City of San Luis Obispo

2018 & 2019 TRAFFIC SAFETY REPORT

Public Works and Police Department

March 2022

VISION ZERO
CITY OF SAN LUIS OBISPO

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Cover Photo: Joe Johnston, SLO Tribune, 2018

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Executive Summary

The Public Works & Police Departments are pleased to present the 18th cycle of the City's Annual Traffic Safety Report. The Annual Traffic Safety Program began in 2002 in an attempt to identify high collision locations within the City. In addition, the program actively pursues corrective measures intended to reduce collision rates and improve safety within the City. This program has resulted in a 60% reduction in citywide collisions since inception, despite increasing traffic volumes.

Due to limited staffing resources and impacts related to the COVID-19 pandemic, this iteration of the annual Traffic Safety Report provides a combined summary of collision data from years 2018 and 2019. In both 2018 and 2019, the total number of collisions decreased to the lowest recorded number since the report began. While reducing the overall collision rate continues to be a priority, the safety program is increasing focus on the most serious collisions—those that result in severe injuries or death. Because injury collisions require a police report and an investigation by a peace officer, these reports provide a clearer picture of the collision circumstances and can establish a more reliable year-to-year trend.

As compared to the 2017 baseline, injury collisions decreased by 17% in 2018 and 15% in 2019. Injury collisions overall have decreased by 28% from 2002 when the safety program began. There was one traffic-related fatality on City right-of-way in 2018 and three fatalities in 2019. A medical emergency is suspected as the cause of the fatal traffic collision in 2018, while three pedestrians were hit and killed by vehicles in 2019.

The Traffic Safety Program aligns with the City's Vision Zero Policy and includes thorough evaluations of safety for vulnerable road users, such as cyclists and pedestrians, who are disproportionately represented in severe injury and fatal collision trends. In 2018, bicycle collisions increased 18% from the previous year; however, 2019 represented the lowest total annual bicycle collisions recorded in the history of the Traffic Safety Program, with an 8% decrease from 2017 and a 22% decrease from 2018. Overall, bicycle collisions have declined by 51% from peak levels in 2009, despite an increase in bicycle mode share. Annual pedestrian collisions have averaged 28 collisions per year since the report began in 2002. Although 2019 saw an 30% increase over 2018, it was a 3 collision decrease over 2017, and followed the average pedestrian collision trend over the past several years.

The following report displays trends in collision history, traffic citations, and traffic safety measures and identifies high-collision rate locations in 2018 and 2019. As in previous Traffic Safety Reports, staff reviewed all high-collision rate intersections and street segments and has recommended measures to increase safety at the top five locations in each category.

Our Vision Zero goal is that the combination of data-driven analysis, appropriate corrective and preventative measures, and consistent and focused education and

enforcement will continue to reduce traffic collisions, eliminating injury and fatal collisions and improve the safety of our streets for all users.

The 2018-19 Traffic Safety Report identifies 18 new recommended project locations, with several projects identified for each location. Additionally, the report identifies further systemic safety projects throughout the City. The new project recommendations are listed in the following table, in order of appearance in the report:

Summary Recommendation for New Projects

No.	Location	Recommended Action
1	**Santa Rosa and Monterey**	Install Flashing Left Yellow Arrow signal phasing for EB & WB Traffic. Upgrade crosswalks to hi-vis style markings. Increase pedestrian lead interval. Consider a pedestrian scramble crossing at his location. *(Planned for 2022 construction)*
2	**Marsh and Osos**	Implement road diet on Marsh Street, reducing to two vehicle lanes. Upgrade crosswalks to hi-vis style markings. Increase pedestrian lead intervals. (*Planned for implementation with 2022 Paving Project).*
3	**Broad and Higuera**	Implement permanent road diet on Higuera Street, reducing to two vehicle lanes and upgrade crosswalks to hi-vis style markings.. *(This scheduled as part of the 2022 Paving Project)*. Investigate installation of overhead signal mast arms for NB & SB Broad approaches with overhead streetlight luminaires. Install additional “yield to pedestrian” signage for northbound and southbound approaches and increase pedestrian lead intervals.
4	**Marsh and Chorro**	Implement road diet on Marsh Street, reducing to two vehicle lanes. *(This is scheduled for the 2022 Paving Project.)* Adjust pedestrian lead intervals. Consider installing “hardened centerlines” on Chorro Street approaches. Evaluate installation of mast-arm signal poles with overhead luminaires for north and south approaches.
5	**Monterey and Grand**	Convert EB left turn to protected signal phasing.
6	**California and Monterey**	Implement measures to reduce bike conflicts with right-turning vehicles, such as addition of bike signal phases or installation of illuminated “yield to bike” signs. *(Currently in design)* In the long-term, (a) implement planned bikeway improvements along Pepper Street per Active Transportation Plan to provide alternate route for SB cyclists connecting from Railroad Safety

		Trail and (b) explore potential to widen intersection for NB & SB dedicated right turn lanes and channelized bike lanes.
7	**California and Palm**	Extend green bike lanes through intersection and install “right turn yield to bikes” warning signage. In the long-term, implement planned bikeway improvements along Pepper Street per Active Transportation Plan to provide alternate route for SB cyclists connecting from Railroad Safety Trail.
8	**Marsh and Nipomo**	Consider measures to reduce vehicle speeds along Marsh Street, such as implementation of a three-to-two lane road diet *(planned with 2022 Paving Project),* extension of the existing 25 MPH business district speed zone west of Broad Street, and installation of speed feedback signage on Marsh to help slow EB vehicles approaching intersection.
9	**Johnson and Laurel**	Install protected left signal phasing for NB Johnson left turn traffic.
10	**Higuera and LOVR**	Implement flashing yellow arrow or protected-only left turn signal phasing for northbound left turn lane.
11	**California and Hathway**	Relocate fire hydrant to alternate location and/or install high-visibility flex posts around hydrant to increase visibility.
12	**LOVR and Descanso**	Install near-side signal head and/or high-visibility signal backplates to increase visibility of signal indicators. Pursue other measures to reduce speeds on LOVR, such as visually narrowing roadway with installation of protected bike lanes on LOVR, as planned by Froom Ranch development project.
13	**Santa Rosa and Palm**	Install hi-visibility signal backplates
14	**Higuera (Santa Rosa to Nipomo)**	Implement permanent road diet, reducing to two auto lanes. Consider measures to reduce auto speeds, such a re-timing traffic signal progression and extension of existing 25 MPH business district speed zone west of Broad Street.
15	**LOVR (Froom Ranch to Calle Joaquin)**	Pursue measures to reduce speeds on LOVR, such as visually narrowing roadway with installation of protected bike lanes on LOVR, as planned by Froom Ranch development project, speed limit reductions and/or additional speed feedback signs

16	**Madonna (US 101 to Dalidio)**	Install Speed Feedback signage for EB and WB traffic.
17	**California and Foothill**	Consider measures to reduce vehicles speeds on Foothill Boulevard, such as installation of speed feedback signage, to help slow WB and EB vehicles approaching intersection. Consider striping changes as part of future paving project to narrow vehicle lanes and install protected bike lanes, as proposed in Active Transportation Plan. Complete railroad crossing safety enhancements *(currently in design)*.
18	**Johnson and Lizzie**	Evaluate feasibility of bikeway enhancements at this location as part of planned 2023 paving work on Johnson Avenue, including assessing feasibility of road diet (reducing from 2 to 1 auto lane in NB and/or SB directions) to provide width for buffered/protected bike lanes, green bike lane markings and installation of "left/right turn yield to bikes" signage.
19	**Systematic Safety - Pedestrian Crossings**	Proactively install systematic pedestrian crossing improvements, such as Rapid Rectangular Flashing Beacons (RRFBs), median refuges and Pedestrian Hybrid Beacons at uncontrolled pedestrian crossings citywide, where warranted. Install ADA-compliant pedestrian signals with countdowns and lead pedestrian intervals at signalized intersections.
20	**Systematic Safety - Bicycle Facilities**	Proactively install systematic bicycle safety improvements along bicycle facilities located on high-speed arterial streets, including measures such as warning signage, striping modifications, green bike lanes, bicycle signals and bike boxes, and quick-build protected bikeway separation where feasible and consistent with Active Transportation Plan.

Introduction

Background

Since its inception in 2002, the annual Traffic Safety Report (TSR) provides an overview of the City of San Luis Obispo's efforts to monitor and improve safety for all road users. Every year, the City prepares a TSR for the previous twelve-month period (a 24-month period for this report) with the following specific objectives:

- Identify the intersections and street segments within the City associated with the highest collision rates, and thoroughly analyze collision patterns in

order to develop potential mitigation measures for the five highest locations that will reduce the potential for collisions—particularly those involving severe injuries and/or fatalities, and;

- Identify the predominant pedestrian and bicycle collision types and high-collision locations, and thoroughly analyze collision data and police reports so as to determine potential mitigation measures for the five highest-rate collision locations that may reduce the potential for collisions, and;

- Report on traffic enforcement efforts, traffic safety education activities, and evaluate the effectiveness of mitigation measures implemented in the previous twelve-month period.

The locations mentioned in this report should not be interpreted as a list of dangerous or “least safe” intersections or streets within the City. The specific total of collisions for any location for any year is a function of various factors such as weather patterns, construction, traffic volumes, roadway conditions and driver habits. Many of these factors are often difficult to identify and are most often beyond the ability of the engineer to change or control. However, the City's mitigation program attempts to identify roadway elements that can be modified to make the transportation infrastructure more driver friendly, reduce driver confusion, promote bicycle and pedestrian safety and comfort, and limit impact severity.

Vision Zero

Vision Zero is a multi-national traffic safety initiative with a straightforward message: No loss of life is acceptable. At its core, Vision Zero seeks the elimination of deaths and serious injuries from our roadways. By focusing on not only reducing overall traffic collisions, but preventing severe collisions, particularly to vulnerable users such as pedestrians, bicyclists and people with disabilities, communities can achieve real live benefits and save lives.

The City of San Luis Obispo formally adopted its Vision Zero policy in 2016 to eliminate traffic-related fatalities and serious injuries by 2030. Through the data-driven analysis performed in the annual TSR, regular collaboration between City Public Works and Police Departments to identify priorities for focused traffic safety enforcement and ongoing community education and outreach campaigns, the City continually strives to improve the safety and efficiency of transportation facilities for all modes and users.

Measuring Progress

Progress towards improving traffic safety for all road users and reaching Vision Zero is measured in the TSR using the following metrics:

- Total collisions, fatalities and serious injuries
- Total pedestrian collisions, fatalities and serious injuries
- Total bicycle collisions, fatalities and serious injuries

The traffic safety data for these metrics is obtained from traffic collision reports provided by the San Luis Obispo Police Department. The TSR for a given calendar year will normally be prepared the following year after City collision statistics become available in April or May of the following year; this report, however, was delayed due to staffing shortages and COVID-19 impacts throughout 2020. The data analyzed in this TSR is for the combined 2018 and 2019 calendar years. Collision data is reviewed for each intersection and roadway segment within the City and entered into the traffic collision database. Auto, pedestrian and bicycle volumes are then utilized in conjunction with collision totals to calculate collision rates for all locations in the City. Considering the calculated collision rates, as well as collision severity, locations are ranked for each type of intersection and roadway segment within the City. The five highest-ranked collision locations for each category are analyzed in further detail and mitigation measures are presented, where feasible.

Additional discussion regarding the technical analysis methodology applied in this TSR is provided in **Appendix A**.

How to Navigate this Report

The remainder of the 2018-19 TSR is organized into the following sections:

- **Citywide Collision Trends** – *Page 8-13*
  How safe are San Luis Obispo's streets? This section describes the state of traffic safety in the City, discussing trends in traffic collisions from 1999 to 2019**.**

- **Traffic Enforcement Measures** – *Page 14-17 14*
  This section describes traffic enforcement efforts of the City Police Department, discussing traffic citations, DUI arrests and hazardous driving trends.

- **Traffic Safety Education Campaigns and Community Partnerships**– *Page 18-1914*
  How are we making San Luis Obispo's streets safer? This section describes the ongoing efforts to improve the safety of transportation facilities for all modes of travel within the City.

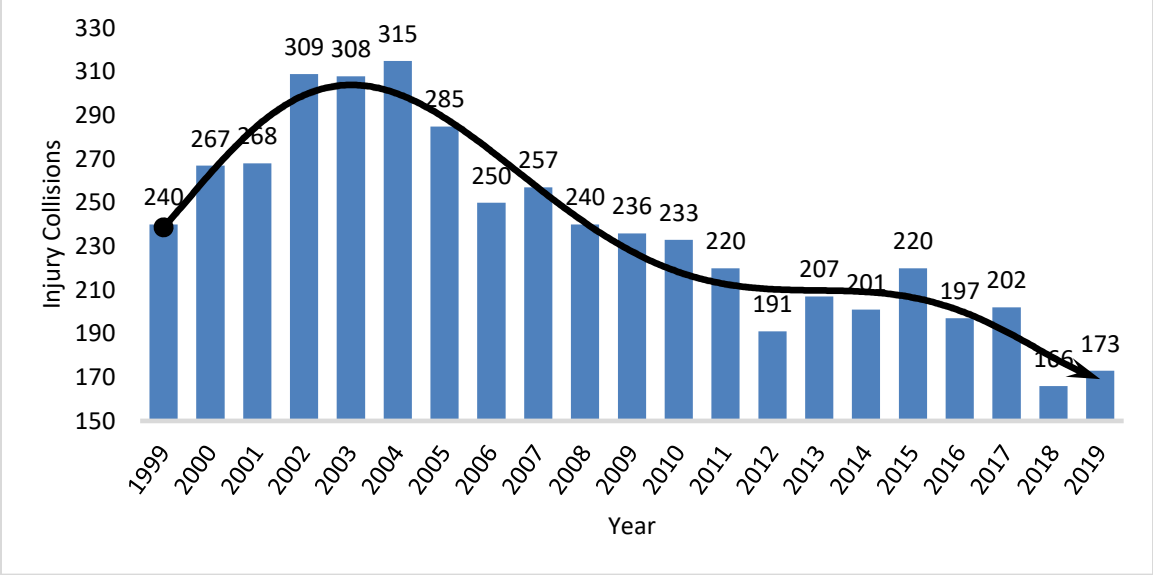
- **2018-19 High Collision Rate Locations & Recommendations** – *Page 32-5122*
  What have we learned about traffic safety in 2019? This section describes the high collision rate intersections and roadway segments for 2018-19 and presents potential mitigation recommendations for high-priority locations.

Citywide Collision Trends

Injury Collision Trend

Injury collisions are the most accurate representation of City collision trends because these types of collision are most consistently reported and investigated.

In 2018, injury collisions reduced by 18% from 2017. In 2019, injury collisions reduced 15% from 2017.



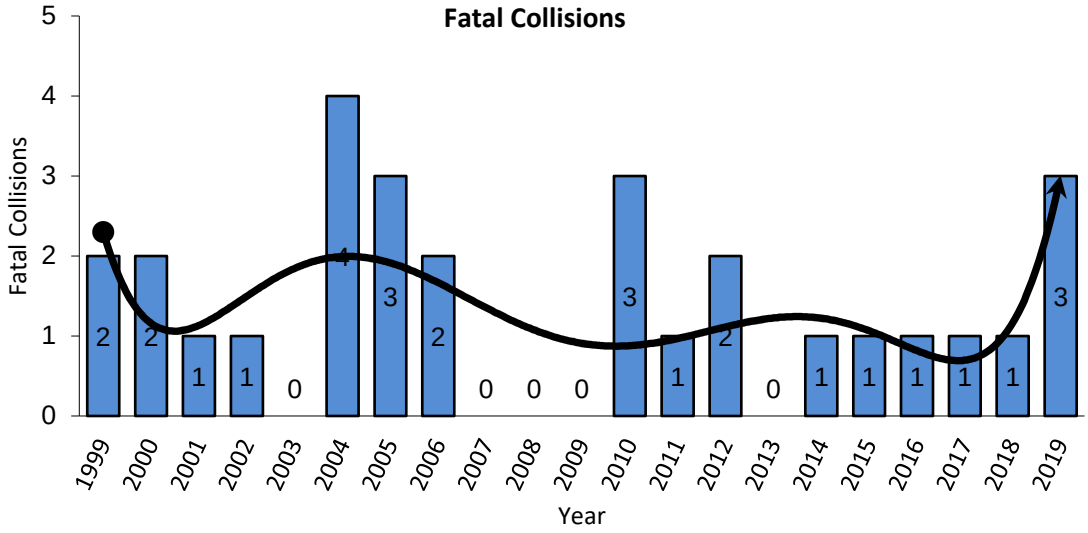
Fatal Collision Trend

It's difficult to identify a trend in fatal collisions because these types of collisions are typically sporadic, uncommon, and occur under unusual circumstances.

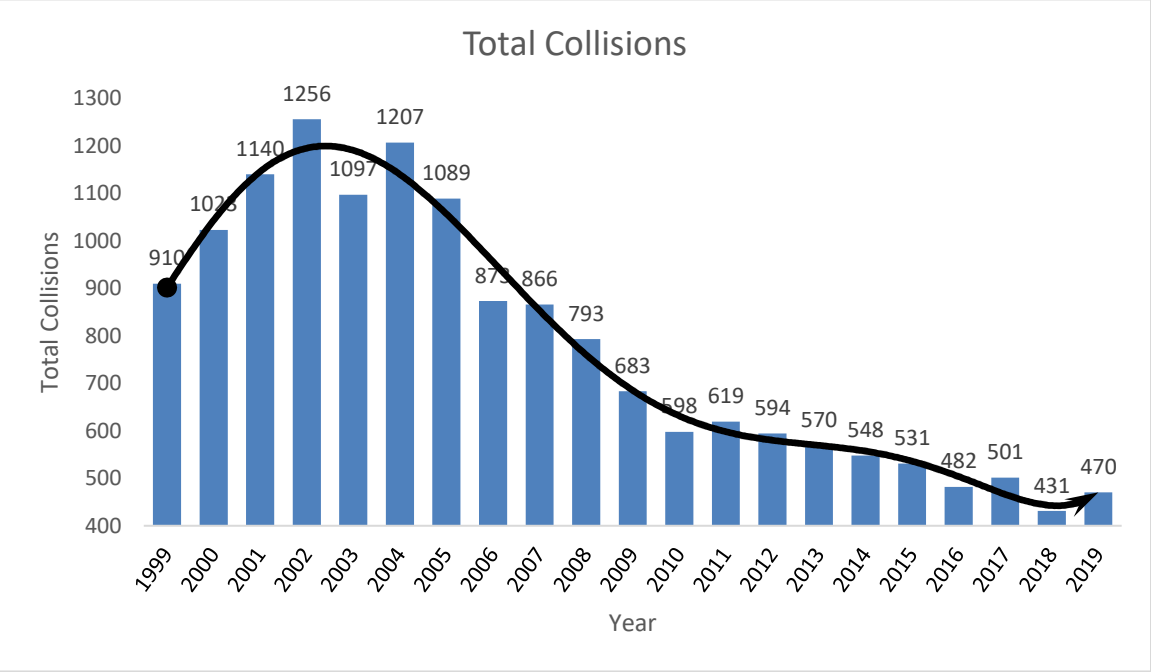
There was one traffic-related fatality on City streets in 2018, which involved a single-vehicle collision with a fixed object adjacent to the roadway on South Higuera near Chumash Drive, allegedly related to a driver medical emergency. There were three (3) traffic-related fatalities in 2019, with all three involving pedestrians being hit by vehicles. Two of the collisions occurred when pedestrians crossed roadways in an unsafe manner mid-block outside of legal crosswalks, despite the availability of signalized crossings within one block—these incidents occurred on Higuera Street north of South Street and on Madonna Road between the Madonna Inn and El Mercado. The third collision occurred at the intersection of Calle Joaquin and Los Osos Valley Road, with the pedestrian crossing illegally against the "DO NOT WALK" signal phase.

Following investigations, the drivers of the vehicles in these three collisions were found not to be at fault. Each of these collisions are tragic in nature and no deaths on City streets should be acceptable. Following detailed analysis and design review of each of these incidents, no specific engineering solutions appeared to

be warranted at these individual locations; however, the general context of these incidents illustrates the need for a more wholistic, systemic review of how vehicle speeds and pedestrian needs are managed along the City's higher-speed arterial corridors, where most pedestrian fatalities have historically occurred in our community.



Overall Collision Trend



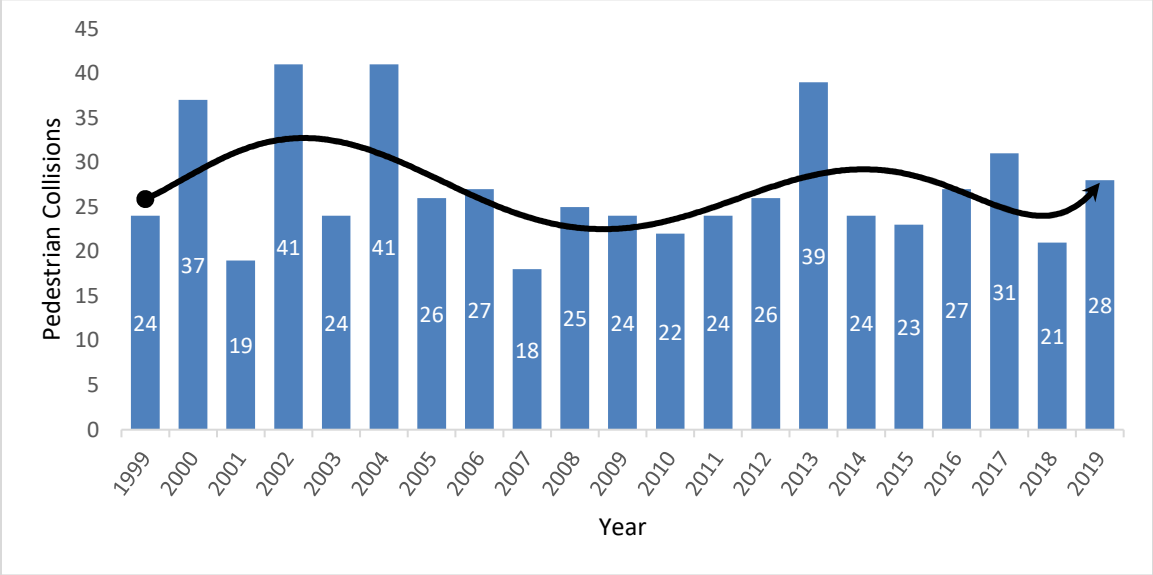
In 2018 there were 431 total reported collisions in the City—this is a 14% reduction from 2017, and 470 reported in 2019, a 6% reduction from 2017. 2018 saw the lowest collisions reported in the history of the City's traffic safety program.

It should be noted that the Overall Collision chart above does not represent all collisions that occur in the City—merely all reported collisions occurring on public streets for which a collision report is generated. Many collisions are either unreported by the involved parties, reported by the parties without an officer investigation, or there is no response to the collision by emergency services. Therefore, the actual total collisions may vary between years. A more accurate measure are the injury and fatal collision trends, as police always respond to collisions where the reporting party indicates there is an injury.

Pedestrian Collision Trend

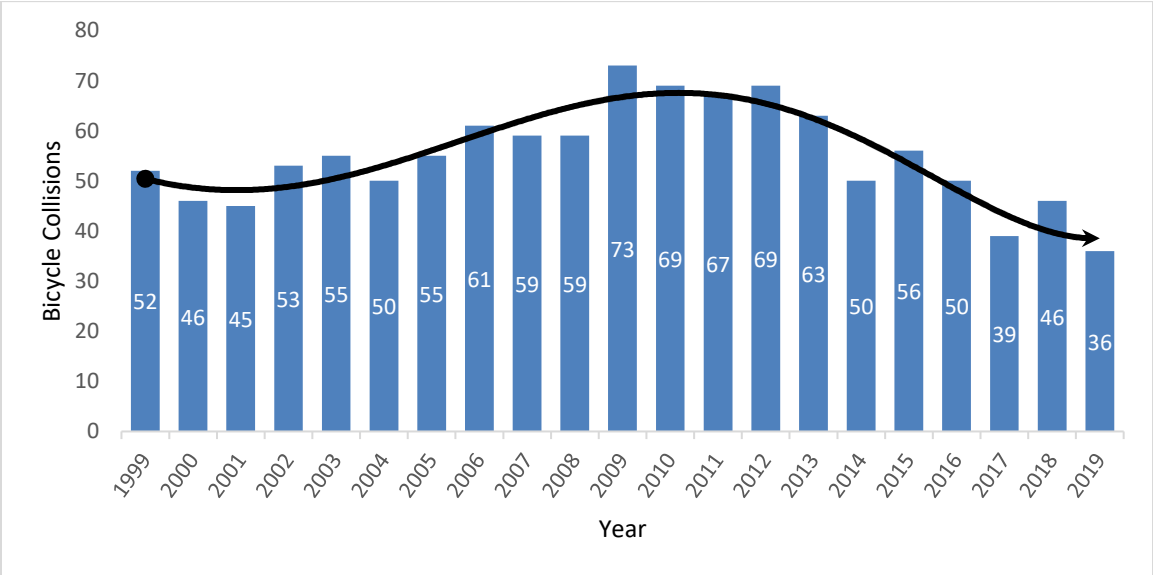
Pedestrian collisions have numbered between 18 and 31 since the beginning of the program, with the exception of unexplained spikes in 2000, 2002, 2004 and 2013.

In 2018, the number of pedestrian collisions dropped to 21, and rose again to 28 in 2019. This is within the trend across past safety reporting periods.



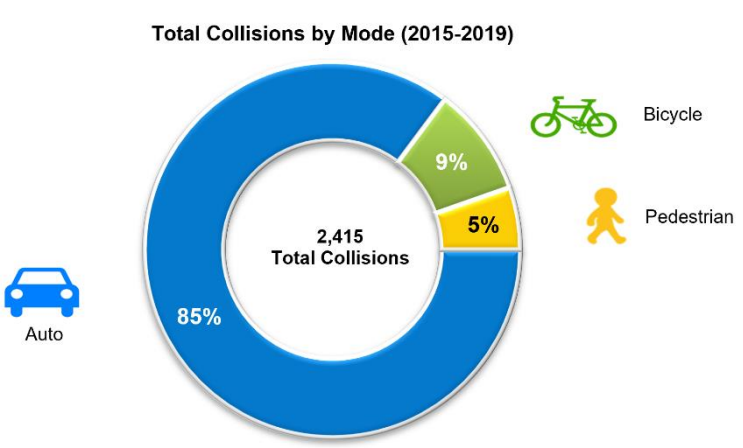
Bicycle Collision Trend

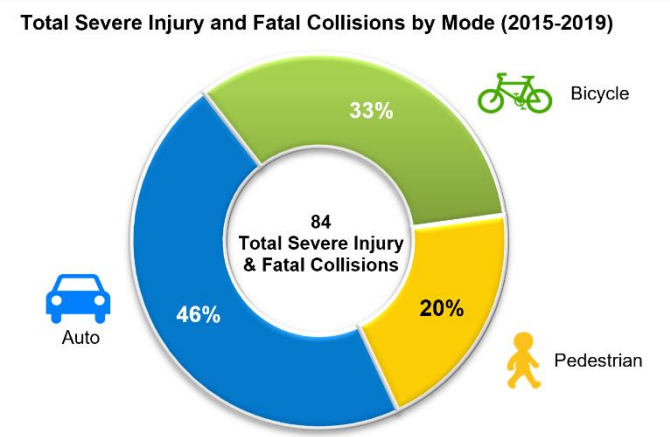
Despite rising bicycle volumes, bicycle collisions have generally been on the decline in recent years. 2018 had a 18% increase in collisions over the 2017 report, but 2019 had the lowest reported bicycle collisions on record. Bicycle collision trends have shown a 47% decline from peak levels in 2009.



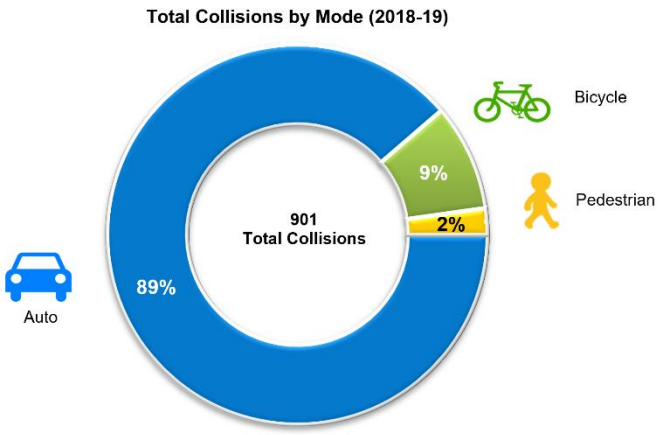
Pedestrian and Bicycle Serious Injuries and Fatalities

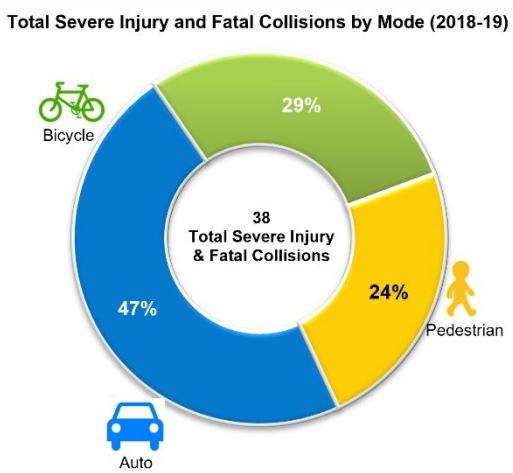
Over the past five years (2015-2019), 2,415 traffic collisions have been reported in the City—about 480 per year. Roughly 14% of these collisions involved a bicyclist or pedestrian, which is generally consistent with citywide bicycle & pedestrian mode share. However, as illustrated in the graphic below, 53% of the collisions resulting in severe injury or death involved a bicyclist or pedestrian. These trends indicate that bicyclists and pedestrians are overrepresented in collisions that resulted in severe and life-threatening injuries and there is continued need for mitigation strategies that target bicycle and pedestrian collisions.





In 2018 and 2019, while the total collisions by mode were consistent with the five-year trend, the severe injury and fatal collisions by mode drastically demonstrate the overrepresentation of bicycle and pedestrian collisions. Taking a closer look at common collision types of bicycle and pedestrian collisions is critical in moving towards Vision Zero.





Human and Economic Impact

Traffic collisions result in direct economic costs to those involved—wages and productivity losses, medical expenses and legal costs, and motor vehicle damages—but, this represents only a portion of total costs associated with collisions. Traffic collisions also have indirect impacts to the families of those involved, employers and society as a whole. A study by the NHTSA found that more than 75 percent of collision costs are born by society in the form of insurance premiums, taxes and congestion-related costs such as travel delay, excess fuel consumption and lost quality of life associated with deaths and injuries.

Comprehensive costs include the economic cost components associated with traffic collisions, but also the indirect societal costs. Using cost estimates by crash severity published in the American Association of State Highway transportation Officials' (AASHTO) *Highway Safety Manual*, adjusted to reflect 2018 and 2019 dollars, the comprehensive costs in 2018 were over $23 million and in 2019 over $32 million. Comprehensive collision costs for 2018 and 2019 by collision type are summarized in **Table 1** below.

Table 1: 2018-19 City of San Luis Obispo Comprehensive Collision Costs

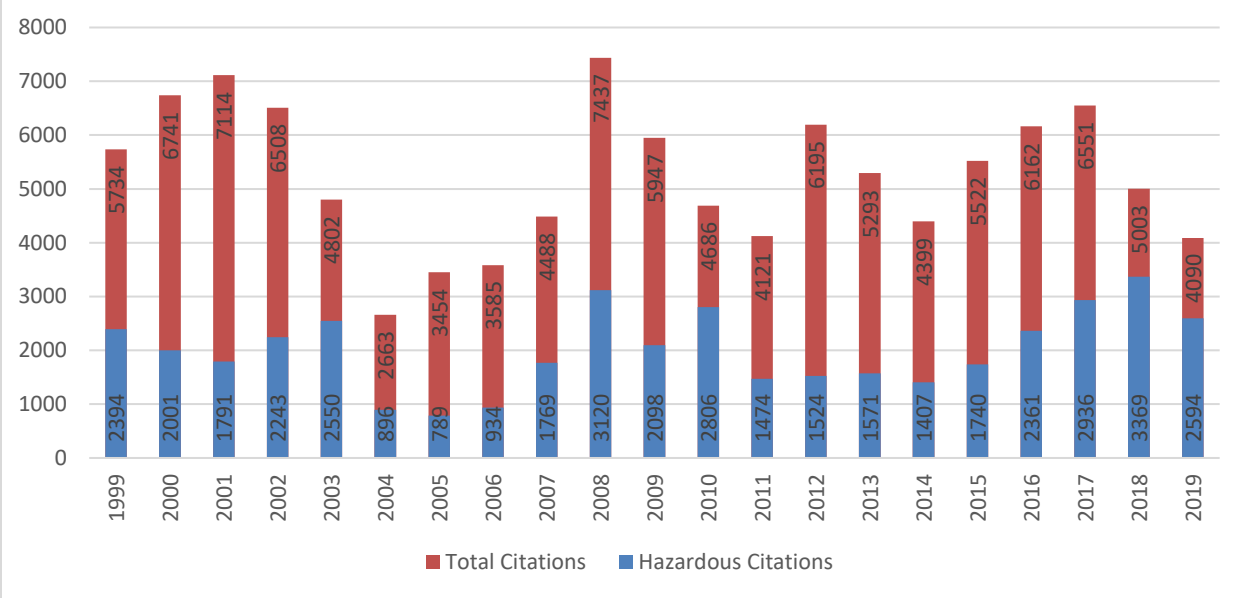
Collision Severity	Number of Collisions		Cost per Collision		Cost	
	2018	2019	2018	2019	2018	2019
Fatal	1	3	$4,666,401	$4,751,887	$4,666,401	$14,255,660
Disabling Injury	20	14	$267,722	$272,627	$5,354,444	$3,816,774
Non-Incapacitating Injury	49	56	$98,342	$100,143	$4,818,751	$5,608,032
Possible Injury	96	100	$57,581	$58,636	$5,527,765	$5,863,573
Property Damage Only	265	297	$10,123	$10,308	$2,682,565	$3,061,574
Total	**431**	**470**			$23,049,926	$32,605,613

Source: Crash Cost Estimates based on AASHTO's *Highway Safety Manual,* 2010. Costs adjusted to 2018 and 2019 dollars based on Consumer Price Index and Employment Cost Index per *Highway Safety Manual* guidance.

Traffic Enforcement Measures

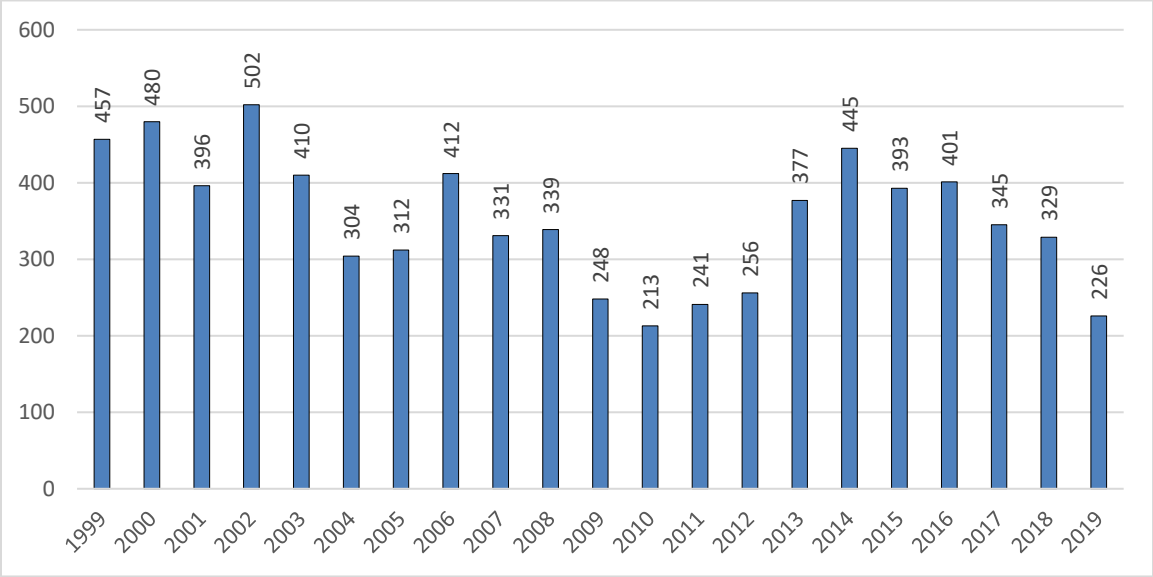
Traffic citations are one method used to promote compliance with the vehicle code and create a safer environment for road users. The vehicle code includes many sections for enforcement. Some vehicle code violations are more serious than others and are designated as “Hazardous Violations”. Vehicle Code Violations are tracked by the Department of Motor Vehicles, and hazardous violations are weighted by a point system. All hazardous vehicle code sections carry at least one point and some carry two points. The point system is used to assess the driving behavior of motorists and place restrictions on negligent drivers, which helps make roadways safer by removing drivers with hazardous driving behavior. The chart below depicts the total citations (hazardous and non-hazardous) by the Police Department since 1999.

Citation Trends

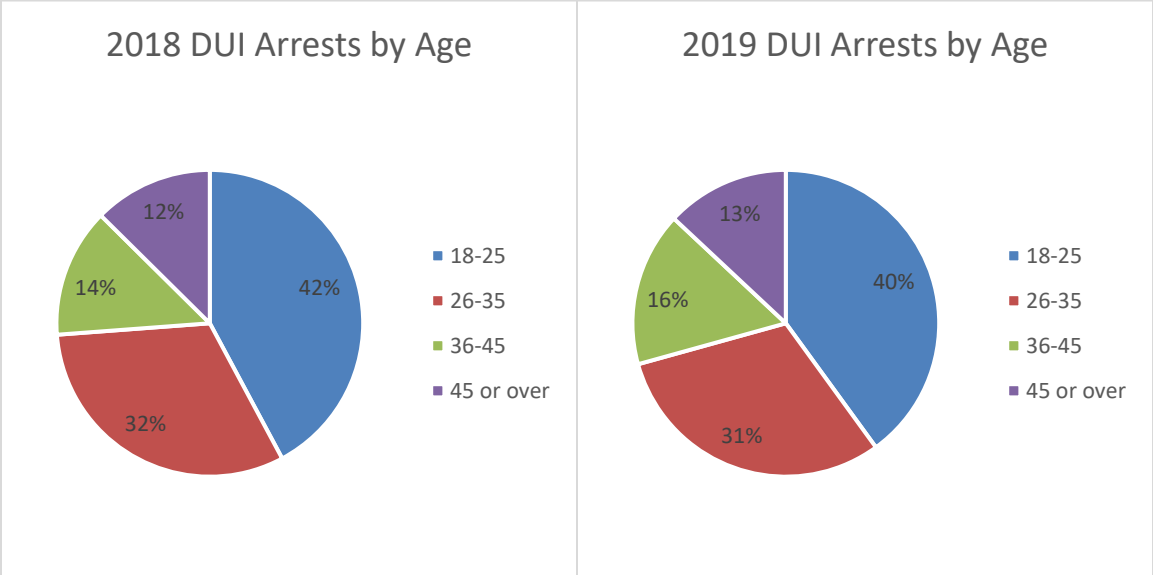


As shown in the chart above, citation trends can fluctuate from year-to-year. These trends are not necessarily a direct reflection of overall driving behavior but can coincide with the resources and staffing levels of the Police Department.

DUI Arrests

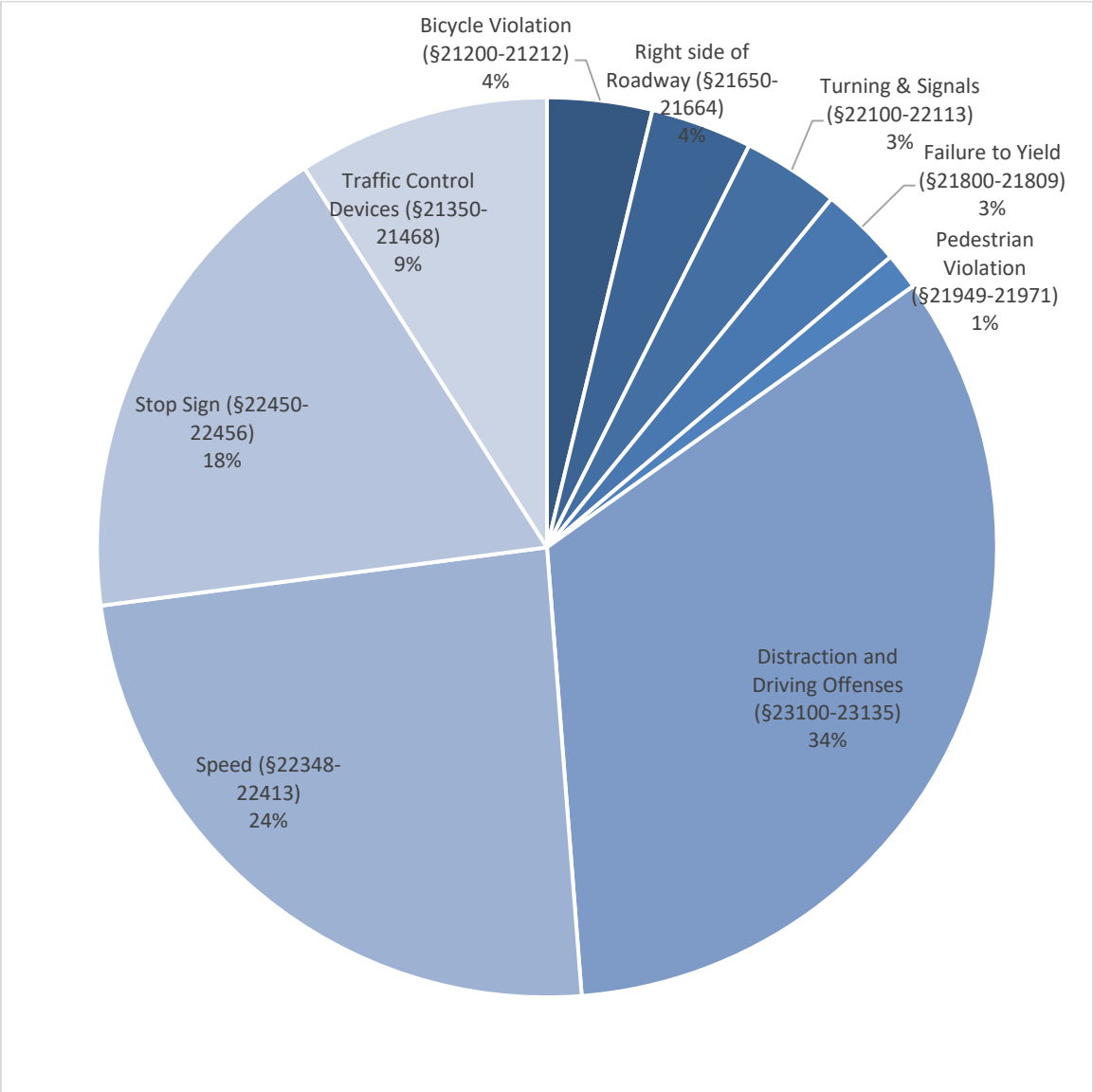


Driving under the influence (DUI) violations have been a focal point of enforcement in an effort to reduce injury traffic collisions. Since 1999, the Police Department has averaged 353 DUI arrests each year. Of those arrests, about five to ten drivers each year were arrested for felony DUI after being involved in a collision that causing injury to someone involved. In 2018 the Police Department arrested 329 people for DUI. In 2019, there were 226 arrests. Just under half (40-42%) of the DUI arrests involved drivers who were between 18 and 25 years old and almost three-quarters (71-74%) were between the 18 and 35 years old.

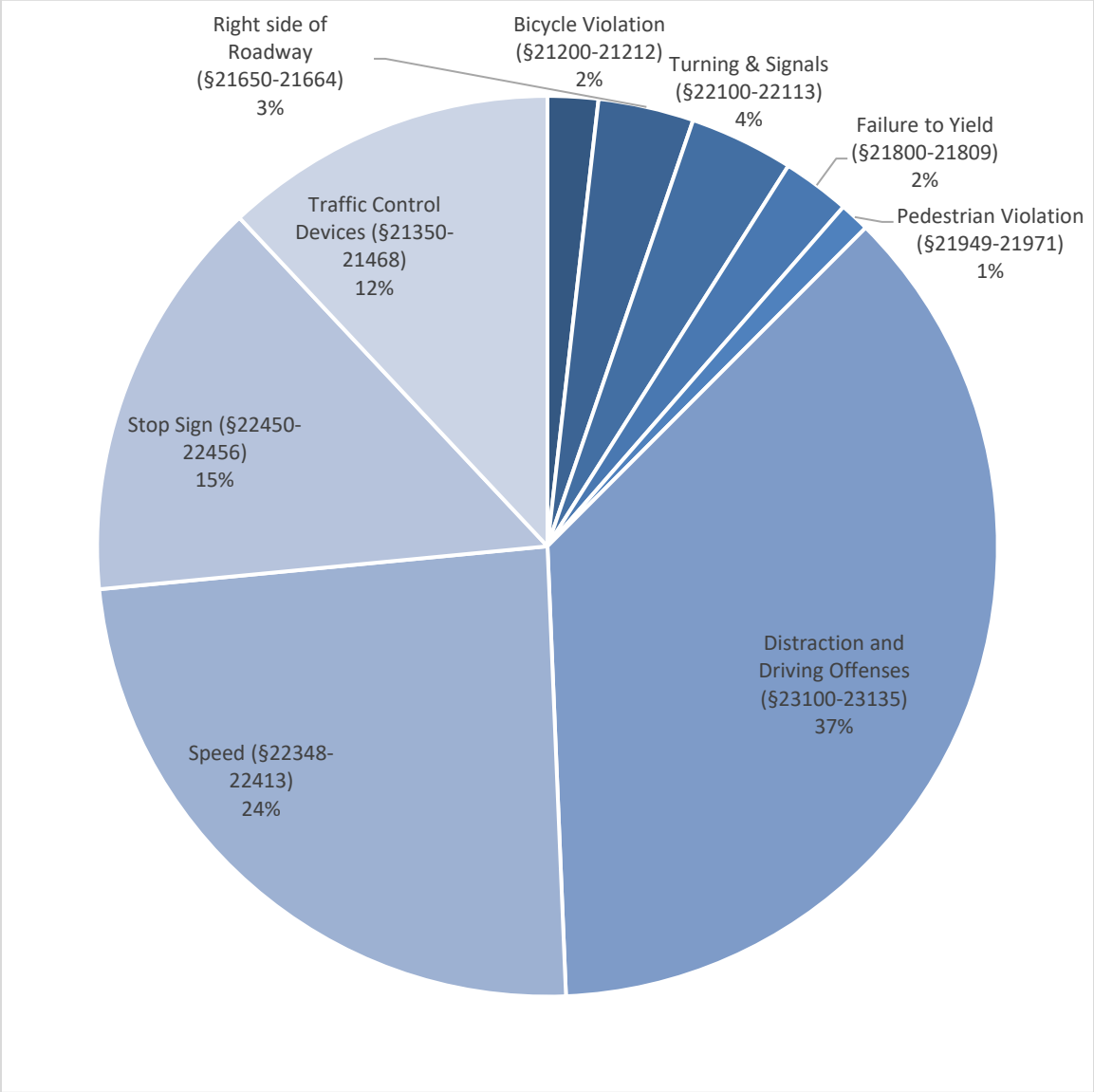


Citations by Vehicle Code Section

The following chart depicts the distribution of vehicle code citations by type for 2018.



The following chart depicts the distribution of vehicle code citations by type for 2019.



Note: Above chart excludes citations related to Driver's License and Insurance violations.

Traffic Safety Education Campaigns and Community Partnerships

Between City-led efforts and activities led by local partners, such as Bike SLO County and SLOCOG/Rideshare, there were multitude of ongoing traffic safety education and outreach campaigns provided to the community of San Luis Obispo in 2018 and 2019. Key education and outreach activities are summarized below:

- **Partnership with the California Office of Traffic Safety**
  A Selective Enforcement Grant funds a full-time DUI officer position. This officer is utilized specifically for DUI enforcement in an effort to further reduce the number of alcohol and drug related driving incidents.
- **Annual Bicycle Rodeo**
  Bike SLO County and SLOCOG host a hands-on bicycle training class targeting youth teaching bicycle skills & operations.
- **Bike Month Activities and Promotion**
  The City participates and encourages participation in Bike Month activities and hosts an annual bike breakfast in May.
- **Pop-Up Bike Education Events**
  SLO Public Works and Police Department partner up with Bike SLO County and the County Public Health Department to have on-the-spot "pop-up" bike education events along high-volume bike corridors, such as the annual Bike Light Checkpoint and Light Give-a-Way.
- **Pedestrian Halloween Safety Campaign**
  The City provides reflective Halloween bags with safety tips to local schools free of cost.
- **Impaired Driver Offender Classes**
  City police officers attend and supplement DUI offender courses to provide a unique positive opportunity to discuss, face to face, the impacts of driving under the influence.
- **Ticket Diversion Program for Bicyclists**
  Cal Poly University PD offers a diversion program for bicyclists that are ticketed for a traffic offense in SLO County.

- **Adult Bicycle Education Workshops**

  Bike SLO County provides offers an adult bicycle class which includes an in-class room and on-street portion, focusing on the rules of the road.

- **Transit Driver Awareness Training**

  City Transportation Staff annually leads a bicycle awareness training to contracted City transit drivers.

- **Every Fifteen Minutes Program**

  The City participates in a multi department and agency event simulating the psychological effects of student fatalities as a result of traffic collisions.

- **Child Car Seat Instruction & Assistance**

  The City provides child safety seat installation and inspection free of cost.

- **SLO PD Traffic Safety Presentations**

  City police officers presented at the following organizations regarding traffic safety in 2018-19:

  - Safety and Law Lectures: *Cuesta Junior College and Cal Poly University criminal justice programs*
  - Coast Riders Motorcycle Club: *Discussed motorcycle safety*
  - Sheriff's Day at the Ranch: *Discussed bicycle and motorcycle safety*
  - Cop's and Kid's Day: *Discussed bicycle and motorcycle safety*
  - National Walk to School Day: *Discussed pedestrian safety with school children*
  - National Bike to School Day: *Discussed bicycle safety with school children*

Completed/Planned Safety Projects & Programs

Transportation safety is and will continue to be a priority for the City. Each year the Public Works Department implements traffic safety improvements through a variety of programs and projects. These improvements are usually stand-alone projects but are often included in other City capital improvement program (CIP) projects or as part of individual land development projects.

Table 2 below identifies notable traffic safety improvements that were completed recently or planned for implementation in the near future.

Table 2: Completed or In Progress Transportation Safety Projects

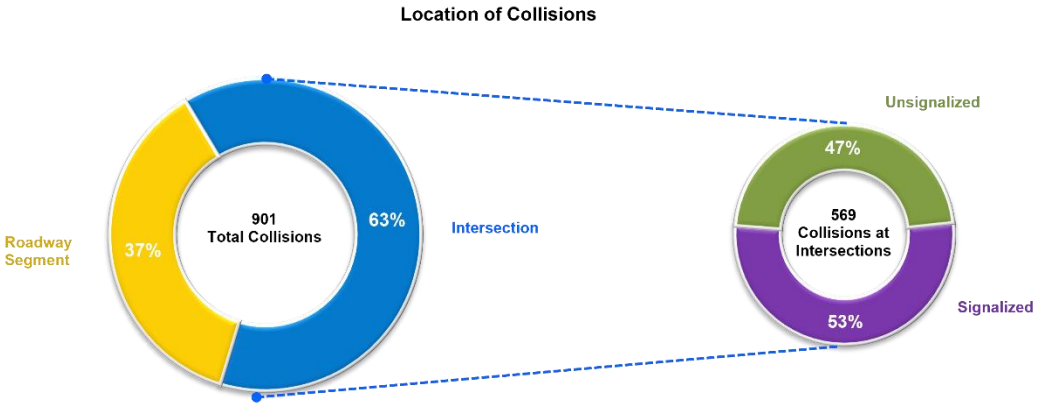
Location	Project Description
Traffic Signal Improvements	
Downtown Core Signal Timing*	Completed implementation of Lead Pedestrian Intervals at several downtown intersections. Implementation to remaining signals citywide underway.
Foothill & Broad*	Install Flashing Yellow Left-Turn Arrows. Implementation required as part of private development at 790 Foothill Blvd., to be completed by spring 2022.
Chorro & Higuera*	Completed relocation of pedestrian signal heads at west crosswalk to adjacent signal poles to improve visibility of pedestrian indications for motorists and pedestrians.
Industrial & Broad*	Upgrade and add signal indicators for more visibility. Investigate the installation of officer assist red light enforcers. Installation in progress by City signal technicians, to be complete winter 2022.
Santa Rosa & Mill*	Upgrade and add signal indicators for more visibility. Investigate the installation of officer assist red light enforcers. Signal indicator upgrades complete.
Broad & Marsh*	Install mast arm signal poles at Broad Street approaches to increase visibility of signal heads. Partially complete--NB approach completed in 2021. Pole at SB approach requires reconstruction of corner, planned as part of proposed 2023-24 Downtown Beautification CIP Project.
LOVR & Calle Joaquin*	Converted NB and SB approaches to protected left turns only.
Pedestrian & Bicycle Improvements	
Montalban Crosswalk at Santa Rosa*	Paint crosswalk on Montalban at Santa Rosa. Completed in 2019.
Tank Farm Crosswalk at Poinsettia	Installed in-roadway pedestrian crossing signs and Rapid Rectangular Flashing Beacon (RRFB) system.
California & Monterey*	Install radar speed feedback signs, additional warning signs or other measures at NB & SB approaches. Currently under planning/design, with likely outcome to be installation of bike signal or illuminated yield to bike signs.
S. Higuera & Suburban	Installed “Right Turn Yield To bikes” warning sign
Broad Street at Woodbridge	Pedestrian Hybrid Beacon installation complete in in 2021.
Foothill at Ferrini	Pedestrian Hybrid Beacon installation complete in late 2019.
Osos & Pismo*	Implemented lead pedestrian intervals and “yield to pedestrian” warning signage.
Grand & Loomis*	Install “yield to bike” sign for NB left turn approach.
Various Locations	In-roadway pedestrian yield signs installed at 15 uncontrolled pedestrian crossings citywide. RRFB beacon systems planned or in progress at numerous uncontrolled pedestrian crossings in 2022, including at Johnson/Sydney, South/King, Marsh/Toro, Johnson/Higuera.
Roadway Improvements	
California & Taft Roundabout*	90% design complete. Final design and right-of-way negotiation underway, with construction planned for 2023.
Orcutt & Tank Farm Roundabout	Construction in progress, with completion expected in spring of 2022.

Location	Project Description
Higuera at Bridge*	Final design and right-of-way coordination with Caltrans underway, with plans to proceed to construction by end of 2022.
Broad at High*	Sight distance improvements implemented in 2021.
Grand at Loomis*	Red curb installation to improve sight distance complete.
California: Foothill to Stafford*	Parking restrictions implemented at driveways to improve sight distance at conflict points.
Street Light Improvements	
North Broad Street	Installed 3 new streetlights between Foothill and Mission.
1229 Fredericks	Installed new streetlight (near Cal Poly)
395 Grand	
16 Hathway	
1386 Laurel	
2068 Story	
Signing & Striping Improvements	
Mill at Osos*	Refreshed SB stop bar and pavement legend to improve driver compliance at stop sign.
Higuera & Vachell*	Installed “Keep Clear” striping and signage. Intersection reconstruction to restrict left-turns planned in 2023 as part of Avila Ranch development.
Johnson & Buchon*	Installed high-visibility median markings and signage to improve visibility for drivers.
Johnson & Toro	Installed all-way stop signs
Broad & Pismo*	Restriped WB Pismo approach to better channelize bicycles and right-turn movements.
Citywide	Replaced approximately 100 traffic signs to meet retroreflectivity standards
Several locations	Reduced speed limits where feasible pursuant to policies in California Vehicle Code Recent on several streets, including upper Monterey Street, Tank Farm east of Broad Street, South Street, and Santa Barbara Street.
**Project recommended in previous Traffic Safety Report*	

2018 & 2019 High Collision Rate Locations & Recommendations

Where Collisions are Occurring

Intersections are the most common location for all collisions. As shown in the figure below, 63% of 2018-19 collisions in the City occurred at intersections, with 53% of those occurring at signalized intersections. This finding highlights the importance of focusing traffic safety efforts on intersections.



All of the traffic collision reported in 2018 and 2019 are shown on the maps in **Error! Reference source not found.**1 and 2. All pedestrian and bicycle collisions reported in 2018 and 2019 are shown on figures 3 and 4.

Figure 1: 2018 Citywide Collisions

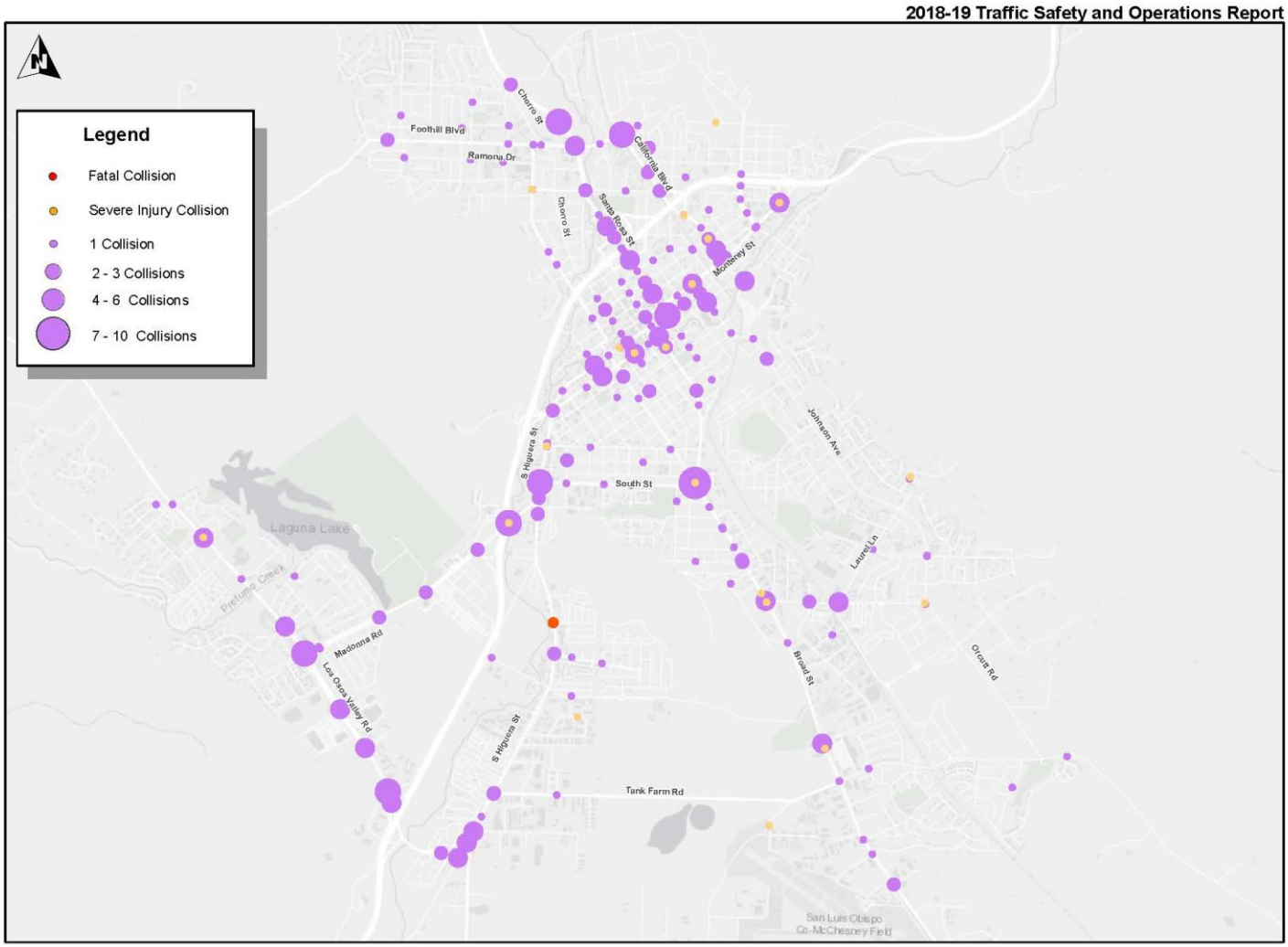


FIGURE 1
2018 CITYWIDE COLLISIONS

Figure 2: 2019 Citywide Collisions

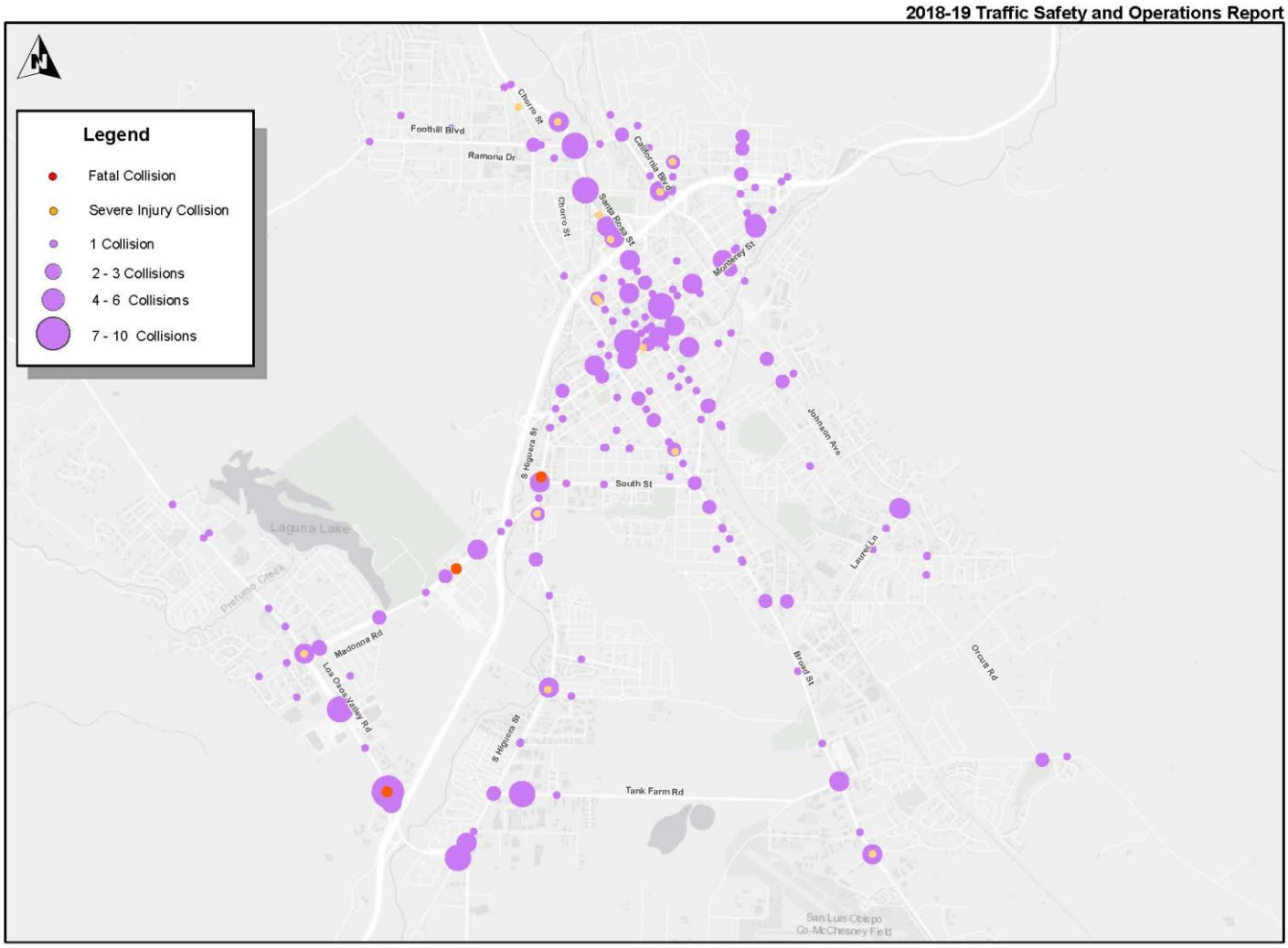


FIGURE 2
2019 CITYWIDE COLLISIONS

Figure 3: 2018 Citywide Pedestrian and Bike Collisions

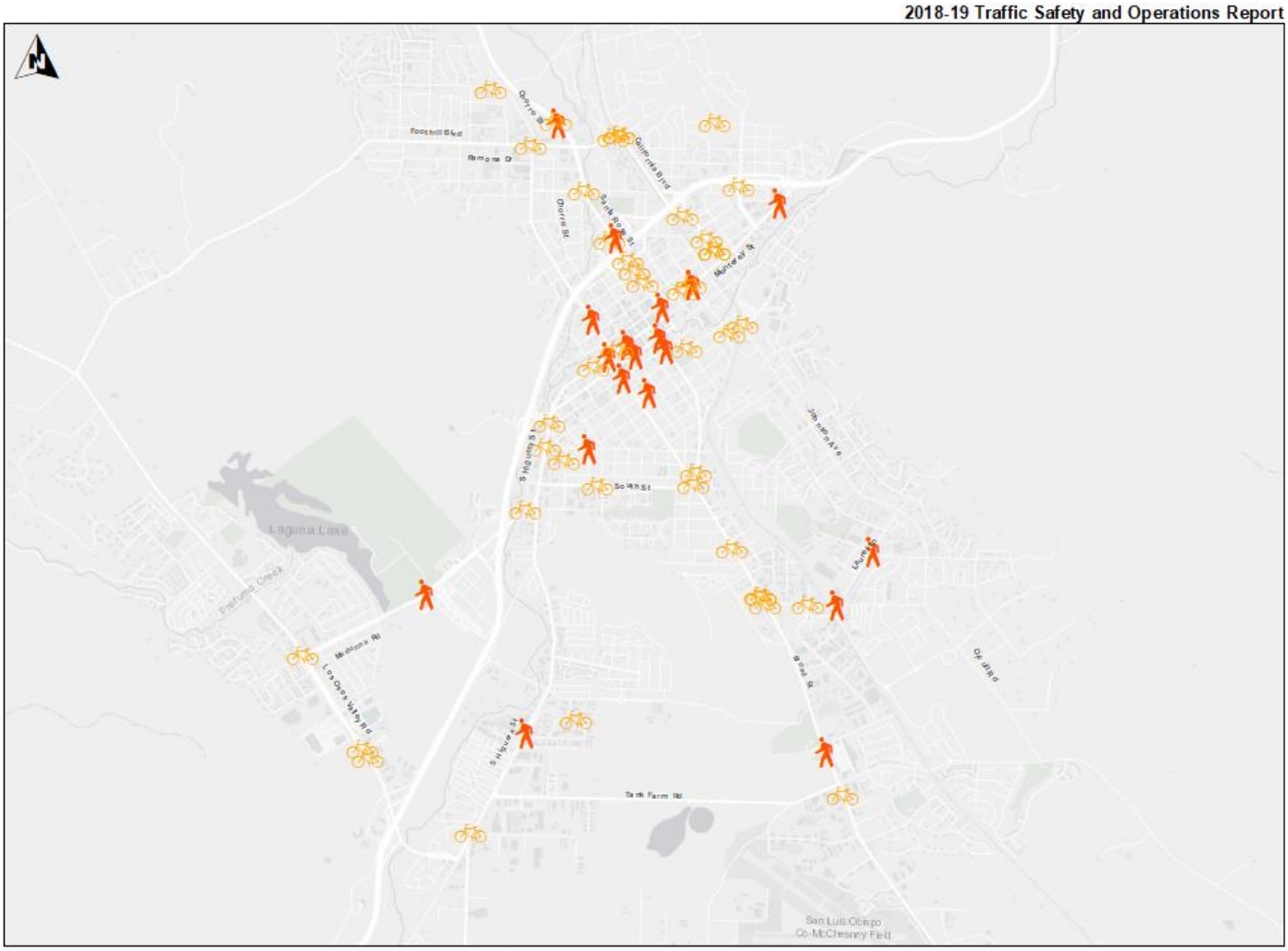


FIGURE 3
2018 CITYWIDE PEDESTRIAN AND BICYCLE COLLISIONS

Figure 4: 2019 Citywide Pedestrian and Bike Collisions

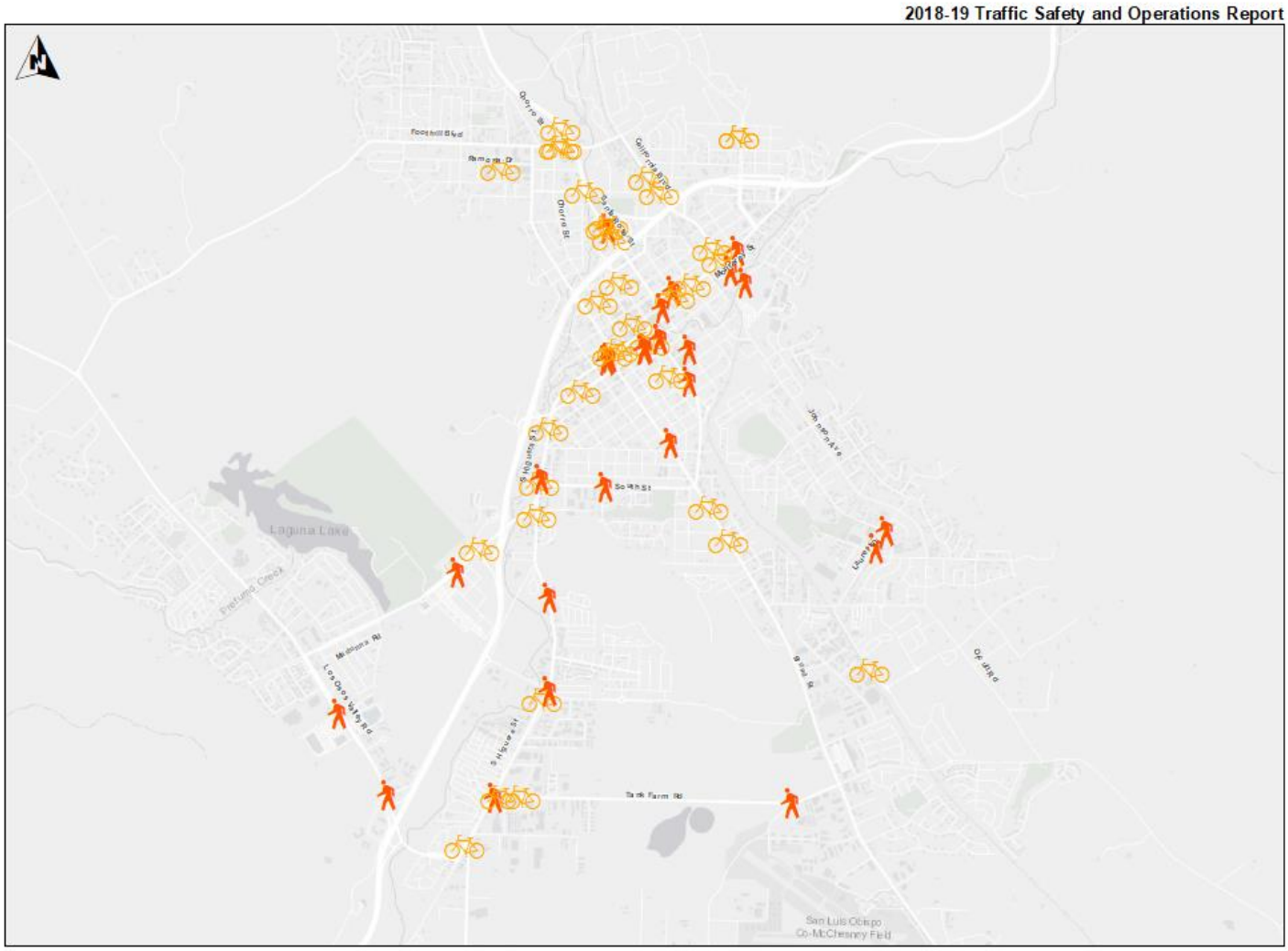
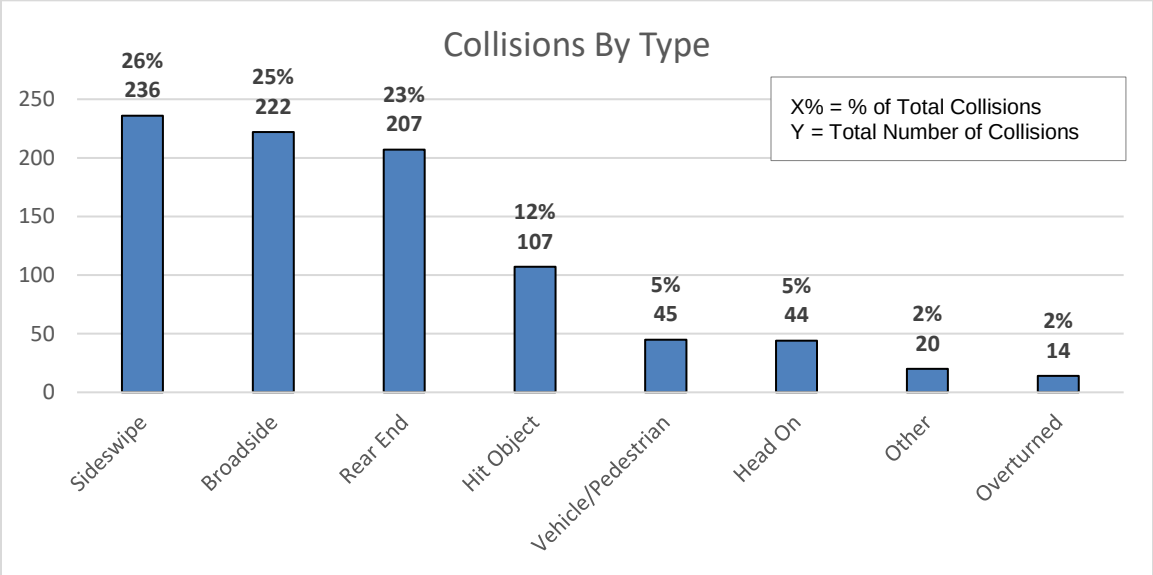


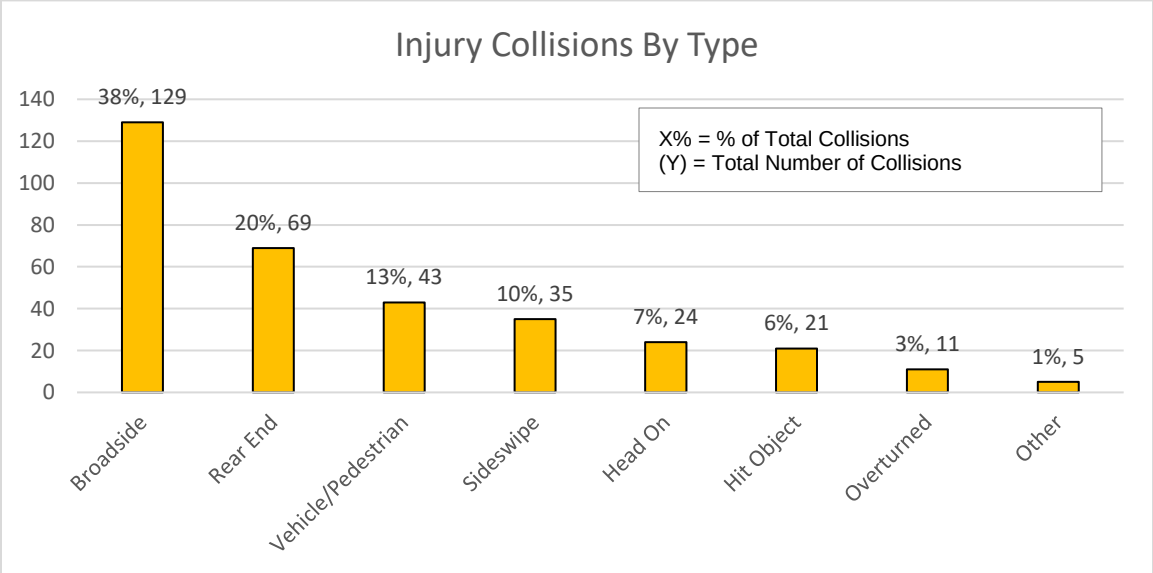
FIGURE 4
2019 CITYWIDE PEDESTRIAN AND BICYCLE COLLISIONS

Most Common Collision Types and Factors

As shown in the chart below, sideswipe, broadside and rear-end collisions were the most common type of collisions reported in 2018 and 2019, representing 74% of the total recorded incidents.



As shown below, broadside and rear-end collisions were the most common type of injury collision reported in 2018 and 2019, representing 38% and 20% of total recorded injury collisions. While collisions involving vehicles with pedestrians represent only 5% of total collisions in 2018-19, they account for 13% of injury collisions. Collisions involving vehicles with pedestrians and bikes make nearly 55% of severe and fatal injury collisions. Thus, preventing these crash types offers the greatest potential for reducing the number of serious injury and fatal incidents.



The most common factors attributed to recorded collisions in 2018 and 2019 are summarized in **Table 3** below. Improper turning, Automobile Right of Way violations and speeding represent the most prevalent factors in overall collisions and injury collisions, accounting for over half the recorded collisions. Pedestrian Violation (i.e. pedestrian crossing illegally) is not ranked in the top 5 of All Collisions but represented 7% of the Severe Injury and Fatal Collisions. DUI continue to rank as a highly prevalent factor attributed to severe injury and fatal collisions.

Table 3: Primary Collision Factors

Factor	Rank	%
All Collisions		
Improper turning	1	26%
Unsafe Speed	2	17%
Automobile Right of Way	3	14%
Drive/Bike Under Infl Alcohol/Drug	4	9%
Unsafe Starting or Backing	5	5%
Injury Collisions		
Improper Turning	1	22%
Automobile Right of Way	2	21%
Unsafe Speed	3	18%
Pedestrian Right of Way	4	7%
Traffic Signs and Signals	5	6%
Severe Injury & Fatal Collisions		
Automobile Right of Way	1	22%
Drive/Bike Under Infl. Alcohol/Drug	2	14%
Improper Turning	2	14%
Pedestrian Right of Way	4	11%
Unsafe Speed	4	11%

Pedestrian Common Collision Types and Factors

As in previous reports, motorist left turning movements were the most frequent types of reported pedestrian collisions. The party at fault was about even between the driver or the pedestrian. Pedestrians failing to yield and crossing illegally made up the majority of pedestrian-at-fault collisions.

Table 4: Pedestrian Collisions by Type

Pedestrian Collision Type	%	Party at Fault	%
Motorist Left-Turn	32%	Driver	52%
Pedestrian Failed to Yield	16%	Pedestrian	48%
Pedestrian Violation (Jaywalking)	13%		
Scooter/Skateboarder in Roadway	13%		
Motorist Failed to Yield	13%		
Pedestrian Violation (Crossing Against Signal)	6%		
Motorist Right-Turn	6%		
Total	100%		

Systematic Planning for Pedestrian Safety

For pedestrian collisions, this TSR further analyzed pedestrian vs. motorist crashes where the motorist was found to be at fault (motorist turning movements and failing to yield). For purposes of this specific analysis, the crash locations studied were limited to intersections, as the majority of collisions within the City occurred at an intersection.

Detailed analysis indicated that pedestrians are more likely to be involved in a motor vehicle crash at signalized intersections that allow permissive left turns. Additionally, there is a direct correlation with surrounding land uses. Most pedestrian vs. motorist collisions happen within or near the downtown core or adjacent to neighborhood commercial areas.

Figure 5 identifies intersections within the City that are signalized allowing permissive movements within a quarter mile radius of the downtown core or commercial shopping areas. In line with the City's Vision Zero goals and to increase pedestrian safety within the City, these locations should be prioritized for systematic safety improvements. **It is recommended that these intersections be considered and evaluated for additional measures to address this risk such as, but not limited to, modifying signal phasing from permissive to protected, increasing visibility and awareness of crossing pedestrians by adding signage or other striping improvements such as hi-visibility crosswalks, and adding lead pedestrian intervals.**

In addition to implementing improvements at the above-described locations, it would also be prudent to focus systematic proactive countermeasures at uncontrolled marked crossings. An uncontrolled marked crossing is a location (either mid-block or at an intersection) where a crosswalk is marked but traffic is not controlled with either a stop sign or traffic signal. Per the Federal Highway Administration, uncontrolled pedestrian crossing locations correspond to higher pedestrian crash rates. The City of San Luis Obispo has 22 uncontrolled marked crossings.

Approaching pedestrian safety systematically, improving these types of uncontrolled marked crossings will proactively increase safety at these crossings and increase the comfort of crossing pedestrians of all ages and abilities. **Figure 6** identifies the locations of uncontrolled marked crossings in the City. **It is recommended that these crossings be considered and evaluated for additional measures to increase crosswalk visibility such as but not limited to in-street pedestrian crossing signs, rectangular rapid flashing beacons (RRFBs) or pedestrian hybrid beacons (PHB). In addition, all strategies to reduce vehicle speeds on high-volume/speed arterials corridors should be evaluated, where permitted within applicable engineering standards and California Vehicle Code provisions.**

If implemented, locations should be prioritized with consideration of collision history, vehicle speeds, number of crossing lanes and proximity to schools. **Table 3** below lists the locations in recommended prioritization.

Table 5: Uncontrolled Pedestrian Crossing Locations

Priority	Location	Pedestrian collisions 5 yr total	Speed Limit	Number of Crossing Lanes	Designated School Crossing?
1	Tank Farm at Poinsettia Street*	1	45	4	No
2	Monterey at Buena Vista*	1	30	3	No
3	Higuera between Chorro and Morro	1	25	3	No
4	Marsh between Chorro and Morro	1	25	3	No
5	Monterey at Court Street*	1	25	2	No
6	Johnson Ave at Sydney*	0	35	4	Yes
7	Broad Street at Upham*	0	30	2	Yes
8	High Street at Hutton*	0	30	2	Yes
9	Marsh at Toro*	0	25	3	No
10	Higuera at Garden	0	25	3	No
11	Chorro at Mill*	0	25	2	Yes
12	Augusta Street at Sinsheimer Elementary*	0	25	2	Yes
13	Hutton Street at Sandercock*	0	25	2	Yes
14	Hutton Street at Branch*	0	25	2	Yes
15	Sandercock Street at Story*	0	25	2	Yes
16	Broad at Mill*	0	25	2	Yes
17	Galleon Way at Royal*	0	25	2	Yes
18	Balboa Street at Lakeview*	0	25	2	Yes
19	Bougainvillea Street	0	25	2	No
20	Osos at Pacific*	0	25	2	No
21	Monterey between Chorro and Morro*	0	25	2	No
22	Broad at Mission Plaza	0	25	2	No

*Crossing enhancements, such as in-road pedestrian yield signs or RRFB beacons recently installed or planned for installation in 2022.

Figure 5: Citywide Uncontrolled Marked Pedestrian Crossings

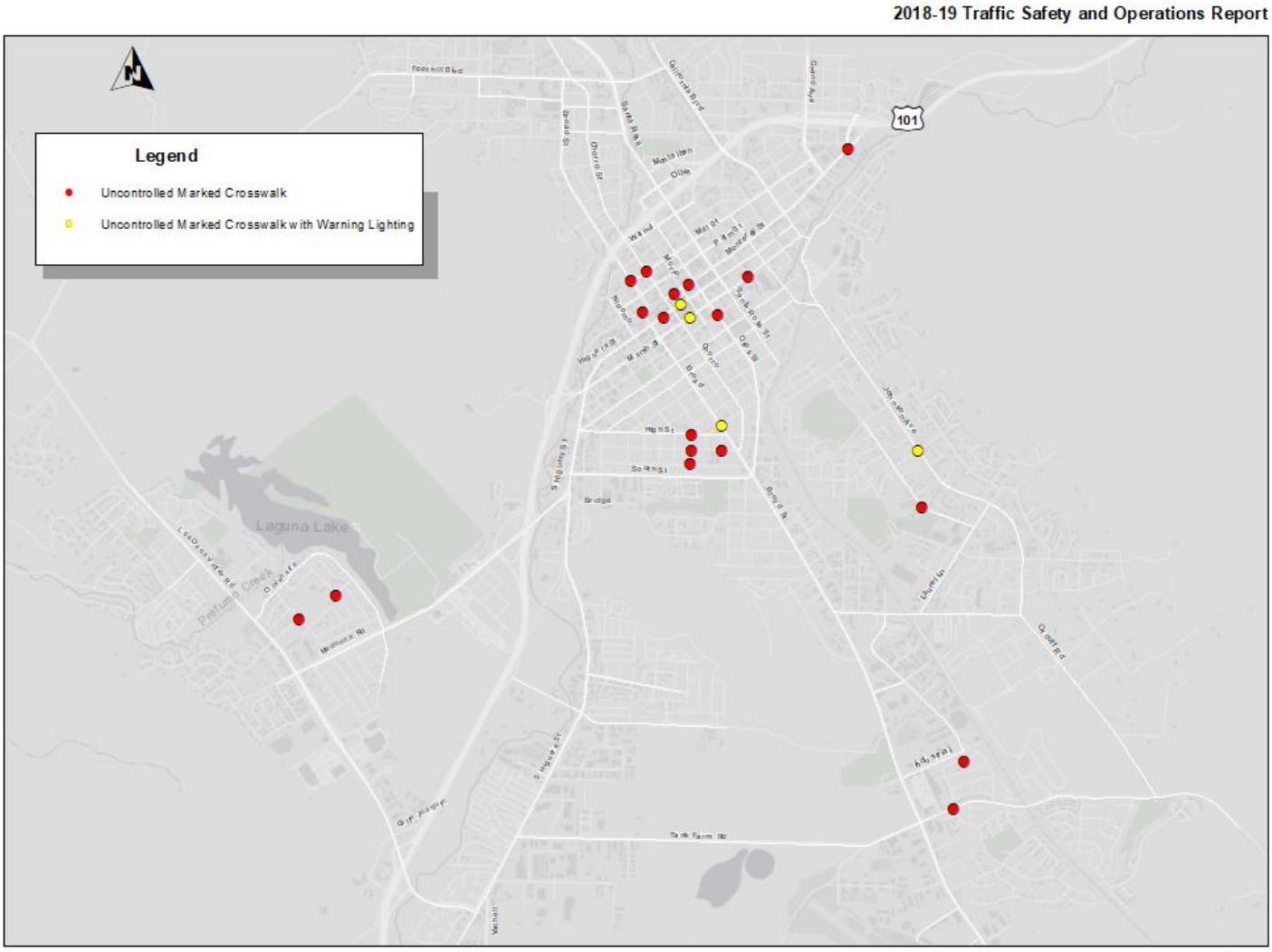


FIGURE 5
2018-19 Citywide Uncontrolled Marked Pedestrian Crossings

Bicycle Common Collision Types and Factors

The table below lists the bicycle collisions by type recorded in 2017, as well as the party at fault. Motorist right turn movements were the most common types of vehicle vs. bicycle collisions reported followed by motorist left turn movements. About 66% of reported vehicle vs. bicycle collisions were the fault of the motorist.

Table 6: Bicycle Collisions by Type

Bicycle Collision Type	%	Party at Fault Motorist Vs. Bicyclist	%
Motorist Right-Turn	26%		
Motorist Left-Turn	15%		
Cyclist Lost Control	10%	Driver	66%
Motorist Failed to Yield	8%	Bicyclist	34%
Wrong-Way Cyclist	8%		
Cyclist no Light	5%		
Motorist Failed to Drive at Safe Distance	5%		
Cyclist Failed to Stop	5%		
Cyclist Under the Influence	5%		
Cyclist Lane change	5%		
Motorist Under the Influence	3%		
Cyclist Failed to Yield	3%		
Motorist Overtaking or Sideswipe	3%		
Total	**100%**		

Systematic Planning for Bicycle Safety

For bicycle collisions, this report looked at the top two most common bicycle vs. motorist crash types: Motorist Right-Turn and Motorist left-turn. For purposes of this analysis, the crash locations studied were limited to intersections and driveways, as the majority of bicycle collisions within the City occurred at an intersection or driveway.

Motorist right-turn and left-turn collisions with bicyclists are more likely to occur at intersections and driveways with traditional “Class 2” bike lanes striped on the edge of the road with no on-street parking. For right turning motorist, this type of configuration requires drivers to merge into the bicycle lane prior to making a right-hand turn. What is often seen, rather, is the driver making a right-hand turn from the travel lane. For left turning motorists, through bicyclists against the curb may sometimes be “hidden” behind other vehicles.

Figure 7 identifies segments within the City that have striped Class 2 bike lanes on the edge of the roadway with no on-street parking. In line with the City’s Vision Zero goals and the systematic analysis of bicycle collision trends in the City, may these locations may warrant proactive measures to reduce collision potential at intersections and driveways. Further, many of these corridors represent high speed/volume arterial streets and have been identified for installation of future

protected bicycle lanes in the City's recently adopted Active Transportation Plan. **To improve systematic safety for cyclists, it is recommended that the improvements identified in the City's Active Transportation Plan be implemented as rapidly as feasible, and other segments shown in Figure 7 be considered and evaluated for additional measures to address this risk such as, but not limited to, signage, hi-visibility green paint in conflict zones, separate right-turn phase from bicycle conflicts, bike scramble, lead phases, buffered or protected bike lanes and identify intersection locations that could benefit from bike box or protected intersection applications. In addition, all strategies to reduce vehicle speeds on high-volume/speed arterials corridors should be evaluated, where permitted within applicable engineering standards and California Vehicle Code provisions.**

High Collision Rate Locations – Pedestrians

Rank	Prev. Year Rank	Intersection	2018-19 Ped Collisions	5 yr total	PH Veh. Vol	PH Ped Vol.	PREV
1	1	SANTA ROSA & MONTEREY	1	7	2007	198	355
2	NR	MARSH & OSOS	3	4	1057	209	101
3	3	BROAD & HIGUERA	2	6	913	661	41
4	NR	MARSH & CHORRO	1	3	1049	529	30
N/A	NR	SANTA ROSA & MONTALBAN	1	4	3200	25	2612
N/A	NR	SANTA ROSA & OLIVE	1	4	3487	54	1291

N/A = Location under Caltrans jurisdiction. Listed for reference, but not included in City rankings
NR = Not Ranked
PH = Peak Hour
PREV = Pedestrian Relative Exposure Value

Pedestrian Recommendations

Rank	Intersection
1	**Santa Rosa & Monterey**[1]
Pattern: Motorists turning left and failing to yield to pedestrians in crosswalk, particularly in the westbound direction. Recommendation: Install Flashing Left Yellow Arrows for EB & WB Traffic. Upgrade crosswalks to hi-vis style markings. Increase pedestrian lead interval. These improvements are planned for 2022. Consider feasibility of a future pedestrian scramble crossing at his location. Continue to monitor in the next safety report.	
2	**Marsh & Osos**
Pattern: No discernable pattern, however Marsh & Osos is a signalized intersection within a half-mile radius of downtown that allows permissive lefts on Marsh from Osos. Recommendation: Implement Road Diet on Marsh Street, reducing to two vehicle lanes. Upgrade crosswalks to hi-vis style crosswalk markings. Increase pedestrian lead intervals. These improvements are scheduled as part of the 2022 paving project.	
3	**Broad & Higuera**[2]
Pattern: NB Broad Motorists turning left and failing to yield to pedestrians in crosswalk, particularly in the northbound direction. Recommendation: Implement permanent road diet on Higuera Street, reducing to two vehicle lanes. This scheduled as part of the 2022 paving project. Investigate installation of overhead signal mast arms for NB & SB Broad approaches with overhead streetlight luminaires. Install additional "yield to pedestrian" signage for northbound and southbound approaches and upgrade crosswalks to hi-vis style markings. Increase pedestrian lead intervals. Continue to monitor in the next safety report.	
4	**Marsh & Chorro**
Pattern: No discernable pattern, however Marsh & Chorro is a signalized intersection within a half-mile radius of downtown that allows permissive lefts on Marsh from Chorro. The signal will be upgraded with the redevelopment of an adjacent property, providing an opportunity for intersection improvements. Recommendation: Implement Road Diet on Marsh Street, reducing to two vehicle lanes. This is scheduled for the 2022 paving project. Adjust pedestrian lead intervals. Consider installing "hardened centerlines" on Chorro Street approaches. Evaluate installation of mast-arm signal poles with overhead luminaires for north and south approaches.	

1. Santa Rosa and Monterey is also ranked as a High Collision Rate Location for Arterial/Arterial Locations
2. Broad and Higuera is also ranked as a High Collision Rate Location for Arterial/Arterial Location

Rank	Caltrans Intersections
NA	**Santa Rosa & Montalban**
Pattern: No discernable pattern. Recommendation: Hi-vis crosswalks installed after 2019. Continue to monitor and work collaboratively with Caltrans to implement additional measures, such as “left/right turn yield to pedestrians” warning signs and/or installation of bulbouts on side streets to shorted pedestrian crossing exposure.	
NA	**Santa Rosa & Olive**
Pattern: No discernable pattern. Recommendation: Continue to monitor and work collaboratively with Caltrans to implement proven pedestrian safety countermeasures, such as addition of hi-vis crosswalk markings, “left/right turn yield to pedestrians” warning signs, and lead pedestrian crossing intervals.	

High Collision Rate Locations – Bicycles

Rank	Prev. Year Rank	Intersection	2018-19 Bicycle Coll.	5 yr Total	PH Veh. Vol	PH Bike Vol	BREV
NR	N/A	SANTA ROSA & WALNUT	1	3	2,795	21	1,996
1	6	JOHNSON & LIZZIE	1	3	2,134	37	865
2	2	CALIFORNIA & MONTEREY	1	7	1,848	101	640
3	NR	CALIFORNIA & PALM	4	5	*900*	60	375

N/A = Location under Caltrans jurisdiction. Listed for reference, but not included in City rankings
NR = Not Ranked
AWSC = All-way Stop-Control
SSSC = Side-Street Stop-Control
PH = Peak Hour
REV = Relative Exposure Value

Bicycle Recommendations

Rank	Intersection	Control	5 Yr. Collisions	PH Veh. Vol	PH Bike. Vol	REV
1	JOHNSON & LIZZIE	Signal	3	2,134	37	865

Pattern: No apparent pattern.

Recommendation: Evaluate feasibility of bikeway enhancements at this location as part of planned 2023 paving work on Johnson Avenue, including assessing feasibility of road diet (reducing from 2 to 1 auto lane in NB and/or SB directions) to provide width for buffered/protected bike lanes, green bike lane markings and installation of "left/right turn yield to bikes" signage. Continue to monitor location in next safety report.

Rank	Intersection	Control	5 Yr. Collisions	PH Veh. Vol	PH Bike. Vol	REV
2	CALIFORNIA & MONTEREY	Signal	7	1,848	101	640

Pattern: Right hook northbound and southbound bicycles with right turning vehicles.

Recommendation: Green bike lane markings through intersection refreshed in 2019 for SB and NB bicycles. Further measures currently under design to reduce conflicts between turning vehicles and bicyclists, with potential solutions including addition of bike signal phases or installation of illuminated yield to bike signs. In the long-term, (a) implement planned bikeway improvements along Pepper Street per Active Transportation Plan to provide alternate route for SB cyclists connecting from Railroad Safety Trail terminus at Pepper Street south to Marsh Street, and (b) explore potential to widen intersection for NB & SB dedicated right turn lanes and channelized bike lanes, keeping through cyclists to the left of right-turning vehicles.

Rank	Intersection	Control	5 Yr. Collisions	PH Veh. Vol	PH Bike. Vol	REV
3	CALIFORNIA & PALM	SSSC	5	***900***	60	375

Pattern: Right hook southbound bicycles with right turning vehicles.

Recommendation: Extend green bike lanes through intersection and install "right turn yield to bikes" warning signage. In the long-term, implement planned bikeway improvements along Pepper Street per Active Transportation Plan to provide alternate route for SB cyclists connecting from Railroad Safety Trail terminus at Pepper Street south to Marsh Street.

Rank	Caltrans Intersections
NA	SANTA ROSA & WALNUT

Pattern: No apparent pattern, however Santa Rosa and Walnut has striped Class 2 bike lanes on the edge of the roadway with no on-street parking. As discussed in previous analysis, these types of locations may need special attention to improve safety conditions for bicyclists.

Recommendation: Continue to monitor and work collaboratively with Caltrans to implement proven bicycle safety countermeasures, such as addition lane width reductions to provide width for buffered/protected bike lanes, addition of green bike lane markings through intersection in NB and SB directions, and addition of "left/right turn yield to bicyclist" warning signs. Implement bicycle facility improvements along north Chorro and Broad Streets to provide alternate route for cyclists to bypass Santa Rosa Street (State Route 1).

High Collision Rate Locations – Arterial/Arterial Intersections

2018 Rank	Prev. year Rank	Intersection	Control	Collisions	Volume	Rate*
1	**NR**	**Higuera & Nipomo**	**Signal**	**4**	**12,544**	**0.874**
2	**NR**	**California & Foothill**	**Signal**	**7**	**24,917**	**0.770**
3	**NR**	**Marsh & Nipomo**	**Signal**	**4**	**14,547**	**0.753**
4	**NR**	**California & San Luis Drive**	**AWSC**	**3**	**11,404**	**0.721**
5	**NR**	**Marsh & Chorro**	**Signal**	**3**	**13,042**	**0.630**
6	NR	Monterey & Johnson	Signal	4	17,587	0.623
7	13	Higuera & South	Signal	6	28,506	0.577
8	NR	Santa Rosa & Higuera	Signal	5	23,921	0.573
9	NR	Broad & South / Santa Barbara	Signal	8	38,422	0.570
10	NR	Johnson & Marsh	Signal	3	14,918	0.551
11	12	Los Osos Valley & Madonna	Signal	7	39,550	0.485
12	10	California & Monterey	Signal	3	22,161	0.371
13	NR	Madonna & 101 N/B On/Off Ramp	Signal	4	34,245	0.320
14	14	Madonna & 101 S/B On/Off Ramp	Signal	3	32528	0.253
15	N/A	Santa Rosa & Foothill	Signal	3	53147	0.155

2019 Rank	Prev. year Rank	Intersection	Control	Collisions	Volume	Rate*
1	**NR**	**Higuera & Chorro**	**Signal**	**6**	**9,783**	**1.680**
2	**NR**	**Johnson & Laurel**	**Signal**	**4**	**14,324**	**0.765**
3	**NR**	**Monterey & Grand**	**Signal**	**3**	**13,034**	**0.631**
4	**3**	**Marsh & Nipomo**	**Signal**	**3**	**14,547**	**0.565**
5	**NR**	**Higuera & Los Osos Valley**	**Signal**	**5**	**25,795**	**0.531**
6	NR	Marsh & Osos	Signal	3	16,405	0.501
7	NR	Santa Rosa & Marsh	Signal	3	17,367	0.473
8	6	Monterey & Johnson	Signal	3	17,587	0.467
9	NR	Santa Rosa & Monterey	Signal	4	25,044	0.438
10	7	Higuera & South	Signal	4	28,506	0.384
11	N/A	Foothill & Santa Rosa	Signal	7	53,147	0.361
12	NR	Broad & Orcutt	Signal	3	37,263	0.221
13	11	Los Osos Valley & Madonna	Signal	3	39,550	0.208
14	NR	Broad & Tank Farm	Signal	3	46,175	0.178

NR = Not Ranked
Rate = Collision frequency per million vehicles entering the intersection

Arterial/Arterial Intersections Recommendations

Rank	Intersection	Control	Collisions	Volume	Rate*
1	HIGUERA & CHORRO	Signal	6	9,783	1.680
Pattern: Rear End Collisions on Chorro. Recommendation: Road diet implemented in 2020. Consider traffic signal corridor re-timing to reduce vehicle platoon speeds. Continue to monitor in next safety report. Where feasible, install near side signal heads and high-visibility signal back plates. In the long term, Install mast arm signal poles on NB & SB Chorro approaches and rebuild signal intersection.					
2	HIGUERA & NIPOMO	Signal	4	12,544	0.874
Pattern: Westbound Higuera traffic rear ending stopped vehicles. Recommendation: Implement permanent road diet, reducing to two auto lanes. Consider measures to reduce auto speeds on Higuera Street, including re-timing traffic signals for slower progression speeds, and extension of existing business speed zone to reduce posted speed limit on Higuera to 25 MPH west of Broad Street. Continue to monitor in next safety report.					
3	CALIFORNIA & FOOTHILL	Signal	6	24,917	0.770
Pattern: EB & WB Rear End Recommendation: Consider measures to reduce vehicles speeds on Foothill Boulevard, such as installation of speed feedback signage, and striping changes as part of future paving project to narrow vehicle lanes and install protected bike lanes, as proposed in Active Transportation Plan. Complete railroad crossing safety enhancements (currently in design).					
4	JOHNSON & LAUREL	Signal	4	14,324	0.765
Pattern: NB Broadside collisions. Recommendation: Implement protected left turn signal phasing for northbound Johnson left turns.					
5	MARSH & NIPOMO	Signal	4 (2018)	14,547	0.753
Pattern: Eastbound Rear End. Recommendation: Consider measures to reduce vehicle speeds along Marsh Street, such as implementation of a three-to-two lane road diet (planned with 2022 Paving Project), extension of the existing business district 25 MPH speed zone west of Broad Street, and installation of speed feedback signage on Marsh to help slow EB vehicles approaching intersection.					
6	CALIFORNIA & SAN LUIS DRIVE	AWSC	3	11,404	0.721
Pattern: Hit object with no pattern identified. Recommendation: Continue to monitor in next safety report.					
7	MONTEREY & GRAND	Signal	3	13,034	0.631
Pattern: EB Broadside. Recommendation: Flashing yellow arrow signal phasing was implemented after 2015 TSR. Collision pattern resolved, but has since re-emerged. Implement protected left turn only phasing for EB left turns.					
8	MARSH & CHORRO[1]	Signal	3	13,042	0.630

Pattern: Pedestrian collisions. Recommendation: See recommendations in pedestrian collision section.					
9	**MARSH & NIPOMO**	**Signal**	**3 (2019)**	**14,547**	**0.565**
Pattern: Eastbound Marsh traffic rear ending stopped vehicles. Recommendation: See above recommendation.					
10	**HIGUERA & LOS OSOS VALLEY**	**Signal**	**5**	**25,795**	**0.531**
Pattern: NB Broadside Collisions. Recommendation: Implement flashing yellow arrow or protected-only left turn signal phasing for northbound left turn lane. Monitor with planned improvements in future safety report.					

*Rate = Collision frequency per million vehicles entering the intersection.
Note: Top 5 high-ranking collisions from 2018 and 2019 included in table of recommendations.

1. Marsh & Chorro is also ranked as a High Collision Rate Location for Pedestrian Locations

High Collision Rate Locations – Arterial/Collector Intersections

2018 Rank	Prev Year Rank	Intersection	Control	Collisions	Volume	Rate*
1	NR	CALIFORNIA & HATHWAY	SSSC	3	19344	0.425
2	NR	SANTA ROSA & PALM	Signal	3	21097	0.390
3	5	BROAD & INDUSTRIAL	Signal	3	31735	0.259

2019 Rank	Prev Year Rank	Intersection	Control	Collisions	Volume	Rate*
1	NR	SANTA ROSA & PISMO	AWSC	4	9275	1.182

NR = Not Ranked
SSSC = Side-Street Stop-Control
Rate = Collision frequency per million vehicles entering the intersection

Arterial/Collector Intersections Recommendations

Rank	Intersection	Control	Collisions	Volume	Rate*
1	SANTA ROSA & PISMO	**AWSC**	**4**	**9275**	**1.182**
Pattern: No Pattern. Recommendation: Continue to monitor in next safety report.					
2	CALIFORNIA & HATHWAY	**Signal**	**3**	**9422**	**0.872**
Pattern: Hit fire hydrant. Recommendation: Relocate fire hydrant to alternate location and/or install high-visibility flex posts around hydrant to increase visibility.					
3	SANTA ROSA & PALM	**Signal**	**3**	**10,591**	**0.776**
Pattern: SB vehicle red-light running violations. Recommendation: Install high-visibility signal backplates to increase visibility of signal indicators to drivers.					
4	BROAD & INDUSTRIAL	**Signal**	**3**	**13,658**	**0.602**
Pattern: No apparent pattern. Recommendation: Complete installation of nearside traffic signal head for SB Broad Street approach in (to be completed winter 2022) and consider installation of high-visibility signal backplates for added driver visibility. Continue to monitor in next safety report.					

1. California and Mill is also ranked as a High Collision Rate Location for Bicycle Locations
2. Osos and Pismo is also ranked as a High Collision Rate Location for Pedestrian Locations

High Collision Rate Locations – Arterial/Local Intersections

2018 Rank	Prev. Year Rank	Intersection	Control	Collisions	Volume	Rate
1	**NR**	**CALIFORNIA & PALM**	**TWSC**	**4**	**11038**	**0.993**
2	**4**	**LOS OSOS VALLEY & CALLE JOAQUIN**	**Signal**	**9**	**37102**	**0.665**
3	**NR**	**MONTEREY & BUENA VISTA**	**TWSC**	**3**	**12577**	**0.654**
4	**11**	**SANTA ROSA & BOYSEN (Caltrans)**	**TWSC**	**7**	**34143**	**0.562**
5	**NR**	**LOS OSOS VALLEY & DESCANSO**	**Signal**	**3**	**21096**	**0.390**
6	10	HIGUERA & VACHELL	TWSC	3	23180	0.355
7	NR	SANTA ROSA & WALNUT (Caltrans)	Signal	4	34414	0.318
8	NR	SANTA ROSA & MURRAY (Caltrans)	Signal	3	38336	0.214
9	NR	LOS OSOS VALLEY & FROOM RANCH	Signal	3	40314	0.204
10	12	SANTA ROSA & MONTALBAN (Caltrans)	TWSC	3	40655	0.202

2019 Rank	Prev. Year Rank	Intersection	Control	Collisions	Volume	Rate
1	**2**	**LOS OSOS VALLEY & CALLE JOAQUIN**	**Signal**	**13**	**37102**	**0.960**
3	**NR**	**TANK FARM & LONG**	**TWSC**	**5**	**20253**	**0.676**
2	**NR**	**CALIFORNIA & TAFT**	**TWSC**	**4**	**16883**	**0.649**
4	**9**	**LOS OSOS VALLEY & FROOM RANCH**	**Signal**	**7**	**40314**	**0.476**
5	**6**	**HIGUERA & VACHELL**	**TWSC**	**4**	**23180**	**0.473**
6	8	SANTA ROSA & MURRAY (Caltrans)	Signal	5	38336	0.357
7	NR	BROAD & AEROVISTA	Signal	3	24051	0.342
8	4	SANTA ROSA & BOYSEN (Caltrans)	TWSC	4	34143	0.321
9	7	SANTA ROSA & WALNUT (Caltrans)	Signal	4	34414	0.318
10	NR	SANTA ROSA & OLIVE (Caltrans)	SSSC	3	53132	0.155

NR = Not Ranked

SSSC = Side-Street Stop-Control

Rate = Collision frequency per million vehicles entering the intersection

Arterial/Local Intersections Recommendations

Rank	Intersection	Control	Collisions	Volume	Rate*
1	CALIFORNIA & PALM[1]	SSSC	4	11,038	0.993
Pattern: SB Right Hook vs. Bicycle Recommendation: See recommendations in Bicycle collision section.					
2	LOS OSOS VALLEY & CALLE JOAQUIN	Signal	13 (2019)	37102	0.960
Pattern: Broadside & Rear end collisions Recommendation: Signal phasing recently converted to protected only left turns for NB & SB approaches, and lead pedestrian interval added crossing LOVR. Also, Caltrans is to assume operation of traffic signal in winter 2022 and will coordinate signal with adjacent US 101 ramp intersections. Continue to monitor.					
3	TANK FARM & LONG	TWSC	5	20253	0.676
Pattern: Broadside Collisions Recommendation: Traffic Signal installed as part of adjacent development in 2020. Continue to monitor in next report.					
4	LOS OSOS VALLEY & CALLE JOAQUIN	SSSC	9 (2018)	37,102	0.665
Pattern: WB Broadside collisions. Recommendation: See recommendation above.					
5	MONTEREY & BUENA VISTA	SSSC	3	12,577	0.654
Pattern: LT vehicles hit island curb. Recommendation: Pedestrian warning signs and flashing beacon system installed in median island in 2020, which improves visibility of island. Continue to monitor in next safety report.					
6	CALIFORNIA & TAFT	TWSC	4	16883	0.649
Pattern: WB Rear End and SB Broadside. Recommendation: Reconstruct intersection as roundabout (planned for 2023). Continue to monitor after construction.					
7	LOS OSOS VALLEY & FROOM RANCH	Signal	7	40,313	0.476
Pattern: No discernable pattern. Recommendation: Intersection rebuilt as a protected intersection in 2021. Pursue other measures to reduce speeds on LOVR, such as visually narrowing roadway with installation of protected bike lanes on LOVR, as planned by Froom Ranch development project, speed limit reductions and/or additional speed feedback signs. Continue to monitor in next safety report.					
8	HIGUERA & VACHELL	TWSC	4	23,179	0.473

Pattern: Broadside collisions with LT movements to/from Vachell Recommendation: Intersection to be reconstructed by Avila Ranch development project to add center median on Higuera and allow right-in/right-out access only to/from Vachell. Continue to monitor collision pattern after modification.					
9	**LOS OSOS VALLEY & DESCANSO**	**SSSC**	**3**	**21,096**	**0.390**
Pattern: Rear End & Broadside due to high speeds on LOVR Recommendation: Install near-side signal head and/or high-visibility signal backplates to increase visibility of signal indicators. Pursue other measures to reduce speeds on LOVR, such as visually narrowing roadway with installation of protected bike lanes on LOVR, as planned by Froom Ranch development project, speed limit reductions and/or additional speed feedback signs.					

1. California and Palm is also ranked as a High Collision Rate Location for Bicycle Locations

Rank	Caltrans Intersections
NA	**SANTA ROSA & BOYSEN**
Pattern: Rear End & Broadside due to high speeds on Santa Rosa. Recommendation: Coordinate with Caltrans to evaluate potential measures to reduce auto speeds on Santa Rosa Street, such as auto lane reductions/narrowing, and installation ofspeed feedback signage for NB & SB traffic.	

High Collision Rate Locations – Collector/Collector Intersections

No Locations Ranked Under this Category

High Collision Rate Locations – Collector/Local Intersections

No Locations Ranked Under this Category

High Collision Rate Locationa - Local/Local Intersections

No Locations Ranked Under this Category

High Collision Rate Locations – Arterial Segments

2018-19 Arterial Segments									
Rank	Prev. Rank	Segment	Collisions	Ped-Bike Coll.	Severe Inj. & Fatal Coll.	Volume	Seg. Length (mi.)	Rate	Location
1	**4**	**Foothill**	**3**	**2**	**1**	**17,227**	**0.24**	**1.99**	**Santa Rosa to California**
2	**5**	**Los Osos Valley**	**10**	**2**	**3**	**30,988**	**0.53**	**1.67**	**Froom to Calle Joaquin**
3	**7**	**Madonna**	**5**	**1**	**2**	**26,690**	**0.34**	**1.51**	**Dalidio to Hwy 101**
4	N/A	Tank Farm	3	0	0	20,709	0.27	1.47	Broad to Santa Fe
NR	N/A	Santa Rosa	3	0	0	37,000	0.51	0.44	Olive to Foothill
5	8	Broad	3	0	0	28,000	0.97	0.30	Orcutt to Tank Farm

2018-19 Arterial Segments									
Rank	Prev. Rank	Segment	Collisions	Ped-Bike Coll.	Severe Inj. & Fatal Coll.	Volume	Seg. Length (mi.)	Rate	Location
1	**4**	**Foothill**	**3**	**2**	**1**	**17,227**	**0.24**	**1.99**	**Santa Rosa to California**
2	**8**	**Los Osos Valley**	**10**	**2**	**3**	**30,988**	**0.53**	**1.67**	**Froom to Calle Joaquin**
3	**N/A**	**Madonna**	**5**	**1**	**2**	**26,690**	**0.34**	**1.51**	**Dalidio to Hwy 101**
4	N/A	Tank Farm	3	0	0	20,709	0.27	1.47	Broad to Santa Fe
NR	N/A	Santa Rosa	3	0	0	37,000	0.51	0.44	Olive to Foothill
5	N/A	Broad	3	0	0	28,000	0.97	0.30	Orcutt to Tank Farm

NR = Not Ranked
N/A = Location under Caltrans jurisdiction. Listed for reference, but not included in City rankings
Rate = Collision frequency per million vehicle-miles traveled along segment

Arterial Segments Recommendations

2018-19 Arterial Segment Recommendations								
Rank	**Segment**	**Collisions**	**Ped-Bike Coll.**	**Severe Inj. & Fatal Coll.**	**Volume**	**Seg. Length (mi.)**	**Rate**	**Location**
1	**Foothill**	**3**	**2**	**1**	**17227**	**0.24**	**1.99**	**Santa Rosa to California**
Pattern: Eastbound rear end and other collisions due to traffic being stopped from California/Foothill signal. Recommendation: Complete Foothill / California Rail Crossing upgrades, planned for 2022-23. Investigate turn channelization as part of the project. Continue to monitor.								
2	**Los Osos Valley**	**10**	**2**	**3**	**30988**	**0.53**	**1.67**	**Froom to Calle Joaquin**
Pattern: Rear end collisions and driveway turning movements. Collisions are associated with unsafe speeds on Los Osos Valley Road. Recommendation: Install speed feedback signage for EB and WB LOVR, install high-visibility signal backplates at signalized intersections, evaluate feasibility of reducing posted speed limits on LOVR.								
3	**Madonna**	**5**	**1**	**2**	**26690**	**0.34**	**1.51**	**Dalidio to Hwy 101**
Pattern: Rear end collisions and driveway turning movements. Collisions are associated with unsafe speeds on Madonna Road. Recommendation: Install speed feedback signage for EB and WB Madonna, evaluate feasibility of reducing posted speed limits on Madonna.								

High Collision Rate Locations – Collector Segments

No Locations Ranked Under this Category

High Collision Rate Locations – Local Segments

No Locations Ranked Under this Category

Figure 6: 2018-19 High Collision Intersection Locations

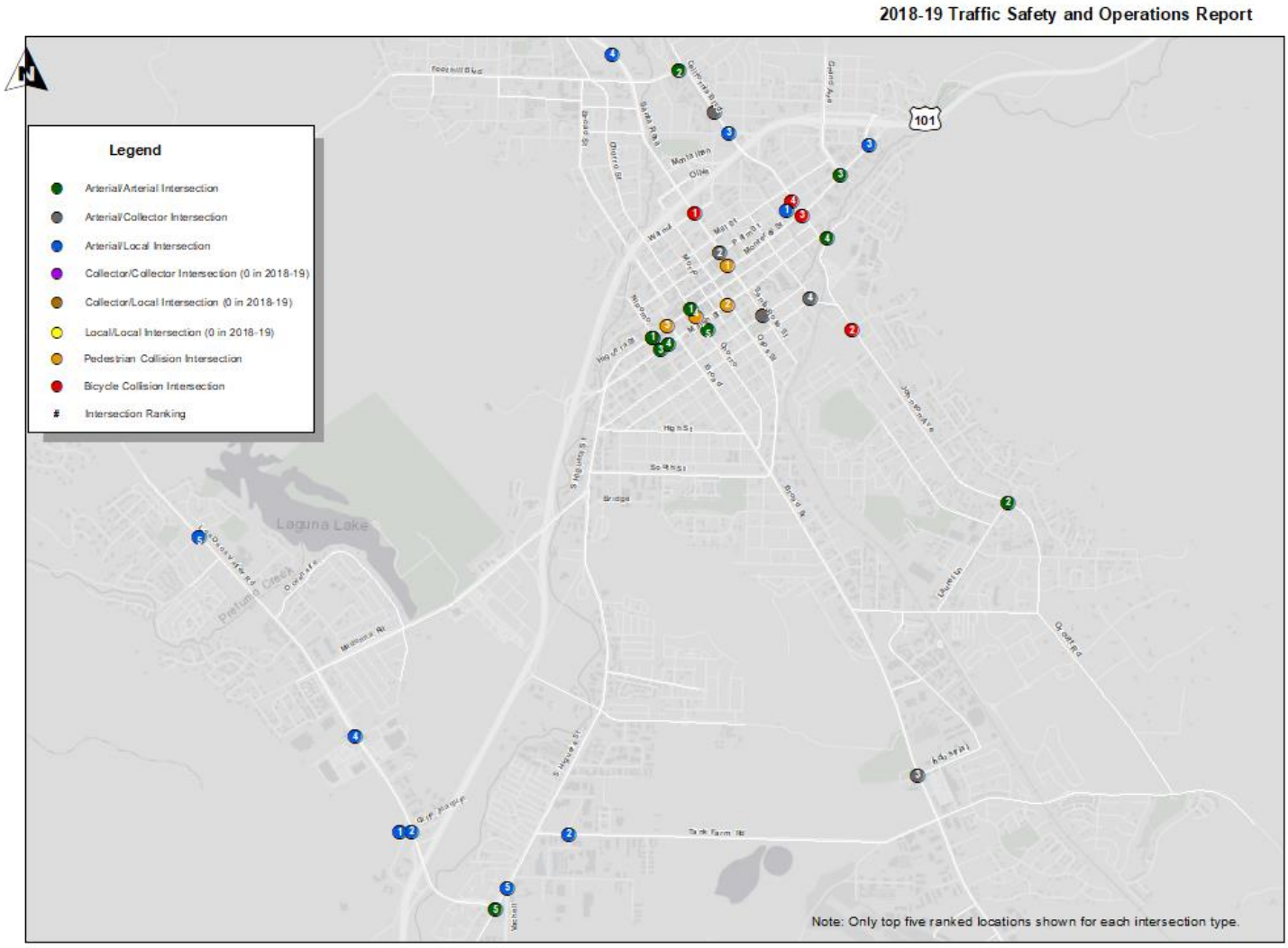


FIGURE 6
2018-19 HIGH COLLISION INTERSECTION LOCATIONS

Figure 7: 2018-19 High Collision Rate Roadway Segments

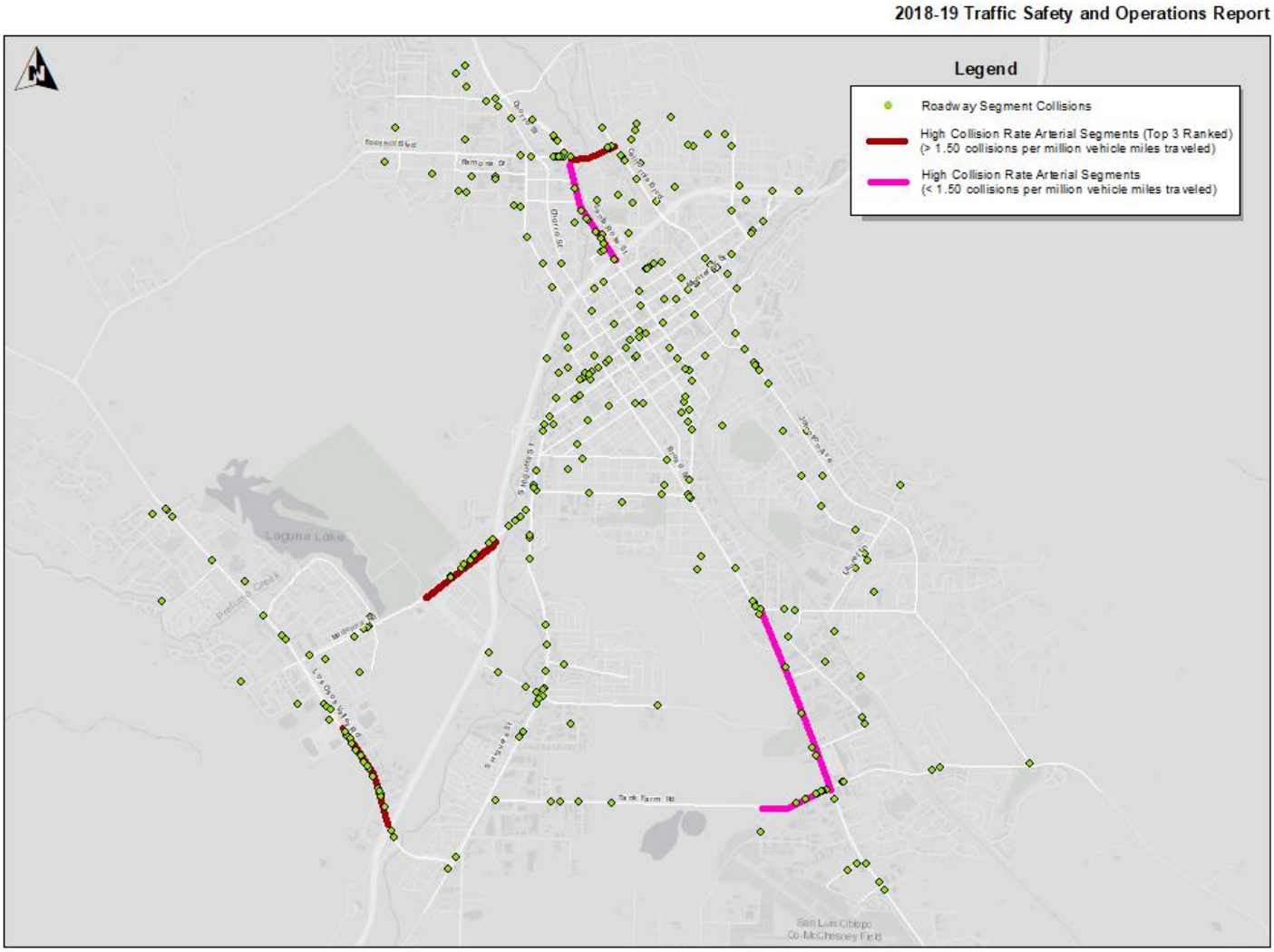


FIGURE 7
2018-19 HIGH COLLISION RATE ROADWAY SEGMENTS

APPENDIX A

Collision Analysis Methodology

Study Methodology

Collision Data

Reported traffic collisions obtained by the City of San Luis Obispo Police Department are the basis used by the City Traffic Engineering group to evaluate traffic safety[1]. Collisions totals are obtained for each intersection and roadway segment within the City and entered into the City's traffic collision database. Collisions occurring on private property or outside of the City Limits are not included in the dataset. Collision locations are then grouped by intersection type (i.e. arterial-arterial, arterial-collector, collector-collector, etc.) and street segment. For locations with at least three (3) total collisions in the past year or at least three (3) bicycle or pedestrian collisions in the previous five-year period, collision rates are calculated and collision diagrams are generated.

Based on the collision patterns for the five highest ranked intersections and roadway segments, as ranked based on collision rate, mitigation measures are formulated where a collision pattern can be identified. Mitigation measures for these sub-categories will be implemented in as projects are designed and funding becomes available.

Traffic Volumes

Vehicle and pedestrian volumes play an important role in calculating collision rates for selected locations within the City. Vehicle volume counts were collected in 2014 as a basis to establish actual conditions in the field environment. Where volume counts were not available, volumes were estimated based on previous experience and engineering judgment.

Collision Rate Calculations

Collision rates were calculated using the following formulas:

Intersections:

$$RI = \frac{N \times 1{,}000{,}000}{V \times 365}$$

Segments:

$$RS = \frac{N \times 1{,}000{,}000}{365 \times V \times L}$$

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[1] It is important to note that the data contained within the Public Works Traffic Collision Database may vary from other sources of collision data such as the California - Statewide Integrated Traffic Records System (SWITRS) or the City's Emergency Dispatch Records System. While SWITRS data is similarly derived from official police collision reports, many times the reports are coded incorrectly due to jurisdictional boundary issues and/or agency reporting inaccuracies. Likewise, City emergency dispatch may receive a call regarding a traffic collision but when the dispatched officer arrives, the vehicles have been moved on or there is no evidence of occurrence. Therefore, statistics derived from this data may be inaccurate for engineering purposes because no official proof or record exists of the actual collision type.

Where:

RI = Intersection Collision Rate = Collision frequency per million vehicles entering the intersection.
RS = Segment Collision Rate = Collision frequency per million vehicle miles traveled along the segment.
N = Number of collisions (collision frequency) of the location.
V = Average daily vehicular volume using the street segment or intersection.
L = Length of street segment (in miles) being analyzed.

For high-rate bicycle and pedestrian collision locations, collision rates were calculated as follows:

Pedestrians:

$$PREV = \frac{5 \times N \times PHVV}{PHPV}$$

Bicycles:

$$BEV = \frac{5 \times N \times PHVV}{PHBV}$$

Where:

PREV = Pedestrian relative exposure value.
PREV = Bicycle relative exposure value.
N = Number of collisions (5-year collision frequency) of the location.
PHVV = Average peak hour vehicular volume.
PHPV = Average peak hour pedestrian volume.
PHBV = Average peak hour bicycle volume.

The pedestrian and bicycle relative exposure value formula is derived from the traditional collision rate calculation, however it factors the volume of either the bicycle or pedestrian with that of vehicles at a given location.