APRIL 2026

CITY OF WAVERLY

COMPREHENSIVE SAFETY ACTION PLAN

Waverly
A Great Place to Grow

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EXECUTIVE SUMMARY

The City of Waverly, Nebraska is committed to creating a safe and equitable transportation network for all residents, workers, and visitors. In alignment with the U.S. Department of Transportation's (USDOT) Safe Streets and Roads for All (SS4A) initiative, this Comprehensive Safety Action Plan identifies the most critical transportation safety issues in the community and lays out a pathway toward reducing transportation-related injuries and fatalities.

A Data-Driven Approach

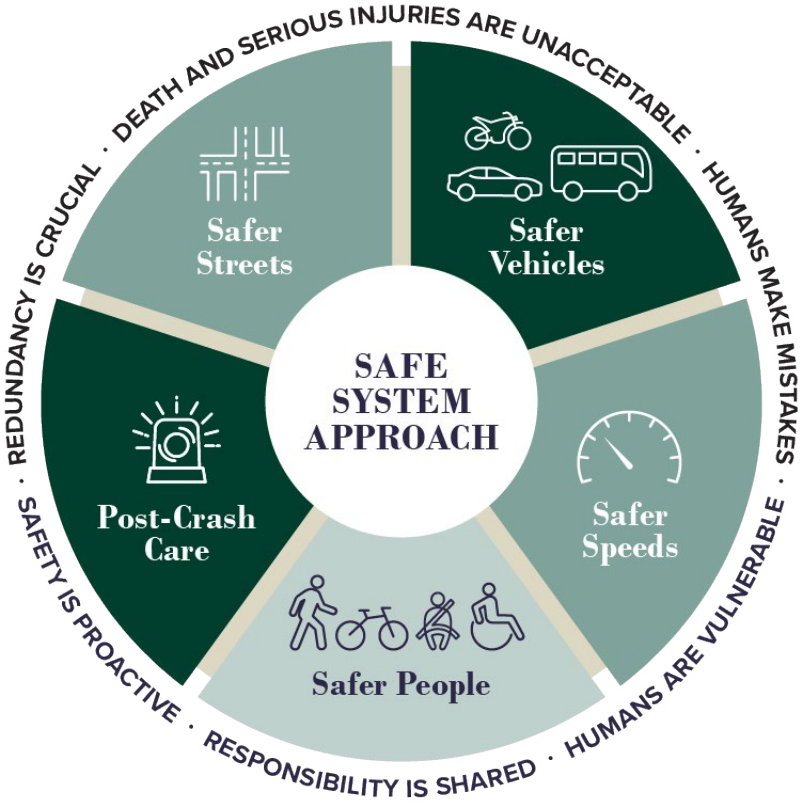
Through a comprehensive review of crash data, street characteristics, and user behavior, the plan highlights key risk areas and traffic safety trends. Insights from crash analysis revealed the locations and underlying factors contributing to severe injuries and fatalities. These findings inform targeted solutions such as enhanced intersections, corridor redesigns, and improvements to vulnerable road user (VRU) facilities (pedestrian and bicyclist) to ensure the most significant impact on safety outcomes.

Community Engagement

Engagement with project stakeholders, community members, and local agencies was essential to developing a shared vision for Waverly's transportation network. Through public meetings, focus group discussions, and online surveys, residents were encouraged to voice ideas and concerns and contribute solutions. The plan prioritizes equitable investments, focusing on improvements that will serve all users of the system, so that everyone in Waverly can travel safely.

Embracing the Safe System Approach

The safety action plan is guided by the Safe System Approach, which recognizes that people make mistakes and that the human body is vulnerable to crash impacts. By designing a transportation system where mistakes are less likely to result in serious injury or death, the City of Waverly seeks to create a culture of safety. The Safe System Approach is built around five key elements:



Five Key Elements of the Safe System Approach

Safer Vehicles

Expand Waverly's availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.

Safer Speeds

Promote safer speeds on all Waverly streets through a combination of thoughtful, equitable, context-appropriate street design, appropriate speed-limit setting, targeted education, outreach campaigns, and enforcement.

Safer People

Encourage safe, responsible driving and behavior by people who use Waverly's streets and create conditions that prioritize their ability to reach their destination unharmed.

Post-Crash Care

Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

Safer Streets

Design street environments in Waverly to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users in the community.

In addition to those five key elements, the Safe Systems Approach is also characterized by several core principles as described below.

Core Principles of the Safe System Approach

1 Death and Serious Injuries are Unacceptable	Transportation systems must aspire to eliminate catastrophic outcomes.
2 Humans Make Mistakes	Recognizing human error leads to more forgiving street designs and interventions.
3 Humans Are Vulnerable	Reducing high-impact crashes and creating safer conditions protect all users.
4 Responsibility is Shared	Engineers, policymakers, local businesses, enforcement, and the public all play a role.
5 Safety is Proactive	Predicting and preventing risks rather than reacting post-incident.
6 Redundancy is Crucial	Layering safety measures ensures multiple lines of defense.

Key Categories

As part of the Safety Action Plan, several recommendations were developed to improve safety on the Waverly transportation system. These various recommendations were considered within the plan to help address key categories of safety enhancements.

Street Upgrades	Conversion of rural sections to urban standards (curbs, gutters, sidewalks, multi-use trails) and the addition of lanes, turn lanes, and median extensions will improve traffic flow and safety.
Traffic Control Improvements	The installation of roundabouts, traffic signals, and RRFBs (Rectangular Rapid Flashing Beacons), along with the extension of medians and reconfiguration of intersections will reduce traffic congestion and improve safety.
Pedestrian and Bicycle Improvements	Additions of multi-use trails and pedestrian/bicycle facilities will enhance safety and connectivity across major streets, and ADA improvements will improve accessibility.
Phased Implementation	Projects broken into phases, allowing for flexible funding and implementation, with priority given to critical improvements (e.g., intersection improvements, street reconstruction, signal upgrades) will make the recommendations feasible.
Other Programs and Policies	Identification of other potential programs and/or policies for Waverly can help address non-location-specific safety issues across the City. The implementation of items such as an Access Management Policy, Safe Routes to School Initiative, and the continuation of sound land use planning in coordination with access management plans with good street design were also highlights and are beneficial in enhancing transportation safety.

Location-Specific Recommendations

Waverly's High Injury Network segments and intersections were each scored and prioritized to identify the locations in Waverly that have the greatest need for safety improvements. Location scoring factored in the crash data, multimodal impact to pedestrians and bicyclists, public comments, and stakeholder feedback.

Based on these rankings, projects were developed to address those priority segments and intersections. These priority project lists are illustrated in detail in Chapter 6 - Recommendations.

Overarching, Prioritized Recommendations

Based upon the compilation of all the data and recommendations, stakeholder feedback, and project discussions related to "making the biggest impact to reduce severe crashes", four highest priority recommendations were developed that include prioritized groups of individual projects along strategic corridors in Waverly. By implementing these overall corridor projects, several of the top safety issues at individual locations across the City can be mitigated. A brief summary of these project locations is included in the descriptions which follow, and detailed project information is included in Chapter 6 – Recommendations.

Prioritized Project Group #1

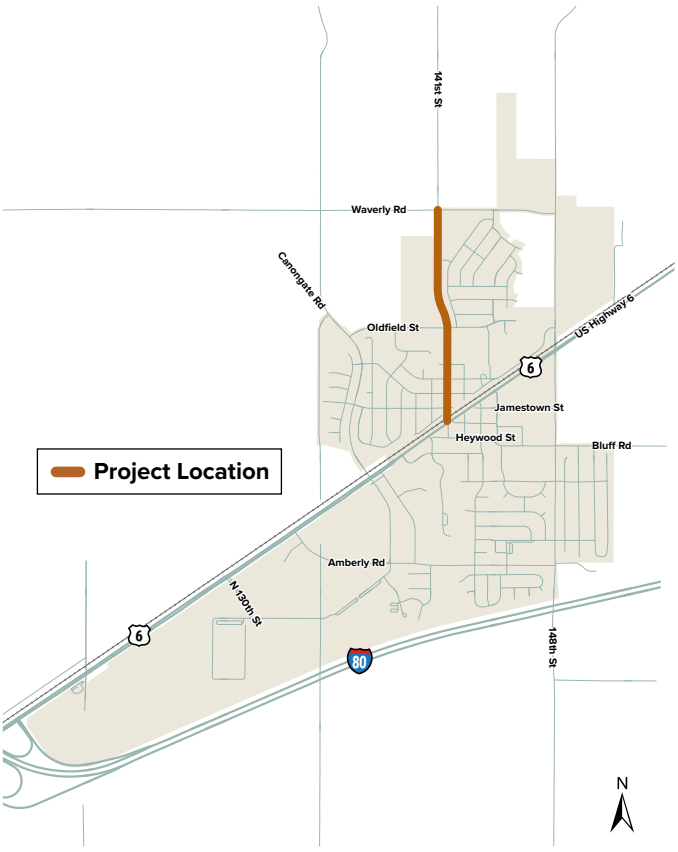
US-6 Corridor Project (130th Street to 148th Street)

This project aims to upgrade the current rural street to an urban street standard by adding curbs, gutters, ADA-compliant sidewalks/multi-use trails, raised medians, improved lighting, longer turn lanes, and upgraded traffic signals. It targets high-priority segments and intersections, with a phased approach if full funding isn't available - including study and design projects at 148th Street, and segments and intersections traveling west through 141st, Amberly Rd, and 130th Street.

Prioritized Project Group #2

141st Street Project (US-6 to Waverly Road)

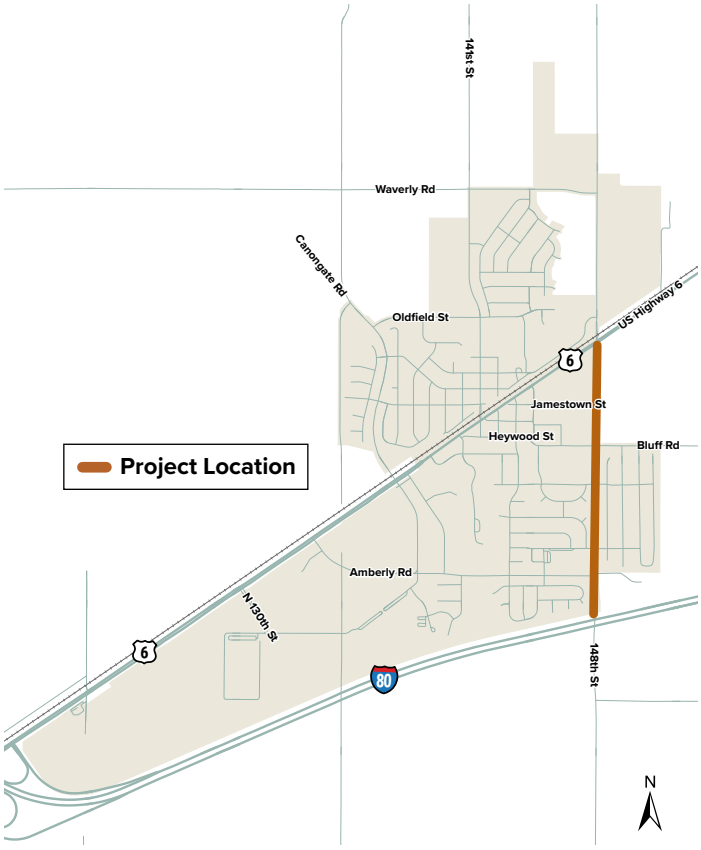
This project focuses on improving traffic flow and safety with features like edge/parking striping, curb extensions at key intersections, and RRFB traffic control at 141st and Mansfield Street. The project also plans to extend the median north of Jamestown Street to reduce vehicle queues near the railroad crossing and potentially convert the street to an urban section from Mansfield Street to Waverly Road, including curbs, gutters, and sidewalks. If funding is limited, the project can be phased, starting with improvements at Mansfield Street, followed by restriping, median extension, and urbanization work. A roundabout should also be planned for construction at the 141st Street & Waverly Road intersection.



High Priority Project #3

148th Street (I-80 bridge to US-6)

This project includes the widening of the two-lane section to a three-lane section, with one through lane in each direction and a center turn lane. It also includes converting the rural section to an urban street section with curb and gutter, storm sewer, sidewalk/trails and ADA accessible ramps, pedestrian crossings with RRFBs and potential refuge islands, lighting and streetscape. This project addresses both segment and intersection crash locations along the corridor, and supports improved multimodal infrastructure with continued development occurring.



Implementation and Next Steps

As a living document, the Safety Action Plan outlines near term, and long-term strategies that work together to improve transportation safety. Regular progress reports, coupled with ongoing data analysis, will guide mid-course adjustments to ensure the plan remains relevant and effective. By integrating safety goals into everyday planning and decision-making, Waverly will continue to build a culture of safe mobility for everyone.

Prioritized Project Group #4

Canongate Project (Amberly Road to Oldfield Street)

This project aims to improve safety and accessibility by phasing Canongate as an urban street with two vehicle lanes, pedestrian overpass/trail provisions (either on the bridge, parallel to the bridge, or at a new central crossing location), improving the Amberly Road intersection to a roundabout, and implementing a rectangular rapid flashing beacon (RRFB) at the Jamestown Street intersection. Urban street standards with new curb and gutter, ADA improvements, safe pedestrian and bicycle facility connections, and street lighting are additional enhancements that can all be included in phasing of this project group.

Our Collective Responsibility

Everyone has a role to play in ensuring safer streets—public officials, transportation designers, law enforcement, drivers, cyclists, and pedestrians alike. This plan is the City's commitment to prioritizing health, safety, and quality of life on our streets. By working together and diligently following through on the recommendations, the City of Waverly will move closer to the shared vision of eliminating fatal and serious injury crashes and creating a welcoming environment where all transportation users can thrive.

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CHAPTER 1

PLAN PURPOSE

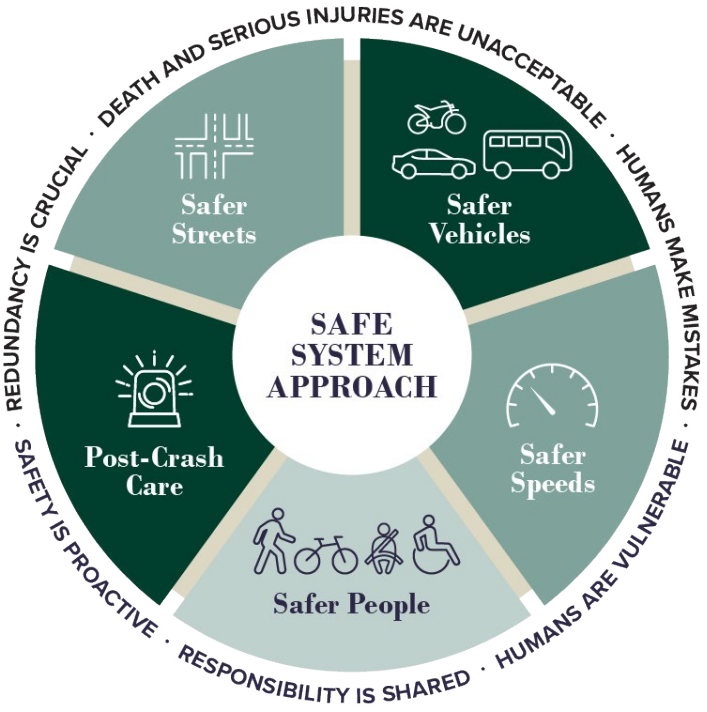
PLAN PURPOSE

WHAT IS A SAFE STREETS AND ROADS FOR ALL (SS4A) - COMPREHENSIVE SAFETY ACTION PLAN?

The U.S. Department of Transportation (USDOT) established the Safe Street and Roads for All discretionary program in 2022 with $5 billion appropriated over five years (2022-2026). The City of Waverly successfully obtained Safe Streets and Roads for All (SS4A) grant dollars in spring 2024 and kicked off the project in fall 2024.

The Waverly Comprehensive Safety Action Plan (CSAP) is the city's blueprint to provide safe streets and roads for all people and road users. The purpose of this plan is to establish and implement steps that can help the City eliminate fatal and serious injury crashes in the community's street network. To achieve this, City leaders have committed to a goal of reaching zero fatal and serious injuries in Waverly.

The CSAP includes community-wide safety analysis, public engagement to identify safety concerns, project recommendations, and an implementation plan that prioritizes locations for deployment of safety countermeasures. This plan was developed by JEO Consulting Group and funded through a grant obtained by the City of Waverly from the USDOT SS4A Program.



PROJECT TIMELINE

Q3 2025	*Q4 2025*	*Q1 2026*	*Q2 2026*
• Project Kick-Off Meeting with Advisory Team	• Two Advisory Team Meetings • Public Open House #1	• Focus Group Conversations • Advisory Team Meeting	• Public Open House #2 • Submit Draft Action Plan • Present Final Plan to City Council

Principles of a Safe System Approach

The Safe System Approach is the foundation that will support the community in achieving its goal of reaching zero fatal and serious injury crashes in Waverly's transportation network. As part of its National Roadway Safety Strategy released in January 2022, USDOT adopted the Safe System Approach as its guiding paradigm to address roadway safety challenges nationwide. This approach acknowledges both human mistakes and human vulnerability and is designed to protect all street users.

The Safe System Approach is built around the following six principles.

Core Principles of the Safe System Approach

1 Death and Serious Injuries are Unacceptable	The Safe System Approach prioritizes the elimination of crashes that result in death and serious injuries on roadways.
2 Humans Make Mistakes	Recognizing human error leads to more forgiving street designs and interventions.
3 Humans Are Vulnerable	Reducing high-impact crashes and creating safer conditions protect all users.
4 Responsibility is Shared	Engineers, policymakers, local businesses, enforcement, and the public all play a role.
5 Safety is Proactive	Proactive tools should be used to identify and address safety issues in the transportation system, rather than waiting for crashes to occur.
6 Redundancy is Crucial	Reducing risks requires that all parts of the transportation system be strengthened, so that if one part fails, the other parts still protect people.

Objectives of a Safe System Approach

There are five objectives of a Safe System Approach: safer street users, safer vehicles, safer streets, safer speeds, and post-crash care. To achieve zero fatal and serious injury crashes, all five of these objectives must be strengthened. Strengthening all objectives allows for redundant layers of protection against fatal and serious injuries on streets. The Waverly Comprehensive Safety Action Plan was developed to strengthen the five Safe System objectives defined below by the National Roadway Strategy, through improving the overall transportation system.

Safer People

Encourage safe, responsible driving and behavior by people who use Waverly's streets and create conditions that prioritize their ability to reach their destination unharmed.

Safer Streets

Design street environments in Waverly to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users in the community.

Safer Vehicles

Expand Waverly's availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.

Safer Speeds

Promote safer speeds on all Waverly streets through a combination of thoughtful, equitable, context-appropriate street design, appropriate speed-limit setting, targeted education, outreach campaigns, and enforcement.

Post-Crash Care

Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

THE NEED FOR SAFER STREETS

A total of 42,939 people died in motor vehicle crashes in 2021 in the U.S.. These deaths occurred in 39,508 crashes involving 61,332 motor vehicles. This was a 10% increase in deaths compared with 2020, according to the Insurance Institute for Highway Safety (IIHS) and the Highway Loss Data Institute (HLDI). Traffic crashes continue to be a leading cause of death for teenagers in America, and disproportionately impact people who are Black, American Indian, or live in rural communities.

In May of 2024, the City initiated the development of a CSAP for the community of Waverly, Nebraska. This project aimed to develop a CSAP that will help to eliminate fatal crashes and dramatically reduce severe injury crashes for all users of Waverly's highway, street, sidewalk, and trail transportation network.

The outcome of this plan will provide an overview of the following:

- Historical crash data for the City of Waverly
- Development of applicable countermeasures
- Equitable transportation access and use solutions
- Focused pedestrian/bicycle improvements

39,508 Crashes

42,939 Deaths

10% Increase in Deaths

Nationwide data from 2021. Insurance Institute for Highway Safety (IIHS) and the Highway Loss Data Institute (HLDI)

WAVERLY CSAP ADVISORY TEAM

To guide the development of these outcomes, an Advisory Team made of community stakeholders was established early on in the planning process. This group met regularly throughout the project and provided their guidance, feedback, and solutions for existing safety concerns experienced in Waverly's transportation system.

Advisory Team Members

Stephanie Fisher
City Administrator
City of Waverly

Tracey Whyman
Public Works Director
City of Waverly

Shayna Murrell
Parks & Recreation Director
City of Waverly

Abbey Pascoe
Council President
City of Waverly

Kris Bohac
Planning Commission Chair
City of Waverly

Ben Houchin
Chief Deputy Sheriff
Lancaster County

Robin Hoffman
Emergency Services Coordinator
City of Waverly

Cory Worrell
Superintendent
District 145

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CHAPTER 2

SAFETY ANALYSIS

SAFETY ANALYSIS

The Safety Analysis portion of this plan presents a comprehensive analysis of crash data, including traffic volume, street information, impact to vulnerable road users, and multi-modal transportation types, for the City of Waverly, Nebraska, spanning the most recent ten-year period (2014-2023). By examining historical crash data, the study team aimed to identify critical safety issues, discern trends and patterns, and understand the underlying causes of transportation-related incidents throughout the city. This data-driven approach informed the development of targeted strategies and interventions to enhance overall street safety and reduce the incidence of traffic-related fatalities and severe injuries within Waverly's street, sidewalk, and trails network.

WAVERLY CRASH ANALYSIS

In development of this plan, several maps were created that visually represent all recorded crashes in Waverly over the past ten years. These maps serve as a foundational tool to illustrate the geographic distribution and frequency of crashes, providing clear visual context for known safety issues and concerns in the community.

The following figures and respective summaries delve deeper into the specifics of all crashes, ultimately shedding light on the most critical areas of concern and guiding the City's efforts to create a safer transportation environment for all residents and visitors.

The crash data used in this analysis was provided by the Nebraska Department of Transportation (NDOT) and augmented by the Lancaster County Sheriff's Department. The data review represents the period from January 1, 2014, to December 31, 2023, unless otherwise noted. During this time, a total of 281 crashes were reported within the city limits of Waverly. Of these, six crashes involved a vulnerable road user (VRU), which is defined as anyone who walks, bikes, or rolls across the transportation network as a pedestrian. The locations of all 281 crashes are depicted in ***Figure 1.***

To illustrate the concentration and frequency of crashes, the map shown in ***Figure 2*** highlights locations within Waverly where multiple crashes have occurred at the same locations during the 10-year reporting period defined previously.

Figure 3 presents an overview of all six VRU crashes.

Figure 4 presents an overview of just the fatal and injury crashes on the network.

Figure 1: City of Waverly Crashes (2014-2023)

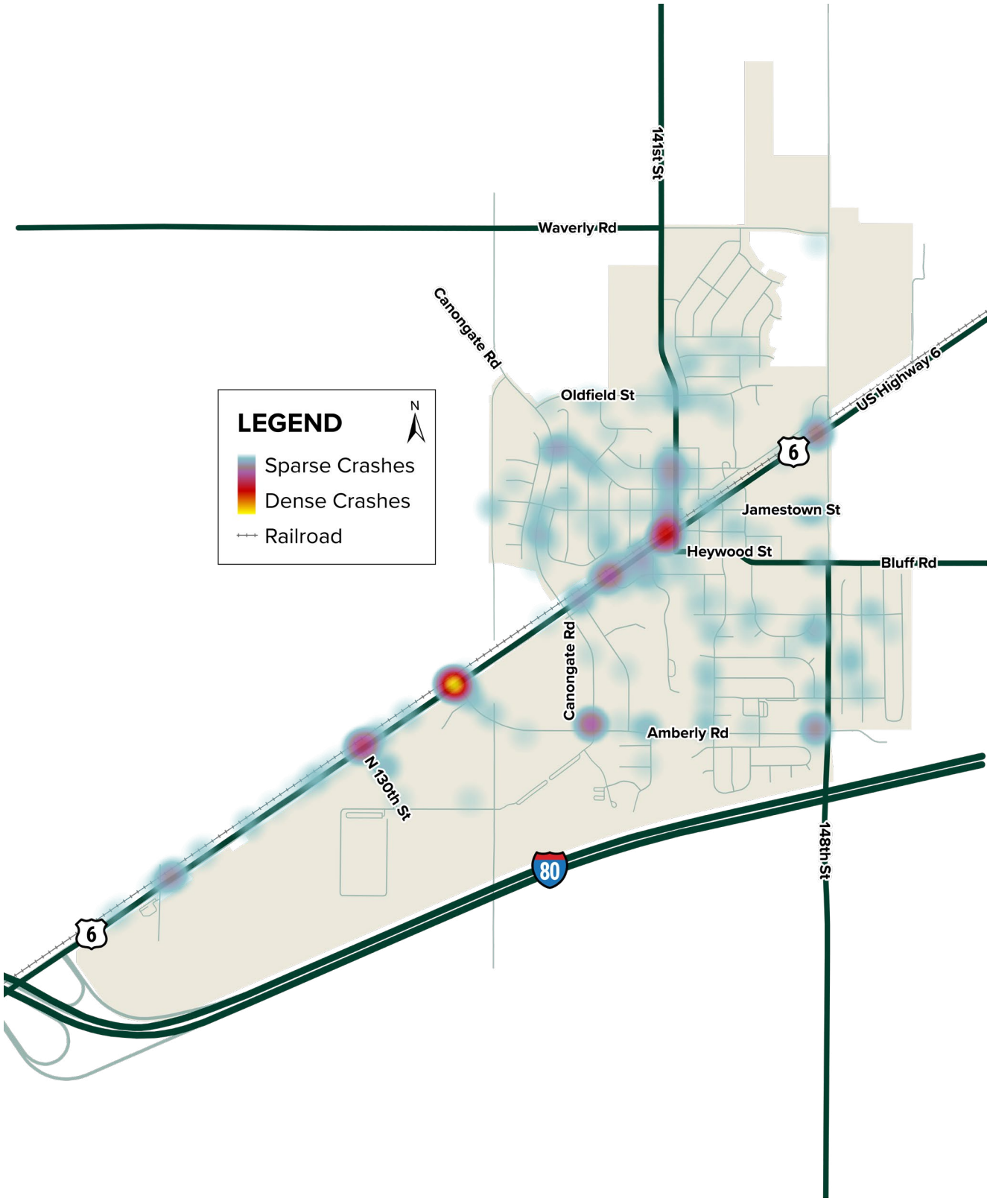


Figure 2: Concentration of Crashes (2014-2023)

Figure 3: City of Waverly VRU Crashes (2014-2023)

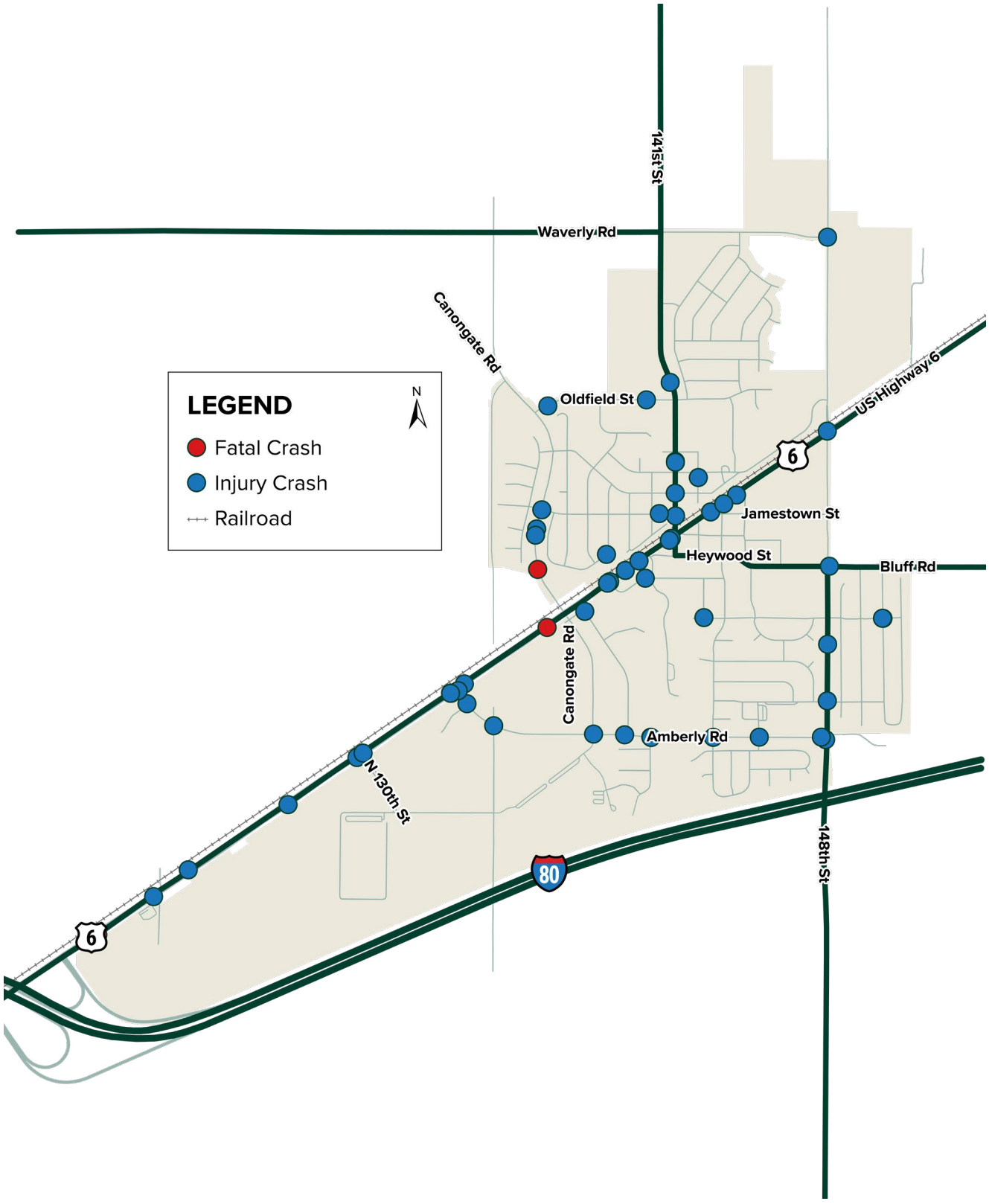


Figure 4: Fatal and Injury Crashes (2014-2023)

SUMMARY OF HISTORICAL CRASH DATA

In alignment with the core objectives of the Safe Streets and Roads for All initiative, this section focuses on analyzing crashes that resulted in a fatal or severe injury. The emphasis on Killed or Seriously Injured (KSI) crashes is essential, as addressing these severe incidents is pivotal to improving overall safety and reducing the most tragic outcomes of traffic collisions. Due to the limited number of KSI crashes, Fatal Plus Injury (FI) crashes also will be examined when applicable. By scrutinizing the data related to KSI and FI crashes, the goal is to uncover critical insights regarding the circumstances and contributing factors that lead to these incidents. This information will guide the formulation of targeted safety interventions and policy recommendations aimed at mitigating the risk and severity of future crashes within the City of Waverly.

KSI and FI Crashes

Of the 281 crashes reported during the 10-year period, **93 resulted in either a fatality or some level of injury** to the individuals involved. These are classified as Fatal plus Injury (FI) crashes *Figure 4.* Of these, **10 crashes are classified as KSI crashes.** While the total number of KSI crashes is low, these events represent the most severe outcomes and are a primary consideration of this analysis. The remainder of this section provides additional insights on KSI crashes in the city.

Comparison to Similar Nebraska Cities

Figure 5 illustrates the crash trends between Waverly and Nebraska communities of similar size (based on population). This data indicates that Waverly is near the average KSI/100k rate among comparable cities.

As shown in *Figure 6*, the crash rate for KSI crashes in Waverly involving alcohol is low compared to similar-sized communities in Nebraska.

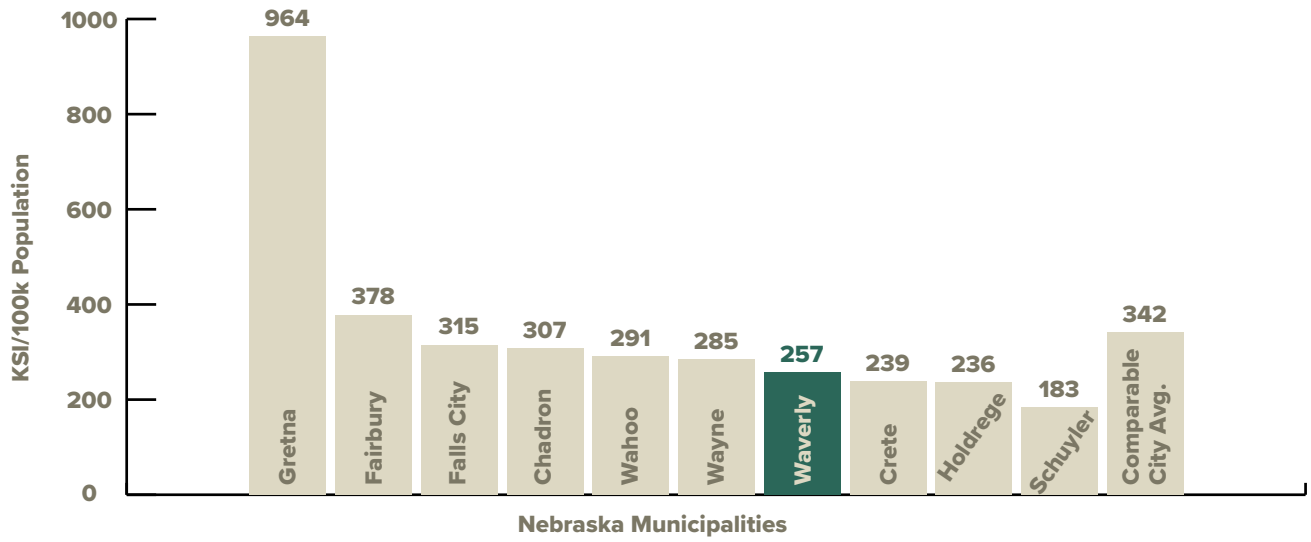


Figure 5: KSI Crashes / 100k Population (2011-2020)

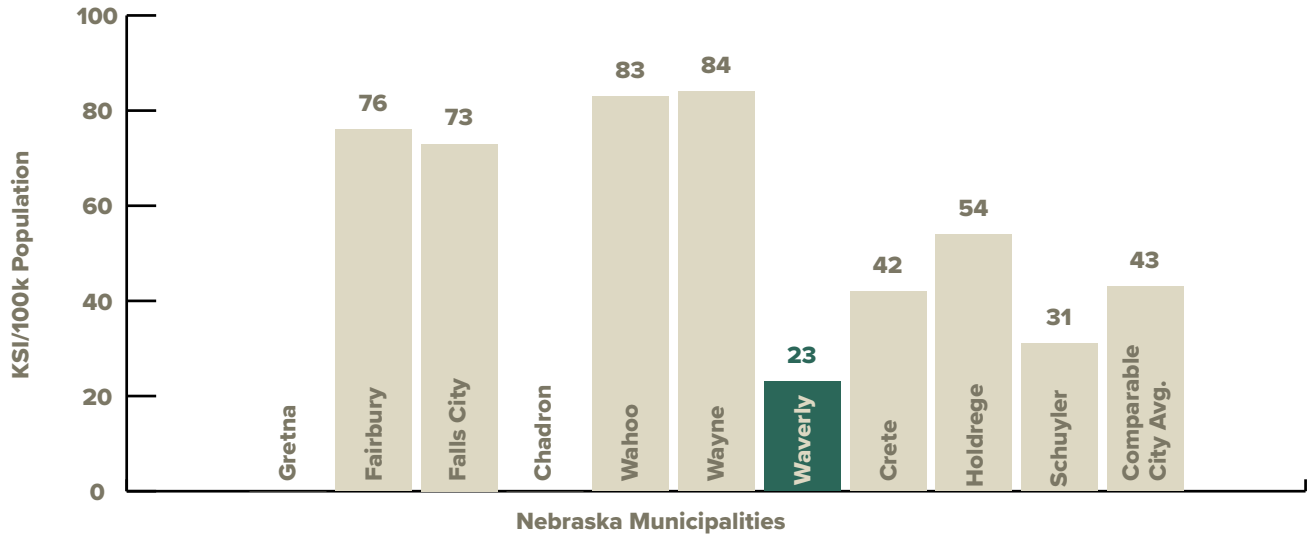


Figure 6: KSI Crashes / 100k Population Involving Alcohol (2011-2020)

As shown in *Figure 7*, the crash rate for crashes involving VRUs in Waverly is relatively high compared to similar-sized Nebraska cities.

Figure 8 shows the crash rate per 100k population for Statewide and Comparable Cities has been generally steady, with an initial large drop but recently having a slight reduction trend. Due to Waverly's relatively limited KSI sample size, drawing trends from the data is difficult. The city had a relatively low number of KSI crashes in 2013, 2017, 2019 and 2020, while relatively higher crash rates occurred in 2012 and from 2014-2016.

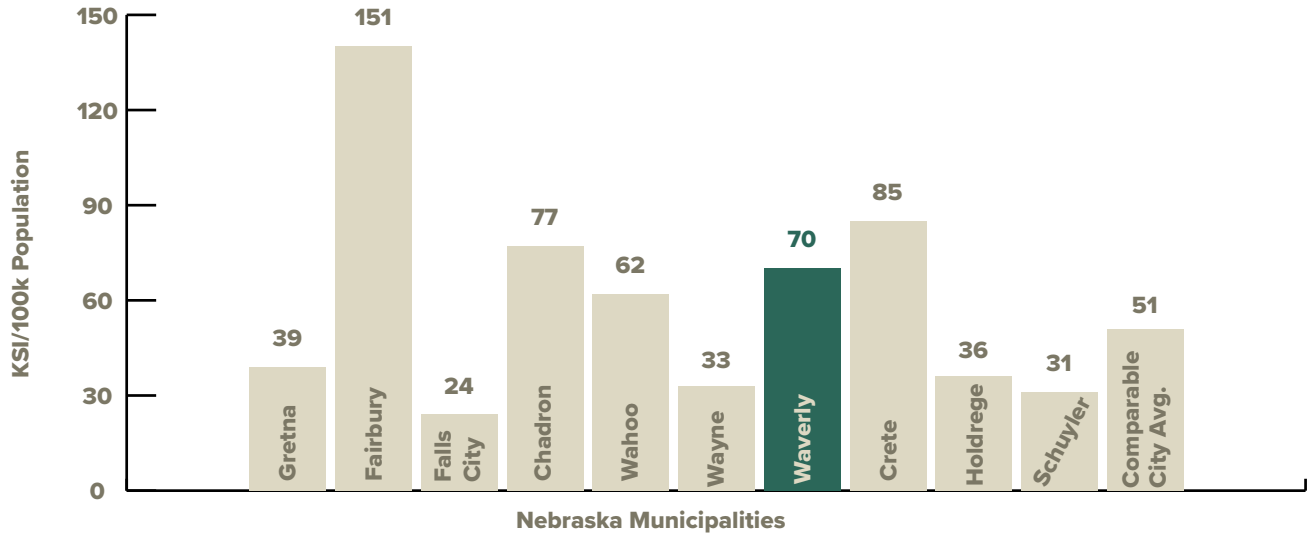


Figure 7: KSI Crashes Involving VRUs / 100k Population (2011-2020)

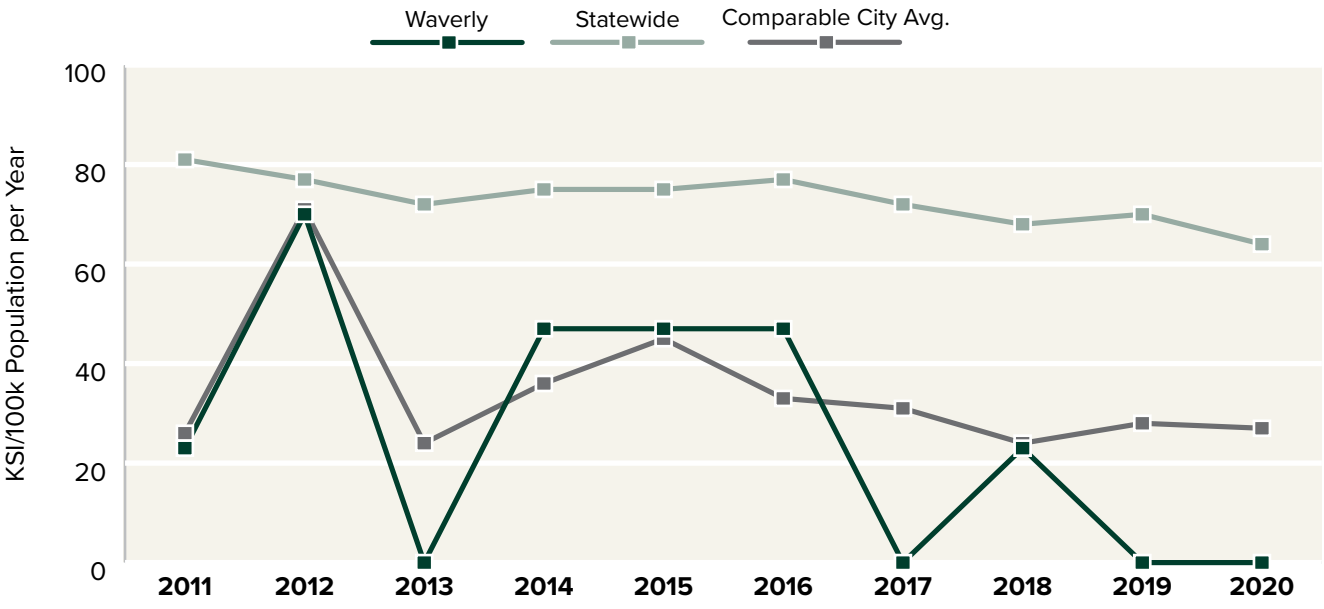


Figure 8: KSI Crashes / 100k Population per year (2011-2020)

Crash Data Characteristics

As shown in *Table 1*, the FI crash frequency by time of day generally increases during peak traffic demands, including morning and evening commuter peaks and school release times. The peak crash times are mostly in the morning (7:00 AM to 9:00 AM) and late day/evening time frames (3:00-8:00 PM). The most frequent crash time for all days of the week is 4:00 PM to 5:00 PM. Monday through Wednesday had the highest frequency of crashes.

Table 1: FI Crashes by Time and Day

Time	SUN	MON	TUE	WED	THU	FRI	SAT	Total
12:00 AM	1	0	0	1	0	0	0	2
1:00 AM	0	0	0	0	0	0	1	1
2:00 AM	0	0	0	0	0	2	0	2
3:00 AM	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0
5:00 AM	1	0	0	1	0	0	0	2
6:00 AM	0	1	0	2	1	1	0	5
7:00 AM	0	2	1	3	1	1	0	8
8:00 AM	0	3	3	1	0	2	1	10
9:00 AM	0	0	1	0	0	0	0	1
10:00 AM	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0
12:00 PM	0	1	0	0	0	0	1	2
1:00 PM	1	0	1	1	0	1	0	4
2:00 PM	0	0	0	0	1	0	0	1
3:00 PM	1	2	4	1	0	2	0	10
4:00 PM	2	4	2	1	1	2	1	14
5:00 PM	0	1	1	2	2	1	0	7
6:00 PM	1	2	2	2	0	1	0	8
7:00 PM	0	0	1	0	1	1	1	4
8:00 PM	1	1	0	3	0	0	2	7
9:00 PM	0	0	0	0	0	0	0	0
10:00 PM	0	0	1	0	0	1	0	2
11:00 PM	0	1	0	0	0	2	0	3
Total	**8**	**18**	**18**	**18**	**7**	**17**	**7**	**93**

A breakdown of the 93 FI crashes by crash type is shown in *Figure 9*. It indicates that angle crashes were the most frequent, accounting for 45% of all FI crashes. Right angle crashes typically occur at intersections and can be the most severe types of crashes in a community. Single-vehicle crashes were the next highest frequency FI at 34%. Rear-end FI crashes made up 14%, while there were 3 FI crashes for left turn (LT) leaving. Sideswipe in opposite direction (SS) crashes accounted for 2% of FI crashes.

The safe system approach is a critical component of every SS4A project. In Waverly's crash data analysis, factors influencing crashes were categorized based on the first two objectives of the safe system approach: street and street users.

The factors related to the street include:

- Lighting Condition
- Pavement Condition
- Functional Classification
- Traffic Control
- Posted Speed

The factors related to street users include:

- Seatbelt Use
- Driver Contributing Circumstances
- Alcohol Involvement
- Driver Age Group

The following sections examine each of these factors.

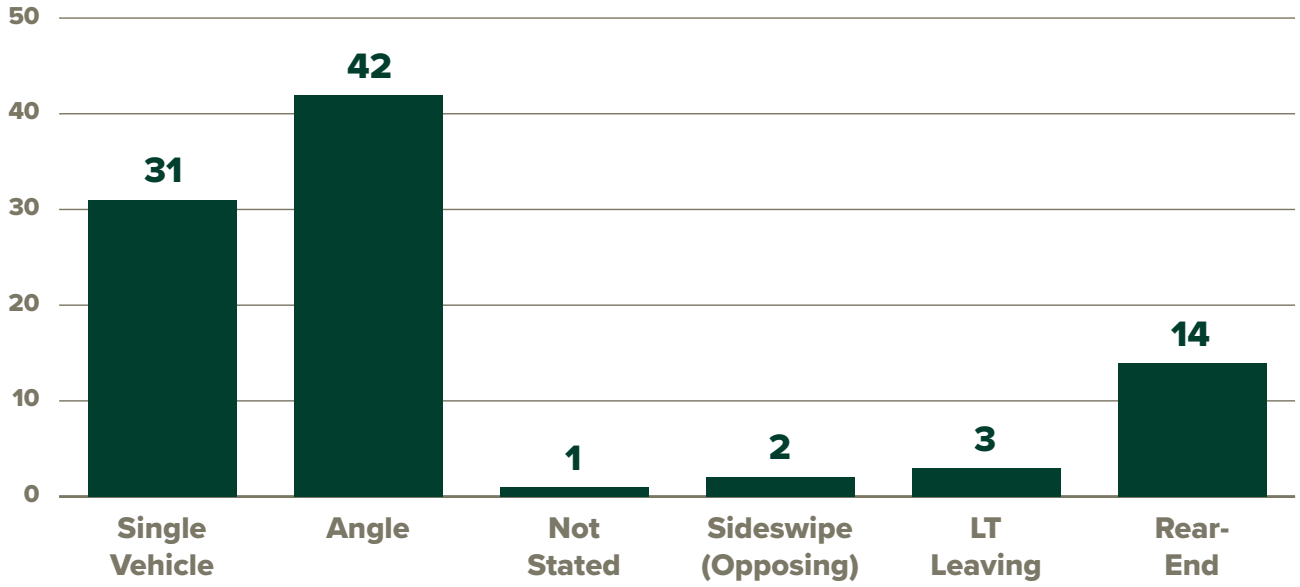


Figure 9: FI Crashes by Type

Street Condition Factors

Lighting Condition

Based on *Table 2*, ***63% of FI crashes occurred in lighted conditions.*** Among the 6 VRU crashes, ***two-thirds of them occurred in reduced light conditions***. This demonstrates that VRUs are at a disproportionately higher risk of being involved in a crash in reduced light conditions than other street users considering that most VRU activity occurs during lighted conditions.

Table 2: Crashes by Lighting Condition

Lighting Condition	All Crashes	VRU	FI Crashes Involving VRU	FI Crashes
Light	174	6	2	59
Dark	51	4	3	18
Dawn	26	0	1	10
Other	12	0	0	6
Total	**281**	**10**	**6**	**93**

Pavement Condition

Table 3 demonstrates that approximately ***82% of FI crashes occurred during dry pavement conditions*** and the remainder occurred during adverse pavement conditions. All of the VRU related crashes happened during normal pavement conditions.

Table 3: Crashes by Pavement Condition

Pavement Condition	All Crashes	VRU	FI Crashes Involving VRU	FI Crashes
Dry	227	10	6	76
Ice	8	0	0	1
Wet	18	0	0	8
Snow	14	0	0	7
Slush	2	0	0	0
Other	12	0	0	1
Total	**281**	**10**	**6**	**93**

Representation Ratios

As a way to further analyze crash data and define more meaningful trends and outliers, representation ratios were evaluated. A representation ratio is a comparative measure utilized in safety analysis to determine whether a particular field condition is overrepresented or underrepresented in crash data relative to its share of the overall network or traffic volume.

The representation ratio is used to quantify the proportion of crashes to a given attribute (e.g., intersection type, street type, speed, etc.). For example, a representation ratio of 1.0 means that crashes are equally represented to the attribute; 3.0 would mean crashes are three-times over-represented; and 0.5 means crashes are only half of what would be expected.

Functional Classification

Representation ratios among different roadway functional classifications are shown in *Figure 10.* The representation ratio for FI crashes on local streets is relatively low (0.37). Despite containing over 82% of the street network by mileage, approximately 30% of the total FI crashes occur on local streets. The Other Arterial classification was shown to be 1.78 for FI crashes. Major Arterials have an FI representation ratio value of 5.6.

Traffic Control

The representation ratio of FI crashes by traffic control type indicates that signalized intersections exhibit a representation ratio of 65.6, which indicates that signal-control intersections are overwhelmingly overrepresented. In addition, over 50% of all KSI crashes occurring at intersections occur at two signalized intersections. Unsignalized crashes representation ratio was 0.205. It should be noted that the signal at U.S. Highway 6 (US-6) and Amberly Road was installed relatively recently in 2019. Therefore, crashes before installment likely skew the overrepresentation at this intersection. A graph was not included for this category due to only 2 traffic control variables - unsignalized and signalized.

Speed

The representation ratio of FI crashes according to the posted speed limit is illustrated in *Figure 11.* Streets with posted speeds of 25 mph experience the smallest representation ratio (0.49). The representation ratio for FI crashes on street segments with speeds 50 or higher is 2.76. However, for posted speed limits of 30 to 45 mph, the representation ratio is even greater at 6.68 for FI crashes.

The difference in FI representation ratio for 30 to 45 mph segments (6.68) and that of 50+ segments (2.76) can be partially accounted for by the difference in access control between high-speed segments and the mid-range 30-45 mph segments. The frequent intersections and driveways result in these 30-45mph segments generally having more complex driving characteristics for motorists. Numerous conflict points exist which create a system that over-exerts the driver's ability to perceive and react accordingly. Conversely, the 50 mph and above segments have stricter access control and fewer conflict points.

For an additional visual representation, *Figure 12* on the following page illustrates all FI crashes related to both traffic control and speed limits on the existing transportation network.

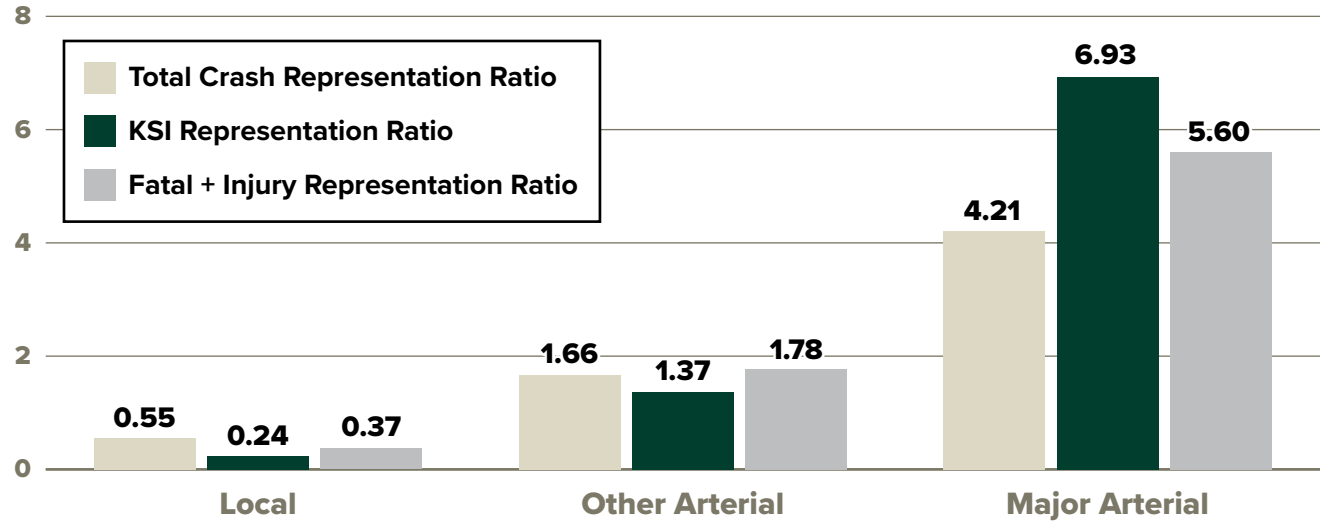


Figure 10: Representation Ratio by Functional Classification

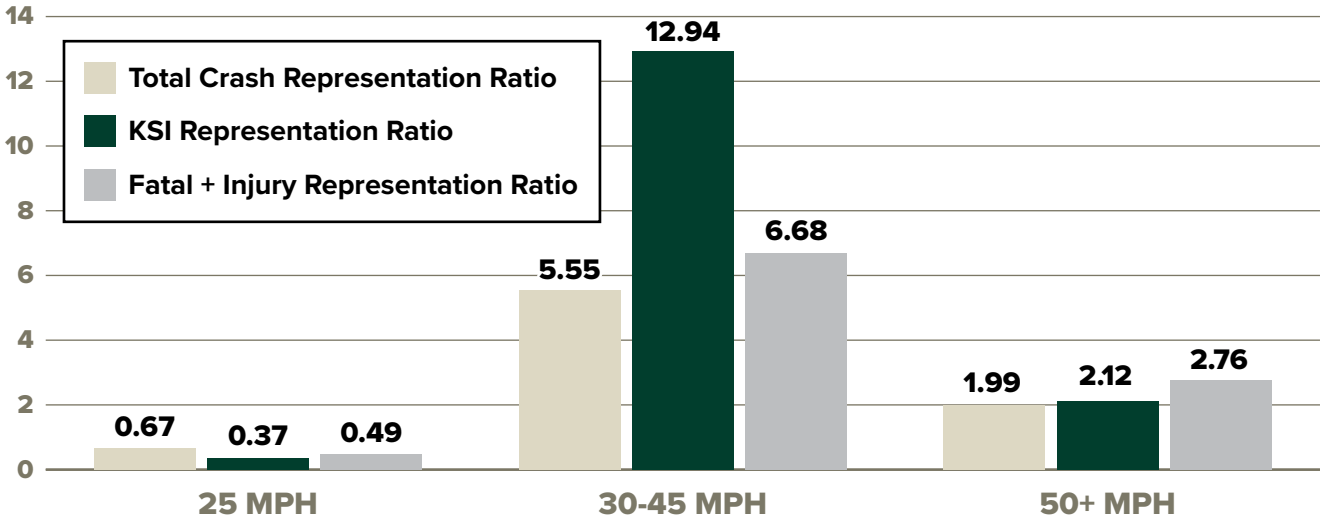


Figure 11: Representation Ratio of FI Crashes by Posted Speed

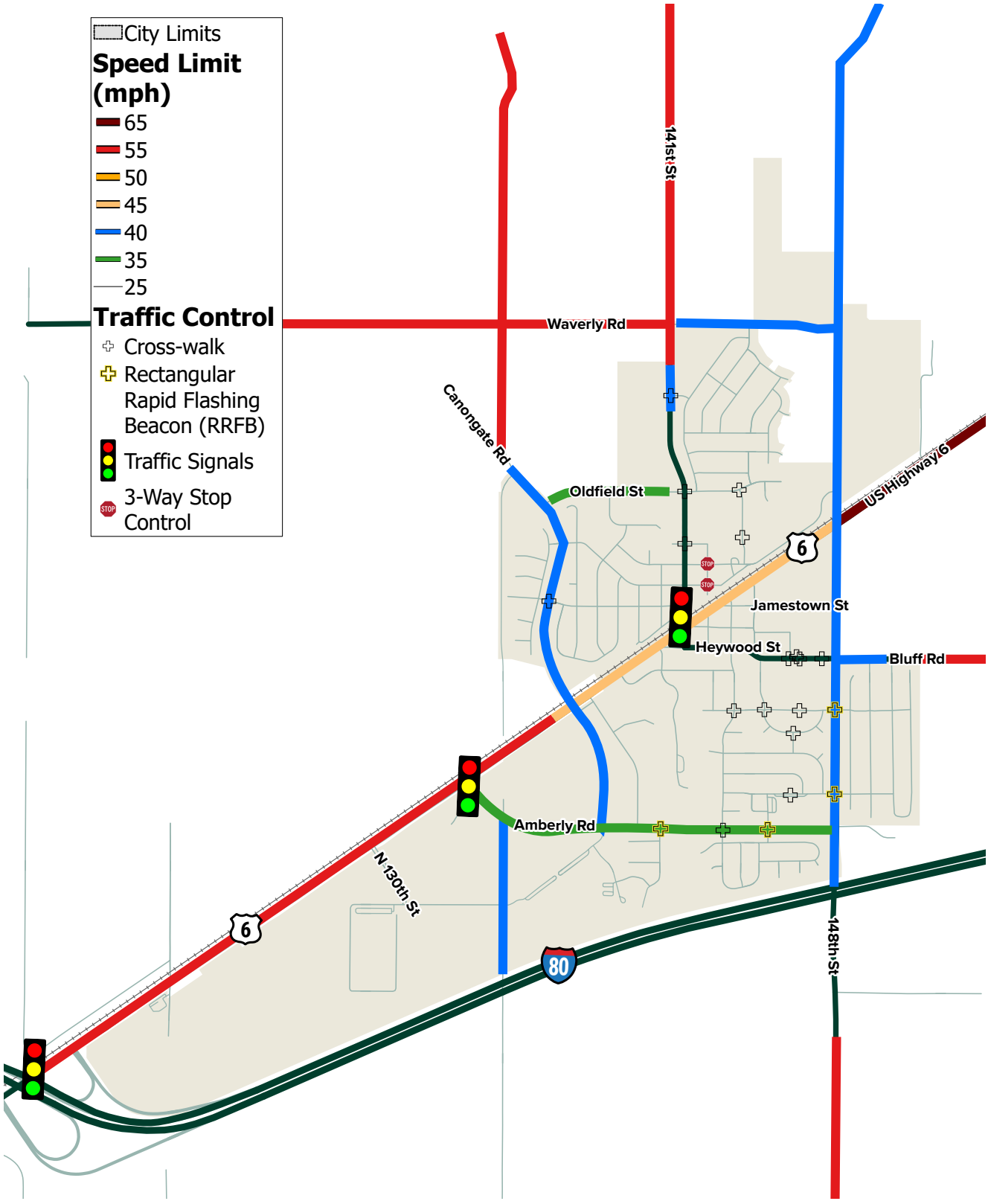


Figure 12: FI Crashes Related to Traffic Control and Speed Limit

Street User Factors

Seatbelt Usage

As shown in *Figure 13*, among FI crashes where the restraint use was known, 9 out of 139 crashes (6%) involved an unbelted user. Among all crashes where the restraint use was known, 14 out of 350 (4%) involved an unbelted user. Of note, the 2022 Nebraska statewide seatbelt survey indicated that approximately 24% of users statewide do not use seatbelts.

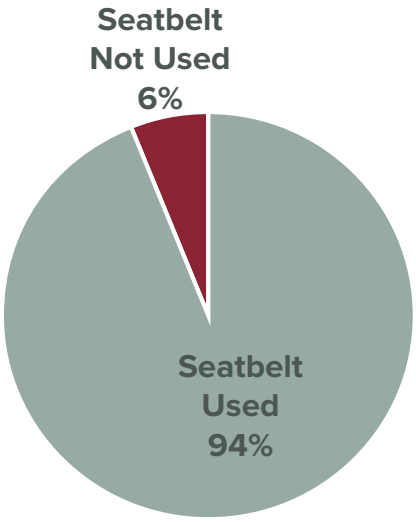


Figure 13: FI Crashes by Seatbelt Usage

Driver Contributing Circumstances

Table 4 details the percentage of FI crashes caused by various driver contributing circumstances. In 44% of all FI crashes, the driver was not cited for any improper driving. Among the remaining crashes, driver error was determined to be the primary contributing factor cited.

Table 4: Fatalities and Injuries by Driver Contributing Circumstances

Driver Contributing Circumstances	% of FI
No improper driving	44%
Failure to Yield	15%
Reckless driving	8%
Other	34%

Impaired Driving

Table 5 details the percentage of FI crashes involving impaired driving (typically alcohol related). This table indicates that FI crashes are more likely to involve impaired driving than a typical crash. Furthermore, VRU crashes are more than twice as likely to involve alcohol.

Table 5: Crashes Involving Alcohol

Alcohol Involved	Total	FI	VRU
Yes	21	12	1
No	260	81	5
% Alcohol Involved	7.5%	12.9%	16.7%

Age

Figure 14 details the frequency of KSI crashes in relation to driver age. FI crashes within the driving age range of 24 and younger are the most frequent among all age groups. The 35 to 44 age group possesses the second-highest frequency of FI crashes. A decline in FI crashes occurs for the 45 to 54 age group, then a rise occurs among drivers aged 55 to 64 who may begin to experience declining reaction time and vision. At age 65 and older, drivers tend to drive less and are thus involved in fewer crashes than other age groups.

Vulnerable Road User Condition

There was a total of 6 crashes involving a VRU. These crashes are summarized in *Table 6.*

Ped Bike	Total
FI	6
KSI	2

Table 6: VRU Crashes

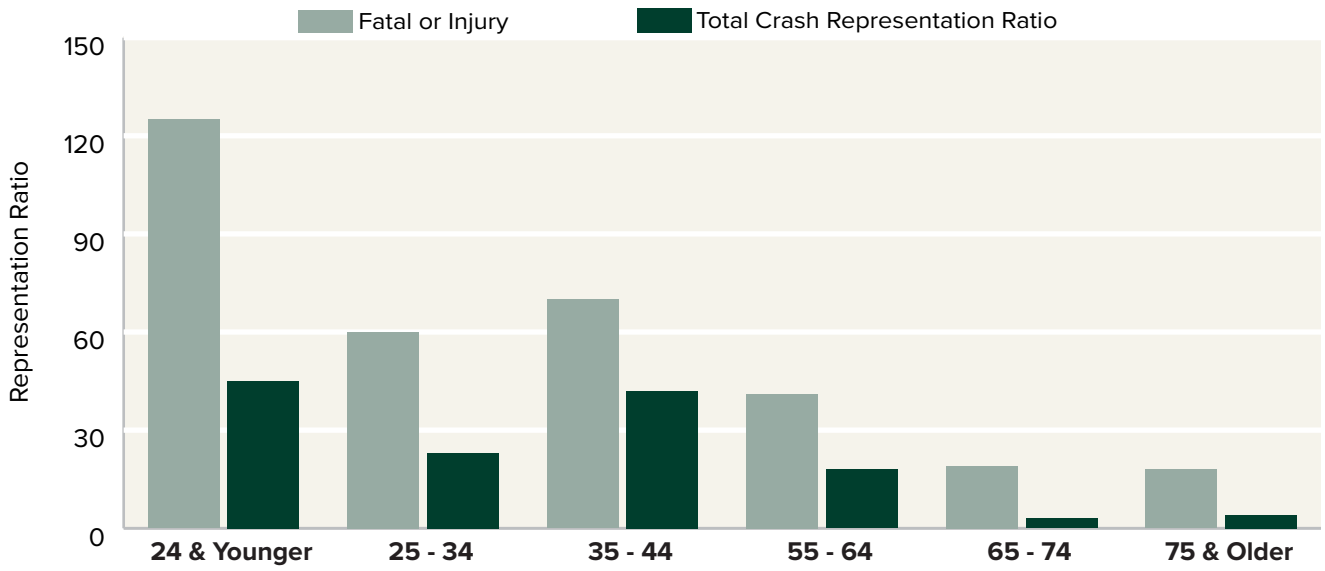


Figure 14: Crashes by Driver Age Group

High Injury Network

A key component of the Waverly Comprehensive Safety Action Plan is identifying its High Injury Network (HIN). The HIN section identifies and analyzes the specific street segments and intersections within Waverly that have a disproportionately high incidence of severe and fatal crashes. By pinpointing these critical areas, the focus is directed towards the most dangerous locations in the city's transportation network. This section will detail the methodology used to identify the HIN, highlight the most problematic areas, and propose targeted interventions to enhance safety and reduce the occurrence of severe crashes in these high-risk locations.

Segment High Injury Network

Two tiers of the segment HIN were developed along 8 corridors, representing the highest 10 percent of segments by crash density, as shown in *Table 7.* Tier 1 contains corridors with fatal plus injury representation ratios (FIRR) above 5 and 13.3. The Tier 2 HIN contains corridors with FIRR between 2 and 5. While comprising only 14% of network length, these two tiers include 80% and 74% of the KSI and FI crashes, respectively.

The HIN was created using the FIRR instead of the KSI representation ratio. This choice was made because using the KSI ratio would have distorted the HIN due to the small number of KSI crashes. Using the FIRR, the data is more reliable and less likely to be skewed by just one or two crashes at a specific location. This method provides a more accurate picture of where severe crashes are most likely.

Table 7: Segment High Injury Network Summary

Tier	#	Miles	KSI	Total FI	% of Network	KSI/ Mile	FI/ Mile	% KSI	% FI	FIRR
1	4	1.7	7	47	5%	4.0	27.1	70%	51%	5 to 13.3
2	4	2.9	1	21	9%	0.3	7.2	10%	23%	2 to 5
Total HIN		**4.6**	**8**	**68**	**14%**	**1.7**	**14.7**	**80%**	**74%**	**2 and above**
Total Network		**33.4**	**10**	**93**	**100.0%**	**0.3**	**2.8**	**100%**	**100%**	**-**

Figure 15: Segment High Injury Network Map

Table 8: Segment High Injury Network Corridors

Rank	HIN Corridor	HIN Tier	Segment Length (mi)	KSI	FI	FI / Mile	FIRR
1	US-6 - Canongate Rd to N 141st St	1	0.41	3	15	36.9	13.3
2	US-6 - N 130th St to Canongate Rd	1	0.74	2	22	29.8	10.7
3	N 141st St - US-6 to Mansfield St	1	0.25	1	5	20.1	7.2
4	Canongate Rd - US-6 to Jamestown St	1	0.34	1	5	14.7	5.3
5	US-6 - I-80 Ramp to N 130th St	2	1.08	1	9	8.4	3.0
6	Amberly St - US-6 to N 140th St	2	0.64	0	5	7.9	2.8
7	N 148th St - I-80 to Heywood St	2	0.66	0	4	6.1	2.2
8	Amberly Rd - N 140th St to N 148th St	2	0.53	0	3	5.7	2.0

Intersection High Injury Network

The intersection HIN was developed from the intersections experiencing the highest crash frequency, summarized in *Table 9.* Further analysis of HIN data was completed to look at representation ratios and divide the intersection into tiers. Based on the number and distribution of crashes, the intersection FIRR was selected as 8 and above for Tier 1 intersections, and between 5 and 8 for Tier 2 intersections. The Tier 1 and Tier 2 Intersection HIN ranges were chosen as they formed a distinct cluster of intersections with higher severity representing less than 8% of all intersections and could encompass the majority of FI crashes. Both signalized intersections are in the HIN.

As shown in *Table 10* and *Figure 16*, the highest FI frequency intersection was US-6 and Amberly Road, which has a FIRR of 46.2. All Tier 1 intersections were located on US-6 or Amberly Road. There are 5 intersections on the Tier 1 HIN and 9 intersections on the Tier 2 HIN. It should be noted that the intersection at US-6 and Amberly Road had a signal added in 2019 and has seen a decrease in serious crashes since then.

Table 9: Intersection High Injury Network Summary

Tier	Count	Signals	Two-way Stop Control	Three-way Stop Control	KSI	FI
1	5	2	3	0	4	36
2	9	0	9	0	4	19
Total HIN	14	2	12	0	4	55
All Intersections	176	2	172	2	4	61
% HIN of Total	**8%**	**100%**	**7%**	**0%**	**100%**	**90%**

Table 10: Intersection High Injury Network Corridors

Rank	Street 1	Street 2	HIN Tier	Traffic Control[1]	All Crashes	KSI Crashes	FI Crashes	Ped Bike Crashes	FIRR
1	US-6	Amberly Rd	1	SG	27	1	16	0	46.2
2	US-6	N 141st St	1	SG	20	3	8	1	23.1
3	US-6	N 130th St	1	ST	11	0	6	0	17.3
4	US-6	Guildford St	1	ST	6	0	3	0	8.7
5	Amberly Rd	Canongate Rd	1	ST	10	0	3	0	8.7
6	US-6	N 148th St	2	ST	7	0	2	0	5.8
7	Amberly Rd	N 140th St	2	ST	3	0	2	0	5.8
8	Amberly Rd	N 148th St	2	ST	6	0	2	0	5.8
9	N 141st St	Kenilworth St	2	ST	2	0	2	1	5.8
10	Amberly Rd	N 143rd St	2	ST	2	0	2	1	5.8
11	Folkestone St	151st St	2	ST	2	0	2	0	5.8
12	N 148th St	Castlewood St	2	ST	2	0	2	0	5.8
13	Heywood St	N 148th St	2	ST	2	0	2	0	5.8
14	Canongate Rd	Jamestown St	2	ST	2	0	2	1	5.8

[1] *SG = signalized intersection; ST = stop-controlled intersection*

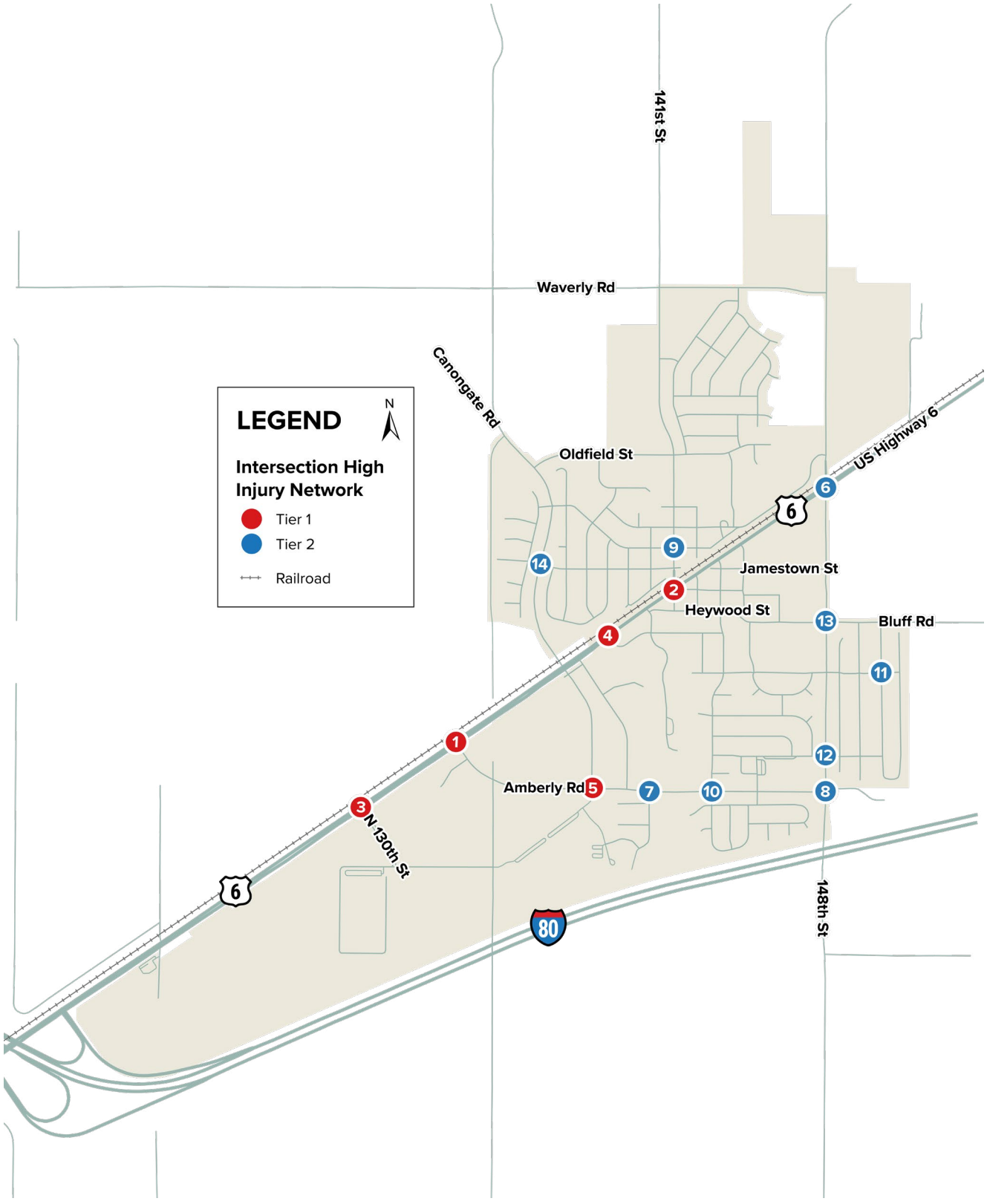


Figure 16: Intersection High Injury Network Map

CRASH DATA ANALYSIS SUMMARY

The Waverly Comprehensive Safety Action Plan emphasizes the need for targeted safety interventions based on a thorough analysis of the crash and street contextual data. The study identifies street safety concerns, with a concentration on fatal and injury crashes. Additionally, the analysis reveals that VRUs, such as pedestrians and cyclists, are disproportionately affected. With US-6 and a railroad facility bisecting the city, traveling is even more of a challenge to citizens who might choose to use active mobility options if they could cross these facilities more safely.

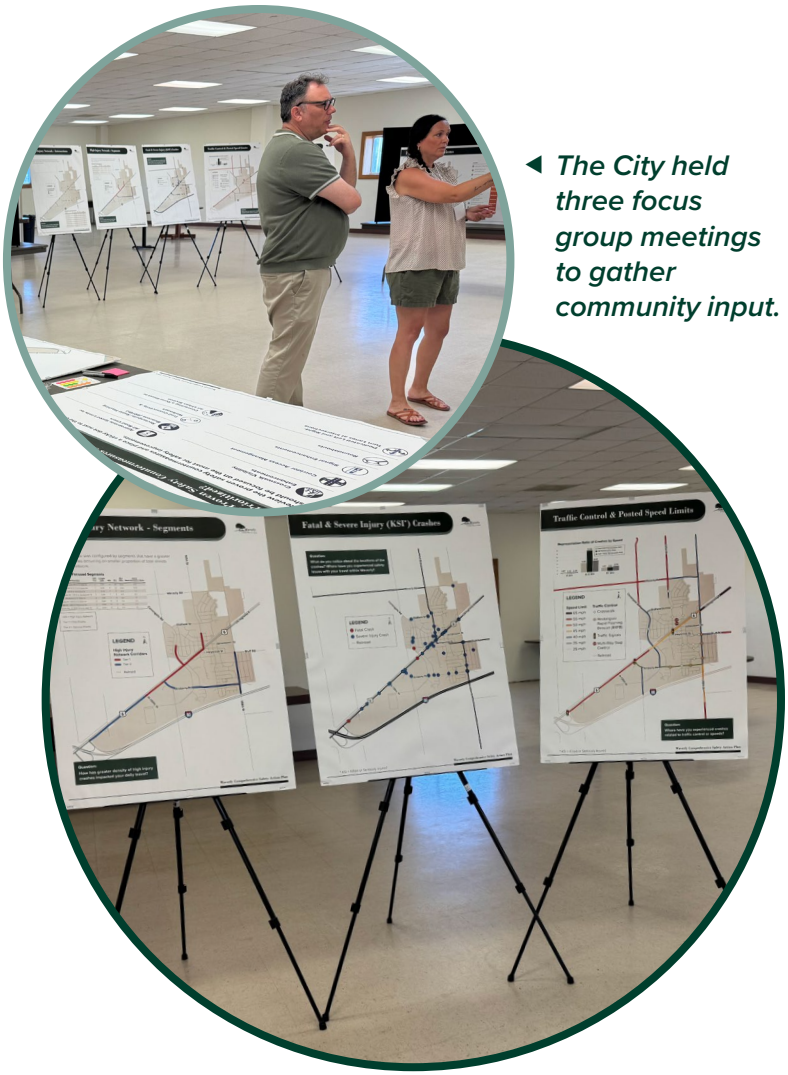
The identification of high-risk segments and intersections through the HIN facilitates the prioritization of critical safety improvements. With the support of measurable crash metrics, safety countermeasures, and policy, recommendations were created to provide a safer transportation environment regardless of what type of transportation one uses.

CHAPTER 3

COMMUNITY ENGAGEMENT

COMMUNITY ENGAGEMENT

Community engagement supported the analysis of street safety conditions through a robust public involvement plan. This plan outlined all engagement strategies that were to be deployed throughout the planning process as well as what type of feedback the City was looking for from the public and identified project stakeholders. Several engagement channels were used to reach community members, including both online and in-person engagement.



The City held three focus group meetings to gather community input.

ENGAGEMENT OPPORTUNITIES

The City offered several engagement opportunities to involve the community in shaping transportation and street safety improvements through this project. Each of the outlined engagement opportunities below provided their own unique experience for participants where they were given one-on-one time with City officials to speak about their safety concerns and values as a resident and user of Waverly's street network system.

Open Houses

Two open house meetings were held to facilitate in-person engagement with the community – one in November 2024 and the final in May 2025. Both of these events provided an opportunity for residents to learn about the project, ask questions, and share their feedback on street and transportation safety issues in Waverly. These meetings resulted in over 200 collective responses through the in-person and online comment form surveys provided during the first and second halves of the project.

Focus Group Meetings

Beyond engagement with community members, the city also held two focus group meetings to gather more in-depth input from specific community members and leaders. The first focus group was conducted with the goal of gaining a deeper understanding of the challenges surrounding traffic safety for employees from the major employers within town. The second focus group was conducted with the goal of gaining valuable perspectives from stakeholders who had participated in the online survey and

indicated that they have children enrolled in Waverly Public Schools. This focus group focused on the traffic safety challenges that students who travel to school may encounter.

Project Website

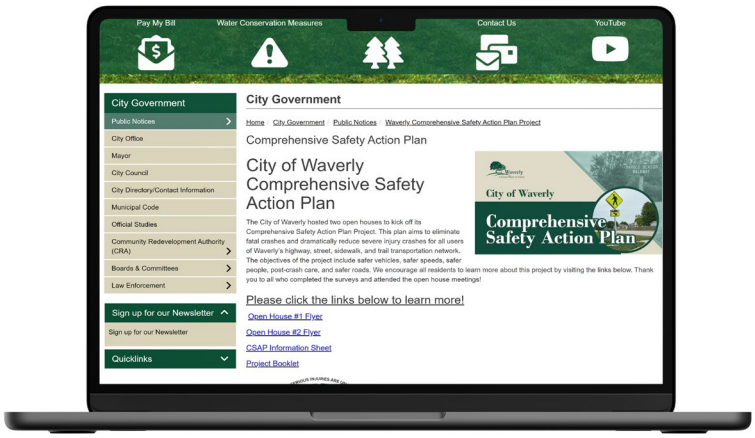
A dedicated website was created to serve as a central hub for the Waverly Comprehensive Safety Action Plan project. The site featured up-to-date project information, news, and resources, allowing residents to stay informed and engage with the planning process online.

Online Surveys

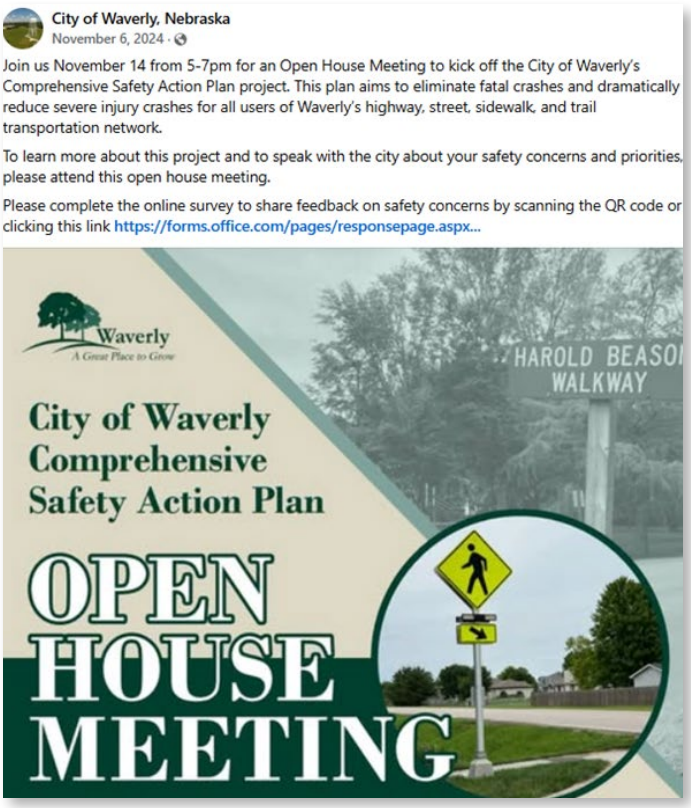
To reach a wider audience, two different online surveys were distributed during the planning process, giving the public numerous chances to share their experiences, concerns, and priorities regarding street and transportation safety. Both surveys were posted online following each open house meeting and included similar information and questions presented to open-house attendees. This ensured that this project's engagement efforts remained evergreen and allowed residents who were unable to attend meetings meaningful opportunities to still participate.

Digital Outreach

A series of informational graphics were also shared through the City's social media channels to help educate followers on the plan and its progress.



▲ *The project website is available in both English and Spanish.*



▲ *The City's social media channels were used to share plan information and progress.*

TAKEAWAYS

This section summarizes public feedback gathered through the engagement strategies outlined previously. This input reflects some of the community thoughts and priorities regarding transportation safety and infrastructure improvements, highlighting key areas such as pedestrian and bicycle safety, traffic management, public education, and the need for better transportation planning and enforcement of traffic laws. The following themes summarize the most frequently mentioned issues and proposed solutions by participants.

Pedestrian and Bicycle Safety

Improving pedestrian safety was a top priority for participants, with stakeholders showing support for enhanced sidewalks, crosswalks, flashing beacons, and pedestrian yield signs. During the first public project survey, 161 out of 209 respondents indicated that they would walk and bike more if safer pedestrian facilities were present. A widely mentioned priority safety improvement is improvements to traffic safety for students going to and from school. Other specific concerns were about crossing Highway 6, especially at busy intersections, as well as crossing Amberly Road.

Suggested improvements include better bike lanes, pedestrian walkways, bike safety education (e.g., helmet use), additional signage near school zones, and improved infrastructure for bikes and pedestrians, including flashing beacons and pedestrian bridges.

Traffic Management and Speed Control

Another topic highlighted was regarding heavy truck speeds along corridors. In addition, traffic operations including difficulty making left turns at key intersections like US-6 and 148th Street were brought up by participants. The feedback collected mentioned the need for the addition of traffic signal control or roundabouts at key intersections like Canongate and Amberly Road to control congestion. Some recommendations mentioned include better street lighting, crosswalk visibility, and general traffic calming methods.

Infrastructure and Transportation Planning

For infrastructure and transportation planning, along with long-term growth considerations, participants mentioned the idea of bypass routes for trucks to reduce traffic in residential areas, the expansion of the sidewalk and trail system to keep pedestrians safe along heavily traveled/desired routes, the integration of new safety measures into the city development plans, and the addition of more cross-town school bus routes to reduce pedestrian traffic near the highways on school days.

Education and Community Awareness

A prominent focus of the respondents was on increasing community education on transportation safety, including driver and pedestrian safety, distracted driving, and speeding tendencies. Solutions provided by participants included incorporating driver and street safety education into an incentive program. The need for education efforts to reach the whole community, including parents, students, and businesses was emphasized.

Some examples of focus areas for information campaigns include improving the understanding and enforcement of rules like jaywalking laws, risks of distracted driving, and how peer pressure and community norms influence safer driving behaviors.

Traffic and Driver Behavior Enforcement

A desire for stronger enforcement of traffic laws, such as tickets for jaywalking, speeding, and distracted driving was discussed by participants and stakeholders during the engagement portions of this project. Specific suggestions included improving signage visibility, specifically near school zones. There was also a push among some participants to strengthen and enforce rules and regulations regarding golf cart usage around the city.

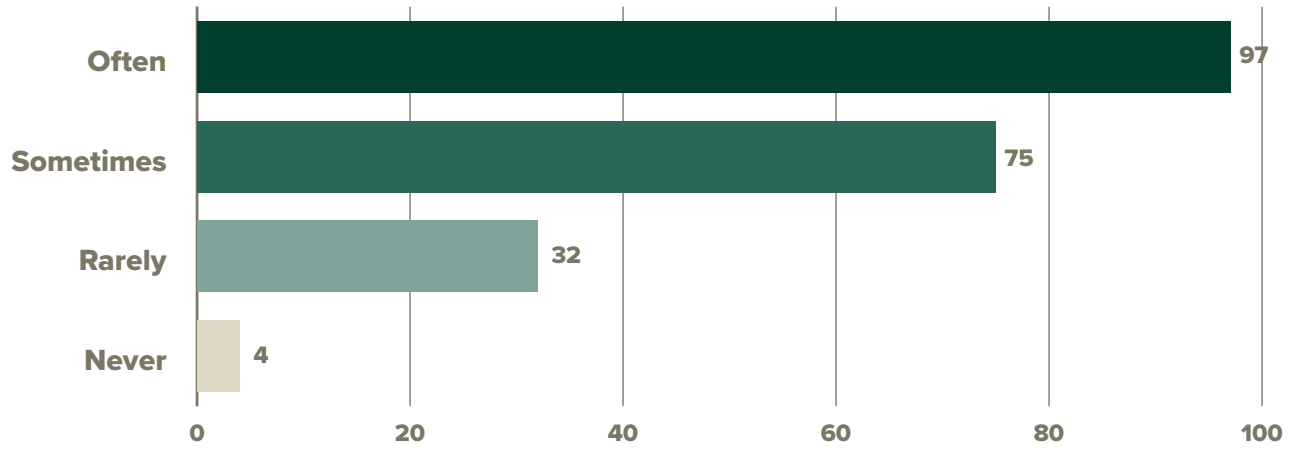
Community engagement strategies were planned based on the goals of the Public Involvement Plan for this project.

Those goals were:

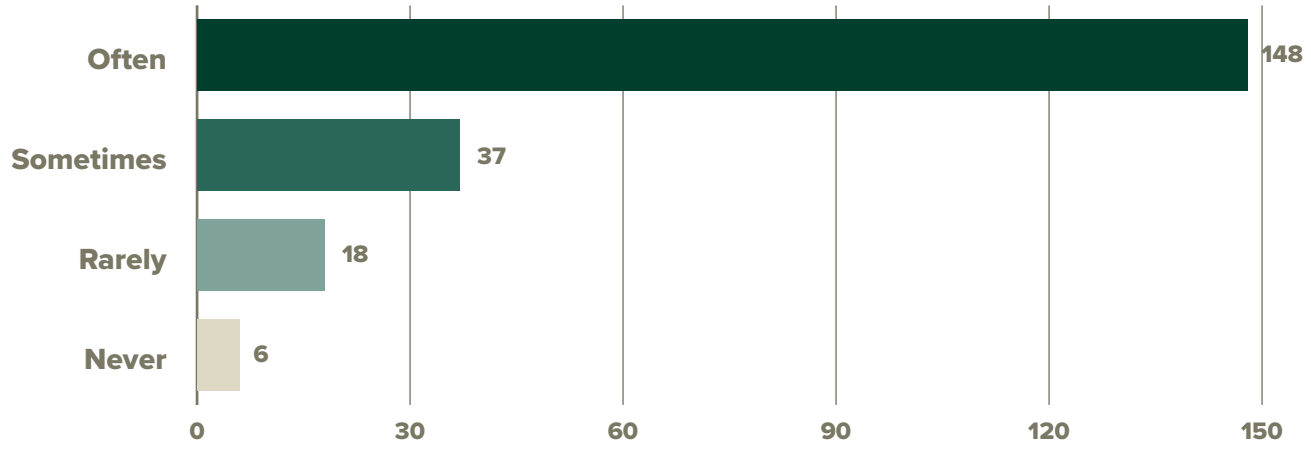
1. Identify the values of the people providing input and report back how we responded to the values.
2. Maintain project teams' situational awareness of input received.
3. Foster community support for the plan effort and forthcoming projects.

A sampling of survey questions and their corresponding results by public respondents is included on the following page.

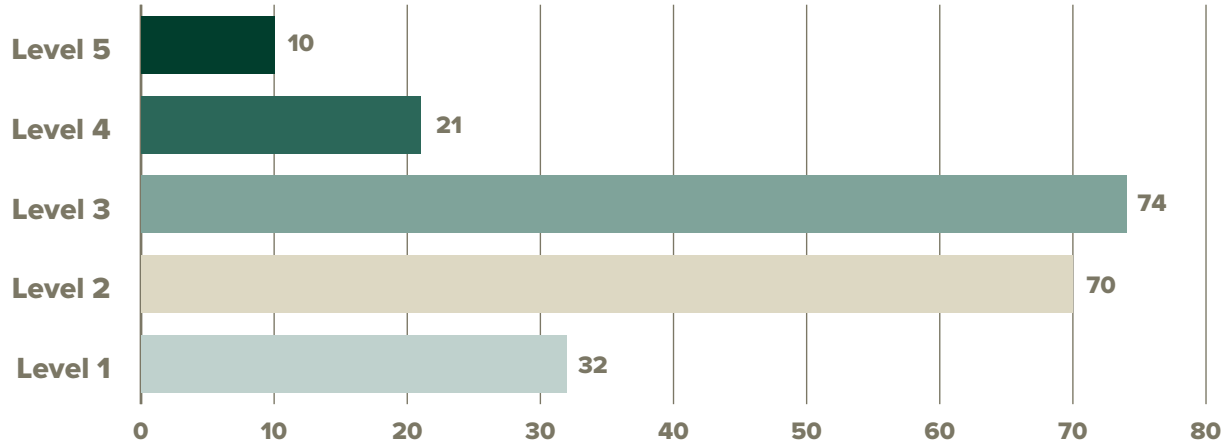
1. How often do you walk or bike around Waverly?



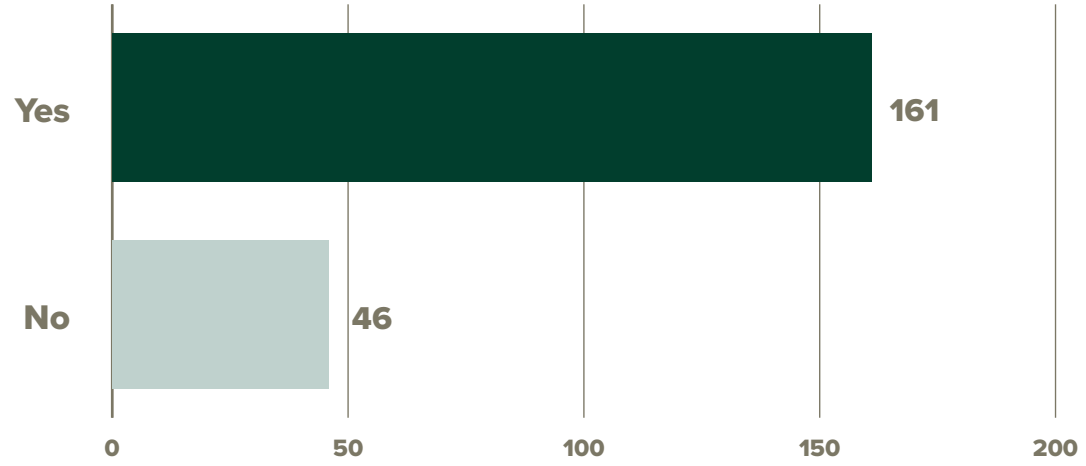
2. How often do you cross U.S. Highway 6 (US-6), whether it's walking, biking, or in a vehicle?



3. How safe do you feel crossing US-6? Level 1 being not safe at all & 5 being extremely safe.



4. Would safer pedestrian facilities encourage you to walk or bike more and across US-6 in Waverly, NE?



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CHAPTER 4:

NEEDS ASSESSMENT

NEEDS ASSESSMENT

A critical part of developing the Comprehensive Safety Action Plan is the prioritization of safety issues across the community, such that solutions can be developed for those locations. This prioritization process provides a clear understanding for what projects are most essential to improving overall safety conditions in the community.

LOCATION/ISSUE SCORING

Based on the list of all network safety locations, starting on page 44, and issues identified through analysis and working with the Waverly CSAP Advisory Committee and City staff, scoring criteria were developed to weigh these areas against one another based on multiple safety impact variables. The locations were also broken into two groups based on if they involved an entire street segment or if they were localized to a specific intersection.

To determine a segment or intersection's safety needs score, the following criteria were established to assist in the prioritization process. The maximum score a location could receive was 100 points. Each variable that is to be considered in the project's score has a rating. Total pedestrian/bicyclist crashes and all fatal/injury crashes were rated from 0 to 5, 5 being the highest concern or need for safety improvements at this location. Public Input was rated from 0 to 2 based on public survey and focus group feedback, with 2 being corridors/intersections of top safety concern. Multimodal was rated from 0 to 3, 3 being the areas most likely to have vulnerable road users. An approach to weight these criteria and utilize a safety index criteria was also developed as highlighted in *Table 11.* These criteria and scoring were developed based on the City's priorities and feedback from the Advisory Committee.

A map showing all of the prioritized HIN intersections and segments is included in *Figure 17.*

Safety Index

Table 11: Safety Criteria Index

Variable	Total Weighting
Total Ped/Bike Crashes	15%
All Fatal/Injury Crashes (HIN)	45%
Public Input	25%
Multimodal	15%
Total	**100%**

Public Input

The Public Input score was based on feedback from the public survey and focus group sessions. Public Input received a score of:

- **2 -** If corridors/intersections were ranked 1 through 3 by respondents as locations of top safety concern
- **1 -** For corridors/intersections ranked 4 through 7 or if they were added to the list by respondents
- **0 -** For those that were ranked in the bottom 3 or not mentioned as a concern

Multimodal

Multimodal received a score of:

- **3 -** For proximity to Downtown/ School/Park type land uses
- **2 -** For proximity to commercial/ Church/Senior & Assisted Living Centers land use
- **1 -** For proximity to neighborhood land use
- **0 -** For segments lacking proximity to walkable land uses such as industrial or agricultural

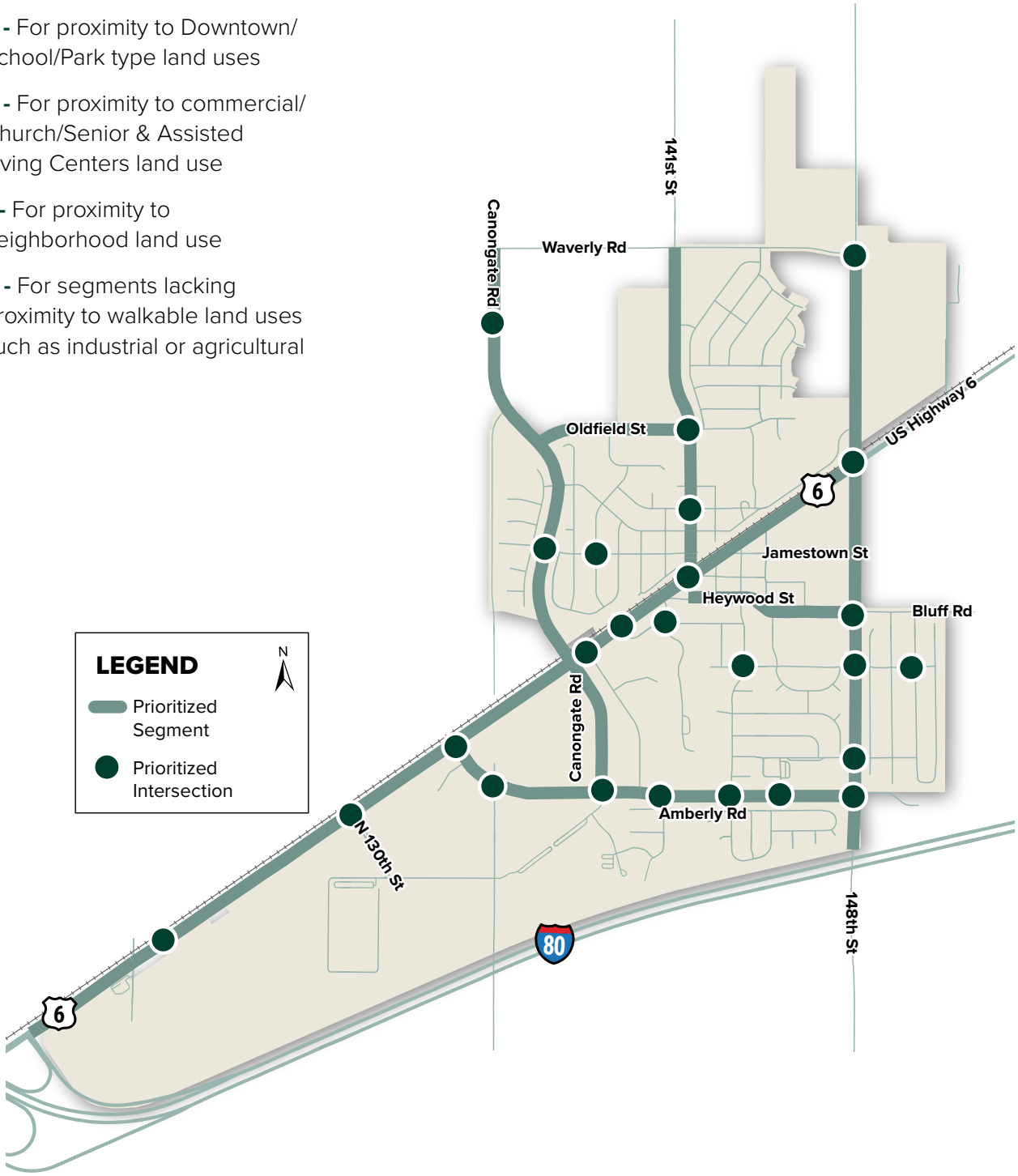

Figure 17: Prioritized HIN Intersections & Segments

LOCATION/ISSUE PRIORITIZATION

Waverly's High Injury Network segments and intersections were each scored and prioritized to identify the locations in Waverly that have the greatest need for safety improvements. Based on those rankings, projects were developed to address those priority segments and intersections. The scoring criteria satisfies key objectives of the SS4A Program by prioritizing locations with the highest number of fatal and serious injury crashes and locations where multimodal transportation, including walking and biking, are more likely to occur.

Table 12: Prioritized Street Segments

Segments

	Location	Overall Priority Scoring
1	US-6; 130th Street to Canongate	High
2	US-6; Canongate Road to N 141st Street	High
3	Canongate Road; US-6 to Jamestown Street	High
4	N 141st Street; US-6 to Mansfield Street	High
5	US-6; N 141st Street to N 148th Street	High
6	Amberly Road; N 140th Street to N 148th Street	Moderate
7	Oldfield Street; Canongate Road to N 141st Street	Moderate
8	US-6; I-80 Ramp to N 130th Street	Moderate
9	Amberly Road; US-6 to N 140th Street	Moderate
10	N 148th Street; I-80 to Heywood Street/Bluff Road	Moderate
11	N 141st Street; Mansfield Street to Waverly Road	Lower
12	Canongate Road; Amberly Road to US-6	Lower
13	Canongate Road; Jamestown Street to N 134th Street	Lower
14	Heywood Street; N 141st Street to N 148th Street	Lower
15	N 148th Street; Heywood Street/Bluff Road to US-6	Lower
16	N 148th Street; US-6 to Waverly Road	Lower
17	N 134th Street; Canongate Road to Waverly Road	Lower

Table 13: Prioritized Intersections

Intersections

	Location	Overall Priority Scoring
1	US-6 and N 141st Street	High
2	Amberly Road and Canongate Road	High
3	US-6 and N 148th Street	High
4	US-6 and Amberly Road	High
5	US-6 and Guildford Street	High
6	N 141st Street and Kenilworth Street	Moderate
7	Amberly Road and N 143rd Street	Moderate
8	Amberly Road and N 140th Street	Moderate
9	Amberly Road and N 148th Street	Moderate
10	Canongate Road and Jamestown Street	Moderate
11	N 148th Street and Castlewood Street	Moderate
12	Heywood Street/Bluff Road and N 148th Street	Moderate
13	US-6 and N 130th Street	Lower
14	Folkstone Street and 151st Street	Lower
15	Amberly Road and N 134th Street	Lower
16	N 142nd Street and Folkstone Street	Lower
17	Amberly Road and N 145th Street	Lower
18	N 148th Street and Waverly Road	Lower
19	N 141st Street and Oldfield Street	Lower
20	N 148th Street and Folkstone Street	Lower
21	N 138th Street and Guildford Street	Lower
22	US-6 and N 120th Street	Lower
23	US-6 and Deep Park Road	Lower
24	Jamestown Street and N 137th Street	Lower

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CHAPTER 5

SAFETY COUNTERMEASURES TOOLBOX

ADDITIONAL SAFETY CONSIDERATIONS

SAFETY COUNTERMEASURES TOOLBOX

The Waverly SS4A Safety Countermeasure Toolbox presents potential countermeasures that support safety on the transportation network as evidenced in numerous other communities who have implemented similar practices and principles. The goal of these countermeasures is to provide solutions to existing safety concerns or issues within the Waverly transportation and street system as well as provide a positive influence on overall safety in the community. In this section, recommended countermeasures are presented based on their relevance and potential for positively impacting Waverly's transportation network. Some examples of safety countermeasures include Crosswalk Visibility Enhancements, Leading Pedestrian Intervals (LPIs), Medians and Pedestrian Refuge, and Rectangular Rapid Flashing Beacons (RRFBs).

The countermeasures presented in this section are recommended by sources including the Federal Highway Association (FHWA), National Highway Traffic Safety Administration (NHTSA), and Nebraska Department of Transportation (NDOT).

FHWA PROVEN SAFETY COUNTERMEASURES

Each of the FHWA's 28 Proven Safety Countermeasures is an effective strategy for reducing fatalities and serious injuries on the transportation network. Implementation of these strategies within any transportation agencies given jurisdiction can help to achieve a safer overall transportation network for all users. The FHWA has catered these strategies to meet the needs of all transportation agencies, including local, state and federal, to better help them address safety focus areas. Each of these focus areas is outlined in this section.

Speed Management

Appropriate Speed Limits for All Road Users

When setting a speed limit, agencies should consider a range of factors such as pedestrian and bicyclist activity, crash history, land use context, intersection spacing, driveway density, roadway geometry, roadside conditions, roadway functional classification, traffic volume, and observed speeds *(Highways.DOT.gov 2024)*.

Speed Safety Cameras (SSCs)

Agencies should conduct a network analysis of speeding-related crashes to identify locations to implement SSCs. The analysis can include scope (e.g., widespread, localized), location types (e.g., urban/suburban/rural, work zones, residential, school zones), roadway types (e.g., expressways, arterials, local streets), times of day, and road users most affected by speed-related crashes (e.g., pedestrians, bicyclists) *(Highways.DOT.gov 2024)*.

Variable Speed Limits (VSLs)

Drivers typically determine their operating speeds under normal weather conditions on a straight street section with good pavement quality and adequate sight distances. If ideal conditions do not exist and the street does not meet the driver's expectations, there is a greater chance that a driver error could result in a crash. Providing variable speeds limits (VSLs) capable of adapting to changing circumstances could reduce crash frequency and severity. VSLs use prevailing information on the roadway, like traffic speed, volumes, weather, and road surface conditions, to determine appropriate speeds and display them to drivers. This strategy improves safety performance and traffic flow by reducing speed variance (i.e., improving speed harmonization). VSLs may also improve driver expectation by providing information in advance of slowdowns and potential lane closures, which could reduce the probability for secondary crashes. VSLs can mitigate adverse weather conditions or to slow faster-moving traffic as it approaches a queue or bottleneck *(Highways.DOT.gov 2024)*.

Pedestrian/Bicyclist

Bicycle Lanes

To make bicycling safer and more comfortable for most types of bicyclists, State and local agencies should consider installing bicycle lanes. Providing bicycle facilities can mitigate or prevent interactions, conflicts, and crashes between bicyclists and motor vehicles, and create a network of safer roadways for bicycling. Bicycle Lanes align with the Safe System Approach principle of recognizing human vulnerability—where separating users in space can enhance safety for all road users *(Highways.DOT.gov 2024)*.

Medians and Pedestrian Refuge Islands in Urban and Suburban Areas

Transportation agencies should consider medians or pedestrian refuge islands in curbed sections of urban and suburban multi-lane roadways, particularly in areas with a significant mix of pedestrian and vehicle traffic, traffic volumes over 9,000 vehicles per day, and travel speeds 35 mph or greater. Medians/refuge islands should be at least 4-ft wide, but preferably 8 ft for pedestrian comfort. Some example locations that may benefit from medians or pedestrian refuge islands include *(Highways.DOT.gov 2024)*.

Road Diets (Roadway Reconfiguration)

A Road Diet, or roadway reconfiguration, can improve safety, calm traffic, provide better mobility and access for all road users, and enhance overall quality of life. A Road Diet typically involves converting an existing four-lane undivided roadway to a three-lane roadway consisting of two through lanes and a center two-way left-turn lane (TWLTL). A Road Diet can be a low-cost safety solution when planned in conjunction with a simple pavement overlay, and the reconfiguration can be accomplished at no additional cost. Typically, a Road Diet is implemented on a roadway with a current and future average daily traffic of 25,000 or less *(Highways.DOT.gov 2024)*.

Crosswalk Visibility Enhancements

Three main crosswalk visibility enhancements help make crosswalks and the pedestrians, bicyclists, wheelchair and other mobility device users, and transit users using them more visible to drivers. These include high-visibility crosswalks, lighting, and signing and pavement markings. These enhancements can also assist users in deciding where to cross. Agencies can implement these features as standalone or combination enhancements to indicate the preferred location for users to cross *(Highways.DOT.gov 2024)*.

Pedestrian Hybrid Beacons

The pedestrian hybrid beacon (PHB) is a traffic control device designed to help pedestrians safely cross higher-speed roadways at midblock crossings and uncontrolled intersections. Nearly 74 percent of pedestrian fatalities occur at non-intersection locations, and vehicle speeds are often a major contributing factor. As a safety strategy to address this pedestrian crash risk, the PHB is an intermediate option between a flashing beacon and a full pedestrian signal because it assigns right of way and provides positive stop control. It also allows motorists to proceed once the pedestrian has cleared their side of the travel lane(s), reducing vehicle delay *(Highways.DOT.gov 2024)*.

Walkways

Well-designed pedestrian walkways, shared use paths, and sidewalks improve the safety and mobility of pedestrians. Pedestrians should have direct and connected network of walking routes to desired destinations without gaps or abrupt changes. In some rural or suburban areas, where these types of walkways are not feasible, street shoulders provide an area for pedestrians to walk next to the roadway, although these are not preferable *(Highways.DOT.gov 2024)*.

Leading Pedestrian Interval

A leading pedestrian interval (LPI) gives pedestrians the opportunity to enter the crosswalk at an intersection 3-7 seconds before vehicles are given a green indication. Pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn right or left (Highways.DOT.gov 2024).

LPIs provide the following benefits:

- Increased visibility of crossing pedestrians.
- Reduced conflicts between pedestrians and vehicles.
- Increased likelihood of motorists yielding to pedestrians.
- Enhanced safety for pedestrians who may be slower to start into the intersection.

Rectangular Rapid Flashing Beacons (RRFB)

The RRFB is applicable to many types of pedestrian crossings but is particularly effective at multi-lane crossings with speed limits less than 40 miles per hour.[2] Research suggests RRFBs can result in motorist yielding rates as high at 98 percent at marked crosswalks, but varies depending on the location, posted speed limit, pedestrian crossing distance, one- versus two-way road, and the number of travel lanes. RRFBs can also accompany school or trail crossing warning signs. RRFBs are placed on both sides of a crosswalk below the pedestrian crossing sign and above the diagonal downward arrow plaque pointing at the crossing. The flashing pattern can be activated with pushbuttons or passive (e.g., video or infrared) pedestrian detection, and should be unlit when not activated *(Highways.DOT.gov 2024)*.

Roadway Departure

Enhanced Delineation for Horizontal Curves

Enhanced delineation at horizontal curves includes a variety of potential strategies that can be implemented in advance of or within curves, in combination, or individually. Enhanced delineation treatments can alert drivers to upcoming curves, the direction and sharpness of the curve, and appropriate operating speed *(Highways.DOT.gov 2024)*.

Roadside Design Improvements at Curves

Horizontal curves account for 27% of all fatal crashes and 80% of all fatal crashes at curves are roadway departure crashes. Roadside design improvements at curves is a strategy encompassing several treatments that target the high-risk roadside environment along the outside of horizontal curves. These treatments can reduce roadway departure fatalities and serious injuries by giving vehicles the opportunity to recover safely and by reducing crash severity. Roadside design improvements can be implemented alone or in combination, and are particularly recommended at horizontal curves—where data indicates a higher risk for roadway departure fatalities and serious injuries *(Highways.DOT.gov 2024)*.

Longitudinal Rumble Strips and Stripes on Two-Lane Roads

Longitudinal rumble strips are milled or raised elements on the pavement intended to alert drivers through vibration and sound that their vehicle has left the travel lane.

Rumble stripes are edge line or center line rumble strips where the pavement marking is placed over the rumble strip.

With roadway departure crashes accounting for more than half of the fatal roadway crashes annually in the United States, rumble strips and stripes are designed to address these crashes by alerting distracted, drowsy, or otherwise inattentive drivers who drift from their lane. They are most effective when deployed systemically *(Highways.DOT.gov 2024)*.

Median Barriers

Median barriers are longitudinal barriers that separate opposing traffic on a divided highway and are designed to redirect vehicles striking either side of the barrier. Median barriers significantly reduce the number of cross-median crashes, which are attributed to the relatively high speeds that are typical on divided highways. American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide (RDG) recommends guidelines for the use of median barriers on high-speed, fully controlled-access roadways for locations where the median is 30 ft in width or less and the average daily traffic (ADT) is greater than 20,000 vehicles per day (VPD) *(Highways.DOT.gov 2024).*

Wider Edge Lines

Roadway departures account for over half of all traffic fatalities in the United States. If drivers cannot clearly identify the edge of the travel lanes and see the road alignment ahead, the risk of roadway departure may be greater. Wider edge lines enhance the visibility of travel lane boundaries compared to traditional edge lines. Edge lines are considered ”wider“ when the marking width is increased from the minimum normal line width of 4 inches to the maximum normal line width of 6 inches *(Highways.DOT.gov 2024).*

Intersections

Backplates with Retroreflective Borders

Backplates added to a traffic signal head improve the visibility of the illuminated face of the signal by introducing a controlled-contrast background. The improved visibility of a signal head with a backplate is made even more conspicuous by framing it with a 1- to 3-inch yellow retroreflective border. Signal heads that have backplates equipped with retroreflective borders are more visible and conspicuous in both daytime and nighttime conditions *(Highways.DOT.gov 2024)*.

Reduced Left-Turn Conflict Intersections

Reduced left-turn conflict intersections are geometric designs that alter how left-turn movements occur. These intersections simplify decision-making for drivers and minimize the potential for higher severity crash types, such as head-on and angle. Two highly effective designs that rely on U-turns to complete certain left-turn movements are known as the Restricted Crossing U-turn (RCUT) and the Median U-turn (MUT) *(Highways.DOT.gov 2024)*.

Yellow Change Intervals

At a signalized intersection, the yellow change interval is the length of time that the yellow signal indication is displayed following a green signal indication. The yellow signal confirms to motorists that the green has ended and that a red will soon follow. Transportation agencies can improve signalized intersection safety and reduce red-light running by reviewing and updating their traffic signal timing policies and procedures concerning the yellow change interval. Agencies should institute regular evaluation and adjustment protocols for existing traffic signal timing *(Highways.DOT.gov 2024)*.

Corridor Access Management

Access management refers to the design, application, and control of entry and exit points along a roadway. Every intersection, from a signalized intersection to an unpaved driveway, has the potential for conflicts between vehicles, pedestrians, and bicyclists. The number and types of conflict points—locations where the travel paths of two users intersect—influence the safety performance of the intersection or driveway. Successful corridor access management involves balancing overall safety and mobility for all users along with the needs of adjacent land uses *(Highways.DOT.gov 2024)*.

Roundabouts

Roundabouts are not only a safer type of intersection; they are also efficient in terms of keeping people moving. Even while calming traffic, they can reduce delay and queuing when compared to other intersection alternatives. Furthermore, the lower vehicular speeds and reduced conflict environment can create a more suitable environment for walking and bicycling *(Highways.DOT.gov 2024)*.

Dedicated Left- and Right-Turn Lanes at Intersections

Auxiliary turn lanes—either for left turns or right turns—provide physical separation between turning traffic that is slowing or stopped and adjacent through traffic at approaches to intersections. Turn lanes can be designed to provide for deceleration prior to a turn, as well as for storage of vehicles that are stopped and waiting for the opportunity to complete a turn *(Highways.DOT.gov 2024)*.

Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections

This systemic approach to intersection safety involves deploying a package of multiple low-cost countermeasures, including enhanced signing and pavement markings, at a large number of stop-controlled intersections within a jurisdiction. These countermeasures increase driver awareness and recognition of the intersections and potential conflicts *(Highways.DOT.gov 2024)*.

Crosscutting

Lighting

The number of fatal crashes occurring in daylight is about the same as those that occur in darkness. However, the nighttime fatality rate is three times the daytime rate because only 25 percent of vehicle miles traveled (VMT) occur at night. At nighttime, vehicles traveling at higher speeds may not have the ability to stop once a hazard or change in the road ahead becomes visible by the headlights. Therefore, lighting can be applied continuously along segments and at spot locations such as intersections and pedestrian crossings in order to reduce the chances of a crash *(Highways.DOT.gov 2024)*.

Road Safety Audit

While most transportation agencies have established traditional safety review procedures, a road safety audit (RSA) or assessment is unique. RSAs are performed by a multidisciplinary team independent of the project. RSAs consider all road users, account for human factors and street user capabilities, are documented in a formal report, and require a formal response from the road owner *(Highways.DOT.gov 2024)*.

Local Road Safety Plans

A local road safety plan (LRSP) provides a framework for identifying, analyzing, and prioritizing street safety improvements on local roads. The LRSP development process and content are tailored to local issues and needs. The process results in a prioritized list of issues, risks, actions, and improvements that can be used to reduce fatalities and serious injuries on local roads *(Highways.DOT.gov 2024)*.

Pavement Friction Management

Friction is a critical characteristic of a pavement that affects how vehicles interact with the roadway, including the frequency of crashes. Measuring, monitoring, and maintaining pavement friction—especially at locations where vehicles are frequently turning, slowing, and stopping—can prevent many roadway departure, intersection, and pedestrian-related crashes. Pavement friction treatments, such as High Friction Surface Treatment (HFST), can be better targeted and result in more efficient and effective installations when using continuous pavement friction data along with crash and roadway data *(Highways.DOT.gov 2024)*.

NHTSA COUNTERMEASURES THAT WORK

While the FHWA's Proven Safety Countermeasures tend to focus more on engineering solutions to improving safety, NHTSA Countermeasures focus primarily on changing human behavior through education and environmental influences.

Impaired Driving

According to the NHTSA's latest edition of its A Highway Safety Countermeasure Guide for State Highway Safety Offices (2023), deterrence is key to reducing drug/alcohol-impaired driving. "Deterrence works by changing behavior through the fear of apprehension and punishment. If drivers believe impaired driving is likely to be detected and impaired drivers are likely to be arrested, convicted, and punished, many will not drive while impaired by alcohol," (NHTSA 2023).

Although only 13% percent of FI crashes in Waverly are related to drug/alcohol-impaired driving, it is the City's goal to eliminate all drug/alcohol-impaired driving behaviors in the community.

The following are countermeasures that have been implemented by other states and agencies to support the reduction of impairment related crashes:

Legislation and Licensing

Countermeasure	Effectiveness	Cost	Use	Time
Administrative License Revocation or Suspension (ALR/ALS)	✪✪✪✪✪	$$$	High	Medium
Minimum Drinking Age 21 Laws	✪✪✪✪✪	$$$	High	Short
Open Container Laws	✪✪✪✪✪	$	High	Short
Lower Blood Alcohol Content (BAC) Limits	✪✪✪✪	$	Low	Short
High-BAC Sanctions	✪✪✪	$	Medium	Short
BAC Test Refusal Penalties	✪✪✪	$	Unknown	Short
Alcohol-Impaired-Driving Law Review	✪✪✪	$$	Unknown	Medium
Drug-Impaired-Driving Laws†	✪	Unknown	Medium	Short

Enforcement

Countermeasure	Effectiveness	Cost	Use	Time
Publicized Sobriety Checkpoints	✪✪✪✪✪	$$$	Medium	Short
High-Visibility Saturation Patrols	✪✪✪✪	$$	High	Short
Alcohol Measurement Devices	✪✪✪✪	$$	High	Short
Integrated Enforcement	✪✪✪	$	Unknown	Short
Alcohol Vendor Compliance Checks	✪✪✪	$$	Unknown	Short
Zero-Tolerance Law Enforcement	✪✪✪	$	Unknown	Short
Enforcement of Drug-Impaired Driving	✪✪✪	$$	Unknown	Short

Other Strategies for Behavior Change

Countermeasure	Effectiveness	Cost	Use	Time
Alcohol Ignition Interlocks	✪✪✪✪✪	$$	Medium	Medium
Alcohol Problem Assessment and Treatment	✪✪✪✪✪	Varies	High	Varies
Alcohol Screening and Brief Intervention	✪✪✪✪✪	$$	Medium	Short
Vehicle and License Plate Sanctions	✪✪✪✪	Varies	Medium	Short
DWI Offender Monitoring	✪✪✪✪	$$$	Unknown	Varies
DWI Courts	✪✪✪✪	$$$	Low	Medium
Limits on Diversion & Plea Agreements	✪✪✪	$	Medium	Short
Alternative Transportation	✪✪✪	$$	Unknown	Short
Mass-Media Campaigns	✪✪	$$$	High	Medium
Court Monitoring	✪✪	$	Low	Short
Education Regarding Medications	✪	Varies	Unknown	Varies

Seat Belts and Child Restraints

Proper seatbelt and restraint mechanisms can play a critical role in a vehicle crash becoming a KSI crash. Increasing drivers' use of these restraints can help to limit overall fatal and severe injury crashes in the community's street network and create a safer environment for both riders and pedestrians.

The following are legislative and enforcement activities implemented by other states and agencies that can help improve the use of these restraints within their community:

Legislation and Licensing

Countermeasure	Effectiveness	Cost	Use	Time
Primary Enforcement Seat Belt Use Laws	✪✪✪✪✪	$	Medium	Short
Strong Child Passenger Safety Laws	✪✪✪✪✪	$	High	Short
Increased Fines for Seat Belt Law Violations	✪✪✪✪	$	Low	Short

Enforcement

Countermeasure	Effectiveness	Cost	Use	Time
Short-Term, High-Visibility Seat Belt Law Enforcement	✪✪✪✪✪	$$$	Medium	Medium
Short-Term, High-Visibility Child Passenger Safety Law Enforcement	✪✪✪✪✪	$$$	Medium	Medium
Nighttime, High-Visibility Seat Belt Law Enforcement	✪✪✪✪	$$$	Unknown	Medium
Sustained Seat Belt Enforcement	✪✪✪	Varies	Unknown	Varies

Other Strategies for Behavior Change

Countermeasure	Effectiveness	Cost	Use	Time
Communication Strategies for Low-Belt-Use Groups as Part of High Visibility Enforcement (HVE)	✪✪✪✪✪	Varies	Unknown	Varies
Employer-based Programs	✪✪✪	Varies	Unknown	Varies
Programs for Older Children	✪✪✪	Varies	Unknown	Varies
Child Restraint Inspection Stations	✪✪✪	$$	High	Short
Programs for Increasing Child Restraint and Booster Seat Use	✪✪	Varies	Unknown	Varies

Speeding and Speed Management

Speed is one of the most common behaviors observed within the local street networks. With that, speed management is a top priority for the City, especially given the traffic that pass through town via US-6.

According to NHTSA, "speeding can be dangerous on all types of roads, but particularly on non-interstate rural and urban roadways. In 2020 some 38% of speeding-related fatalities occurred on non-interstate rural roadways, another 49% on non-interstate urban roadways, 8% on interstate urban roadways, and 5% on interstate rural roadways," (NCSA, 2022).

Recommended strategies from the NHTSA to mitigate the impacts of speeding include the following:

Legislation and Licensing

Countermeasure	Effectiveness	Cost	Use	Time
Lower Speed Limits	✪✪✪✪✪	$	High	Varies
Increasing Penalties	✪✪✪✪	Varies	High	Varies
Variable Speed Limits	✪✪	$$$	Medium	Varies

Enforcement

Countermeasure	Effectiveness	Cost	Use	Time
Speed Safety Camera Enforcement	✪✪✪✪✪	Varies	Low	Medium
High-Visibility Enforcement	✪✪✪✪	$$$	Medium	Medium

Other Strategies for Behavior Change

Countermeasure	Effectiveness	Cost	Use	Time
Dynamic Speed Display/Feedback Signs	✪✪✪✪✪	$	High	Short
Intelligent Speed Assistance	✪✪✪	Varies	Unknown	Varies

Distracted Driving

Another common behavior among drivers, distracted driving involves a variety of factors that can take a driver's attention away from the task of safely operating their vehicle. Distracted driving, as defined by the NHTSA, is "any activity that diverts attention from driving, including talking or texting on your phone, eating and drinking, talking to people in your vehicle, fiddling with the stereo, entertainment or navigation system—anything that takes your attention away from the task of safe driving" (NHTSA, n.d.-a).

Strategies to prevent distracted driving can include:

Legislation and Licensing

Countermeasure	Effectiveness	Cost	Use	Time
GDL Passenger Limits for Young Drivers	✪✪✪✪✪	$	High	Medium
Cell Phone Laws	✪✪	$	Medium	Short

Enforcement

Countermeasure	Effectiveness	Cost	Use	Time
High-Visibility Cell Phone Enforcement	✪✪✪✪	$$$	Low	Medium

Other Strategies for Behavior Change

Countermeasure	Effectiveness	Cost	Use	Time
Employer Programs	✪✪	$	Unknown	Short

Motorcycle Safety

As reported by the NHTSA, motorcycle driving is one of the riskier forms of modern transportation. "Not only does operating a motorcycle require more physical skill and strength than driving a passenger vehicle, but motorcycles lack a protective structure, offering the rider virtually no protection in a crash," (NHTS 2023).

Recommended strategies to help prevent motorcycle KSI crashes and to keep motorcycle drivers safe include:

Legislation and Licensing

Countermeasure	Effectiveness	Cost	Use	Time
Universal Motorcycle Helmet Use Laws	✪✪✪✪✪	$	Medium	Short
GDL for Motorcyclists	✪✪	$	Medium	Short

Enforcement

Countermeasure	Effectiveness	Cost	Use	Time
Alcohol-Impaired Motorcyclists: Detection, Enforcement, and Sanctions	✪✪✪	Varies	Unknown	Varies

Other Strategies for Behavior Change

Countermeasure	Effectiveness	Cost	Use	Time
Motorcycle Rider Training	✪✪	$$	High	Varies
Strategies to Increase Rider Conspicuity and Use of Protective Clothing	✪	Varies	High	Medium

Young Drivers

Young drivers are at a higher risk of being involved in a vehicle crash due to their limited experience operating a vehicle. According to the NHTSA, motor vehicle crashes are the leading cause of unintentional death for 15-24 year olds in the United States.

To keep young drivers safe and increase overall safety within the network they operate a vehicle in, the following strategies can be implemented:

Legislation and Licensing

Countermeasure	Effectiveness	Cost	Use	Time
Graduated Driver Licensing (GDL)	✪✪✪✪✪	$	High	Medium
GDL Learner's Permit	✪✪✪✪✪	$	High	Medium
GDL Intermediate License Nighttime Restrictions	✪✪✪✪✪	$	High	Medium
GDL Intermediate License Passenger Restrictions	✪✪✪✪✪	$	High	Medium

Enforcement

Countermeasure	Effectiveness	Cost	Use	Time
Enforcement of GDL	✪✪	$	Unknown	Short

Other Strategies for Behavior Change

Countermeasure	Effectiveness	Cost	Use	Time
Electronic Technology for Parental/ Guardian Monitoring	✪✪✪	$	Low	Short
Programs to Assist Parents/Guardians of Young Drivers	✪✪	$$	Medium	Short
Hazard Perception Training	✪✪	Varies	Low	Varies

Older Drivers

Comparatively to young drivers, older drivers are more likely to be involved in a vehicle crash than most drivers due to age-related declines in vision, slower reaction times, and cognitive changes. Unfortunately for this population of drivers, the United States' current roadway network and system is not supportive of their unique needs and abilities. Signage, lighting, licensing, traffic signals and controls, and vehicles themselves are not always designed with this demographic in mind.

To ensure the safety of older drivers within the transportation system, the following strategies have been implemented by other states and agencies:

Legislation and Licensing

Countermeasure	Effectiveness	Cost	Use	Time
License Screening and Testing	✪✪✪✪[†]	$$	High	Medium
Licensing Agency Referrals	✪✪✪✪[††]	$$	Low	Medium
License Restrictions	✪✪✪✪	$	Low	Short
Medical Review Protocols	✪✪[†††]	Varies	High	Medium
In-Person Renewal and Vision Test	✪✪	$$$	Medium	Medium

Other Strategies for Behavior Change

Countermeasure	Effectiveness	Cost	Use	Time
Formal Courses for Older Drivers (classroom + on-street feedback)[†]	✪✪✪✪	$$	Low	Medium

[†] Proven for identifying drivers whose driving should be limited
[††] Proven for identifying at-risk drivers
[†††] Part of a comprehensive system for identifying and restricting at-risk drivers. Quality varies considerably.

Pedestrian Safety

KSI crashes involving pedestrians accounted for 33% of Waverly's total KSI crashes over the last ten years. As vulnerable road users, pedestrians are often left to accommodate their transportation methods based on the car-driven design of the modern roadway system. Designing streets and sidewalks in a way that prioritizes the pedestrian experience is a critical part of undoing car focused mentality. However, the City can also implement some behavior-based strategies that have been successful elsewhere, which also prioritize pedestrian safety.

Legislation and Licensing

Countermeasure	Effectiveness	Cost	Use	Time
Lower Speed Limits	✪✪✪✪	$	High	Varies

Enforcement

Countermeasure	Effectiveness	Cost	Use	Time
High-Visibility Enforcement at Pedestrian Crossings	✪✪✪	$$	Low	Short

Other Strategies for Behavior Change

Countermeasure	Effectiveness	Cost	Use	Time
Pedestrian Safety Zones	✪✪✪✪✪	$$$	Low	Long
Elementary-Age Child Pedestrian Training	✪✪✪	$	Unknown	Medium
Safe Routes to School	✪✪✪	$	High	Medium
Walking School Buses	✪✪	$	Unknown	Short
Conspicuity Enhancement	✪✪	$	Low	Medium

Bicycle Safety

Similar to pedestrians, bicyclists are also expected to fit their transportation needs and safety within a car-centered roadway system. According to the NHTSA, "Bicyclist injuries remain consistently, disproportionately high. In 2021 an additional estimated 41,615 bicyclists were injured. Over the last 5 years, estimated injury-only crashes averaged about 45,400 yearly," (NHTSA 2023). Although these stats reflect the state of bicycle safety in the entire United States, prioritizing bicycle safety in Waverly is also a priority for the City.

Other potential strategies as provided by NHTSA to improve bicycle safety include:

Legislation and Licensing

Countermeasure	Effectiveness	Cost	Use	Time
Lower Speed Limits	✪✪✪✪	$	High	Varies
Bicycle Helmet Laws for Children	✪✪✪	$	Medium	Short
Universal Bicycle Helmet Laws	✪✪✪	$	Low	Short
Active Lighting Laws	✪✪	$	High	Varies
Motorist Passing Bicyclist Laws	✪	$	Medium	Short

Other Strategies for Behavior Change

Countermeasure	Effectiveness	Cost	Use	Time
Promote Bicycle Helmet Use with Education	✪✪✪	$$$	Unknown	Medium
Safe Routes to School	✪✪✪	$	High	Short
Bicycle Safety Education for Children	✪✪	$	Unknown	Short
Cycling Skills Clinics, Bike Fairs, Bike Rodeos	✪	$	Unknown	Short

Drowsy Driving

The NHTSA describes drowsy driving as a prevalent safety concern. “In 2021 some 684 people were killed in crashes involving a drowsy driver, representing 1.6% of all motor vehicle traffic crash fatalities (Stewart, 2023). Drowsy driving was reportedly involved in 1.8% of fatal crashes from 2017 to 2021,” (NHTSA, 2023). Since this safety concern is highly driven by lifestyle patterns and behaviors of drivers, it can be difficult to influence vehicle drivers to not participate or to prevent them from participating in this practice.

Strategies identified by NHTSA include:

Legislation and Licensing

Countermeasure	Effectiveness	Cost	Use	Time
Graduated Drivers’ Licensing Intermediate License Nighttime Restrictions	✪✪✪✪✪	$	High	Medium

Other Strategies for Behavior Change

Countermeasure	Effectiveness	Cost	Use	Time
Employer Programs	✪✪	Varies	Unknown	Short
School Start Times	✪✪	Varies	Low	Long

NDOT STRATEGIC HIGHWAY SAFETY PLAN (SHSP)

The Nebraska Department of Transportation (NDOT) publishes its Strategic Highway Safety Plan every five years with the most recent publication extending from 2022-2026. In this Plan the NDOT outlines strategies, action, and policies that are proven and recommended by the NDOT for localities to implement in an effort to prevent all KSI crashes from occurring within the street networks they service. As referenced in the plan, "Zero is the only acceptable number of fatalities on Nebraska streets. Every strategy, every goal, and every statistic in this plan is focused on Nebraska's goal toward zero deaths. Safety is a shared responsibility among street users and street stewards. The Critical Emphasis Areas outlined in the Nebraska Strategic Highway Safety Plan are opportunities to take individual and agency action towards our shared goal of zero deaths on Nebraska streets. We can achieve this goal together," (NDOT SHSP 2022).

The following critical emphasis areas were selected for the SHSP 2026 because of their greatest opportunity to successfully reduce the number of traffic fatalities and serious injuries. Each of these emphasis areas contribute to the overall safety of the NDOT's street and roadway networks and particularly focus on protecting vulnerable road users within those networks.

1. Increasing Seat Belt Usage
2. Reducing Roadway/Lane Departure Crashes
3. Reducing Impaired Driving Crashes
4. Reducing Intersection Crashes
5. Reducing Young Driver Crashes
6. Reducing Older Driver Crashes
7. Reducing Non-Motorist Crashes

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CHAPTER 6

RECOMMENDATIONS

RECOMMENDATIONS

This chapter provides recommendations for location-specific projects developed for the City's HIN by segment and intersections. Each of these HIN locations were identified and prioritized in Chapter 4 – Needs Assessment. This chapter also identifies systemic countermeasures for deployment throughout the transportation network, policy changes and proposed new policies to create a safer future transportation network, and demonstration projects that could be used to determine the benefits of emerging technologies and strategies in the City of Waverly.

LOCATION-SPECIFIC RECOMMENDATIONS

Waverly's High Injury Network segments and intersections were each scored and prioritized to identify the locations in Waverly that have the greatest need for safety improvements. Location scoring factored in the crash data, multimodal impact to pedestrians and bicyclists, and public comments. Based on the location rankings, further evaluation and discussions, projects were developed to address those priority segments and intersections. The recommended projects presented in this chapter will ultimately improve safety conditions and help to eliminate KSI crashes within the city.

While individual projects were developed and recommended for spot locations, overall "groups" of projects were also identified and highlighted based on a corridor wide approach. These overall project groups would include individual projects (segments and intersections) within these primary corridors, and could be bundled in an overall strategy to address multiple improvements in a comprehensive manner. Those overall projects are further summarized in pages that follow. In addition, to evaluate overall size and scope of projects, high-level (planning level) costs of projects were also provided for perspectives on funding and implementation.

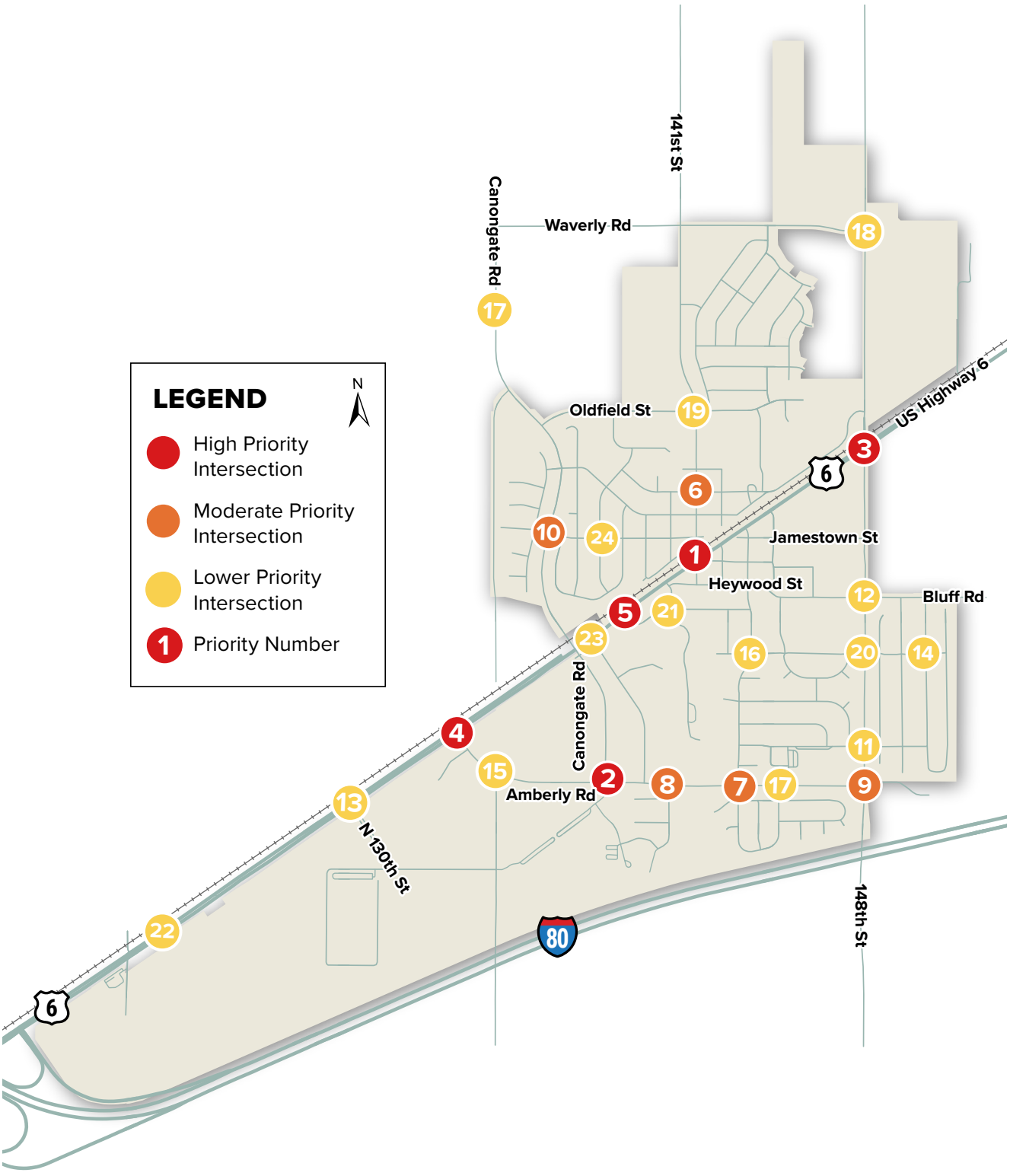


Figure 18: Prioritized HIN Intersection Locations

Table 14: Priority Locations - Top HIN Intersections

	Location	Overall Priority Scoring
1	US-6 and N 141st Street	High
2	Amberly Road and Canongate Road	High
3	US-6 and N 148th Street	High
4	US-6 and Amberly Road	High
5	US-6 and Guildford Street	High
6	N 141st Street and Kenilworth Street	Moderate
7	Amberly Road and N 143rd Street	Moderate
8	Amberly Road and N 140th Street	Moderate
9	Amberly Road and N 148th Street	Moderate
10	Canongate Road and Jamestown Street	Moderate
11	N 148th Street and Castlewood Street	Moderate
12	Heywood Street/Bluff Road and N 148th Street	Moderate

	Location	Overall Priority Scoring
13	US-6 and N 130th Street	Lower
14	Folkstone Street and 151st Street	Lower
15	Amberly Road and N 134th Street	Lower
16	N 142nd Street and Folkstone Street	Lower
17	Amberly Road and N 145th Street	Lower
18	N 148th Street and Waverly Road	Lower
19	N 141st Street and Oldfield Street	Lower
20	N 148th Street and Folkstone Street	Lower
21	N 138th Street and Guildford Street	Lower
22	US-6 and N 120th Street	Lower
23	US-6 and Deep Park Road	Lower
24	Jamestown Street and N 137th Street	Lower

Table 15: Priority Locations - Top HIN Segments

	Location	Overall Priority Scoring
1	US-6; 130th Street to Canongate	High
2	US-6; Canongate Road to N 141st Street	High
3	Canongate Road; US-6 to Jamestown Street	High
4	N 141st Street; US-6 to Mansfield Street	High
5	US-6; N 141st Street to N 148th Street	High
6	Amberly Road; N 140th Street to N 148th Street	Moderate
7	Oldfield Street; Canongate Road to N 141st Street	Moderate
8	US-6; I-80 Ramp to N 130th Street	Moderate
9	Amberly Road; US-6 to N 140th Street	Moderate
10	N 148th Street; I-80 to Heywood Street/Bluff Road	Moderate
11	N 141st Street; Mansfield Street to Waverly Road	Lower
12	Canongate Road; Amberly Road to US-6	Lower
13	Canongate Road; Jamestown Street to N 134th Street	Lower
14	Heywood Street; N 141st Street to N 148th Street	Lower
15	N 148th Street; Heywood Street/Bluff Road to US-6	Lower
16	N 148th Street; US-6 to Waverly Road	Lower
17	N 134th Street; Canongate Road to Waverly Road	Lower

Figure 19: Prioritized HIN Segment Locations

WAVERLY CSAP TOP PRIORITY PROJECTS

Top recommended projects for the Waverly Comprehensive Safety Action Plan focus primarily on the U.S. Highway 6 Corridor, Amberly Road, and other streets that carry heavy traffic through town on a daily basis, therefore providing critical infrastructure for truck traffic, commuters, and local transportation. The priority projects involve street upgrades, traffic control improvements, and pedestrian and bicycle safety.

The following provides a deeper analysis of each of the prioritized projects for both HIN segments and intersections. This analysis includes estimated costs, safety improvement potential, and a phased approach for implementation.

1. **High Priority Project Group #1**
   - » US-6 Corridor
     130th Street to 148th Street
2. **High Priority Project Group #2**
   - » 141st Street
     Amberly Road to Waverly Road
3. **High Priority Project Group #3**
   - » 148th Street
     I-80 bridge to US-6
4. **High Priority Project Group #4**
   - » Canongate
     Amberly Road to Oldfield Street

A summary of these project locations is included in the following project group detail sheets.

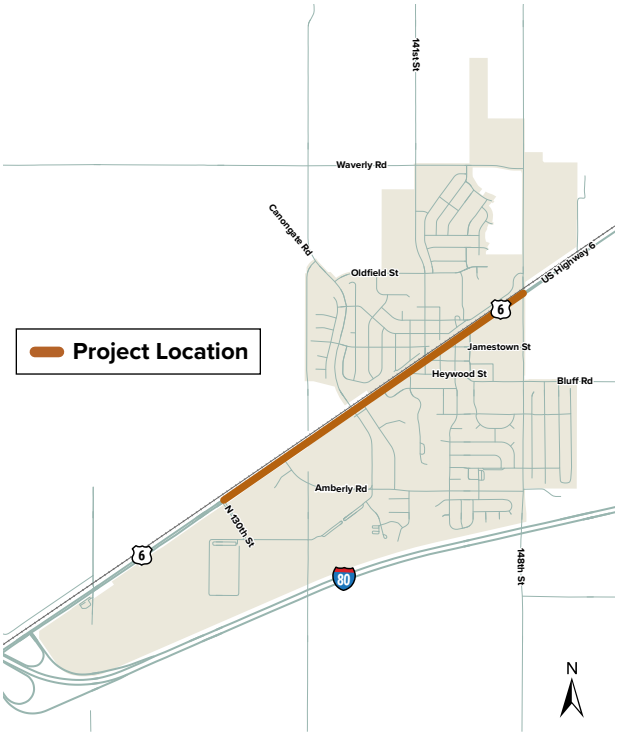
High Priority Project Group #1

US-6 Corridor (130th Street to 148th Street)

This project would include converting the current rural cross-section to an urban cross-section, including:

- **a.** Curb and gutter.
- **b.** Add multi-use trail/sidewalk on the south side of the street.
- **c.** Provide ADA improvements.
- **d.** Additional lighting where needed.
- **e.** Addition of raised medians in key locations for access and speed management.
- **f.** Lengthen left/right turn lane storage/ deceleration lengths.
- **g.** Upgrade the existing signal at US-6 and 141st Street.
- **h.** Monitor traffic signal warrants at 148th and US-6 and construct a signal if thresholds are satisfied.

This project would address the number 1, 2, and 5 ranked segments and intersections 1, 3, 4, and 5.



If funding is not available for the complete project, the following phased approach could be considered:

1. Phase 1 would include a warrant study at the 148th Street intersection. If warranted, a traffic signal could be constructed. Regardless of the warrant study results, improved turn lanes, and the rural-to-urban section conversion could be extended from 141st Street to just east of 148th Street.
2. Phase 2 could start at Amberly Road and extend to 141st Street. This Phase would still look at converting the rural section to urban and updating the signal infrastructure at 141st Street.
3. Phase 3 would be a lower priority of rural to urban section conversion of US-6 from the interchange to 130th Street.

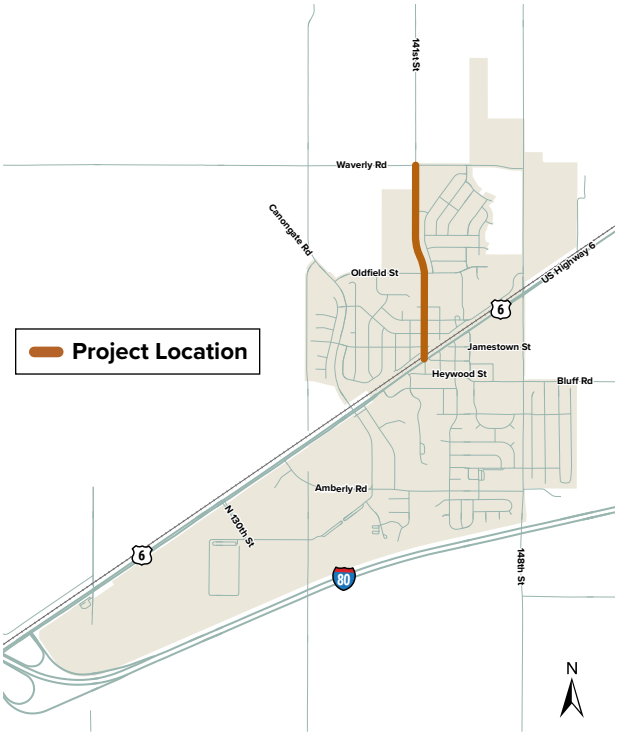
High Priority Project Group #2

141st Street (US-6 to Waverly Road)

This project would introduce traffic calming features such as edge/parking striping to define lane widths better and provide curb extensions at intersections, especially adjacent to Jaycee and Lawson Parks, where greater foot traffic demands are present. These could include, but are not limited to, Mansfield Street, Lancashire Street, and Kenilworth Street. The existing median on the southbound approach to US-6 should be extended north of Jamestown Street, restricting this intersection right-in/right-out on both the east and west legs of this intersection, reducing the chances for vehicle queues to encroach into the at-grade railroad crossing. RRFB traffic control would be added at 141st and Mansfield Street.

A future phase could include the conversion of 141st Street from its current rural type of section to an urban section from Mansfield Street to Waverly Road. Again, urban sections would consist of the addition of curb, gutter, and sidewalk. With these improvements, curb extension could also be located with RRFB traffic control at the Oldfield Street and St. Ronan Street intersections. Additionally, the intersection of 141st Street & Waverly Road could be converted from two-way stop control into a roundabout. This would create a way to decrease vehicle speeds entering the north side of the City of Waverly from the 141st Street and Waverly Road corridors, and it would likely require a combined effort with Lancaster County. Short-term improvements at the intersection could also include rumble bars as well as lighted or reflective striping on stop signs and warning signs in each direction along Waverly Road approaching the intersection.

This project addresses the number 4- and 11-ranked segment and the number 6 and 19 ranked intersections.



If funding for the whole project is not available at once, this project could be subdivided into the following sub-phases:

a. RRFB and curb extensions at Mansfield.

b. Restriping of 141st Street from US-6 to Mansfield.

c. Extension of the median to the north of Jamestown Street.

d. Construction of the urbanized section from Mansfield Street to Waverly Road with curb extensions at Kenilworth Street and Lancashire Street. This could be conducted in two phases, the first from Mansfield Street to Oldfield Street and the second from Oldfield Street to Waverly Road.

e. Curb extensions and RRFB at the south leg of the Oldfield Street intersection.

f. RRFB and curb extensions at the southern crossing of the St. Ronan Street intersection.

g. The stop-controlled intersection of 141st Street & Waverly Road could be converted to a roundabout before the rural-to-urban street conversion in the future.

High Priority Project Group #3

148th Street (I-80 bridge to US-6)

Improve safety and operations of 148th Street and implement turn lanes at intersections and options for enhanced ped crossings, refuge islands, streetscape and lighting. Project would include the following:

a. Widen the two-lane section to a three-lane section with one through lane in each direction and a center turn lane.

b. Convert rural section to urban section to include lighting, curb, gutter, and sidewalk/multi-use trails.

This project addresses the number 10-ranked segment and the number 3, 9, 11, 12, and 20th ranked intersections.

Due to scale of the project, it could be phased from I-80 bridge to Folkestone, and then from Folkestone to US-6.

High Priority Project Group #4

Canongate (Amberly Road to Oldfield Street)

This project would include the following:

a. Rehab/reconstruct of Canongate Rd to urban street standards (off bridge).

b. Implement pedestrian overpass/trail provisions (either on bridge, parallel to bridge, or at new central crossing location).

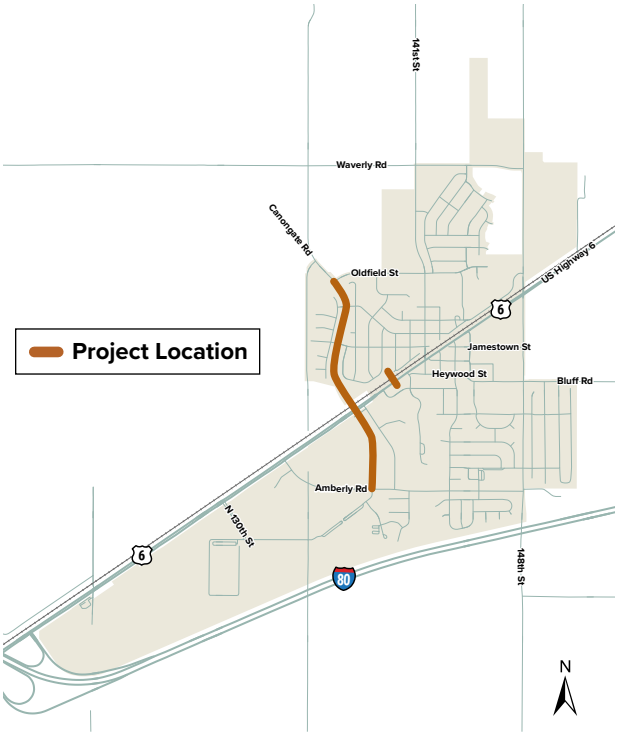
c. Conversion of the two-way stop control intersection at Amberly Road to a single lane roundabout.

d. Install an RRFB at the Jamestown Street intersection.

e. Conversion of the current rural section to an urban section, including the following:

- » Convert from a two-lane section to a three-lane section to the north for turn lanes at key intersections.
- » Curb and gutter.
- » Pedestrian trail/connection provisions.
- » Provide ADA improvements.
- » Additional lighting where needed.

This project would address the number 3-ranked segment and the number 2 and 10-ranked intersections. This project would also provide a much-needed safe pedestrian/bicycle connection between the north and south side of Waverly, avoiding greater risk at grade crossings of US-6 and railroad facilities.



Again, if needed, this project could also be subdivided into phases. Phases could include the following:

a. Pedestrian overpass provisions (via final concept & location study)

b. The stop-controlled intersection at Amberly could be converted to a roundabout before the rural-to-urban street conversion.

c. Rural to Urban cross-section conversion could be split into two sub-phases:

d. Amberly Rd to the bridge.

e. Bridge to Oldfield Street.

OPINION OF PROBABLE CONSTRUCTION COSTS FOR OVERALL PROJECT GROUPS

High Priority Project Group #1

US-6 Corridor (130th Street to 148th Street)

Project	Improvement Type	Unit Cost	Unit	Project Length	Proposed Cost Range
US-6 (Canongate to 141st)	5 Lane Urban Section	$2,717,000	0.25 mile	0.95 mile	$12M to $15M
Traffic Signal at 148th	Traffic Signal	$500,000	Each	NA	$0.5M to $1M
US-6 (130th to Canongate)	5 Lane Urban Section	$2,717,000	0.25 mile	0.74 mile	$10M to $15M
Concrete Multi-Use Trail	-	$1,000,000	1 mile	0.95 mile	$1M to $1.5M

High Priority Project Group #2

141st Street (US-6 to Oldfield Street)

Project	Improvement Type	Unit Cost	Unit	Project Length	Proposed Cost Range
Mansfield Street to Waverly Road	3 Lane Urban Section	$2,085,000	0.25 mile	0.66 mile	$5.5M to $6.0M
US-6 to Mansfield Street	Resurface & Restripe	$750,000	1 mile	0.66 mile	$0.5M to $1.0M
Mansfield, Lancashire, and Kenilworth	RRFB & Curb Extensions, Median Work	$500,000	1 LS	NA	$0.5M to $1M
Oldfield and St. Ronan	RRFB & Curb Extensions	$120,000	1 LS	NA	$0.1M to $0.2M
141st & Waverly RAB	RAB	$2,000,000	1 Single Lane RAB	NA	$2M to $3M

High Priority Project Group #3

148th Street (I-80 bridge to US-6)

Project	Improvement Type	Unit Cost	Unit	Project Length	Proposed Cost Range
I-80 Bridge to US-6	3 Lane Urban Section	$2,500,000	0.25 mile	1 mile	$10M to $15M
Concrete Multi-Use Trail	-	$1,000,000	1 mile	1 mile	$2M to $4M

High Priority Project Group #4

Canongate (Amberly Road to Oldfield Street)

Project	Improvement Type	Unit Cost	Unit	Project Length	Proposed Cost Range
Amberly to Bridge	3 Lane Urban Section	$2,085,000	0.25 mile	0.34 mile	$3M to $5M
Bridge to Oldfield	3 Lane Urban Section	$2,085,000	0.25 mile	0.59 mile	$6M to $8M
Pedestrian Trail/Overpass	Alts, grade separation	$7M to $12M	1 LS	TBD - based alts	$7M to $12M
Amberly & Canongate RAB	RAB	$2,000,000	1 Single Lane RAB	NA	$2M to $4M
RRFB at Jamestown Street	Rectangular Rapid Flashing Beacon	$120,000	1 LS	NA	$0.1M to $0.2M
Concrete Multi-Use Trail	-	$1,000,000	1 mile	0.93 mile	$1M to $2M

MEDIUM TO LOWER PRIORITY PROJECTS

Amberly Road (US-6 to 148th Street)

General conversion of the current rural section to an urban-style section:

- **a.** Add multi-use trail on north side to connect Canongate Road to the existing trail at 140th Street.
- **b.** Curb and gutter.
- **c.** Strategic street lighting improvements to fill in existing gaps.
- **d.** Curb extensions could be considered with lane reconfiguration at 143rd Street and 145th Street intersections.

148th Street (US-6 to Waverly Road)

- **a.** Widen to a three-lane section with one through lane in each direction and a center turn lane.
- **b.** Curb and gutter.
- **c.** Strategic street lighting improvements to fill in existing gaps.
- **d.** Sidewalk/multi-use trails.

This project could be deferred until adjacent development occurs, and an opportunity for cost participation from a given development could be feasible.

Oldfield Street (Canongate Road to 141st Street)

Convert this street from the existing gravel road to a three-lane paved section (One through lane in each direction with a center turn lane). This project should include:

- **a.** Curb and gutter.
- **b.** Strategic street lighting improvements to fill in existing gaps.
- **c.** Multi-use trail on one side of the street connecting Lawson Park to the future trail along Canongate Road.
- **d.** Sidewalk on the side opposite the multi-use trail.

Heywood Street (141st Street to 148th Street)

This project would include:

- **a.** Restripe street to include a three-lane section (one through lane in each direction and a center turn lane) and parking on one side of the street. A second option would be to stripe parking on both sides and stripe for two-lanes (one through lane in each direction).
- **b.** Strategic street lighting improvements to fill in existing gaps.
- **c.** Add curb extensions at 141st Street, 143rd Street, and 146th Street.

Longer Term Projects

Project	Improvement Type	Unit Cost	Unit	Project Length	Proposed Cost Range
Amberly Road (US56 to 148th Street)	3 Lane Urban Section	$2,085,000	0.25 mile	1.15 mile	$10M to $15M
Oldfield Street (Canongate Road to 141st Street)	3 Lane Urban Section	$2,085,000	0.25 mile	0.42 mile	$3.5M to $5.0M
148th Street (US-6 to Waverly Road)	3 Lane Urban Section	$2,717,000	0.25 mile	0.48 mile	$6M to $9M
Heywood Street (141st Street to 148th Street)	Restripe and Resurface	$433,000	1 mile	0.53 mile	$0.35M to $0.5M

OTHER CITYWIDE EFFORTS

1. Replace the school zone signing for consistency and to comply with the latest Manual on Uniform Traffic Control Devices (MUTCD).
2. Restripe crosswalks and update signs within Wayne Park to improve consistency, visibility, and bring signing and striping up to the current standard.
3. Work with Rail Bureau to enhance at-grade railroad crossings.
4. Sidewalk improvement program.
5. Traffic signal optimization.
6. Safe Routes to School Review.
7. Roundabout feasibility studies for traffic calming as vehicles enter city limits at the following locations:
   - » Canongate Road/Oldfield Street
   - » 148th Street and Waverly Road
   - » 148th Street and Amberly Road
   - » 148th Street and Heywood/Bluff
8. Commercial vehicle noise and routing enforcement.
9. Citywide trail enhancements such as lighting, benches etc.
10. Distracted driving and impaired driving prevention and education programs.
11. Municipal Golf Cart Code Refinement and Enforcement Program.
12. Neighborhood traffic calming process review.
13. Complete Streets Policy (especially for new developments to include sidewalk and trail infrastructure as part of their off-site responsibilities).

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CHAPTER 7

IMPLEMENTATION

IMPLEMENTATION

The Waverly CSAP was developed with input from community members, key stakeholders, and elected officials and the commitment of the City of Waverly to achieving its goals. However, accomplishing the plan's goals will require a strong implementation plan. The following outlines the City's commitment to achieving zero fatal and serious injury crashes within the community through progress reporting, strategic actions, and policy implementation at the local and state level.

COMMITMENT TO SAFETY

The completion of this Safety Action Plan is the City's commitment to its citizens and users of its transportation system that no injuries or deaths are acceptable in the community of Waverly. This plan also allows the City to pursue additional funding to support the recommendations of this plan and their implementation through the USDOT's SS4A Program. This funding is very important toward achieving the City's safety goal. Going forward, as the City continues to grow and seek new funding opportunities, it will need to prioritize safety when selecting future projects and infrastructure improvements. Policies that can create a greater focus on safety, both in the current operations of the transportation system and in future maintenance and construction activities, will need to be established by staff and local policy makers. Safety will also need to remain at the forefront of conversations within the community as a means to continue building a culture of safety in Waverly. Serious commitment from all elected leaders towards the goals of this plan will help to decrease fatal and serious injury crashes in the community presently and in years to come.

PROGRESS REPORTING

Regular reporting and communication of progress towards the goals of this plan is necessary as the City strives to ultimately reach zero fatal and serious injury crashes.

As part of the WCSAP, the City will continue to track fatal and serious injury crashes as they occur in the community. This data analysis will include a focus on the City's HIN. By tracking this crash data, the City will be in a better position to identify prioritized locations for safety improvement projects within its street, trail, and sidewalk network. Additionally, the City should also track past trends of fatal and serious injury occurrences in its network to support progress tracking for year-to-year comparisons.

The HIN should also be analyzed with each update of the WCSAP to ensure safety priorities are aligned with the most current crash data. Vulnerable road users remain to be a safety priority for the City and will continue to be a focus of safety measures going forward based on available crash data. The City will also continue to collaborate with NDOT and the State Highway Safety Office on analyzing and reporting progress of safety metrics as well as the implementation of safety improvement projects.

TAKING ACTION

The implementation of this plan will require a continued focus and commitment by the City towards safety every single day. Through the engagement process of this plan, the community has clearly stated that deaths and serious injuries on streets and roads in Waverly are not acceptable. The City's completion of this plan shows its commitment to accomplishing the goal of zero deaths or serious injuries, while still knowing it is an ambitious goal. But, with the strategic policies and safety improvement projects recommended in this plan, achieving this goal can become a reality for the City of Waverly.

Waverly
A Great Place to Grow