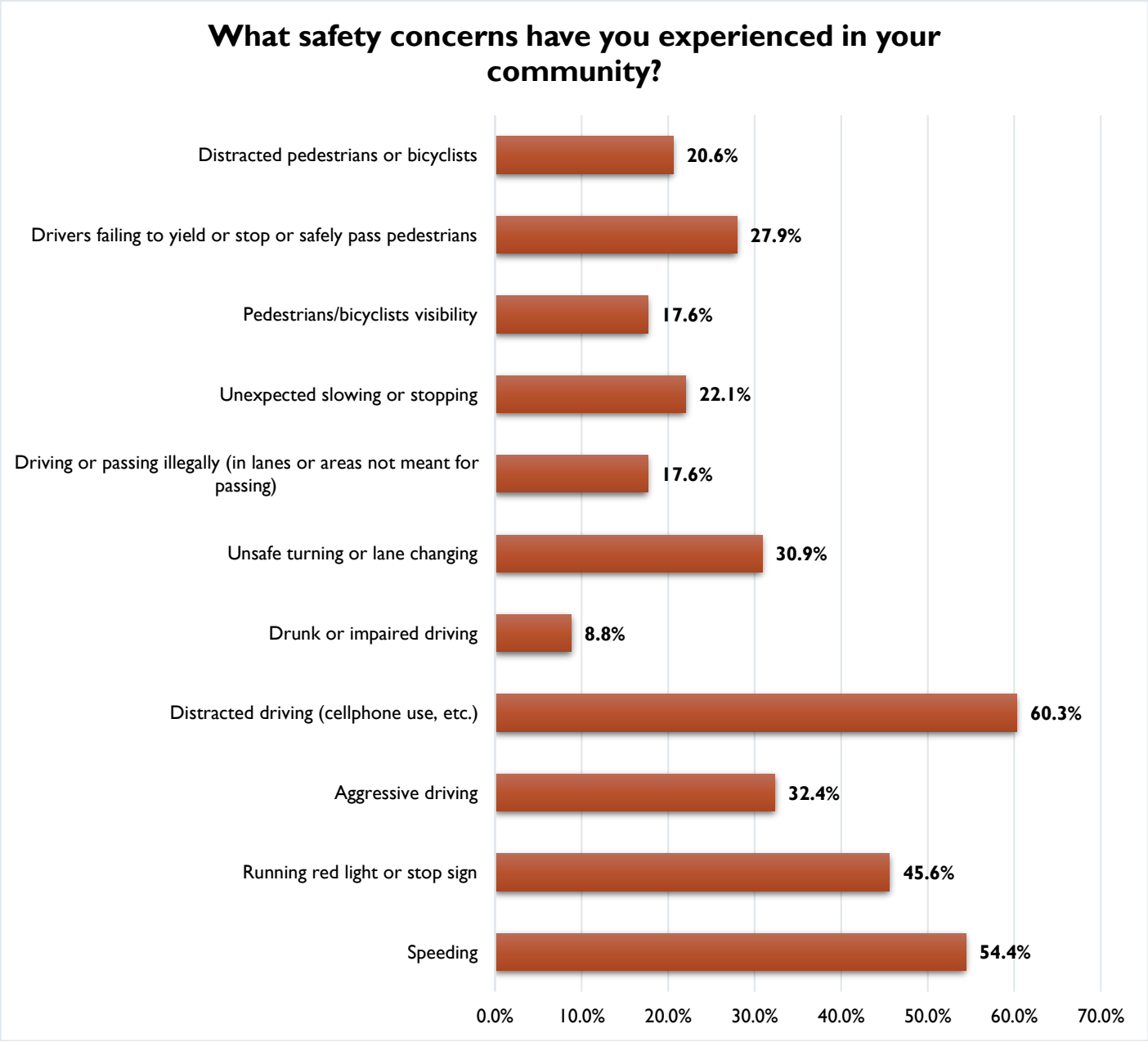
The data clearly shows that **distracted driving**, particularly cellphone use, stands out as the top safety concern, noted by 60.3% of residents. **Speeding** is another widespread issue, with over half (54.4%) of respondents identifying it as a danger on the roads. **Running red lights or stop signs** (45.6%) and **aggressive driving** (32.4%) were also mentioned as traffic safety concerns. Interestingly, while impaired driving is often considered a major concern in many regions, only 8.8% of respondents flagged it, indicating perhaps a focus on everyday, more frequent risks. In addition, **pedestrian and bicyclist safety issues** received significant response, with nearly 28% of people worried about unsafe passing and 20.6% noted distracted walkers or cyclists.

Example Comments:

"Speeding is a significant concern on our roads. We must implement effective measures to control excessive speeds and ensure road safety."

"Aggressive driving poses a substantial risk on our roads. Promoting safe driving behaviors is crucial to mitigate this issue."

Figure A8. Community Safety Concerns



Q6. Roadway Safety Issues

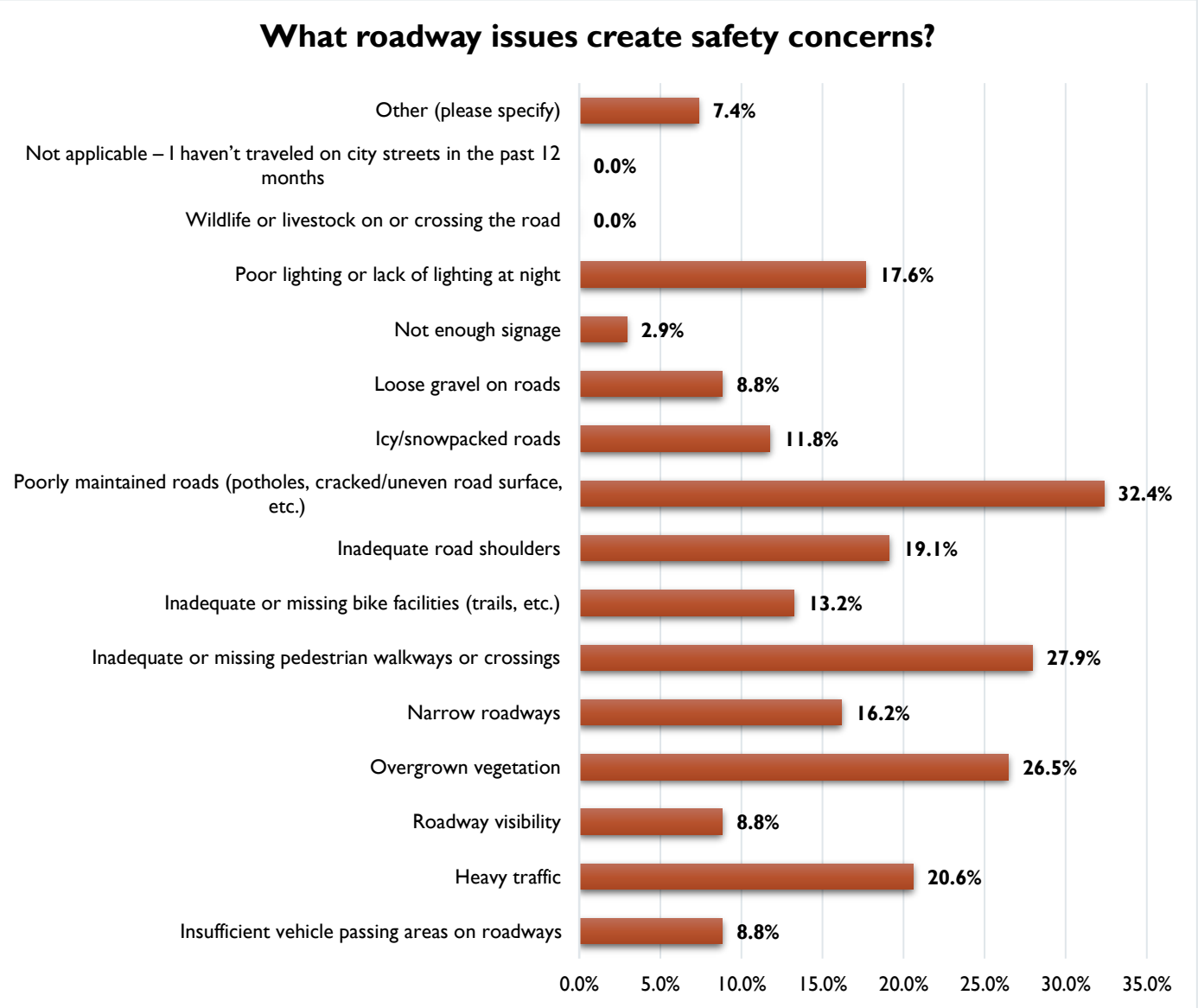
Respondents were asked to select any safety issues that they experience in their communities. Several options received significant response. The top two most commonly cited issues were roadway conditions (potholes, road surface conditions) and inadequate or missing pedestrian crossings.

Example Comments:

"Poorly maintained road surfaces are a significant concern. Upgrading these surfaces is vital for enhancing road safety."

"Overgrown vegetation affects visibility and safety. Regular maintenance is needed to improve road conditions and prevent accidents."

Figure A9. Roadway Safety Issues



Q7. Walk or Bike Preferences

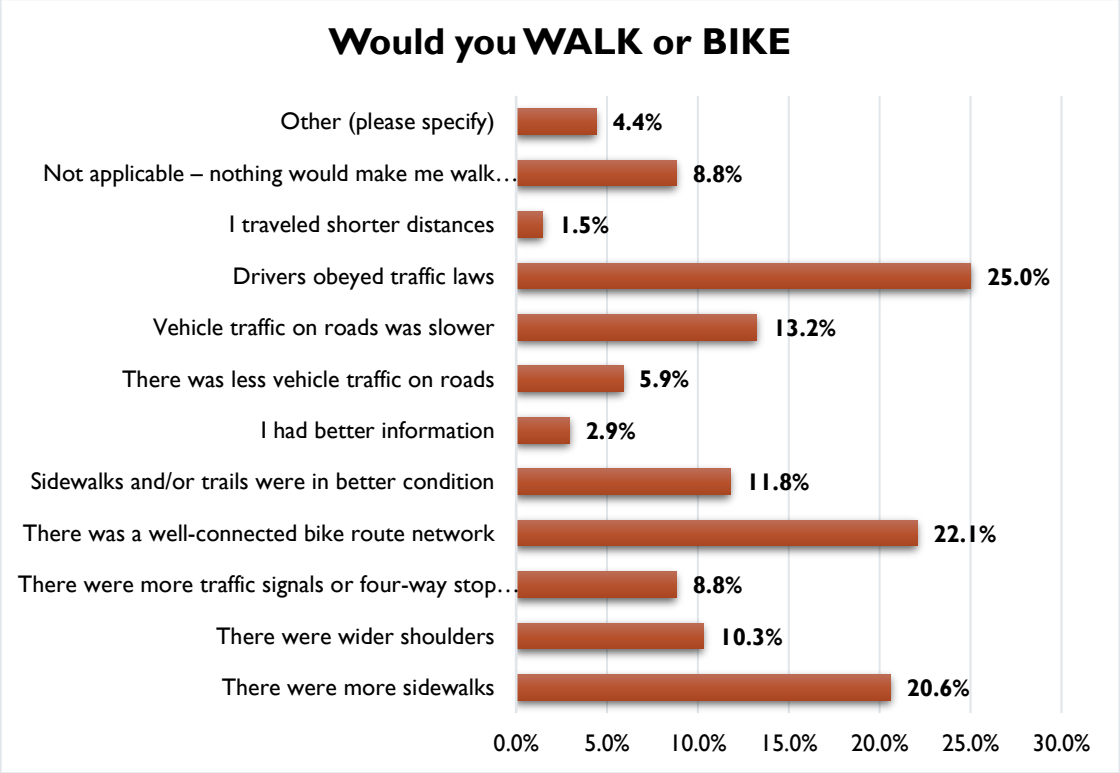
Respondents stated that the primary factor that would encourage people to walk or bike more is if drivers **obeyed traffic laws**, with 25% of respondents identifying this as a top motivator. This indicates a strong desire for safer road interactions between drivers, pedestrians, and cyclists. A **well-connected bike route network** received the second-most responses, with 22.1% of participants noting this. **Sidewalk infrastructure** also plays a crucial role, as 20.6% mentioned the need for more sidewalks, and 11.8% pointed out the importance of **better-maintained sidewalks and trails**. Traffic conditions further influence these decisions, with 13.2% preferring **slower vehicle traffic**, and 5.9% would be more likely to walk or bike if there was **less vehicle traffic overall**. These results emphasize the need for a holistic approach to pedestrian and cycling infrastructure improvements, focusing on safety, connectivity, and road conditions.

Example Comments:

"If drivers obeyed traffic laws, more people would choose to walk or bike. Ensuring law compliance can promote healthier transportation options."

"There is a need for more sidewalks and better-maintained ones. Investing in sidewalk infrastructure will support safer walking."

Figure A10. Walk or Bike Preferences



Q8. Safety Solutions Priorities

The community's top priority according to the survey is **improving road surface conditions**, with 26.5% signaling a desire for safer, well-maintained roads. **Policy and enforcement changes** addressing user behaviors follow closely at 23.5%. The designation of **Safe Routes to School** (11.8%) and the improvement of **traffic flow through lanes and signals** (10.3%) are also noted as concerns. Additionally, better **street**

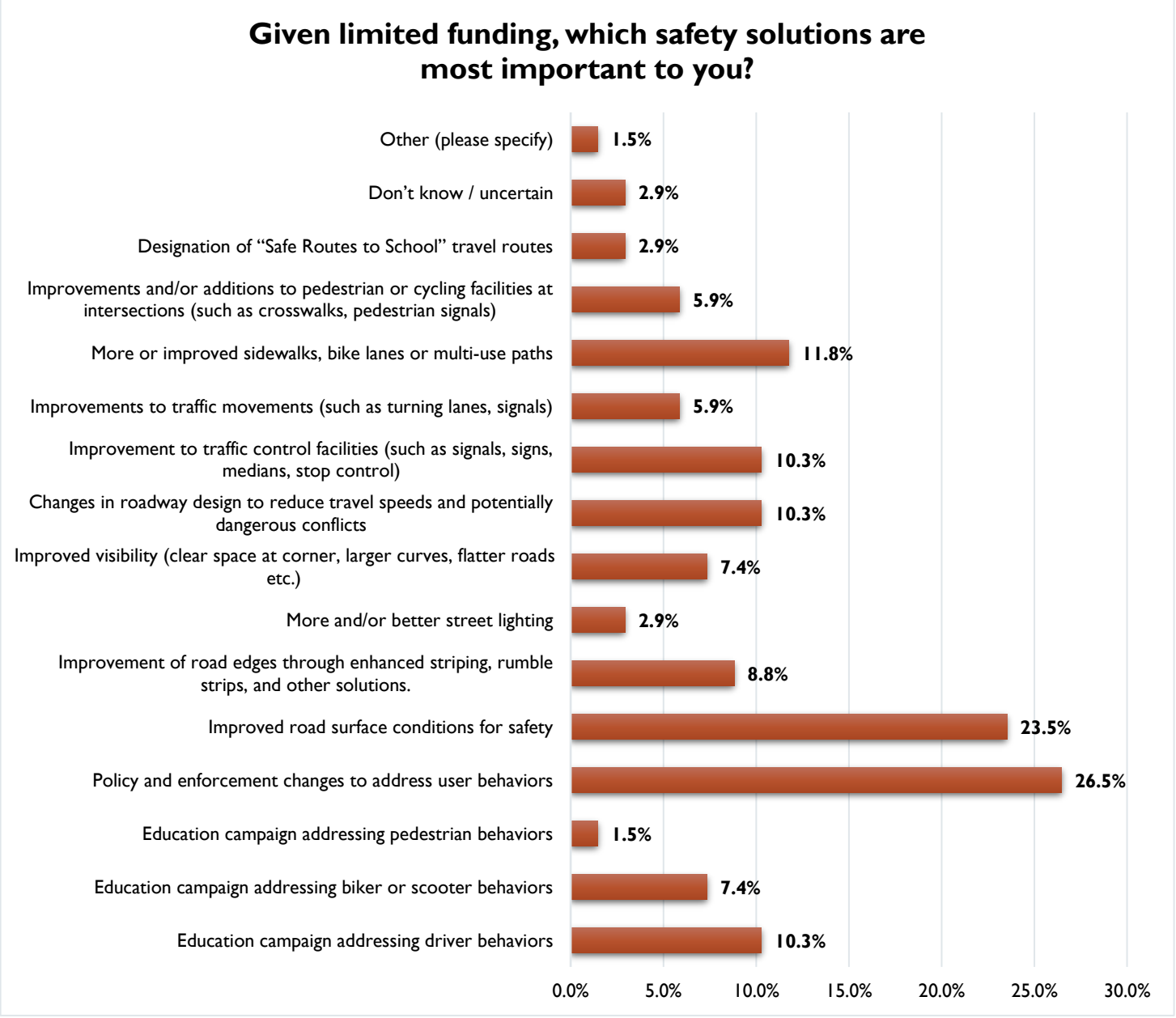
lighting (8.8%) and enhanced signage at dangerous crossings received some support for physical improvements and behavior-focused safety measures.

Example Comments:

"Stricter traffic regulations and enforcement are needed. These changes can address dangerous driving behaviors and improve road safety."

"Enhancing traffic flow through better lanes and signals is needed. Efficient traffic management can reduce congestion and accidents."

Figure A11. Safety Solution Priorities



Q9. Witnessed or Experienced Incidents

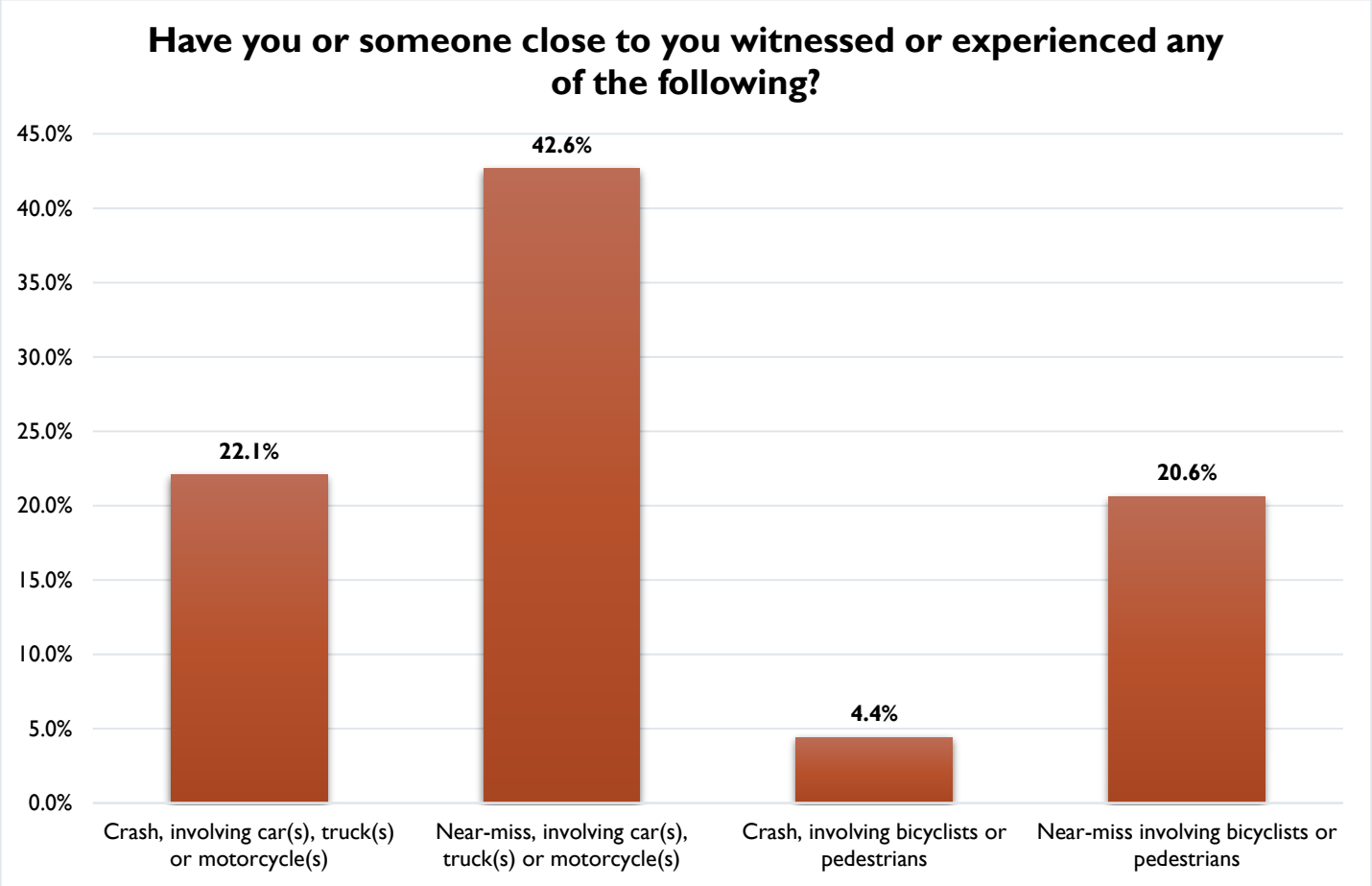
A sizeable percentage of respondents (42.6%) respond that they have **witnessed or experienced near-misses** involving cars, trucks, or motorcycles, indicating that safety is a widespread concern. **Crashes involving vehicles** follow at 22.1%, reinforcing the importance of safety improvements. **Near-misses involving bicyclists or pedestrians** also rank high at 20.6%, indicating challenges for vulnerable road users. **Crashes involving bicyclists or pedestrians** were noted by 4.4% of respondents.

Example Comments:

"Crashes involving vehicles are a serious concern. Implementing safety measures and improving road designs can help reduce these incidents."

"Crashes involving pedestrians and cyclists are alarming. Focused safety measures are necessary to address these serious issues."

Figure A12. Witnessed or Experienced Incidents



Comprehensive Safety Action Plan
Appendix B

DESCRIPTIVE AND SYSTEMIC ANALYSIS SUMMARY

Prepared for:

Central Iowa Regional Transportation Planning Alliance
939 Office Park Road, Suite 306
West Des Moines, IA 50265

Prepared by:

Felsburg Holt & Ullevig
1300 Walnut Street, Suite 101
Des Moines, IA 50309
515.493.2757

FHU Reference No. 122668-01

Table of Contents

Descriptive Analysis **3**
Data Collection 3
Crash History 3
Age of Driver/Operator 4
Roadway Classification 5
Traffic Volumes 6
Roadway Surface Conditions 6
Lighting Conditions 7
Posted Speed Limit 7
Major Cause of Crash 9
Crash Types 10
Crash Locations 14
Fatal Crashes 16
Summary of Descriptive Analysis **18**
Overrepresented Crashes **19**
Focus Crash Refinement **21**
Normal Condition 21
Redundancy 21
Total Crash Frequency 21
Roadway Risk Factors **22**
Crash Trees 22
Development of High Injury Network **24**
Next Steps **25**
Appendix B1 – Crash Data Tables **26**
Total Crash Tables 27
Intersection Crash Tables 33
Segment Crash Tables 38
Municipality Crash Tables 43
Appendix B2 – High Injury Network (HIN) Maps **54**

Descriptive Analysis

This memo summarizes the results and findings of the crash analysis for the Central Iowa Regional Transportation Planning Alliance (CIRTPA) as part of the development of CIRTPA's Comprehensive Safety Action Plan (CSAP). The targeted area of the CSAP plan is the cities within the CIRTPA planning area. The data analysis conducted provides an understanding of the region's safety trends and challenges. The findings from the data analysis will help establish the steps that the region needs to realize the commitment of Vision Zero.

The analysis provides a summary of the locations where crashes are occurring and the severity of the crashes. The data was also analyzed for all relevant road users including motor vehicles, motorcyclists, pedestrians, and pedalcyclist. Contributing factors and roadway characteristics such as crash type, speed limit, traffic control, were reviewed as part of the analysis conducted. High-risk contributing factors were identified and used to conduct a systemic analysis to predict locations that are most likely to experience fatal and serious injury crashes based on the characteristics.

Data Collection

Crash data was obtained using the Iowa Crash Analysis Tool (ICAT) to review and document existing safety conditions in the study area. The most recently available 5-year period of crash data is from January 1, 2018, to December 31, 2022. It should be noted that crash history from 2020 through 2021 may be impacted by the widespread impacts to travel patterns and subsequently crash frequency stemming from the COVID-19 pandemic.

The Iowa DOT Vulnerable Road Users (VRU) Intersections and Iowa DOT Road Network geocoded data were used to supplement the ICAT data to provide intersection and segment characteristics in the CIRTPA planning area. This data provides additional roadway characteristics such as type of traffic control, type of median, and number of lanes.

Crash History

The CIRTPA regional crash history for the period of January 1, 2018, to December 31, 2022, was evaluated to understand the magnitude and nature of existing safety concerns within the study area.

Table B1 summarizes the total crashes by severity over the five-year study period.

Table B1. Crash Severity by Year (2018-2022)

Year	Fatal (K)	Major (A)	Minor (B)	Possible (C)	PDO (O)	Total Crashes	% of Total Crashes	# of KSI Crashes*	% of KSI Crashes*	% of KSI Crashes per Year*
2018	2	22	102	145	919	1,190	20.4%	24	19.7%	2.0%
2019	2	20	108	169	1,000	1,299	22.3%	22	18.0%	1.7%
2020	2	19	95	118	795	1,029	17.7%	21	17.2%	2.0%
2021	3	21	88	179	859	1,150	19.7%	24	19.7%	2.1%
2022	5	26	117	140	871	1,159	19.9%	31	25.4%	2.7%
Totals	**14**	**108**	**510**	**751**	**4,444**	**5,827**	**100.0%**	**122**	**100.0%**	**2.1%**

*KSI = Killed or Seriously Injured

During the study period, 5,827 crashes were recorded, of which 4,444 resulted in Property Damage Only (PDO), 751 resulted in Possible Injury (C), 510 resulted in Minor Injury (B), 108 resulted in Major Injury (A), and 14 crashes resulted in fatal collisions. Of the 5,827 crashes, 1,369 resulted in injuries (1,896 people injured), and 13 were fatal collisions (14 people killed). In general, fatal and serious injury (KSI) crashes have been linearly increasing from 2018 to 2022, with a slight dip in 2020 that may be associated with the COVID-19 pandemic. Over the 5-year period, there were approximately 24.4 KSI crashes per year that occurred within the municipalities of the CIRTPA planning area.

The crash history for the period of January 1, 2018, to December 31, 2022, was also evaluated and reviewed for crashes that involved a vulnerable user. Vulnerable road users (VRUs) are non-motorists who share and use the transportation infrastructure provided in our communities. These users are typically at a greater risk of collision and major injuries because they are unprotected by an outside shield (i.e., a car). For the purpose of this analysis, pedestrians, pedalcyclists (bicyclists), and other non-motorists were identified as VRUs. There were several crashes that noted the involvement of a non-motorist but did not specify the type of user. These were grouped into the "other non-motorists" mode to account for all VRU crashes. During the 5-year period, there were a total of 51 other non-motorist crashes, 21 pedestrian crashes, and 20 pedalcyclist crashes reported. **Table B2** summarizes the VRU crashes by severity over the five-year study period.

Table B2. VRU Crash Severity by Year (2018-2022)

Year	Fatal (K)	Major (A)	Minor (B)	Possible (C)	PDO (O)	Total Crashes	% of Total Crashes	# of KSI Crashes*	% of KSI Crashes*	% of KSI Crashes per Year*
2018	0	0	8	5	0	13	14.1%	0	0.0%	0.0%
2019	0	5	6	8	0	19	20.7%	5	35.7%	26.3%
2020	0	4	5	7	0	16	17.4%	4	28.6%	25.0%
2021	1	2	12	8	0	23	25.0%	3	21.4%	13.0%
2022	0	2	15	3	1	21	22.8%	2	14.3%	9.5%
Totals	**1**	**13**	**46**	**31**	**1**	**92**	**100.0%**	**14**	**100.0%**	**14.8%**

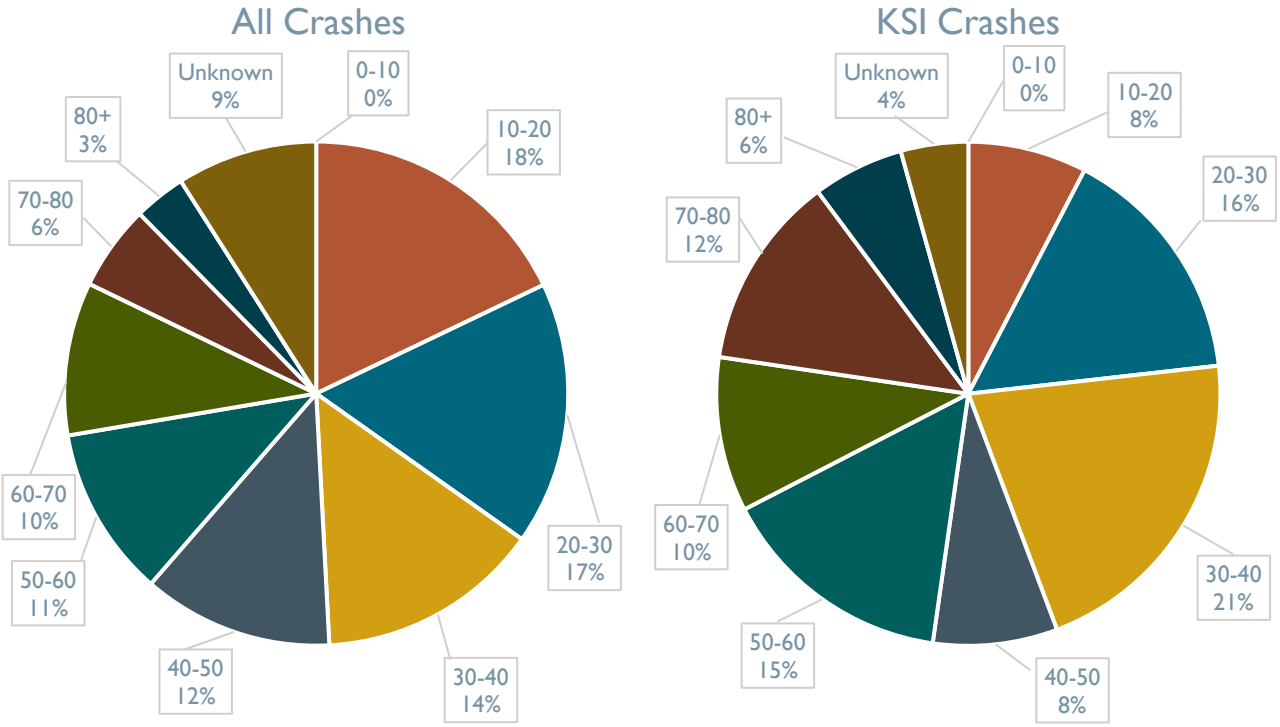
*KSI = Killed or Seriously Injured

Over the last five years, VRUs were involved in 31 Possible (C) injury crashes, 46 Minor (B) injury crashes, 13 Major (A) injury crashes, and 1 Fatal (K) crash. A total of 14 KSI crashes occurred during the 5-year period. This equated to approximately 15% of vulnerable crashes per year resulting in a KSI crash. It should be noted that the number of non-injury VRU crashes and single VRU crashes are often under-reported due to biases in the crash reporting process, which might explain why PDO (O) crashes only make up one of the 92 recorded VRU crashes reported.

Age of Driver/Operator

The age of the driver of the primary vehicle involved in a crash was reviewed for the study area. **Figure B1** provides a breakdown of the total crashes and KSI crashes that occurred for various age groups.

Figure B1. Total Crashes by Age



The data shows that more than a third (37%) of KSI crashes involved a driver or operator between the ages of 20 and 40 years old while nearly a quarter (22%) of all crashes involved drivers over the age of 70 years old.

Roadway Classification

Crashes within the municipalities of the CIRTPA planning area were compared based on the Federal Functional Classification of the major street where the crash occurred. This information provides an understanding of roadways where KSI crashes are occurring. **Table B3** provides a summary of 5-year crash history based on the roadway classification.

Table B3. Crashes by Federal Classification

Classification	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of VRU Crashes	% of VRU Crashes
Local	2,246	38.5%	35	28.7%	1.6%	40	43.5%
Minor Collector	58	1.0%	6	4.9%	10.3%	3	3.3%
Major Collector	760	13.0%	19	15.6%	2.5%	19	20.3%
Minor Arterial	1,390	23.9%	31	25.4%	2.2%	15	16.3%
Principal Arterial	1,339	23.0%	31	25.4%	2.3%	15	16.3%
Unknown	34	0.6%	0	0.0%	0.0%	0	0%
Totals	**5,827**	**100.0%**	**122**	**100.0%**	**2.1%**	**92**	**100.0%**

VRU=Vulnerable Road User

A significant portion of all crashes, 38.5%, occurred on Local streets, which make up 32% of roadways analyzed within the CIRTPA planning area in terms of street miles. Of the 92 VRU crashes recorded, 40 of them occurred on Local streets. A high percentage of all crashes and KSI crashes also occurred on Minor and Principal Arterials.

Traffic Volumes

Crashes within the municipalities of the CIRTPA planning area were summarized based on the Annual Average Daily Traffic (AADT) on the major roadway where the crash occurred. **Table B4** provides a summary of the 5-year crash history based on the AADT.

Table B4. Crashes by AADT

AADT	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of VRU Crashes	% of VRU Crashes
0-1,000	2,018	34.6%	42	34.4%	2.1%	32	34.8%
1,000-5,000	1,875	32.2%	38	31.1%	2.0%	35	38.0%
5,000-10,000	1,396	24.0%	30	24.6%	2.1%	22	23.9%
10,000-15,000	197	3.4%	6	4.9%	3.0%	1	1.1%
15,000-20,000	295	5.1%	6	4.9%	2.0%	2	2.2%
20,000+	0	0.0%	0	0.0%	0.0%	0	0.0%
No AADT Available	46	0.8%	0	0.0%	0.0%	0	0.0%
Totals	**5,827**	**100.0%**	**122**	**100.0%**	**2.1%**	**92**	**100.0%**

VRU=Vulnerable Road User

As shown in the table, 91% of all crashes and 90% of KSI crashes occurred on roads with AADTs with less than 10,000 vehicles. It should be noted that the crash data reviewed as part of this study only included crashes within the municipal boundaries where most of the streets have low volumes.

Roadway Surface Conditions

Crashes within the municipalities of the CIRTPA planning area were summarized based on the roadway surface conditions at the time of the crash. **Table B5** provides a summary of 5-year crash history based on the roadway surface conditions.

Table B5. Crashes by Road Surface Condition

Road Surface Condition	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of VRU Crashes	% of VRU Crashes
Snow	361	6.2%	2	1.6%	0.6%	0	0.0%
Slush	44	0.8%	0	0.0%	0.0%	1	1.1%
Ice/frost	229	3.9%	2	1.6%	0.9%	0	0.0%
Wet	593	10.2%	8	6.6%	1.3%	8	8.7%
Dry	4,214	72.3%	107	87.7%	2.5%	83	90.2%
Mud/dirt	1	0.0%	0	0.0%	0.0%	0	0.0%
Sand	7	0.1%	0	0.0%	0.0%	0	0.0%
Gravel	31	0.5%	3	2.5%	9.7%	0	0.0%
Water (standing/moving)	1	0.0%	0	0.0%	0.0%	0	0.0%
Unknown	34	0.6%	0	0.0%	0.0%	0	0.0%
Other	7	0.1%	0	0.0%	0.0%	0	0.0%
Not Reported	305	5.2%	0	0.0%	0.0%	0	0.0%
Totals	**5,827**	**100.0%**	**122**	**100.0%**	**2.1%**	**92**	**100.0%**

VRU=Vulnerable Road User

As shown in the table, 72.3% of all crashes and 87.7% of KSI crashes occurred when the surface condition of the road was dry. Approximately 10% of all crashes and 7% of KSI crashes occurred when the roadway surface was wet.

Lighting Conditions

Crashes within the municipalities of the CIRTPA planning area were summarized based on the lighting conditions at the time of the crash. **Table B6** provides a summary of 5-year crash history based on the lighting conditions.

Table B6. Crashes by Lighting Conditions

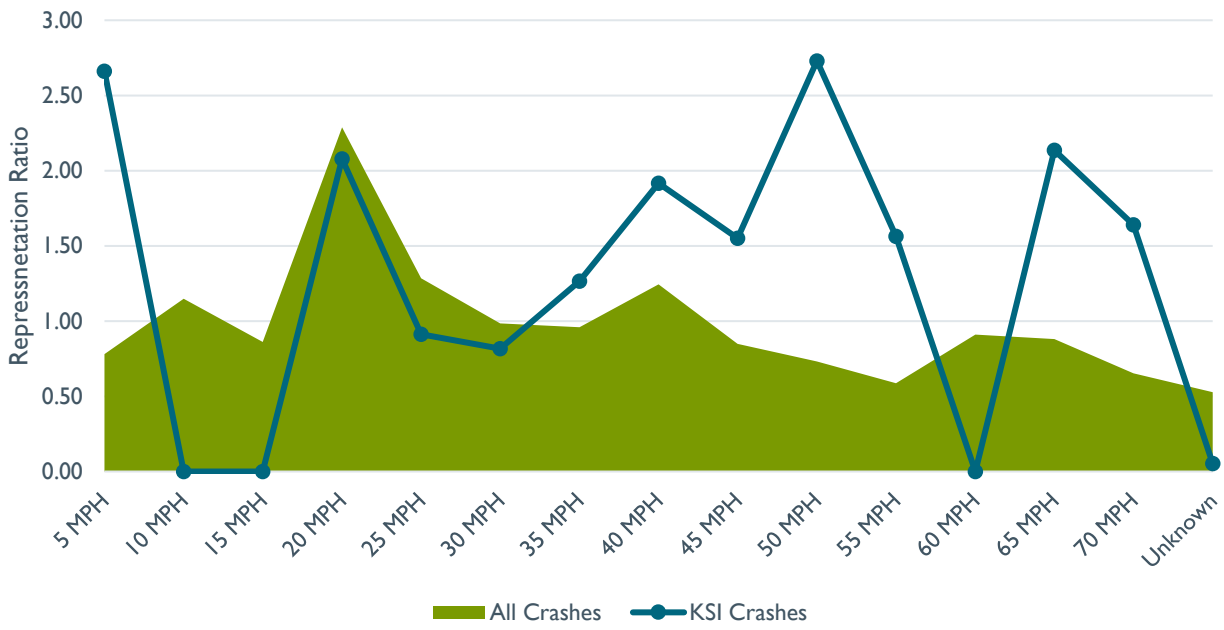
Light Conditions	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of VRU Crashes	% of VRU Crashes
Dark - Roadway Lighted	685	11.8%	17	13.9%	2.5%	9	9.8%
Dark - Roadway Not Lighted	294	5.0%	13	10.7%	4.4%	3	3.3%
Dark - Unknown Roadway Lighting	48	0.8%	2	1.6%	4.2%	2	2.2%
Dawn	115	2.0%	1	0.8%	0.9%	1	1.1%
Daylight	4,181	71.8%	84	68.9%	2.0%	73	79.3%
Dusk	165	2.8%	5	4.1%	3.0%	4	4.3%
Unknown	36	0.6%	0	0.0%	0.0%	0	0.0%
Not Reported	303	5.2%	0	0.0%	0.0%	0	0.0%
Totals	**5,827**	**100.0%**	**122**	**100.0%**	**2.1%**	**92**	**100.0%**

As shown in the table, 71.8% of all crashes and 69% of KSI crashes occurred during daylight. Approximately 17.6% of all crashes and 27% of KSI crashes occurred during dark conditions (nighttime) regardless of the roadway being lighted or not.

Posted Speed Limit

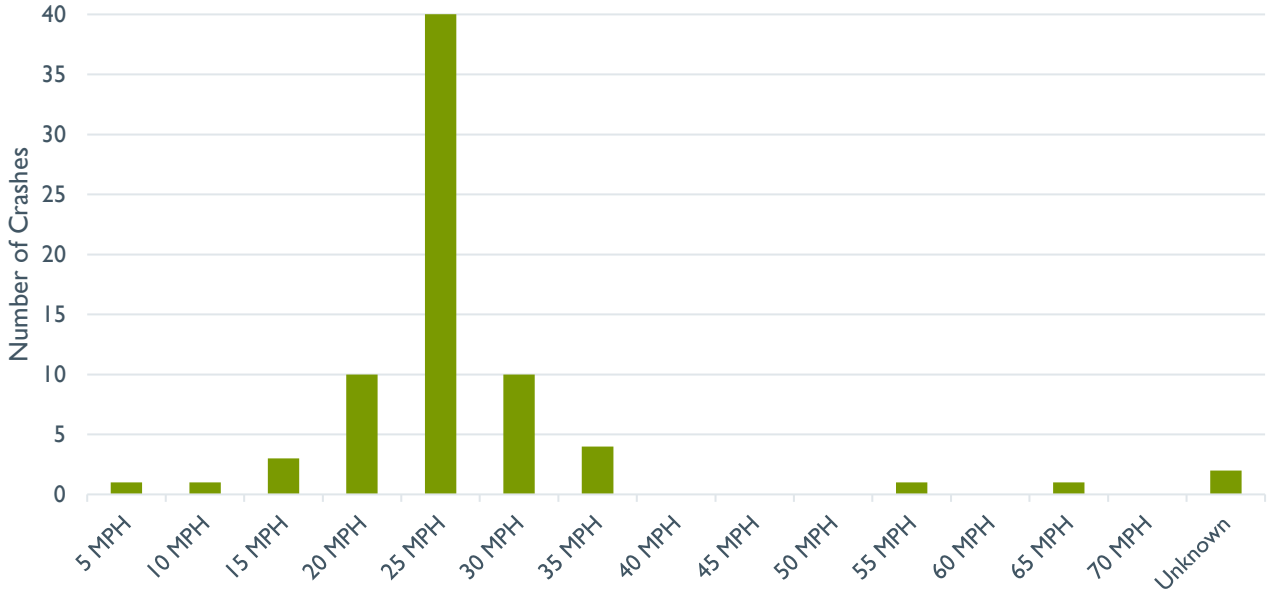
Crashes were summarized based on the posted speed limit in miles per hour (mph) of the major street where the crash occurred. Crashes by posted speed limit were compared using a representation ratio which is the proportion of crashes occurring at a specific speed limit to the proportion of the roadways with that posted speed limit. **Figure B2** illustrates how all crashes and KSI crashes are represented within the CIRTPA municipalities based on the speed limit. Crashes for VRUs were also summarized based on the posted speed limit of the major street where the crash occurred. The posted speed limit for VRU crashes is summarized in **Figure B3.**

Figure B2. Crashes by Posted Speed Limit



KSI crashes on facilities with posted speed limits of 5 mph, 35 mph, 40 mph, 45 mph, 50 mph, 55 mph, 65 mph, and 70 mph had a representation ratio greater than that of all crashes, indicating that serious injury or fatality are more likely to occur at these posted speeds.

Figure B3. VRU Crashes by Posted Speed Limit

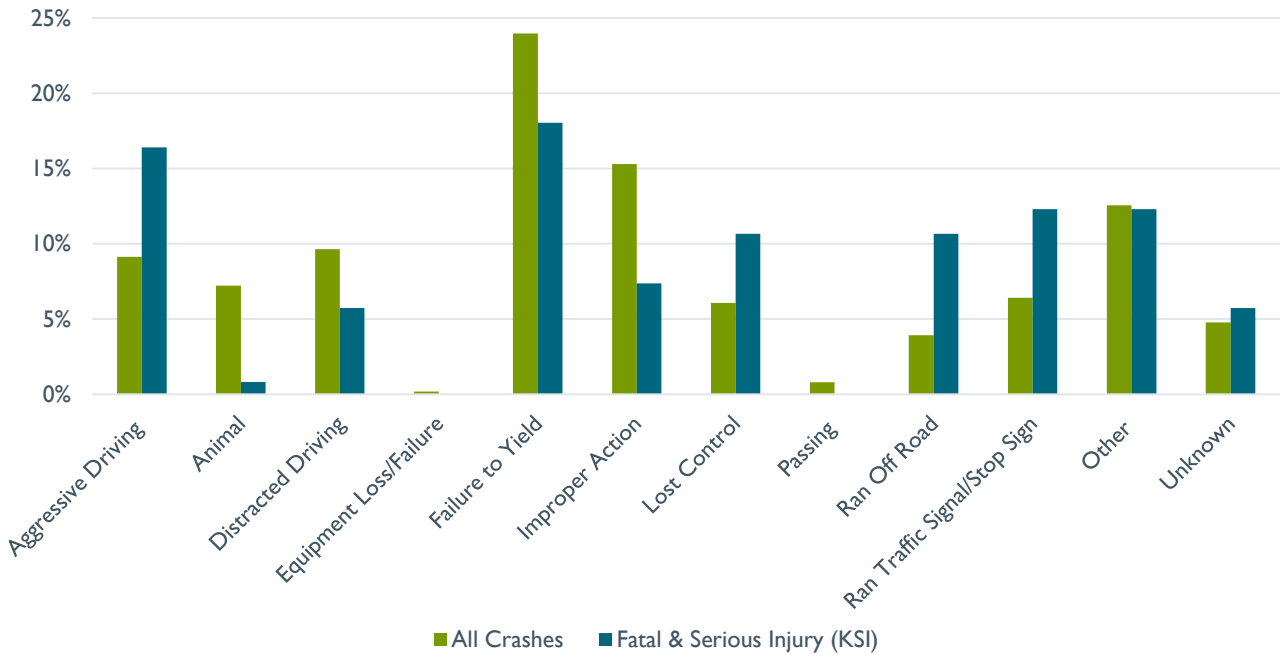


VRU crashes were concentrated around streets with lower speeds, primarily facilities with posted speed limits of 25 mph. Facilities with lower vehicle speeds feel safer than those with higher vehicle speeds to VRUs like bicyclists and pedestrians.

Major Cause of Crash

The Major Cause of Crash was reviewed to understand the root cause of crashes occurring in the study area**.** **Figure B4** displays a comparison of the major cause of crash for all crashes and KSI crashes.

Figure B4. Crashes by Major Cause

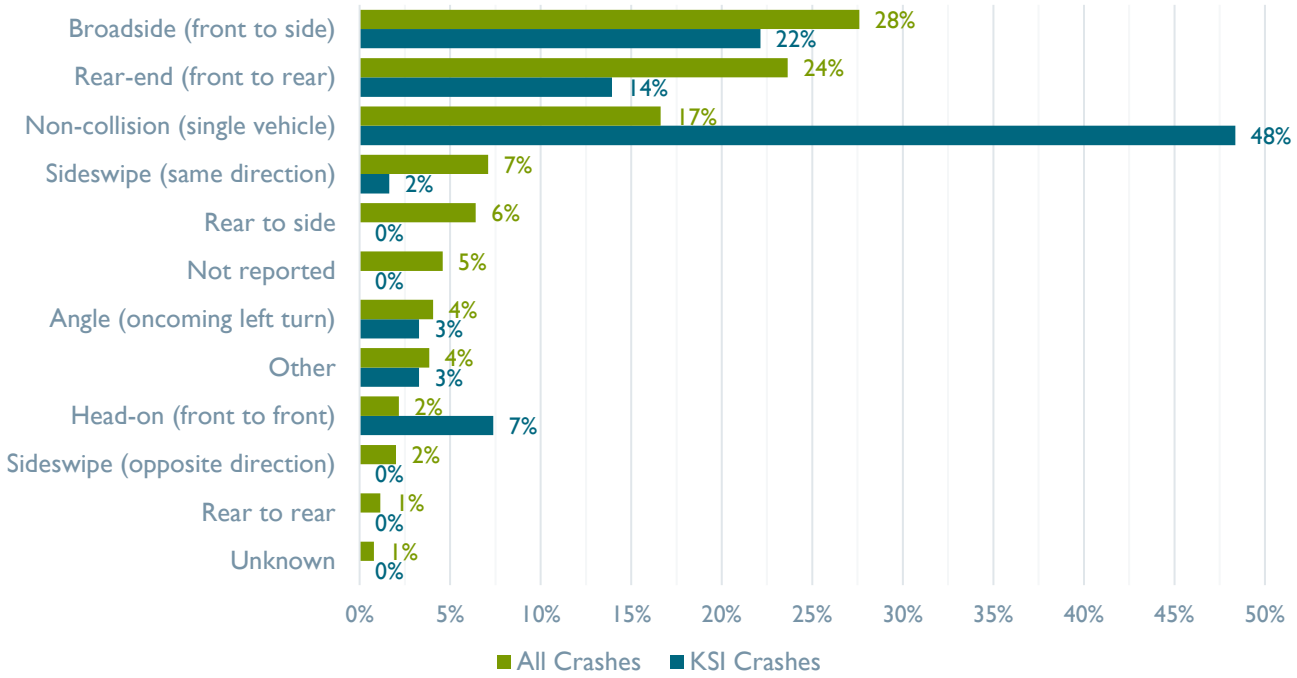


As shown in the figure, Aggressive Driving was cited as a major cause in 9% of all crashes, but 16% KSI crashes; Aggressive Driving crashes were also looked at year-over-year, but they remained relatively consistent at approximately 100 crashes per year. Lost Control, Ran Off Road, and Ran Traffic Signal / Stop Sign crashes also accounted for a greater percentage of KSI crashes than they did all crashes, indicating that these causes are more likely to result in fatality or serius injury.

Crash Types

Crash types were evaluated to understand which movements and collision types are most common in the study area and most likely to result in severe (injury or fatal) crashes. **Figure B5** shows the distribution of recorded crash types for all and KSI crash frequencies.

Figure B5. Most Common Crash Types



NOTE: Crash types ranked according to percentage of All Crashes.

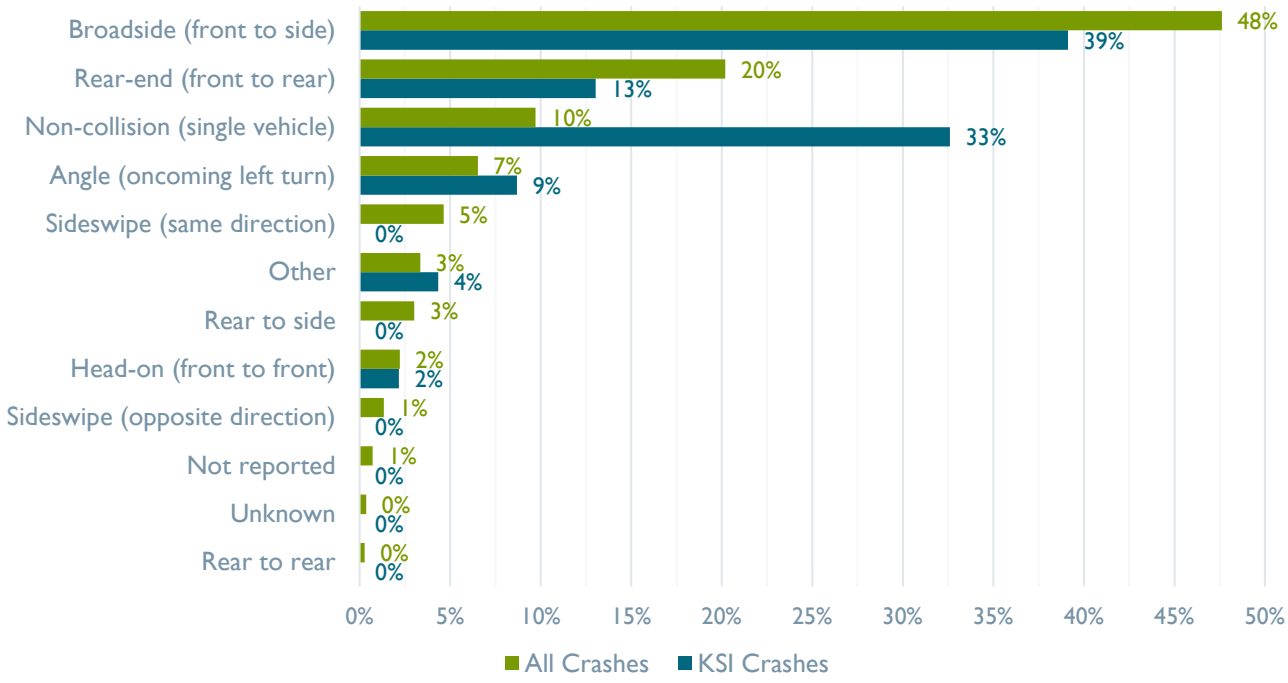
Broadside (front to side) crashes were most common, comprising 28% of total crashes. Rear-end (24%), Non-collision (17%), and Sideswipe (Same Direction) (7%) crashes were the next most common crash types. As depicted in **Figure B5**, there are a few small differences between the distribution of total and severe (injury and fatal) crash frequencies. This indicates certain crash types may be more susceptible to serious injury or fatal crashes. For example:

- Non-collision crashes represent 17% of total crashes, but 48% of KSI crashes.
- Head-on crashes represent 2% of total crashes, but 7% of KSI crashes.

Intersection Crashes

Figure B6 shows the distribution of recorded crash types for all and KSI crash frequencies at intersection crashes.

Figure B6. Intersection Crashes by Type



NOTE: Crash types ranked according to percentage of All Crashes.

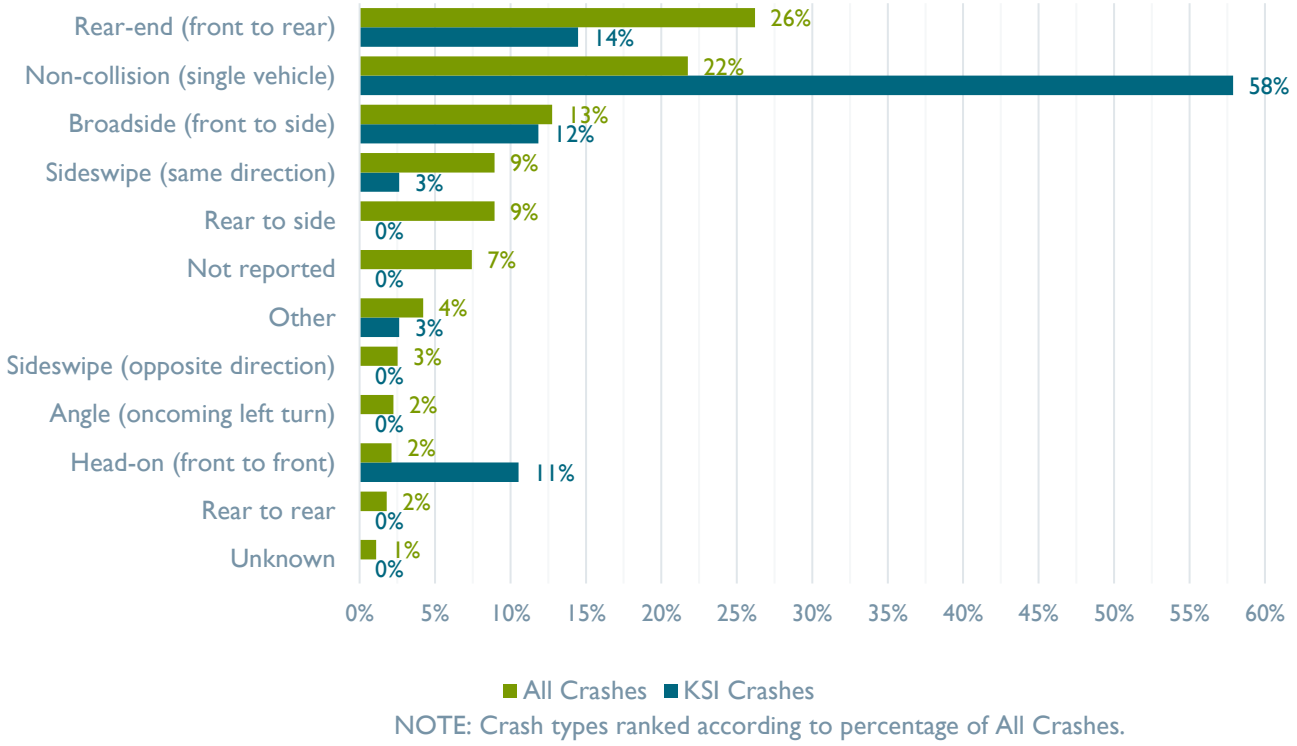
Broadside (front to side) crashes were most common, comprising 48% of total crashes. Rear-end (20%), Non-collision (10%), and Angle (oncoming left-turn) (7%) crashes were the next most common crash types. As depicted in **Figure B6**, there are a few small differences between the distribution of total and severe (injury and fatal) crash frequencies. This indicates certain crash types may be more susceptible to serious injury or fatal crashes. For example:

- Non-collision crashes represent 10% of total crashes, but 33% of KSI crashes.
- Angle (oncoming left-turn) crashes represent 7% of total crashes, but 9% of KSI crashes.

Segment Crashes

Figure B7 shows the distribution of recorded crash types for all and KSI crash frequencies along roadway segments.

Figure B7. Segment Crashes by Type



NOTE: Crash types ranked according to percentage of All Crashes.

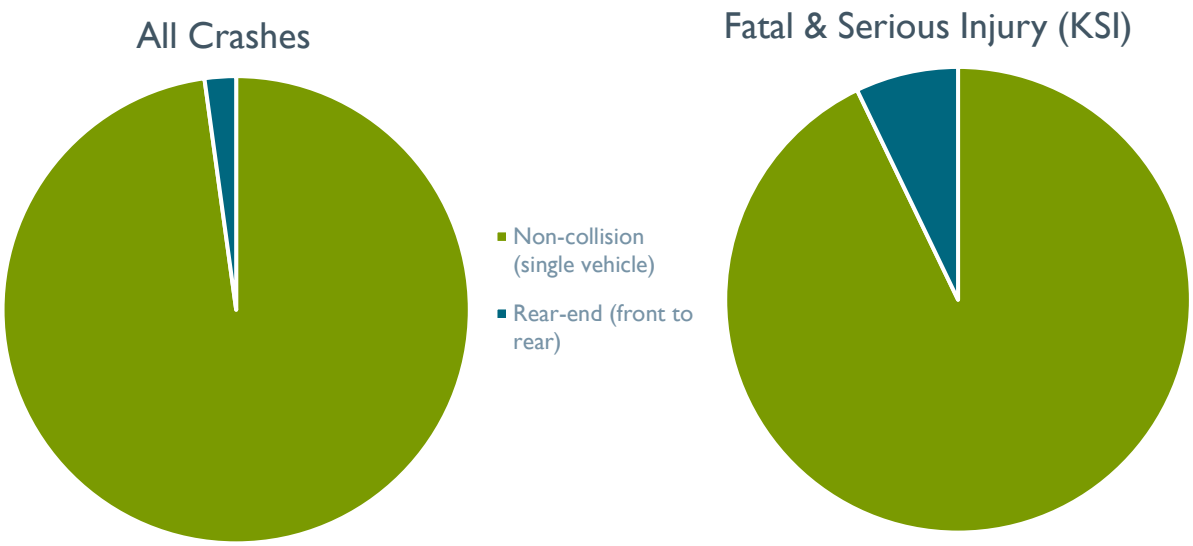
Rear-end crashes were most common with 26% of total crashes. Non-collision (22%), Broadside (front to side) (13%), Sideswipe (same direction) (9%), and Rear to Side (9%) crashes were the next most common crash types. As depicted in **Figure B7**, there are a few small differences between the distribution of total and severe (injury and fatal) crash frequencies. This indicates certain crash types may be more susceptible to serious injury or fatal crashes. For example:

- Non-collision crashes represent 22% of total crashes, but 58% of KSI crashes.
- Head-on crashes represent 2% of total crashes, but 10% of KSI crashes.

VRU Crashes

Figure B8 shows the distribution of recorded crash types for all and KSI crash frequencies for VRUs.

Figure B8. VRU Crashes by Crash Type



There were only two crash types, Non-collision and Rear-end, reported to involve VRUs; 98% of all crashes and 93% of KSI crashes involving VRUs were reported as Non-collision while the remaining 2% of all crashes and 7% of KSI crashes involving VRUs were reported as Rear-end crashes. It should be noted that the Non-collision crash type may be slightly misleading, but "Non-collision" simply refers to the fact that only a single vehicle was involved in the crash. In this case, it would be more accurate to say that most VRU crashes only involve one vehicle. Not enough data was available to determine the manner(s) of collision in which VRUs were struck.

Crash Locations

Crash locations were evaluated to understand what types of facilities within the study area are more susceptible to injury and fatal crashes. **Figure B9** displays a comparison of crash locations for all and KSI crashes.

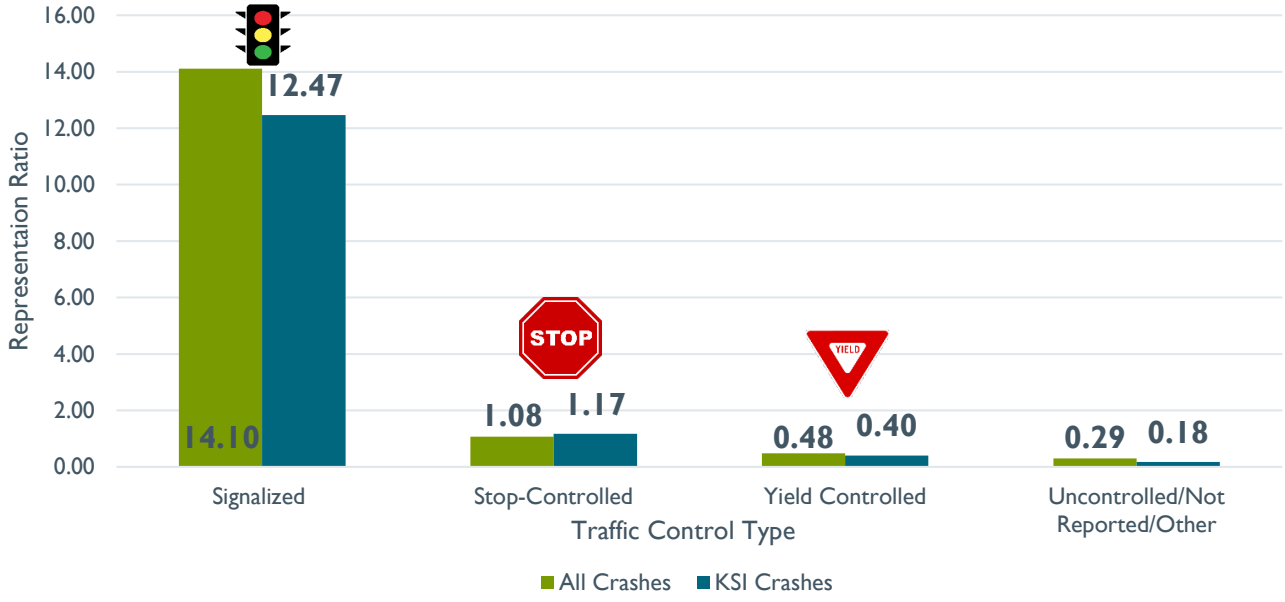
Figure B9. Crashes by Location Type

The distribution of crash locations between all and KSI crashes did not yield significant differences.

Intersection Crashes

Crashes that occurred at intersections were further reviewed to provide an understanding of where the intersection crashes are occurring. Crashes by traffic control type were compared using a representation ratio which is the proportion of crashes occurring at the traffic control type to the proportion of the traffic control type found in the CIRTPA study area. **Figure B10** illustrates the comparison of all and KSI crashes.

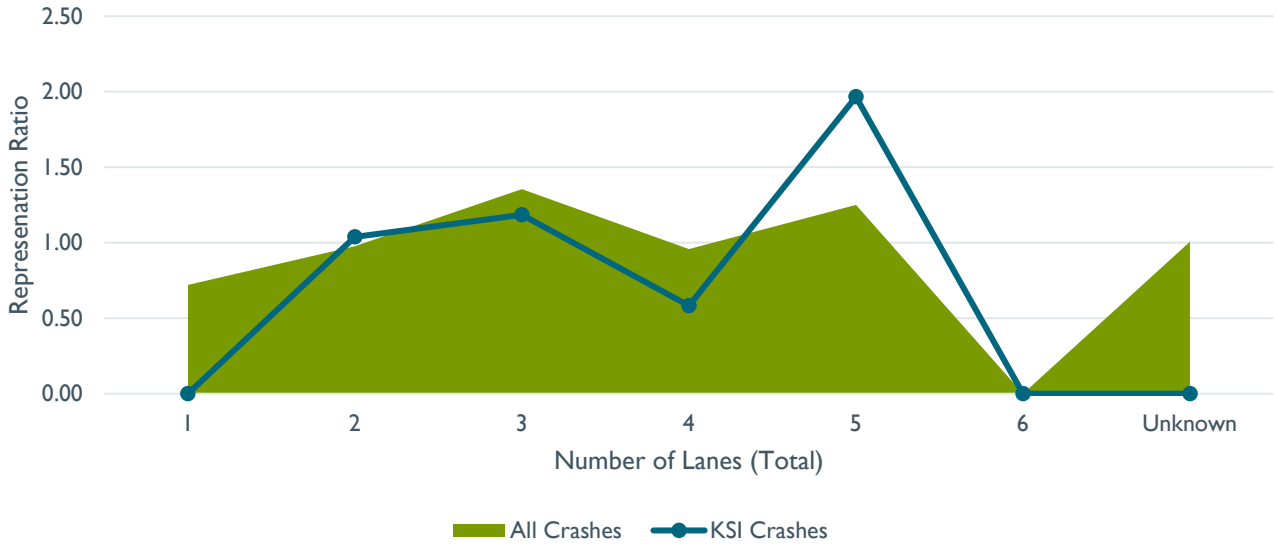
Figure B10. Intersection Crashes by Control Type



Segment Crashes

Segment crash locations were reviewed to identify the types of roads where KSI crashes were most prevalent. Crashes by number of lanes were compared using a representation ratio which is the proportion of crashes occurring at a said number of lanes to the proportion of the roadways with that number of lanes in the CIRTPA study area. **Figure B11** illustrates the comparison of all and KSI injury crashes along roadway segments based on the number of lanes.

Figure B11. Segment Crashes by Number of Lanes



VRU Crashes

The locations where VRU crashes occurred in the 5-year period were reviewed. Vulnerable user crashes by location of the non-motorist were compared and summarized in **Table B7.** Based on the findings, for the majority of crashes, the location of non-motorist was unknown, or not provided in the data. This is likely due to limitations associated with the crash reporting format and process.

Table B7. Vulnerable User Crashes by Location

Location	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes
Driveway access	2	2.2%	1	7.1%
Intersection: Not within crosswalk	3	3.3%	0	0.0%
Intersection: Unknown location	1	1.1%	1	7.1%
Intersection: Within marked crosswalk	12	13.0%	0	0.0%
Intersection: Within unmarked crosswalk	11	12.0%	0	0.0%
Non-intersection (midblock): Not within crosswalk	3	3.3%	1	7.1%
Non-intersection (midblock): Within unmarked crosswalk	2	2.2%	0	0.0%
Other	1	1.1%	1	7.1%
Shoulder/roadside	1	1.1%	0	0.0%
Sidewalk	2	2.2%	0	0.0%
Travel lane, other location	4	4.3%	0	0.0%
Unknown	50	54.3%	10	71.4%
Totals	**92**	**100%**	**14**	**100%**

Fatal Crashes

Fourteen (14) fatal crashes occurred along city roadways during the study period. Descriptions of each are as follows:

- Intersection of IA 210 and Cedar St/Woodward State Hospital School Blvd – Woodward (March 10, 2018)
    - Non-Collision (Single-Vehicle)
    - Fixed Object: Tree
    - Ran Stop-sign.
    - 1 vehicle, 3 occupants (1 Fatal, 2 Serious Injury)
    - Under the influence of alcohol.
    - Crash occurred at night (12:10 AM), dry roadway conditions.
- IA 163 (66-feet N.O. M.M. 42) – Pella (December 29, 2018)
    - Head-on Crash
    - Traveling wrong way/wrong side of the road.
    - 2 vehicles, 2 occupants (1 Fatal, 1 Possible Injury)
    - Under the influence of alcohol.
    - Crash occurred during Dark (7:15 PM) and dry roadway conditions.
- Intersection of Border Street and Broadway Street – New Virginia (May 11, 2019)
    - Non-Collision (Single-Vehicle):
    - Fixed Object: Tree
    - Exceeding posted speed limit.
    - Under the influence of alcohol.
    - 1 vehicle, 1 occupant (Fatal)
    - Crash occurred during Dark (11:37 PM) and dry roadway conditions.
- Park Street west of 1st Avenue – Perry (October 30, 2019)
    - Sideswipe (Same Direction) Crash
    - Lost Control; Hitting parked vehicles and tree.
    - Under the influence of alcohol.
    - 4 vehicles, 1 occupant (Fatal)
    - Crash occurred during Dark (11:25 PM) and dry roadway conditions.
- Intersection of SE Marshall Street and US 30 – Boone (July 7, 2020)
    - Angle Crash, Broadside (front to side)
    - Failure to Yield: From stop-sign.
    - Under the influence of alcohol.
    - 2 vehicles, 3 occupants (1 Fatal, 1 Suspected Injury, 1 Possible Injury)
    - Crash occurred during Daylight (5:44 PM) and dry roadway conditions.
- Intersection of Hwy 92 and Hwy 65/69 – Indianola (August 27, 2020)
    - Angle Crash, Broadside (front to side)
    - Ran traffic signal.
    - Under the influence of drugs/medications.
    - 2 vehicles, 2 occupants (1 Fatal)
    - Crash occurred during Dark (3:39 AM) and dry roadway conditions.

- 1321 S Jefferson Way – Indianola (April 30, 2021)
    - Run-off road Crash; vehicle airborne.
    - Lost control of vehicle; driver fatigue/sleepiness.
    - Under the influence of drugs/medications.
    - 1 vehicle, 4 occupants (1 Fatal, Injuries)
    - Crash occurred during Day (11:37 AM) and dry roadway conditions.
- Intersection of Main Street and Tama Street – Slater (July 3, 2021)
    - Rear-end Crash; Vehicle backing, from parking spot.
    - Driver was distracted and ran over pedestrians while backing.
    - 2 vehicle, 2 occupants, and 2 Pedestrians (1 Fatal, 2 Major Injuries, 1 Minor Injury)
    - Crash occurred during Day (11:03 AM) and dry roadway conditions. Post 4th of July parade.
- SE 9th Street near Roosevelt Road – Pella (September 10, 2021)
    - Non-Collision (Single-Vehicle):
    - Fixed Object: Pole/Post
    - Struck curb and was ejected from motorcycle.
    - 1 motorcycle, 1 occupant (Fatal)
    - Crash occurred during Dark (9:18 PM) and dry roadway conditions.
- Highway 6 WB between 6th and 7th Street – Adel (February 25, 2022)
    - Angle Crash, Broadside (front to side)
    - Vehicle lost control/traction.
    - 2 vehicles, 2 occupants (1 Fatal).
    - Crash occurred during Daylight (10:13 AM) and dry roadway conditions.
- Walnut Trail – Saint Charles (May 19, 2022)
    - Non-Collision (Single-Vehicle).
    - Hit rut/hole/bump in roadway and lost control.
    - 1 moped, 1 occupant (1 Fatal).
    - Crash occurred during Daylight (11:02 AM) and dry roadway conditions.
- McKimber Drive west of Willets Drive – Knoxville (May 30, 2022)
    - Head-on Crash.
    - Motorcyclist lost control and crossed roadway centerline.
    - 2 vehicles, 2 occupants (1 Fatal).
    - Crash occurred during Daylight (2:52 PM) and dry roadway conditions with severe winds.
- Intersection of Hwy 17 and Broadway Street – Granger (October 10, 2022)
    - Angle Crash, Broadside (front to side).
    - Failure to yield while making a left turn.
    - 2 vehicles, 4 occupants (1 Fatal, 2 Major Injuries).
    - Crash occurred during Daylight (9:10 AM) and dry roadway conditions.
- US Hwy 30 just east of 6th Street – Nevada (December 19, 2022)
    - Non-Collision (Single-Vehicle):
    - Fixed Object: Guardrail.
    - Driver lost control and ran-off road.
    - 1 vehicle, 1 occupant (1 Fatal).
    - Crash occurred during Daylight (1:40 PM) and wet and snowy roadway conditions.

Summary of Descriptive Analysis

In summary, crash history was reviewed for the Central Iowa Regional Transportation Planning Alliance (CIRTPA) as part of the development of CIRTPA's Comprehensive Safety Action Plan (CSAP). Crash data was obtained using the Iowa Crash Analysis Tool (ICAT) for the most recently available 5-year period of crash data, which was from January 1, 2018, to December 31, 2022. It should be noted that crash history from 2020 through 2021 may be impacted by the widespread impacts to travel patterns and subsequently crash frequency stemming from the COVID-19 pandemic. This crash data was supplemented with Iowa DOT Vulnerable Road Users (VRU) Intersection data and Iowa DOT Road Network geocoded data to provide intersection and segment characteristics for facilities in the CIRTPA planning area.

During this five-year period, a total of 5,827 crashes were recorded within the study area; 2,480 of these crashes occurred at intersections, and the remaining 3,347 crashes occurred along roadway segments. Of the 5,827 crashes, 122 crashes resulted in a fatality or serious injury (KSI crashes), and 92 of the 5,827 crashes involved a bicyclist, pedestrian, or other vulnerable road user (VRU). 4,444 crashes were recorded as Property Damage Only (PDO) (O), 751 were recorded as Possible (C) injury, 510 were recorded as Minor (B) injury, 108 were recorded as Major (A) injury, and 14 crashes resulted in fatal collisions (K).

These crashes were then reviewed based on a number of different criteria, including driver age, roadway classification / facility type, roadway and lighting conditions, traffic volumes, posted speed limits, factors contributing to crashes, crash types, and crash locations. The results of this review are as follows:

- Nearly a third (31%) of all crashes and more than a third (37%) of KSI crashes involved a driver or operator between the ages of 20 and 40 years old. 22% of KSI crashes involved a driver or operator over the age of 70 years old.
- Well over a third (38.5%) of all crashes and nearly half (43.5%) of KSI crashes occurred on Local streets. Minor and Principal Arterials accounted for nearly a quarter (23.9% and 23.0%, respectively) of all crashes; 25.4% of KSI crashes and 16.3% of VRU crashes occurred on each of these facilities (50.8% and 32.6% in total).
- 90.8% of all crashes, 90.2% of KSI crashes, and 96.7% of VRU crashes occurred on roadways with Annual Average Daily Traffic (AADT) volumes less than 10,000 vehicles per day (vpd); a majority of these crashes occurred on roadways with AADTs less than 5,000 vpd.
    - It should be noted that the crash data reviewed as part of this study only included crashes within the municipal boundaries where most of the streets have low volumes.
- A large majority of all crashes (72.3%), KSI crashes (87.7%), and VRU crashes (90.2%) occurred on roadways with dry surface conditions.
- Approximately three-quarters of all crashes (71.8%), KSI crashes (68.9%), and VRU crashes (79.3%) occurred during the daylight. 17.6% of all crashes, 26.2% of KSI crashes, and 15.2% of VRU crashes occurred during dark conditions (nighttime) regardless of lighting conditions.
- KSI crashes on facilities with posted speed limits of 5 mph, 35 mph, 40 mph, 45 mph, 50 mph, 55 mph, 65 mph, and 70 mph had a representation ratio greater than that of all crashes, indicating that serious injury or fatality are more likely to occur at these posted speeds. Vulnerable user crashes were concentrated around streets with lower speeds, primarily those with speeds posted at 25mph.
- Failure to yield was cited as a major cause in nearly a quarter (24.0%) of all crashes, just under a fifth (18.0%) of KSI crashes, and a quarter (25.0%) of VRU crashes. Lost Control, Ran Off Road, and Ran Traffic Signal / Stop Sign crashes accounted for a greater percentage of KSI crashes than they did for all crashes, indicating that these causes are more likely to result in fatality or serious injury.

- Broadside (front to side) crashes accounted for more than a quarter (28%) of all crashes while Rear-end crashes made up 24% of all crashes. Non-collision (single vehicle) crashes accounted for 17% of all crashes, but nearly half (48%) of KSI crashes were Non-collision (single vehicle) crashes; this indicates this crash type may be more likely to result in fatality or serious injury.
- Only two crash types, Non-collision (single vehicle) and Rear-end, were reported to involve VRUs; 98% of all crashes and 93% of KSI crashes involving vulnerable users were reported as Non-collision while the remaining 2% of all crashes and 7% of KSI crashes involving vulnerable users were reported as Rear-end crashes.
    - It should be noted that the Non-collision crash type may be slightly misleading, as "Non-collision" simply refers to the fact that only a single vehicle was involved in the crash. In this case, it would be more accurate to say that most VRU crashes only involve one vehicle. Not enough data was available to determine the manner(s) of collision in which vulnerable users were struck.
- 57% of all crashes and 62% of KSI crashes occurred along roadway segments while the remaining 43% of all crashes and 38% of KSI crashes occurred at intersections.

Overrepresented Crashes

The following crash types and contributing factors were identified as overrepresented in the fatal and serious injury (KSI) and/or fatal and injury (Severe) crash histories compared to the total five-year crash record for municipalities within the CIRTPA planning area:

- **Road Surface Condition**
    - Dry
    - Gravel
    - Slush
- **Number of Users**
    - 1-Vehicle Crash
    - 3+ Vehicle Crash
- **Crash Type**
    - Angle (oncoming)
    - Broadside
    - Head On
    - Non-Collision
- **Weather**
    - Clear
- **Fixed Object Type**
    - Building
    - Ditch
    - Embankment
    - Tree
- **Lighting**
    - Dark (Lighted)
    - Dark (Unlighted)
- **Vehicle Movements**
    - Going Straight
    - Navigating Curve
    - Accelerating
- **Driver/Operator Age**
    - 30-40 years old
- **Driver Condition**
    - Driver Impaired
- **Driver Contributing Factor**
    - Non-Apparent
- **Vulnerable User Location**
    - Intersection (Marked Crosswalk)
    - Intersection (Unmarked Crosswalk)
    - Unknown
- **Mode Types**
    - Pedestrian
    - Pedalcyclists
    - Other Non-Motorist
    - Motorcycle

Table B8 displays a summary of the Total, KSI, and Severe crash frequencies of all overrepresented crashes.

Table B8. Summary of Overrepresented Crashes (2018-2022)

Focus Crash	Total Crashes	KSI Crashes	Severe Crashes
Number of Users			
1-Vehicle Crash	1,228	58	345
3+ Vehicle Crash	199	4	85
Crash Type			
Angle (oncoming left turn)	237	4	74
Broadside (front to side)	1,608	27	458
Head-on (front to front)	126	9	47
Non-collision (single vehicle)	969	59	350
Fixed Object Type			
Building	24	2	10
Ditch	87	4	37
Embankment	7	2	5
Tree	30	3	13
Road Surface Conditions			
Dry	4,214	107	1,091
Gravel	31	3	15
Slush	44	0	17
Weather Conditions			
Clear	3,832	91	963
Lighting Condition			
Dark - roadway lighted	685	17	190
Dark - roadway not lighted	294	13	84
Mode Type			
Pedalcyclist	20	0	20
Pedestrian	21	4	21
Other Non-Motorist	51	10	50
Motorcycle	100	27	83
Vehicle Movement			
Accelerating	28	1	12
Going straight	3,097	82	926
Navigating curve	47	4	24
Driver Contributing Factor			
None-apparent	4,849	112	1,236
Driver/Operator Age			
30-40 years old	837	31	234
Location of VRU			
Intersection: Marked Crosswalk	12	0	12
Intersection: Unmarked Crosswalk	11	0	11
Unknown	50	10	49
Driver Condition			
Driver Impaired	229	17	89

Focus Crash Refinement

Refinement to the list of overrepresented crashes was conducted to develop a selection of Focus Crashes that will be used for more detailed systemic safety analysis. Through this refinement process, some overrepresented crash types and contributing factors were removed from the list of Focus crashes based on their status as the normal travel condition, redundancy with other crashes, lack of total crash frequency, or unique scenarios found within crash trees.

Normal Condition

Multiple crash types were removed from the list of Focus Crashes based on their status as the "normal condition" within the crash history:

- **Dry Road:** Dry road surface conditions were identified as an overrepresented contributing factor but represent a normal state for road conditions and are therefore removed from the list of Focus Crashes.
- **Gravel Road:** Gravel road surface condition was identified as an overrepresented contributing factor but represents a normal state for road conditions and was therefore removed from the list of Focus Crashes.
- **Accelerating & Going Straight:** Accelerating and Going Straight movements were identified as an overrepresented contributing factor but represent a normal state of driving and are therefore removed from the list of Focus Crashes.
- **Clear Weather:** Clear weather conditions were identified as an overrepresented contributing factor but represent a normal state for weather conditions and are therefore removed from the list of Focus Crashes.
- **None-apparent:** None-apparent contributing driver factor was identified as an overrepresented contributing factor but represents a normal state of driver and was therefore removed from the list of Focus Crashes.

Redundancy

Multiple crash types and contributing factors were removed from the list of Focus Crashes based on their redundancy with other crashes or because reporting limitations:

- **Embankment & Ditch:** Embankment and ditch were both identified as overrepresented fixed object types for the area. However, embankments and ditches are semantically related and are often interchangeable. These crashes were combined into a single Embankment/Ditch crash type for further evaluation.
- **Unknown VRU Location:** The "unknown" VRU location was identified as an overrepresented contributing factor. However, due to limited information on the location of these users, they were removed from the list of Focus Crashes as countermeasures may not be applicable.

Total Crash Frequency

Multiple crash types and contributing factors had a low frequency of total crashes throughout the municipalities in the CIRTPA planning area and were therefore removed from the list of Focus Crashes:

- **Slush:** Slush roadway surface conditions were identified as an overrepresented contributing factor but represent a total of 44 crashes. These were removed from the Focus Crashes.
- **Vulnerable User Crashes (VRU):** The pedestrian and pedalcyclist were identified as overrepresented but both had less than 25 total crashes during the 5-year period. Additionally, there were 51 total "Other Non-Motorist" crashes which were grouped together due to incomplete data regarding the type of non-motorist. The pedestrian, pedalcyclist, and other non-motorist crashes were grouped together into a Vulnerable Road User crash type.

Roadway Risk Factors

The following roadway risk factors were identified as overrepresented in the fatal and serious injury (KSI) and/or fatal and injury (Severe) crash histories compared to the total five-year crash record for the municipalities within the CIRTPA planning area:

- Federal Classification
- Number of Lanes
- Traffic Volume (AADT)
- Median Type
- Shoulder Type
- Traffic Control Type
- Posted Speed Limit

Crash Trees

Crash trees were developed for all overrepresented crash types to evaluate the frequency of crashes in specific roadway conditions and eliminate crash types and contributing factors from the list of Focus Crashes if potential countermeasures are beyond the scope of the safety action plan (i.e. high crash frequency on freeways controlled by other jurisdictions).

After developing and evaluating crash trees, no crash types or contributing factors were removed from the list of Focus Crashes. The following roadway characteristics/conditions were determined to be related with the specified focus crashes.

- Number of Users
  - 1-Vehicle Crash
    - At Non-intersection on Principal Arterials.
    - Posted Speed Limit Less Than or Equal to 25 mph.
    - AADT of 0-1,000 VPD.
    - Undivided two-lane roadways.
  - 3+ Vehicle Crash
    - At Non-intersection on Principal Arterials.
    - Posted Speed Limit of 30-40 MPH.
    - AADT of 15,000-20,000 VPD.
    - Undivided four-lane cross section with no shoulders.
- Crash Type
  - Angle (oncoming)
    - At Intersections on Minor Arterials
    - Posted Speed Limit of 30-40 MPH
    - Signalized intersections.
    - Undivided two-lane roadways
    - AADT of 5,000-10,000 VPD
  - Broadside
    - At Intersections on Local Roads
    - Posted Speed Limit of 25 MPH or less.
    - Two-way Stop Controlled (TWSC) Intersections
    - Undivided two-lane roadways.
    - AADT of 0-1,000 VPD
  - Head-On
    - At Non-intersection on Local Roads.
    - Posted Speed Limit of 25 MPH or less.
    - Undivided two-lane roadways with no shoulder.
    - AADT of 0-1,000 VPD

- Non-Collision
  - At Non-intersection on Local Roads.
  - Posted Speed Limit of 25 MPH or less.
  - Undivided two-lane roadways with no shoulder.
  - AADT of 0-1,000 VPD.

- Fixed Object Type
  - Building
    - At Non-intersection on Local Roads.
    - Posted Speed Limit less than or equal to 25 mph.
    - Undivided two-lane roadways.
    - AADT of 0-1,000 VPD.
  - Tree
    - At Non-intersection on Local Roads.
    - Posted Speed Limit less than or equal to 25 mph.
    - Undivided two-lane roadways.
    - AADT of 0-1,000 VPD.

- Lighting
  - Dark (Lighted)
    - At Non-intersection on Local Roads.
    - Posted Speed Limit of 25 MPH or less.
    - Undivided two-lane roadways with no shoulder.
    - AADT of 0-1,000 VPD.
  - Dark (Unlighted)
    - At Non-intersection on Local Roads.
    - Posted Speed Limit of 25 MPH or less.
    - Undivided two-lane roadways with no shoulder.
    - AADT of 0-1,000 VPD.

- Vehicle Movements
  - Navigating Curve
    - At Non-intersection on Local Roads.
    - Posted Speed Limit of 25 MPH or less.
    - Undivided two-lane roadways with no shoulder or grass/earth shoulder.
    - AADT of 0-1,000 VPD.

- Driver/Operator Age
  - 30-40 years old
    - At Intersection on Local Roads.
    - Posted Speed Limit of 25 MPH or less.
    - Undivided two-lane roadways.
    - AADT of 0-1,000 VPD.

- Driver Condition
  - Driver Impaired
    - At Non-intersection on Local Roads
    - Posted Speed Limit of 25 MPH or less.
    - Undivided two-lane roadways with no shoulders.
    - AADT of 0-1,000 VPD

- Vulnerable User Location
  - Intersection (Marked Crosswalk)
    - At Intersections on Minor Arterials.
    - Posted Speed Limit of 25 MPH – 40 MPH.
    - AADT of 1,000-10,000 VPD
    - Two, three, and four-lane cross sections.
    - At signalized intersections.
  - Intersection (Unmarked Crosswalk)
    - At Intersections on Principal Arterials.
    - Posted Speed Limit of 25 MPH or less.
    - AADT of 5,000-20,000 VPD
    - Four-lane cross sections.
    - At signalized intersections.
- Mode Types
  - Motorcycle
    - At Non-intersection on Local Roads
    - Posted Speed Limit of 25 MPH or less.
    - Undivided two-lane roadways with no shoulders.
    - AADT of 0-1,000 VPD

Development of High Injury Network

A High Injury Network (HIN) within the CIRTPA planning area was determined based on results from the descriptive and systemic crash analyses. The HIN identifies stretches of roads and/or intersections that have a high concentration of accidents resulting in injuries. Data from the Iowa DOT Crash Analysis Tool (ICAT), Iowa DOT Vulnerable Road User Intersections, Iowa DOT Road Network, and Crash Severity Cost Information for Iowa crashes was used to develop the HIN.

The HIN was developed based on two criteria: total number of crashes occurring at an intersection or on a segment and the Equivalent Property Damage Only (EPDO) value for the intersection or segment. To be included in the HIN, at least five crashes must have occurred during the five-year period of crashes reviewed as part of this project, and intersections or segments EPDO value must have ranked in the 80th percentile or higher; intersections or segments with EPDO values in the 90th percentile or higher were classified as Tier 1 locations, and the rest were classified as Tier 2 locations.

A total of 94 high-injury intersections and 82 high-injury roadway segments were included in the HIN. 73 intersections and 47 roadway segments were identified as Tier 1 locations; an additional 21 intersections and 35 roadway segments were identified as Tier 2 locations. The intersections included in the HIN represent just over 2% of all intersections within the CIRTPA planning area; however, they account for more than 40% of KSI intersection crashes. The segments included in the HIN represent 6% of street miles within the CIRTPA planning area, but these segments account for more than half (55%) of KSI segment crashes.

Maps depicting the HIN intersections and segments, locations of fatal and major injury crashes, and locations of non-motorist crashes within each CIRTPA community are included in the **Appendix**.

Next Steps

Using this list of Focus Crashes, systemic safety analysis will continue with the following steps:

- Map locations of Focus Crashes
- Develop Countermeasure Toolbox based on Critical Roadway Attributes and Focus Crashes
- Identify/screen locations to develop a prioritized list of potential locations for systemic safety improvements
- Develop a Comprehensive Safety Action Plan documenting the outcomes from stakeholder and public engagement and information and findings gathered throughout the project.

Appendix B1 – Crash Data Tables

Total Crash Tables

Crashes by Year and Severity

Year	Fatal (K)	Major (A)	Minor (B)	Possible (C)	PDO (O)	Total Crashes	% of Total Crashes	# of KSI Crashes	% of KSI Crashes	% of KSI Crashes per Year
2018	2	22	102	145	919	1,190	20.4%	24	19.7%	2.0%
2019	2	20	108	169	1,000	1,299	22.3%	22	18.0%	1.7%
2020	2	19	95	118	795	1,029	17.7%	21	17.2%	2.0%
2021	3	21	88	179	859	1,150	19.7%	24	19.7%	2.1%
2022	5	26	117	140	871	1,159	19.9%	31	25.4%	2.7%
Totals	**14**	**108**	**510**	**751**	**4,444**	**5,827**	**100.0%**	**122**	**100.0%**	**2.1%**

Crashes by Type

Crash Type	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI
Angle (oncoming left turn)	237	4%	4	3.3%	1.7%
Broadside (front to side)	1,608	28%	27	22.1%	1.7%
Head-on (front to front)	126	2%	9	7.4%	7.1%
Non-collision (single vehicle)	969	17%	59	48.4%	6.1%
Rear to rear	67	1%	0	0.0%	0.0%
Rear to side	374	6%	0	0.0%	0.0%
Rear-end (front to rear)	1,378	24%	17	13.9%	1.2%
Sideswipe (opposite direction)	117	2%	0	0.0%	0.0%
Sideswipe (same direction)	414	7%	2	1.6%	0.5%
Other	224	4%	4	3.3%	1.8%
Not reported	267	5%	0	0.0%	0.0%
Unknown	46	1%	0	0.0%	0.0%
Total	**5,827**	**100%**	**122**	**100.0%**	**2.1%**

Crashes by AADT

AADT	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
0-1,000	2,018	34.6%	42	34.4%	2.1%	32	34.8%
1,000-5,000	1,875	32.2%	38	31.1%	2.0%	35	38.0%
5,000-10,000	1,396	24.0%	30	24.6%	2.1%	22	23.9%
10,000-15,000	197	3.4%	6	4.9%	3.0%	1	1.1%
15,000-20,000	295	5.1%	6	4.9%	2.0%	2	2.2%
20,000+	0	0.0%	0	0.0%	0.0%	0	0.0%
No AADT Available	46	0.8%	0	0.0%	0.0%	0	0.0%
Totals	**5,827**	**100%**	**122**	**100%**	**2.1%**	**92**	**100%**

Crashes by Location

Location	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Intersection	2,480	42.6%	46	37.7%	1.9%	52	56.5%
Segment	3,347	57.4%	76	62.3%	2.3%	40	43.5%
Totals	**5,827**	**100%**	**122**	**100%**	**2%**	**92**	**100%**

Alcohol / Drug Related Crashes

Alcohol/Drug Related	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Yes	229	3.9%	17	13.9%	7.4%	2	2.2%
No	5,598	96.1%	105	86.1%	1.9%	90	97.8%
Totals	**5,827**	**100%**	**122**	**100%**	**2%**	**92**	**100%**

Crashes by Cause (Detailed)

Cause of Crash	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of VRU Crashes	% of Total VRU Crashes
Aggressive driving/road rage	19	0%	0	0%	0%	0	0%
Animal	421	7%	1	1%	0%	0	0%
Cargo/equipment loss or shift	3	0%	0	0%	0%	0	0%
Crossed centerline (undivided)	11	0%	1	1%	9%	0	0%
Crossed median (divided)	1	0%	0	0%	0%	0	0%
Downhill runaway	3	0%	0	0%	0%	0	0%
Driver Distraction: Adjusting devices (radio, climate)	13	0%	1	1%	8%	0	0%
Driver Distraction: Exterior distraction	82	1%	4	3%	5%	2	2%
Driver Distraction: Inattentive/lost in thought	82	1%	0	0%	0%	0	0%
Driver Distraction: Manual operation of an electronic communication device	18	0%	0	0%	0%	0	0%
Driver Distraction: Other electronic device activity	13	0%	0	0%	0%	0	0%
Driver Distraction: Other interior distraction	273	5%	0	0%	0%	4	4%
Driver Distraction: Passenger	26	0%	0	0%	0%	0	0%
Driver Distraction: Reaching for object(s)/fallen object(s)	31	1%	2	2%	6%	1	1%
Driver Distraction: Talking on a hand-held device	8	0%	0	0%	0%	0	0%
Driver Distraction: Talking on a hands free device	2	0%	0	0%	0%	0	0%
Driver Distraction: Unrestrained animal	13	0%	0	0%	0%	0	0%
Driving less than the posted speed limit	1	0%	0	0%	0%	0	0%
Driving too fast for conditions	184	3%	2	2%	1%	2	2%
Equipment failure	8	0%	0	0%	0%	0	0%
Exceeded authorized speed	49	1%	6	5%	12%	0	0%
Failed to keep in proper lane	53	1%	0	0%	0%	1	1%
Failed to yield to emergency vehicle	11	0%	1	1%	9%	0	0%
Failure to signal intentions	2	0%	0	0%	0%	0	0%
Followed too close	513	9%	5	4%	1%	1	1%
FTYROW: At uncontrolled intersection	84	1%	2	2%	2%	0	0%
FTYROW: From driveway	140	2%	0	0%	0%	0	0%

Cause of Crash	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of VRU Crashes	% of Total VRU Crashes
FTYROW: From parked position	68	1%	0	0%	0%	0	0%
FTYROW: From stop sign	614	11%	9	7%	1%	7	8%
FTYROW: From yield sign	98	2%	2	2%	2%	0	0%
FTYROW: Making left turn	298	5%	5	4%	2%	0	0%
FTYROW: Making right turn on red signal	5	0%	0	0%	0%	2	2%
FTYROW: Other	64	1%	0	0%	0%	2	2%
FTYROW: To pedestrian	14	0%	3	2%	21%	12	13%
Illegally parked/unattended	19	0%	1	1%	5%	0	0%
Improper backing	176	3%	0	0%	0%	0	0%
Improper or erratic lane changing	52	1%	0	0%	0%	0	0%
Improper starting	1	0%	0	0%	0%	0	0%
Lost control	273	5%	12	10%	4%	1	1%
Made improper turn	152	3%	1	1%	1%	3	3%
Operating vehicle in an reckless/erratic/careless/negligent manner	186	3%	10	8%	5%	2	2%
Operator inexperience	33	1%	1	1%	3%	0	0%
Other	512	9%	6	5%	1%	11	12%
Other: Disregarded signs/road markings	6	0%	0	0%	0%	0	0%
Other: Disregarded warning sign	2	0%	0	0%	0%	0	0%
Other: Getting off/out of vehicle	2	0%	0	0%	0%	0	0%
Other: Illegal off-road driving	1	0%	0	0%	0%	0	0%
Other: Improper operation	12	0%	1	1%	8%	1	1%
Other: No improper action	112	2%	7	6%	6%	29	32%
Other: Vision obstructed	47	1%	0	0%	0%	4	4%
Over correcting/over steering	16	0%	0	0%	0%	0	0%
Passing: On wrong side	3	0%	0	0%	0%	0	0%
Passing: Other passing	28	0%	0	0%	0%	0	0%
Passing: Through/around barrier	6	0%	0	0%	0%	0	0%
Passing: Where prohibited by signs/markings	1	0%	0	0%	0%	0	0%
Passing: With insufficient distance/inadequate visibility	9	0%	0	0%	0%	0	0%
Ran off road - left	66	1%	3	2%	5%	0	0%
Ran off road - right	142	2%	10	8%	7%	1	1%
Ran off road - straight	21	0%	0	0%	0%	0	0%
Ran stop sign	247	4%	9	7%	4%	1	1%
Ran traffic signal	126	2%	6	5%	5%	1	1%
Swerving/Evasive Action	42	1%	2	2%	5%	2	2%
Traveling wrong way or on wrong side of road	28	0%	2	2%	7%	0	0%
Unknown	281	5%	7	6%	2%	2	2%
Total	**5,827**	**100%**	**122**	**100%**	**2%**	**92**	**100%**

Crashes by Cause (Consolidated)

Cause of Crash	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of VRU Crashes	% of Total VRU Crashes	% of Crashes Resulting in VRU
Aggressive Driving	532	9.1%	20	16.4%	3.8%	6	6.5%	1.1%
Animal	421	7.2%	1	0.8%	0.2%	0	0.0%	0.0%
Distracted Driving	561	9.6%	7	5.7%	1.2%	7	7.6%	1.2%
Equipment Loss/Failure	11	0.2%	0	0.0%	0.0%	0	0.0%	0.0%
Failure to Yield	1,396	24.0%	22	18.0%	1.6%	23	25.0%	1.6%
Improper Action	891	15.3%	9	7.4%	1.0%	4	4.3%	0.4%
Lost Control	354	6.1%	13	10.7%	3.7%	2	2.2%	0.6%
Passing	47	0.8%	0	0.0%	0.0%	0	0.0%	0.0%
Ran Off Road	229	3.9%	13	10.7%	5.7%	1	1.1%	0.4%
Ran Traffic Signal/Stop Sign	373	6.4%	15	12.3%	4.0%	2	2.2%	0.5%
Other	731	12.6%	15	12.3%	2.1%	45	48.9%	6.2%
Unknown	281	4.8%	7	5.7%	2.5%	2	2.2%	0.7%
Total	**5,827**	**100%**	**122**	**100%**	**2.1%**	**92**	**100%**	**1.6%**

Crashes by Mode / User Type

User/Mode Type	Fatal (K)	Major (A)	Minor (B)	Possible (C)	PDO (O)	Total Crashes	% Share of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI
Pedalcyclist (bicycle/tricycle/unicycle/pedal car)	0	0	15	5	0	20	0.3%	0	0.0%	0.0%
Pedestrian	0	4	11	6	0	21	0.4%	4	3.3%	19.0%
Other Non-Motorist	1	9	20	20	1	51	0.9%	10	8.2%	19.6%
Motorcycle	2	25	38	18	17	100	1.7%	27	22.1%	27.0%
Motor Vehicle	11	70	426	702	4,426	5635	96.7%	81	66.4%	1.4%
Total / Average	**14**	**108**	**510**	**751**	**4,444**	**5,827**	**100%**	**122**	**100%**	**2.1%**

Crashes by Federal Classification

Classification	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Local	2246	38.5%	35	28.7%	1.6%	40	43.5%
Minor Collector	58	1.0%	6	4.9%	10.3%	3	3.3%
Major Collector	760	13.0%	19	15.6%	2.5%	19	20.7%
Minor Arterial	1,390	23.9%	31	25.4%	2.2%	15	16.3%
Principal Arterial - other	1,339	23.0%	31	25.4%	2.3%	15	16.3%
Interstate	0	0.0%	0	0.0%	0.0%	0	0.0%
Unknown	34	0.6%	0	0.0%	0.0%	0	0.0%
Totals	**5,827**	**100%**	**122**	**100%**	**2.1%**	**92**	**100%**

Crashes by Roadway Surface Conditions

Roadway Conditions	# of Crashes	% of All Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Snow	361	6.2%	2	1.6%	0.6%	0	0.0%
Slush	44	0.8%	0	0.0%	0.0%	1	1.1%
Ice/frost	229	3.9%	2	1.6%	0.9%	0	0.0%
Wet	593	10.2%	8	6.6%	1.3%	8	8.7%
Dry	4,214	72.3%	107	87.7%	2.5%	83	90.2%
Mud/dirt	1	0.0%	0	0.0%	0.0%	0	0.0%
Sand	7	0.1%	0	0.0%	0.0%	0	0.0%
Gravel	31	0.5%	3	2.5%	9.7%	0	0.0%
Water (standing or moving)	1	0.0%	0	0.0%	0.0%	0	0.0%
Unknown	34	0.6%	0	0.0%	0.0%	0	0.0%
Other	7	0.1%	0	0.0%	0.0%	0	0.0%
Not Reported	305	5.2%	0	0.0%	0.0%	0	0.0%
Totals	**5,827**	**100%**	**122**	**100%**	**2.1%**	**92**	**100%**

Crashes by Light Conditions

Light Conditions	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Dark - Roadway Lighted	685	11.8%	17	13.9%	2.5%	9	9.8%
Dark - Roadway Not Lighted	294	5.0%	13	10.7%	4.4%	3	3.3%
Dark - Unknown Roadway Lighting	48	0.8%	2	1.6%	4.2%	2	2.2%
Dawn	115	2.0%	1	0.8%	0.9%	1	1.1%
Daylight	4,181	71.8%	84	68.9%	2.0%	73	79.3%
Dusk	165	2.8%	5	4.1%	3.0%	4	4.3%
Unknown	36	0.6%	0	0.0%	0.0%	0	0.0%
Not Reported	303	5.2%	0	0.0%	0.0%	0	0.0%
Totals	**5,827**	**100%**	**122**	**100%**	**2.1%**	**92**	**100%**

Crashes by Posted Speed Limit

Posted Speed Limit	# of Crashes	% of All Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes	Street Miles	Crashes per Mile	KSI Crashes per Mile	% of All Classification	All Crashes Class. Ratio	KSI Crash Class. Ratio
5 MPH	14	0.2%	1	0.8%	7.1%	1	1.1%	2.0	6.83	0.49	0.3%	0.78	2.66
10 MPH	42	0.72%	0	0.0%	0.0%	1	1.1%	4.2	10.05	0.00	0.6%	1.15	0.00
15 MPH	46	0.79%	0	0.0%	0.0%	3	3.3%	6.1	7.55	0.00	0.9%	0.86	0.00
20 MPH	263	4.51%	5	4.1%	1.9%	10	10.9%	13.0	20.16	0.38	2.0%	2.30	2.09
25 MPH	2,824	48.46%	42	34.4%	1.5%	59	64.1%	251.0	11.25	0.17	37.7%	1.28	0.91
30 MPH	576	9.89%	10	8.2%	1.7%	10	10.9%	66.8	8.63	0.15	10.0%	0.98	0.82
35 MPH	652	11.19%	18	14.8%	2.8%	4	4.3%	77.5	8.41	0.23	11.7%	0.96	1.27
40 MPH	93	1.60%	3	2.5%	3.2%	0	0.0%	8.5	10.89	0.35	1.3%	1.24	1.92
45 MPH	314	5.39%	12	9.8%	3.8%	0	0.0%	42.2	7.44	0.28	6.3%	0.85	1.55
50 MPH	64	1.10%	5	4.1%	7.8%	0	0.0%	10.0	6.41	0.50	1.5%	0.73	2.73
55 MPH	305	5.23%	17	13.9%	5.6%	1	1.1%	59.3	5.14	0.29	8.9%	0.59	1.56
60 MPH	2	0.03%	0	0.0%	0.0%	0	0.0%	0.3	7.97	0.00	0.0%	0.91	0.00
65 MPH	138	2.37%	7	5.7%	5.1%	1	1.1%	17.9	7.72	0.39	2.7%	0.88	2.14
70 MPH	19	0.33%	1	0.8%	5.3%	0	0.0%	3.3	5.72	0.30	0.5%	0.65	1.64
Unknown	475	8.15%	1	0.8%	0.2%	2	2.2%	103.0	4.61	0.01	15.5%	0.53	0.05
Totals	**5,827**	**100%**	**122**	**100%**	**2.1%**	**92**	**100%**	**665.2**	**8.76**	**0.18**	**100%**	**1.00**	**1.00**

Crashes by Age Group

Age	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes	Population	% of Population	All Crashes Pop. Ratio	KSI Crashes Pop. Ratio
0-10	0	0.0%	0	0.0%	0.0%	0	0.0%	96,006	13%	0.00	0.00
10-20	1,043	17.9%	14	11.5%	1.3%	10	10.9%	105,520	14%	1.28	0.82
20-30	985	16.9%	27	22.1%	2.7%	9	9.8%	115,824	15%	1.10	1.44
30-40	837	14.4%	31	25.4%	3.7%	13	14.1%	104,581	14%	1.03	1.83
40-50	712	12.2%	10	8.2%	1.4%	14	15.2%	91,974	12%	1.00	0.67
50-60	638	10.9%	17	13.9%	2.7%	11	12.0%	91,900	12%	0.90	1.14
60-70	573	9.8%	10	8.2%	1.7%	16	17.4%	78,513	10%	0.94	0.79
70-80	319	5.5%	7	5.7%	2.2%	4	4.3%	44,091	6%	0.94	0.98
80+	194	3.3%	2	1.6%	1.0%	5	5.4%	24,632	3%	1.02	0.50
Unknown	526	9.0%	4	3.3%	0.8%	10	10.9%	0	0%	0.00	0.00
Totals	**5,827**	**100.0%**	**122**	**100%**	**2.1%**	**92**	**100%**	**753,041**	**100%**	**1.00**	1.00

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Intersection Crash Tables

Crashes by Year and Severity

Year	Fatal (K)	Major (A)	Minor (B)	Possible (C)	PDO (O)	Total Crashes	% of Total Crashes	# of KSI Crashes	% of KSI Crashes	% of KSI Crashes per Year
2018	1	9	53	76	397	536	21.6%	10	21.7%	1.9%
2019	0	12	59	86	380	537	21.7%	12	26.1%	2.2%
2020	2	4	49	65	327	447	18.0%	6	13.0%	1.3%
2021	1	6	43	90	343	483	19.5%	7	15.2%	1.4%
2022	1	10	59	83	324	477	19.2%	11	23.9%	2.3%
Totals	**5**	**41**	**263**	**400**	**1,771**	**2,480**	**100%**	**46**	**100%**	**1.8%**

Crashes by Type

Crash Type	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Angle (oncoming left turn)	162	6.5%	4	8.7%	2.5%	0	0.0%
Broadside (front to side)	1,181	47.6%	18	39.1%	1.5%	0	0.0%
Head-on (front to front)	55	2.2%	1	2.2%	1.8%	0	0.0%
Non-collision (single vehicle)	241	9.7%	15	32.6%	6.2%	50	96.2%
Rear to rear	7	0.3%	0	0.0%	0.0%	0	0.0%
Rear to side	75	3.0%	0	0.0%	0.0%	0	0.0%
Rear-end (front to rear)	501	20.2%	6	13.0%	1.2%	2	3.8%
Sideswipe (opposite direction)	33	1.3%	0	0.0%	0.0%	0	0.0%
Sideswipe (same direction)	115	4.6%	0	0.0%	0.0%	0	0.0%
Other	83	3.3%	2	4.3%	2.4%	0	0.0%
Not reported	18	0.7%	0	0.0%	0.0%	0	0.0%
Unknown	9	0.4%	0	0.0%	0.0%	0	0.0%
Total	**2,480**	**100%**	**46**	**100%**	**1.9%**	**52**	**100%**

Crashes by AADT

AADT	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
0-1,000	932	37.6%	13	28.3%	1.4%	15	28.8%
1,000-5,000	873	35.2%	21	45.7%	2.4%	22	42.3%
5,000-10,000	492	19.8%	7	15.2%	1.4%	13	25.0%
10,000-15,000	67	2.7%	2	4.3%	3.0%	0	0.0%
15,000-20,000	105	4.2%	3	6.5%	2.9%	2	3.8%
20,000+	0	0.0%	0	0.0%	0.0%	0	0.0%
No AADT Available	11	0.4%	0	0.0%	0.0%	0	0.0%
Totals	**2,480**	**100%**	**46**	**100%**	**1.9%**	**52**	**100%**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Crashes by Cause

Cause of Crash	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of VRU Crashes	% of Total VRU Crashes
Aggressive Driving	162	6.5%	4	8.7%	2.5%	0	0.0%
Animal	1181	47.6%	18	39.1%	1.5%	0	0.0%
Distracted Driving	55	2.2%	1	2.2%	1.8%	0	0.0%
Equipment Loss/Failure	241	9.7%	15	32.6%	6.2%	50	96.2%
Failure to Yield	7	0.3%	0	0.0%	0.0%	0	0.0%
Improper Action	75	3.0%	0	0.0%	0.0%	0	0.0%
Lost Control	501	20.2%	6	13.0%	1.2%	2	3.8%
Passing	33	1.3%	0	0.0%	0.0%	0	0.0%
Ran Off Road	115	4.6%	0	0.0%	0.0%	0	0.0%
Ran Traffic Signal/Stop Sign	83	3.3%	2	4.3%	2.4%	0	0.0%
Other	18	0.7%	0	0.0%	0.0%	0	0.0%
Unknown	9	0.4%	0	0.0%	0.0%	0	0.0%
Total	**2,480**	**100%**	**46**	**100%**	**1.9%**	**52**	**100%**

Crashes by Mode / User Type

User/Mode Type	Fatal (K)	Major (A)	Minor (B)	Possible (C)	PDO (O)	Total Crashes	% Share of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI
Pedalcyclist (bicycle/tricycle/unicycle/pedal car)	0	0	10	5	0	15	0.6%	0	0.0%	0.0%
Pedestrian	0	1	6	6	0	13	0.5%	1	2.2%	7.7%
Other Non-Motorist	1	6	8	8	1	24	1.0%	7	15.2%	29.2%
Motorcycle	0	4	17	7	6	34	1.4%	4	8.7%	11.8%
Motor Vehicle	4	30	222	374	1,764	2,394	96.5%	34	73.9%	1.4%
Total / Average	**5**	**41**	**263**	**400**	**1,771**	**2,480**	**100%**	**46**	**100%**	**1.9%**

Crashes by Federal Classification

Classification	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Local	1053	42.5%	12	26.1%	1.1%	19	36.5%
Minor Collector	28	1.1%	3	6.5%	10.7%	2	3.8%
Major Collector	357	14.4%	9	19.6%	2.5%	11	21.2%
Minor Arterial	624	25.2%	11	23.9%	1.8%	10	19.2%
Principal Arterial - other	410	16.5%	11	23.9%	2.7%	10	19.2%
Interstate	0	0.0%	0	0.0%	0.0%	0	0.0%
Unknown	8	0.3%	0	0.0%	0.0%	0	0.0%
Totals	**2,480**	**100%**	**46**	**100%**	**1.9%**	**52**	**100%**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Crashes by Roadway Surface Conditions

Roadway Conditions	# of Crashes	% of All Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Snow	169	6.8%	0	0.0%	0.0%	0	0.0%
Slush	24	1.0%	0	0.0%	0.0%	1	1.9%
Ice/frost	86	3.5%	1	2.2%	1.2%	0	0.0%
Wet	278	11.2%	4	8.7%	1.4%	4	7.7%
Dry	1,877	75.7%	41	89.1%	2.2%	47	90.4%
Mud/dirt	1	0.0%	0	0.0%	0.0%	0	0.0%
Sand	1	0.0%	0	0.0%	0.0%	0	0.0%
Gravel	10	0.4%	0	0.0%	0.0%	0	0.0%
Water (standing or moving)	0	0.0%	0	0.0%	0.0%	0	0.0%
Unknown	9	0.4%	0	0.0%	0.0%	0	0.0%
Other	4	0.2%	0	0.0%	0.0%	0	0.0%
Not Reported	21	0.8%	0	0.0%	0.0%	0	0.0%
Totals	**2,480**	**100%**	**46**	**100%**	**1.9%**	**52**	**100%**

Crashes by Light Conditions

Light Conditions	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Dark - Roadway Lighted	319	12.9%	7	15.2%	2.2%	7	13%
Dark - Roadway Not Lighted	36	1.5%	0	0.0%	0.0%	1	2%
Dark - Unknown Roadway Lighting	7	0.3%	0	0.0%	0.0%	0	0%
Dawn	43	1.7%	0	0.0%	0.0%	1	2%
Daylight	1,978	79.8%	37	80.4%	1.9%	41	79%
Dusk	73	2.9%	2	4.3%	2.7%	2	4%
Unknown	5	0.2%	0	0.0%	0.0%	0	0%
Not Reported	19	0.8%	0	0.0%	0.0%	0	0%
Totals	**2,480**	**100%**	**46**	**100%**	**1.9%**	**52**	**100%**

Crashes by Number of Lanes

# of Lanes	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
1	15	0.6%	1	2.2%	6.7%	0	0.0%
2	1,968	79.4%	36	78.3%	1.8%	38	73.1%
3	229	9.2%	2	4.3%	0.9%	7	13.5%
4	193	7.8%	6	13.0%	3.1%	6	11.5%
5	48	1.9%	1	2.2%	2.1%	1	1.9%
6	2	0.1%	0	0.0%	0.0%	0	0.0%
Unknown	25	1.0%	0	0.0%	0.0%	0	0.0%
Totals	**2,480**	**100%**	**46**	**100%**	**1.9%**	**52**	**100%**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Crashes by Posted Speed Limit

Posted Speed Limit	# of Crashes	% of All Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
5 MPH	4	0.2%	1	2.2%	25.0%	0	0.0%
10 MPH	8	0.3%	0	0.0%	0.0%	1	1.9%
15 MPH	10	0.4%	0	0.0%	0.0%	1	1.9%
20 MPH	121	4.9%	1	2.2%	0.8%	5	9.6%
25 MPH	1,382	55.7%	18	39.1%	1.3%	33	63.5%
30 MPH	301	12.1%	7	15.2%	2.3%	8	15.4%
35 MPH	310	12.5%	5	10.9%	1.6%	3	5.8%
40 MPH	45	1.8%	3	6.5%	6.7%	0	0.0%
45 MPH	106	4.3%	5	10.9%	4.7%	0	0.0%
50 MPH	15	0.6%	1	2.2%	6.7%	0	0.0%
55 MPH	83	3.3%	4	8.7%	4.8%	0	0.0%
60 MPH	0	0.0%	0	0.0%	0.0%	0	0.0%
65 MPH	21	0.8%	1	2.2%	4.8%	0	0.0%
70 MPH	2	0.1%	0	0.0%	0.0%	0	0.0%
Unknown	72	2.9%	0	0.0%	0.0%	1	1.9%
Totals	**2,480**	**100%**	**46**	**100%**	**1.9%**	**52**	**100%**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Crashes by Traffic Control Type

Traffic Control	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes	Crashes per Intersection	KSI Crashes per Intersection	# of Intersection Type	% of All Intersections	All Crashes Int. Ratio	KSI Crashes Int. Ratio
Signalized (w/ Ped Signals)	310	12.5%	5	10.9%	1.6%	11	21.2%	6.89	0.11	45	0.8%	15.33	13.33
Signalized (w/o Ped Signals)	178	7.2%	3	6.5%	1.7%	1	1.9%	5.56	0.09	32	0.6%	12.38	11.25
All-way Stop	146	5.9%	0	0.0%	0.0%	7	13.5%	0.46	0.00	317	5.7%	1.02	0.00
Two-way Stop	1,033	41.7%	15	32.6%	1.5%	20	38.5%	0.71	0.01	1445	26.2%	1.59	1.25
One-way Stop	506	20.4%	19	41.3%	3.8%	8	15.4%	0.29	0.01	1726	31.3%	0.65	1.32
Yield Signs	128	5.2%	2	4.3%	1.6%	1	1.9%	0.21	0.00	597	10.8%	0.48	0.40
Uncontrolled	150	6.0%	0	0.0%	0.0%	3	5.8%	0.12	0.00	1280	23.2%	0.26	0.00
Not Reported	5	0.2%	1	2.2%	20.0%	1	1.9%	0.11	0.02	44	0.8%	0.25	2.73
Other	24	1.0%	1	2.2%	4.2%	0	0.0%	0.73	0.03	33	0.6%	1.62	3.64
Totals	**2,480**	**100%**	**46**	**100%**	**1.9%**	**52**	**100%**	**0.45**	**0.01**	**5519**	**100%**	**1.00**	**1.00**

Crashes by Age Group

Age	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes	Population	% of Population	All Crashes Pop. Ratio	KSI Crashes Pop. Ratio
0-10	0	0.0%	0	0.0%	0.0%	0	0.0%	96,006	12.7%	0.00	0.00
10-20	481	19.4%	3	6.5%	0.6%	8	15.4%	105,520	14.0%	1.38	0.47
20-30	410	16.5%	9	19.6%	2.2%	3	5.8%	115,824	15.4%	1.07	1.27
30-40	365	14.7%	12	26.1%	3.3%	5	9.6%	104,581	13.9%	1.06	1.88
40-50	296	11.9%	4	8.7%	1.4%	6	11.5%	91,974	12.2%	0.98	0.71
50-60	284	11.5%	7	15.2%	2.5%	6	11.5%	91,900	12.2%	0.94	1.25
60-70	275	11.1%	5	10.9%	1.8%	12	23.1%	78,513	10.4%	1.06	1.04
70-80	161	6.5%	4	8.7%	2.5%	3	5.8%	44,091	5.9%	1.11	1.49
80+	84	3.4%	0	0.0%	0.0%	1	1.9%	24,632	3.3%	1.04	0.00
Unknown	124	5.0%	2	4.3%	1.6%	8	15.4%	0	0.0%	0.00	0.00
Totals	**2,480**	**100%**	**46**	**100%**	**1.9%**	**52**	**100%**	**753,041**	**100%**	**1.00**	**1.00**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Segment Crash Tables

Crashes by Year and Severity

Year	Crashes by Severity									
	Fatal (K)	Major (A)	Minor (B)	Possible (C)	PDO (O)	Total Crashes	% of Total Crashes	# of KSI Crashes	% of KSI Crashes	% of KSI Crashes per Year
2018	1	13	49	69	522	654	19.5%	14	18.4%	2.1%
2019	2	8	49	83	620	762	22.8%	10	13.2%	1.3%
2020	0	15	46	53	468	582	17.4%	15	19.7%	2.6%
2021	2	15	45	89	516	667	19.9%	17	22.4%	2.5%
2022	4	16	58	57	547	682	20.4%	20	26.3%	2.9%
Totals	**9**	**67**	**247**	**351**	**2,673**	**3,347**	**100%**	**76**	**100%**	**2.3%**

Crashes by Type

Crash Type	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Angle (oncoming left turn)	75	2.2%	0	0.0%	0.0%	0	0.0%
Broadside (front to side)	427	12.8%	9	11.8%	2.1%	0	0.0%
Head-on (front to front)	71	2.1%	8	10.5%	11.3%	0	0.0%
Non-collision (single vehicle)	728	21.8%	44	57.9%	6.0%	40	100.0%
Rear to rear	60	1.8%	0	0.0%	0.0%	0	0.0%
Rear to side	299	8.9%	0	0.0%	0.0%	0	0.0%
Rear-end (front to rear)	877	26.2%	11	14.5%	1.3%	0	0.0%
Sideswipe (opposite direction)	84	2.5%	0	0.0%	0.0%	0	0.0%
Sideswipe (same direction)	299	8.9%	2	2.6%	0.7%	0	0.0%
Other	141	4.2%	2	2.6%	1.4%	0	0.0%
Not reported	249	7.4%	0	0.0%	0.0%	0	0.0%
Unknown	37	1.1%	0	0.0%	0.0%	0	0.0%
Total	**3,347**	**100%**	**76**	**100%**	**2.3%**	**40**	**100%**

Crashes by Mode / User Type

User/Mode Type	Fatal (K)	Major (A)	Minor (B)	Possible (C)	PDO (O)	Total Crashes	% Share of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI
Pedalcyclist (bicycle/tricycle/unicycle/pedal car)	0	0	5	0	0	5	0.1%	0	0.0%	0.0%
Pedestrian	0	3	5	0	0	8	0.2%	3	3.9%	37.5%
Other Non-Motorist	0	3	12	12	0	27	0.8%	3	3.9%	11.1%
Motorcycle	2	21	21	11	11	66	2.0%	23	30.3%	34.8%
Motor Vehicle	7	40	204	328	2,662	3,241	96.8%	47	61.8%	1.5%
Total / Average	**9**	**67**	**247**	**351**	**2,673**	**3,347**	**100%**	**76**	**100%**	**2.3%**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Crashes by Roadway Surface Conditions

Roadway Conditions	# of Crashes	% of All Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Snow	192	5.7%	2	2.6%	1.0%	0	0.0%
Slush	20	0.6%	0	0.0%	0.0%	0	0.0%
Ice/frost	143	4.3%	1	1.3%	0.7%	0	0.0%
Wet	315	9.4%	4	5.3%	1.3%	4	10.0%
Dry	2,337	69.8%	66	86.8%	2.8%	36	90.0%
Mud/dirt	0	0.0%	0	0.0%	0.0%	0	0.0%
Sand	6	0.2%	0	0.0%	0.0%	0	0.0%
Gravel	21	0.6%	3	3.9%	14.3%	0	0.0%
Water (standing or moving)	1	0.0%	0	0.0%	0.0%	0	0.0%
Unknown	25	0.7%	0	0.0%	0.0%	0	0.0%
Other	3	0.1%	0	0.0%	0.0%	0	0.0%
Not Reported	284	8.5%	0	0.0%	0.0%	0	0.0%
Totals	**3,347**	**100%**	**76**	**100%**	**2.3%**	**40**	**100%**

Crashes by Light Conditions

Light Conditions	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes
Dark - Roadway Lighted	366	10.9%	10	13.2%	2.7%	2	5.0%
Dark - Roadway Not Lighted	258	7.7%	13	17.1%	5.0%	2	5.0%
Dark - Unknown Roadway Lighting	41	1.2%	2	2.6%	4.9%	2	5.0%
Dawn	72	2.2%	1	1.3%	1.4%	0	0.0%
Daylight	2,203	65.8%	47	61.8%	2.1%	32	80.0%
Dusk	92	2.7%	3	3.9%	3.3%	2	5.0%
Unknown	31	0.9%	0	0.0%	0.0%	0	0.0%
Not Reported	284	8.5%	0	0.0%	0.0%	0	0.0%
Totals	**3,347**	**100%**	**76**	**100%**	**2.3%**	**40**	**100%**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Crashes by AADT

AADT	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes	Street Miles	Crashes per Mile	KSI Crashes per Mile	% of All Classification	All Crashes Class. Ratio	KSI Crash Class. Ratio
0-1,000	1,086	32.4%	29	38.2%	2.7%	17	42.5%	207.5	5.23	0.14	31.2%	1.04	1.22
1,000-5,000	1,002	29.9%	17	22.4%	1.7%	13	32.5%	227.0	4.41	0.07	34.1%	0.88	0.66
5,000-10,000	904	27.0%	23	30.3%	2.5%	9	22.5%	161.7	5.59	0.14	24.3%	1.11	1.25
10,000-15,000	130	3.9%	4	5.3%	3.1%	1	2.5%	17.7	7.34	0.23	2.7%	1.46	1.98
15,000-20,000	190	5.7%	3	3.9%	1.6%	0	0.0%	45.0	4.22	0.07	6.8%	0.84	0.58
20,000+	0	0.0%	0	0.0%	0.0%	0	0.0%	0.0	0.00	0.00	0.0%	0.00	0.00
No AADT Available	35	1.0%	0	0.0%	0.0%	0	0.0%	6.4	5.50	0.00	1.0%	1.09	0.00
Totals	**3,347**	**100%**	**76**	**100%**	**2.3%**	**40**	**100%**	**665.2**	**5.03**	**0.11**	**100%**	**1.00**	**1.00**

Crashes by Median Type

Median Type	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes	Street Miles	Crashes per Mile	KSI Crashes per Mile	% of All Classification	All Crashes Class. Ratio	KSI Crash Class. Ratio
None	3,121	93.2%	68	89.5%	2.2%	39	97.5%	597.93	5.22	0.11	89.9%	1.04	1.00
Raised Median	9	0.3%	0	0.0%	0.0%	1	2.5%	1.40	6.44	0.00	0.2%	1.28	0.00
Grass Surface (w/o Barrier)	214	6.4%	8	10.5%	3.7%	0	0.0%	65.68	3.26	0.12	9.9%	0.65	1.07
Hard Surface (w/ Barrier)	1	0.0%	0	0.0%	0.0%	0	0.0%	0.00	0.00	0.00	0.0%	#DIV/0!	#DIV/0!
Grass Surface (w/ Barrier)	2	0.1%	0	0.0%	0.0%	0	0.0%	0.21	9.67	0.00	0.0%	1.92	0.00
Totals	**3,347**	**100%**	**76**	**100%**	**2.3%**	**40**	**100%**	**665.2**	**5.03**	**0.11**	**100%**	**1.00**	**1.00**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Crashes by Posted Speed Limit

Posted Speed Limit	# of Crashes	% of All Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes	Street Miles	Crashes per Mile	KSI Crashes per Mile	% of All Classification	All Crashes Class. Ratio	KSI Crash Class. Ratio
5 MPH	10	0.3%	0	0.0%	0.0%	1	2.5%	2.0	4.88	0.00	0.3%	0.97	0.00
10 MPH	34	1.0%	0	0.0%	0.0%	0	0.0%	4.2	8.14	0.00	0.6%	1.62	0.00
15 MPH	36	1.1%	0	0.0%	0.0%	2	5.0%	6.1	5.91	0.00	0.9%	1.17	0.00
20 MPH	142	4.2%	4	5.3%	2.8%	5	12.5%	13.0	10.89	0.31	2.0%	2.16	2.68
25 MPH	1,442	43.1%	24	31.6%	1.7%	26	65.0%	251.0	5.74	0.10	37.7%	1.14	0.84
30 MPH	275	8.2%	3	3.9%	1.1%	2	5.0%	66.8	4.12	0.04	10.0%	0.82	0.39
35 MPH	342	10.2%	13	17.1%	3.8%	1	2.5%	77.5	4.41	0.17	11.7%	0.88	1.47
40 MPH	48	1.4%	0	0.0%	0.0%	0	0.0%	8.5	5.62	0.00	1.3%	1.12	0.00
45 MPH	208	6.2%	7	9.2%	3.4%	0	0.0%	42.2	4.93	0.17	6.3%	0.98	1.45
50 MPH	49	1.5%	4	5.3%	8.2%	0	0.0%	10.0	4.91	0.40	1.5%	0.98	3.51
55 MPH	222	6.6%	13	17.1%	5.9%	1	2.5%	59.3	3.74	0.22	8.9%	0.74	1.92
60 MPH	2	0.1%	0	0.0%	0.0%	0	0.0%	0.3	7.97	0.00	0.0%	1.58	0.00
65 MPH	117	3.5%	6	7.9%	5.1%	1	2.5%	17.9	6.55	0.34	2.7%	1.30	2.94
70 MPH	17	0.5%	1	1.3%	5.9%	0	0.0%	3.3	5.11	0.30	0.5%	1.02	2.63
Unknown	403	12.0%	1	1.3%	0.2%	1	2.5%	103.0	3.91	0.01	15.5%	0.78	0.08
Totals	**3,347**	**100%**	**76**	**100%**	**2.3%**	**40**	**100%**	**665.2**	**5.03**	**0.11**	**100%**	**1.00**	**1.00**

Crashes by Age Group

Age	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes	Population	% of Population	All Crashes Pop. Ratio	KSI Crashes Pop. Ratio
0-10	0	0.0%	0	0.0%	0.0%	0	0.0%	96,006	12.7%	0.00	0.00
10-20	562	16.8%	11	14.5%	2.0%	2	5.0%	105,520	14.0%	1.20	1.03
20-30	575	17.2%	18	23.7%	3.1%	6	15.0%	115,824	15.4%	1.12	1.54
30-40	472	14.1%	19	25.0%	4.0%	8	20.0%	104,581	13.9%	1.02	1.80
40-50	416	12.4%	6	7.9%	1.4%	8	20.0%	91,974	12.2%	1.02	0.65
50-60	354	10.6%	10	13.2%	2.8%	5	12.5%	91,900	12.2%	0.87	1.08
60-70	298	8.9%	5	6.6%	1.7%	4	10.0%	78,513	10.4%	0.85	0.63
70-80	158	4.7%	3	3.9%	1.9%	1	2.5%	44,091	5.9%	0.81	0.67
80+	110	3.3%	2	2.6%	1.8%	4	10.0%	24,632	3.3%	1.00	0.80
Unknown	402	12.0%	2	2.6%	0.5%	2	5.0%	0	0.0%	0.00	0.00
Totals	**3,347**	**100%**	**76**	**100%**	**2.3%**	**40**	**100%**	**753,041**	**100%**	**1.00**	**1.00**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Crashes by Number of Lanes

# of Lanes	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes	Street Miles	Crashes per Mile	KSI Crashes per Mile	% of All # of Lanes	All Crashes # of Lanes Ratio	KSI Crash # of Lanes Ratio
`	39	1.2%	0	0.0%	0.0%	0	0.0%	10.8	3.62	0.00	1.6%	0.72	0.00
2	2,691	80.4%	65	85.5%	2.4%	35	87.5%	548.0	4.91	0.12	82.4%	0.98	1.04
3	302	9.0%	6	7.9%	2.0%	4	10.0%	44.3	6.82	0.14	6.7%	1.35	1.19
4	217	6.5%	3	3.9%	1.4%	0	0.0%	45.0	4.82	0.07	6.8%	0.96	0.58
5	56	1.7%	2	2.6%	3.6%	0	0.0%	8.9	6.29	0.22	1.3%	1.25	1.97
6	0	0.0%	0	0.0%	0.0%	0	0.0%	0.0	0.00	0.00	0.0%	0.00	0.00
Unknown	42	1.3%	0	0.0%	0.0%	1	2.5%	8.3	5.07	0.00	1.2%	1.01	0.00
Totals	**3,347**	**100%**	**76**	**100%**	**2.3%**	**40**	**100%**	**665.2**	**5.03**	**0.11**	**100.0%**	**1.00**	**1.00**

Crashes by Federal Classification

Classification	# of Crashes	% of Crashes	# of KSI Crashes	% of Total KSI Crashes	% of Crashes Resulting in KSI	# of Vulnerable User Crashes	% of Vulnerable User Crashes	Street Miles	Crashes per Mile	KSI Crashes per Mile	% of All Classification	All Crashes Class. Ratio	KSI Crash Class. Ratio
Local	1,193	35.6%	23	30.3%	1.9%	21	52.5%	215.6	5.53	0.11	32.4%	1.10	0.93
Minor Collector	30	0.9%	3	3.9%	10.0%	1	2.5%	7.6	3.94	0.39	1.1%	0.78	3.45
Major Collector	403	12.0%	10	13.2%	2.5%	8	20.0%	81.0	4.98	0.12	12.2%	0.99	1.08
Minor Arterial	766	22.9%	20	26.3%	2.6%	5	12.5%	168.4	4.55	0.12	25.3%	0.90	1.04
Principal Arterial - other	929	27.8%	20	26.3%	2.2%	5	12.5%	187.8	4.95	0.11	28.2%	0.98	0.93
Interstate	0	0.0%	0	0.0%	0.0%	0	0.0%	0.0	0.00	0.00	0.0%	-	-
Unknown	26	0.8%	0	0.0%	0.0%	0	0.0%	4.9	5.36	0.00	0.7%	1.07	0.00
Totals	**3,347**	**100%**	**76**	**100%**	**2.3%**	**40**	**100%**	**665.2**	**5.03**	**0.11**	**100%**	**1.00**	**1.00**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Municipality Crash Tables

Crashes by Year

Municipality	Crashes by Year					
	2018	2019	2020	2021	2022	Total Crashes
Ackworth	1	1	1	0	1	4
Adel	52	67	51	57	74	301
Alleman	10	4	1	8	2	25
Baxter	0	0	6	3	2	11
Beaver	0	0	0	1	1	2
Berkley	0	0	0	0	2	2
Bevington	2	3	0	0	1	6
Boone	133	159	126	150	130	698
Bouton	0	0	1	1	0	2
Boxholm	0	0	0	0	0	0
Bussey	0	2	1	1	1	5
Cambridge	1	2	3	3	2	11
Colfax	16	13	10	6	12	57
Collins	0	2	1	0	1	4
Colo	2	6	3	7	6	24
Cumming	0	1	0	1	0	2
Dallas Center	8	8	9	8	12	45
Dawson	1	2	1	0	0	4
De Soto	17	12	8	10	15	62
Dexter	0	4	3	1	2	10
Earlham	5	9	5	0	2	21
Elkhart	1	2	2	1	1	7
Fraser	0	0	3	1	2	6
Granger	15	19	9	12	12	67
Hamilton	3	0	0	1	1	5
Hartford	2	0	1	2	1	6
Harvey	0	1	0	0	0	1
Huxley	17	12	26	15	15	85
Indianola	230	214	182	201	170	997
Kelley	1	1	3	1	2	8
Kellogg	3	6	4	4	2	19
Knoxville	84	88	90	58	77	397
Lacona	0	0	1	0	0	1
Lambs Grove	0	1	1	1	0	3
Linden	0	0	0	1	0	1
Luther	2	2	1	2	2	9
Lynnville	1	2	1	3	0	7
Madrid	13	2	3	3	6	27
Martensdale	4	0	0	4	0	8
Maxwell	5	0	4	5	3	17
McCallsburg	1	1	1	0	0	3
Melcher-Dallas	2	5	5	5	6	23
Milo	3	3	4	5	0	15
Minburn	2	2	1	2	2	9
Mingo	0	0	0	0	0	0
Monroe	11	14	11	9	13	58
Nevada	49	62	43	63	66	283
New Virginia	3	2	1	1	0	7
Newton	151	169	127	149	165	761
Oakland Acres	0	0	0	0	1	1
Ogden	9	7	15	9	6	46
Patterson	0	0	1	1	2	4
Pella	136	170	100	139	169	714
Perry	72	84	51	56	42	305
Pilot Mound	0	1	0	0	0	1

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Municipality	Crashes by Year					
	2018	2019	2020	2021	2022	Total Crashes
Pleasantville	10	19	9	7	11	56
Prairie City	5	6	4	8	4	27
Reasnor	0	1	1	2	1	5
Redfield	0	1	2	1	3	7
Roland	3	7	0	2	3	15
Runnells	0	1	1	2	0	4
Saint Charles	6	1	1	1	3	12
Saint Marys	0	0	0	0	0	0
Sandyville	1	0	1	0	0	2
Sheldahl	1	0	1	1	0	3
Slater	8	7	7	11	7	40
Spring Hill	0	0	1	0	0	1
Story City	13	19	14	13	21	80
Sully	3	0	6	1	4	14
Truro	0	2	0	1	0	3
Van Meter	11	12	7	12	16	58
Winterset	50	47	42	53	39	231
Woodward	9	9	11	20	15	64
Zearing	2	2	0	4	0	8
Total / Average	**1,190**	**1,299**	**1,029**	**1,150**	**1,159**	**5,827**

Crashes by Severity

Municipality	Crashes by Severity							
	Fatal (K)	Major (A)	Minor (B)	Possible (C)	PDO (O)	Total Crashes	% of Total KSI Crashes	% of KSI Crashes by City
Ackworth	0	0	1	1	2	4	0%	0.0%
Adel	1	6	23	42	229	301	6%	2.3%
Alleman	0	0	5	3	17	25	0%	0.0%
Baxter	0	1	1	0	9	11	1%	9.1%
Beaver	0	0	1	0	1	2	0%	0.0%
Berkley	0	1	0	0	1	2	1%	50.0%
Bevington	0	0	1	1	4	6	0%	0.0%
Boone	1	10	48	108	531	698	9%	1.6%
Bouton	0	0	0	0	2	2	0%	0.0%
Boxholm	0	0	0	0	0	0	0%	0.0%
Bussey	0	0	0	0	5	5	0%	0.0%
Cambridge	0	0	0	2	9	11	0%	0.0%
Colfax	0	1	5	9	42	57	1%	1.8%
Collins	0	0	1	1	2	4	0%	0.0%
Colo	0	2	3	3	16	24	2%	8.3%
Cumming	0	0	0	1	1	2	0%	0.0%
Dallas Center	0	1	5	3	36	45	1%	2.2%
Dawson	0	0	1	0	3	4	0%	0.0%
De Soto	0	2	6	8	46	62	2%	3.2%
Dexter	0	0	0	3	7	10	0%	0.0%
Earlham	0	0	3	2	16	21	0%	0.0%
Elkhart	0	0	0	1	6	7	0%	0.0%
Fraser	0	1	2	0	3	6	1%	16.7%
Granger	1	0	9	12	45	67	1%	1.5%
Hamilton	0	1	0	2	2	5	1%	20.0%
Hartford	0	0	0	1	5	6	0%	0.0%
Harvey	0	0	0	0	1	1	0%	0.0%
Huxley	0	4	4	13	64	85	3%	4.7%
Indianola	2	19	82	142	752	997	17%	2.1%
Kelley	0	0	3	2	3	8	0%	0.0%
Kellogg	0	0	0	4	15	19	0%	0.0%
Knoxville	1	3	45	41	307	397	3%	1.0%

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Municipality	Crashes by Severity							
	Fatal (K)	Major (A)	Minor (B)	Possible (C)	PDO (O)	Total Crashes	% of Total KSI Crashes	% of KSI Crashes by City
Lacona	0	0	0	0	1	1	0%	0.0%
Lambs Grove	0	0	0	0	3	3	0%	0.0%
Linden	0	0	0	0	1	1	0%	0.0%
Luther	0	1	0	2	6	9	1%	11.1%
Lynnville	0	2	1	0	4	7	2%	28.6%
Madrid	0	0	2	5	20	27	0%	0.0%
Martensdale	0	0	1	1	6	8	0%	0.0%
Maxwell	0	0	3	1	13	17	0%	0.0%
McCallsburg	0	0	0	1	2	3	0%	0.0%
Melcher-Dallas	0	1	2	3	17	23	1%	4.3%
Milo	0	0	3	3	9	15	0%	0.0%
Minburn	0	0	6	1	2	9	0%	0.0%
Mingo	0	0	0	0	0	0	0%	0.0%
Monroe	0	2	3	5	48	58	2%	3.4%
Nevada	1	1	36	42	203	283	2%	0.7%
New Virginia	1	0	0	1	5	7	1%	14.3%
Newton	0	19	78	109	555	761	16%	2.5%
Oakland Acres	0	0	0	0	1	1	0%	0.0%
Ogden	0	0	2	5	39	46	0%	0.0%
Patterson	0	0	0	0	4	4	0%	0.0%
Pella	2	14	48	69	581	714	13%	2.2%
Perry	1	3	24	47	230	305	3%	1.3%
Pilot Mound	0	0	0	0	1	1	0%	0.0%
Pleasantville	0	3	5	7	41	56	2%	5.4%
Prairie City	0	0	2	4	21	27	0%	0.0%
Reasnor	0	0	0	1	4	5	0%	0.0%
Redfield	0	0	1	0	6	7	0%	0.0%
Roland	0	0	2	2	11	15	0%	0.0%
Runnells	0	0	0	1	3	4	0%	0.0%
Saint Charles	1	1	2	2	6	12	2%	16.7%
Saint Marys	0	0	0	0	0	0	0%	0.0%
Sandyville	0	0	1	0	1	2	0%	0.0%
Sheldahl	0	0	0	0	3	3	0%	0.0%
Slater	1	1	0	2	36	40	2%	5.0%
Spring Hill	0	0	0	0	1	1	0%	0.0%
Story City	0	0	11	7	62	80	0%	0.0%
Sully	0	1	0	3	10	14	1%	7.1%
Truro	0	0	0	0	3	3	0%	0.0%
Van Meter	0	4	3	3	48	58	3%	6.9%
Winterset	0	3	17	15	196	231	2%	1.3%
Woodward	1	0	7	4	52	64	1%	1.6%
Zearing	0	0	1	0	7	8	0%	0.0%
Totals	**14**	**108**	**510**	**751**	**4,444**	**5,827**	**100%**	**2.1%**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Crashes by User Type / Mode

Municipality	Crashes by User Type								
	Pedalcyclist	Pedestrian	Other Non-Motorist	Motorcycle	Motor Vehicle	Total Crashes	% of Vulnerable User Crashes	# of Vulnerable User KSI Crashes	% of Vulnerable User KSI Crashes
Ackworth	0	0	0	0	4	4	0.0%	0	0.0%
Adel	1	0	1	6	293	301	0.7%	0	0.0%
Alleman	0	0	0	0	25	25	0.0%	0	0.0%
Baxter	0	0	0	1	10	11	0.0%	0	0.0%
Beaver	0	0	0	0	2	2	0.0%	0	0.0%
Berkley	0	0	0	0	2	2	0.0%	0	0.0%
Bevington	0	0	0	0	6	6	0.0%	0	0.0%
Boone	3	2	7	10	676	698	1.7%	1	8.3%
Bouton	0	0	0	0	2	2	0.0%	0	0.0%
Boxholm	0	0	0	0	0	0	0.0%	0	0.0%
Bussey	0	0	0	0	5	5	0.0%	0	0.0%
Cambridge	0	0	1	0	10	11	9.1%	0	0.0%
Colfax	0	0	0	1	56	57	0.0%	0	0.0%
Collins	0	0	0	0	4	4	0.0%	0	0.0%
Colo	0	0	1	1	22	24	4.2%	1	100.0%
Cumming	0	0	0	0	2	2	0.0%	0	0.0%
Dallas Center	1	0	0	1	43	45	2.2%	0	0.0%
Dawson	0	0	0	0	4	4	0.0%	0	0.0%
De Soto	0	0	0	4	58	62	0.0%	0	0.0%
Dexter	0	0	0	0	10	10	0.0%	0	0.0%
Earlham	0	0	0	1	20	21	0.0%	0	0.0%
Elkhart	0	0	0	1	6	7	0.0%	0	0.0%
Fraser	0	0	0	1	5	6	0.0%	0	0.0%
Granger	0	0	0	0	67	67	0.0%	0	0.0%
Hamilton	0	0	0	2	3	5	0.0%	0	0.0%
Hartford	0	0	0	0	6	6	0.0%	0	0.0%
Harvey	0	0	0	0	1	1	0.0%	0	0.0%
Huxley	0	1	0	0	84	85	1.2%	0	0.0%
Indianola	4	3	4	10	976	997	1.1%	1	9.1%
Kelley	0	1	0	0	7	8	12.5%	0	0.0%
Kellogg	0	0	0	0	19	19	0.0%	0	0.0%
Knoxville	2	2	9	8	376	397	3.3%	0	0.0%
Lacona	0	0	0	0	1	1	0.0%	0	0.0%
Lambs Grove	0	0	0	0	3	3	0.0%	0	0.0%
Linden	0	0	0	0	1	1	0.0%	0	0.0%
Luther	0	0	0	0	9	9	0.0%	0	0.0%
Lynnville	0	0	0	2	5	7	0.0%	0	0.0%
Madrid	0	0	0	1	26	27	0.0%	0	0.0%
Martensdale	0	0	0	0	8	8	0.0%	0	0.0%
Maxwell	0	0	0	0	17	17	0.0%	0	0.0%
McCallsburg	0	0	0	0	3	3	0.0%	0	0.0%
Melcher-Dallas	0	1	0	1	21	23	4.3%	1	100.0%
Milo	0	0	0	0	15	15	0.0%	0	0.0%
Minburn	0	0	0	0	9	9	0.0%	0	0.0%
Mingo	0	0	0	0	0	0	0.0%	0	0.0%
Monroe	0	0	0	0	58	58	0.0%	0	0.0%
Nevada	0	0	1	2	280	283	0.4%	0	0.0%
New Virginia	0	0	0	0	7	7	0.0%	0	0.0%
Newton	4	4	9	21	723	761	2.2%	2	11.8%
Oakland Acres	0	0	0	0	1	1	0.0%	0	0.0%

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Municipality	Crashes by User Type								
	Pedalcyclist	Pedestrian	Other Non-Motorist	Motorcycle	Motor Vehicle	Total Crashes	% of Vulnerable User Crashes	# of Vulnerable User KSI Crashes	% of Vulnerable User KSI Crashes
Ogden	0	1	0	0	45	46	2.2%	0	0.0%
Patterson	0	0	0	0	4	4	0.0%	0	0.0%
Pella	0	2	9	8	695	714	1.5%	3	27.3%
Perry	1	1	1	4	298	305	1.0%	1	33.3%
Pilot Mound	0	0	0	0	1	1	0.0%	0	0.0%
Pleasantville	0	0	1	0	55	56	1.8%	0	0.0%
Prairie City	0	0	0	0	27	27	0.0%	0	0.0%
Reasnor	0	0	0	0	5	5	0.0%	0	0.0%
Redfield	0	0	0	1	6	7	0.0%	0	0.0%
Roland	0	0	0	1	14	15	0.0%	0	0.0%
Runnells	0	0	0	0	4	4	0.0%	0	0.0%
Saint Charles	0	1	0	1	10	12	8.3%	1	100.0%
Saint Marys	0	0	0	0	0	0	0.0%	0	0.0%
Sandyville	0	0	0	0	2	2	0.0%	0	0.0%
Sheldahl	0	0	0	1	2	3	0.0%	0	0.0%
Slater	0	0	1	0	39	40	2.5%	1	100.0%
Spring Hill	0	0	0	0	1	1	0.0%	0	0.0%
Story City	2	1	2	2	73	80	6.3%	0	0.0%
Sully	0	0	1	0	13	14	7.1%	1	100.0%
Truro	0	0	0	0	3	3	0.0%	0	0.0%
Van Meter	1	0	1	2	54	58	3.4%	1	50.0%
Winterset	1	1	2	5	222	231	1.7%	0	0.0%
Woodward	0	0	0	1	63	64	0.0%	0	0.0%
Zearing	0	0	0	0	8	8	0.0%	0	0.0%
Totals	**20**	**21**	**51**	**100**	**5,635**	**5,827**	**1.6%**	**14**	**15.2%**

KSI Crashes by Type

Municipality	KSI Crashes by Type							
	Angle	Fixed Obj.	Head-on	Rear-end	Sideswipe (Same)	Sideswipe (Opposite)	Other	Total Crashes
Ackworth	0	0	0	0	0	0	0	0
Adel	3	3	0	1	0	0	0	7
Alleman	0	0	0	0	0	0	0	0
Baxter	0	1	0	0	0	0	0	1
Beaver	0	0	0	0	0	0	0	0
Berkley	0	1	0	0	0	0	0	1
Bevington	0	0	0	0	0	0	0	0
Boone	5	4	0	1	0	0	1	11
Bouton	0	0	0	0	0	0	0	0
Boxholm	0	0	0	0	0	0	0	0
Bussey	0	0	0	0	0	0	0	0
Cambridge	0	0	0	0	0	0	0	0
Colfax	0	1	0	0	0	0	0	1
Collins	0	0	0	0	0	0	0	0
Colo	0	1	1	0	0	0	0	2
Cumming	0	0	0	0	0	0	0	0
Dallas Center	0	1	0	0	0	0	0	1
Dawson	0	0	0	0	0	0	0	0
De Soto	1	1	0	0	0	0	0	2
Dexter	0	0	0	0	0	0	0	0
Earlham	0	0	0	0	0	0	0	0
Elkhart	0	0	0	0	0	0	0	0
Fraser	0	1	0	0	0	0	0	1
Granger	1	0	0	0	0	0	0	1

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Municipality	KSI Crashes by Type							
	Angle	Fixed Obj.	Head-on	Rear-end	Sideswipe (Same)	Sideswipe (Opposite)	Other	Total Crashes
Hamilton	1	0	0	0	0	0	0	1
Hartford	0	0	0	0	0	0	0	0
Harvey	0	0	0	0	0	0	0	0
Huxley	0	0	1	2	0	0	1	4
Indianola	8	6	0	5	0	0	2	21
Kelley	0	0	0	0	0	0	0	0
Kellogg	0	0	0	0	0	0	0	0
Knoxville	0	2	1	0	0	0	1	4
Lacona	0	0	0	0	0	0	0	0
Lambs Grove	0	0	0	0	0	0	0	0
Linden	0	0	0	0	0	0	0	0
Luther	0	0	0	1	0	0	0	1
Lynnville	0	1	1	0	0	0	0	2
Madrid	0	0	0	0	0	0	0	0
Martensdale	0	0	0	0	0	0	0	0
Maxwell	0	0	0	0	0	0	0	0
McCallsburg	0	0	0	0	0	0	0	0
Melcher-Dallas	0	1	0	0	0	0	0	1
Milo	0	0	0	0	0	0	0	0
Minburn	0	0	0	0	0	0	0	0
Mingo	0	0	0	0	0	0	0	0
Monroe	0	1	0	0	0	0	1	2
Nevada	1	1	0	0	0	0	0	2
New Virginia	0	1	0	0	0	0	0	1
Newton	2	14	0	2	1	0	0	19
Oakland Acres	0	0	0	0	0	0	0	0
Ogden	0	0	0	0	0	0	0	0
Patterson	0	0	0	0	0	0	0	0
Pella	2	7	2	3	0	0	2	16
Perry	0	3	0	0	1	0	0	4
Pilot Mound	0	0	0	0	0	0	0	0
Pleasantville	1	1	1	0	0	0	0	3
Prairie City	0	0	0	0	0	0	0	0
Reasnor	0	0	0	0	0	0	0	0
Redfield	0	0	0	0	0	0	0	0
Roland	0	0	0	0	0	0	0	0
Runnells	0	0	0	0	0	0	0	0
Saint Charles	0	2	0	0	0	0	0	2
Saint Marys	0	0	0	0	0	0	0	0
Sandyville	0	0	0	0	0	0	0	0
Sheldahl	0	0	0	0	0	0	0	0
Slater	0	0	1	1	0	0	0	2
Spring Hill	0	0	0	0	0	0	0	0
Story City	0	0	0	0	0	0	0	0
Sully	0	1	0	0	0	0	0	1
Truro	0	0	0	0	0	0	0	0
Van Meter	1	2	0	1	0	0	0	4
Winterset	1	1	1	0	0	0	0	3
Woodward	0	1	0	0	0	0	0	1
Zearing	0	0	0	0	0	0	0	0
Total	**27**	**59**	**9**	**17**	**2**	**0**	**8**	**122**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

KSI Crashes by Posted Speed Limit

Municipality	KSI Crashes by Posted Speed Limit							
	0-25 MPH	30-35 MPH	40-45 MPH	50-55 MPH	60-65 MPH	70-75 MPH	Unknown	Totals
Ackworth	0	0	0	0	0	0	0	0
Adel	2	1	0	2	2	0	0	7
Alleman	0	0	0	0	0	0	0	0
Baxter	1	0	0	0	0	0	0	1
Beaver	0	0	0	0	0	0	0	0
Berkley	0	1	0	0	0	0	0	1
Bevington	0	0	0	0	0	0	0	0
Boone	3	4	3	1	0	0	0	11
Bouton	0	0	0	0	0	0	0	0
Boxholm	0	0	0	0	0	0	0	0
Bussey	0	0	0	0	0	0	0	0
Cambridge	0	0	0	0	0	0	0	0
Colfax	0	0	0	1	0	0	0	1
Collins	0	0	0	0	0	0	0	0
Colo	2	0	0	0	0	0	0	2
Cumming	0	0	0	0	0	0	0	0
Dallas Center	1	0	0	0	0	0	0	1
Dawson	0	0	0	0	0	0	0	0
De Soto	0	1	1	0	0	0	0	2
Dexter	0	0	0	0	0	0	0	0
Earlham	0	0	0	0	0	0	0	0
Elkhart	0	0	0	0	0	0	0	0
Fraser	0	0	1	0	0	0	0	1
Granger	0	0	0	1	0	0	0	1
Hamilton	0	1	0	0	0	0	0	1
Hartford	0	0	0	0	0	0	0	0
Harvey	0	0	0	0	0	0	0	0
Huxley	1	1	0	2	0	0	0	4
Indianola	5	7	4	5	0	0	0	21
Kelley	0	0	0	0	0	0	0	0
Kellogg	0	0	0	0	0	0	0	0
Knoxville	0	1	2	0	0	0	1	4
Lacona	0	0	0	0	0	0	0	0
Lambs Grove	0	0	0	0	0	0	0	0
Linden	0	0	0	0	0	0	0	0
Luther	0	0	0	1	0	0	0	1
Lynnville	1	0	0	1	0	0	0	2
Madrid	0	0	0	0	0	0	0	0
Martensdale	0	0	0	0	0	0	0	0
Maxwell	0	0	0	0	0	0	0	0
McCallsburg	0	0	0	0	0	0	0	0
Melcher-Dallas	1	0	0	0	0	0	0	1
Milo	0	0	0	0	0	0	0	0
Minburn	0	0	0	0	0	0	0	0
Mingo	0	0	0	0	0	0	0	0
Monroe	0	0	1	0	1	0	0	2
Nevada	0	0	0	2	0	0	0	2
New Virginia	1	0	0	0	0	0	0	1
Newton	12	5	1	0	0	1	0	19
Oakland Acres	0	0	0	0	0	0	0	0
Ogden	0	0	0	0	0	0	0	0
Patterson	0	0	0	0	0	0	0	0
Pella	5	6	1	0	4	0	0	16
Perry	3	0	0	1	0	0	0	4
Pilot Mound	0	0	0	0	0	0	0	0
Pleasantville	2	0	0	1	0	0	0	3

Municipality	KSI Crashes by Posted Speed Limit							
	0-25 MPH	30-35 MPH	40-45 MPH	50-55 MPH	60-65 MPH	70-75 MPH	Unknown	Totals
Prairie City	0	0	0	0	0	0	0	0
Reasnor	0	0	0	0	0	0	0	0
Redfield	0	0	0	0	0	0	0	0
Roland	0	0	0	0	0	0	0	0
Runnells	0	0	0	0	0	0	0	0
Saint Charles	1	0	0	1	0	0	0	2
Saint Marys	0	0	0	0	0	0	0	0
Sandyville	0	0	0	0	0	0	0	0
Sheldahl	0	0	0	0	0	0	0	0
Slater	1	0	1	0	0	0	0	2
Spring Hill	0	0	0	0	0	0	0	0
Story City	0	0	0	0	0	0	0	0
Sully	1	0	0	0	0	0	0	1
Truro	0	0	0	0	0	0	0	0
Van Meter	2	0	0	2	0	0	0	4
Winterset	3	0	0	0	0	0	0	3
Woodward	0	0	0	1	0	0	0	1
Zearing	0	0	0	0	0	0	0	0
Totals	**48**	**28**	**15**	**22**	**7**	**1**	**1**	**122**

KSI Crashes by AADT

Municipality	KSI Crashes by AADT							
	0-1,000	1,000-5,000	5,000-10,000	10,000-15,000	15,000-20,000	20,000+	No AADT Available	Totals
Ackworth	0	0	0	0	0	0	0	0
Adel	1	2	3	1	0	0	0	7
Alleman	0	0	0	0	0	0	0	0
Baxter	1	0	0	0	0	0	0	1
Beaver	0	0	0	0	0	0	0	0
Berkley	1	0	0	0	0	0	0	1
Bevington	0	0	0	0	0	0	0	0
Boone	2	4	4	1	0	0	0	11
Bouton	0	0	0	0	0	0	0	0
Boxholm	0	0	0	0	0	0	0	0
Bussey	0	0	0	0	0	0	0	0
Cambridge	0	0	0	0	0	0	0	0
Colfax	0	1	0	0	0	0	0	1
Collins	0	0	0	0	0	0	0	0
Colo	2	0	0	0	0	0	0	2
Cumming	0	0	0	0	0	0	0	0
Dallas Center	1	0	0	0	0	0	0	1
Dawson	0	0	0	0	0	0	0	0
De Soto	1	1	0	0	0	0	0	2
Dexter	0	0	0	0	0	0	0	0
Earlham	0	0	0	0	0	0	0	0
Elkhart	0	0	0	0	0	0	0	0
Fraser	1	0	0	0	0	0	0	1
Granger	1	0	0	0	0	0	0	1
Hamilton	1	0	0	0	0	0	0	1
Hartford	0	0	0	0	0	0	0	0
Harvey	0	0	0	0	0	0	0	0
Huxley	1	1	2	0	0	0	0	4
Indianola	5	4	3	3	6	0	0	21
Kelley	0	0	0	0	0	0	0	0
Kellogg	0	0	0	0	0	0	0	0
Knoxville	0	3	1	0	0	0	0	4

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

Municipality	KSI Crashes by AADT							
	0-1,000	1,000-5,000	5,000-10,000	10,000-15,000	15,000-20,000	20,000+	No AADT Available	Totals
Lacona	0	0	0	0	0	0	0	0
Lambs Grove	0	0	0	0	0	0	0	0
Linden	0	0	0	0	0	0	0	0
Luther	0	0	1	0	0	0	0	1
Lynnville	1	1	0	0	0	0	0	2
Madrid	0	0	0	0	0	0	0	0
Martensdale	0	0	0	0	0	0	0	0
Maxwell	0	0	0	0	0	0	0	0
McCallsburg	0	0	0	0	0	0	0	0
Melcher-Dallas	1	0	0	0	0	0	0	1
Milo	0	0	0	0	0	0	0	0
Minburn	0	0	0	0	0	0	0	0
Mingo	0	0	0	0	0	0	0	0
Monroe	0	1	1	0	0	0	0	2
Nevada	1	0	0	1	0	0	0	2
New Virginia	1	0	0	0	0	0	0	1
Newton	6	9	4	0	0	0	0	19
Oakland Acres	0	0	0	0	0	0	0	0
Ogden	0	0	0	0	0	0	0	0
Patterson	0	0	0	0	0	0	0	0
Pella	5	2	9	0	0	0	0	16
Perry	2	1	1	0	0	0	0	4
Pilot Mound	0	0	0	0	0	0	0	0
Pleasantville	2	1	0	0	0	0	0	3
Prairie City	0	0	0	0	0	0	0	0
Reasnor	0	0	0	0	0	0	0	0
Redfield	0	0	0	0	0	0	0	0
Roland	0	0	0	0	0	0	0	0
Runnells	0	0	0	0	0	0	0	0
Saint Charles	1	1	0	0	0	0	0	2
Saint Marys	0	0	0	0	0	0	0	0
Sandyville	0	0	0	0	0	0	0	0
Sheldahl	0	0	0	0	0	0	0	0
Slater	0	2	0	0	0	0	0	2
Spring Hill	0	0	0	0	0	0	0	0
Story City	0	0	0	0	0	0	0	0
Sully	1	0	0	0	0	0	0	1
Truro	0	0	0	0	0	0	0	0
Van Meter	3	1	0	0	0	0	0	4
Winterset	0	2	1	0	0	0	0	3
Woodward	0	1	0	0	0	0	0	1
Zearing	0	0	0	0	0	0	0	0
Totals	**42**	**38**	**30**	**6**	**6**	**0**	**0**	**122**

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

KSI Crashes by Age Group

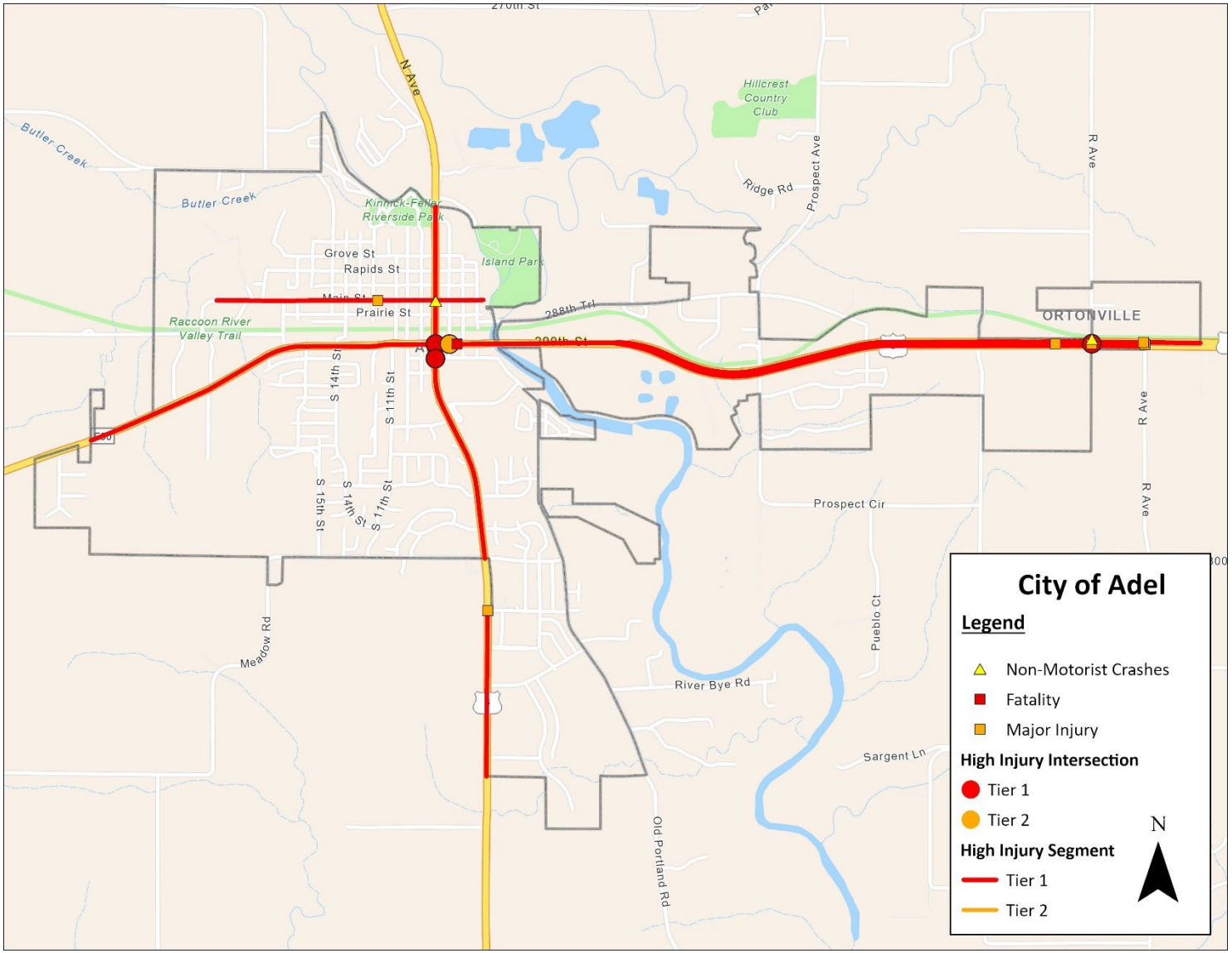
Municipality	KSI Crashes by Age Group										
	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Unknown	Totals
Ackworth	0	0	0	0	0	0	0	0	0	0	0
Adel	0	0	0	3	0	1	2	0	0	1	7
Alleman	0	0	0	0	0	0	0	0	0	0	0
Baxter	0	0	1	0	0	0	0	0	0	0	1
Beaver	0	0	0	0	0	0	0	0	0	0	0
Berkley	0	0	1	0	0	0	0	0	0	0	1
Bevington	0	0	0	0	0	0	0	0	0	0	0
Boone	0	1	1	4	4	0	0	1	0	0	11
Bouton	0	0	0	0	0	0	0	0	0	0	0
Boxholm	0	0	0	0	0	0	0	0	0	0	0
Bussey	0	0	0	0	0	0	0	0	0	0	0
Cambridge	0	0	0	0	0	0	0	0	0	0	0
Colfax	0	0	1	0	0	0	0	0	0	0	1
Collins	0	0	0	0	0	0	0	0	0	0	0
Colo	0	0	1	0	1	0	0	0	0	0	2
Cumming	0	0	0	0	0	0	0	0	0	0	0
Dallas Center	0	0	0	0	0	0	0	0	1	0	1
Dawson	0	0	0	0	0	0	0	0	0	0	0
De Soto	0	1	1	0	0	0	0	0	0	0	2
Dexter	0	0	0	0	0	0	0	0	0	0	0
Earlham	0	0	0	0	0	0	0	0	0	0	0
Elkhart	0	0	0	0	0	0	0	0	0	0	0
Fraser	0	0	0	1	0	0	0	0	0	0	1
Granger	0	0	0	0	1	0	0	0	0	0	1
Hamilton	0	0	0	0	1	0	0	0	0	0	1
Hartford	0	0	0	0	0	0	0	0	0	0	0
Harvey	0	0	0	0	0	0	0	0	0	0	0
Huxley	0	2	1	1	0	0	0	0	0	0	4
Indianola	0	1	5	4	0	2	4	4	0	1	21
Kelley	0	0	0	0	0	0	0	0	0	0	0
Kellogg	0	0	0	0	0	0	0	0	0	0	0
Knoxville	0	0	1	0	0	1	1	1	0	0	4
Lacona	0	0	0	0	0	0	0	0	0	0	0
Lambs Grove	0	0	0	0	0	0	0	0	0	0	0
Linden	0	0	0	0	0	0	0	0	0	0	0
Luther	0	0	0	1	0	0	0	0	0	0	1
Lynnville	0	0	1	0	0	0	1	0	0	0	2
Madrid	0	0	0	0	0	0	0	0	0	0	0
Martensdale	0	0	0	0	0	0	0	0	0	0	0
Maxwell	0	0	0	0	0	0	0	0	0	0	0
McCallsburg	0	0	0	0	0	0	0	0	0	0	0
Melcher-Dallas	0	1	0	0	0	0	0	0	0	0	1
Milo	0	0	0	0	0	0	0	0	0	0	0
Minburn	0	0	0	0	0	0	0	0	0	0	0
Mingo	0	0	0	0	0	0	0	0	0	0	0
Monroe	0	1	1	0	0	0	0	0	0	0	2
Nevada	0	0	0	0	0	2	0	0	0	0	2
New Virginia	0	1	0	0	0	0	0	0	0	0	1
Newton	0	2	5	8	0	4	0	0	0	0	19
Oakland Acres	0	0	0	0	0	0	0	0	0	0	0
Ogden	0	0	0	0	0	0	0	0	0	0	0
Patterson	0	0	0	0	0	0	0	0	0	0	0
Pella	0	1	4	2	3	2	2	1	1	0	16
Perry	0	0	0	2	0	1	0	0	0	1	4
Pilot Mound	0	0	0	0	0	0	0	0	0	0	0
Pleasantville	0	2	0	1	0	0	0	0	0	0	3

September 19, 2024
Descriptive Analysis and Focus Crash for Systemic Safety Analysis Memo
APPENDIX

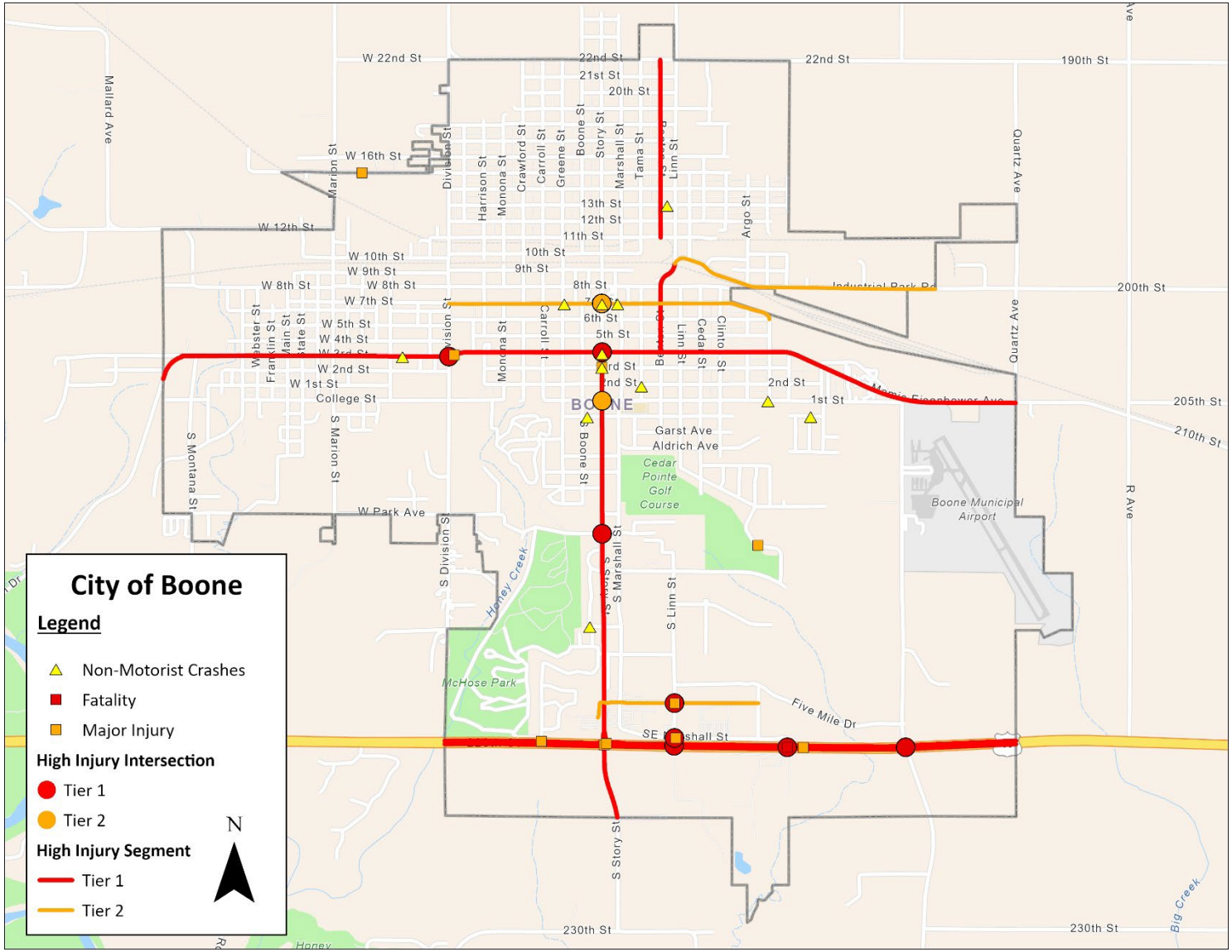
Municipality	KSI Crashes by Age Group										
	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80+	Unknown	Totals
Prairie City	0	0	0	0	0	0	0	0	0	0	0
Reasnor	0	0	0	0	0	0	0	0	0	0	0
Redfield	0	0	0	0	0	0	0	0	0	0	0
Roland	0	0	0	0	0	0	0	0	0	0	0
Runnells	0	0	0	0	0	0	0	0	0	0	0
Saint Charles	0	0	0	1	0	1	0	0	0	0	2
Saint Marys	0	0	0	0	0	0	0	0	0	0	0
Sandyville	0	0	0	0	0	0	0	0	0	0	0
Sheldahl	0	0	0	0	0	0	0	0	0	0	0
Slater	0	0	0	1	0	0	0	0	0	1	2
Spring Hill	0	0	0	0	0	0	0	0	0	0	0
Story City	0	0	0	0	0	0	0	0	0	0	0
Sully	0	0	0	0	0	1	0	0	0	0	1
Truro	0	0	0	0	0	0	0	0	0	0	0
Van Meter	0	1	1	2	0	0	0	0	0	0	4
Winterset	0	0	2	0	0	1	0	0	0	0	3
Woodward	0	0	0	0	0	1	0	0	0	0	1
Zearing	0	0	0	0	0	0	0	0	0	0	0
Totals	**0**	**14**	**27**	**31**	**10**	**17**	**10**	**7**	**2**	**4**	**122**

Appendix B2 – High Injury Network (HIN) Maps

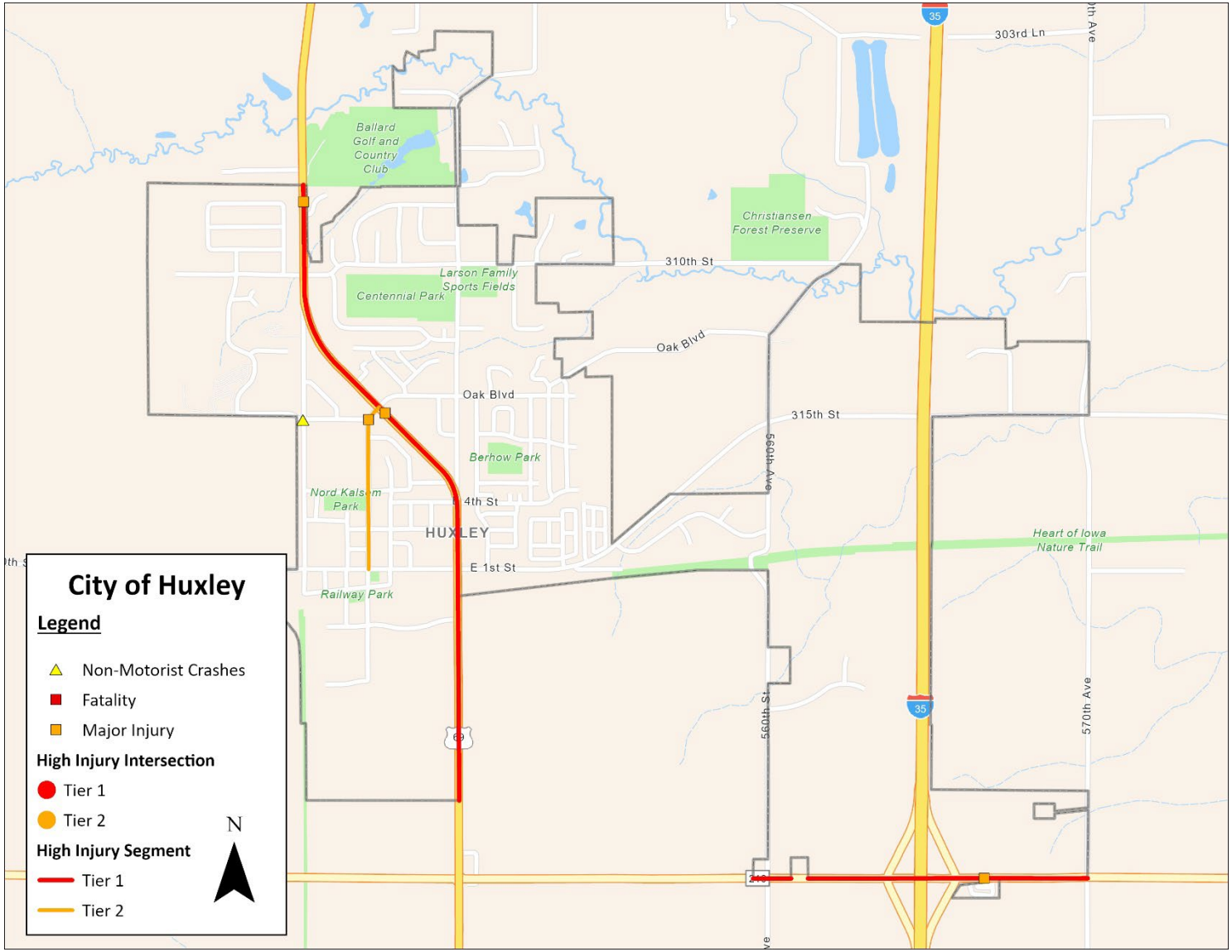
Adel HIN Map


City of Adel
Legend
Non-Motorist Crashes
Fatality
Major Injury
High Injury Intersection
Tier 1
Tier 2
High Injury Segment
Tier 1
Tier 2
N
N Ave
Butler Creek
Hillcrest Country Club
Ridge Rd
Prospect Ave
R Ave
Kinnick-Fellas Riverside Park
Island Park
Grove St
Rapids St
Main St
Prairie St
288th Trl
200th St
ORTONVILLE
Raccoon River Valley Trail
S 14th St
S 11th St
S 15th St
S 14th St
S 11th St
Prospect Cir
Pueblo Ct
Meadow Rd
River Bye Rd
Sargent Ln
Old Portland Rd

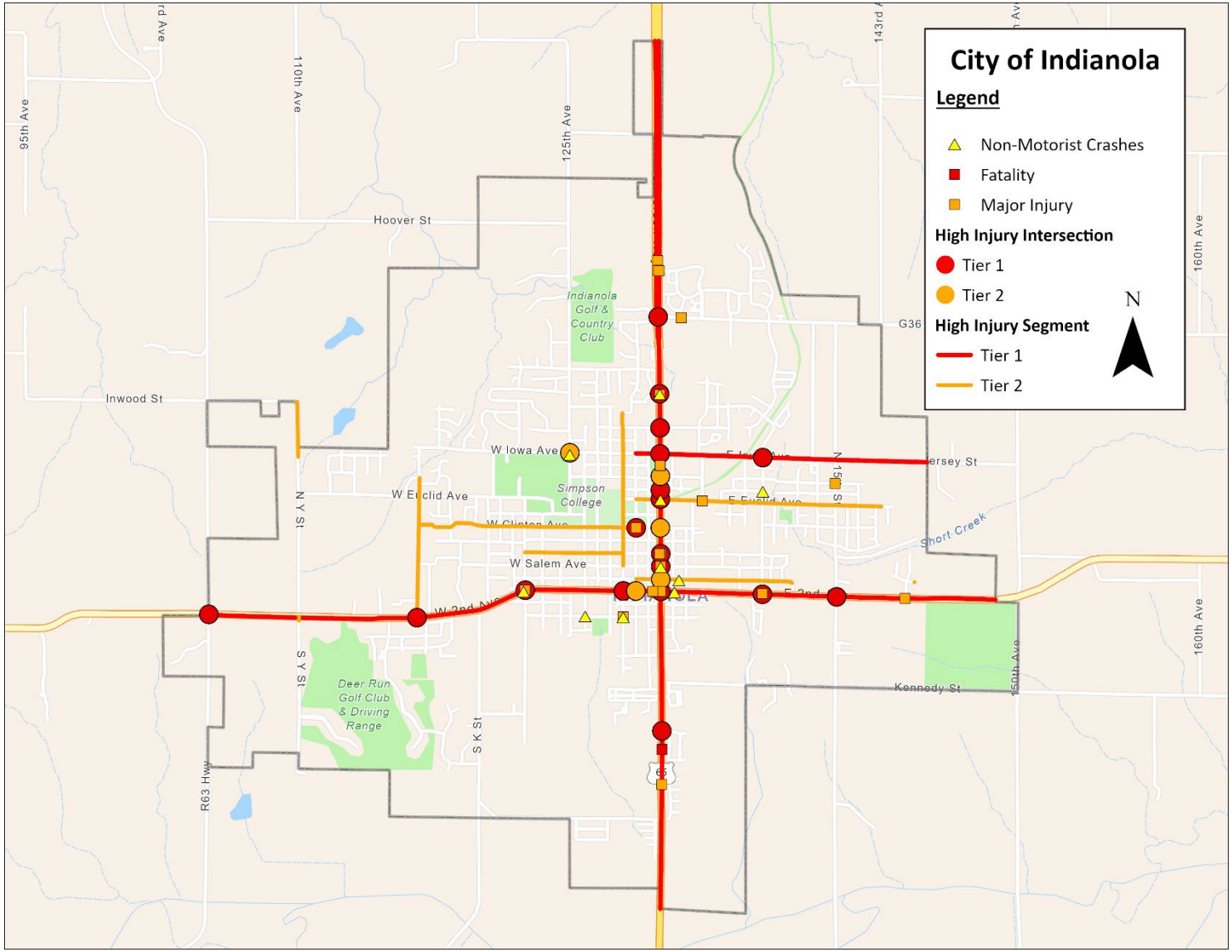
Boone HIN Map



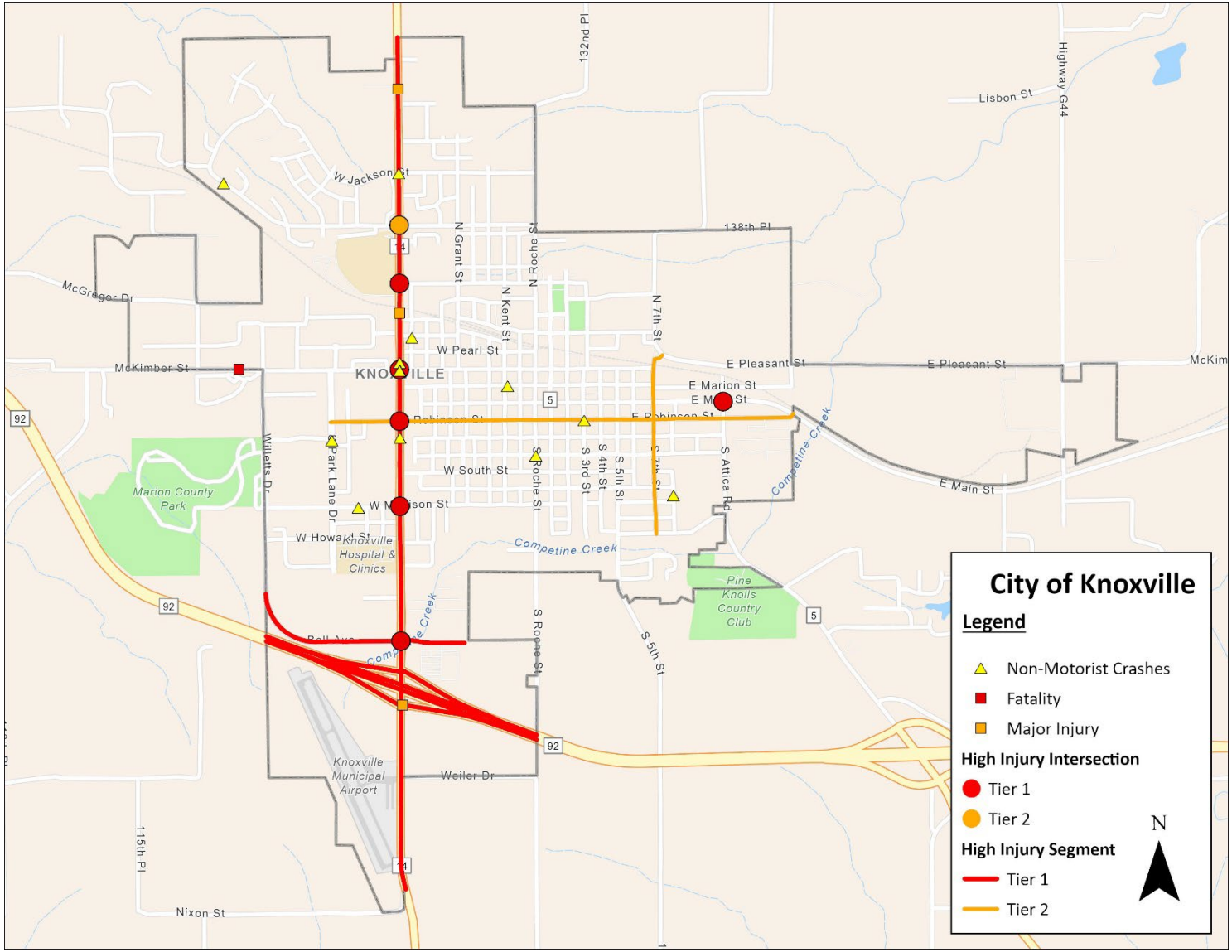
Huxley HIN Map



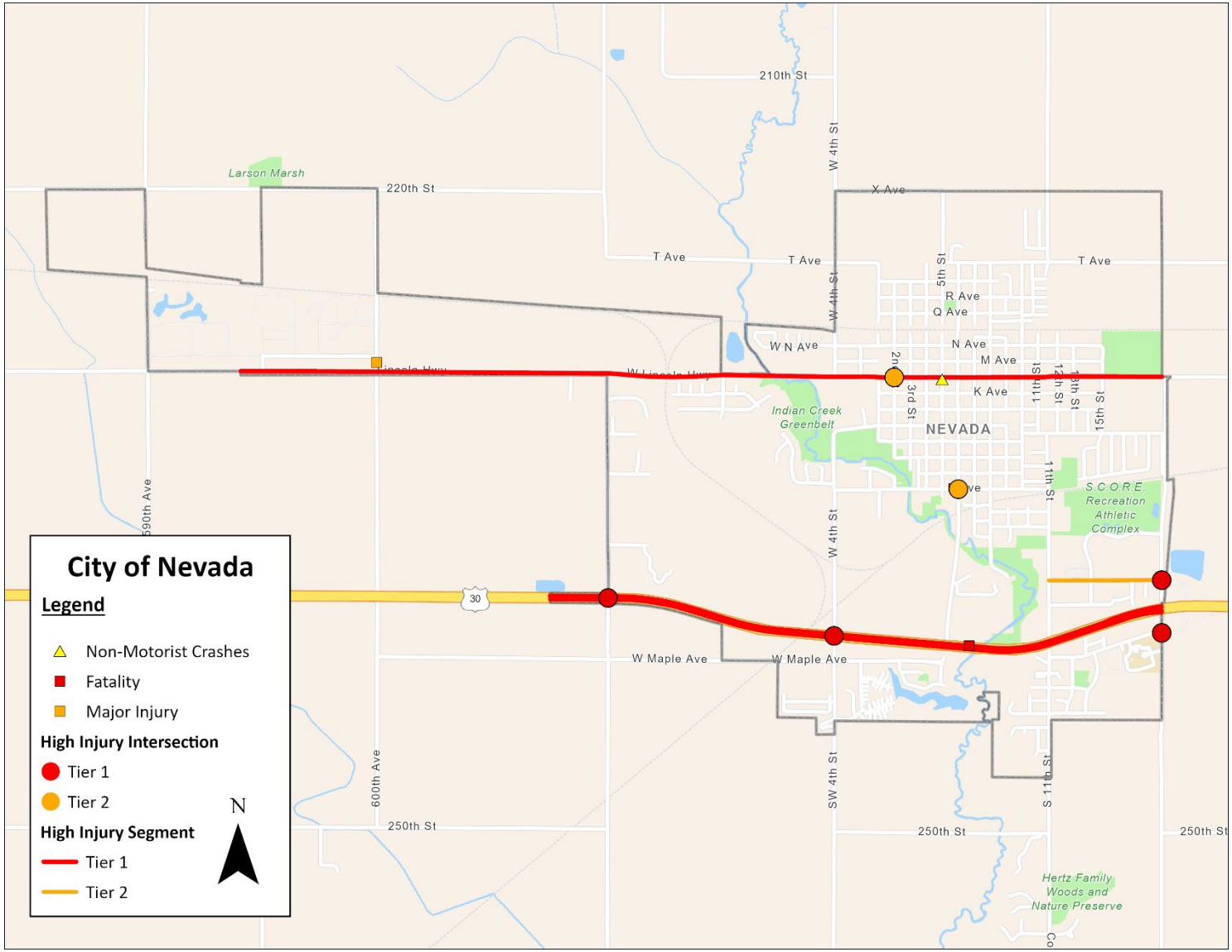
Indianola HIN Map



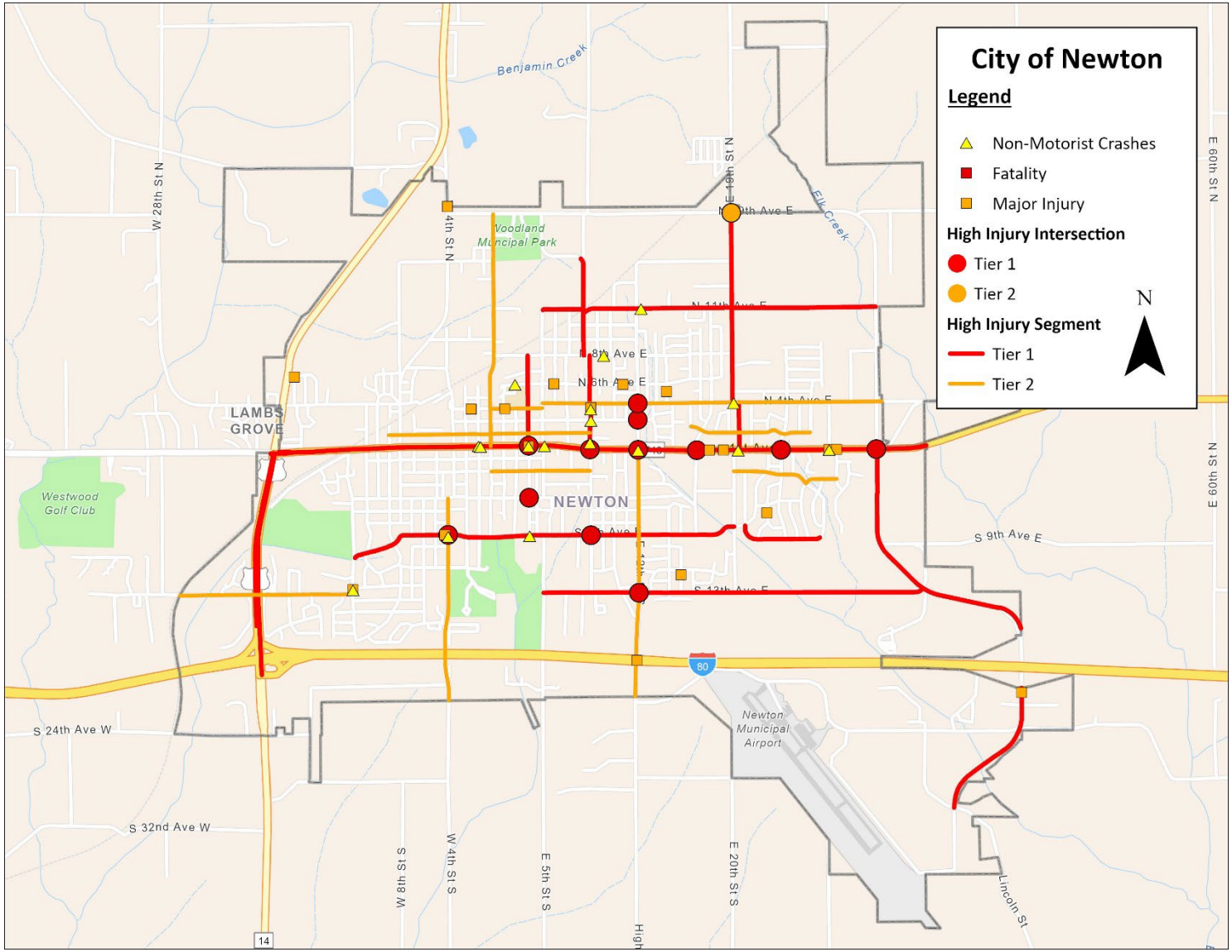
Knoxville HIN Map



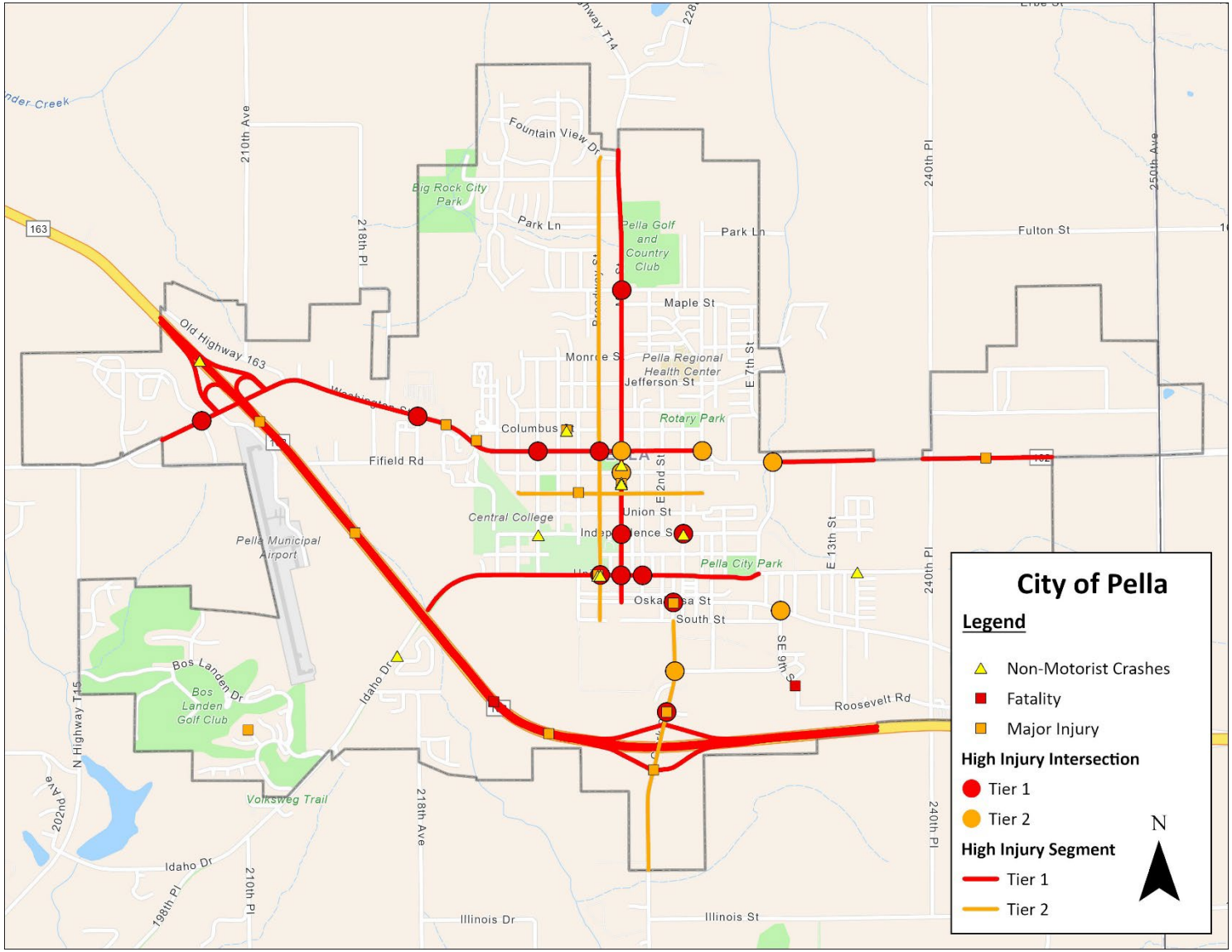
Nevada HIN Map



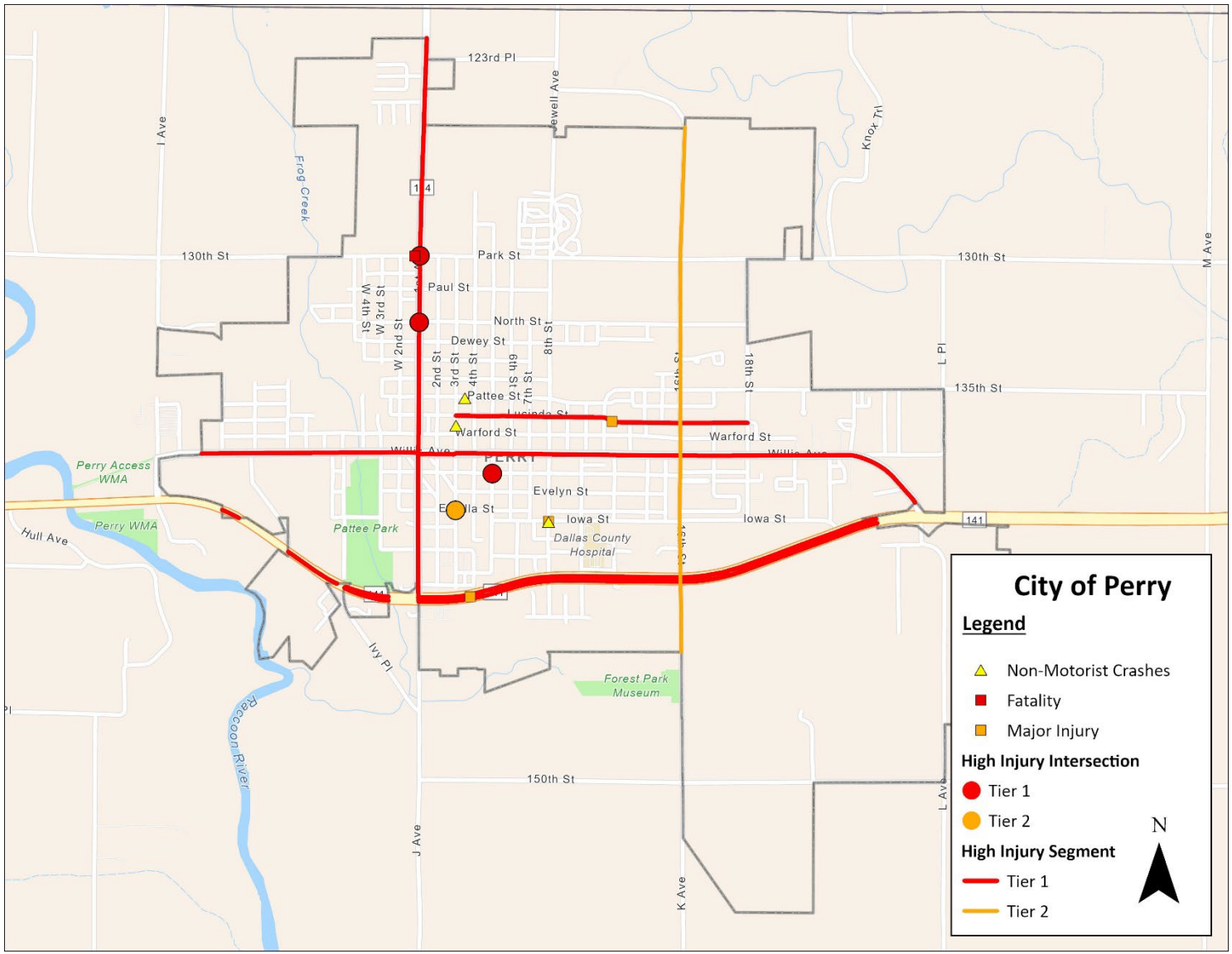
Newton HIN Map



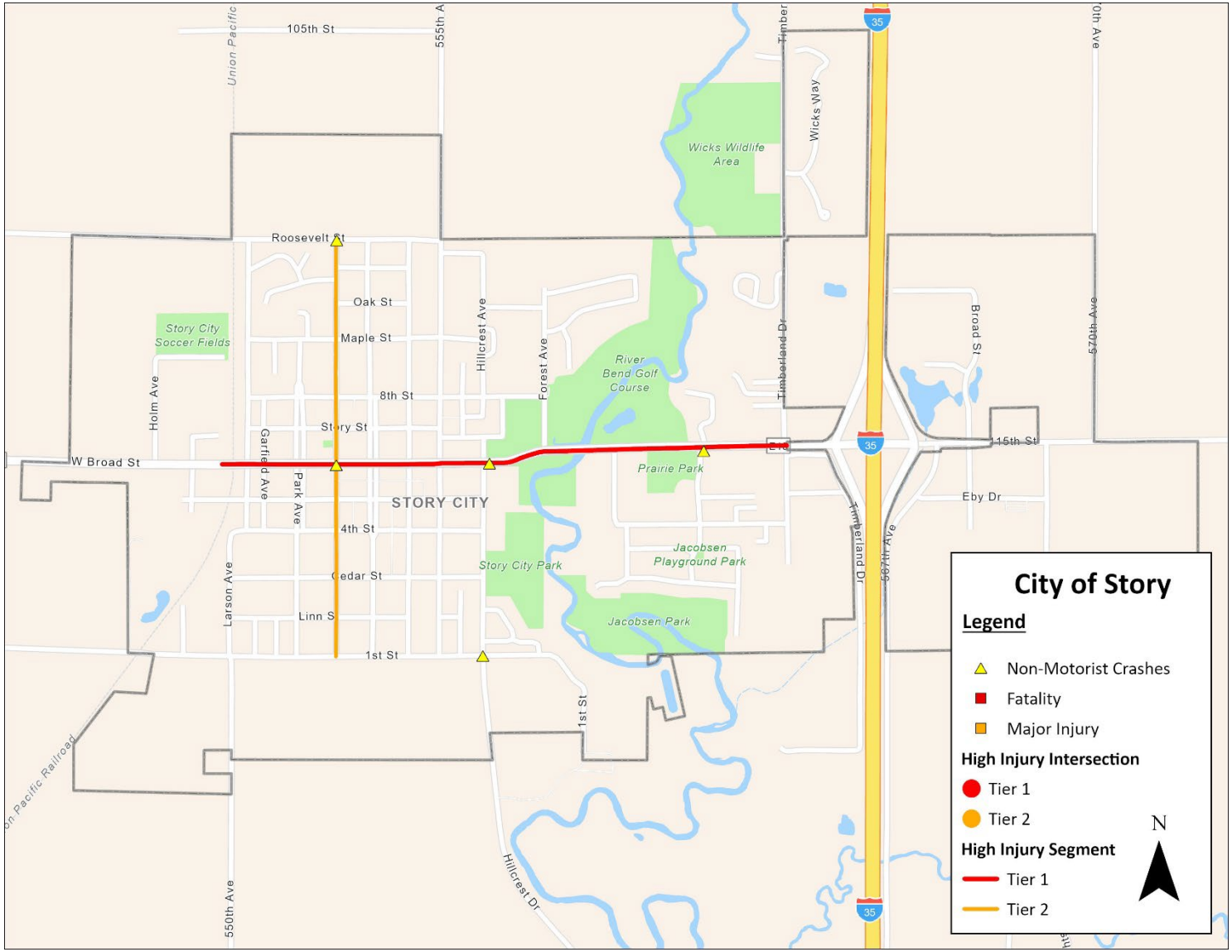
Pella HIN Map



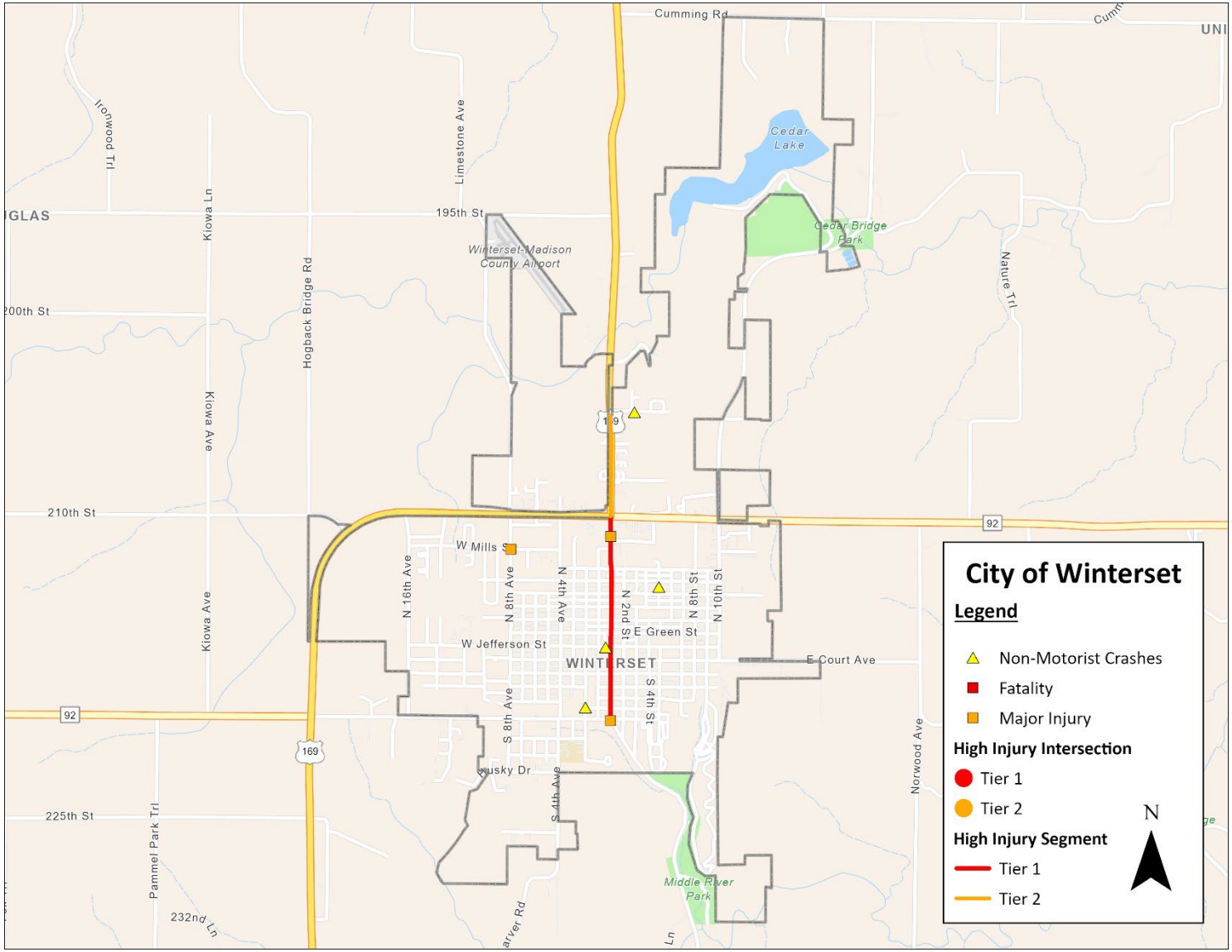
Perry HIN Map



Story City HIN Map



Winterset HIN Map



Comprehensive Safety Action Plan
Appendix C

COUNTERMEASURES TOOLBOX

Prepared for:

CENTRAL IOWA REGIONAL
CIRTPA
TRANSPORTATION PLANNING ALLIANCE

Central Iowa Regional Transportation Planning Alliance
939 Office Park Road, Suite 306
West Des Moines, IA 50265

Prepared by:

Felsburg Holt & Ullevig
1300 Walnut Street, Suite 101
Des Moines, IA 50309
515.493.2757

FHU Reference No. 122668-01

IMPROVED INTERSECTION & ROADWAY LIGHTING

This countermeasure primarily addressed the Dark (unlighted) focus area; however, it could potentially address other focus areas, as the identified crash types, vehicle movement, VRU locations, and mode types can all occur or be present during dark (unlighted) conditions. The only focus area this countermeasure would not address is driver impairment.

Applications

Research shows that continuous roadway lighting has an established safety benefit for vehicular traffic on both rural and urban highways (including freeways). This also applies to intersections, as provision of lighting increases visibility, and gives road users more time to react to situations like pedestrians crossing the roadway at either intersection or mid-block locations.

Costs

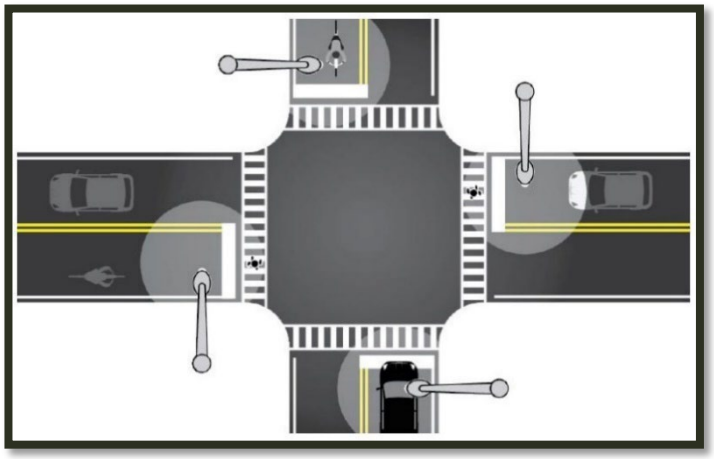
A typical streetlight costs between $2,000 and $3,000, plus an additional $1,000 for installation costs.

Implementation Timeline

This countermeasure has a mid-term implantation timeline of five to ten years.

Relevant Federal Performance Measures

CMF IDs 192, 433, 436, 2376, 11026.



SAFETY BENEFIT

32%

CRASH REDUCTION FOR ALL CRASHES

RELATIVE COST

$$

TIMELINE

REGULAR PAVEMENT MARKING MAINTENANCE

This countermeasure primarily addresses the Dark (unlighted) and Navigating Curve focus areas by ensuring that pavement markings are properly visible and maintain adequate levels of retroreflectivity. This improved delineation of travel lanes and roadway edges could also potentially address head-on and non-collision crash types, both of which are focus areas.

Applications

This countermeasure would be implemented region-wide in the form of an ongoing pavement marking maintenance program. This would likely require coordination between the CIRTPA member communities and Iowa DOT.

Costs

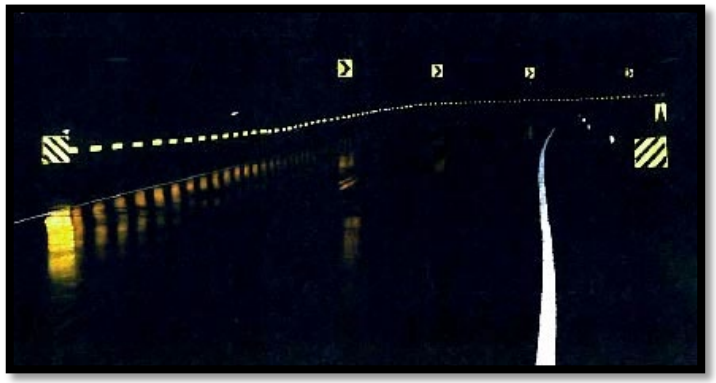
Pavement markings are very low-cost, only a couple of dollars at most per linear foot.

Implementation Timeline

This countermeasure has a short-term implementation timeline of five years or less.

Relevant Federal Performance Measures

CMF IDs 2116, 2117, 2118, 8102.



SAFETY BENEFIT

11%

CRASH REDUCTION FOR ALL CRASHES

RELATIVE COST

$$

TIMELINE

RUMBLE STRIPS/STRIPES (SHOULDER & CENTERLINE)

This countermeasure primarily addresses the Non-Collision (which were typically run-off road fixed object or animal collisions) and Navigating Curve focus areas by providing an audible and tactile warning to drivers if they begin to cross over the centerline or drift onto the shoulder.

Applications

Longitudinal rumble strips are milled or raised elements on the pavement that can be installed on the shoulder, edge line, or at or near the centerline of an undivided roadway. Rumble stripes are similar; however, the edge line or centerline striping is placed directly over the rumble strip, which can increase the durability and visibility of the pavement marking during wet or nighttime conditions. In more urban areas where noise is a concern, an alternative design, known as "mumble strips", could be considered, but it should be noted that the safety benefits of this design have not been studied fully. FHWA states that rumble strips/stripes are most effective when implemented systematically.

Costs

Installation of rumble strips/stripes is relatively low cost with unit prices in the range of $500 to $6,000 per mile.

Implementation Timeline

This countermeasure has a mid-term implementation timeline of five to ten years.

Relevant Federal Performance Measures

CMF IDs 3358, 3356, 3425, 3648, 10446.

WIDER EDGE LINES

This countermeasure primarily addresses the Lighting Condition, Non-Collision (which were typically run-off road fixed object or animal collisions) and Navigating Curve focus areas by providing improved delineation of the edge of roadway.

Applications

Wider edge lines increase drivers' awareness of the edge of travel lane and can provide a safety benefit to all facility types in both urban and rural settings, but they have the greatest potential benefit on rural two-lane highways, especially for single-vehicle crashes. FHWA recommends implementing wider edge lines on a systemic basis based on roadway departure risk factors such as pavement and should width, presence of curves, traffic volumes, and history of nighttime crashes.

Costs

Wider edge lines are slightly more expensive than standard edge lines (approximately 25% more for 6-inch vs. 4-inch edge line). Costs for wider edge lines can range from $500 to $5,000 per mile depending on the type of material used.

Implementation Timeline

This countermeasure has a short-term implementation timeline of five years or less.

Relevant Federal Performance Measures

CMF ID 4737.

ENHANCED DELINEATION FOR HORIZONTAL CURVES

This countermeasure primarily addresses the Navigating Curve focus area by providing improved delineation of the edge of roadway along horizontal curves through the use of chevrons and delineators along with other visibility enhancements.

Applications

There are several different strategies that can be used to enhance delineation of horizontal curves that can be implemented in advance of or within curves and can used in combination or individually. These include pavement markings, in-lane curve warning pavement markings, retroreflective strips on signs, delineators, chevron signs, enhanced conspicuity signs (larger / more retroreflective, etc.), dynamic curve warning signs (including speed feedback signs), and sequential dynamic chevrons. FHWA recommends systemic implementation of this countermeasure and that consistent practices for similar curves be maintained to create consistent experience for road users.

Costs

Costs vary depending on the strategy selected. Sequential dynamic chevrons can cost as much as $5,000 dollars per unit; this would likley be most expensive option, requiring power and detection.

Implementation Timeline

This countermeasure has a short-term implementation timeline of five years or less.

Relevant Federal Performance Measures

CMF IDs 2439, 2431, 2432, 2438, 8978, 10362, 10312, 9167.

SAFETY BENEFIT

15-38%

CRASH REDUCTION

VARIES BY TREATMENT TYPE

RELATIVE COST

$

TIMELINE

ROAD DIET / LANE RECONFIGURATION

This countermeasure primarily addresses the Crash Types focus area with the greatest potential for reduction to Angle crashes. Road diets / lane reconfigurations also have potential to address the Vulnerable User Location and Vulnerable Road Users focus areas whether this is done through the implementation of curb extensions or median refuge islands at pedestrian crossing locations.

Applications

Road diets are most commonly implemented on four-lane undivided roadways where a lane of travel in each direction is removed and replaced with a two-way left-turn lane (TWLTL); if sufficient ROW is available, other facilities like bike lanes or on-street parking can be added as well. Road diet / lane reconfiguration projects typically do not require modification of the existing ROW and can be accomplished by changing pavement markings. While less common, a road diet / lane reconfiguration project can also be implemented on two-lane undivided roadways with very wide lanes; if adequate roadway width is provided, a TWLTL could be implemented, as could bike lanes or on-street parking.

Costs

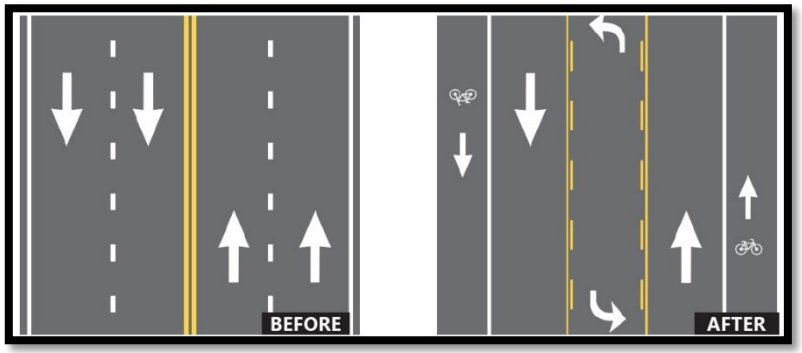
If only implementing pavement marking modifications, costs may be in the range of $25,000 to $50,000 per mile; however, if additional features like curb extensions, raised medians, or pedestrian refuge islands are included in the project, costs can be upwards of $100,000 per mile or more.

Implementation Timeline

This countermeasure has a long-term implementation timeline of ten years or more.

Relevant Federal Performance Measures

CMF IDs 5554, 2841.



SAFETY BENEFIT

19-47%

CRASH REDUCTION FOR ALL CRASHES

RELATIVE COST

$$$$

TIMELINE

ROUNDABOUTS

This countermeasure primarily addresses the Crash Types focus area with the greatest potential for reduction to Angle, Broadside and Head-on crashes. Roundabouts also have potential to address the Vulnerable User Location and Vulnerable Road Users focus areas, as splitter medians for roundabouts can be used as pedestrian refuge areas and allow bicyclists and pedestrians to cross in two stages.

Applications

Roundabouts are a versatile intersection configuration that can be implemented in urban and rural areas, and they can replace signalized intersection and stop-controlled intersections; roundabouts can also handle a wide range of traffic conditions. Roundabouts have been found to be an effective option in managing speeds and transitioning traffic from high to low speeds, making roundabouts a good option to consider for highway transition zones into rural communities.

Costs

Costs to convert intersections to roundabouts can vary significantly depending on the size and type of roundabout. Modular roundabouts, which are built on top of the exisitng intersection, can cost between $50,000 and $500,000 and can be constructed in just a few days while traditional roundabouts that require reconstruction of the existing intersection can cost upwards of $2 million or more.

Implementation Timeline

This countermeasure has a long-term implementation timeline of ten years or more.

Relevant Federal Performance Measures

CMF IDs 211, 226.

SAFETY EDGE

This countermeasure primarily addresses the Non-Collision focus area (typically run off road animal or fixed object crashes) and would likely have some impact on the Navigating Curve focus, as many of these crashes involved running off the road. Exposed vertical pavement and pavement drop-offs can prevent vehicles from safely returning to the roadway, but by providing a gradual slope on the pavement edge, drivers are more easily able to recover and return to the travel lane. Even when erosion exposes Safety Edge, the gradual slope still provides a smoother transition back to the roadway compared to the traditional vertical pavement edge.

Applications

The primary consideration when adding Safety Edge to a roadway is the posted speed limit; at higher speeds a more gradual slope may be needed to maintain the safety benefits associated with this countermeasure. Paving equipment can easily be modified with commercially available attachments to place Safety Edge; FHWA recommends that this countermeasure be implemented systemwide on all new paving or resurfacing projects.

Costs

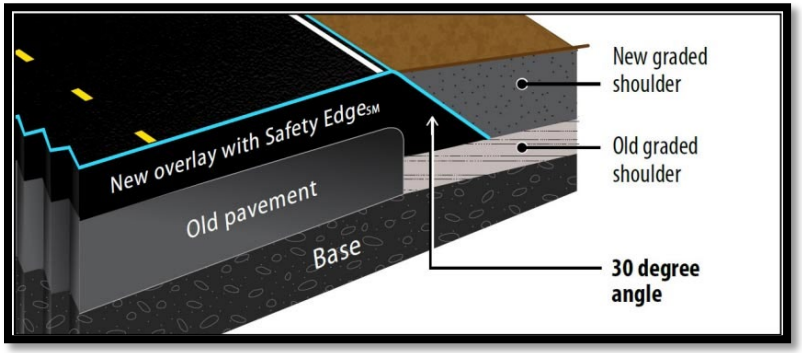
Safety Edge does not require additional pavement, and the only costs associated with this countermeasure are those needed to acquire the attachments for paving equipment, which can range from $5,000 to$10,000.

Implementation Timeline

This countermeasure has a mid-term implementation of five to ten years.

Relevant Federal Performance

CMF IDs 9205, 9211, 9217.



SAFETY BENEFIT

11%

CRASH REDUCTION FOR K S I CRASHES

RELATIVE COST

$$

TIMELINE

CROSSWALK VISIBILITY ENHANCEMENTS

This countermeasure primarily addresses the Vulnerable User Location and Vulnerable Road Users focus areas by increasing driver awareness of vulnerable road users through the use of high-visibility crosswalk markings, lighting, and supplemental signing / pavement markings.

Applications

Crosswalk visibilty enhancements can be implented as standalone or combination enhanncements at any pedestrian crossing location. For multilane roadway crossings where ADTs exceed 10,000 vehilces per day, a marked crosswalk alone is typically not sufficient and FHWA encourages more substantial visbility enhancements to reduce bicycle and pedestrian crash potential.

Costs

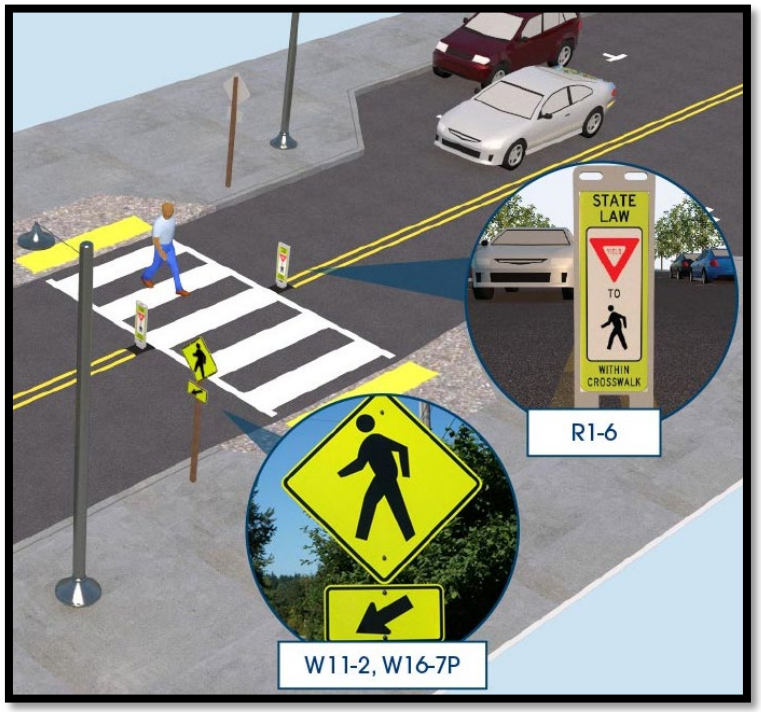
Costs associated with the various types of crosswalk visibility enhancements are relatively low, ranging from $200 to $10,000. If mutliple enhancements are implemented, costs could in the range of $12,000 to $25,000.

Implementation Timeline

This countermeasure has a mid-term implementation timeline of five to ten years.

Relevant Federal Performance Measures

CMF IDs 4123, 436, 9017.



SAFETY BENEFIT

42%

CRASH REDUCTION FOR INJURY CRASHES

RELATIVE COST

$$$

TIMELINE

MARKED CROSSWALKS

This countermeasure primarily addresses the Vulnerable User Location and Vulnerable Road Users focus areas by increasing driver awareness of vulnerable road users.

Applications

Marked crosswalks should be implemented at intersections without marked crosswalks where there is either a history of pedestrian crashes or where pedestrian volumes are high (i.e. near schools, parks, downtown areas, etc.). It is important to note that marked crosswalks alone may result in higher pedestrian crash rates compared to unmarked crossing locations; other safety countermeasures should be considered along with the installation of marked crosswalks.

Costs

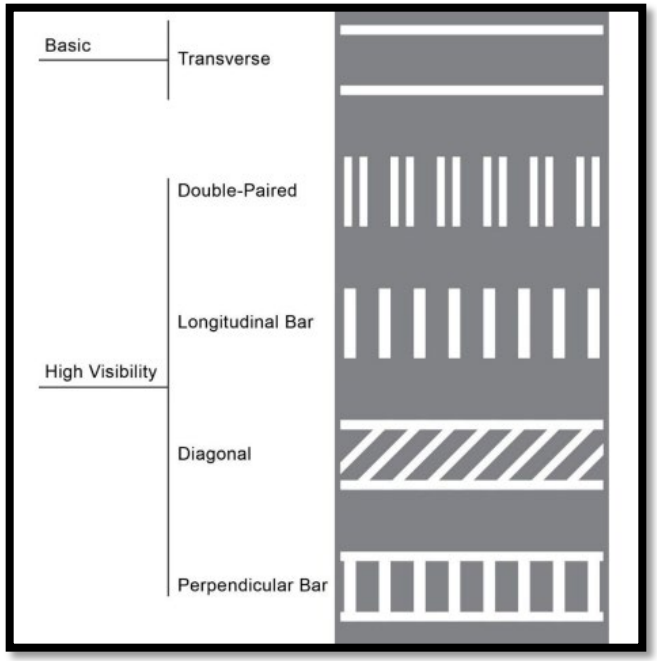
Costs for marked crosswalks are dependent on the type of markings and materials used; they can range from $1,000 to $5,000 dollars per crossing location.

Implementation Timeline

This countermeasure has a short-term implementation timeline of five years or less.

Relevant Federal Performance Measures

CMF ID 4123, 4124.



RAISED CROSSWALKS

Raised crosswalks are ramped speed tables that span the entire width of the roadway; they are demarcated with paint and/or special paving materials. This countermeasure primarily addresses the Vulnerable User Location and Vulnerable Road Users focus areas by increasing driver awareness of vulnerable road users through the use of vertical deflection and pavement markings. The vertical deflection provided by raised crosswalks would also encourage slower vehicle speeds, potentially reducing the severity of pedestrian-vehicle crashes should they occur at locations with raised crosswalks.

Applications

Raised crosswalks can be implemented on two- or three-lane roadways with speeds less than or equal to 30 mph and ADTs lower than 9,000 vpd. While they are most commonly implemented at mid-block locations, they may also be used at intersections, primarily on the minor street approaches. Consideration should be given to the type of traffic that would traverse the raised crosswalks; truck routes, emergency routes, and arterial streets should generally be avoided. Locations near pedestrian generators like school campuses, shopping center, and pick-up / drop-off zones are ideal candidates for consideration of a raised crosswalk. Snowplow operation should also be considered when evaluating this countermeasure for implementation.

Costs

The average cost of a raised crosswalk is just over $8,000, but they can cost as much as $30,000 dollars in situations where drainage is impacted.

Implementation Timeline

This countermeasure has a mid-term implementation timeline of five to ten years.

Relevant Federal Performance Measures

CMF IDs 135, 136, 137.

SAFETY BENEFIT

30%

CRASH REDUCTION FOR INJURY CRASHES

RELATIVE COST

$$$

TIMELINE

MEDIANS & PEDESTRIAN REFUGE ISLANDS

This countermeasure primarily addresses the Vulnerable User Location and Vulnerable Road Users focus areas by providing pedestrians with refuge areas free of vehicle conflict; they also allow pedestrians to cross roadways in two stages and only worry about one direction of travel at a time.

Applications

Medians and/or pedestrian refuge areas should be considered in curbed sections of urban and suburban multi-lane roadways, particulary where there are high volumes of pedestrians and vehicles. This countermeasure provides the greatest benefit when ADTs exceed 9,000 vpd and vehicle speeds are 35 mph or higher. Mid-block crossings, multi-lane intersection approaches, and areas near transit stops or other pedestrian-focused sites are locations where medians and pedestrian refuge areas should be considered. Medians and pedestrian refuge islands should be at least 4 feet wide, but an 8-foot width is preferrred for pedestrian comfort.

Costs

Costs for raised medians and pedestrian refuge islands can vary wildly depending on their width and length with costs in the range of $30,000 to $50,000 per 100 feet of median / pedestrian refuge island.

Implementation Timeline

This countermeasure has a mid-term implementation timeline of five to ten years.

Relevant Federal Performance Measures

CMF ID 175.

SAFETY BENEFIT

46-56%

CRASH REDUCTION FOR V R U CRASHES

RELATIVE COST $$$

TIMELINE

RECTANGULAR RAPID FLASHING BEACONS (RRFB) & PEDESTRIAN HYBRID BEACONS (PHB)

This countermeasure primarily addresses the Vulnerable User Location and Vulnerable Road Users focus areas by increasing driver awareness of vulnerable road users through the use of flashers to notify drivers (PHB and RRFB) and traffic control devices (PHB) to reduce and potentially eliminate pedestrian-vehicle conflicts at crossing locations. This could also address the Non-Collision crash type focus area, as many of these crashes involved pedestrians and other VRUs.

Applications

RRFBs can be implemented in a wide variety of situation, but are most effect at multi-lane crossings where vehicles speeds are less than 40 mph. They should be placed on both sides of the crosswalk below the pedestrian crossing sign and above the diagonal downward arrow plaque; push buttons can be used to activate the beacon or passive pedestrian detection could also be used. Trail and school crossings are good candidates for RRFBs. PHBs should be used when speeds are higher than 35 mph and where gaps in traffic are not sufficient for pedestrians to cross safely; they are most effective on facilities with three or more lanes and ADTs are above 9,000 vpd. PHB installations must also include a marked crosswalk.

Costs

RRFB installations can cost anwhere between $5,000 and $50,000 dollars while PHBs are typically more expensive with costs in the range of $20,000 to $130,000.

Implementation Timeline

This countermeasure has a mid-term implementation timeline of five to ten years.

Relevant Federal Performance Measures

CMF IDs 9024, 9020, 2911, 2917.

SAFETY BENEFIT

47%

CRASH REDUCTION FOR V R U CRASHES

RELATIVE COST

$$$

TIMELINE

SIDEWALKS / SHARED-USE PATHS / BIKE LANES

This countermeasure would address the Vulnerable User focus area by providing pedestrians and bicyclists with dedicated ROW separate from vehicles, reducing the potential for conflict between vehicles and VRUs; it could also potentially address the Non-Collision crash type focus areas, as many of those crash types involved VRUs. This countermeasure could also have other indirect effects on crashes; providing a connected network of walking/biking routes to desired destinations can reduce a community's dependence on vehicles and encourage a more multi-modal approach.

Applications

Pedestrian and bicycle facilities should be incorporated into all roadway projects unless there are specific circumstances preventing this; sidewalk and/or shared-use paths should be provided on both sides of the road in urban areas, especially in areas with heavy pedestrian traffic like recreation areas, school zones, and transit locations. A systemic and system-wide approach should be used to implement this countermeasure. Standard sidewalks should be provided on both sides of the roadways throughout the CIRTPA communities to create a connected network of walking routes, and more robust facilities like shared-use paths should be considered along strategic routes to connect major destinations. Bike lanes could also be incorporated into roadway projects along strategic routes to connect existing facilities; residential streets with low vehicular traffic and wide cross-sections are good candidates for on-street bike facilities.

Costs

The costs associated with this countermeasure can vary greatly depending on the type of pedestrian/bicyclist facility implemented and the materials used. Striping a bike lane can be relatively low-cost at $5,000 to $50,000 per mile while constructing an eight-foot wide shared-used path can cost upwards of $1,000,000 per mile.

Implementation Timeline

This countermeasure has a long-term implantation timeline of ten years or more.

Relevant Federal Performance Measures

CMF IDs 3247, 9250, 10737, 11246.

SAFETY BENEFIT

20-89%

CRASH REDUCTION

VARIES BY TREATMENT TYPE

RELATIVE COST

$$$

TIMELINE

SIGNAL BACKPLATES & RETROREFLECTIVE BORDERS

This countermeasure primarily addresses the Lighting Conditions focus area by increasing the visibility of traffic signals. It could also have some positive impact on the Crash Types focus area as well; it should also be noted that this countermeasure would likely have a positive effect on rear-end crashes associated with following too closely. This was a common crash type at CIRTPA intersections, but did not often result in serious injury.

Applications

Retroreflective signal backplates are recommended to be implemented systematically, as they are a low-cost option. They also state that this countermeasure is most effective to adopt as a standard treatment across a jurisdiction. Existing signal support structures should be reviewed to ensure additional wind load can be handled when an entire backplate is added.

Costs

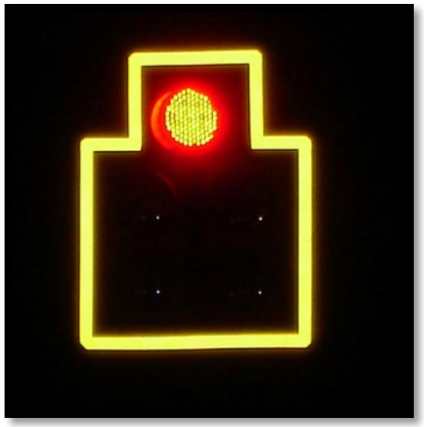
Costs for signal backplates with retroreflective borders are very low-cost, and can typically be implented for $500 to $1,500 per intersection.

Implementation Timeline

This countermeasure has a mid-term implementation timeline of five to ten years.

Relevant Federal Performance Measures

CMF ID 1410.



SAFETY BENEFIT

15%

CRASH REDUCTION FOR ALL CRASHES

RELATIVE COST

$$

TIMELINE

VARIABLE SPEED LIMIT / SPEED FEEDBACK SIGNS

This countermeasure could potentially address all of the focus areas except Driver Condition; while it may not necessarily show up in crash data, speed plays some part in almost every crash. Speed feedback signs can increase speed limit compliance and potentially reduce the severity of crashes by reducing vehicle speeds.

Applications

Speed feedback signs can be implemented anywhere speeding is a concern and where excessive speeds may lead to a greater risk of crashing; transitions zones from high speed to low speed (rural to urban transitions) and horizontal curves are locations that may benefit from speed feedback signs. A systemic approach should be taken to implement this countermeasure at locations where speeding may increase the risk of severe crashes.

Costs

Costs for these sign installations can range from $10,000 to $25,000.

Implementation Timeline

This countermeasure has a mid-term implementation timeline of five to ten years.

Relevant Federal Performance Measures

CMF ID 11002, 11005, 11003.

SAFETY BENEFIT

32%

CRASH REDUCTION FOR ALL CRASHES

RELATIVE COST $$$

TIMELINE

SYSTEMIC APPLICATION OF LOW-COST COUNTERMEASURES AT STOP-CONTROLLED INTERSECTIONS

SAFETY BENEFIT

10%

CRASH REDUCTION FOR K S I CRASHES

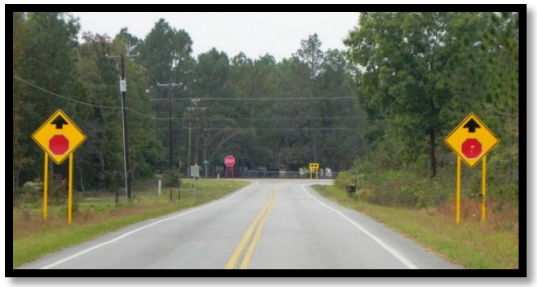
RELATIVE COST $$

TIMELINE

This countermeasure could potentially address the Angle and Broadside Crash Type focus areas along the Lighting Condition focus areas by increasing driver awareness to potential conflicts, particularly in low-light conditions; it could also improve conditions for VRUs at intersections by alerting drivers to the potential of pedestrians at certain locations.

Applications

As the countermeasure's name suggests, a systemic approach should be taken when implementing low-cost countermeasures at stop-controlled locations. Countermeasures to implement include enhanced signing and pavement markings like oversized and doubled-up advanced warning signs, retroreflective sheeting on signposts, properly placed stop bars, and double arrow warning signs at the stem of T-intersections.



Costs

Costs for this countermeasure vary but are dependent on the comnbination of treatments applied at each location. Costs would likley range from as low as $1,000 to upwards of $20,000.

Implementation Timeline

This countermeasure has a mid-term implementation timeline of five to ten years.

Relevant Federal Performance Measures

CMF ID 8867, 8870, 8874, 8893.

EDUCATION & OUTREACH

This countermeasure would address all focus areas by providing education and outreach to road users about various topics including the focus areas identified in the CIRTPA region, risky driving behaviors, and road safety practices. This countermeasure will primarily address the Driver Condition (Driver Impaired) focus area, as this is a human behavior that cannot be addressed through engineering improvements.

Applications

Education and outreach may include targeted education regarding traffic terminology as well as the creation of additional messaging about distracted driving or upcoming speed limit and zone changes. Opportunities for the public to offer feedback about past projects and current conditions can provide leaders with ideas of how to engage with the community more effectively and enhance safety during future projects.

Costs

Costs for these programs can vary depending on what strategies are used and at what scale they are implemented.

RELATIVE COST
$$

TIMELINE

Implementation Timeline

This countermeasure has a mid-term implementation timeline of five to ten years.

Relevant Federal Performance Measures

There is no federal performance measure associated with this countermeasure.

Comprehensive Safety Action Plan
Appendix D

PRIORITY CORRIDORS

Prepared for:

CENTRAL IOWA REGIONAL
CIRTPA
TRANSPORTATION PLANNING ALLIANCE

Central Iowa Regional Transportation Planning Alliance
939 Office Park Road, Suite 306
West Des Moines, IA 50265

Prepared by:

Felsburg Holt & Ullevig
1300 Walnut Street, Suite 101
Des Moines, IA 50309
515.493.2757

FHU Reference No. 122668-01

Table D1. Summary of Priority Corridors

Route	Community	Total Crashes	KSI Crashes	VRU Crashes	Fatal (A) Crashes	Corridor Length (mi)
US Hwy 30	Nevada**	34	1	0	1	2.74
West St	Colo*	5	1	1	0	1.25
US Hwy 6	Newton	104	2	1	0	4.60
E 8th St N	Newton	12	1	2	0	1.04
IA Hwy 163	Pella	83	4	1	1	5.24
University St	Pella	9	1	1	0	1.53
Main St	Pella	41	1	3	0	1.95
N Lincoln St	Knoxville	55	2	2	0	3.14
IA Hwy 92	Indianola	93	1	1	0	4.42
US Hwy 65	Indianola	206	6	0	1	4.80
US Hwy 6	Adel	134	4	0	1	5.25

* - Colo is not a member community of CIRTPA

** - US 30 corridor may be addressed with recent project completion

Highlighted corridors are state facilities

MAIN ST FROM OSKALOOSA ST TO NORTH OF FOUNTAIN DR – PELLA

A total of 41 crashes were recorded on this corridor during the five-year period analyzed; one those crashes was a KSI crash (non-fatal), and three crashed involved a VRU. **Table D2** summarizes the reported major causes of crash and crash types, and **Table D3** outlines potential safety projects.

Table D2. Crash Breakdown for Main Street Corridor (Pella)

Major Cause of Crash	Count
Other	12
Followed too close	6
FTYROW: From parked position	2
Operator inexperience	2
Driver Distraction: Other interior distraction	2
Operating vehicle in a reckless/erratic/careless/negligent manner	5
Driver Distraction: Other electronic device activity	1
Driver Distraction: Exterior distraction	1
Other: No improper action	1
Animal	3
Other: Vision obstructed	2
Improper backing	1
Over correcting/over steering	1
Driver Distraction: Inattentive/lost in thought	1
FTYROW: From stop sign	1
Driving too fast for conditions	1
TOTAL CRASHES	**42**

Crash Type	Count
Other	13
Rear-end	19
Fixed Obj.	5
Sideswipe (Same)	3
Sideswipe (Opposite)	1
Angle	1
TOTAL CRASHES	**42**

Potential safety projects to consider are:

- **Improve intersection configuration at Main Street and Oskaloosa Street by converting to roundabout**
  - Would prioritize primary movements (southbound left and westbound right).
- **Lane reconfiguration project along Main Street from Oskaloosa to Fountian View Drive (approximately city limits),**
  - Conversion to three-lane cross-section with TWLTL where possible.
  - This cross-section may not be feasible through downtown Pella where ROW is limited; one possible solution would be to realign parking from angle to parallel.
- **Pedestrian infrastructure improvements**
  - Increase sidewalk connectivity, implement curb extensions where possible (primarily downtown area), and modify mid-block crossings at alleys to reduce pedestrian and vehicular conflict.

Table D3. Main Street Corridor (Pella) Potential Safety Improvements

Potential Safety Project	Relative Cost	Implementation Timeline
Oskaloosa Roundabout Conversion	$2,800,000	Long-Term
Conversion to Three-Lane w/ TWLTL	$8,100,000	Long-Term
Pedestrian Infrastructure Improvements	$1,450,000	Mid-Term

IA 92 FROM HWY R63 TO 150TH AVE - INDIANOLA

A total of 93 crashes were recorded on this corridor during the five-year period analyzed; one those crashes was a KSI crash (non-fatal), and one crash involved a VRU. **Table D4** summarizes the reported major causes of crash and crash types, and **Table D5** outlines potential safety projects.

Table D4. Crash Breakdown for IA 92 Corridor (Indianola)

Major Cause of Crash	Count
Followed too close	20
Other	8
FTYROW: From driveway	5
Improper or erratic lane changing	6
Lost control	7
Driver Distraction: Inattentive/lost in thought	3
FTYROW: Making left turn	9
Driving too fast for conditions	1
Animal	14
Unknown	3
Driver Distraction: Other interior distraction	4
Swerving/Evasive Action	1
Driver Distraction: Passenger	2
Driver Distraction: Manual operation of an electronic communication device	2
Failure to signal intentions	1
Ran off road – right	2
Equipment failure	1
Operating vehicle in an reckless/erratic/careless/negligent manner	2
Ran off road – left	1
Made improper turn	1
TOTAL CRASHES	93

Crash Type	Count
Rear-end	43
Angle	11
Sideswipe (Same)	10
Sideswipe (Opposite)	4
Other	11
Head-on	2
Fixed Obj.	12
TOTAL CRASHES	93

Potential safety projects to consider are:

- **Lane reconfiguration project along IA 92 corridor**
  - Conversion to uniform three-lane cross-section (TWLTL); segment from US 65 to 15th Street has a four-lane undivided cross-section.
- **Access management along IA 92**
  - Where feasible, access onto IA 92 should be consolidated, realigned, and/or removed to reduce the number of potential conflict points along the corridor.
- **Gateway treatment and transition zones**
  - Gateway treatment includes signage and landscaping; transitions zones would approximately be from Hwy R63 to Y Street (west) and 150th Avenue to 15th Street (east).
  - Animal warning signage should also be added for traffic leaving Indianola, as several animal crashes were reported near city limits.
- **Pedestrian infrastructure improvements**
  - Increase sidewalk connectivity along both sides of the corridor, especially on eastern and western limits; there are several gaps in the sidewalks along the corridor.

Table D5. IA 92 Corridor (Indianola) Potential Safety Improvements

Potential Safety Project	Relative Cost	Implementation Timeline
Conversion to Three-Lane w/ TWLTL	$325,000	Short-Term
Access Management	$900,000	Long-Term
Gateway Treatment & Transition Zones	$325,000	Short-Term
Pedestrian Infrastructure Improvements	$1,150,000	Mid-Term

US 65 FROM HAYES ST TO 17TH AVE - INDIANOLA

A total of 206 crashes were recorded on this corridor during the five-year period analyzed; six those crashes were KSI crashes (one fatal, five Major (A)), and no crashes involved a VRU. **Table D6** summarizes the reported major causes of crash and crash types, and **Table D7** outlines potential safety projects.

Table D6. Crash Breakdown for US 65 Corridor (Indianola)

Major Cause of Crash	Count
Improper or erratic lane changing	14
Lost control	24
Animal	24
Followed too close	42
Driver Distraction: Inattentive/lost in thought	3
Other	19
Ran off road - right	3
FTYROW: From driveway	8
FTYROW: From stop sign	2
FTYROW: Making left turn	18
Driver Distraction: Other interior distraction	7
Driver Distraction: Exterior distraction	3
Failed to yield to emergency vehicle	1
Driving too fast for conditions	3
Over correcting/over steering	1
FTYROW: Other	3
Exceeded authorized speed	1
Other: No improper action	2
Unknown	11
Made improper turn	9
Operating vehicle in an reckless/erratic/careless/negligent manner	1
Traveling wrong way or on wrong side of road	1
FTYROW: At uncontrolled intersection	1
Driver Distraction: Manual operation of an electronic communication device	1
Ran traffic signal	3
FTYROW: Making right turn on red signal	1
TOTAL CRASHES	**206**

Crash Type	Count
Sideswipe (Same)	30
Rear-end	90
Fixed Obj.	25
Other	24
Sideswipe (Opposite)	1
Angle	35
Head-on	1
TOTAL CRASHES	**206**

Potential safety projects to consider are:

- **Lane reconfiguration project along US 65 corridor**
  - Conversion of existing two-lane cross-section south of IA 92 to an urban three-lane cross-section with TWLTL as far south as city limits.
  - Conversion of existing four-lane undivided cross-section north of IA 92 to a five-lane cross-section with TWLTL to match the cross-section north of Girard Street.
- **Signal infrastructure improvements**
  - Includes signal retiming project along corridor with equipment upgrades where necessary.
- **Gateway treatment and transition zones**
  - Gateway treatment includes signage and landscaping; transitions zones would approximately be from Hayes St to Trail Ridge Avenue (north) and 17th Avenue to Plainview Avenue (south).
  - Animal warning signage should also be added for traffic leaving Indianola, as several animal crashes were reported near city limits.
- **Pedestrian infrastructure improvements**
  - Increase sidewalk connectivity, enhance/relocate midblock crossing near 5th Avenue, stripe pedestrian crossings at all signalized intersections with high visibility (longitudinal) markings, and consider Leading Pedestrian Interval (LPI) at locations with high pedestrian volumes. Further engineering studies are needed to determine if the mid-block crossing near 5th Avenue is in the appropriate location, and if not, where the most suitable location would be for a mid-block crossing along the corridor.

Table D7. US 65 Corridor (Indianola) Potential Safety Improvements

Potential Safety Project	Relative Cost	Implementation Timeline
Add TWLTL (IA 92 to Girard)	$3,300,000	Long-Term
Add TWLTL (S of IA 92)	$5,300,000	Long-Term
Signal Infrastructure Improvements	$325,000	Short-Term
Gateway Treatment & Transition Zones	$325,000	Short-Term
Pedestrian Infrastructure Improvements	$850,000	Mid-Term

US 6 FROM RICHLAND PL TO SOUTHRIDGE DR – ADEL

A total of 134 crashes were recorded on this corridor during the five-year period analyzed; four of those crashes were KSI crashes (one fatal, three Major (A)), and no crashes involved a VRU. **Table D8** summarizes the reported major causes of crash and crash types, and **Table D9** outlines potential safety projects.

Table D8. Crash Breakdown for US 6 Corridor (Adel)

Major Cause of Crash	Count
Animal	48
Ran traffic signal	1
Improper or erratic lane changing	4
Driver Distraction: Inattentive/lost in thought	3
Followed too close	16
Equipment failure	1
FTYROW: From stop sign	14
Other	4
Ran off road - left	3
Driving too fast for conditions	3
FTYROW: Making left turn	7
Failed to keep in proper lane	1
Ran off road - right	4
Ran stop sign	1
Driver Distraction: Other interior distraction (cell phone, passenger, etc.)	5
Lost control	6
Traveling wrong way or on wrong side of road	2
Operating vehicle in an reckless/erratic/careless/negligent manner	2
FTYROW: Other	2
Other: Vision obstructed	1
Driver Distraction: Exterior distraction	2
Made improper turn	3
FTYROW: At uncontrolled intersection	1
TOTAL CRASHES	**134**

Crash Type	Count
Fixed Obj.	22
Rear-end	30
Angle	28
Other	42
Sideswipe (Same)	6
Head-on	2
Sideswipe (Opposite)	4
TOTAL CRASHES	**134**

Potential safety projects to consider are:

- **Lane reconfiguration project along US 6 corridor**
  - Convert four-lane undivided section of US 6 east of N Avenue to a three-lane cross-section with TWLTL.
  - Convert US 6 south of Greene Street to city limits to a three-lane cross-section with TWLTL. Curb and gutter should also be added to create a more urban feel and reduce likelihood of vehicles leaving the roadway.
- **Turn lane improvements along four-lane divided segment of US 6 (eastern limits of Adel)**
  - Ensure turn lanes are designed according to Iowa DOT standards and provide adequate deceleration and lane change distance.
  - Consider left-turn lanes at minor accesses (field accesses, private and commercial driveways, etc.).
- **Install animal signage on US 6 for traffic leaving Adel**
- **Intersection Improvements at Greene Street and N Avenue**
  - Convert existing through/left-turn lanes on eastbound and westbound approaches to left-turn only lanes; implement flashing yellow arrow (FYA) signal heads.
  - Improvement to southwest corner of intersection including curb and gutter repair/replacement, moving sidewalk off back-of-curb, and adjusting site access.
- **Conversion of intersection of Greene Street with N Avenue to roundabout**
- **Conversion of intersection of US 6 with Southbridge Drive to roundabout**
  - This would function as a transition zone and help to reduce speeds entering Adel.
- **Pedestrian infrastructure improvements**
  - Improve sidewalk connectivity (especially south of Greene Street), enhance midblock crossing south of Bryan Street, restripe pedestrian crossing markings with high visibility (longitudinal) pavement markings.

Table D9. US 6 Corridor (Adel) Potential Safety Improvements

Potential Safety Project	Relative Cost	Implementation Timeline
Lane Reconfiguration (Hwy section to Greenwood Hills)	$225,000	Short-Term
Add TWLTL (S of Greenwood Hills)	$6,300,000	Long-Term
Turn Lane Improvements	$1,450,000	Mid-Term
Roadway Lighting Improvements	$275,000	Short-Term
Animal Signage	$35,000	Short-Term
Greene St & N Ave Intersection Improvements	$125,000	Short-Term
Greene St / N Ave Roundabout Conversion	$2,800,000	Long-Term
Southbridge Dr Roundabout Conversion	$2,800,000	Long-Term
Pedestrian Infrastructure Improvements	$1,050,000	Mid-Term

IA 14 FROM ERWIN DR TO NIXON ST – KNOXVILLE

A total of 55 crashes were recorded on this corridor during the five-year period analyzed; two of those crashes were KSI crashes (non-fatal), and two crashes involved a VRU. **Table D10** summarizes the reported major causes of crash and crash types, and **Table D11** outlines potential safety improvement projects.

Table D10. Crash Breakdown for IA 14 Corridor (Knoxville)

Major Cause of Crash	Count
Other	6
Followed too close	9
Improper backing	1
Equipment failure	1
Ran off road - right	3
FTYROW: At uncontrolled intersection	1
Swerving/Evasive Action	2
FTYROW: From driveway	4
FTYROW: Other	1
Improper or erratic lane changing	3
Driver Distraction: Other interior distraction	4
Unknown	2
Made improper turn	2
Other: Vision obstructed	1
FTYROW: Making left turn	3
Passing: Other passing	1
Operating vehicle in an reckless/erratic/careless/negligent manner	3
Failed to keep in proper lane	1
Operator inexperience	2
Driver Distraction: Exterior distraction	1
Lost control	1
Animal	1
Driver Distraction: Reaching for object(s)/fallen object(s)	1
Driving too fast for conditions	1
TOTAL CRASHES	**55**

Crash Type	Count
Rear-end	22
Other	7
Fixed Obj.	11
Sideswipe (Same)	7
Angle	8
TOTAL CRASHES	**55**

Potential safety projects to consider are:

- **Add roadway lighting along the corridor**
  - The two VRU crashes occurred during nighttime conditions; this would increase visibility for drivers.
- **Turn lanes for IA 14 south of Hwy 5 ramps to city limits**
  - Investigate turn lanes along at intersections and commercial drives south of Hwy 5 ramp terminals to city limits.
- **Reducing roadway width; make curb and gutter improvements**
  - Reduce curb-to-curb distance to eliminate excess ROW (from previous road diet); utilize for pedestrian / bike facilities improvements. Curb and gutter should also be improved north of the Hwy 5 ramps terminals and considered south of the ramp terminals.
- **Gateway Treatment**
- **Animal Signage near corridor limits**
- **Pedestrian Infrastructure Improvements**
  - Improve sidewalk connectivity along the corridor, restripe marked crosswalks with high-visibility (longitudinal) markings.

Table D11. IA 14 Corridor (Knoxville) Potential Safety Improvements

Potential Safety Project	Relative Cost	Implementation Timeline
Roadway Lighting Improvements	$325,000	Short-Term
Turn Lane Improvements (S of Hwy 5)	$900,000	Mid-Term
Roadway Width and Curb/Gutter Improvements	$1,850,000	Mid-Term
Gateway Treatment	$75,000	Short-Term
Animal Signage (corridor limits)	$35,000	Short-Term
Pedestrian Infrastructure Improvements	$750,000	Mid-Term

US 6 FROM I-80/US 6 JUNTION TO IOWA SPEEDWAY DR - NEWTON

A total of 104 crashes were recorded on this corridor during the five-year period analyzed; two those crashes were KSI crashes (non-fatal), and one crash involved a VRU. **Table D12** summarizes the reported major causes of crash and crash types, and **Table D13** outlines potential safety improvement projects.

Table D12. Crash Breakdown for US 6 Corridor (Newton)

Major Cause of Crash	Count
Unknown	5
Made improper turn	2
Followed too close	21
FTYROW: Making left turn	9
Improper or erratic lane changing	3
Driver Distraction: Inattentive/lost in thought	3
Driver Distraction: Manual operation of an electronic communication device	2
Ran off road - right	3
Lost control	8
Other	10
Driver Distraction: Interior distraction	7
Driving too fast for conditions	4
Animal	6
FTYROW: From driveway	5
Other: No improper action	2
Ran traffic signal	4
Failed to keep in proper lane	1
FTYROW: At uncontrolled intersection	2
Passing: Through/around barrier	1
FTYROW: From stop sign	2
Improper backing	2
Driver Distraction: Exterior distraction	2
FTYROW: Other	3
TOTAL CRASHES	**107**

Crash Type	Count
Sideswipe (Same)	9
Other	18
Rear-end	43
Angle	22
Fixed Obj.	12
Sideswipe (Opposite)	1
Head-on	2
TOTAL CRASHES	**107**

Potential safety projects to consider are:

- **Truck Route Study**
- **Improved signage along US 6 between I-80/US 6 junction and 1st Avenue**
  - This would include Advance Warning signage at intersections along with Animal Warning signage and additional speed limit signage along the corridor.
- **Add rumble strips along US 6 between I-80/US 6 junction and 1st Avenue**
- **Conversion of intersection of US 6 with 1st Avenue to roundabout**
- **Lane reconfiguration along US 6 from E 17th Street to Iowa Speedway Drive**
  - Convert the existing four-lane undivided cross-section to a three-lane cross-section with TWLTL.
- **Add Retroreflective backplates to signals along the corridor (and city-wide)**
- **Add TWLTL to corridor from IA 14 to E 2nd Street**
  - May not be feasible through portions of downtown; could eliminate parking to accommodate.
- **Pedestrian infrastructure improvements**
  - Improve sidewalk connectivity along east-west portion of corridor and restripe all marked pedestrian crossings with high visibility (longitudinal) markings.

Table D13. US 6 Corridor (Newton) Potential Safety Improvements

Potential Safety Project	Relative Cost	Implementation Timeline
Truck Route Study	$100,000	Short-Term
Signage Improvements (12th Ave to 1st Ave)	$35,000	Short-Term
Rumble Strips (I-80 to 1st Ave)	$45,000	Short-Term
IA 14/1st Ave Intersection Conversion to Roundabout	$2,800,000	Long-Term
Lane Reconfiguration (E 14th Ave to E 31st St)	$225,000	Short-Term
Signal Improvements (Retroreflective Backplates)	$75,000	Short-Term
TWLTL (IA 14 to E 2nd St)	$4,300,000	Long-Term
Pedestrian Infrastructure Improvements	$750,000	Mid-Term

E 8TH ST FROM 1ST AVE TO N 15TH AVE - NEWTON

A total of 12 crashes were recorded on this corridor during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and two crashes involved a VRU. **Table D14** summarizes the reported major causes of crash and crash types, and **Table D15** outlines potential safety improvement projects.

Table D14. Crash Breakdown for E 8th Street Corridor (Newton)

Major Cause of Crash	Count
Other: No improper action	2
Ran off road - right	2
Driver Distraction: Reaching for object(s)/fallen object(s)	1
Operating vehicle in an reckless/erratic/careless/negligent manner	2
Made improper turn	1
Driver Distraction: Other interior distraction	1
Lost control	1
Passing: On wrong side	1
FTYROW: From driveway	1
TOTAL Crashes	**12**

Crash Type	Count
Fixed Obj.	6
Other	3
Sideswipe (Opposite)	1
Rear-end	1
Sideswipe (Same)	1
TOTAL Crashes	**12**

Potential safety projects to consider are:

- **Add/improve curb and gutter along the corridor**
- **Roadway and intersection lighting along the corridor**
- **Speed Management along the corridor**
  - Install speed bumps along the corridor, additional speed limit sings, consider speed feedback signs near school, etc.
- **Enhance on-street bike facilities between N 11th Avenue and N 15th Avenue**
- **Pedestrian infrastructure improvements**
  - Improve sidewalk connectivity, enhance pedestrian crossing locations (ADA compliance, stripe crosswalks with high-visibility (longitudinal) markings, etc.).

Table D15. E 8th Street Corridor (Newton) Potential Safety Improvements

Potential Safety Project	Relative Cost	Implementation Timeline
Curb and Gutter Improvements	$750,000	Mid-Term
Roadway Lighting	$125,000	Short-Term
Speed Management	$75,000	Short-Term
On-street Bike Facility Improvements	$45,000	Short-Term
Pedestrian Infrastructure Improvements	$550,000	Mid-Term

US 30 FROM W 18TH ST TO 19TH ST - NEVADA

A total of 34 crashes were recorded on this corridor during the five-year period analyzed; one of those crashes was a KSI crash (fatal), and no crashes involved a VRU. **Table D16** summarizes the reported major causes of crash and crash types, and **Table D17** outlines potential safety improvement projects.

Table D16. Crash Breakdown for US 30 Corridor (Nevada)

Major Cause of Crash	Count
Unknown	5
Made improper turn	2
Followed too close	21
FTYROW: Making left turn	9
Improper or erratic lane changing	3
Driver Distraction: Inattentive/lost in thought	3
Driver Distraction: Manual operation of an electronic communication device	2
Ran off road - right	3
Lost control	8
Other	10
Driver Distraction: Interior distraction	7
Driving too fast for conditions	4
Animal	6
FTYROW: From driveway	5
Other: No improper action	2
Ran traffic signal	4
Failed to keep in proper lane	1
FTYROW: At uncontrolled intersection	2
Passing: Through/around barrier	1
FTYROW: From stop sign	2
Improper backing	2
Driver Distraction: Exterior distraction	2
FTYROW: Other	3
TOTAL CRASHES	**107**

Crash Type	Count
Sideswipe (Same)	9
Other	18
Rear-end	43
Angle	22
Fixed Obj.	12
Sideswipe (Opposite)	1
Head-on	2
TOTAL CRASHES	**107**

Potential safety projects to consider are:

- **Access Management Study**
  - Review at-grade intersection at 6th Street; consider conversion to interchange.
- **Add median barrier cable along corridor**
  - Median barrier cable should run cover the bridge structures within city limits, including both sides of the 19th Street interchange.
- **Add Safety Edge along US 30 corridor**
- **Add Animal Warning signage**
- **Enhance Speed Limit Conspicuity with in-lane pavement markings**
- **Add roadway lighting along US 30 corridor**

Table D17. US 30 Corridor (Nevada) Potential Safety Improvements

Potential Safety Project	Relative Cost	Implementation Timeline
Access Management Study	$300,000	Long-Term
Median Barrier Cable	$1,450,000	Mid-Term
Shoulder Improvements (Repave + Safety Edge)	$650,000	Mid-Term
Animal Signage	$35,000	Short-Term
Speed Limit In-lane Pavement Markings	$45,000	Short-Term
Roadway Lighting Improvements	$325,000	Short-Term

US 163 FROM WASHINGTON ST JUNCTION TO 250TH AVE JUNCTION – PELLA

A total of 83 crashes were recorded on this corridor during the five-year period analyzed; three of those crashes were KSI crashes (one fatal and two Major (A)), and one crash involved a VRU. **Table D18** summarizes the reported major causes of crash and crash types, and **Table D19** outlines potential safety improvement projects.

Table D18. Crash Breakdown for US 163 Corridor (Pella)

Major Cause of Crash	Count
Ran off road - right	7
Animal	47
Other	2
Operating vehicle in an reckless/erratic/careless/negligent manner	4
Traveling wrong way or on wrong side of road	1
Driver Distraction: Other interior distraction	1
Followed too close	5
Unknown	4
Driver Distraction: Inattentive/lost in thought	2
Other: No improper action	2
Ran off road - left	2
Driving too fast for conditions	1
Lost control	2
Driver Distraction: Exterior distraction	2
FTYROW: From parked position	1
TOTAL CRASHES	**83**

Crash Type	Count
Fixed Obj.	34
Other	32
Rear-end	13
Head-on	1
Sideswipe (Same)	3
TOTAL CRASHES	**83**

Potential safety projects to consider are:

- **Pave shoulders and add Safety Edge along US 183 corridor**
- **Add median barrier cable along US 163 corridor**
  - Median barrier cable should run cover the bridge structures within city limits, including both sides of the 19th Street interchange.
- **Conduct wildlife crossing study**
  - More than half of all crashes on this corridor were Animal-related; consider an over/undercrossing for wildlife.
- **Add Animal Warning signage along US 163 corridor**
  - Consider flashing LED sign installations, as a majority of Animal collisions occur during nighttime conditions.
- **Add roadway lighting along US 163 corridor**

Table D19. US 163 Corridor (Pella) Potential Safety Improvements

Potential Safety Project	Relative Cost	Implementation Timeline
Shoulder Improvements	$950,000	Mid-Term
Median Barrier Cable	$2,350,000	Mid-Term
Wildlife Crossing Study	$6,500,000	Long-Term
Animal Signage (LED Enhanced)	$45,000	Short-Term
Roadway Lighting	$525,000	Short-Term

UNIVERSITY ST FROM US 163 TO E 8TH ST – PELLA

A total of 9 crashes were recorded on this corridor during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal) and one crash involved a VRU. **Table D20** summarizes the reported major causes of crash and crash types, and **Table D21** outlines potential safety improvement projects.

Table D20. Crash Breakdown for University Street Corridor (Pella)

Major Cause of Crash	Count
Followed too close	1
Ran off road - right	1
Swerving/Evasive Action	1
Unknown	1
FTYROW: From driveway	1
Operating vehicle in an reckless/erratic/careless/negligent manner	2
Operator inexperience	1
FTYROW: To pedestrian	1
TOTAL CRASHES	**9**

Crash Type	Count
Rear-end	4
Fixed Obj.	3
Sideswipe (Same)	1
Other	1
TOTAL CRASHES	**9**

Potential safety projects to consider are:

- **Speed Management**
  - Add speed bumps along the corridor from W 3rd Street to E 8th Street.
  - Install larger speed limit signs, post more frequently along the corridor; also consider speed feedback signs.
- **Passing Restrictions**
  - Restripe centerline from US 163 bridge to Broadway Street as double-yellow line to restrict passing; post appropriate signage north of US 163 bridge and west of W 5th Street intersection.
- **Add Animal Warning signage**
  - Post signage for westbound/southbound vehicles; post signage just west/south of United Methodist Church of Pella driveway.
- **Roadway Improvements from Main Street to Farmer Street**
  - Resurface roadway and improve curb and gutter.
- **Pedestrian Infrastructure Improvements**
  - Increase sidewalk connectivity (primarily between Main Street and Farmer Street), ensure ADA compliance, and consider midblock crossing between Farmer Street and E 8th Street to connect parks.

Table D21. University Street Corridor (Pella) Potential Safety Improvements

Potential Safety Project	Relative Cost	Implementation Timeline
Speed Management	$85,000	Short-Term
Passing Restrictions	$35,000	Short-Term
Animal Signage	$35,000	Short-Term
Roadway Improvements (Main St to Farmer St)	$600,000	Long-Term
Pedestrian Infrastructure Improvements	$750,000	Mid-Term

695TH AVE FROM 230TH ST TO PROGRESS DR - COLO

A total of five crashes were recorded on this corridor during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal) and one crash involved a VRU. **Table D22** summarizes the reported major causes of crash and crash types, and **Table D23** outlines potential safety projects.

Table D22. Crash Breakdown for 695th Street Corridor (Colo)

Major Cause of Crash	Count
Driver Distraction: Other interior distraction	1
Followed too close	1
Driver Distraction: Reaching for object(s)/fallen object(s)	2
Other	1
TOTAL CRASHES	**5**

Crash Type	Count
Other	1
Rear-end	1
Fixed Obj.	2
Angle	1
TOTAL CRASHES	**5**

Potential safety projects to consider are:

- **Refresh pavement markings**
- **Curb and Gutter**
  - Add curb and gutter from US 30 to 230th Street. Consider roadway resurfacing along with this.
- **School Zone Improvements**
  - Post school zone signage between Melrose Street and US 30; consider speed bump or raised crosswalk along this segment.
- **Pedestrian Infrastructure Improvements**
  - Add continuous sidewalk or shared-use path from school north to 230th Street; relocation and enhancement of Melrose Street pedestrian crossing (shift to midblock, closer to school).

Table D23. 695th Street Corridor (Colo) Potential Safety Improvements

Potential Safety Project	Relative Cost	Implementation Timeline
Refresh Pavement Markings	$30,000	Short-Term
Roadway Improvements (curb and gutter)	$750,000	Mid-Term
School Zone Improvements	$75,000	Short-Term
Pedestrian infrastructure Improvements	$750,000	Mid-Term

Comprehensive Safety Action Plan
Appendix E

PRIORITY INTERSECTIONS

Prepared for:

Central Iowa Regional Transportation Planning Alliance
939 Office Park Road, Suite 306
West Des Moines, IA 50265

Prepared by:

Felsburg Holt & Ullevig
1300 Walnut Street, Suite 101
Des Moines, IA 50309
515.493.2757

FHU Reference No. 122668-01

Table E1. Summary of Priority Intersections

Intersection	Community	Total Crashes	KSI Crashes	VRU Crashes
Mamie Eisenhower Ave & Story St	Boone	7	0	1
Hawkeye Dr & S Linn St	Boone	12	1	0
SE Marshall St & S Linn St	Boone	11	1	0
US 30 & Crown Flair Dr	Boone	10	1	0
US 6 & E 12th St	Newton	7	0	1
US 6 & E 4th St	Newton	7	1	1
S 8th Ave W & W 4th St S	Newton	8	0	1
IA 14 S Ramp & S Monroe St	Monroe*	5	1	0
Roosevelt Rd & S Clark St	Pella	5	1	0
Oskaloosa St & Clark St	Pella	6	1	0
University St & Broadway St	Pella	7	0	1
Independence St & E 3rd St	Pella	8	0	1
W Pleasant St & Lincoln St	Knoxville	12	0	2
IA 92 & S G St	Indianola	10	1	0
IA 92 & US 65	Indianola	19	2	0
IA 92 & S 9th St	Indianola	17	1	0
E Salem Ave & US 65	Indianola	18	1	1
E Ashland Ave & US 65	Indianola	18	2	0
E Euclid Ave & US 65	Indianola	16	0	2
Valley Pl Dr & US 65	Indianola	18	1	1
W Clinton Ave & N Howard St	Indianola	9	1	0
360th St & Richland Rd	Van Meter*	7	1	0
Willow St & US 169	De Soto*	5	1	0
US 6 & R Ave	Adel	10	1	0

* - Not CIRTPA Member Community
Highlighted intersections are on state facilities

S LINN ST & HAWKEYE DR – BOONE

There was a total of 12 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there were no VRU crashes. **Table E2** summarizes the reported major causes of crash and crash types, and **Table E3** outlines potential safety improvements at the intersection.

Table E2. Crash Breakdown for S Linn St & Hawkeye Dr (Boone)

Major Cause of Crash	Count
FTYROW: From stop sign	7
Ran stop sign	4
Traveling wrong way or on wrong side of road	1
TOTAL CRASHES	**12**

Crash Type	Count
Angle	11
Head-on	1
TOTAL CRASHES	**12**

Potential safety projects to consider are:

- **Enhanced Warning (Stop Signs)**
  - Install "Stop Sign Ahead" warning signs (W3-1) in advance of stop signs on the EB and WB approaches
  - Install flashers above stop signs on EB and WB approaches
  - Increase size of stop signs from 30"x30" (assumed existing size from Streetview Imagery) to 36"x36"
- **Conversion to All-Way Stop-Control (AWSC)**
- **Conversion to Roundabout**

Table E3. S Linn St & Hawkeye Dr (Boone) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Stop Signs)	$30,000	Short-Term
Conversion to AWSC	$35,000	Short-Term
Conversion to Roundabout	$2,800,000	Long-Term

OSKALOOSA ST & CLARK ST - PELLA

There was a total of six crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there were no VRU crashes. **Table E4** summarizes the reported major causes of crash and crash types, and **Table E5** outlines potential safety improvements at the intersection.

Table E4. Crash Breakdown for Oskaloosa St & Clark St (Pella)

Major Cause of Crash	Count
Made improper turn	1
Ran traffic signal	2
Followed too close	1
Other	2
TOTAL CRASHES	**6**

Crash Type	Count
Head-on	1
Angle	2
Rear-end	3
TOTAL CRASHES	**6**

Potential safety projects to consider are:

- **Enhanced Pedestrian Crossing**
  - Refresh pavement markings, convert crosswalk markings to high-visibility (longitudinal) markings. Add FYA phasing to northbound left-turn.
- **Intersection Improvements**
  - Reduce curb radii on southeast and southwest intersection corners, if possible; investigate truck turning templates and modify curb radii and stop bar locations as necessary. Add curb on northwest corner to separate parking lot from roadway.
- **Conversion to Roundabout**

Table E5. Oskaloosa St & Clark St (Pella) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Pedestrian Crossing	$45,000	Short-Term
Intersection Improvements	$250,000	Mid-Term
Conversion to Roundabout	$2,800,000	Long-Term

S 8TH AVE W. & W. 4TH ST – NEWTON

There was a total of 8 crashes at this location during the five-year period analyzed; none of those crashes were KSI crashes, and there was one VRU crash. **Table E6** summarizes the reported major causes of crash and crash types, and **Table E7** outlines potential safety improvements at the intersection.

Table E6. Crash Breakdown for S. 8th Ave W. & W. 4th Street (Newton)

Major Cause of Crash	Count
FTYROW: From Stop Sign	3
Ran Stop Sign	3
Other: No Improper Action	1
Driving too fast	1
TOTAL CRASHES	**8**

Crash Type	Count
Angle	6
Fixed Object	2
TOTAL CRASHES	**8**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Stop Signs)**
- **Access Management @ Intersection**
- **Conversion to Mini Roundabout**

Table E7. S. 8th Ave W. & W. 4th Street (Newton) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Stop Signs)	$35,000	Short-Term
Access Management @ Intersection	$200,000	Mid-Term
Conversion to Mini Roundabout	$800,000	Long-Term

UNIVERSITY ST & BROADWAY ST – PELLA

There was a total of 7 crashes at this location during the five-year period analyzed; none of those crashes were KSI crashes, and there was one VRU crash. **Table E8** summarizes the reported major causes of crash and crash types, and **Table E9** outlines potential safety improvements at the intersection.

Table E8. Crash Breakdown for University Street & Broadway Street (Pella)

Major Cause of Crash	Count
FTYROW: From Stop Sign	3
Ran Stop Sign	2
Followed too close	1
Other	1
TOTAL CRASHES	**7**

Crash Type	Count
Angle	5
Rear-End	1
Fixed Obj.	1
TOTAL CRASHES	**7**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Stop Signs)**
- **Conversion to AWSC**
- **Conversion to Roundabout**

Table E9. University Street & Broadway Street (Pella) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Stop Signs)	$30,000	Short-Term
Conversion to AWSC	$35,000	Short-Term
Conversion to Roundabout	$2,800,000	Long-Term

US 65 & VALLEY PLACE DR – INDIANOLA

There was a total of 18 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there was one VRU crash. **Table E10** summarizes the reported major causes of crash and crash types, and **Table E11** outlines potential safety improvements at the intersection.

Table E10. Crash Breakdown for US 65 & Valley Place Drive (Indianola)

Major Cause of Crash	Count
Ran Off Road – Right	1
Lost Control	2
Followed too close	7
FTYROW: Making Left Turn	3
Driver Distraction: Animal	1
Ran Traffic Signal	1
Made Improper Turn	1
Unknown	2
TOTAL CRASHES	**18**

Crash Type	Count
Angle	3
Rear-Eng	10
Fixed Obj.	1
Other	4
TOTAL CRASHES	**18**

Potential safety projects to consider are:

- **Enhanced Warning (Signal)**
- **Intersection Improvements**
- **Conversion to Roundabout**

Table E11. US 65 & Valley Place Drive (Indianola) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Signal)	$30,000	Short-Term
Intersection Improvements	$200,000	Mid-Term
Conversion to Roundabout	$2,800,000	Long-Term

IA 92 / W. 2ND AVE & S. G ST – INDIANOLA

There was a total of 10 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there were no VRU crashes. **Table E12** summarizes the reported major causes of crash and crash types, and **Table E13** outlines potential safety improvements at the intersection.

Table E12. Crash Breakdown for IA 92 / W. 2nd Avenue & S. G Street (Indianola)

Major Cause of Crash	Count
Ran Off Road – Right	1
FTYROW: To Pedestrian	1
FTYROW: Making Left Turn	1
Made Improper Turn	2
FTYROW: From Stop Sign	5
TOTAL CRASHES	**10**

Crash Type	Count
Angle	8
Fixed Obj.	1
Side Swipe	1
TOTAL CRASHES	**10**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Stop Signs)**
- **Conversion to Roundabout**

Table E13. IA 92 / W. 2nd Avenue & S. G Street (Indianola) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Stop Signs)	$35,000	Short-Term
Conversion to Roundabout	$2,800,000	Long-Term

US 65 / JEFFERSON WAY & 2ND AVE – INDIANOLA

There was a total of 19 crashes at this location during the five-year period analyzed; two of these crashes were KSI crashes, and there were no VRU crashes. **Table E14** summarizes the reported major causes of crash and crash types, and **Table E15** outlines potential safety improvements at the intersection.

Table E14. Crash Breakdown for US 65 / Jefferson Way & 2nd Avenue (Indianola)

Major Cause of Crash	Count
Driver Distraction: Passenger	1
Other: No Improper Action	1
FTYROW: Making Left Turn	2
Driver Distraction: Inattentive	1
Ran Traffic Signal	4

Major Cause of Crash (cont'd.)	Count
Lost Control	3
Followed Too Close	4
Other	2
Unknown	1
TOTAL CRASHES	**19**

Crash Type	Count
Rear-End	12
Angle	3
Other	4
TOTAL CRASHES	**19**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Signal)**
- **Signal Improvements (Visibility & Timing)**
- **Intersection Improvements**
- **Conversion to Roundabout**

Table E15. US 65 / Jefferson Way & 2nd Avenue (Indianola) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Signal)	$35,000	Short-Term
Signal Improvements (Visibility & Timing)	$40,000	Short-Term
Intersection Improvements	$300,000	Mid-Term
Conversion to Roundabout	$2,800,000	Long-Term

IA 14 / LINCOLN ST & W. PLEASANT ST – KNOXVILLE

There was a total of 12 crashes at this location during the five-year period analyzed; none of these were KSI crashes, and there were two VRU crashes. **Table E16** summarizes the reported major causes of crash and crash types, and **Table E17** outlines potential safety improvements at the intersection.

Table E16. Crash Breakdown for Lincoln Street & W. Pleasant Street (Knoxville)

Major Cause of Crash	Count
Ran Traffic Signal	5
FTYROW: Making Left Turn	1
Lost Control	2
Swerving/Evasive Action	1
Unknown	1
Other: No Improper Action	1
Other	1
TOTAL CRASHES	**12**

Crash Type	Count
Angle	5
Head-On	1
Rear-end	2
Fixed Obj.	3
Other	1
TOTAL CRASHES	**12**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Signal)**
- **Intersection Improvements**
- **Conversion to Roundabout**

Table E17. Lincoln Street & W. Pleasant Street (Knoxville) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Signal)	$40,000	Short-Term
Intersection Improvements	$300,000	Mid-Term
Conversion to Roundabout	$2,800,000	Long-Term

US 6 & R AVE – ADEL

There was a total of 10 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there were no VRU crashes. **Table E18** summarizes the reported major causes of crash and crash types, and **Table E19** outlines potential safety improvements at the intersection.

Table E18. Crash Breakdown for US 6 & R Avenue (Adel)

Major Cause of Crash	Count
FTYROW: From Stop Sign	7
FTYROW: From Yield Sign	1
FTYROW: Making Left Turn	1
Animal	1
TOTAL CRASHES	**10**

Crash Type	Count
Angle	8
Rear-End	1
Other	1
TOTAL CRASHES	**10**

Potential safety projects to consider are:

- **Intersection Improvements**
- **Conversion to R-CUT Intersection**
- **Conversion to Roundabout**

Table E19. US 6 & R Avenue (Adel) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Stop Signs)	$35,000	Short-Term
Conversion to R-CUT Intersection	$800,000	Long-Term
Conversion to Roundabout	$2,800,000	Long-Term

US 65 & ASHLAND AVE – INDIANOLA

There was a total of 18 crashes at this location during the five-year period analyzed; two of these crashes were KSI crashes (non-fatal), and there were no VRU crashes. **Table E20** summarizes the reported major causes of crash and crash types, and **Table E21** outlines potential safety improvements at the intersection.

Table E20. Crash Breakdown for US 65 & Ashland Avenue (Indianola)

Major Cause of Crash	Count
Ran Traffic Signal	9
Made Improper Turn	1
Erratic Lane Change	2
Followed Too Close	2
FTYROW: Making Left Turn	3
Other	1
TOTAL CRASHES	**18**

Crash Type	Count
Angle	10
Rear-End	2
Side Swipe	2
Fixed Obj.	1
Other	3
TOTAL CRASHES	**18**

Potential safety projects to consider are:

- **Enhanced Pedestrian Crossing**
- **Intersection Improvements**
- **Access Management @ Intersection**
- **Conversion to Roundabout**

Table E21. US 65 & Ashland Avenue (Indianola) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Pedestrian Crossing	$50,000	Short-Term
Intersection Improvements	$250,000	Mid-Term
Access Management @ Intersection	$250,000	Mid-Term
Conversion to Roundabout	$2,800,000	Long-Term

US 65 & EUCLID AVENUE – INDIANOLA

There was a total of 16 crashes at this location during the five-year period analyzed; none of these were KSI crashes, and there were two VRU crashes. **Table E22** summarizes the reported major causes of crash and crash types, and **Table E23** outlines potential safety improvements at the intersection.

Table E22. Crash Breakdown for US 65 & Euclid Avenue (Indianola)

Major Cause of Crash	Count
Ran Traffic Signal	4
FTYROW: Making Left Turn	3
Followed Too Close	3
FTYROW: Other	1
FTYROW: Pedestrian	1

Major Cause of Crash	Count
Made Improper Turn	1
Driver Distraction: Reaching	1
Driver Distraction: Passenger	1
Unknown	1
TOTAL CRASHES	**16**

Crash Type	Count
Angle	6
Rear-End	6
Fixed Obj.	2
Other	2
TOTAL CRASHES	**16**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Signal)**
- **Intersection Improvements**

Table E23. US 65 & Euclid Avenue (Indianola) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Signal)	$45,000	Short-Term
Intersection Improvements	$250,000	Mid-Term

US 6 & E. 12TH ST – NEWTON

There was a total of 7 crashes at this location during the five-year period analyzed; none of these crashes were a KSI, and there was one VRU crash. **Table E24** summarizes the reported major causes of crash and crash types, and **Table E25** outlines potential safety improvements at the intersection.

Table E24. Crash Breakdown for US 6 & E. 12th Street (Newton)

Major Cause of Crash	Count
Ran Traffic Signal	3
FTYROW: Making Right Turn	1
Driving Too Fast (Speeding)	1
Other: No Improper Action	1
Other	1
TOTAL CRASHES	**7**

Crash Type	Count
Angle	2
Rear-End	2
Fixed Obj.	2
Other	1
TOTAL CRASHES	**7**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Signals)**
- **Intersection Improvements**

Table E25. US 6 & E. 12th Street (Newton) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Signals)	$45,000	Short-Term
Intersection Improvements	$250,000	Mid-Term

CR F90 / 360TH ST & RICHLAND RD – VAN METER

There was a total of 7 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash, and there were no VRU crashes. **Table E26** summarizes the reported major causes of crash and crash types, and **Table E27** outlines potential safety improvements at the intersection.

Table E26. Crash Breakdown for CR F90 / 360th Street & Richland Rd (Van Meter)

Major Cause of Crash	Count
Made improper turn	1
FTYROW: From Stop Sign	2
Ran Stop Sign	1
Animal	1
Other	2
TOTAL CRASHES	**7**

Crash Type	Count
Angle	3
Rear-End	2
Fixed Obj.	2
TOTAL CRASHES	**7**

Potential safety projects to consider are:

- **Enhanced Warning (Stop Signs)**
- **Intersection Improvements**
- **Conversion to Roundabout**

Table E27. CR F90 / 360th Street & Richland Rd (Van Meter) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Stop Signs)	$30,000	Short-Term
Intersection Improvements	$250,000	Mid-Term
Conversion to Roundabout	$2,800,000	Long-Term

US 65 & SALEM AVE – INDIANOLA

There was a total of 18 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there was one VRU crash. **Table E28** summarizes the reported major causes of crash and crash types, and **Table E29** outlines potential safety improvements at the intersection.

Table E28. Crash Breakdown for US 65 & Salem Avenue (Indianola)

Major Cause of Crash	Count
Ran Traffic Signal	7
Followed Too Close	2
Driver Distraction: Other	2
Driver Distraction: Inattentive	1
FTYROW: Pedestrian	1
Unknown	5
TOTAL CRASHES	**18**

Crash Type	Count
Angle	8
Rear-End	5
Side Swipe	1
Fixed Obj.	1
Other	3
TOTAL CRASHES	**18**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Signals)**
- **Intersection Improvements**
- **Access Management @ Intersection**
- **Signal Improvements (Timing & Visibility)**
- **Conversion to Roundabout**

Table E29. US 65 & Salem Avenue (Indianola) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Signals)	$45,000	Short-Term
Intersection Improvements	$250,000	Mid-Term
Access Management @ Intersection	$300,000	Mid-Term
Signal Improvements (Timing & Visibility)	$40,000	Short-Term
Conversion to Roundabout	$2,800,000	Long-Term

IA 14 SOUTH RAMP & S. MONROE ST – MONROE

There was a total of 5 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there were no VRU crashes. **Table E30** summarizes the reported major causes of crash and crash types, and **Table E31** outlines potential safety improvements at the intersection.

Table E30. Crash Breakdown for IA 14 South Ramp & S. Monroe Street (Monroe)

Major Cause of Crash	Count
Made improper turn	1
FTYROW: Making Left Turn	2
FTYROW: From Stop Sign	2
TOTAL CRASHES	**5**

Crash Type	Count
Angle	2
Head-On	1
Sideswipe	1
Other	1
TOTAL CRASHES	**5**

Potential safety projects to consider are:

- **Enhanced Warning (Signals & Stop Signs)**
- **Intersection Improvements**
- **Conversion to Signalized Intersection**
- **Conversion to Roundabout**

Table E31. IA 14 South Ramp & S. Monroe Street (Monroe) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Signals & Stop Signs)	$35,000	Short-Term
Intersection Improvements	$250,000	Mid-Term
Conversion to Signalized Intersections	$650,000	Mid-Term
Conversion to Roundabout	$2,800,000	Long-Term

SE MARSHALL ST & S. LINN ST – BOONE

There was a total of 11 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there were no VRU crashes. **Table E32** summarizes the reported major causes of crash and crash types, and **Table E33** outlines potential safety improvements at the intersection.

Table E32. Crash Breakdown for SE Marshall Street & S. Linn Street (Boone)

Major Cause of Crash	Count
FTYROW: From Stop Sign	5
Ran Stop Sign	3
Driving Too Fast (Speeding)	1
Driver Distraction: Other	1
Other	1
TOTAL CRASHES	**11**

Crash Type	Count
Angle	8
Sideswipe	2
Fixed Obj.	1
TOTAL CRASHES	**11**

Potential safety projects to consider are:

- **Enhanced Warning (Stop Signs)**
- **Intersection Lighting Improvements**
- **Access Management @ Intersection**
- **Conversion to Signalized Intersection**

Table E33. SE Marshall Street & S. Linn Street (Boone) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Stop Signs)	$30,000	Short-Term
Intersection Lighting Improvements	$200,000	Mid-Term
Access Management @ Intersection	$300,000	Mid-Term
Conversion to Signalized Intersection	$650,000	Mid-Term

CLINTON AVE & N. HOWARD ST – INDIANOLA

There was a total of 9 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there were no VRU crashes. **Table E34** summarizes the reported major causes of crash and crash types, and **Table E35** outlines potential safety improvements at the intersection.

Table E34. Crash Breakdown for Clinton Avenue & N. Howard Street (Indianola)

Major Cause of Crash	Count
Ran Stop Sign	3
FTYROW: From Stop Sign	5
Other: Improper Operation	1
TOTAL CRASHES	**9**

Crash Type	Count
Angle	8
Rear-End	1
TOTAL CRASHES	**9**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Stop Signs)**
- **Intersection Improvements**
- **Conversion to Mini Roundabout**

Table E35. Clinton Avenue & N. Howard Street (Indianola) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Stop Signs)	$35,000	Short-Term
Intersection Improvements	$250,000	Mid-Term
Conversion to Mini Roundabout	$800,000	Long-Term

GUTHRIE ST & WILLOW ST / SPRUCE ST – DE SOTO

There was a total of 5 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there were no VRU crashes. **Table E36** summarizes the reported major causes of crash and crash types, and **Table E37** outlines potential safety improvements at the intersection.

Table E36. Crash Breakdown for Guthrie Street & Willow Street / Spruce Street (De Soto)

Major Cause of Crash	Count
Made improper turn	1
Traveling Wrong Way	1
FTYROW: From Stop Sign	2
FTYROW: Making Left Turn	1
TOTAL CRASHES	**5**

Crash Type	Count
Angle	2
Head-On	1
Other	2
TOTAL CRASHES	**5**

Potential safety projects to consider are:

- **Enhanced Warning (Stop Signs)**
- **Intersection Improvements**
- **Conversion to Signalized Intersection**
- **Conversion to Roundabout**

Table E37. Guthrie Street & Willow/Spruce Street (De Soto) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Stop Signs)	$30,000	Short-Term
Intersection Improvements	$250,000	Mid-Term
Conversion to Signalized Intersection	$650,000	Mid-Term
Conversion to Roundabout	$2,800,000	Long-Term

US 30 / 220TH ST & CROWN FLAIR DR – BOONE

There was a total of 10 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there were no VRU crashes. **Table E38** summarizes the reported major causes of crash and crash types, and **Table E39** outlines potential safety improvements at the intersection.

Table E38. Crash Breakdown for US 30 / 220th Street & Crown Flair Drive (Boone)

Major Cause of Crash	Count
Animal	1
FTYROW: From Stop Sign	8
FTYROW: Other	1
TOTAL CRASHES	**10**

Crash Type	Count
Angle	8
Other	2
TOTAL CRASHES	**10**

Potential safety projects to consider are:

- **Conversion to R-CUT Intersection**
- **Conversion to Roundabout**

Table E39. US 30 / 220th Street & Crown Flair Drive (Boone) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Conversion to R-CUT Intersection	$800,000	Long-Term
Conversion to Roundabout	$2,800,000	Long-Term

US 6 & E. 4TH ST S. / E. 4TH ST N. – NEWTON

There was a total of 7 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there was one VRU crash. **Table E40** summarizes the reported major causes of crash and crash types, and **Table E41** outlines potential safety improvements at the intersection.

Table E40. Crash Breakdown for US 6 & E. 4th Street (Newton)

Major Cause of Crash	Count
Driver Distraction: Exterior distraction	1
FTYROW: Making right turn on red signal	1
Unknown	1
Ran traffic signal	2
Made improper turn	1
Lost control	1
TOTAL CRASHES	**7**

Crash Type	Count
Angle	4
Fixed Obj.	1
Rear-end	2
TOTAL CRASHES	**7**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Stop Signs)**
- **Intersection Improvements**
- **Access Management**

Table E41. US 6 & E. 4th Street (Newton) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Stop Signs)	$35,000	Short-Term
Intersection Improvements	$300,000	Mid-Term
Access Management	$200,000	Mid-Term

IA 92 / E. 2ND AVE & S. 9TH ST – INDIANOLA

There was a total of 17 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there were no VRU crashes. **Table E42** summarizes the reported major causes of crash and crash types, and **Table E43** outlines potential safety improvements at the intersection.

Table E42. Crash Breakdown for IA 92 / E. 2nd Avenue & S. 9th Street (Indianola)

Major Cause of Crash	Count
FTYROW: Making left turn	9
FTYROW: From driveway	1
FTYROW: From stop sign	2
FTYROW: Other	1
Lost control	1
Made improper turn	1
Ran off road - right	1
Driver Distraction: Inattentive/lost in thought	1
TOTAL CRASHES	**17**

Crash Type	Count
Angle	9
Rear-end	1
Other	5
Sideswipe (Same)	2
TOTAL CRASHES	**17**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Stop Signs)**
- **Intersection Improvements**
- **Access Management**
- **Conversion to Roundabout**

Table E43. IA 92 / E. 2nd Avenue & S. 9th Street (Indianola) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Stop Signs)	$35,000	Short-Term
Intersection Improvements	$250,000	Mid-Term
Access Management	$200,000	Mid-Term
Conversion to Roundabout	$2,800,000	Long-Term

MAMIE EISENHOWER AVE & STORY ST – BOONE

There was a total of 7 crashes at this location during the five-year period analyzed; none of those crashes were KSI crashes, and there was one VRU crash. **Table E44** summarizes the reported major causes of crash and crash types, and **Table E45** outlines potential safety improvements at the intersection.

Table E44. Crash Breakdown for Mamie Eisenhower Avenue & Story Street (Boone)

Major Cause of Crash	Count
Driver Distraction: Exterior distraction	1
FTYROW: Making left turn	3
Unknown	1
Ran traffic signal	1
Other	1
TOTAL CRASHES	**7**

Crash Type	Count
Rear-end	1
Other	4
Angle	1
Fixed Obj.	1
TOTAL CRASHES	**7**

Potential safety projects to consider are:

- **Enhanced Pedestrian Crossing**
- **Intersection Improvements**
- **Signal Improvements (Timing & Visibility)**

Table E45. Mamie Eisenhower Avenue & Story Street (Boone) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Pedestrian Crossing	$50,000	Short-Term
Intersection Improvements	$250,000	Mid-Term
Signal Improvements (Timing & Visibility)	$40,000	Short-Term

INDEPENDENCE ST & E. 3RD ST – PELLA

There was a total of 8 crashes at this location during the five-year period analyzed; none of those crashes were KSI crashes, and there was one VRU crash. **Table E46** summarizes the reported major causes of crash and crash types, and **Table E47** outlines potential safety improvements at the intersection.

Table E46. Crash Breakdown for Independence Street & E. 3rd Street (Pella)

Major Cause of Crash	Count
Other: No improper action	1
FTYROW: From stop sign	3
Ran stop sign	1
FTYROW: From driveway	1
Ran off road - right	1
Driving too fast for conditions	1
TOTAL CRASHES	**8**

Crash Type	Count
Fixed Obj.	2
Angle	5
Other	1
TOTAL CRASHES	**8**

Potential safety projects to consider are:

- **Enhanced Warning (Pedestrian & Stop Signs)**
- **Intersection Lighting Improvements**
- **Intersection Improvements**
- **Conversion to AWSC**
- **Conversion to Mini Roundabout**

Table E47. Independence Street & E. 3rd Street (Pella) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Pedestrian & Stop Signs)	$35,000	Short-Term
Intersection Lighting Improvements	$75,000	Short-Term
Intersection Improvements	$250,000	Mid-Term
Conversion to AWSC	$35,000	Short-Term
Conversion to Mini Roundabout	$800,000	Long-Term

S. CLARK ST & ROOSEVELT RD – PELLA

There was a total of 5 crashes at this location during the five-year period analyzed; one of those crashes was a KSI crash (non-fatal), and there were no VRU crashes. **Table E48** summarizes the reported major causes of crash and crash types, and **Table E49** outlines potential safety improvements at the intersection.

Table E48. Crash Breakdown for S. Clark Street & Roosevelt Road (Pella)

Major Cause of Crash	Count
FTYROW: From driveway	2
Followed too close	2
FTYROW: From stop sign	1
TOTAL CRASHES	**5**

Crash Type	Count
Angle	2
Rear-end	2
Other	1
TOTAL CRASHES	**5**

Potential safety projects to consider are:

- **Enhanced Warning (Stop Signs)**
- **Intersection Improvements**
- **Conversion to Roundabout**

Table E49. S. Clark Street & Roosevelt Road (Pella) Potential Safety Improvements

Potential Safety Project	Cost	Implementation Timeline
Enhanced Warning (Stop Signs)	$30,000	Short-Term
Intersection Improvements	$250,000	Mid-Term
Conversion to Roundabout	$2,800,000	Long-Term