2022 Annual Roadway Safety Report

July 2023

Prepared By:

Next Phase Engineering

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INTRODUCTION

The City of Fort Collins is a vibrant city of 170,000 people nestled against the foothills of the Rocky Mountains about an hour's drive north of Denver. This outdoor oriented community is home to Colorado State University and its 33,000 students. The area is known for its high tech companies, innovation, entrepreneurialism, and beer and bike culture. The Old Town area in the city is a unique, lively downtown with residential areas, historic buildings, retail shops, museums, theatres, and restaurants.

ROADWAY SAFETY

Like other cities, The City of Fort Collins experiences roadway crashes. With an average of just over 3,000 reported crashes each year, 300 of which involve an injury or fatality, the impact of traffic crashes touches every aspect of the physical and emotional well-being of a community including families, workplaces, emergency responders, neighborhoods, livelihoods, mobility and more. In Fort Collins in 2022 alone, the annual societal cost of these crashes was $161 million. Improving roadway safety by reducing the number and severity of crashes is a priority.

Safety Matters

In 2022, there were 384 crashes involving an injury or fatality in Fort Collins

This Roadway Safety Report is a compilation of traffic crash and safety information on public streets within Fort Collins. The report is supported and funded by the City's Traffic Operations Department. It summarizes basic crash information, analyzes specific types of crashes in more detail, and evaluates locations for higher-than-expected crashes, trends, and patterns. The report also discusses specific next steps and provides detailed safety-based work items for the City in the coming year.

MOVING TOWARDS VISION ZERO

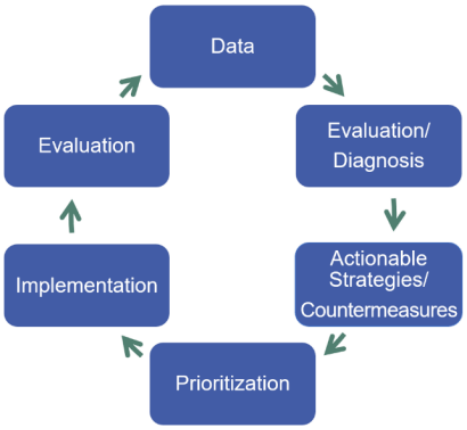
In late 2016, the City of Fort Collins became the first public local entity to join the Colorado Department of Transportation's (CDOT) Moving Towards Zero Deaths initiative. In the spring of 2023, the City adopted a Vision Zero Action Plan, that reflects the City's commitment to the vision of zero traffic-related deaths.

The Vision Zero Action Plan is a high-level plan that outlines principles (crashes are unacceptable, humans make mistakes and are vulnerable, and that safety should be proactive) and then provides overarching guiding strategies to support safety (encouraging mode shift, prioritize safer streets, promoting culture of safety, increasing data transparency, and center equity).

This annual report resides underneath the vision zero framework and provides detailed data, analysis, and identification of locations in order to make measurable strides towards meeting vision zero. This work most closely aligns with Transformative Action 4 to Implement Engineering Countermeasures, and Transformative Action 9 to Perform Annual Analysis and Before and After Studies. There are also a number of support actions in the Vision Zero plan that are addressed by this report, including 2.2 (signal and operational modifications), 4.2 (regionwide crash data), 4.5 (dashboard and data in annual safety report), and 5.3 (traffic enforcement).

The success of moving towards vision zero requires an approach that is a consistent and continuous process of data, evaluation, prioritization, countermeasures, implementation, and evaluation. See the graphic at right. This sets up a system of addressing transportation safety.

The starting point is to fully review, analyze, and understand the locations, patterns, causes, and trends among current crashes. This document provides the information needed for that data review.



Systems-Based Transportation Safety Approach

COLLABORATION AND PLANNING EFFORTS

Improving roadway safety requires commitment and contributions beyond the City's Traffic Operations Department. Other city departments, including Police Services, FCMoves, Engineering, Streets, and others all play a vital role in a comprehensive roadway safety improvement program. Strategies need to be multifaceted and include all the various components including Engineering, Enforcement, Education/Encouragement, and Evaluation. They should encompass all elements of the transportation system from policies and programs through design, construction, operations, management, and maintenance. A strong cooperative relationship among the groups is an important factor as well.

Other jurisdictions, such as Larimer County and the Colorado Department of Transportation (CDOT) are also important partners as crashes occur on jurisdictional boundaries, or along state highways in the city.

The residents of the community and everyone using the transportation system through any mode also play a critical role in supporting safety for everyone. Everyone has a right to travel around Fort Collins safely, and everyone has a responsibility to contribute towards that end. This document provides information that can be used for education and messaging to the greater Fort Collins community.

Finally, Fort Collins has invested in many planning documents and programs, including the Transportation Master Plan, the Active Modes Plan, the Capital Improvement Plan and the Vision Zero Action Plan that provide concurrent guidance on the transportation system. Safety work, planning efforts, and engineering programming dovetail with one another.

EXPLANATION OF DATA

The source for crash information is the City of Fort Collins Traffic Operations Department traffic crash database. The department works cooperatively with Fort Collins Police Services to obtain electronic copies of reports for all crashes on public streets. This includes all crashes investigated and reported by Fort Collins Police Services.

Traffic Operations staff reviews each crash report to ensure that data is as complete, accurate, and consistent as possible. Crash narratives are used to further detail some of the fields.

Population data used in this report was from the U.S. Census Bureau. The Colorado Department of Revenue provided data showing the number of licensed drivers by age in Fort Collins.

There are some crashes that are not included in the data. This includes:

- Crashes on private property (such as grocery store parking lots),
- Crashes that go unreported. This includes crashes on the trail system, or crashes that do not involve a motor vehicle (i.e., single bicycle crashes, or crashes between a pedestrian and bicyclist). Pedestrian crashes that do not involve an injury are also often not reported.

- Some crashes that occur along jurisdictional boundaries if other agencies respond (although efforts are made to add data from others when known),
- Non-injury crashes reported only to the State (such as during 'accident alert' status during bad weather) are not being captured by Fort Collins Police Services, and therefore not included in the analysis.

As new technology is deployed such as micro mobility devices, scooters and e-bikes, the consistency with which that information is captured on a crash report varies. The detailed review and quality control done by Traffic Operations staff helps to identify those types of crashes, but it should be noted that fully understanding details may be difficult as they are not always captured on the crash form.

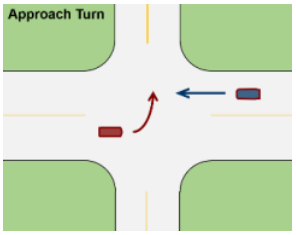
Most of the analyses represent five years of data, from 2018 to 2022. Some instances are noted and may only include three years of analysis, 2020-2022.

TYPES OF CRASHES

Throughout the document, there is detailed discussion and analysis regarding a variety of crash types. The most frequently noted crash categories are listed on the next page with an explanation and definition for each one. Some are depicted in the diagrams in ***Figure 1***. Note that all crashes reported involve some type of motor vehicle.

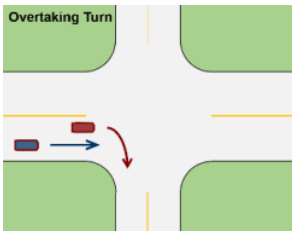
Crash reports will often indicate "front to side" collisions (also known as broadside). As indicated in the definitions and the diagrams, the circumstances related to the front of a vehicle striking the side of another vehicle can vary, and the mitigation to address these collisions may be very different depending on the type of crash. More detailed descriptions (approach turn, right angle, and overtaking turn) are explained below and used in this report.

Approach Turn
Two vehicles traveling in opposite directions, one turns left (or attempts a U-turn) in front of the oncoming vehicle and is struck.



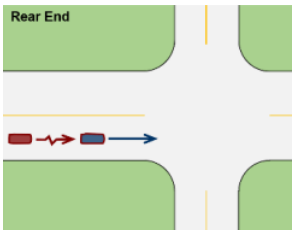
Bicycle
Any crash that involves a bicyclist and a motor vehicle.

Fixed Object
A single vehicle crash where a fixed object other than a parked vehicle is struck. This includes items such as a curb, median, or other roadside feature such as tree, fence, or utility pole.



Overtaking Turn
Two vehicles traveling in the same direction, the front vehicle turns right or left and is hit as the following vehicle tries to pass on the right or left. When this type of crash involves a bicycle traveling straight and a vehicle making a right turn, it is also known as a 'right hook' crash.

Parking Related
Any crash involving a parked vehicle or a vehicle entering/leaving a parking space.



Pedestrian
Any crash that involves a pedestrian and a motor vehicle.

Rear End

Two vehicles traveling in the same direction, leading vehicle struck by following vehicle.

Right Angle

Two vehicles traveling on perpendicular streets one fails to yield or passes a traffic control device and strikes the other.

Sideswipe Opposite Direction (also side to side opposite)

Two vehicles traveling in opposite directions, one veers into the wrong lane and strikes the side of the other car. This often occurs where a vehicle waiting at a STOP sign or traffic signal is struck by a vehicle turning right from a perpendicular road (frequently during icy conditions).

Sideswipe Same Direction (also side to side same)

Two vehicles traveling the same direction, one vehicle veers into the other striking it in the side (usually due to improper lane changes).

Other

Other crashes that do not fit into any other category.

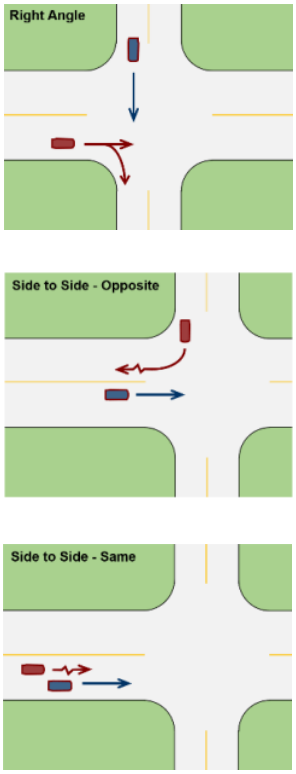


Figure 1.
Crash Type Diagrams

Section 2

GENERAL SAFETY DATA

This section of the report provides an overview of general safety data for the City of Fort Collins. Unless otherwise noted, the data represents a compilation or average of five years of data (2018-2022).

CRASH NUMBERS

Total reported crashes are shown in ***Figure 2*** and are generally declining. 2020 is understood to be a unique year due to the pandemic, with reduced travel volumes throughout the year. Compared to pre-pandemic 2019, total reported crashes declined by more than 20%.

Severe crashes are those that are coded (documented) as 'suspected minor injury', 'suspected major injury' or 'fatal'. The numbers of those crashes are generally increasing – up 38% when compared to 2019 (pre pandemic). 2020 is considered to be an anomaly.

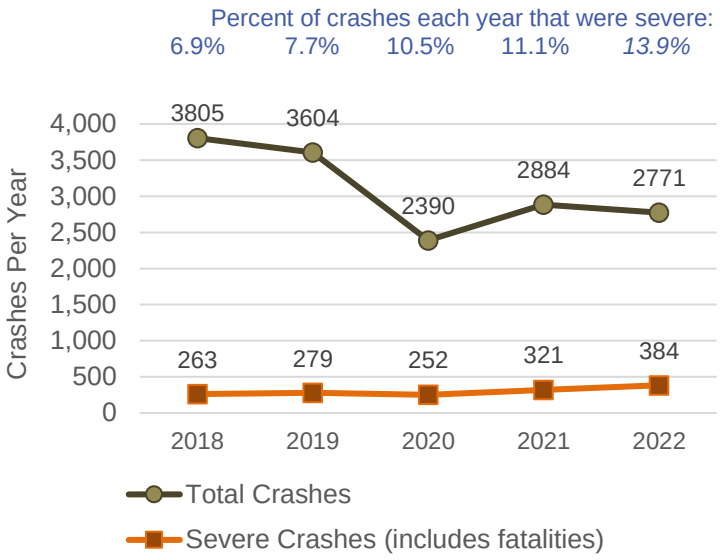


Figure 2. Total and Severe Crashes 2018-2022

Comparisons to other cities are in a later section (page 21).

Compared to 2019: Total crashes are down **23%**

But severe crashes are up **38%**

A **'severe'** crash is one that involves a suspected minor injury, suspected serious injury or fatality.

CRASH SEVERITY

The majority (almost 75%) of crashes do not result in any injury. See ***Figure 3.*** Crashes that are included within the 'severe' category throughout this report include those coded in the police report as 'suspected minor injury', 'suspected major injury' or fatal crashes. Severe crashes represent 9.7% of all reported crashes.

9.7%
of crashes involve an injury/fatality

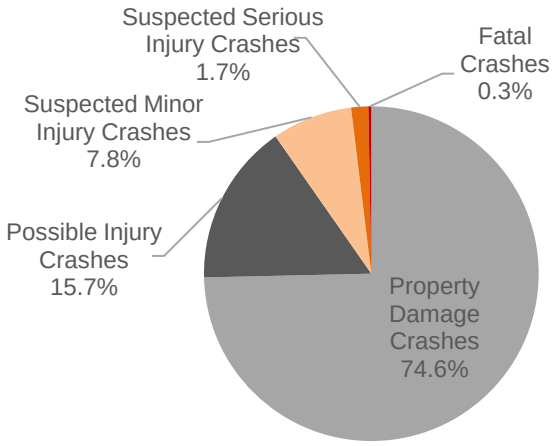


Figure 3. Overall Crash Severity

A review of whether that percentage has changed in the last years indicates that crashes in Fort Collins have become more severe (see values in the top of ***Figure 2***). Pre-pandemic, the percent of severe crashes was about 7 - 8%. In 2020 the percentage was 10.5% and in 2022 the percentage of crashes that were severe jumped to 13.9%. This increase reflects the combination of generally lower overall crash numbers (more non-injury crashes reported just to the state) but increasing severe crash trends. This phenomenon was seen across the United States during the pandemic – lower overall crash numbers likely due to reduced volumes, but higher severe crashes.

Figure 4 shows the five-year crash trends by severity. Severe crashes are trending upward, with the largest increase occurring among minor injury crashes. Fatal crashes are down significantly in 2022. It is however important to note that fatal crash numbers fluctuate more due to the small number of crashes and due to regression to the mean. Regression to the mean is the statistical tendency for data points to adjust towards the long-term average. Because of this, caution is needed when looking for trends in the fatal crash numbers.

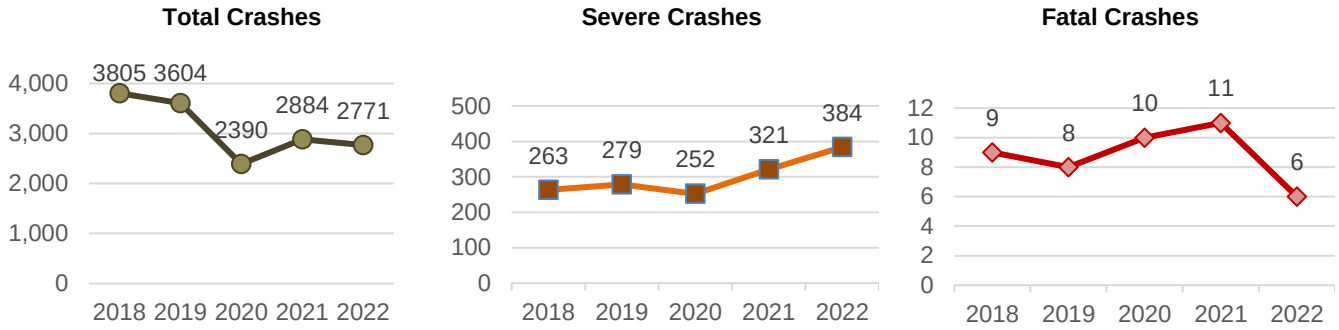


Figure 4. Crash Trends by Severity

CRASHES BY MODE

Figure 5 shows trends in severe crashes when separated by modes. Crashes involving only motor vehicles represent the largest percentage of severe crashes – about 2 of every 3 severe crashes. There has been an especially large increase in minor injury crashes involving just motor vehicles.

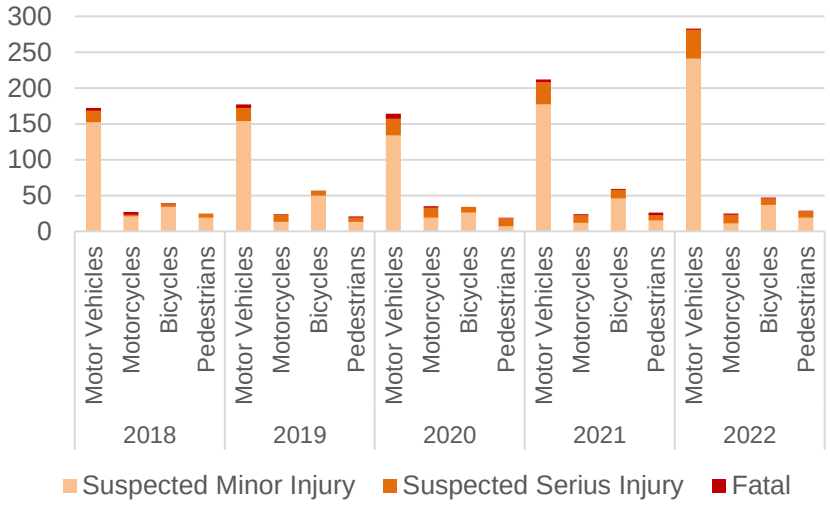


Figure 5. Severe Crash Trends by Mode

IMPACT ON VULNERABLE ROAD USERS

When vulnerable road users (motorcyclists, bicyclists, and pedestrians) are involved in a crash, it tends to be severe. While crashes involving only motor vehicles remain by far the most prevalent (94% of all crashes), they account for just 50% of fatalities. See ***Figure 6***.

Vulnerable road users are involved in
6% of all crashes but
50% of fatal crashes

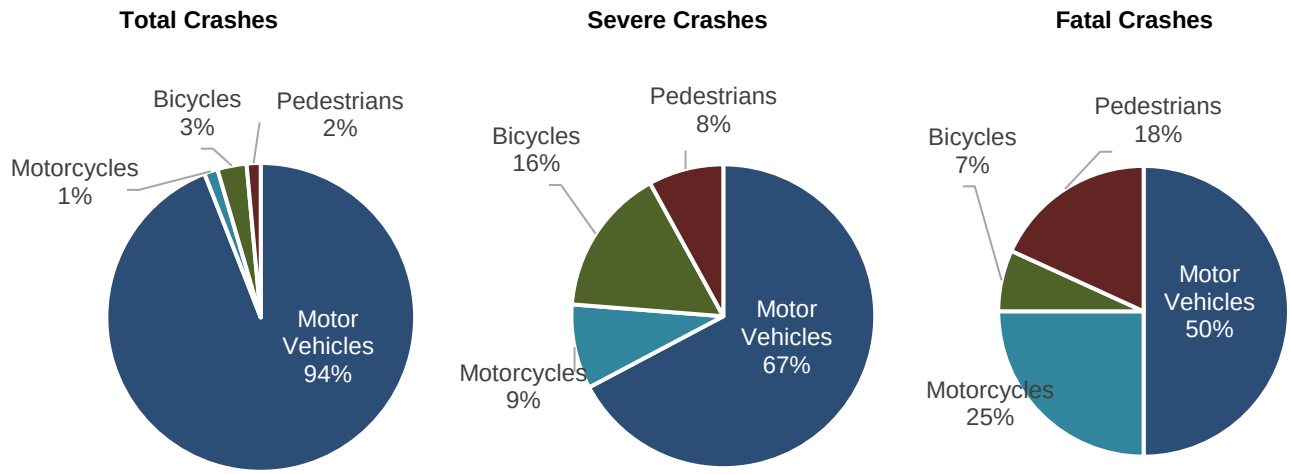


Figure 6. Severity Impact on Vulnerable Road Users

Trends in the past five years for crashes that involve a vulnerable user are shown in ***Figure 7.*** Bicycle crashes, while trending downward, remain the most frequent type of vulnerable user crash. In the two years since the pandemic impacted year of 2020, pedestrian crashes are increasing while motorcycle crashes are decreasing.

The number of severe crashes by mode over the past five years is shown in ***Figure 8.*** Severe bicycle crashes vary quite a bit from year to year but are trending down since 2019 (excluding COVID year of 2020). Severe pedestrian crashes are slowly trending up.

More detailed information on crashes involving bicyclists and pedestrians is presented later in this report.

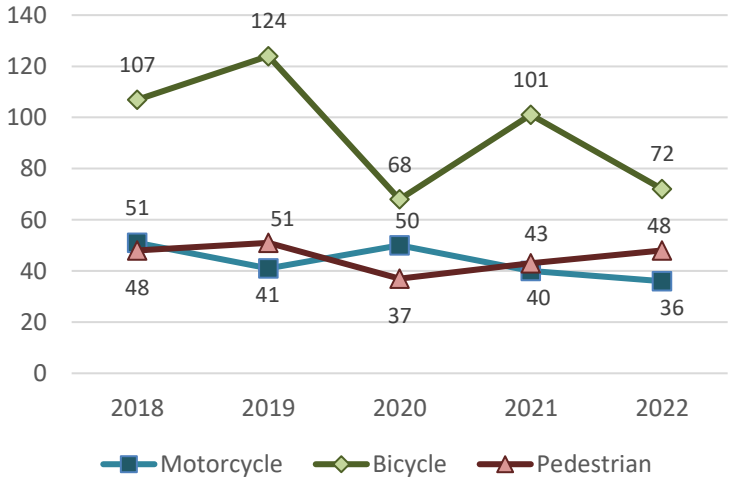


Figure 7. Vulnerable User Crash Trends (Total Crashes)

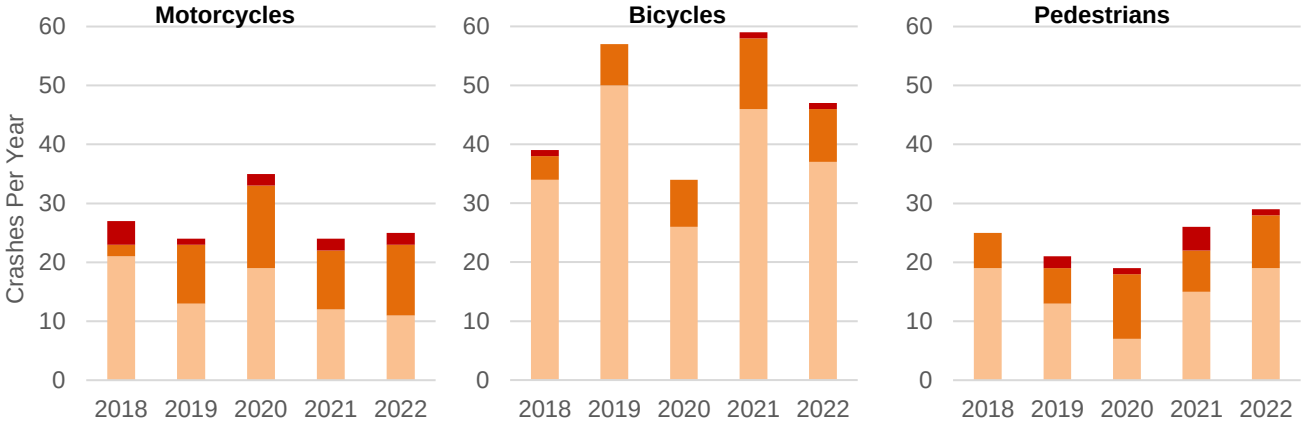


Figure 8. Vulnerable User Crash Trends By Mode (Severe Crashes)

FATAL CRASHES

There were 27 crashes that resulted in fatalities in the past three years. The locations of these crashes are shown in ***Figure 14*** with 24 of the 27 occurring on arterial streets. The number and type of mode involved in the crash is shown in ***Figure 9***. The information in ***Figure 10*** shows a breakdown of fatal crash by mode in each of the past three years.

Fatal crashes are down significantly (by 45%) in 2022. It is important to recognize that due to low numbers, there can be relatively high variations from year to year. Also, while the decrease is encouraging news, any number of fatalities remains a tragedy and work continues to eliminate these types of crashes.

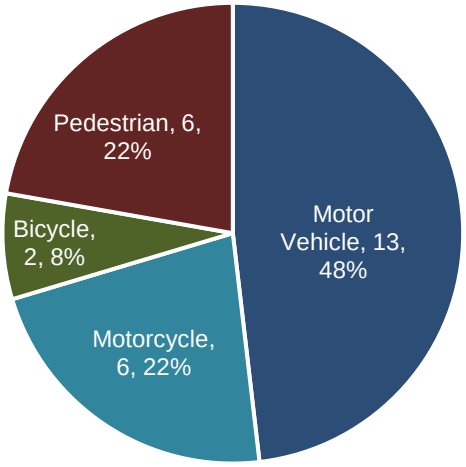


Figure 9. Fatal Crashes by Mode (2020-2022)

One of the tenants of the Vision Zero plan is to take a data driven approach to crash trends and utilize the knowledge to develop specific actions for the City to take to achieve Vision Zero. A detailed review of some of the common circumstances around fatal crashes is noted below. This is not intended to place blame, but rather to understand the most common factors to develop focus areas for countermeasures.

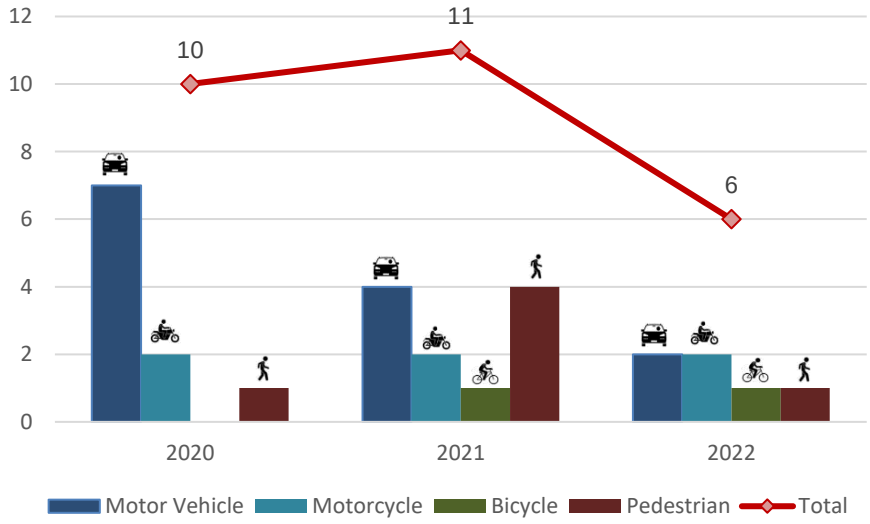


Figure 10. Fatal Crash Trend by Mode (2020-2022)

Note: The national fatal database doesn't include finalized 2022 numbers. All fatal data in this section is from City of Fort Collins crash reports.

Fatalities Involving Only Motor Vehicles

From 2020-2022 there were 13 fatal crashes involving only motor vehicles.

- 5 crashes were vehicles running off the road.
- 2 crashes were non-intersection head-on collisions.
- 2 crashes were approach turn crashes at signalized intersections.
- 2 crashes were right angle crashes at unsignalized intersections.
- 1 crash was a high-speed mid-block side swipe.
- 1 crash was a multi-vehicle (15 vehicle) pileup.

Fatalities Involving Motorcycles

From 2020-2022 there were six fatal crashes that involved motorcycles.

- 2 crashes were right angle crashes where a motor vehicle hit a motorcyclist at an unsignalized intersection.
- 2 involved a motorcycle running off the road.
- 1 involved a motorcycle turning left in front of oncoming traffic.
- 1 involved a motorcycle rear-ending a motor vehicle.

Fatalities Involving Bicycles

From 2020-2022 there were two fatal crashes involving people riding a bicycle. One occurred in 2021 and one occurred in 2022 and both occurred during daylight hours at unsignalized intersections.

- 1 crash was a bicyclist that turned right from a side road onto a main road into traffic.
- 1 crash was a person on a motorized bicycle that turned left in front of oncoming traffic.

Fatalities Involving Pedestrians

From 2020-2022 there were six crashes that resulted in pedestrian fatalities. Four of those crashes occurred in 2021. There was only one crash in 2022. All of the pedestrians were adults ranging in age from 20 to 74, and five of six were male.

- 5 of the 6 crashes occurred at non-intersection locations with pedestrians that entered the roadway without the right-of-way.
- One pedestrian was a construction worker fatally struck by a vehicle leaving the roadway.
- 4 of the 6 crashes occurred after dark. This is a recurring theme with severe pedestrian crashes.

Addressing Fatal Crashes

Addressing fatal crashes will require continued work focused on all modes of travel. The data above, especially when combined with trends from other injury crashes will help identify focus areas. These can include:

- Intersection safety,
- Education around the dangers of being impaired, and
- Bicycle and pedestrian education to support safe bicycling and walking behaviors.

LOCATION OF CRASHES

74%
of crashes occur at an intersection, driveway, or alley access

Crash reports generally show information on relative location such as cross streets, and an indication whether a crash was related to some type of intersection. As typical in an urban area, almost three in every four crashes (74%) occur at an intersection, driveway, or alley access. See ***Figure 11.*** This illustrates the importance of prioritizing intersections in efforts to improve traffic safety and the importance of reducing the number of driveways/accesses when possible.

Crash reports now generally include a geo-coded location that can be evaluated through mapping efforts. This allows for a visual depiction of crash prevalence at specific locations or along corridors. ***Figure 12*** is a citywide heat map of crashes in the last three years in Fort Collins (2020-2022).

Care should be taken to understand that 'hot spots' on the map are simply number based, and neither correlated to volumes, nor necessarily indicative of statistically based higher than expected crash locations. Heat maps provide an overall sense of crash locations and can be used to understand geospatial patterns, guide resources and target enforcement areas. More detailed heat maps related to specific types of crashes (including crashes involving pedestrians and bicyclists) are shown later in this report.

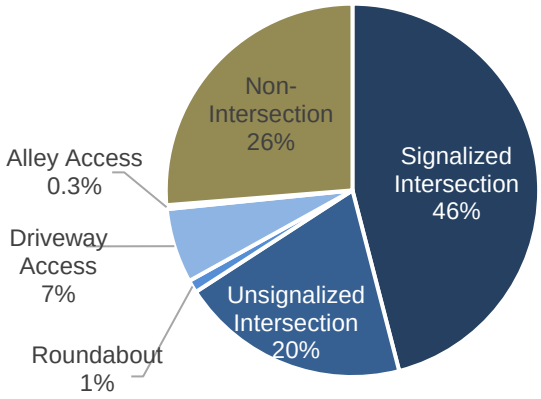


Figure 11. Location of Crashes

Arterials as Priority Corridors

Three years of data from 2020-2022 (shown in ***Figure 12***) was reviewed to determine what types of streets are most crash prone. Arterial streets are the major streets in the city intended to provide citywide connectivity and intercity travel. Specifically, they are the streets that are classified as either a minor arterial (2 lane) or major arterial (4 lane or 6 lanes) on the City of Fort Collins' Master Street Plan (such as College Avenue, Harmony Road, Laporte Avenue, Overland Trail, etc.).

In 2020-2022

87% of **ALL** crashes occurred on an arterial

79% of **ALL** crashes occurred at an intersection or driveway on an arterial

Most crashes occur on arterials. 87% of all crashes and 89% of severe crashes occurred on an arterial. This is depicted in ***Figures 12 and 14***. Arterials are those roadways with the highest traffic volumes, creating the greatest number of potential conflicts. Arterials are also the roadways with the highest traffic speeds within the City, which can result in less time for reaction, and when crashes occur the higher speeds tend to result in greater severity. The data in these maps was used to create the High Injury Network identified through the Vision Zero Action Plan - shown in ***Figure 16***.

As the City pursues traffic safety improvements, the priority corridors for action must be the arterial street system (and especially at intersections). Almost 80% of all crashes occur at an arterial intersection or driveway. These are the locations where improvements have the largest opportunity for reduction in number and severity of crashes.

Although the priority is on arterials, it should be noted that roadway safety along collector roads and local neighborhood streets remains an important element of the transportation system. Crash evaluation should continue to be completed on all roadways, with programs, projects, and spot improvements made throughout the City as appropriate.

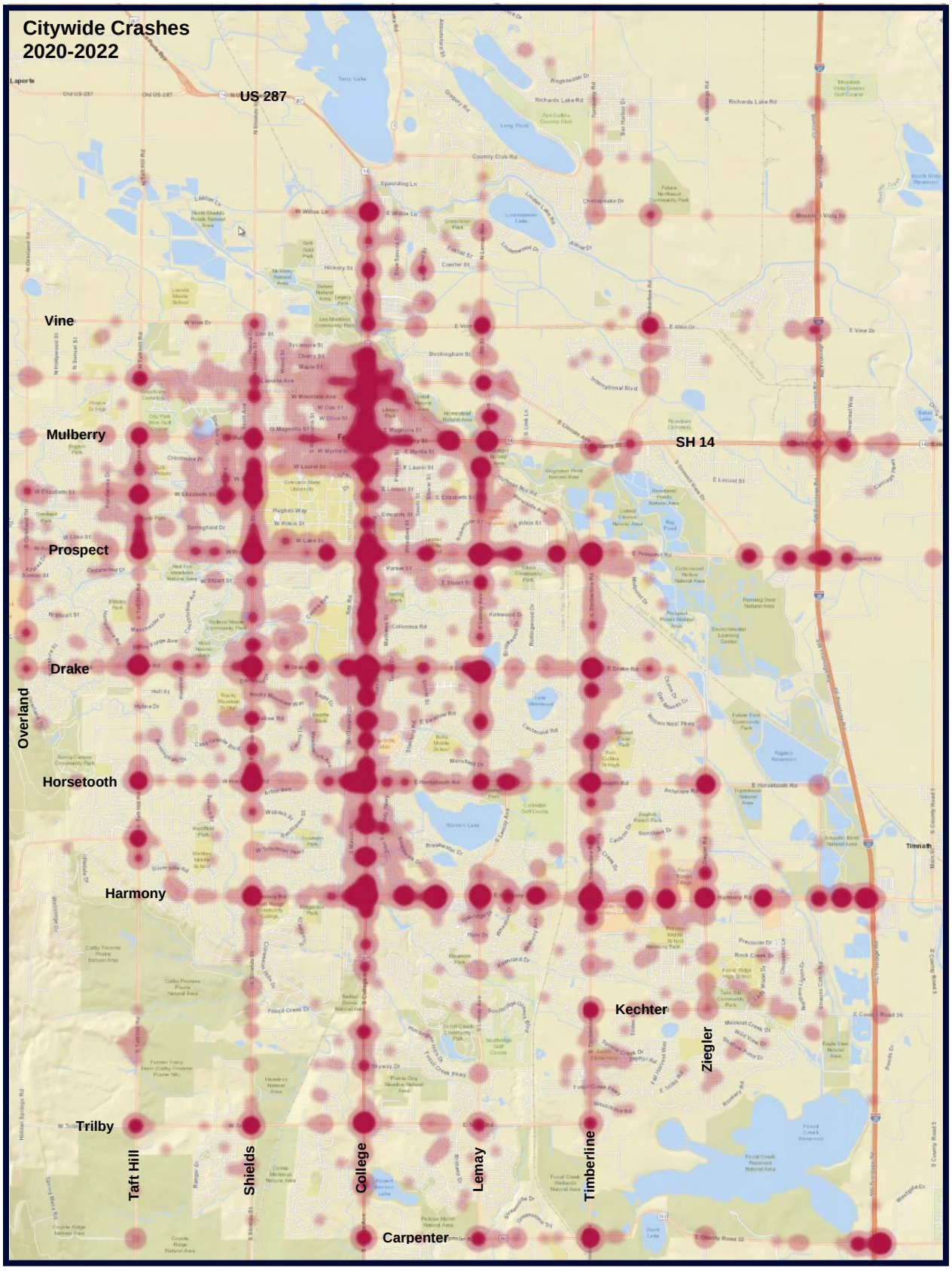


Figure 12. Citywide Heat Map of Crashes (2020-2022)

Locations of Severe Crashes

Figure 14 shows the location of severe crashes in the City in the past three years. Eighty-nine percent of severe crashes occur on the arterial system, 81% at intersections, and 50% at signalized intersections.

The heat map also helps to identify potential locations not related to intersections where severe crashes are occurring. For instance, 16 of the 27 fatal crashes in the past three years (59%) were not at intersections. More discussion is on page 8, as fatal crashes tend to be somewhat more random in location. The locations of fatal crashes are highlighted in ***Figure 14***.

Severe Crashes (2020-2022)

89% of **SEVERE** crashes occurred on an arterial

81% of **SEVERE** crashes occurred at an intersection or driveway on an arterial

Non-Intersection Crashes

Crashes that are not specifically tied to the function or operations at an intersection are classified as non-intersection crashes (also sometimes listed as mid-block crashes). They represent about 33% of reported crashes. These include almost all parking related crashes, run-off-the-road and fixed object crashes, and crashes that occur at driveways. Fixed object crashes can be the result of a variety of causes such as slow speed sliding into curbs during inclement weather, or high-speed impaired drivers leaving the road. The location of non-intersection crashes is shown in ***Figure 15.*** Seventy three percent of non-intersection crashes occur on arterial streets. This is somewhat lower than intersection crashes and reflects that most local street crashes involve parked cars. Other obvious 'hot spots' are parking related crashes downtown, and heavily used driveways for commercial businesses.

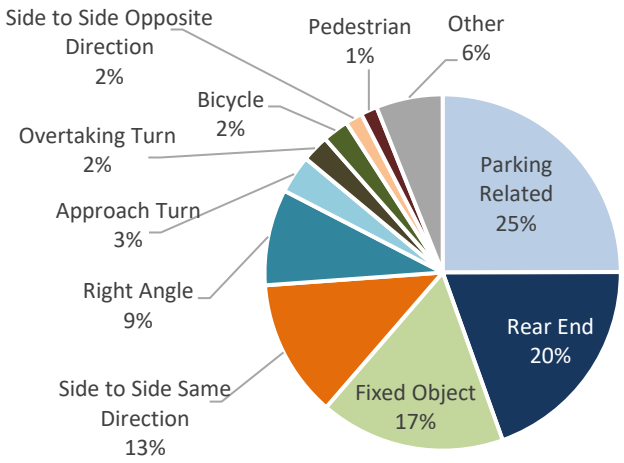
Non -Intersection Crashes

1,028 crashes each year

8.5% are severe

The type of non-intersection crashes for both overall crashes and severe crashes are shown in ***Figure 13***.

Overall Non-Intersection Crashes



Severe Non-Intersections Crashes

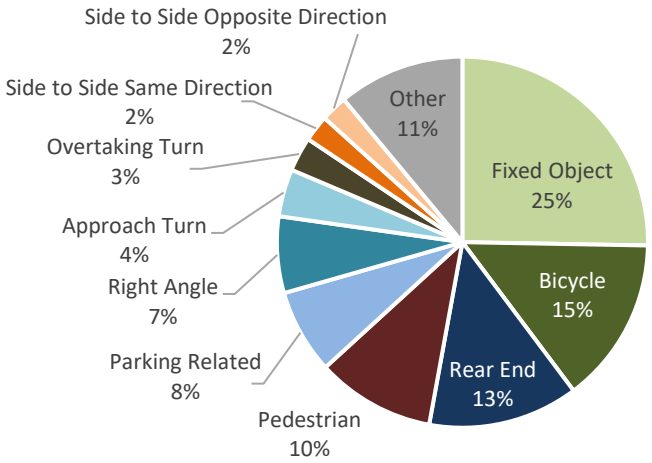


Figure 13. Crash Types For Non-Intersection Crashes

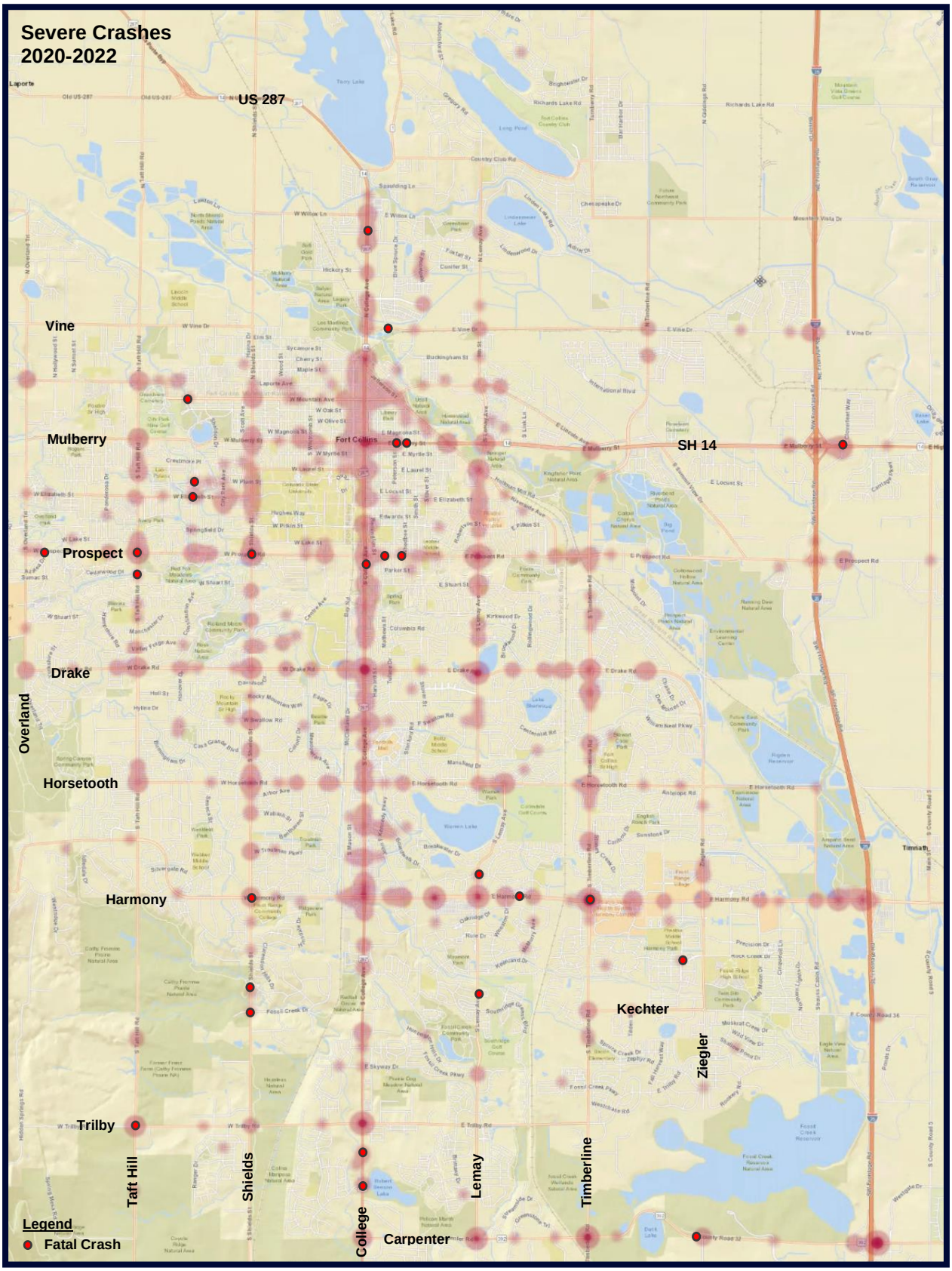


Figure 14. Severe Crash Heat Map (2020-2022)

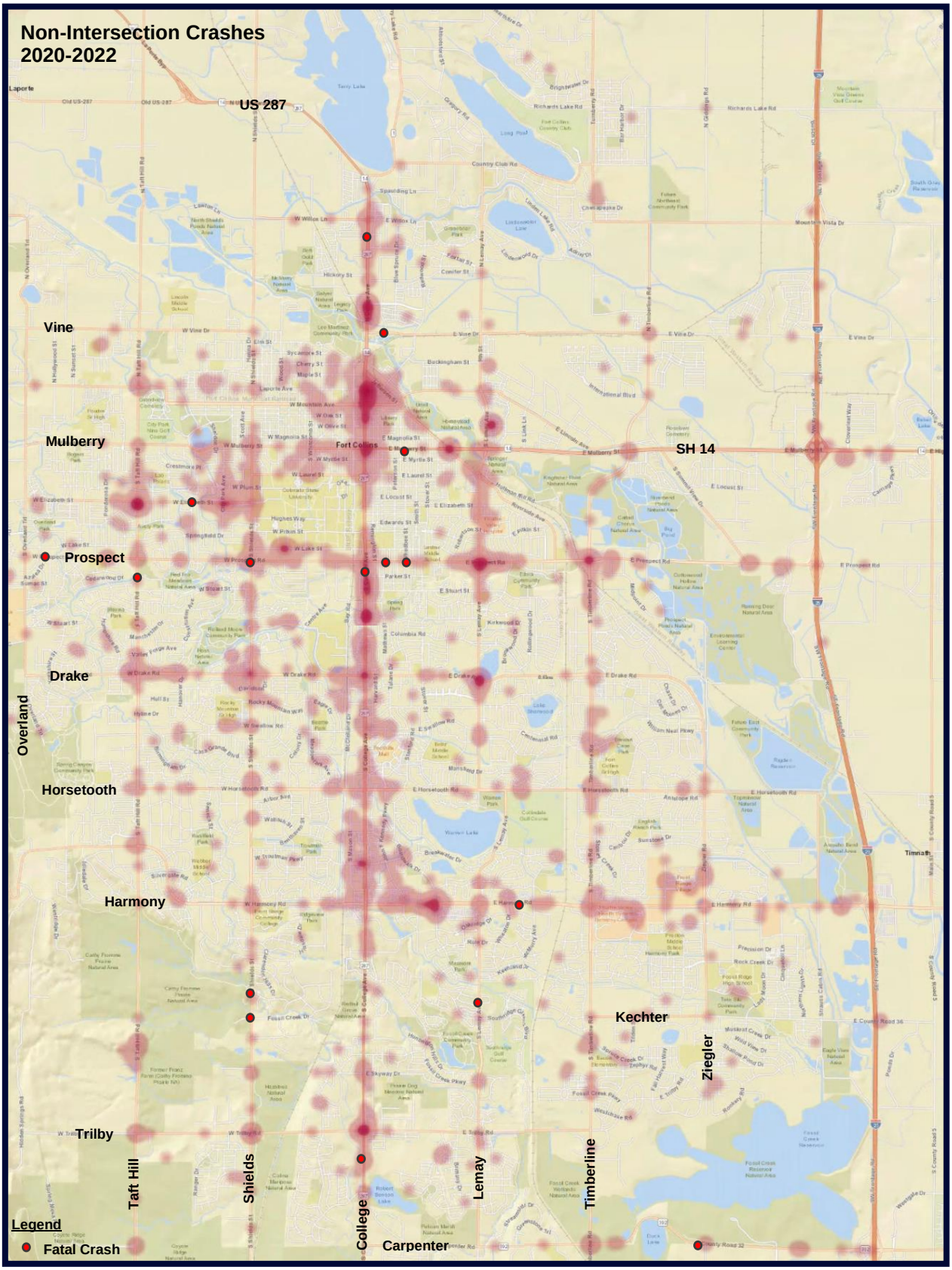


Figure 15. Non-Intersection Crash Heat Map (2020-2022)

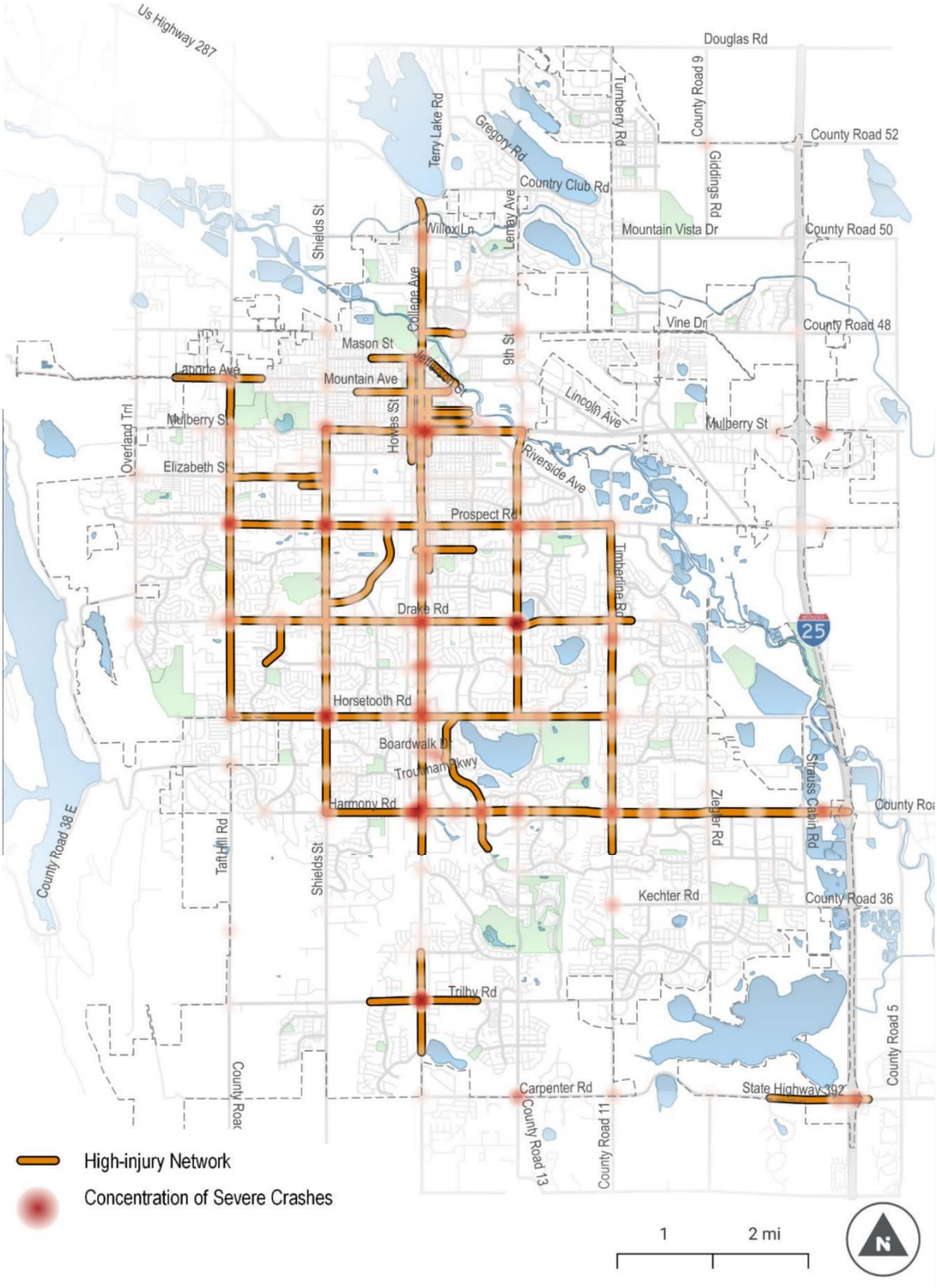


Figure 16. Fort Collins High Injury Network (2017-2021) as Identified in the Vision Zero Action Plan

CRASHES BY MONTH, DAY, AND TIME

The variations of crashes in intervals of time can help identify when crashes are more prevalent, and especially when crash rates are higher than expected when compared to traffic volumes. This offers information that can be used to target educational campaigns and/or enforcement. The analysis represents an average of five years of data (2018-2022). The traffic volume data for the month and day of week analysis comes from City of Fort Collins traffic counts, while the hourly time of day data comes from State Highway 14 continuous counters west of I-25.

Crashes by Month of the Year

A review of injury/fatal crashes by month shows that the number of severe crashes vary substantially (between an average of 15 to 40 each month). The most crashes occur during the late summer months and into the fall (perhaps coinciding with the start of school, including the influx of university students). Although traffic volumes are highest then as well, the number of severe crashes is overrepresented. See ***Figure 17.***

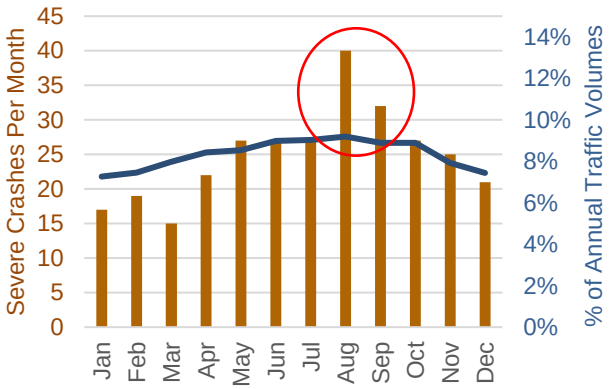


Figure 17. Injury/Fatal Crashes by Month

Crashes by Day of the Week

Figure 18 shows that more crashes occur on Fridays than any other day of the week. Daily variation in crashes generally tracks with daily variation in traffic volumes.

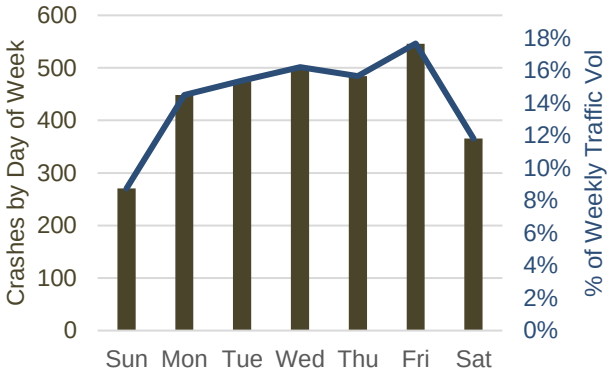


Figure 18. Crashes by Day of the Week

Crashes by Time of Day

Crashes are shown by time of day in ***Figure 19***. The most striking takeaway for this information is the over-representation of crashes at noon and between 3 p.m. and 5 p.m. That is also the time when traffic volumes are highest, but the increase in crashes is not proportional to the increase in volumes.

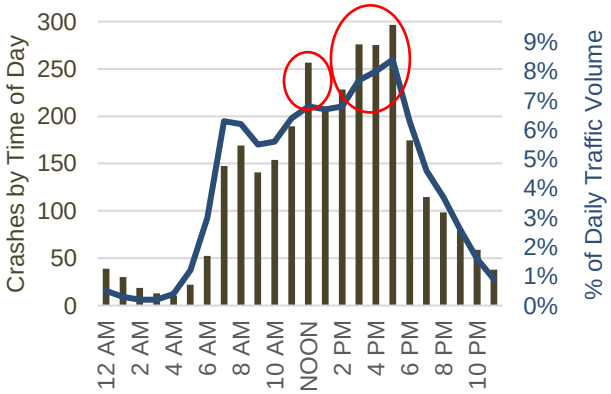


Figure 19. Crashes by Time of Day

CRASH INFORMATION BY DRIVER AGE

Figure 20 compares the number of crashes by age of at-fault drivers with the percent of licensed drivers in that age category. Drivers aged 15-19 are almost three times as likely to be involved in a crash as would be expected given the number of licensed drivers in that age group. Drivers aged 20-24 are also more likely to be involved in crashes. All other age groups are under-represented in crashes.

This trend of higher numbers than expected of young drivers in crashes is not unique to Fort Collins. It does indicate the impact of driver inexperience (and perhaps higher risk taking) as likely key factors in crashes and offers insight into potential countermeasures to address this challenge.

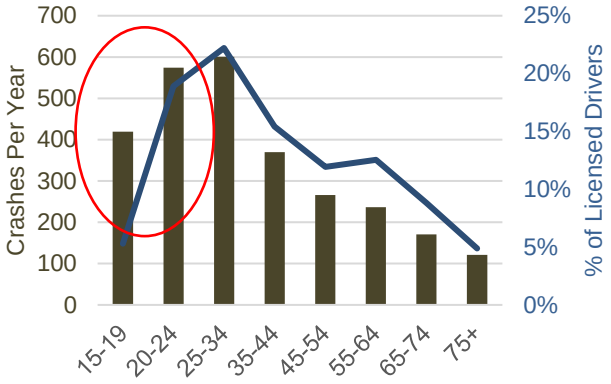


Figure 20. At Fault Drivers By Age

Teenagers represent **5%** of all drivers but are involved in **15%** of all crashes

Although older drivers are generally underrepresented in crashes, there are certain types of crashes where they are overrepresented. ***Figure 21*** compares the types of crashes that older drivers (aged 65+) are involved in against the prevalence of those crashes among all drivers. Older drivers have higher numbers of approach turn crashes relative to all drivers. An approach turn crash is a left turning crash that involves judging oncoming vehicle speeds and choosing an appropriate gap. These tend to be crashes that cause more injury due to higher speeds.

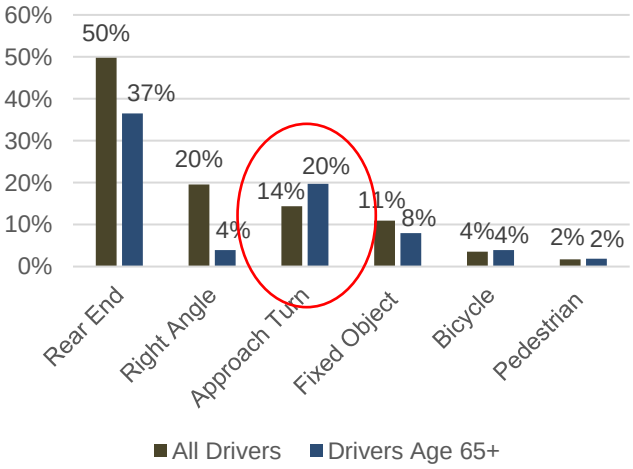


Figure 21. Crash Type by Driver Age

MOTORCYCLE CRASHES

From 2018-2022 there were a total of 218 reported motorcycle crashes, including 11 fatalities. Although there was an increase in crashes during 2020, the general trend is downward. See ***Figure 22***. While motorcycle crashes can follow the same patterns as other crashes, they tend to be more severe as shown ***Figure 23***. Overall, only 25% of all crashes result in some type of injury while 80% of motorcycle crashes result in injury (62% are classified as severe).

Motorcycle Crashes

44 crashes each year

61.9% are severe

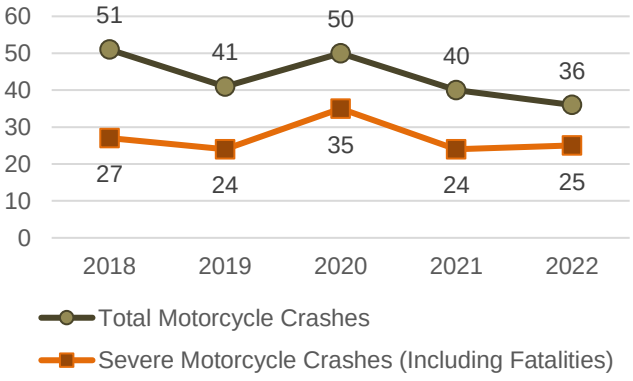


Figure 22. Motorcycle Crash Trends

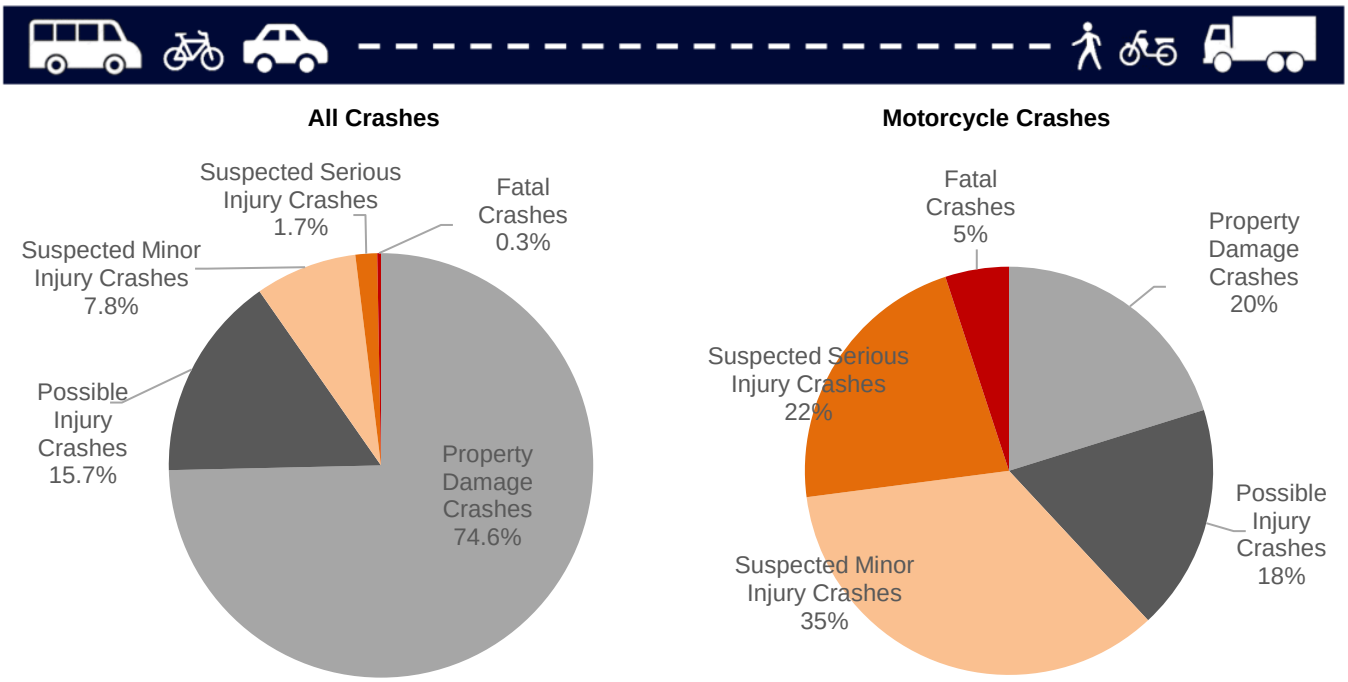


Figure 23. Severity Impact on Motorcycle Crashes

Motorcycle crashes have several idiosyncrasies that are different from overall crash trends:

- They are the mode of travel that result in the highest percentage of severe crashes - 67%. (In comparison, only 9% of motor vehicle crashes, 58% of bicycle crashes and 58% of pedestrian crashes are severe.)
- In addition, 21% of motorcycle crashes are single vehicle crashes (the overall percentage of single vehicle crashes is 13%).

The takeaway for motorcycle crashes is that they tend to be severe, and more frequently than other crashes occur as single vehicle non-intersection crashes.

In a crash, motorcyclists are

6 times as likely to be injured and

16 times as likely to be killed

than people in motor vehicles.

Motorcycle Crashes:

26%
Non-intersection

85%
on arterials

21%
Single Vehicle

CRASHES INVOLVING YOUTH

Crashes involving young people (aged 0-17) are of special interest. These crashes include crashes involving a young pedestrian, a young bicyclist, or a young motor vehicle driver. The data does not include youths that are passengers in vehicles involved in a crash. (So the bicyclist and pedestrian data includes all ages of youth, while the motor vehicle data represents just 16 and17 year olds.)

Figure 24 shows the trends in crashes that involve youths. Like in many other instances, 2020 was an anomaly, but in general youth crashes are decreasing – overall crashes are down 35% in five years. However, crashes that are considered severe involving youth are increasing, up 60% in five years.

In the last five years, overall crashes involving youths are down

35%

While severe crashes are up

60%

The mode split for crashes involving youths is shown in ***Figure 25 and Figure 26.*** Most of these crashes involve young drivers. Using five years of data, the average number of crashes per year involving youth are:

- 255 vehicle crashes
- 15 bicycle crashes
- 7 pedestrian crashes
- 1 motorcycle crash

Figures 27, 28, and 29 show the trends in crashes involving youths by mode. Motor vehicle crashes are decreasing, while crashes involving young pedestrians saw an increase in 2022.

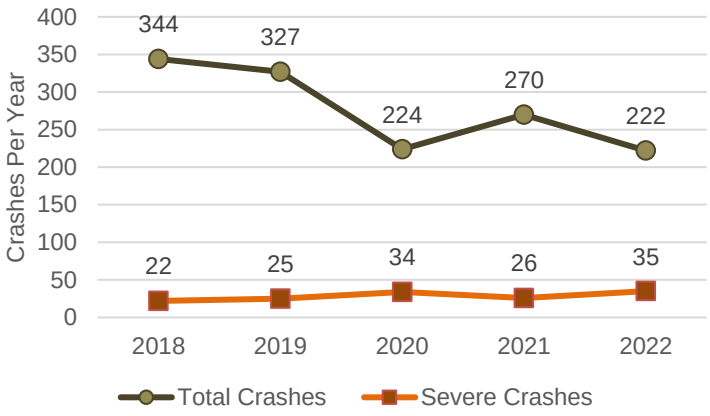


Figure 24. Trends for Crashes Involving Youths

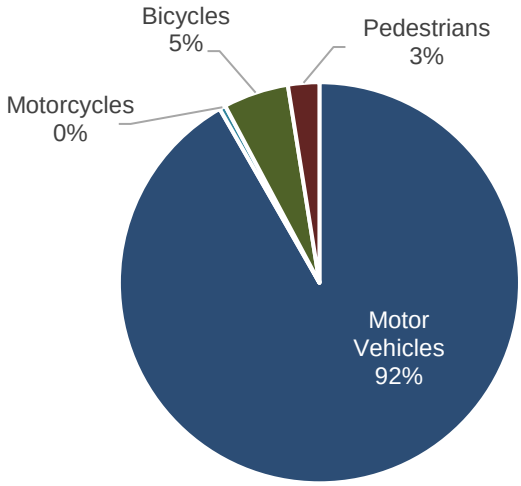


Figure 25. Mode Split for Crashes Involving Youths

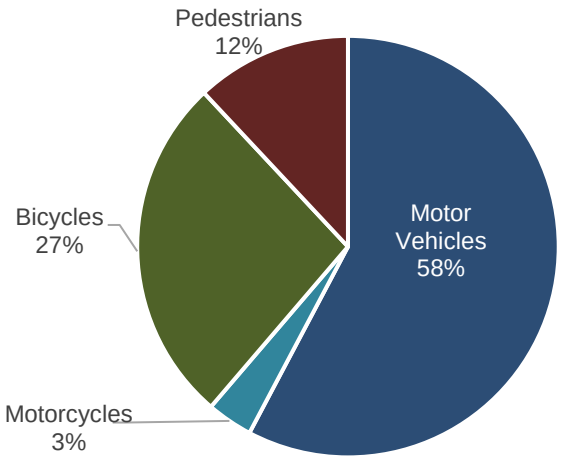


Figure 26. Mode Split for Severe Crashes Involving Youths

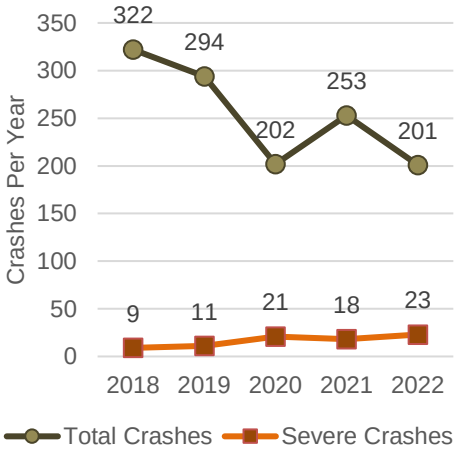


Figure 27. Crashes Involving Young Drivers

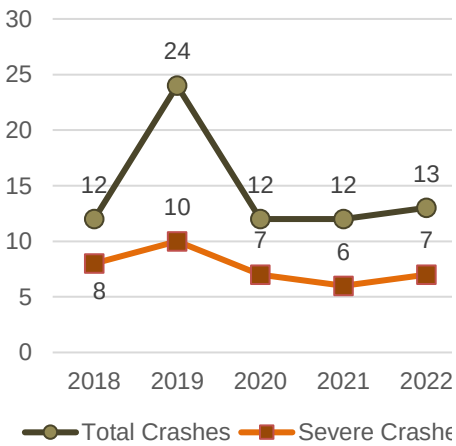


Figure 28. Crashes Involving Young Bicyclists

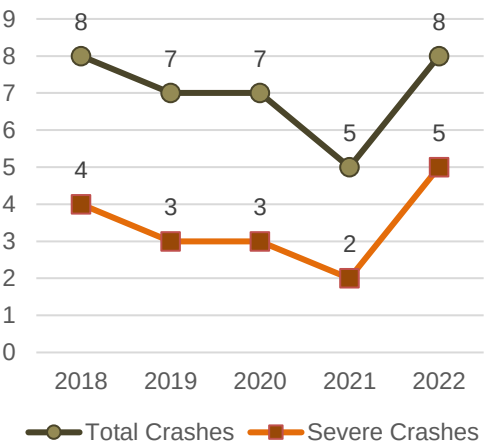


Figure 29. Crashes Involving Young Pedestrians

ECONOMIC IMPACT OF CRASHES

Using numbers determined by the Federal Highway Administration and published in the Highway Safety Manual, an estimation of economic costs associated with crashes in Fort Collins can be made. The costs are weighted by severity and adjusted to 2022 numbers (see Section 4 for more details). The annual societal cost of traffic crashes in Fort Collins is about $161 million. See ***Table 1.*** The crash costs shown are adjusted to reflect 2022 values. Crash costs include monetary losses associated with medical care, emergency services, property damage, and lost productivity. They also include costs related to the reduction in the quality of life related to injuries.

Societal cost of crashes in Fort Collins in 2022:
$161 million

A study completed by the National Highway Traffic Safety Administration (NHTSA) identified who pays the costs of the economic impact of crashes. The NHTSA study found that society at large pays for about 75% of all costs incurred for traffic crashes. Those costs are passed on to the public through insurance premiums, taxes, direct out of pocket payments for goods/services, and increased medical costs.

Crash Severity	Number of Crashes	Cost Per Crash	Societal Cost
Property Damage Crashes	2,039	$ 12,400	$ 25,283,600
Possible Injury Crashes	348	$ 76,300	$ 26,552,400
Non-Incapacitating Injury Crashes	308	$ 135,200	$ 41,641,600
Incapacitating Injury Crashes	70	$ 370,000	$ 26,552,400
Fatal Crashes	6	$ 6,970,800	$ 41,824,800
Total	**2,771**		**$ 161,202,400**

Table 1. Economic Impact of Traffic Crashes in Fort Collins, 2022

Crash cost source: FHWA Highway Safety Manual Table 4A-1 adjusted to 2022 dollars.

COMPARISON TO OTHER CITIES

The most consistent way to compare Fort Collins' crash frequency with that of other cities is to compare the fatal crash rate (crashes per 100,000 population). Fatal crashes are used for this comparison as they are most consistently reported due to federal reporting requirements. ***Tables 2 and 3*** are sorted by fatal crash rate and compare Fort Collins to other cities in Colorado and also other peer cities nationwide with similar populations (90,000 to 200,000).

Colorado crash data is from the Colorado Department of Transportation (CDOT). Crash data for communities outside Colorado (peer cities) was obtained from the National Highway Traffic Safety Administration's Fatal Accident Reporting System (FARS) which contains data through 2021. Population estimates are from the U.S. Census.

Colorado Cities								
City	Population	Fatal Crashes, 2018 - 2022					Avg.	Fatal Crash Rate (Crashes / 100,000 Pop.)
		2018	2019	2020	2021	2022		
Pueblo	111,456	16	12	13	18	13	14.4	**12.9**
Lakewood	156,120	17	19	12	7	17	14.4	**9.2**
Longmont	98,687	6	12	5	6	2	6.2	**6.3**
Avg. CO Cities	125,511	8.3	8.7	8.2	6.0	7.9	7.8	**6.2**
Greeley	109,209	9	4	13	2	5	6.6	**6.0**
Westminster	114,533	10	5	6	1	10	6.4	**5.6**
Fort Collins	169,249	9	8	10	11	6	8.8	**5.2**
Thornton	143,282	1	13	8	3	12	7.4	**5.2**
Arvada	121,581	5	3	4	2	5	3.8	**3.1**
Boulder	105,485	2	2	3	4	1	2.4	**2.3**

Table 2. Fatal Crash Rate Comparison to Other Colorado Cities

Peer Cities								
City	Population	Fatal Crashes, 2017-2021*					Avg.	Fatal Crash Rate (Crashes / 100,000 Pop.)
		2017	2018	2019	2020	2021		
Springfield, MO	170,067	17	18	15	27	27	20.8	**12.2**
Boca Raton, FL	99,009	6	10	6	11	15	9.6	**9.7**
Norman, OK	129,627	9	9	5	12	10	9	**6.9**
San Angelo, TX	99,112	4	5	3	9	10	6.2	**6.3**
Fort Collins, CO	169,249	13	9	8	10	11	10.2	**6.0**
Avg. Peer Cities	139,971	6.8	6.5	6.2	8.5	9.1	7.4	**5.4**
Broken Arrow, OK	117,911	7	7	3	4	9	6	**5.1**
Richardson, TX	118,802	4	5	5	9	7	6	**5.1**
Cedar Rapids, IA	136,429	5	9	9	5	6	6.8	**5.0**
Coral Springs, FL	133,369	7	3	4	8	7	5.8	**4.3**
Overland Park, KS	197,726	8	2	9	7	5	6.2	**3.1**
Olathe, KS	145,616	3	6	6	3	4	4.4	**3.0**
Naperville, IL	149,936	3	1	3	2	5	2.8	**1.9**
Bellevue, WA	152,767	2	1	4	4	2	2.6	**1.7**

Table 3. Fatal Crash Rate Comparison to Similar Peer Cities Nationwide

** Note: 2021 is most current national data available*

Section 3

REVIEW OF MOST FREQUENT SEVERE CRASH TYPES

As noted earlier, crashes are categorized into a variety of types. Definitions and explanations of those types are included in the introduction. This section provides a more detailed review of the most prevalent crash types that result in severe crashes (those that are categorized as involving non-incapacitating injury, incapacitating injury, or fatal crashes).

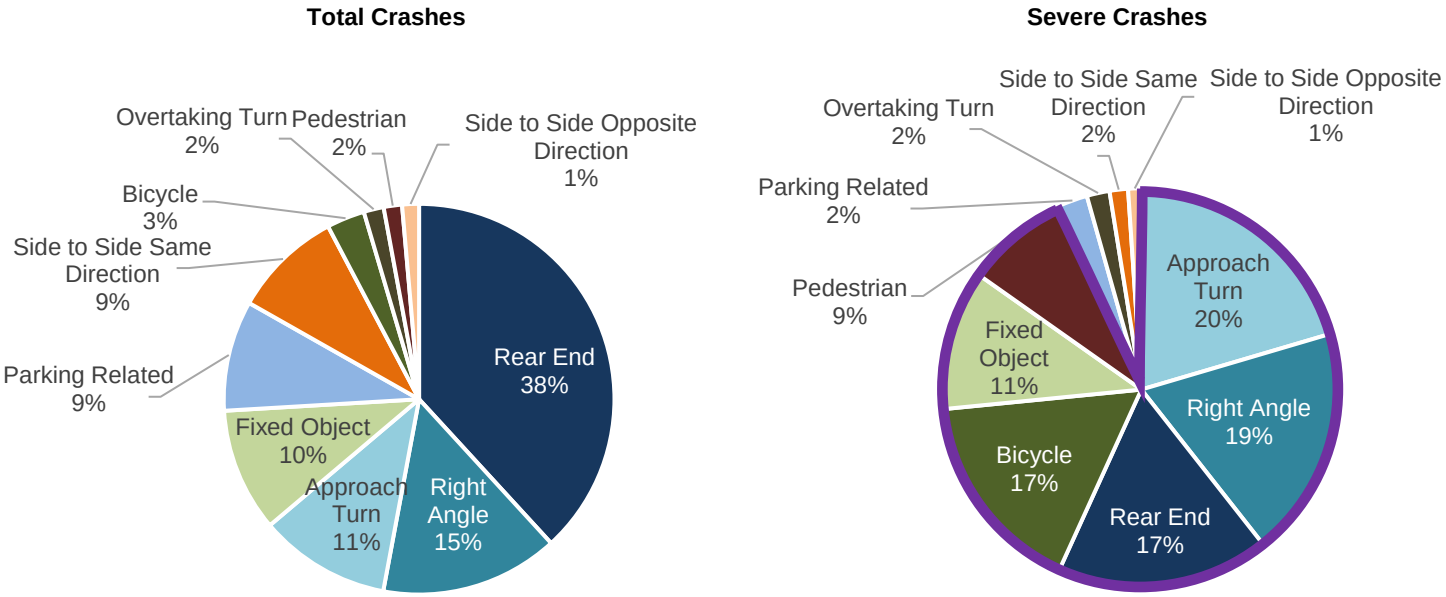


Figure 30. Crash Types by Total Crashes and Severe Crashes

Figure 30 indicates the type of crashes that occur, both when evaluated among all crashes, and then only among severe crashes. There are six types of crashes that are responsible for 88% of all severe crashes (outlined in purple color in Figure 30. While rear end crashes see large numbers in both overall crashes and severe crashes, bicycle crashes and pedestrian crashes become a larger component of the severe crash picture and join approach turns, right angle and fixed object crashes as the most prevalent.

While all traffic crashes are of concern, those that occur most often with the more serious consequences are of special interest. (Note that motorcycle crashes are not separated as a type of crash type in this analysis and are discussed in Section 2.)

Table 4 provides a numerical summary of the six crash types that result in the highest number of severe crashes each year. These are the types of crashes that may have greater prospects for safety improvements and should be a key focus in the roadway safety program. Each one of these crash types is reviewed in more detail in subsequent pages.

6 crash types are responsible for **88%** of severe crashes:

Approach Turn
Right Angle
Rear End
Bicycle
Fixed Object
Pedestrian

Type of Crash	Avg. Number of Crashes / Year	Percent of Crashes that are Severe	Avg. Number of Severe Crashes / Year
Approach Turn	326	17.8%	**58**
Right Angle	442	12.2%	**54**
Rear End	1144	4.3%	**49**
Bicycle	94	50.0%	**47**
Fixed Object	306	10.5%	**32**
Pedestrian	45	52.9%	**24**

Table 4. Summary of Crash Types Involved in the Highest Number of Severe Crashes (Using 5 Years of Data: 2018-2022)

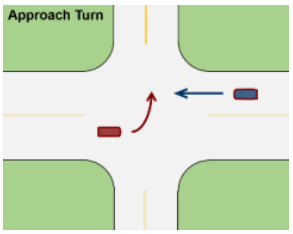
APPROACH TURN CRASHES

Approach turn crashes involve two vehicles traveling in opposite directions, and one turns left (or attempts a U-turn) in front of the oncoming vehicle and is struck. There are two main causes of approach turn crashes:

Approach Turn Crashes

326 crashes each year

17.8% are severe



Poor estimation of distance / speed of approaching through traffic: These crashes occur at both signalized and unsignalized intersections. Poor visibility – often the result of offset left turn lanes – also contributes to these crashes.

Inappropriate response to the onset of the yellow or red signal display: This situation can occur at signalized intersections where permissive left turns are allowed. A driver waiting to turn left on the green ball or flashing yellow arrow is required to yield the right of way to opposing through traffic. When the traffic signal turns yellow and/or red, some left turning drivers assume that oncoming traffic will stop and turn in front of oncoming traffic.

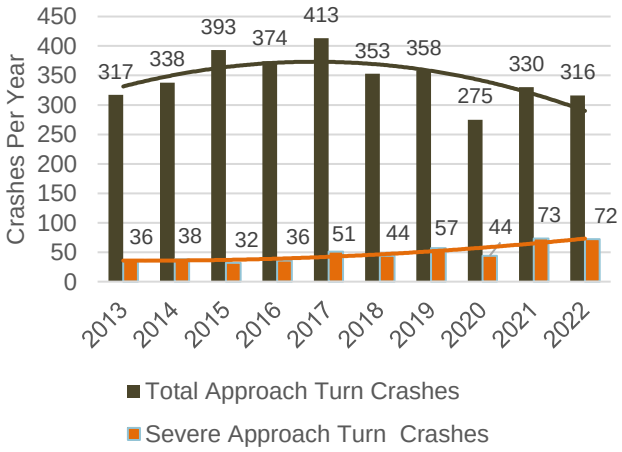


Figure 31. Historic Trend of Approach Turn Crashes

Figure 31 shows the 10-year historic trend of approach turn crashes in Fort Collins. The total number of crashes is generally decreasing (by 23% since a high in 2017), however the number of severe approach turn crashes is up 41% in the last five years.

Severe approach turn crashes up

41%

In the past five years

90%

at intersections

96%

on arterials

A review of the last three years of data shows that 90% of approach turn crashes occur at intersections, and 96% occur on arterial streets. With the highest number of severe crashes in the city in this category, a priority for safety focus should be targeted countermeasures for this type of crash as discussed later in this report.

Table 5 lists the locations with the greatest number of approach turn crashes in the last three years (2020-2022). Note that this list is sorted by the number of crashes and therefore locations with higher traffic volumes will also tend to have higher numbers of crashes. The pattern

recognition section in this report identifies locations of higher-than-expected approach turn crashes based on a statistical evaluation. A combination of the two lists should be used to determine locations for further review.

Facility ID	North - South Street	East - West Street	Number of Approach Turn Crashes in 3 years
119	Shields St	Prospect Rd	20
35	College Ave	Troutman	19
10	College Ave	Drake Rd	18
59	Lemay Ave	Drake Rd	18
111	Shields St	Horsetooth Rd	18
25	College Ave	Mulberry St	15
108	Shields St	Drake Rd	15
144	Timberline Rd	Drake Rd	15
69	Lemay Ave	Riverside Ave	14
68	Lemay Ave	Prospect Rd	13
110	Shields St	Harmony Rd	12
7290	College Ave	Mason/Palmer	12

Notes

Table is sorted by the number of approach turn (AT) crashes

Locations included with at least 12 approach turn crashes in three years

Additional locations may be identified through statistical anlaysis

Table 5. Locations with Most Approach Turn (AT) Crashes

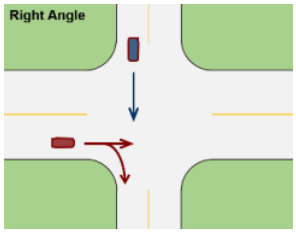
RIGHT ANGLE CRASHES

Right angle crashes occur at intersections when vehicles arrive on perpendicular roads and one fails to yield or passes a traffic control device and strikes the other. There are two main types of right angle crashes – one where approaching traffic has stopped and then proceeds inappropriately into the intersection, and one where entering traffic disregards a stop sign or signal.

Right Angle Crashes

442 crashes each year

12.2% are severe



Failure to yield after stopping: Typical contributing factors to these crashes include sight obstructions such as fences, trees, shrubs, parked cars, or approaching vehicles that prevent the stopped driver from seeing conflicting traffic.

Passing a signal/STOP without stopping: Typical contributing factors to these crashes include inattention, visibility of signal heads or STOP signs, wide streets and/or "busy" areas where traffic control devices become less noticeable, and icy roads. This also tends to occur more often if the STOP sign or signal is not warranted and may be unexpected.

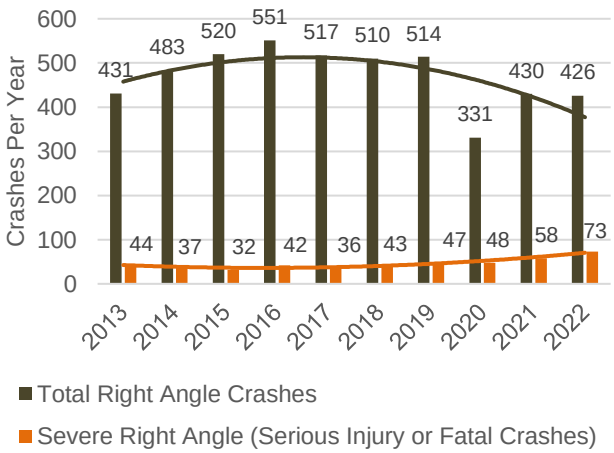


Figure 32. Historic Trend of Right Angle Crashes

Figure 32 shows the 10-year historic trend for right angle crashes in Fort Collins. There has been a significant reduction in right angle crashes since 2016 (down 23%). However, severe right angle crash numbers are steadily increasing - up 100% in five years. This trend should be a priority for safety focus.

Figure 33 shows that 58% of right angle crashes occur when someone stops but then proceeds into oncoming traffic. Most the remaining crashes (40%) are the result of a motorist running a red light or stop sign.

Table 6 lists the locations with the greatest number of right angle crashes in the three-year period. Note that this list is sorted purely by the number of crashes and therefore locations with higher volumes will also tend to have higher numbers of crashes. The pattern recognition section in this report identifies locations of higher-than-expected right angle crashes based on a statistical evaluation. A combination of the two lists should be used to determine locations for further review.

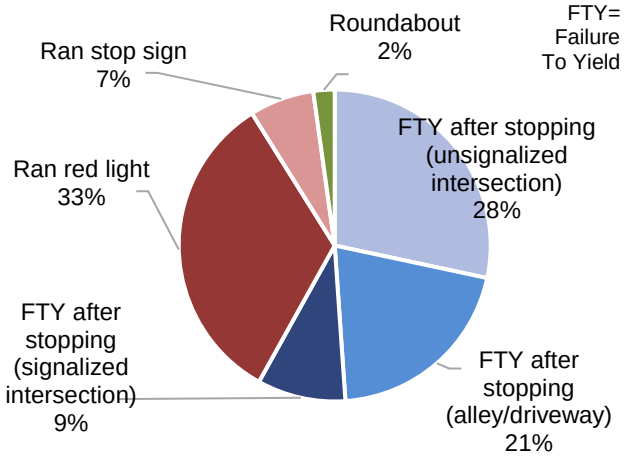


Figure 33. Right Angle Crashes by Type

Facility ID	North - South Street	East - West Street	Number of Right Angle Crashes in 3 years
18	College Ave	Kensington	14
25	College Ave	Mulberry St	13
80	Mason St	Harmony Rd	12
8	College Ave	Columbia	12

Table 6. Locations with Most Right Angle (RA) Crashes

Notes

Table is sorted by the number of right angle crashes

Locations included with at least 12 right angle crashes in three years

Additional locations may be identified through statistical anlaysis

REAR END CRASHES

Rear end crashes are the most prevalent crash type in Fort Collins, accounting for 38% of all crashes with an average of 1,144 crashes each year. Only 4.3% of rear end crashes are considered severe and involve a non-incapacitating injury, incapacitating injury, or fatality. However, because of the sheer number of these types of crashes, they are an important element to consider in safety reviews as their high quantity adds up in societal costs, community impact, congestion, etc. and whiplash injuries can be long term issues.

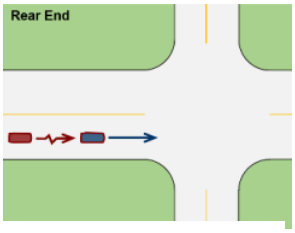
The majority (63%) of rear end crashes occur at signalized intersections. Eighteen percent (18%) of rear end crashes are mid-block crashes.

The 10-year historic trend for rear end crashes is shown in ***Figure 34***. The total number of rear end crashes is down 49% from a high in 2015. Severe rear end crash numbers have been steady, with an unusual jump in 2022.

Rear End Crashes

1,144 crashes each year

4.3% are severe



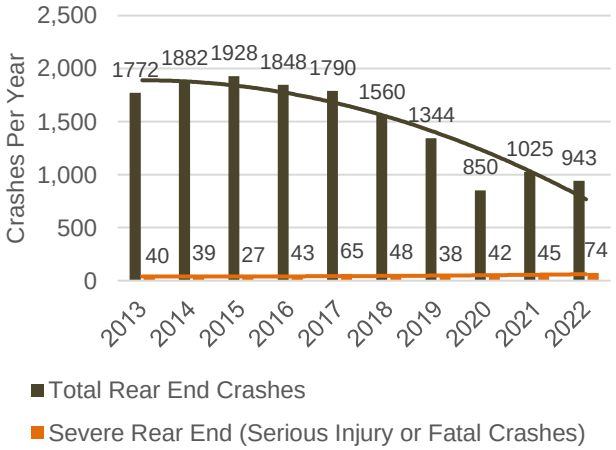


Figure 34. Historic Trend of Rear End Crashes

Table 7 lists the locations with the greatest number of rear end crashes in the three-year period. Note that this list is sorted purely by the number of crashes and therefore locations with higher volumes will also tend to have higher numbers of crashes. The pattern recognition section in this report identifies locations of higher-than-expected rear end crashes based on a statistical evaluation. A combination of the two lists should be used to determine locations for further review.

Facility ID	North - South Street	East - West Street	Number of Rear End Crashes in 3 years
145	Timberline Rd	Harmony Rd	68
14	College Ave	Harmony Rd	64
162	Lemay Ave	Harmony Rd	54
10	College Ave	Drake Rd	47
1	Boardwalk Dr	Harmony Rd	45
16	College Ave	Horsetooth Rd	41
149	Timberline Rd	Prospect Rd	39
119	Shields St	Prospect Rd	34
28	College Ave	Prospect Rd	32
68	Lemay Ave	Prospect Rd	32
66	Lemay Ave	Mulberry St	31
143	Timberline Rd	Carpenter Rd	31
25	College Ave	Mulberry St	30
157	Ziegler	Harmony Rd	30
34	College Ave	Trilby Rd	30
105	Riverside Ave	Mulberry St	30
55	JFK	Harmony Rd	30

Notes

Table is sorted by the number of rear end crashes

Locations included with at least 30 rear end crashes in three years

Additional locations may be identified through statistical anlaysis

Table 7. Locations with Most Rear End (RE) Crashes

Rear end crashes are typically the result of motorist inattention, and/or following too closely combined with unexpected stops in the traffic stream. Care must be taken to avoid increasing rear end crash potential by implementation of countermeasures intended to reduce other types of crashes. For example, installation of traffic signals, or the addition of protected only left turn signal phasing at existing traffic signals are countermeasures that may be used to reduce right angle of left turn crashes. However, they also tend to increase the potential for rear end crashes. Since right angle and approach turn crashes tend to be more severe, it may be reasonable to implement these countermeasures, but careful analysis and consideration regarding the impact on rear end crashes is critical to effective overall safety improvements.

BICYCLE CRASHES

The City of Fort Collins is well known for its bike culture, and there is a strong focus on encouraging increased riding. Bike safety is an important component of supporting these efforts. This section analyzes reported bicycle crashes, which involve a bicycle and a motor vehicle.

Bicycle Crashes

94 crashes each year

50.0% are severe

Figure 35 shows the historic trend of bicycle crashes in Fort Collins during the past ten years. The general trend is decreasing numbers of bike crashes, with overall crashes down 33% since 2018. Severe crashes consistently account for between 50-60 crashes each year (discounting the pandemic year), with a 20% decrease in the last year.

Overall, bicycle crashes account for 3% of all crashes in Fort Collins. However, they account for 16% of severe crashes. This illustrates that bicycle crashes, when they do occur, tend to be more serious than other motor vehicle crashes. The comparison in severity is depicted in ***Figure 36***.

Bicycle crashes are down
33%
Since 2018

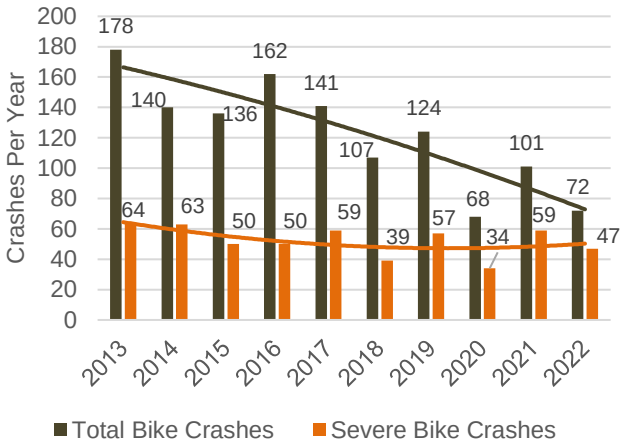


Figure 35. Historic Trend of Bicycle Crashes

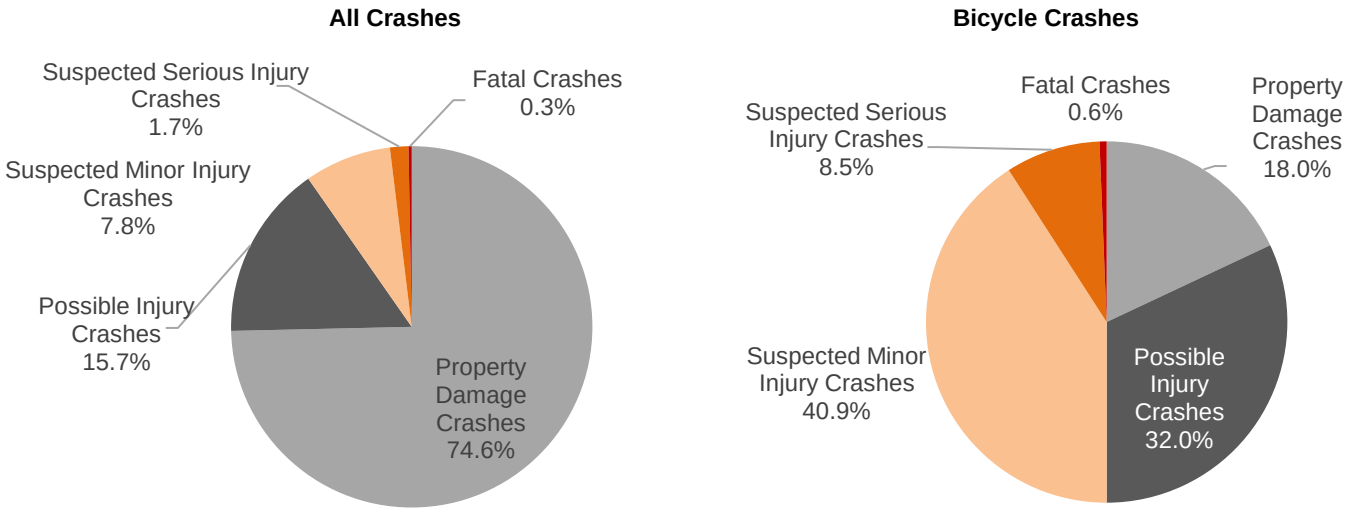


Figure 36. Severity Impact on Bicycle Crashes

The numbers related to severe bicycle crashes are shown in ***Figure 37***. Minor injury (or non-Incapacitating) crashes vary significantly from year to year, while serious injury (or incapacitating) crashes have generally been trending up, with a slight decrease in 2022.

Male cyclists are involved in 73% of all bicycle crashes.

Bicycle crashes can be further evaluated by location. See ***Figures 38 and 39***.

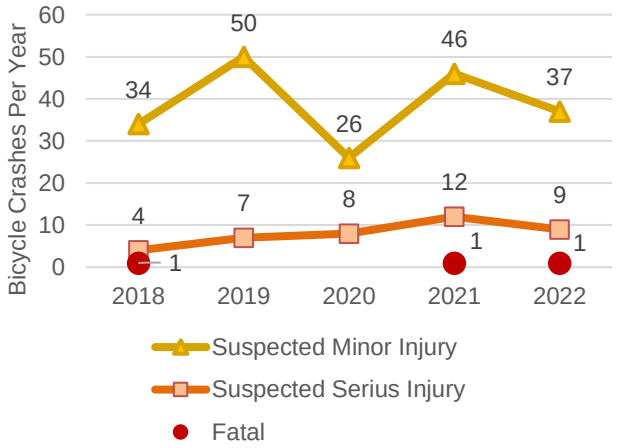


Figure 37. Numbers of Severe Bicycle Crashes

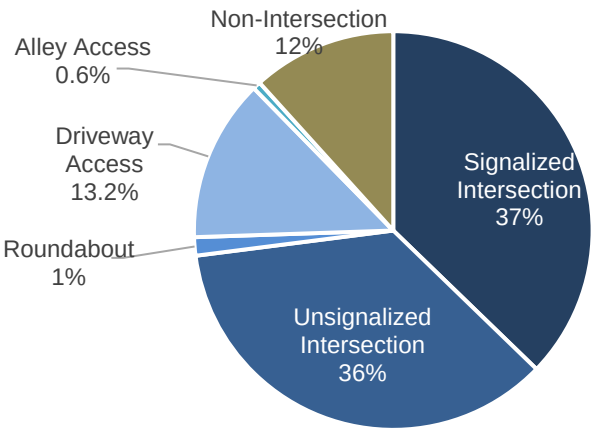


Figure 38. Bicycle Crashes by Location

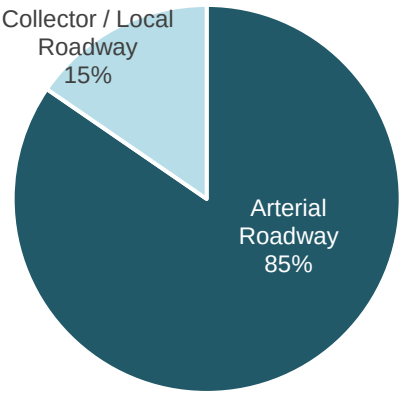


Figure 39. Bicycle Crashes by Road Classification (2020-2022)

The location of greatest risk for bicycle riders is not along various road segments (12% of bicycle crashes), but rather at locations where crossing traffic occurs such as driveways and intersections (88%). While corridor projects such as wider bicycle lanes and features to increase comfort such as buffers and protected bicycle lanes support bicycling mobility and increase perceived safety, an emphasis on intersection safety for bicyclists is critical to reducing the number and severity of bicycle crashes. For instance, implementation of access management to combine/eliminate driveways reduces the number of conflict points.

In addition, 85% of bicycle crashes occur on the arterial roadway system, so similar to the trend in overall crashes, the priority locations for bike safety improvements should be arterial intersections.

Figure 42 is the citywide heat map of bicycle crash locations in the last three years (2020-2022).

Bicycle Crashes

88%
at intersections, driveways, or alley access

85%
on arterials

Figure 40 shows the types of bicycle crashes that have occurred in Fort Collins in the past five years. Depictions of the three most frequent types of bicycle crashes are shown in ***Figure 41*** and represent 82% of all bicycle crashes. Right angle crashes are the most common type representing more than half of all bicycle crashes.

A significant contributing factor in bicycle crashes and especially right angle crashes involves the bicyclist riding against traffic (on sidewalk or in the street). In these instances, motorists often do not see the bicyclist as they may be looking to the left, and not to the right. Twenty-five percent (25%) of all bike crashes and 44% of right angle bike crashes involve bicyclists traveling against traffic. Education for both motorists to 'look right before turning right' and for bicyclists to not ride against traffic is critical to addressing this.

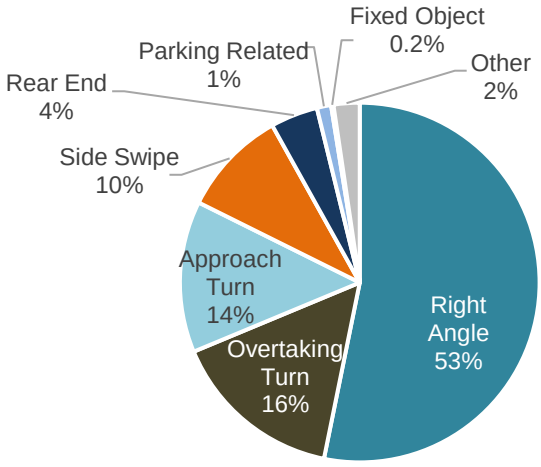


Figure 40. Types of Bicycle Crashes

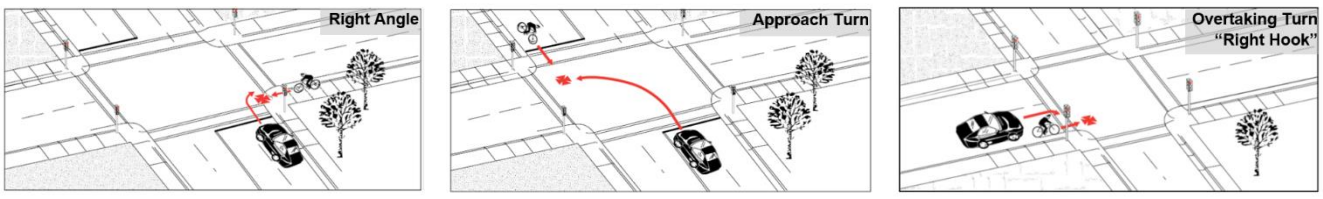


Figure 41. Visual Depiction of Types of Bicycle Crashes

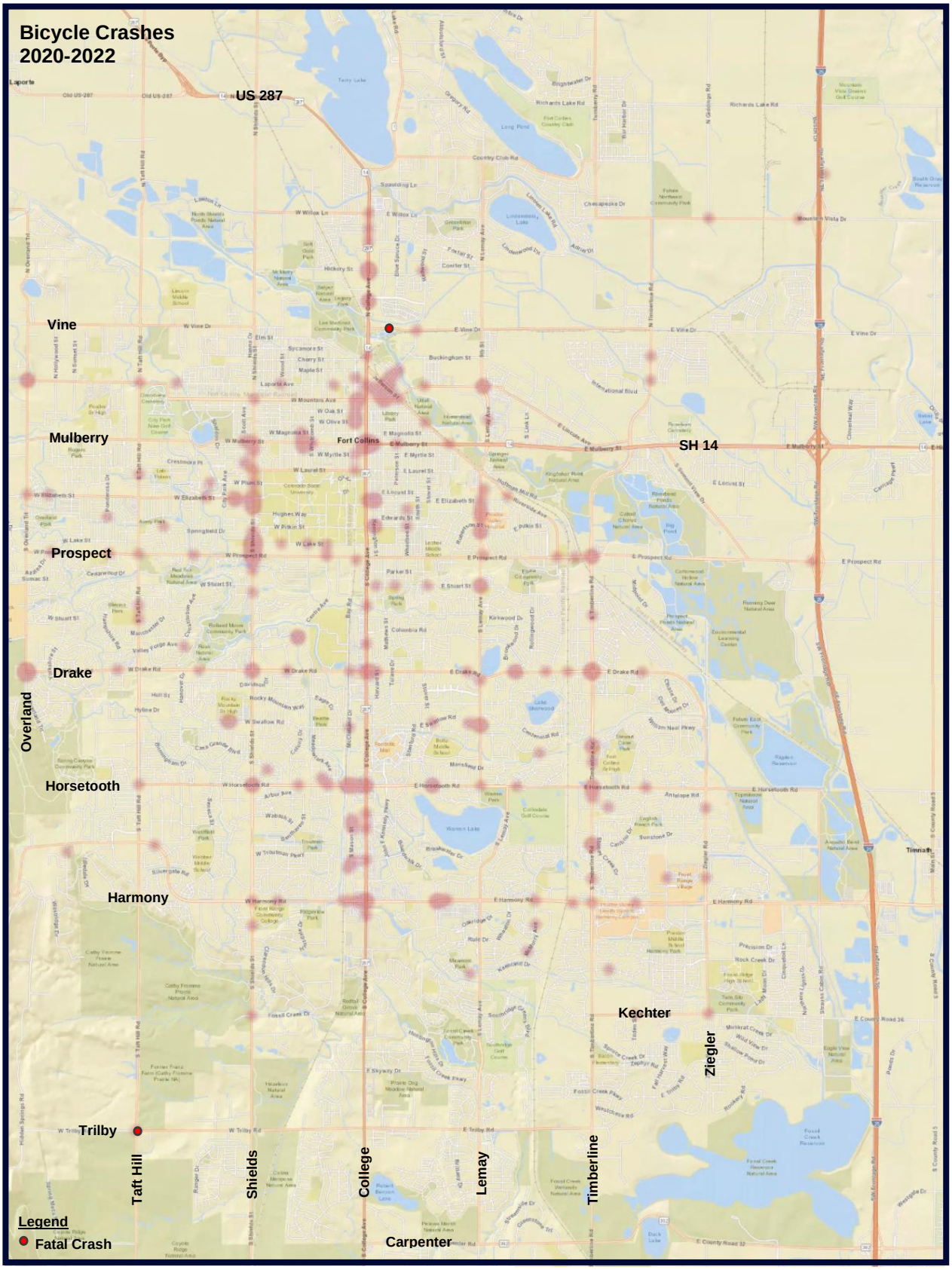


Figure 42. Bicycle Crash Heat Map (2020-2022)

Table 8 lists the location with the highest number of bicycle crashes in the past three years. Note that this list is sorted by the number of crashes and therefore locations with higher volumes (whether vehicle volumes or bicycle volumes) will also tend to have higher numbers of crashes. The pattern recognition section in this report identifies locations of higher-than-expected bicycle crashes based on a statistical evaluation. A combination of the two lists should be used to determine locations for further review.

25% of bicycle crashes involve bicyclists traveling against traffic

Facility ID	North - South Street	East - West Street	Number of Bicycle Crashes in 3 years
8562	Overland	Drake Rd	4
113	Shields St	Lake St	4
25	College Ave	Mulberry St	3
119	Shields St	Prospect Rd	3
144	Timberline Rd	Drake Rd	3
1	Boardwalk Dr	Harmony Rd	2
10	College Ave	Drake Rd	2
111	Shields St	Horsetooth Rd	2
108	Shields St	Drake Rd	2
14	College Ave	Harmony Rd	2
16	College Ave	Horsetooth Rd	2
149	Timberline Rd	Prospect Rd	2
146	Timberline Rd	Horsetooth Rd	2
64	Lemay Ave	Lincoln Ave	2
142	Timberline Rd	Caribou	2
71	Lemay Ave	Stuart	2
99	Remington Ave	Elizabeth St	2
102	Remington Ave	Pitkin	2
6664	McClelland	Horsetooth Rd	2
72	Lemay Ave	Swallow	2
9976	College Ave	Hickory	2
129	Stover	Horsetooth Rd	2
15995	Shields St	University	2

Table 8. Locations with Most Bicycle Crashes

Notes

Table is sorted by the number of bicycle crashes

Locations included with at least 2 bicycle crashes in three years

Additional locations may be identified through statistical anlaysis

FIXED OBJECT CRASHES

Fixed object crashes are predominantly single vehicle crashes (95%) where a driver collides with a fixed roadway feature such as a curb or a median or runs off the road and hits a roadside feature such as a tree, fence or utility pole. (Note crashes with parked cars are not included in fixed object crashes.) Eighty percent (80%) occur on the arterial road system.

Fixed Object Crashes

306 crashes each year

10.5% are severe

Figure 43 shows the historic trend for fixed object crashes. Like many other crash types, the general trend is a reduction in crashes since about 2015 (with the exception of 2019). Severe fixed object crash numbers saw a large increase in 2022.

Fixed object crashes are the crash type that occurs least frequently at intersections. One half (50%) of fixed object crashes are identified as non-intersection crashes.

Minor fixed object crashes often occur in inclement weather (31%). The other main contributor to these types of crashes, especially the higher speed crashes resulting in greater severity, is alcohol. 16% of all fixed object crashes involve alcohol. For severe crashes the percentage related to alcohol goes up to 35%.

Fixed object crashes

16% involve alcohol

35% of severe fixed object crashes involve alcohol

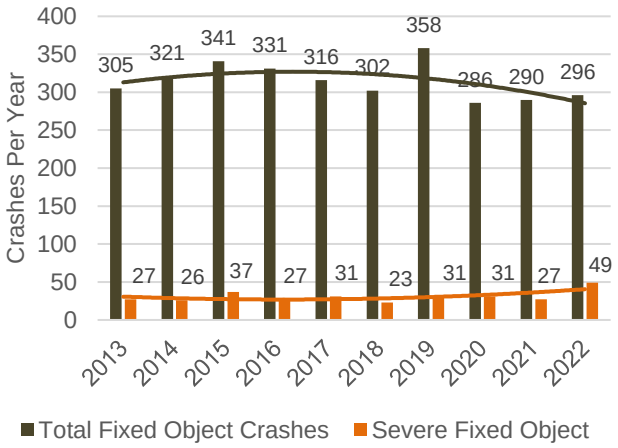


Figure 43. Historic Trends of Fixed Object Crashes

PEDESTRIAN CRASHES

Pedestrian crashes account for only 1.5% of all crashes; however, represent 8.4% of severe crashes. When pedestrian crashes occur, more than half (53%) will involve a documented injury or fatality. There have been eight (8) fatal pedestrian crashes in the last three years.

Pedestrian Crashes

45 crashes each year

52.9% are severe

Figure 44 shows the historic trends of pedestrian crashes in the last ten years in Fort Collins. The variability in pedestrian crash numbers from year to year is quite high partially due to the relatively small numbers, so care should be taken in looking for patterns or trends. Pedestrian crash numbers are quite steady, lower than the highest crash numbers experienced in 2015, but severe crashes have increased in the past five years.

Figure 45 shows the breakdown of severe pedestrian crashes by year for the past five years.

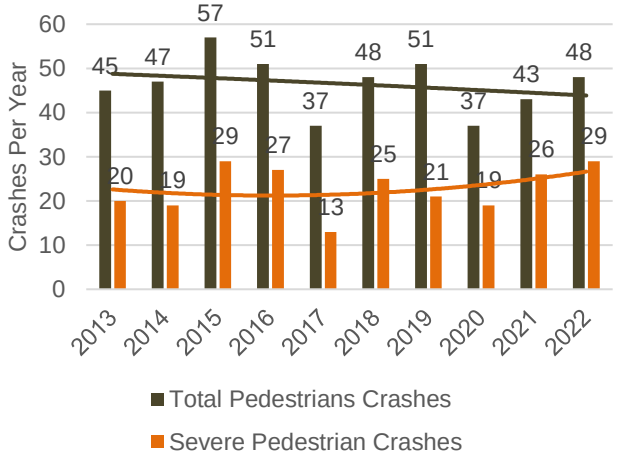


Figure 44. Historical Trends of Pedestrian Crashes

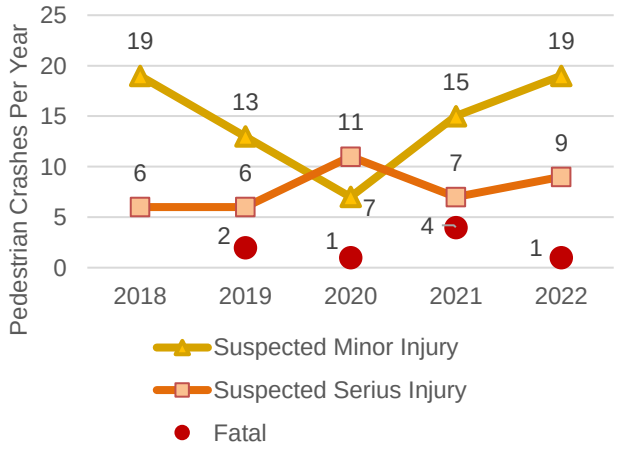


Figure 45. Numbers of Severe Pedestrian Crashes

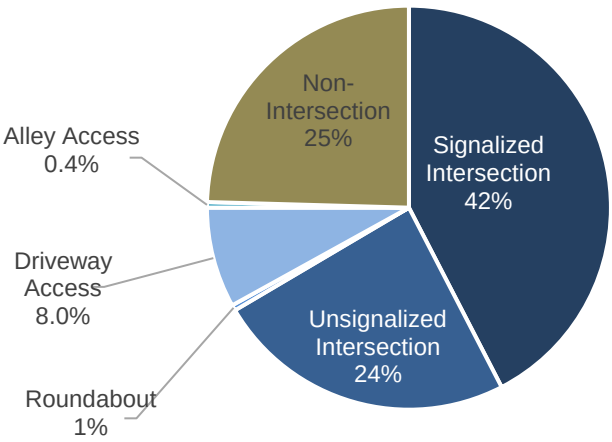


Figure 46. Pedestrian Crashes by Location

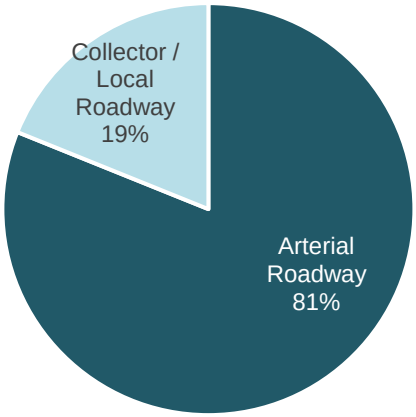
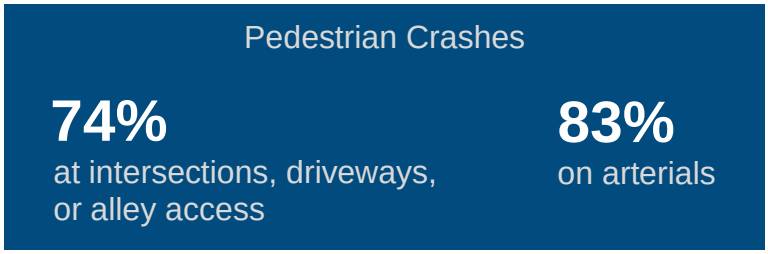


Figure 47. Pedestrian Crashes by Road Classification (2020-2022)

Categorizing locations of pedestrian crashes helps to understand locations of greatest interest in terms of pedestrian safety. ***Figures 46 and 47*** indicate where pedestrian crashes are occurring. Most pedestrian crashes occur at arterial intersections. As these major intersections are reviewed for operational and safety improvements, pedestrian safety is a critical component to consider.



When pedestrian crashes are categorized by gender of the pedestrian that was struck, males are disproportionately represented when compared to the overall population. Males are involved in 66% of pedestrian crashes.

Crashes are categorized into a variety of types, and their prevalence in pedestrian crashes are shown in ***Figure 48***. The definitions and explanation of some common types of pedestrian crashes are described below:

Motorist Fails to Yield at Signalized Intersection

Crashes at signalized intersections where a pedestrian legally crossing the street is hit by a motorist. These crashes often involve a turning driver whose attention is diverted.

Motorist Fails to Yield at Unsignalized Intersection

Crashes where a pedestrian legally in the street is hit by a driver who does not yield the right of way. These crashes often involve a turning driver whose attention is diverted.

Motorist Fails to Yield while Exiting a Driveway

Crashes that involve motorists crossing a sidewalk in the process of exiting a driveway to a public street and striking a pedestrian on the sidewalk crossing the driveway.

Dart Out

Crashes where a pedestrian enters the street in front of an approaching motorist who is too close to avoid a collision.

Pedestrian Crosses Against Signal

Crashes at signalized intersections involving a pedestrian crossing against the signal indication.

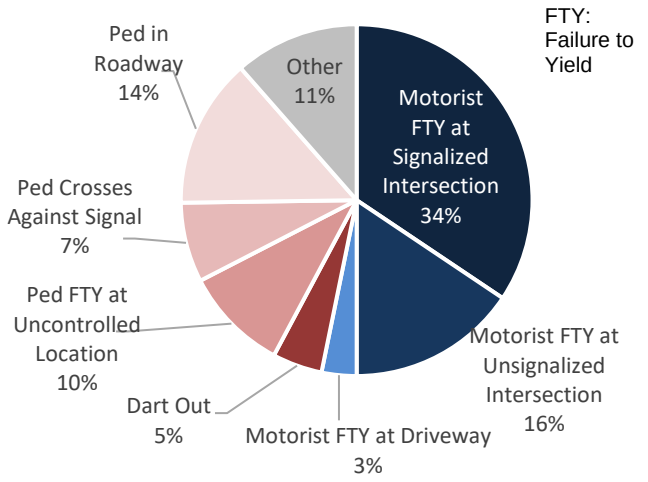


Figure 48. Pedestrian Crashes by Type

Pedestrian Fails to Yield at Uncontrolled Locations

At non-crosswalk locations pedestrians must yield to motorists prior to crossing. These crashes involve pedestrians who attempted to cross without waiting for a safe break in traffic. Many of these crashes occur at night when pedestrians are less visible to motorists.

Pedestrian Standing/Walking in Road

Pedestrian walking on the road but not attempting to cross is struck by a motorist.

Table 9 lists the locations with the greatest number of pedestrian crashes in the three-year period. Note that this list is sorted by the number of crashes and therefore locations with higher volumes (both motor vehicle volumes and pedestrian volumes) will also tend to have higher numbers of crashes. The pattern recognition section in this report identifies locations of higher-than-expected pedestrian crashes based on a statistical evaluation called 'probability of exceedance'. A combination of the two lists should be used to determine locations for further review.

Facility ID	North - South Street	East - West Street	Number of Pedestrian Crashes in 3 years
25	College Ave	Mulberry St	3
20	College Ave	Laurel St	3
32	College Ave	Stuart	3
1	Boardwalk Dr	Harmony Rd	2
15033	College Ave	Rutgers	2
91	McMurry	Harmony Rd	2
7	College Ave	Cherry St	2
21	College Ave	Magnolia	2
84	Mason St	Mulberry St	2
5303	City Park	Plum	2

Notes

Table is sorted by the number of pedestrian crashes

Locations included with at least 2 pedestrian crashes in three years

Additional locations may be identified through statistical anlaysis

Table 9. Locations with Most Pedestrian Crashes

Figure 49 shows the location of pedestrian crashes in the last three years.

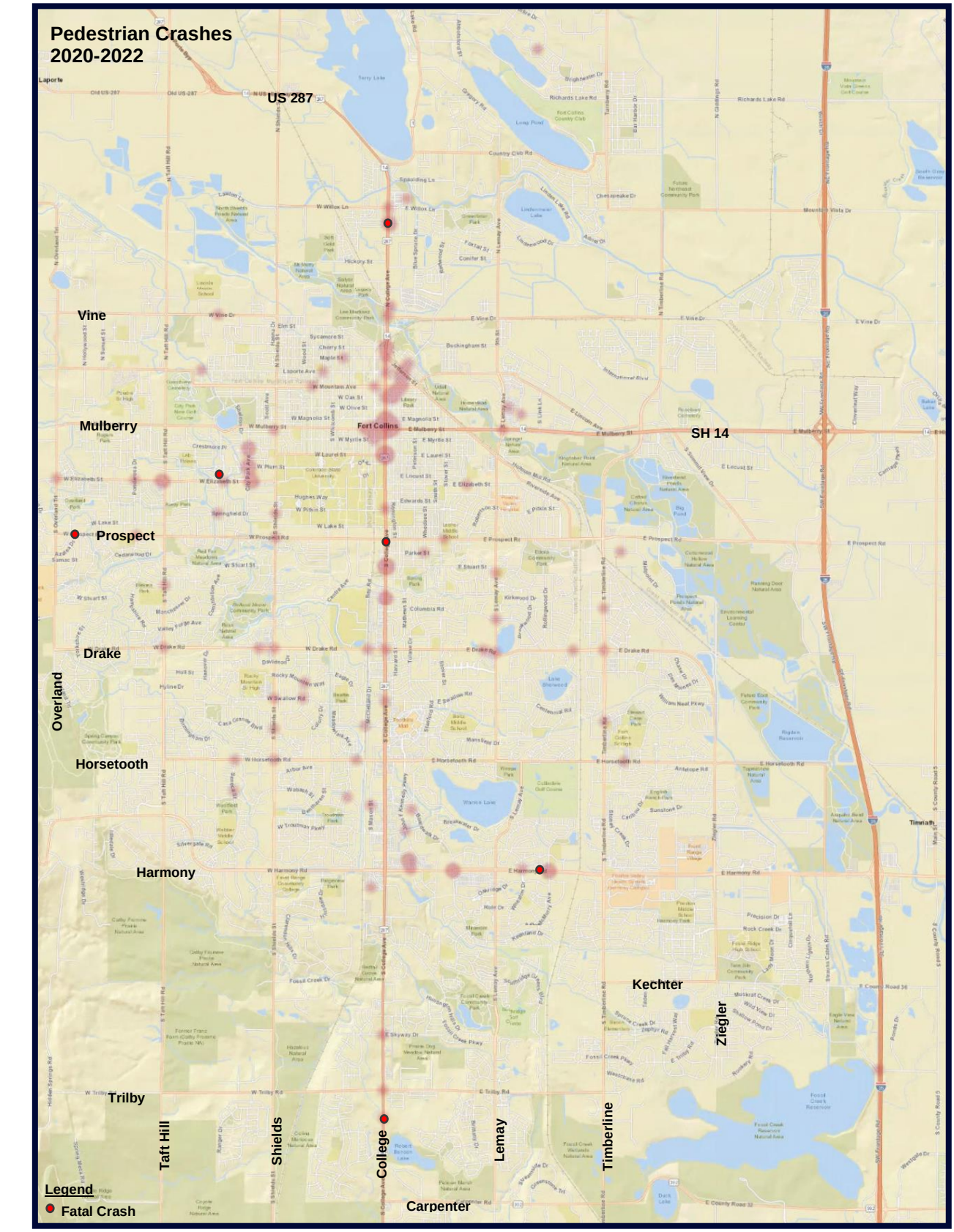


Figure 49. Pedestrian Crash Heat Map (2020-2022)

Section 4

INTERSECTION EVALUATION

Most of this report is a summary of the numbers, types, and patterns of crashes. This information can be used to identify overall trends. The next element is to use the data to identify specific locations for potential improvements.

Total crash numbers at any location (either in a chart or through crash density maps (heat maps) included in previous sections of this report) identify the locations where the most crashes occur. While helpful, because volumes and other elements at specific locations vary widely, it is difficult to draw relevant conclusions from this data. Therefore, an additional analysis is conducted to identify intersections where there are more crashes than expected considering traffic volumes, roadway geometry, type of traffic control, and crash severity.

INTERSECTIONS BY EXCESS CRASH COST

To identify locations with the most potential for crash reduction, it is important to use methods that account for crash severity, traffic volumes, roadway geometry, and type of control at intersections as those factors have an impact on the number of crashes at a given location.

It is also necessary to acknowledge that even though traffic crashes are partially deterministic (i.e., factors affecting crash potential can be controlled), crashes are, to some extent, random events. This random nature of crashes can make it more difficult to determine if a location is truly a problem versus a location where normal variation led to a high crash frequency during the analysis period. To identify locations that warrant further investigation it is helpful to use a methodology that accounts for the somewhat random nature of crashes.

In 2010 the Transportation Research Board (TRB) and the American Association of State Highway and Transportation Officials (AASHTO) published the *Highway Safety Manual* (HSM). The HSM includes a statistical approach that considers traffic volumes and intersection types while also accounting for the natural fluctuation of data called regression to the mean. The result is the identification of locations that have a higher-than-expected crash frequency even after accounting for random variation.

Crash Prediction Models

The method in the Highway Safety Manual that is applied for this evaluation uses crash prediction models to predict the number of crashes (both property damage only and injury/fatal crashes) at each location given traffic volumes, roadway geometry, and type of control at each intersection. The predictions are then compared to the actual number of crashes at each location (adjusted to account for regression to the mean). The more the actual adjusted number of crashes exceeds the number of predicted crashes (expressed as excess crash cost) the more likely it is that a location might benefit from targeted improvements.

Several crash prediction models were considered including those found in the Highway Safety Manual 1st edition, models developed for the Colorado Department of Transportation (CDOT) in 2009, and models developed for CDOT in 2018. Model results were compared to actual Fort Collins crash data and the models that best matched the data in each intersection category were selected for use (see ***Table 10)***.

Once the comparison between modal predicted and actual crashes is completed, the numbers can be monetized into ‘excess crash costs’. This is the cost of crashes above the model predictions for an intersection and provides an indication of the potential benefit of reducing crashes. Cost costs are weighted by severity and based on information provided in the Highway Safety Manual (Table 4A-1), adjusted to 2022 dollars, and consider Fort Collins’ proportion of severe crashes. The costs include monetary losses associated with medical care, emergency services, property damage and lost productivity. They also include costs related to reduction in quality of life that is related to injuries. See ***Table 11*** for the costs used in this report.

Table 10. Prediction Model Used in Intersection Analysis

Number of Legs *	Type of Control	Model Used
3	Stop Controlled	CDOT 2018
4	Stop Controlled	CDOT 2018
3	Signalized	CDOT 2018
4	Signalized	CDOT 2009 (total crashes) 2018 (injury crashes
All	Roundabout	NCHRP 888

Table 11. 2022 Crash Costs

Severity of Crash	Cost
Property Damage Only	$ 12,400 /crash
Fatal / Injury	$ 213,600 /crash

Source of cost: Highway Safety Manual

** Legs: Segments of roadway approaching an intersection*

Traffic Volumes

Traffic volumes in Fort Collins were down in 2020 by about 20% due to COVID-19. To account for this, three-year average traffic volumes used for analysis at each location were reduced by 7% to account for the reduced volumes in 2020.

Average ADT over three years = (V + V + 0.8V)/3 = 0.93V = -7%

This analysis was completed for about 300 of the most major intersections in Fort Collins using three years of data (2020-2022). The evaluation shows that 42% have an excess crash cost and 58% have a negative crash cost (indicating less crashes than predicted). This means that when aggregated and averaged, intersections in Fort Collins have less crashes and/or severity than what would be predicted compared to similar intersections in the state used to calibrate the crash prediction models.

58% of intersections in Fort Collins have fewer crashes than what would be predicted

Table 12 shows the 50 intersections with the greatest excess crash costs (grey highlighted column). Since injury and fatal crashes have higher crash costs associated with them, the ranking method gives more weight to locations with more severe crashes compared to locations with primarily "fender benders". A column in the table indicates whether the intersection is on the High Injury Network identified through the Vision Zero action plan (and shown in ***Figure 16***). ***Figure 50*** shows the location of the top 25 on a map.

LEVEL OF SERVICE OF SAFETY (LOSS)

While excess crash cost is a quantitative approach, CDOT uses a similar but more qualitative approach to identify locations with more crashes than expected termed Level of Service of Safety (LOSS). LOSS is a scale from 1 – 4. LOSS 3 and 4 indicate locations with an above average number of crashes and above the 80th percentile number of crashes respectively compared to estimates from a crash prediction model. LOSS 3 and 4 indicate the highest potential for crash reduction with a mitigating project. LOSS 1 and 2 may still have a pattern that can be mitigated but would likely result in lower numbers of overall crash reduction. Calculation of LOSS was completed in this review and results are included in ***Table 12***. LOSS is included as it may identify some additional intersections – especially with lower volumes -- that may warrant further investigation. It also gives the City information needed to determine locations that may score favorably in the review process for CDOT safety funds.

TRENDS IN INTERSECTION SAFETY

In addition to identifying intersections with higher-than-expected crash numbers and severity, reviewing crash trends can identify changing conditions and safety at specific locations. ***Table 12*** lists the change in excess crash costs both positively and negatively. (A larger version of the table is included at the end of the report). As noted earlier, the base calculation includes three years of data (2020-2022) and the comparison is against the previous three years of data (2017-2019). The comparisons take into account the volume changes in the "after" period related to COVID. Locations with more significant improvement in safety trends are shaded green, while locations with increasing excess crash costs are shaded in red. Note that in locations with few crashes, a single injury/fatal crash can create a pronounced swing in excess crash costs. In these cases, judgment is needed to determine whether a trend is significant or not.

Table 12. Top 50 Intersections by Excess Crash Cost (larger table included at end of report)

Top 50 Intersections by Excess Crash Cost

	Intersection			Traffic Vol	Model Predicted Crashes		Actual Adjusted Crashes		Excess Crashes (# and Costs)			LOSS		Crash Trends	Notes			
	Fac ID	North-South Street	East-West Street	Total AADT	Predicted Crashes/ Year	Predicted FI Crashes/ Year	Expected Crashes/ Year	Expected FI Crashes/ Year	Excess PDO	Excess FI	Excess Expected Crash Value ($)	LOSS Total Crashes	LOSS FI Crashes	2017-2019 vs 2020-2022 ∆ Crash Cost		High Injury Network	Type Of Control	Rank
Top 10 intersections	10	College Av	Drake Rd	68,433	27.8	5.1	30.2	8.9	-1.4	3.8	$791,361	LOSS 3	LOSS 4	-$250,365	Capital project in design	Y	4SG	1
	162	Lemay	Harmony Rd	60,171	20.5	4.5	24.6	7.4	1.2	2.9	$628,040	LOSS 3	LOSS 4	-$409,021	Adaptive signal timing 2019, crashes trending down	Y	4SG	2
	119	Shields St	Prospect Rd	46,739	16.2	4.4	22.7	6.8	4.1	2.4	$565,117	LOSS 4	LOSS 4	-$58,554	Red Light Cameras in 2020, crashes trending down	Y	4SG	3
	59	Lemay	Drake Rd	48,728	16.9	4.6	18.7	7.1	-0.7	2.6	$537,247	LOSS 3	LOSS 4	-$336,730	Project planned - HSIP add SBRT lane, red light cam	Y	4SG	4
	1	Boardwalk Dr	Harmony Rd	55,037	16.6	4.0	21.3	6.1	2.5	2.2	$499,099	LOSS 3	LOSS 4	-$558,999	Protected Lefts in 2019, crashes trending down	Y	4SG	5
	34	College Av	Trilby Rd	45,174	15.1	3.9	16.4	5.6	-0.4	1.7	$366,002	LOSS 3	LOSS 4	-$616,361	Protected Lefts in 2020, capital project in design	Y	4SG	6
	55	JFK	Harmony Rd	46,531	11.9	2.8	13.1	4.2	-0.3	1.4	$302,378	LOSS 3	LOSS 4	$212,620		Y	4SG	7
	25	College Av	Mulberry St	49,330	17.2	4.6	24.6	5.7	6.4	1.0	$298,216	LOSS 4	LOSS 3	-$12,052		Y	4SG	8
	118	Shields St	Plum	32,196	7.5	1.8	10.9	3.0	2.2	1.2	$278,446	LOSS 4	LOSS 4	-$86,031		Y	4SG	9
	143	Timberline Rd	Carpenter	26,800	7.0	2.4	12.2	3.4	4.2	1.0	$262,340	LOSS 4	LOSS 4	-$485,037	Funded Project - HSIP funds to install WBRT lane	n	4SG	10
Next 15 intersections	69	Lemay	Riverside	37,663	11.9	3.6	13.1	4.6	0.2	1.0	$215,636	LOSS 3	LOSS 3	$315,563		Y	4SG	11
	18	College Av	Kensington	37,260	6.5	2.5	9.4	3.2	2.1	0.7	$185,303	LOSS 4	LOSS 3	-$87,069		Y	4SG	12
	9402	Lemay	Carpenter	20,940	4.8	1.7	5.6	2.5	-0.1	0.9	$184,942	LOSS 3	LOSS 4	-$618		n	4SG	13
	35	College Av	Troutman	42,276	10.2	3.1	11.6	3.9	0.6	0.8	$184,052	LOSS 3	LOSS 3	-$489,035	Funded Project- signal replacement, add FYA for LT	Y	4SG	14
	9994	Taft Hill	Trilby	17,548	2.4	1.1	4.2	1.9	1.1	0.8	$174,576	LOSS 4	LOSS 4	$193,038	County improvement project in process, includes nev	n	4ST	15
	140	Taft Hill Rd	Prospect Rd	33,579	10.2	3.1	9.8	3.9	-1.3	0.8	$159,451		LOSS 3	-$264,713		Y	4SG	16
	8	College Av	Columbia	45,829	8.8	2.9	10.2	3.6	0.7	0.7	$157,166	LOSS 3	LOSS 3	-$65,412	Funded Project, signal replacement	Y	4SG	17
	240	Timberline Rd	Custer	29,579	4.1	0.8	5.7	1.4	1.0	0.6	$146,653	LOSS 4	LOSS 4	-$94,586		Y	4SG	18
	145	Timberline Rd	Harmony Rd	82,439	34.9	5.8	36.2	6.5	0.6	0.7	$146,178	LOSS 3	LOSS 3	-$128,859		Y	4SG	19
	101	Remington	Mulberry St	26,805	6.2	1.7	8.4	2.2	1.7	0.5	$133,402	LOSS 4	LOSS 3	-$187,590	Funded Project - HSIP funds to replace signal	Y	4SG	20
	8656	Shields	Richmond	31,097	2.0	0.7	4.1	1.2	1.5	0.5	$131,580	LOSS 4	LOSS 4	$117,924		Y	4ST	21
	8432	College	Bristlecone	25,180	1.4	0.5	2.1	1.1	0.0	0.6	$130,950	LOSS 3	LOSS 4	$151,315		Y	3ST	22
	110	Shields St	Harmony Rd	38,748	12.2	3.7	14.5	4.1	1.9	0.5	$122,729	LOSS 3	LOSS 3	-$88,352		Y	4SG	23
	116	Shields St	Mountain	16,251	2.9	0.9	4.1	1.4	0.6	0.5	$120,118	LOSS 4	LOSS 4	$81,585		n	4SG	24
	139	Taft Hill Rd	Mulberry St	25,525	6.5	2.2	8.6	2.7	1.6	0.5	$117,800	LOSS 4	LOSS 3	-$138,655		Y	4SG	25
	9542	College	Smokey	35398	1.8	0.6	4.0	1.0	1.8	0.4	$112,047	LOSS 4	LOSS 4	$11,847	Funded Project - development project to limit access	Y	3ST	26
	8835	Timberline Rd	Kechter	23078	5.2	1.5	7.8	1.9	2.2	0.4	$111,811	LOSS 4	LOSS 3	-$245,805	Funded Project -corridor completion in 2023	n	4SG	27
	5329	College	Plum	36164	1.8	0.6	3.2	1.0	1.0	0.4	$100,457	LOSS 4	LOSS 4	$48,719		Y	3ST	28
	6417	Timberline	Vine	14151	1.2	0.6	4.5	0.8	3.0	0.3	$98,606	LOSS 4	LOSS 4	-$73,019	Funded Project- new signal construction in Q3 2023	n	4ST	29
	62	Lemay	Horsetooth (East)	40597	6.5	2.1	8.2	2.5	1.3	0.4	$98,247	LOSS 3	LOSS 3	$51,689		Y	3SG	30
	7290	College	Mason/Palmer	41645	3.7	1.3	5.2	1.7	1.1	0.4	$96,678	LOSS 3	LOSS 3	$31,418		Y	4ST	31
	125	Shields St	Trilby Rd	24445	6.0	2.1	8.1	2.4	1.8	0.3	$92,621	LOSS 4	LOSS 3	-$154,398		n	4SG	32
	6688	Automation Way	Horsetooth	25263	1.4	0.5	1.6	0.9	-0.3	0.4	$89,617	LOSS 3	LOSS 4	$68,567		Y	3ST	33
	10247	Rigden	Drake	16601	0.6	0.2	1.7	0.6	0.7	0.4	$84,276	LOSS 4	LOSS 4	$76,993		Y	3ST	34
	111	Shields St	Horsetooth Rd	45589	15.8	4.3	17.7	4.6	1.6	0.3	$84,205	LOSS 3	LOSS 3	-$690,744		Y	4SG	35
	7	College Av	Cherry	36868	10.9	2.9	9.6	3.4	-1.8	0.5	$83,540		LOSS 3	-$16,529		Y	4SG	36
	9380	Timberline	Lincoln	16582	1.2	0.6	5.6	0.8	4.2	0.1	$82,580	LOSS 4	LOSS 3	$141,823		n	4ST	37
	33	College Av	Swallow	48338	13.2	3.6	11.1	4.1	-2.6	0.5	$81,477		LOSS 3	-$88,646	Minor signal imp made.Crashes trending down	Y	4SG	38
	4	College Av	Boardwalk	44966	10.2	3.2	11.0	3.5	0.4	0.3	$78,993	LOSS 3	LOSS 3	$209,018		Y	4SG	39
	193	Stover (East Int.)	Prospect	25463	1.9	0.5	3.9	0.7	1.7	0.3	$78,367	LOSS 4	LOSS 4	$3,733		Y	3ST	40
	80	Mason St	Harmony Rd	36814	10.6	2.8	14.2	2.9	3.4	0.1	$73,801	LOSS 4	LOSS 3	-$1,048,302	Safety project completed, positive trend	Y	4SG	41
	6171	Edinburgh	Drake	24457	1.4	0.5	3.0	0.8	1.4	0.3	$72,820	LOSS 4	LOSS 3	-$45,751		Y	3ST	42
	71	Lemay	Stuart	30613	6.6	1.6	5.9	2.0	-1.1	0.4	$65,904		LOSS 3	-$77,540		Y	4SG	43
	8562	Overland	Drake	14757	1.6	0.5	2.3	0.7	0.5	0.3	$62,356	LOSS 4	LOSS 4	-$14,287	Safety project completed, positive trend	n	3ST	44
	72	Lemay	Swallow	29477	4.3	1.2	5.3	1.5	0.7	0.2	$60,319	LOSS 3	LOSS 3	-$68,163		Y	3SG	45
	8710	College	Thunderbird	41222	2.8	0.8	3.4	1.0	0.4	0.2	$53,931	LOSS 3	LOSS 3	$116,117		Y	4ST	46
	99	Remington	Elizabeth	6486	0.6	0.2	1.3	0.4	0.5	0.2	$52,352	LOSS 4	LOSS 4	$47,275		n	4ST	47
	8698	College	Parker	42333	2.0	0.6	2.5	0.8	0.3	0.2	$49,798	LOSS 3	LOSS 3	$83,755		Y	3ST	48
	46	Howes	Laporte	10695	1.3	0.5	1.8	0.7	0.3	0.2	$46,828	LOSS 4	LOSS 4	$58,055		n	4SG	49
	137	Taft Hill Rd	Horsetooth Rd	33013	9.6	2.7	10.5	2.9	0.6	0.2	$46,051	LOSS 3	LOSS 3	-$174,167	Funded Project, will add NBRT lane	Y	4SG	50

Legend:
- 10 high priority locations for review
- Additional 15 locations with potential for crash reduction
- Recently Improved - safety being monitored
- Project In Process

AADT Annualized Average Daily Traffic
PDO Property Damage Only
FI Fatal or Injury
LOSS Levelof Service of Safety

Shading reflects LOSS 4

Range of -$50k to +$50k unshaded
Red shading notes increasing crash trend
Green shading identifies impoving safety trend

SG Signal
ST Stop

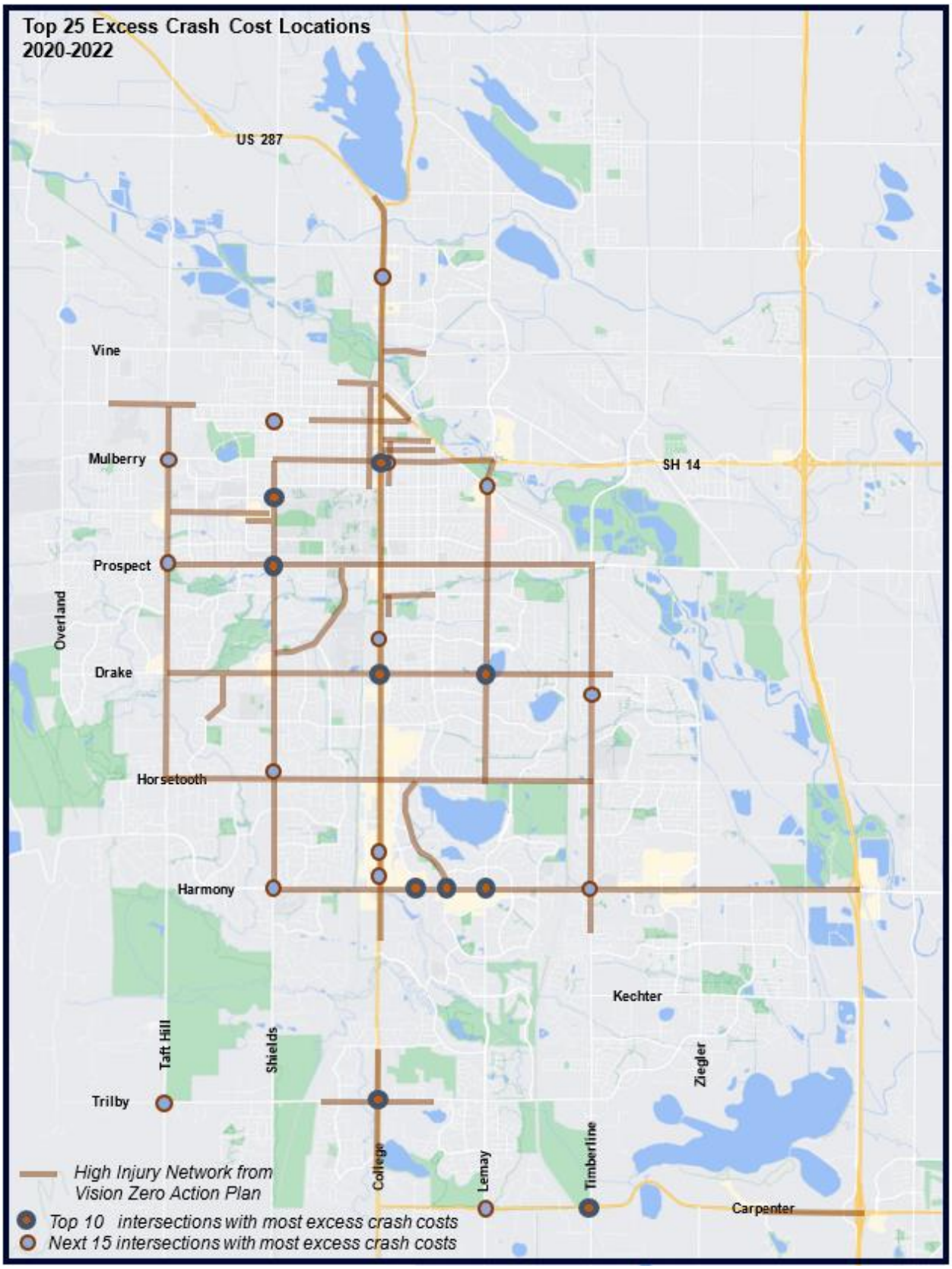


Figure 50. Top 25 Intersections With Most Excess Crash Costs (2020-2022)

Tables 13 and 14 summarize the trend information for those intersections with improving safety, and those with increasing crash trends.

Table 13. Top 15 Intersections with Improving Safety Trends

Facility ID	Intersection		Current Crash Information			Crash Trends 2017 - 2019 vs. 2020 - 2022 Δ Crash Cost	Type of control
	North - South Street	East - West Street	Excess PDO Crashes	Excess FI Crashes	Excess Expected Crash Value ($)		
66	Lemay Avenue	Mulberry St	19.4	4.0	-$220,420	-$425,556	4 leg signal
28	College Avenue	Prospect Rd	23.2	4.0	-$216,364	-$428,234	4 leg signal
149	Timberline Rd	Prospect Rd	21.4	5.0	$33,950	-$436,352	4 leg signal
74	Lemay Avenue	Vine Dr	7.0	1.6	$38,327	-$479,884	4 leg signal
143	Timberline Rd	Carpenter Rd	12.2	3.4	$262,340	-$485,037	4 leg signal
35	College Avenue	Troutman	11.6	3.9	$184,052	-$489,035	4 leg signal
157	Ziegler	Harmony Rd	18.9	2.4	-$517,701	-$503,751	4 leg signal
91	McMurry	Harmony Rd	10.8	2.2	-$195,974	-$516,042	4 leg signal
1	Boardwalk	Harmony Rd	21.3	6.1	$499,099	-$558,999	4 leg signal
34	College Avenue	Trilby Rd	16.4	5.6	$366,002	-$616,361	4 leg signal
20	College Avenue	Laurel St	10.3	2.6	-$114,104	-$625,590	4 leg signal
111	Shields St	Horsetooth Rd	17.7	4.6	$84,205	-$690,744	4 leg signal
14	College Avenue	Harmony Rd	30.3	5.7	-$16,647	-$1,011,840	4 leg signal
80	Mason St	Harmony Rd	14.2	2.9	$73,801	-$1,048,302	4 leg signal
16	College Avenue	Horsetooth Rd	22.1	4.2	-$132,111	-$1,714,637	4 leg signal

Table 14. Top 15 Intersections with Increasing Crash Trends

Facility ID	Intersection		Current Crash Information			Crash Trends 2017 - 2019 vs. 2020 - 2022 Δ Crash Cost	Type of control
	North - South Street	East - West Street	Excess PDO Crashes	Excess FI Crashes	Excess Expected Crash Value ($)		
69	Lemay Avenue	Riverside Ave	13.1	4.6	$215,636	$315,563	4 leg signal
55	JFK	Harmony Rd	13.1	4.2	$302,378	$212,620	4 leg signal
4	College Avenue	Boardwalk	11.0	3.5	$78,993	$209,018	4 leg signal
9994	Taft Hill	Trilby	4.2	1.9	$174,576	$193,038	4 leg stop
19	College Avenue	LaPorte Ave	7.6	2.0	$18,055	$154,779	4 leg signal
8432	College	Bristlecone	2.1	1.1	$130,950	$151,315	3 leg stop
27	College Avenue	Pitkin St	5.5	2.4	-$51,654	$144,355	4 leg signal
40	Corbett	Harmony Rd	14.1	3.7	-$20,218	$141,868	4 leg signal
8656	Shields	Richmond	4.1	1.2	$131,580	$117,924	4 leg stop
8710	College Avenue	Thunderbird	3.4	1.0	$53,931	$116,117	4 leg stop
78	LOOMIS	Mulberry St	2.7	1.0	$26,120	$108,812	4 leg signal
105	Riverside Ave	Mulberry St	12.9	3.5	-$117,723	$106,188	4 leg signal
15033	College Avenue	Rutgers	9.6	2.4	-$2,114	$97,419	4 leg signal
9976	College Avenue	Hickory	3.9	1.0	$24,350	$91,186	3 leg stop
68	Lemay Avenue	Prospect Rd	19.9	4.2	-$121,359	$90,025	4 leg signal

PDO: Property Damage Only
FI: Fatal / Injury

PATTERN RECOGNITION

Table 15 identifies intersections where a pattern of a particular crash type is identifiable. The evaluation is a statistical analysis developed by the Colorado Department of Transportation and compares the prevalence of a particular crash type at an intersection against the typical expected proportion of that crash type at the intersection. The table indicates the control type, the location, and the number of that type of crash in three years (2020 – 2022).

Only intersections with at least three crashes in three years (average one per year) are included (except for the bicycle and pedestrian crash categories - those locations with a pattern of these crashes and two crashes or more in three years are included). Judgment is needed with this analysis as a higher-than-normal proportion of one type of crash may be caused by a lower-than-normal proportion of another type of crash. Thus, some locations that are listed, especially those with fewer crashes, may not be of concern.

Some intersections may be listed in more than one category. For instance, the intersection of College and Cherry is listed in both the serious injury and red light running. The intersection of Timberline and Drake is listed under approach turn crashes and bicycle crashes. The causes of these crashes may or may not be related.

This more detailed information about the types and patterns of crashes should be combined with other elements of analysis to gain a complete picture and greater understanding of the safety performance of an intersection to identify subsequent mitigation measures.

Table 15. Intersections with Statistical Pattern of Particular Crash Types (continued on next page)

Control	North - South Street	East - West Street	# crashes in 3 years
Approach Turn			
4 leg signal	Shields St	Prospect Rd	20
4 leg signal	College Ave	Troutman	19
4 leg signal	Shields St	Horsetooth Rd	18
4 leg signal	Lemay Ave	Drake Rd	18
4 leg signal	Shields St	Drake Rd	15
4 leg signal	Timberline Rd	Drake Rd	15
4 leg signal	Lemay Ave	Riverside Ave	14
4 leg stop	College Ave	Mason/Palmer	12
4 leg stop	College Ave	Lake	11
4 leg signal	College Ave	Boardwalk	11
4 leg signal	College Ave	Swallow	10
4 leg stop	College Ave	Thunderbird	9
4 leg signal	Taft Hill Rd	Prospect Rd	9
3 leg signal	Lemay Ave	Horsetooth (west Int)	8
4 leg signal	Lemay Ave	Magnolia	7
3 leg stop	College Ave	Plum	7
4 leg signal	Riverside Ave	Mountain Ave	6
4 leg stop	Tulane	Drake	4
Pedestrian			
4 leg signal	College Ave	Stuart	3
4 leg signal	College Ave	Laurel	3
4 leg signal	College Ave	Mulberry St	3
4 leg stop	City Park	Plum	2
4 leg signal	College Ave	Magnolia	2
4 leg signal	Mason St	Mulberry St	2

Control	North - South Street	East - West Street	# crashes in 3 years
Right Angle			
4 leg signal	College Ave	Kensington	14
4 leg signal	College Ave	Columbia	12
4 leg signal	Mason St	Harmony Rd	12
4 leg signal	Taft Hill Rd	Prospect Rd	11
4 leg signal	College Ave	Cherry St	10
4 leg signal	Remington St	Prospect Rd	9
4 leg signal	Remington St	Mulberry St	9
4 leg signal	Taft Hill Rd	Horsetooth Rd	9
4 leg stop	Mason	Magnolia St	8
4 leg signal	Shields St	Mulberry St	8
4 leg signal	Howes St	LaPorte Ave	7
4 leg signal	JFK	Boardwalk	7
3 leg stop	Rigden	Drake Rd	7
4 leg stop	Redwood	Conifer St	7
4 leg signal	Remington St	Elizabeth St	6
4 leg stop	Worthington	Centre	6
4 leg signal	Research / Meadowlark	Drake Rd	6
4 leg signal	College Ave	Olive	6
3 leg stop	NW Frontage Road	Vine Dr	6
4 leg stop	Meldrum	LaPorte Ave	6
4 leg signal	Shields St	Swallow	6
4 leg signal	Whedbee	Mulberry St	5
4 leg stop	Linden	Vine Dr	5
3 leg stop	Timberline	Milestone	4
3 leg stop	Lemay Ave	Stoney Hill	3
4 leg signal	Taft Hill Rd	Valley Forge	3
4 leg stop	Lemay	Haxton	3
4 leg stop	Taft Hill Rd	Bronson	3

Table 15 Continued. Intersections with Statistical Patterns of Particular Crash Types

Control	North - South Street	East - West Street	# crashes in 3 years
Rear End			
4 leg signal	Timberline Rd	Harmony Rd	68
4 leg signal	College Ave	Harmony Rd	64
4 leg signal	Lemay Ave	Harmony Rd	54
4 leg signal	Boardwalk Rd	Harmony Rd	45
4 leg signal	College Ave	Horsetooth Rd	41
4 leg signal	Timberline Rd	Carpenter Rd	31
4 leg signal	Riverside Ave	Mulberry St	30
4 leg signal	JFK	Harmony Rd	30
4 leg signal	Shields St	Plum	29
4 leg signal	Corbett	Harmony Rd	29
4 leg signal	Lady Moon	Harmony Rd	27
4 leg signal	College Ave	Monroe	21
4 leg signal	Taft Hill Rd	Harmony Rd	19
4 leg signal	College Ave	Foothills	19
3 leg signal	McClelland	Horsetooth Rd	14
3 leg stop	Stover (east int.)	Prospect	13
4 leg signal	Shields St	Raintree / Centre	12
4 leg stop	Welch	Prospect	11
3 leg signal	McClelland	Drake Rd	10
4 leg stop	Shields St	Richmond	9
4 leg signal	College Ave	Fossil Creek	9
4 leg stop	Taft Hill Rd	Lake St	8
3 leg stop	Timberline	Mountain Vista	7
4 leg stop	Ponderosa	Elizabeth St	5
3 leg stop	Heatheridge	Prospect	5
4 leg signal	Howes	Laurel	5
3 leg stop	College	Oak	4
Red Light Running			
4 leg signal	College Ave	Columbia	12
4 leg signal	McMurry	Harmony Rd	9
4 leg signal	College Ave	Kensington	9
4 leg signal	Shields St	Mulberry St	8
4 leg signal	Remington St	Mulberry St	8
4 leg signal	College Ave	Cherry St	8
4 leg signal	Taft Hill Rd	Prospect Rd	8
4 leg signal	Howes St	LaPorte Ave	7
4 leg signal	Remington St	Prospect Rd	7
4 leg signal	JFK	Boardwalk	6
4 leg signal	Timberline Rd	Custer	6
4 leg signal	Research/Meadowlark	Drake Rd	5
4 leg signal	Taft Hill Rd	Valley Forge	3
Additional locations with at least 10+ RLR crashes in last 3 years			
4 leg signal	Mason St	Harmony Rd	10
4 leg signal	Taft Hill Rd	Drake Rd	10
4 leg signal	Lemay Ave	Mulberry St	11
4 leg signal	College Ave	Mulberry St	12
4 leg signal	Shields St	Prospect Rd	11
4 leg signal	Timberline Rd	Harmony Rd	11

Control	North - South Street	East - West Street	# crashes in 3 years
Bicycle			
3 leg stop	Overland	Drake	4
3 leg signal	Shields St	Lake St	4
4 leg signal	Timberline Rd	Drake Rd	3
4 leg signal	Shields St	Prospect Rd	3
4 leg signal	College Ave	Mulberry St	3
4 leg signal	Remington St	Pitkin	2
4 leg signal	Remington St	Elizabeth St	2
4 leg signal	Timberline Rd	Caribou	2
3 leg stop	Shields St	University	2
Single Vehicle Crashes			
4 leg signal	Timberline Rd	Harmony Rd	16
4 leg signal	College Ave	Willox	7
3 leg stop	Strauss Cabin	Horsetooth Rd	6
4 leg signal	Taft Hill Rd	Drake Rd	6
3 leg signal	Lemay Ave	Horsetooth (east Int)	6
4 leg stop	Timberline Rd	Vine Dr	6
4 leg signal	Timberline Rd	Custer	5
4 leg signal	Timberline Rd	Timberwood	4
4 leg signal	Manhattan	Horsetooth Rd	3
Snow and Ice			
4 leg signal	Ziegler Rd	Harmony Rd	10
4 leg signal	Riverside Ave	Prospect Rd	6
4 leg signal	Shields St	Swallow	5
4 leg signal	Taft Hill Rd	Elizabeth St	5
3 leg signal	Constitution Ave	Drake Rd	4
4 leg signal	Lemay Ave	Boardwalk	3
Serious Injury			
4 leg signal	Timberline Rd	Carpenter Rd	9
4 leg signal	Lemay Ave	Carpenter Rd	8
4 leg signal	Taft Hill Rd	Prospect Rd	8
4 leg signal	College Ave	Cherry St	7
4 leg signal	Timberline Rd	Custer	6
4 leg signal	Timberline Rd	Caribou	4
Additional locations with at least 10+ Serious Injury crashes in last 3 years			
4 leg signal	Timberline Rd	Harmony Rd	12
4 leg signal	College Ave	Drake Rd	10

Note: the additional locations shown in the Red Light Running and Serious Injury categories are locations where the number of crashes do not show a statistical pattern (due to a high number of other crashes), but because the red light running or serious injury crash numbers are high, they are listed here for information and consideration for future review.

ROUNDABOUT SAFETY REVIEW

Fort Collins has several roundabouts in the City. Roundabouts are often lauded for their roadway safety benefits due to slow speeds, and assumed reduced approach turn and right angle crashes. Reviewing crash data at the roundabouts in Fort Collins could help verify whether these claims are accurate in Fort Collins and could help direct roundabout policy in the future.

Four roundabout intersections in Fort Collins were reviewed as part of the intersection evaluation process described earlier in this report utilizing a crash prediction model developed for the National Transportation Research Board using crash data from roundabouts throughout the United States. ***Table 16*** shows the results for those four roundabout intersections. As shown in the table three of the four roundabouts reviewed had more crashes than expected (positive excess crash costs).

It's important to clarify that the expectation for roundabouts is that they will have less crashes than other types of intersections (STOP signs or traffic signals). Thus, the three roundabouts with an excess crash cost are higher than typical **when compared to other roundabouts**. While the excess crash cost may indicate an opportunity for improvement, it should not be misconstrued that the roundabouts are less safe than other types of intersections with lower excess crash costs because the basis for those excess crash costs is different.

Table 16. Roundabout Intersection Comparison by Excess Crash Cost

Fac ID	Intersection		Traffic Vol	Model Predicted Crashes		Actual Adjusted Crashes		Excess Crashes (# and Costs)			LOSS		Crash Trends	Type Of Control
	North-South Street	East-West Street	Total AADT	Predicted Crashes/ Year	Predicted FI Crashes/ Year	Expected Crashes/ Year	Expected FI Crashes/ Year	Excess PDO	Excess FI	Excess Expected Crash Value ($)	LOSS Total Crashes	LOSS FI Crashes	2017-2019 vs 2020-2022 Δ Crash Cost	
162	Remington	Laurel	7,673	1.4	0.2	2.0	0.4	0.5	0.1	$37,325	LOSS 3	LOSS 4	$9,265	RND
10	Ziegler	Horsetooth	25,367	7.4	1.4	13.7	1.1	6.6	-0.3	$14,628	LOSS 4		-$296,827	RND
119	Ziegler	Kechter	14,804	2.3	0.4	2.1	0.5	-0.3	0.1	$11,056		LOSS 3	-$78,743	RND
59	Shields	Vine	13,027	2.0	0.4	2.8	0.3	0.8	-0.1	-$12,954	LOSS 3		-$193,360	RND

AADT: Annualized Average Daily Traffic
PDO: Property Damage Only
FI: Fatal or Injury
RND: Roundabout

To compare safety at the roundabouts relative to other types of intersections the crash prediction models for signalized or unsignalized intersections can be used to estimate the number of crashes under other types of control. ***Table 17*** shows the predicted number of crashes and injury crashes at the four analyzed roundabout intersections if they were converted to traffic signals or, in the case of Remington/Laurel, STOP sign control.

The analysis shows that for the three intersections that could potentially be converted to traffic signals it would be predicted that they would have more crash costs with signal control than they currently do as roundabouts. This is due to the higher number of injury crashes that would be expected with signal control. Note that Remington and Laurel is not outperforming STOP control. Crashes would be expected to be about the same or even less there with STOP control.

Table 17. Roundabout Intersection Crash Comparison with Change in Traffic Control

Facility ID	North - South Street	East - West Street	Expected Crashes/Year w/RBT	Expected FI Crashes/Year w/RBT	Predicted Crashes/Year w/Signal or STOP	Predicted FI Crashes/Year w/Signal or STOP	Expected Additional Crash Cost w/change
6473	Ziegler	Horsetooth	13.7	1.1	6.4	1.9	$58,320
559	Shields	Vine	2.8	0.3	2.0	0.7	$73,065
11282	Ziegler	Kechter	2.1	0.5	2.4	0.9	$68,439
100	Remington	Laurel	2.0	0.4	1.1	0.3	-$30,164

PDO: Property Damage Only
FI: Fatal / Injury
RBT: Roundabout

Section 5

IMPROVING ROADWAY SAFETY

Successful improvement of roadway safety requires collaborative efforts from numerous departments within the City, the community, and individuals. In order to systematically reduce the number and severity of crashes, there must be a commitment and focus to address specific safety concerns that are identified through data. Roadway safety is complex, and both big and small initiatives are important.

VISION ZERO ACTION PLAN

The City adopted a Vision Zero (VZ) Action Plan in the spring of 2023. The overarching emphasis in the plan is on the safety of vulnerable road users. It outlines an approach that uses the Safer Systems Principles from the Federal Highway Administration (FHWA). See ***Figure 51.***

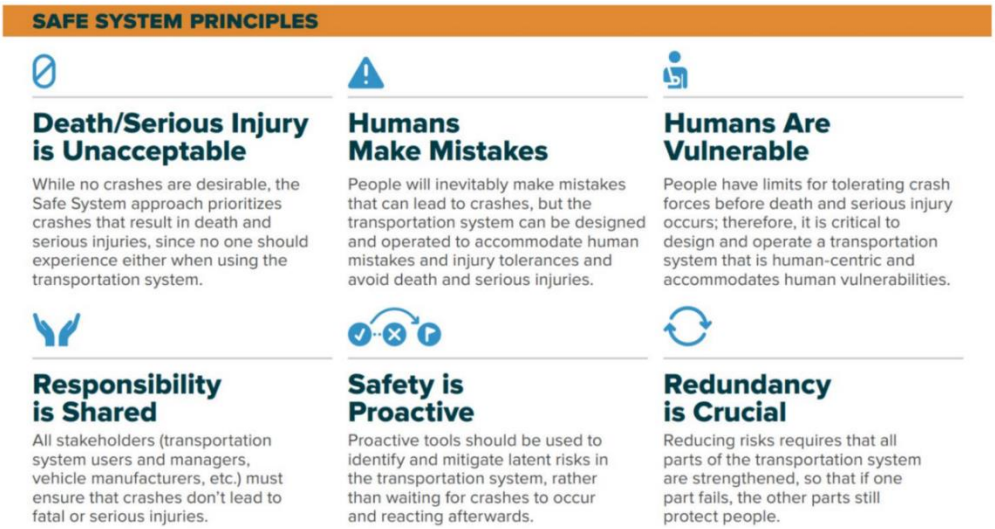


Figure 51. Safe System Principles from FHWA

The Vision Zero plan is intentionally high-level and provides a framework of guiding strategies and actions. The listed "supporting actions" (on page 30 in the report) with their corresponding sub actions are shown below.

1. Support mode shift
   - 1.1 Continue fare-less transit and implement Transit Master Plan.
   - 1.2 Prioritize investments in trails.
   - 1.3 Evaluate night-time transit hours and transit stop amenities.
2. Prioritize safer streets and multi-modal places.
   - 2.1 Implement geometric intersection treatments with proven safety benefits.
   - 2.2 Implement signal and/or operational modifications that are proven to reduce severe crashes.
   - 2.3 Evaluate all bus stop locations for installation of pedestrian crossings.
3. Promote a culture of traffic safety.
   - 3.1 Work with agencies and organizations to promote traffic safety.
   - 3.2 Work with the media to more accurately report crashes.
   - 3.3 Pair roadway design changes with communication on why changes are needed (Vision Zero signage)
   - 3.4 Engage City staff in training and conversations on Vision Zero.
   - 3.5 Support establishment of a victim's advocacy organization.

3.6 Incorporate safety features in City fleet vehicles and expand training.
3.7 Fill current vacancies to fully staff Traffic Enforcement Unit

4. Increase data transparency and partnership.
   4.1 Expand the current group of safety stakeholders into interdisciplinary VZ task force.
   4.2 Work with CDOT and Larimer County for better region-wide crash data
   4.3 Convene rapid response meetings after all severe crashes.
   4.4 Partner with medical and substance abuse organization to share data and strategies.
   4.5 Provide a dashboard with accessible data about crashes on the City's website.
   4.6 Advocate for policies regulating automated vehicles that advance VZ goals.
   4.7 Incorporate growth projections and anticipated development into safety planning
5. Center equity
   5.1 Pilot a diversion program with education to encourage safe behaviors over punitive measures.
   5.2 Engage youth to raise awareness of VZ.
   5.3 Expand use of automated traffic enforcement.
   5.4 Provide opportunities for community input on VZ initiatives.

This Annual Roadway Safety Report provides the analysis and identifies next steps to support some of the actions above.

IDENTIFIED SAFETY PRIORITY ACTIONS

This report has detailed the data-driven evaluation of transportation safety in Fort Collins. Coupling that with the guidance from the Vision Zero Action Plan, areas of opportunity for safety improvements can be determined. ***Table 18*** lists specific priorities for safety-based action items. It provides a 'roadmap' of which topics and locations are recommended for further evaluation, and the identification of actionable strategies to reduce the number and severity of crashes. Each priority is aligned with one of the Vision Zero supporting actions.

As the information is put to use, additional analysis may be needed and helpful, and the priority list can be refined throughout the year.

Table 18. List of Priorities for Safety Based Action Items

Item Priority	Concern / Topic	Action / Locations	Considerations	Supporting Action from VZ Plan
1. Engineering High Priority	Top 10 intersections with high excess crash costs, increasing crash trends, and/or identified opportunities. (Shaded darker blue in Table 12.)	Comprehensive, detailed safety audits 1. Boardwalk / Harmony 2. JFK / Harmony 3. College / Mulberry 4. Shields / Plum 5. Lemay / Riverside 6. College / Kensington 7. Lemay / Carpenter 8. College / Columbia 9. Timberline / Custer 10. College / Bristlecone	Full safety audit including data collection, crash review, operations evaluation, field visit etc. Consider all available strategies including low cost improvement, signal timing, geometrics, capital project potential, safety grant opportunities etc.	2.1
2. Process/ Policy Priority	Incorporate safety elements into ongoing capital projects	Review and provide input to all capital projects with a lens of safety for all modes. Complete safety audit for all capital projects. Consider HIN and include safety as an element as projects are prioritized in Capital Improvement Program.	Consider how to elevate safety considerations in project decisions. Utilize Interactive Highway Safety Design Model (IHSDM) to compare alternatives.	2.1

Table 18 Continued. List of Priorities for Safety Based Action Items

	Item Priority	Concern / Topic	Action / Locations	Considerations	Supporting Action from VZ Plan
Active Mode Recommendations	3. Ongoing	Bicycle Crashes	Review all locations with multiple bicycle crashes (see ***Tables 8 and 14***). Focus on intersection improvements to reduce conflicts / bicycle crashes.	Conflicts with turning vehicles (both approach turns and right hook).	2.1
	4. Ongoing	Pedestrian Crashes – especially Fatalities	Review all locations with multiple pedestrian crashes (see ***Tables 9 and 14)*** for trends or countermeasures Consider how environmental factors and behavior contributes to midblock and nighttime crashes – look for opportunities to reduce these occurrences.	5 of the 6 fatal crashes occurred at non-intersection locations with pedestrians that entered the roadway without the right-of-way	2.1
	5. Medium Priority	Additional 15 intersection reviews (Shaded lighter blue in Table 12.)	Per ***Table 12*** complete a higher-level review of crash data at intersections ranked shaded lighter blue.	Look for crash patterns, low-cost improvements (i.e., striping changes)	2.1, 2.2
	6. Operational Priority	Approach Turn Crashes	Locations with a high number of approach turn crashes, and a statistical pattern of more AT crashes than expected. 1. Shields / Prospect 2. College / Troutman 3. Shields / Horsetooth 4. Lemay / Drake 5. Shields / Drake 6. Timberline / Drake 7. Lemay / Riverside 8. College / Mason Palmer	Review each location individually and/or consider a citywide review of permissive / protected left turn phasing. Prioritize projects requiring longer mast arms for four-section heads.	2.2
	7. High Priority	Red Light Running /Right Angle Crashes	Review locations with statistical pattern of higher-than-expected red light running patterns and right angle crashes. 1. College / Kensington 2. College / Columbia 3. Taft Hill / Prospect 4. College Cherry 5. Remington / Mulberry 6. Shields / Mulberry 7. Howes / LaPorte	Review visibility of signal heads, signal timing progression / offsets regarding arrival of platoon, etc.	2.2
	8. Medium Priority	Non-Intersection Crashes	Review locations with clusters of crashes related to driveways / access locations. 1. College N of Vine 2. Magnolia E of Lemay 3. Lemay at Prospect 4. Eliz. W of Taft Hill 5. Elizabeth at City Park 6. College N of Rutgers 7. Willox E of College	Changes in striping, access control and work with businesses on queuing impacts on arterials.	2.1

Table 18 Continued. List of Priorities for Safety Based Action Items

Item Priority	Concern / Topic	Action / Locations	Considerations	Supporting Action from VZ Plan
9. Education Priority	Education	Continue and enhance education and communication campaign to elevate transportation safety as community priority. Consider creation of a core team of safety champions. Partner with Poudre School District on some type of transportation safety training / outreach to all students and parents every year.	Messaging could include education for young drivers, discouraging bicyclists traveling against traffic, pedestrian safety, etc. Consider a traffic safety week in mid-August to coincide with CSU and PSD efforts.	3.1,
10. Ongoing	Enforcement	Continue to partner with Police Services on ways to work together – identifying locations for enforcement, additional red light cameras etc.		5.3
11. Medium Priority	Policies / Programs / Standards	Explore how a transportation safety standard could be added to LCUASS which would provide strength to addressing safety concerns in development review. Continue work with FCMoves on how to integrate operations, safety data and improvement strategies during planning projects. Support efforts to improve comfort/mobility and reduce number/severity of crashes for all modes.		2.1
12. Ongoing Priority	Data	Continue to work on data quality control and improving crash data especially with implementation of new statewide crash form DR3447. (See discussion in Section 6)	Coordination with Police Services on data entry training. Create arterial location designation in database.	4.2, 4.5

TRACKING AND MEASURING SAFETY IMPROVEMENTS

A key component to a safety toolbox is the ongoing monitoring and continuous safety evaluation of the City's transportation system. In addition to annual data gathering and review shown earlier in this report, monitoring specific efforts/initiatives for their effectiveness and impact on safety can inform future actions and projects. Fort Collins has a long history of implementing safety improvement projects. Significant strides have been made toward a safer transportation system.

Recent Project Evaluations

Table 19 shows the net change in crashes and crash costs for locations where recent safety improvement projects were completed. Where possible three years of before and after data were used, however, 2020 was excluded due to the unusual nature of travel during the COVID pandemic so that, in some cases, only two years of after data were available.

Table 19. Monitoring Safety from Recent Improvements

Facility ID	North - South Street	East - West Street	Before Time Period	PDO Crashes/Year Before	FI Crashes/Year Before	Project Completed	After Time Period	PDO Crashes/Year After	FI Crashes/Year After	Δ Crash Cost/Year
16	College	Horsetooth	2015-2017	42.3	17.7	Capital Project 2018	2019, 2021-2022	20.6	5.0	-$2,981,800
34	College	Trilby	2017-2019	23	9.7	Protected Lefts 2020	2021-2022	6.3	4	-$1,424,600
23	College	Monroe	2015-2017	26	6.7	Capital Project 2018	2019, 2021-2022	10	2.7	-$1,052,800
239	Snow Mesa	Harmony	2015-2017	14	7	Protected Lefts 2018	2019, 2021-2022	9	3	-$916,400
117	Shields	Mulberry	2017-2019	12	5	Photo Radar 2020	2021-2022	6	3	-$501,600
1	Boardwalk	Harmony	2016-2018	28.7	8	Protected Lefts 2019	2021-2022	13	7	-$408,280
119	Shields	Prospect	2017-2019	16.3	8.3	Capital Project 2017	2021-2022	15	6.5	-$400,600
180	City Park	Mulberry	2015-2017	4	0.33	Road Diet 2018	2019, 2021-2022	0.3	0	-$116,368

Δ: Change in

PDO: Property Damage Only
FI: Fatal / Injury

Section 6

NEXT STEPS

The City has identified roadway safety as a top priority, and adopted the Vision Zero philosophy that people making minor mistakes using the transportation system shouldn't result in a potential life-altering event for someone. Improving the safety of all roadway users requires everyone – the City, community and individuals – to share the effort and responsibility of improving and ultimately ensuring safety.

Under the umbrella of the ***Vision Zero Action Plan***, the analysis in this ***Roadway Safety Report*** as well as the extensive data that supports the review is a critical step in the complex and multi-faceted challenge of roadway safety. The document provides a holistic and comprehensive look at roadway safety in Fort Collins and outlines specific action steps for the next year.

WORKING ON PRIORITIES

The compilation of identified priorities in the previous section (***Table 18***) provides a starting point for safety efforts in the coming year. Utilizing a systems-based approach ensures that the highest priorities are incorporated into daily work within the City. Next steps may include infrastructure review through safety audits, low cost improvements, signal timing refinements, and other elements in the education, and enforcement arenas.

IMPROVING THE DATA

The City has undertaken significant efforts in partnership between Traffic Operations and Police Services to improve the available data for this document. The data is critical as it informs the Vision Zero Plan, the High Injury Network, and the analysis in this document. With appreciation to all those involved, the data accuracy and level of detail is improving.

With the state's implementation of the new crash reporting form (DR 3447), collaboration should continue to further understand the complexity of the new form, the most beneficial fields for safety analysis, and the process to get that information from the form into the analysis database. Specific areas of focus include:

- Ensuring location data through geocoding is accurate.
- Consistent identification of whether crashes are intersection related or not.
- Details regarding crashes involving vulnerable road users (such as pedestrian and bicyclist age).
- Crashes involving impairment.
- Noting whether crashes occur on an arterial or not.

The ability to 'move the needle' on numbers and severity of crashes is dependent on the continued improvement of the quality of data and analysis to develop and implement effective strategies and countermeasures.

LOOKING TOWARDS THE FUTURE

In coming years, there are a number of potential initiatives that can dramatically impact roadway safety.

- Collision Avoidance Systems are becoming more standard on new vehicles. With almost half of all crashes being rear-end crashes, this has the potential of profound improvements.
- Connected and autonomous vehicles have the potential to increase capacity and improve safety on the roadway system.
- Within the analysis realm, the use of big data including video analytics of near crash events could be one way to pro-actively detect systematic safety concerns before crash patterns in crash reports identify the issue.

All these initiatives and others that are not yet even identified can support transportation safety.

Table 12 (reprinted to larger size)

Top 50 Intersections by Excess Crash Cost

	Fac ID	Intersection: North-South Street	Intersection: East-West Street	Traffic Vol: Total AADT	Model Predicted Crashes: Predicted Crashes/ Year	Model Predicted Crashes: Predicted FI Crashes/ Year	Actual Adjusted Crashes: Expected Crashes/ Year	Actual Adjusted Crashes: Expected FI Crashes/ Year	Excess Crashes (# and Costs): Excess PDO	Excess Crashes (# and Costs): Excess FI	Excess Crashes (# and Costs): Excess Expected Crash Value ($)	LOSS: LOSS Total Crashes	LOSS: LOSS FI Crashes	Crash Trends: 2017-2019 vs 2020-2022 Δ Crash Cost	Notes	High Injury Network	Type Of Control	Rank
Top 10 intersections	10	College Av	Drake Rd	68,433	27.8	5.1	30.2	8.9	-1.4	3.8	$791,361	LOSS 3	LOSS 4	-$250,365	Capital project in design	Y	4SG	1
	162	Lemay	Harmony Rd	60,171	20.5	4.5	24.6	7.4	1.2	2.9	$628,040	LOSS 3	LOSS 4	-$409,021	Adaptive signal timing 2019, crashes trending down	Y	4SG	2
	119	Shields St	Prospect Rd	46,739	16.2	4.4	22.7	6.8	4.1	2.4	$565,117	LOSS 4	LOSS 4	-$58,554	Red Light Cameras in 2020, crashes trending down	Y	4SG	3
	59	Lemay	Drake Rd	48,728	16.9	4.6	18.7	7.1	-0.7	2.6	$537,247	LOSS 3	LOSS 4	-$336,730	Project planned - HSIP add SBRT lane, red light cam	Y	4SG	4
	1	Boardwalk Dr	Harmony Rd	55,037	16.6	4.0	21.3	6.1	2.5	2.2	$499,099	LOSS 3	LOSS 4	-$558,999	Protected Lefts in 2019, crashes trending down	Y	4SG	5
	34	College Av	Trilby Rd	45,174	15.1	3.9	16.4	5.6	-0.4	1.7	$366,002	LOSS 3	LOSS 4	-$616,361	Protected Lefts in 2020, capital project in design	Y	4SG	6
	55	JFK	Harmony Rd	46,531	11.9	2.8	13.1	4.2	-0.3	1.4	$302,378	LOSS 3	LOSS 4	$212,620		Y	4SG	7
	25	College Av	Mulberry St	49,330	17.2	4.6	24.6	5.7	6.4	1.0	$298,216	LOSS 4	LOSS 3	-$12,052		Y	4SG	8
	118	Shields St	Plum	32,196	7.5	1.8	10.9	3.0	2.2	1.2	$278,446	LOSS 4	LOSS 4	-$86,031		Y	4SG	9
	143	Timberline Rd	Carpenter	26,800	7.0	2.4	12.2	3.4	4.2	1.0	$262,340	LOSS 4	LOSS 4	-$485,037	Funded Project - HSIP funds to install WBRT lane	n	4SG	10
Next 15 intersections	69	Lemay	Riverside	37,663	11.9	3.6	13.1	4.6	0.2	1.0	$215,636	LOSS 3	LOSS 3	$315,563		Y	4SG	11
	18	College Av	Kensington	37,260	6.5	2.5	9.4	3.2	2.1	0.7	$185,303	LOSS 4	LOSS 3	-$87,069		Y	4SG	12
	9402	Lemay	Carpenter	20,940	4.8	1.7	5.6	2.5	-0.1	0.9	$184,942	LOSS 3	LOSS 4	-$618		n	4SG	13
	35	College Av	Troutman	42,276	10.2	3.1	11.6	3.9	0.6	0.8	$184,052	LOSS 3	LOSS 3	-$489,035	Funded Project- signal replacement, add FYA for LT'	Y	4SG	14
	9994	Taft Hill	Trilby	17,548	2.4	1.1	4.2	1.9	1.1	0.8	$174,576	LOSS 4	LOSS 4	$193,038	County improvement project in process, includes new	n	4ST	15
	140	Taft Hill Rd	Prospect Rd	33,579	10.2	3.1	9.8	3.9	-1.3	0.8	$159,451		LOSS 3	-$264,713		Y	4SG	16
	8	College Av	Columbia	45,829	8.8	2.9	10.2	3.6	0.7	0.7	$157,166	LOSS 3	LOSS 3	-$65,412	Funded Project, signal replacement	Y	4SG	17
	240	Timberline Rd	Custer	29,579	4.1	0.8	5.7	1.4	1.0	0.6	$146,653	LOSS 4	LOSS 4	-$94,586		Y	4SG	18
	145	Timberline Rd	Harmony Rd	82,439	34.9	5.8	36.2	6.5	0.6	0.7	$146,178	LOSS 3	LOSS 3	-$128,859		Y	4SG	19
	101	Remington	Mulberry St	26,805	6.2	1.7	8.4	2.2	1.7	0.5	$133,402	LOSS 4	LOSS 3	-$187,590	Funded Project - HSIP funds to replace signal	Y	4SG	20
	8656	Shields	Richmond	31,097	2.0	0.7	4.1	1.2	1.5	0.5	$131,580	LOSS 4	LOSS 4	$117,924		Y	4ST	21
	8432	College	Bristlecone	25,180	1.4	0.5	2.1	1.1	0.0	0.6	$130,950	LOSS 3	LOSS 4	$151,315		Y	3ST	22
	110	Shields St	Harmony Rd	38,748	12.2	3.7	14.5	4.1	1.9	0.5	$122,729	LOSS 3	LOSS 3	-$88,352		Y	4SG	23
	116	Shields St	Mountain	16,251	2.9	0.9	4.1	1.4	0.6	0.5	$120,118	LOSS 4	LOSS 4	$81,585		n	4SG	24
	139	Taft Hill Rd	Mulberry St	25,525	6.5	2.2	8.6	2.7	1.6	0.5	$117,800	LOSS 4	LOSS 3	-$138,655		Y	4SG	25
	9542	College	Smokey	35398	1.8	0.6	4.0	1.0	1.8	0.4	$112,047	LOSS 4	LOSS 4	$11,847	Funded Project - development project to limit access	Y	3ST	26
	8835	Timberline Rd	Kechter	23078	5.2	1.5	7.8	1.9	2.2	0.4	$111,811	LOSS 4	LOSS 3	-$245,805	Funded Project -corridor completion in 2023	n	4SG	27
	5329	College	Plum	36164	1.8	0.6	3.2	1.0	1.0	0.4	$100,457	LOSS 4	LOSS 4	$48,719		Y	3ST	28
	6417	Timberline	Vine	14151	1.2	0.6	4.5	0.8	3.0	0.3	$98,606	LOSS 4	LOSS 4	-$73,019	Funded Project- new signal construction in Q3 2023	n	4ST	29
	62	Lemay	Horsetooth (East)	40597	6.5	2.1	8.2	2.5	1.3	0.4	$98,247	LOSS 3	LOSS 3	$51,689		Y	3SG	30
	7290	College	Mason/Palmer	41645	3.7	1.3	5.2	1.7	1.1	0.4	$96,678	LOSS 3	LOSS 3	$31,418		Y	4ST	31
	125	Shields St	Trilby Rd	24445	6.0	2.1	8.1	2.4	1.8	0.3	$92,621	LOSS 4	LOSS 3	-$154,398		n	4SG	32
	6688	Automation Way	Horsetooth	25263	1.4	0.5	1.6	0.9	-0.3	0.4	$89,617	LOSS 3	LOSS 4	$68,567		Y	3ST	33
	10247	Rigden	Drake	16601	0.6	0.2	1.7	0.6	0.7	0.4	$84,276	LOSS 4	LOSS 4	$76,993		Y	3ST	34
	111	Shields St	Horsetooth Rd	45589	15.8	4.3	17.7	4.6	1.6	0.3	$84,205	LOSS 3	LOSS 3	-$690,744		Y	4SG	35
	7	College Av	Cherry	36868	10.9	2.9	9.6	3.4	-1.8	0.5	$83,540		LOSS 3	-$16,529		Y	4SG	36
	9380	Timberline	Lincoln	16582	1.2	0.6	5.6	0.8	4.2	0.1	$82,580	LOSS 4	LOSS 3	$141,823		n	4ST	37
	33	College Av	Swallow	48338	13.2	3.6	11.1	4.1	-2.6	0.5	$81,477		LOSS 3	-$88,646	Minor signal imp made.Crashes trending down	Y	4SG	38
	4	College Av	Boardwalk	44966	10.2	3.2	11.0	3.5	0.4	0.3	$78,993	LOSS 3	LOSS 3	$209,018		Y	4SG	39
	193	Stover (East Int.)	Prospect	25463	1.9	0.5	3.9	0.7	1.7	0.3	$78,367	LOSS 4	LOSS 4	$3,733		Y	3ST	40
	80	Mason St	Harmony Rd	36814	10.6	2.8	14.2	2.9	3.4	0.1	$73,801	LOSS 4	LOSS 3	-$1,048,302	Safety project completed, positive trend	Y	4SG	41
	6171	Edinburgh	Drake	24457	1.4	0.5	3.0	0.8	1.4	0.3	$72,820	LOSS 4	LOSS 3	-$45,751		Y	3ST	42
	71	Lemay	Stuart	30613	6.6	1.6	5.9	2.0	-1.1	0.4	$65,904		LOSS 3	-$77,540		Y	4SG	43
	8562	Overland	Drake	14757	1.6	0.5	2.3	0.7	0.5	0.3	$62,356	LOSS 4	LOSS 4	-$14,287	Safety project completed, positive trend	n	3ST	44
	72	Lemay	Swallow	29477	4.3	1.2	5.3	1.5	0.7	0.2	$60,319	LOSS 3	LOSS 3	-$68,163		Y	3SG	45
	8710	College	Thunderbird	41222	2.8	0.8	3.4	1.0	0.4	0.2	$53,931	LOSS 3	LOSS 3	$116,117		Y	4ST	46
	99	Remington	Elizabeth	6486	0.6	0.2	1.3	0.4	0.5	0.2	$52,352	LOSS 4	LOSS 4	$47,275		n	4ST	47
	8698	College	Parker	42333	2.0	0.6	2.5	0.8	0.3	0.2	$49,798	LOSS 3	LOSS 3	$83,755		Y	3ST	48
	46	Howes	Laporte	10695	1.3	0.5	1.8	0.7	0.3	0.2	$46,828	LOSS 4	LOSS 4	$58,055		n	4SG	49
	137	Taft Hill Rd	Horsetooth Rd	33013	9.6	2.7	10.5	2.9	0.6	0.2	$46,051	LOSS 3	LOSS 3	-$174,167	Funded Project, will add NBRT lane	Y	4SG	50

Legend:

- 10 high priority locations for review
- Additional 15 locations with potential for crash reduction
- Recently Improved - safety being monitored
- Project In Process

AADT Annualized Average Daily Traffic
PDO Property Damage Only
FI Fatal or Injury
LOSS Lovelof Service of Safety

Shading reflects LOSS 4

Range of -$50k to +$50k unshaded
Red shading notes increasing crash trend
Green shading identifies impoving safety trend

SG Signal
ST Stop