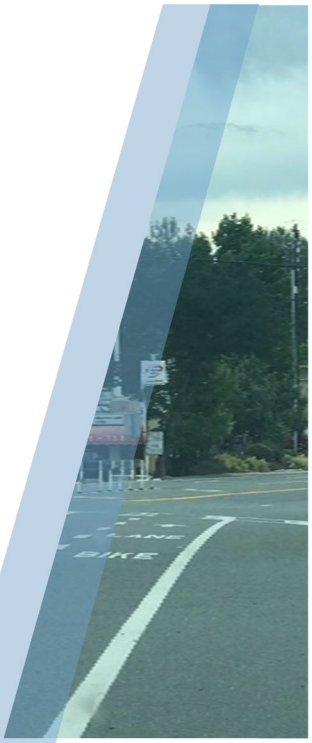
Local Road Safety Plan (LRSP)

Prepared for:
City of Shasta Lake

Final Report
January 2021



REPORT SIGNATURE SHEET

This Local Road Safety Plan has been prepared under the direction of the following Professional Traffic Engineer. The Registered Traffic Engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

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January 19, 2021

Date

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Acronyms

ATP – Active Transportation Program or Plan

AASHTO - American Association of State Highway and Transportation Officials

BUI - Biking Under the Influence

CA MUTCD – California Manual of Uniform Traffic Control Devices.

CMAQ - Congestion Mitigation and Air Quality

DUI - Driving Under the Influence

FHWA – Federal Highway Administration

HSM – Highway Safety Manual

HSIP – Highway Safety Improvement Program

LRSP – Local Road Safety Plan

SHSP - Strategic Highway Safety Plan

SSAR – Systemic Safety Analysis Report

Executive Summary

In 2020, the City of Shasta Lake was awarded a state grant from Caltrans to perform a Local Road Safety Plan (LRSP). The LRSP grant application included a citywide analysis of the roadway system in Shasta Lake comprising of the current collisions patterns and high-risk roadway characteristics. Furthermore, the City of Shasta Lake's goal is to identify safety countermeasures to help mitigate the City's primary crash type trends and reduce the overall collision severity.

The LRSP is a collaborative process that is similar to a Systemic Safety Analysis Report (SSAR) except a LRSP has a local leadership group that represents the 5 E's (not just engineering) and public outreach. **The 5 E's of traffic safety include Engineering, Enforcement, Education, Emergency Services, and Emerging Technologies.**

This holistic approach allows certain areas of concern not showing a crash pattern to be analyzed. Also, it fosters local, state, and agency partnerships to advance local road safety.

In following the overall LRSP process, a Stakeholder Working Group (Working Group) was formed with the City as the lead and local organizations from the 5 E's and anyone with an interest in improving the City's roadway safety. This group gathered for meetings and the meeting results helped to guide the LRSP goals, priorities, and recommendations.

Based on the City's Stakeholder Working Group Meetings, this LRSP will address multiple Strategic Highway Safety Plan (SHSP) Challenge Areas including but not limited to:

1. Intersections
2. Pedestrians
3. Bicycling
4. Young Drivers
5. Aging Drivers

In addition, the vision, mission statement, and goals were established in guiding the development of the LRSP. It was also decided that the LRSP for the City of Shasta Lake would be a living document with official updated every five (5) years.

Based on the LRSP working group, the following strategies are recommended for the focused study locations and citywide systemic applications for the 5 E's of Traffic Safety.

1. Engineering: Apply low-cost safety countermeasures at current locations experiencing collisions and systemically at locations with similar risks (comprehensive approach)
2. Enforcement: Enforce actions that reduce high-risk behaviors to include speeding and Driving Under the Influence (DUI).
3. Education: Educate all road users on safe behaviors.
4. Emergency Response: Improve emergency response times and actions.
5. Emerging Technologies: Apply emerging technologies to the roadway, vehicle, and user.

In addition, it is important to understand the upcoming funding opportunities in the successful implementation of these safety projects.

Funding opportunities include but are not limited to:

- Highway Safety Improvement Program (HSIP) – Call typically every 2 years. Last call (cycle 10) started in April and ends November 2, 2020 (extended due to COVID-19)
    - Next call HSIP Cycle 11 is schedule to start in April 2022
- Active Transportation Program (ATP)
    - Next call for funding projects is scheduled to start in March 2022
- Congestion Mitigation and Air Quality (CMAQ) program
- Sustainable Transportation Planning Grant (Sustainable Communities)

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1. Introduction

The project involves the development of a Local Road Safety Plan (LRSP), which provides local agencies an opportunity to address unique roadway safety needs in their jurisdictions. The process of preparing an LRSP creates a framework to systematically identify and analyze local safety problems and recommend engineering safety improvements for future Highway Safety Improvement Program (HSIP) funding.

Figure 1.1 California SHSP (2020-2024)

Preparing an LRSP facilitates local agency partnerships and collaboration, resulting in a prioritized list of improvements and actions that contribute to California's Strategic Highway Safety Plan (SHSP) overall vision and goals. This SHSP focuses on reducing fatal and severe injury collisions (FSI collisions) with focused challenge areas with a focus on the Five "E's" of Traffic Safety (see **Figure 1.1**).

The City and GHD will follow the Federal Highways Administration's (FHWA) Local Road Safety process in the following six (6) steps as shown in **Figure 1.2**:

Figure 1.2 FHWA's LRSP Development Process

In working with the first step of establishing leadership, Will Bond, P.E., the Assistant City Engineer from the City of Shasta Lake, reached out to the various stakeholder representatives for the LRSP working group in capturing the "5E's" and local community members that can contribute to the overall safety plan for the City of Shasta Lake. This working group is key in creating a comprehensive safety plan that is tailored to address the local needs and issues.

2. Background

2.1 Purpose and Need

The City of Shasta Lake has a current population of 10,000 and is approximately 10 miles north of Redding, California. The City of Shasta Lake has a mix of traffic to include local and commuter traffic, recreational and tourist traffic, and commercial traffic. The City is the gateway to well-traveled tourists destinations for Shasta Lake Reservoir and Shasta Dam. In addition, there can be very large heavy trucks for the lumber mill.

In focusing in on the roadway safety needs, the past five (5) years of collisions were evaluated and the fatal and severe injury collisions are discussed below. There were 3 fatal collisions and 3 severe injury collisions recorded for the City of Shasta Lake jurisdiction. One of the fatal collisions was not on the City street system rather on the railroad.

The fatal collisions on City streets had the following characteristics:

- 2015 – A Single Vehicle Hit Object Collision cited as “Unsafe Speed” on Park Place at Rose Avenue. The driver was cited as “Impaired Driver.”
- 2016 – A Single Vehicle Hit Object Collision cited as “Unsafe Speed” on Wonderland Boulevard (where the road dead ends). The driver was cited as “Impaired Driver.”

The fatal collision on the railroad had the following characteristics:

- 2019 – A Broadside Collision between a motorcycle/rail cited as “Other Improper Driving” and not on the road system (west of La Mesa Avenue)
    - For the LRSP, this collision is removed from roadway analysis and will be referenced as a railroad to motorcycle collision.

The severe injury collisions on the city streets comprised of the following:

- 2016 – A Single Vehicle Hit object collision cited as “Unsafe Speed” located 70 feet east of Rose Avenue and Lena Way
- 2017 – Rear End Collision with a pedestrian on the road/shoulder cited as a “Hit and Run” with alcohol involved on Cascade Boulevard
- 2019 – Overturned collision cited as “Unsafe Turning” on Cascade Boulevard at Washington Avenue

There were three (3) severe injury collisions on the Caltrans roadways (State Route 151). They consisted of the following characteristics:

- 2016 – Sideswipe collision cited as the vehicle not yielding to the “Pedestrian Right of Way.” Pedestrian was crossing SR 151 in the crosswalk at Locust Street.
- 2017 – Vehicle/Pedestrian collision cited as the vehicle did not yield to the “Pedestrian Right of Way.” Pedestrian was Crossing SR 151 at the Cascade Boulevard intersection crosswalk.

- 2019 – A Hit object collision cited as “Unsafe Speed” located 646 feet east of SR 151/Rouge Road.

In improving roadway safety for the City of Shasta Lake it is important to focus on mitigating these high injury collisions and loss of life. In addition, the stakeholder working group wanted an emphasis on livable community practices. Per AARP, “a livable community is one that is safe and secure, has affordable and appropriate housing and transportation options, and offers supportive community features and services. Livable communities make for happier, healthier residents of every age.”

2.2 LRSP Methodology

The LRSP methodology followed the FHWA’s LRSP development process as shown in **Figure 2.1**.

Below is a roadmap created by the Federal Highway Administration to show the process of creating the Local Road Safety Plan. Here are the primary steps used to create this plan:

1. **Identify Stakeholders**

   i) Working Group was formed of the 5 E’s and other interested representatives.

2. **Use Safety Data**

   i) Past 5 years of collisions were analysed with discussion of other high risk locations.

3. **Chose Proven Solutions**

   i) FHWA Proven Countermeasures and Caltrans safety countermeasures were used in mitigating collision trends and risk characteristics.

4. **Implement Solutions**

   i) Projects were identified for specific location and systemically.

Figure 2.1 FHWA's LRSP Development Map

Source: Federal Highway Administration

2.3 Standards and Guidelines

In developing the City of Shasta Lake LRSP the following standards and guidelines were followed:

- *"Local Roadway Safety, A Manual for California's Local Road Owners",* Caltrans, Version 1.5, April 2020
- 2020-2024 California's Strategic Highway Safety Plan (SHSP), *"California Safe Roads: 2020-2024 Strategic Highway Safety Plan",* Caltrans.
- *"Developing Safety Plans, A Manual for Local Rural Road Owners"*, Federal Highway Administration, March 2012.
- *"Highway Safety Manual",* American Association of State Highway and Transporations Officials (AASHTO), 1st Edition, 2014 supplement.
- *"California Manual of Uniform Traffic Control Devices (CA MUTCD)",* Revision 5, 2014.

2.4 Current Safety Projects

The City of Shasta Lake has conducted some previous safety plans with some subsequent projects.

2.4.1 Bicycle and Pedestrian Safety Plan

A bicycle and pedestrian safety plan was developed in 2016 and was titled "*Recommendations to Improve Pedestrian and Bicyclist Safety in the City of Shasta Lake"*, by Tony Dang, Jaime Fearer,

Wendy Alfsen, California Walks; Jill Cooper, Jesus Barajas, UC Berkeley SafeTREC, October 2016. This plan had project ideas, interim low-cost strategies, and California Walks/SafeTREC recommendations. More information is found in **Appendix A: Previous Safety Plans and Projects** and a summary of those findings are below.

2.4.1.1 Transformative Project Ideas

- Strong support for focusing competitive grant applications on comprehensive transformations of priority streets that include a package of pedestrian and bicycle safety improvement components including pedestrian-scale lighting
- Broad consensus that the city should focus on establishing an East-West Complete Streets Corridor along Shasta Dam Blvd and a North-South Complete Streets Corridor (no specific corridor specified but did identify the need to connect downtown to the Gateway Greenbelt and then beyond to existing Sacramento River Trail system)

2.4.1.2 Interim, Low-Cost, Quick-Build Strategies

The interim, low-cost, quick-build strategies are for the city and Caltrans to pursue in tandem with ongoing maintenance/cap improvement projects.

- Signage: One-way signage, gore markings, and warnings on Shasta Dam Blvd on couplet section; update fluorescent yellow/green school signage
- Enhanced Pedestrian Crossings: upgrade existing standard crosswalks to high-visibility markings; install rectangular rapid flashing beacons (RRFB) at the SR 151 and Shasta Way crossing; evaluate possibility of decorative/art crosswalks
    - This improvement is captured in the HSIP Call for Projects – Cycle 10, see Section 2.4.2
- Code Enforcement: Notify property owners to keep sidewalks clear of overgrown vegetation and sandwich board signs

2.4.1.3 California Walks/SafeTREC Recommendations

- Pilot a Separated Bikeway (Class IV or Cycle Track) on Shasta Dam Blvd
- First/Last Mile Connections – Improve pedestrian and bicycle access to transit: safe access to bus stops for those on foot (typ. within ¼ mile) and those on bike (typ. within ½ mile) with particular focus on downtown core and key destinations such as schools and parks. Could include improved, high visibility crossings at current crossing locations, additional crossings to facilitate access to transit and nearby destinations, complete sidewalk networks within a ¼ mile radius of RABA (Redding Area Bus Authority) Route 1

2.4.1.4 ATP Call For Projects – Cycle 5

The Active Transportation Program (ATP) call for projects, Cycle 5 closed in September 2020. Per this call, the City of Shasta Lake submitted an application for installation of a Class 1 –Shared Use Path, Class 3 – Shared Lane Markings (Sharrows) for the continuous bikeway from Ashby Road, La Mesa Avenue, and Hardenbrook Avenue. These improvements also include roadway restriping and drainage improvements. Further detail is found in the **Appendix A: Previous Safety Plans and Projects.**

Figure 2.2 RRFB

2.4.2 HSIP Call for Projects – Cycle 10

Three different pedestrian crossing improvements were proposed at uncontrolled crossings on Shasta Dam Boulevard (SR 151). In October 2020, the City of Shasta Lake applied for HSIP funding set-asides for pedestrian crossing enhancements at these locations: SR 151 at Shasta Ave, SR 151 at Median Ave, and SR 151, west of Mussel Shoals Ave/Grand Coulee Blvd. These enhancements include the installation of pedestrian activated Rectangular Rapid Flashing Beacons (RRFBs) as shown in **Figure 2.2** at each of the three locations. A copy of the HSIP plans, which includes these improvements, is included in **Appendix A: Previous Safety Plans and Projects.**

3. Safety Partners and Stakeholders

3.1 LRSP Working Group Members

Based on community connections, the City of Shasta Lake led the formation of the LRSP Working Group. This leadership group was consulted in the development of the LRSP and was crucial in capturing the safety needs and goals for the City of Shasta Lake.

The LRSP Working Group included the following agencies/members:

- City of Shasta Lake
- Caltrans – District 2
- Shasta County Health and Human Services Agency
- Shasta Lake Fire Protection
- Shasta County Sheriff Office
- Shasta Living Streets
- Gateway Unified School District
- Shasta Lake Citizens/Business Owners

3.1.1 LRSP Working Group Meetings

Two meetings were held with the stakeholder working group. The virtual meetings were as follows:

1. June 15, 2020 – 10 a.m. to noon

a. Went over the LRSP Process, their role in the group, past 5 years of collisions (City and Caltrans roadways), vision, goals, and priorities.

2. August 19, 2020 – 10 a.m. to noon

    a. Updated collision analysis, safety countermeasures and projects, refinement of LRSP's guiding principles, and next steps (public outreach).

3.2 Guiding Principles

The members of the working group coordinated to establish the vision, mission statement, and goals that guided the development of the document. In addition, a motto also took formation. Ideally, this document will help the City to achieve Vision Zero. The aim toward Vision Zero is to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, and equitable mobility for all. Traditionally traffic deaths and severe injuries have been considered as inevitable side effects of modern life. The reality is that these tragedies can be addressed overtime by taking a proactive, preventative approach that prioritizes traffic safety as a public health issue.

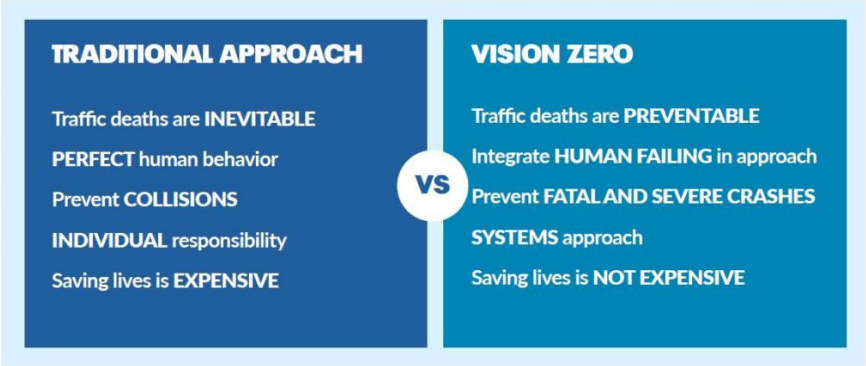
3.2.1 Vision Zero

Vision Zero is a significant departure from the status quo in two major ways:

- Vision Zero recognizes that people will sometimes make mistakes, so the road system and related policies should be designed to minimize those inevitable mistakes and reduce their likeliness to result in severe injuries or fatalities. This means that system designers and policymakers are expected to improve the roadway environment, policies (such as speed management), and other related systems to lessen the severity of crashes. Roadway users are however still responsible for their mistakes and should follow all applicable laws and use reasonable judgement when conducting themselves within the public right of way.
- Vision Zero is a multidisciplinary approach, bringing together diverse and necessary stakeholders to address this complex problem. In the past, meaningful, cross-disciplinary collaboration among local traffic planners and engineers, policymakers, and public health professionals has not been the norm. Vision Zero acknowledges that many factors contribute to safe mobility -- including roadway design, speeds, behaviors, technology, and policies -- and sets clear goals to achieve the shared goal of zero fatalities and severe injuries.

As shown in **Figure 3.1**, is the comparison of the traditional approach versus the Vision Zero approach.

Figure 3.1 Traditional Approach vs. Vision Zero



3.2.2 SHSP Challenge Areas

The LRSP will complement California's SHSP 2020-2024. Per this plan the recommended challenge areas area shown in **Figure 3.2**. These challenge areas are recommended emphasis areas in the development of the plan.

Figure 3.2 SHSP Challenge Areas

Based on the LRSP Working Group Meetings, this LRSP will address multiple Strategic Highway Safety Plan (SHSP) Challenge Areas including:

1. Intersections
2. Pedestrians
3. Bicycling
4. Young Drivers
5. Aging Drivers

3.2.3 Vision

A vision statement describes what the Local Road Safety Plan is trying to achieve.

Working together in Shasta Lake, we will ensure all people have the transportation choice to walk, bike, and drive, while we work to achieve zero fatalities and no life-altering injuries on our roadways – because every person in our community matters.

3.2.4 Mission Statement

The mission statement defines the purpose of the plan, what it does, and what it is about. The mission statement was developed in collaboration with the working group.

Shasta Lake will provide a safe and sustainable multimodal transportation system for all users of the public roadways in the City of Shasta Lake.

3.2.5 Goals

Safety goals were development for the Local Road Safety Plan. It is important to capture realistic goals that can be measurable or evolve over time.

- Improve the health and vitality of our community.
- Goal toward zero deaths and zero life altering injuries on local roadways by 2030.
- Increase walking, biking, rolling (wheelchair, skateboard, scooter, etc.), to the downtown district, to work, and to schools.
- Residents report they have safe, comfortable, convenient routes on local roads where they are walking, biking, rolling, or driving.

3.2.6 Motto

With collaboration from the LRSP working group, a motto took formation. This motto (Walk Safe. Ride Safe. Drive Safe.) is a memorable phrase that spearheads the overall message or slogan that will guide the Local Road Safety Plan.

WALK SAFE.
RIDE SAFE.
DRIVE SAFE.

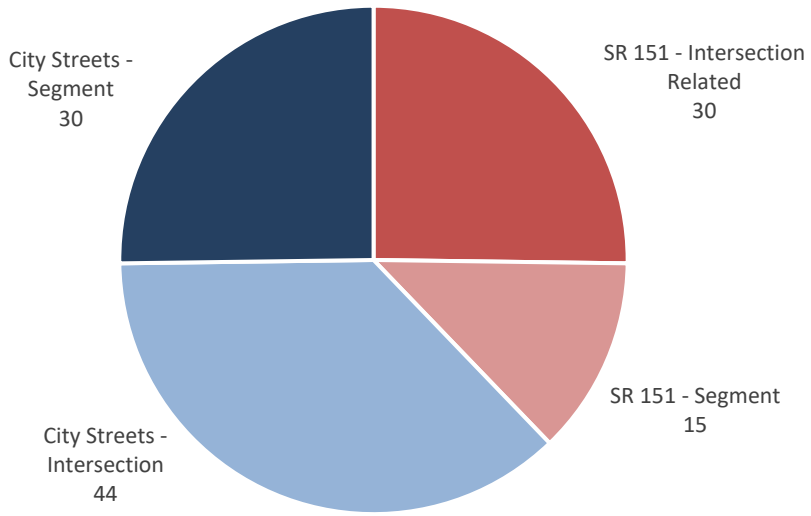
4. Data Analysis

The City of Shasta Lake collision data was gathered using the Statewide Integrated Traffic Records System (SWITRS), the Traffic Accident Surveillance and Analysis System (TASAS), and City collision records. Each data set was analyzed and compiled into one complete set with any repeating data removed. This process was done to ensure that all reported collisions occurring within the City are accounted for and to provide additional information that one system may not have captured. The data set contains five years' worth of collisions spanning from 2015 to 2019. Most of the collisions reported through SWITRS contained adequate information for analysis.

During this period, a total of 143 collisions were reported in the City of Shasta Lake with one collision removed due to it not occurring on a roadway (motorcycle/railroad collision) for a total of 142 collisions. These collisions were classified based on collision jurisdiction (City or Caltrans). Collisions were further categorized into intersection related collisions and roadway segment related collisions with a separate focus on the City streets and SR 151. Collisions on Interstate 5 (I-5) mainline and ramps were not included as part of the analysis (7 on mainline and 16 ramp collisions). Therefore, the five-year analysis had 119 collisions with 74 on City streets and 45 on SR 151.

The pie chart in **Figure 4.1**, depicts the number of collisions by jurisdiction and collision location (intersection or segment). The highest number of collisions was at intersections on City Streets and the overall percentage of local roadway collisions is just over half the pie.

Figure 4.1 Total Collisions on City of Shasta Lake Roadways and SR 151



4.1.1 Collisions on City Roadways

There were a total of 75 collisions recorded on City roadways between 2015 and 2019. As seen by the collision density map (see **Figure 4.2** below), areas with high density of collisions include Pine Grove Avenue at Ashby Road and Cascade Boulevard, south of Trinity Street. In total, there were 2 fatal and 3 severe injury collisions on City roads with 1 fatal collision on the railroad. Broadside collisions were the primary collision type. The top five violation categories for City roadways are listed below.

- Unsafe Speed
- Automobile Right of Way
- Improper Turning
- Traffic Sign and Signal
- Improper Starting/Backing

Figure 4.3 summarizes the City collisions based on severity and type.

Figure 4.2 Collision Density on City Roads

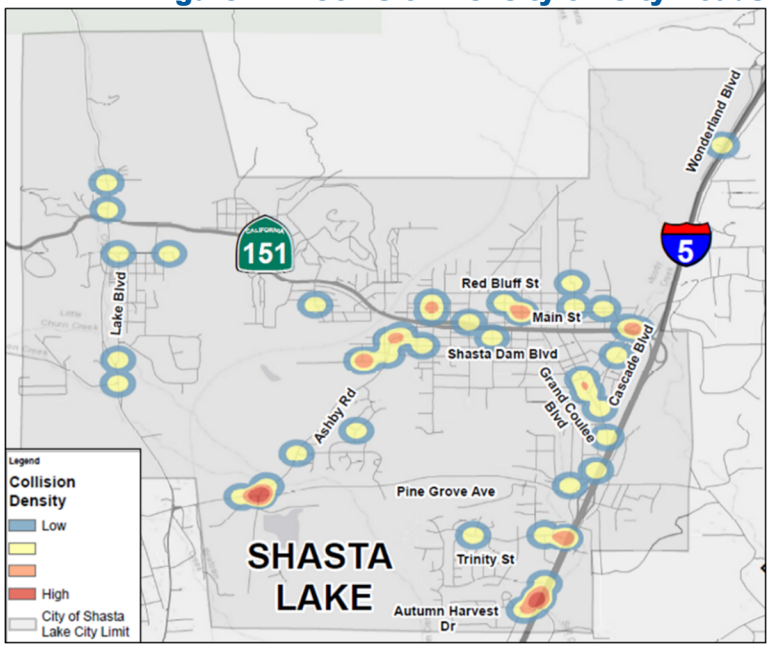


Figure 4.3 Summary of City Collisions

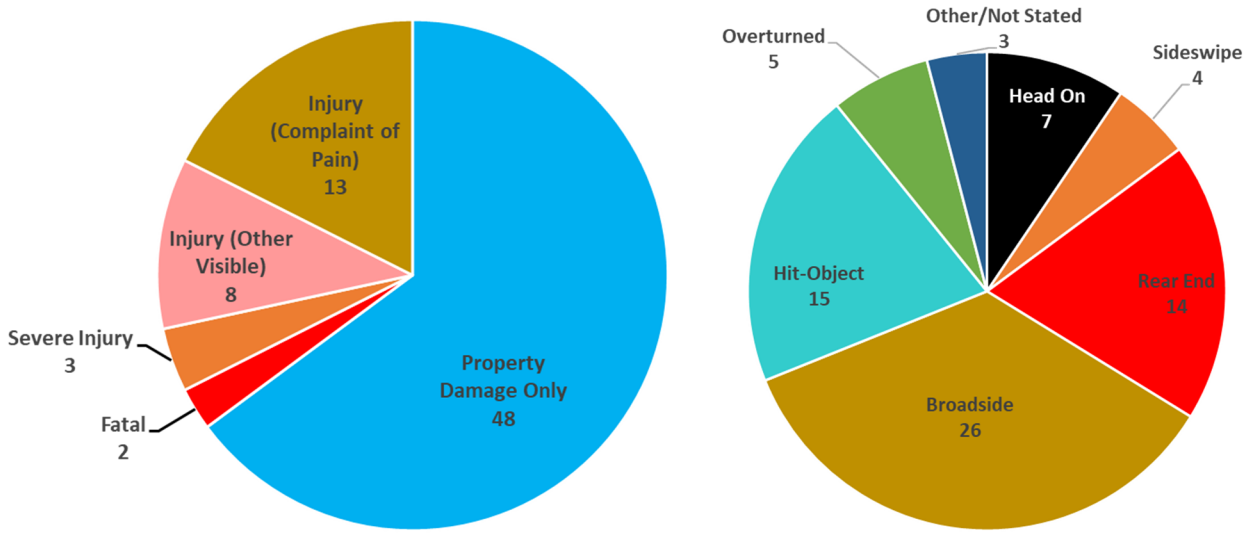


Table 4.1 shows the breakdown of collision severity and violation type by intersection. Pine Grove Avenue at Ashby Road has the most collisions (6) in the past five years but the majority of the collisions were Property Damage Only (5 PDO's and 1 injury (complaint of pain)). Rose Avenue at Park Place had one fatality due to unsafe speed and there were 2 severe injury collisions that were located at 3rd Street at Cascade Boulevard and Cascade Boulevard at Washington Avenue/Fell Street that were due to unknown violation and improper turning, respectively.

Table 4.1 Intersection Collisions on City Roadways

Name	Severity					PCF Violation									Total Collisions
	Fatal	Injury (Severe)	Injury (Other Visible)	Injury (Complaint of Pain)	Property Damage Only	Unsafe Speed	Following Too Closely	Improper Turning	Auto Right of Way	Traffic Signals and Signs	Other Equipment	Other Than Driver/Ped	Unsafe Starting or Backing	Unknown	
GRAND AVE / NELL ORR ST					1			1							1
MAIN ST / GRAND RIVER AVE				1	1				1	1					2
CHICO ST / MEDIAN AVE					1			1							1
FRONT ST / HARDENBROOK AVE					1					1					1
MAIN ST / MONTANA ST					1				1						1
CHICO ST / MONTANA ST			1							1					1
3RD ST / CASCADE BLVD		1												1	1
GRAND COULEE BLVD / CASCADE BLVD				1	2	1		1						1	3
MORNINGSTAR WAY / GRAND COULEE BLVD					1	1									1
SHASTA ST / GRAND COULEE BLVD					1				1						1
MEADE ST / CABELLO ST					1				1						1
LA MESA AVE / ASHBY RD				1				1							1
EL CAJON AVE / MESQUITE ST					1								1		1
CONCHAS ST / ROUGE RD				1								1			1
ROSE AVE / PARK PL	1					1									1
FLANAGAN RD / LAKE BLVD					1			1							1
COEUR D ALENE AVE / ASHBY RD				1					1						1
PINE GROVE AVE / ASHBY RD				1	5			1	3					2	6
TRINITY ST / CASCADE BLVD				1	2	2		1							3
TRINITY ST / WEST ST				1		1									1
TRINITY ST / BUCKINGHAM DR					1									1	1
AUTUMN HARVEST DR / CASCADE BLVD				1									1		1
RIDDLE RD / CASCADE BLVD				1	1		1							1	2
CASCADE/PINE GROVE AVE					3	1	1						1		3
CASCADE/WASHINGTON AVE/FELL ST		1						1							1
FLOWER ST/ASHBY RD					1						1				1
HARDENBROOK AVE/FORT PECK ST					1		1								1
LAKE BLVD/CONSTRUCTION WAY					1	1									1
TRINITY ST/ SMITH AVE				1						1					1
VALLECITO ST/ CABELLO ST					1	1									1
WASHINGTON AVE/ SHASTA ST					1			1							1
TOTAL	**1**	**2**	**1**	**11**	**29**	**9**	**3**	**9**	**8**	**4**	**1**	**1**	**3**	**6**	**44**

Source: SWITRS (2015-2019)

The total number of collisions, crash rate, and Equivalent Property Damage Only (EPDO) rating were assessed at these locations to determine the top study intersections. Per the Caltrans Local Roadway Safety Manual it is recommended to rank locations with higher severity as higher focus. The Highway Safety Manual (HSM) methodology of Equivalent Property Damage Only (EPDO) rating assigns a weight to collisions in capturing the relative severity in equivalent property damage only (PDO =1). **Table 4.2** provides the comprehensive collision costs and EPDO weights that were used in ranking the collisions. Collision costs include both direct and indirect costs. Direct crash costs include ambulance service, police and fire services, property damage, insurance, and other costs directly related to the crashes. Indirect collision costs account for the value society would place on pain and suffering or loss of life associated with the crash.

Table 4.2 Comprehensive Collision Costs and EPDO Weights (2018 dollars)

Severity	Comprehensive Costs	EPDO Weight
Fatal (K)	$6,418,400	544
Severe Injury (A)	$345,800	30
Minor Injury (B)	$126,500	11
Non-Visible Injury (C)	$71,900	6
PDO (O)	$11,800	1

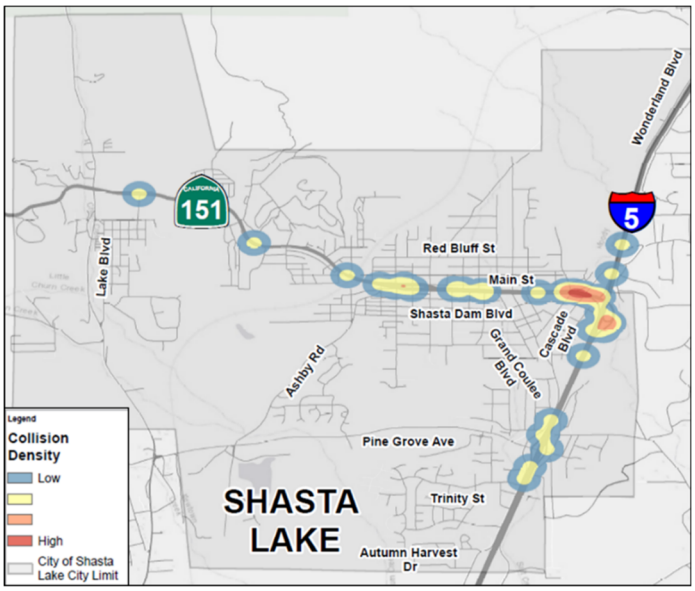
Based on Table 7-1, Highway Safety Manual, 2010, Adjusted to 2018 dollars.

The intersection of Pine Grove Avenue and Ashby Road had the highest number of collisions (6) and the second highest crash rate (0.405). Rose Avenue at Park Place had the highest EPDO ranking (544) due to a fatality. Further detailed collision analysis included EPDO ranking is in **Appendix B: Collision Data**.

The segment collisions were also analyzed by EPDO and total number of collisions. The Wonderland Blvd had the highest EPDO rating (544) due to a fatality. However, Cascade Blvd had the highest number of segment collisions (8) and second highest EPDO (43).

4.1.2 Collisions on Caltrans Roadways (SR 151)

Figure 4.4 Collision Density on Caltrans Roads



There were a total of 68 collisions on Caltrans roadways between 2015 and 2019. As seen by the collision density map (see **Figure 4.4**), the area on Shasta Dam Boulevard (SR 151) from Cascade Boulevard to Interstate 5 has a high density of collisions with 48 total collisions. In total, there were no fatal and 3 severe injury collisions on Shasta Dam Boulevard. The majority of collisions were rear ends. The top five violation categories for Shasta Dam Boulevard are listed below.

- Unsafe Speed
- Improper Turning
- Automobile Right of Way
- Pedestrian Right of Way
- Wrong Way Driving

Figure 4.5 summarizes the Caltrans collisions on SR 151 based on severity and type.

Figure 4.5 Summary of SR 151 Collisions

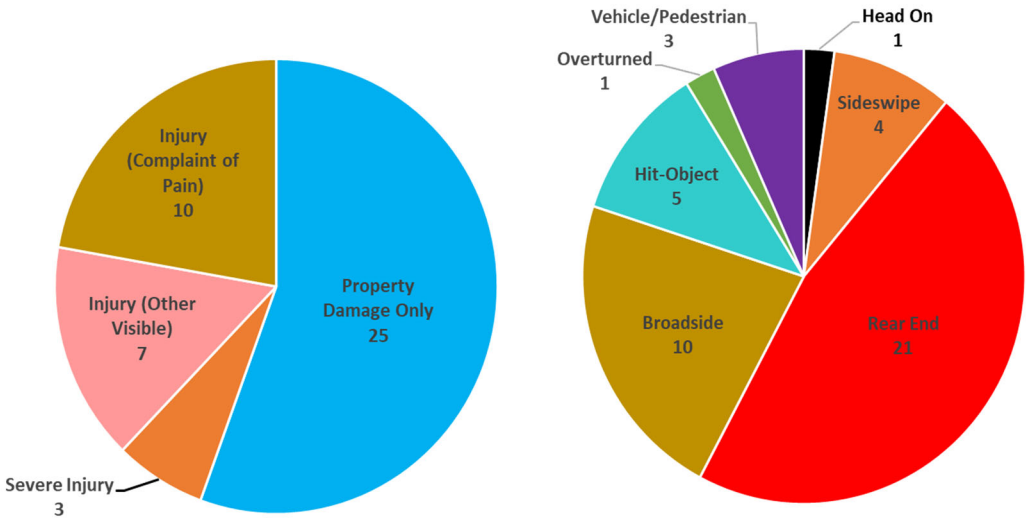


Table 4.3 shows the breakdown of collision severity and violation type by intersection. The intersection of Shasta Dam Boulevard and Cascade Boulevard had the highest number of collisions (8) and the highest EPDO (42).

Table 4.3 Intersection Collisions on SR 151

Name	Severity					PCF Violation							Total Collisions
	Fatal	Injury (Severe)	Injury (Other Visible)	Injury (Complaint of Pain)	Property Damage Only	Unsafe Speed	Wrong Side of Road	Improper Turning	Auto Right of Way	Ped Right of Way	Unsafe Starting or Backing	Unknown	
SHASTA DAM BLVD / CASCADE BLVD		1		1	6	4	1	1	1		1		8
SHASTA DAM BLVD / SHASTA WAY / SHASTA ST			1	1	3	3		1				1	5
SHASTA DAM BLVD/ OREGON AVE					1				1				1
SHASTA DAM BLVD / GRAND COULEE BLVD				1	1	1					1		2
SHASTA DAM BLVD / DEER CREEK RD				1					1				1
SHASTA DAM BLVD / GRAND RIVER AVE			1							1			1
SHASTA DAM BLVD / MEDIAN AVE				1	2	3							3
EB SHASTA DAM BLVD / LOCUST AVE		1			1				1	1			2
EB SHASTA DAM BLVD / MONTANA AVE					2	1			1				2
SHASTA DAM BLVD / ASHBY RD / SAN GORGONIO AVE			1					1					1
SHASTA DAM BLVD / NORTH BLVD					1			1					1
SHASTA DAM BLVD/RED BLUFF ST			1			1							1
SHASTA DAM BLVD / TWIN LAKE DR				1		1							1
SHASTA DAM BLVD / SACRAMENTO ST					1	1							1
Total	0	2	4	6	18	15	1	4	5	2	2	1	30

Source: SWITRS (2015-2019)

4.1.1 Pedestrian and Bicycle Collisions

There were a total of 5 pedestrian and 8 bicycle collisions for the City and Caltrans roadways. The majority of pedestrian collisions were along Shasta Dam Boulevard. The location of each collision, along with its associated jurisdiction is outlined in **Figures 4.6** and **4.7**.

Figure 4.6 Map of Pedestrian Collisions

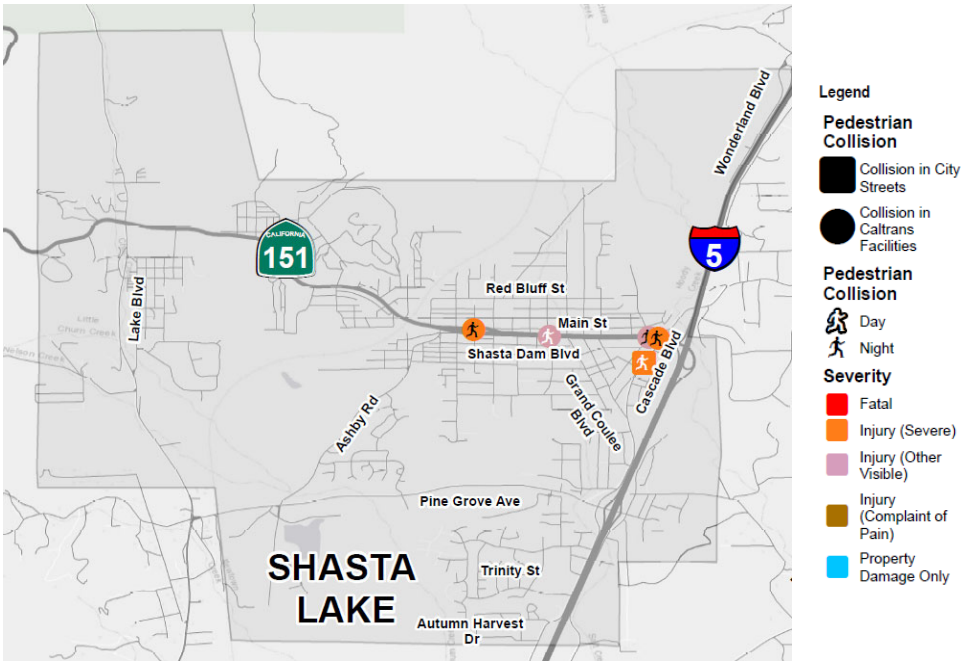
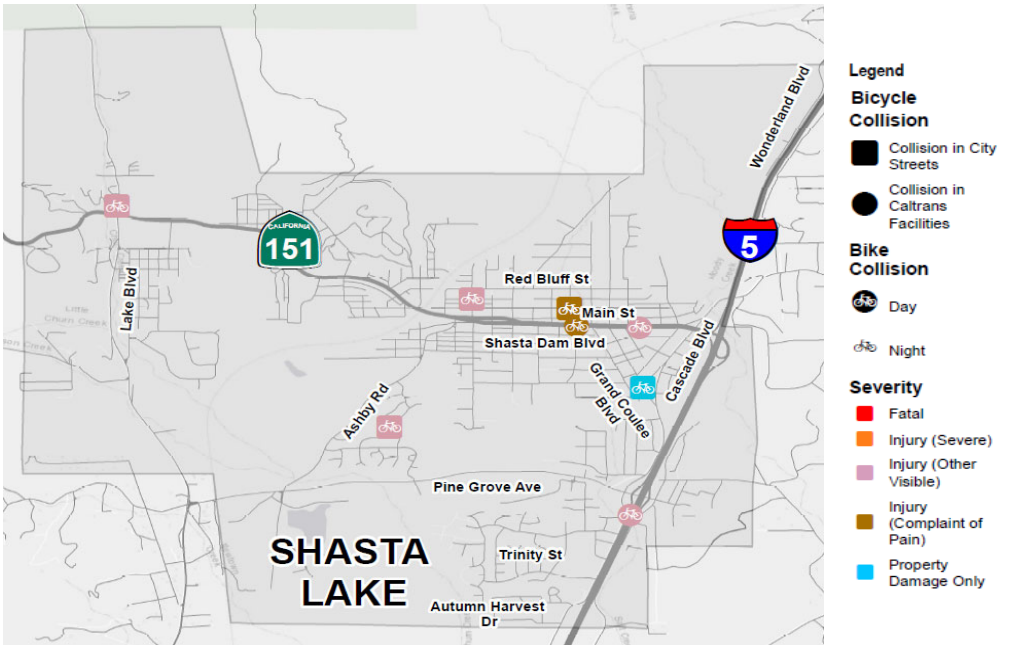


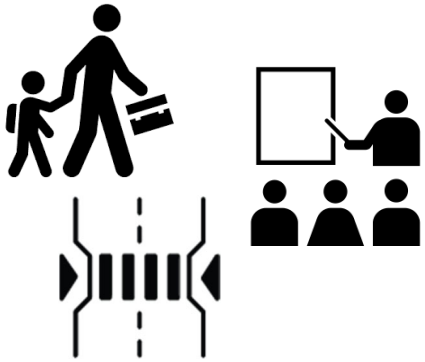
Figure 4.7 Map of Bicycle Collisions



5. Emphasis Areas

The emphasis areas determined by the stakeholder working group are as follows:

- Evaluate signage and possible improvements to reduce wrong way driving on Shasta Dam Boulevard
- Evaluate ways to improve pedestrian crossings
- Promote walking and bicycling
- Safe routes to school
- Encouragement and Education Efforts
- Evaluate Traffic Calming Options
- Address COVID-19 related changes to traffic
- Circulation changes from development projects
- Prioritize based on collision frequency, Equivalent Property Damage Only (EDPO) ranking, and crash rates



These emphasis areas were used in prioritizing safety projects.

5.1 Performance Measures

Performance measures should be **SMART**:

Specific – clear action item description

Measurable – identified performance measures

Achievable – committed resources by responsible organization

Relevant – statewide significance and data-driven issue and countermeasure

Time Constrained – achievable within the LRSP time frame

The performance measures will coincide with the goals defined by the LRSP working group.

5.2 Strategies

Strategies to improve safety will coincide with the current safety issues, goals of the LRSP, public outreach, and goals of the previous safety plans.

In summary, the following strategies will be implemented based on the findings.

6. Identify Strategies

6.1 Virtual Public Outreach

A presentation about the collision analysis within the City of Shasta Lake was created to educate the public about the plan and ask for public feedback on City roadways. This presentation was posted on the City of Shasta Lake's Facebook page (see **Figure 6.1**) and City of Shasta Lake Website (**see Figure 6.2**). Please see **Appendix C: Stakeholder and Public Input** for the comments and respective responses. Some of the public concerns were:

- Speed of trucks on Shasta Dam Boulevard
- Speed limit and pedestrian/bicycle safety on Shasta Dam Boulevard
- Evacuation routes
- Safety of children walking to school along Deer Creek Road
- Speed limit on Grand Coulee

Figure 6.1 LRSP Facebook Post

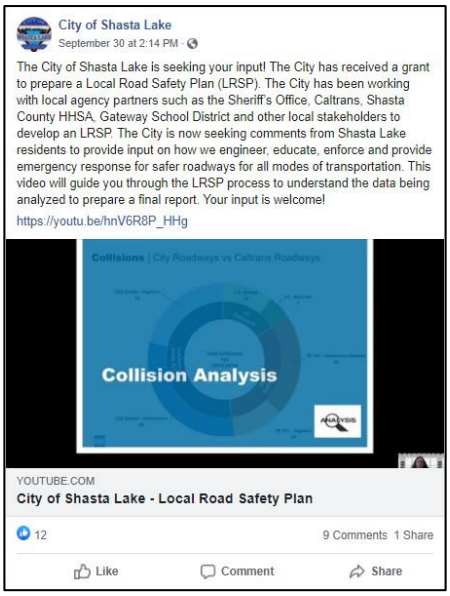
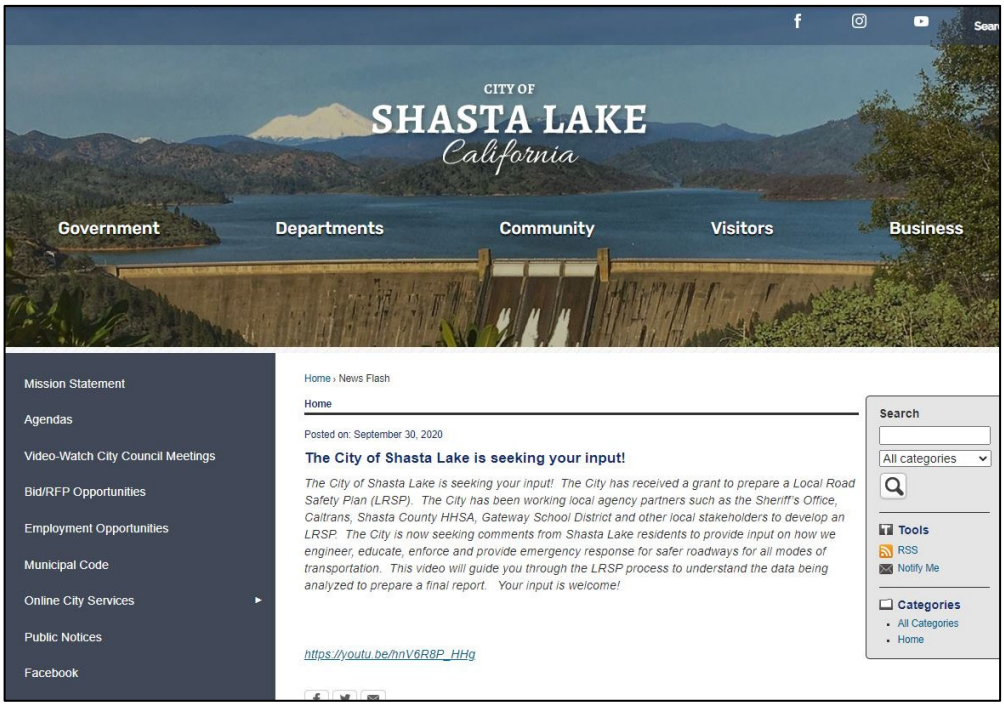


Figure 6.2 City of Shasta Lake Website Virtual Public Outreach



7. Prioritize and Incorporate Strategies

Through coordination and feedback from the City of Shasta Lake, LRSP working group, and public outreach, safety projects and strategies were identified for the Local Road Safety Plan.

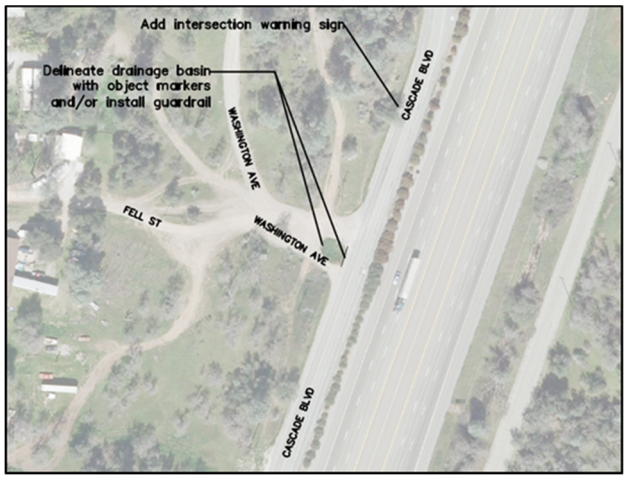
The LRSP will reference specific location engineering projects and systemic safety applications. In addition, safety strategies and projects that address the other E's to include Enforcement, Education, Emergency Response, and Emerging Technologies will be discussed below.

7.1 Engineering Strategies

7.1.1 City Intersection Projects

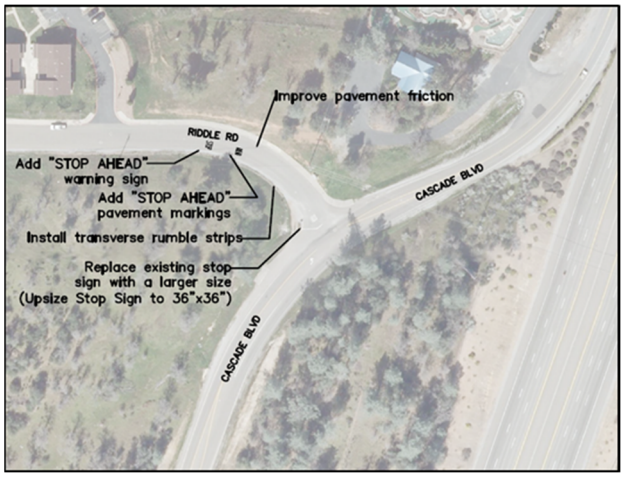
Per the HSIP program, engineering countermeasures are available for grant funding. Per the most recent HSIP Cycle (Cycle 10) the approved countermeasures and crash reduction benefits were quantified in the HSIP analyzer. The recommended countermeasures for the 11 intersections with the highest Equivalent Property Damage Only (EPDO) ranking are presented in **Appendix D**. Since the next HSIP Cycle 11 is in 2022, further safety analysis should be conducted at that time in refining the collision data and subsequent safety projects and Benefit to Cost Ratios (BCRs).

The recommended projects for future HSIP Cycles, along with their estimated BCR are shown below.



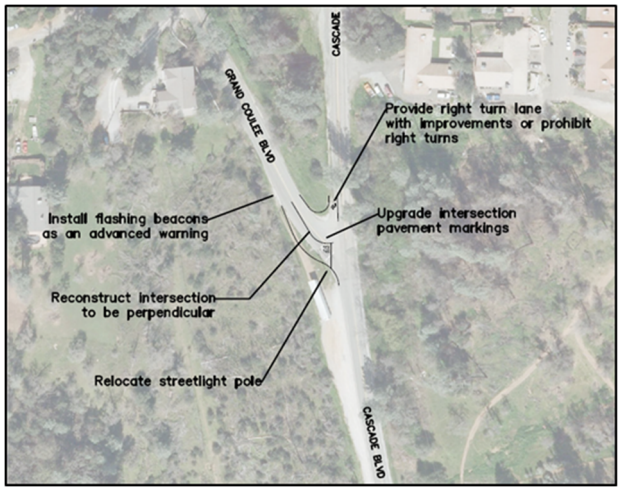
Cascade Blvd at Washington Ave (BCR=76.67)

- Delineate drainage basin with object markers and/or install guardrail
- Add intersection warning sign on north leg of Cascade Blvd



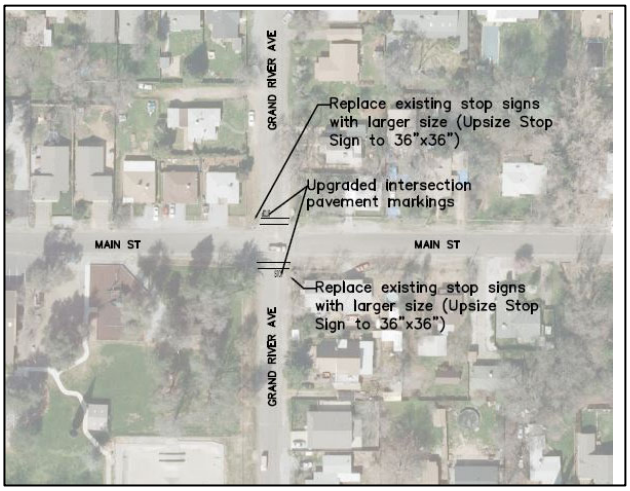
Cascade Blvd at Riddle Road (BCR=1.14)

- Add "STOP AHEAD" warning sign and pavement markings on Riddle Rd to alert drivers of upcoming stop
- Install transverse rumble strips on Riddle Rd to account for the curve on approach to the intersection if warranted
- Replace existing stop sign on Riddle Rd with a larger size to increase visibility
- Improve pavement friction on Riddle Rd approach



Cascade Blvd at Grand Coulee Blvd (BCR=7.17)

- Install flashing beacons on Grand Coulee Blvd to alert drivers of upcoming stop
- Reconstruct the intersection to be more perpendicular
- Provide right turn lane or restrict right turns on the north leg of Cascade Blvd
- Upgrade intersection pavement markings

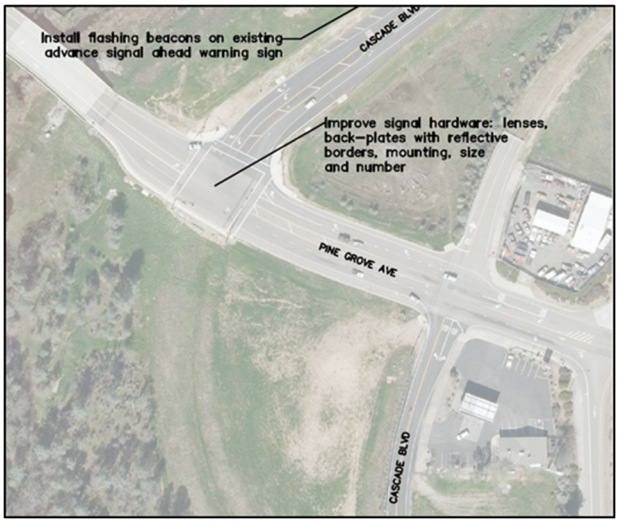


Main St at Grand River Ave (BCR=4.79)

- Upgrade intersection pavement markings
- Replace existing stop signs with larger size to increase visibility

Median Ave at Chico St (BCR=2.58)

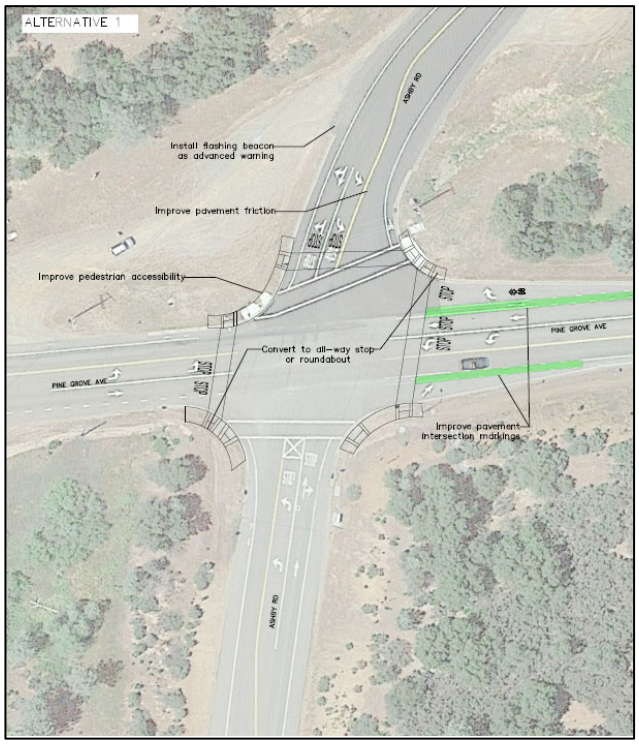
- Replace existing stop signs with larger size to increase visibility
- Remove obstructions to stop signs

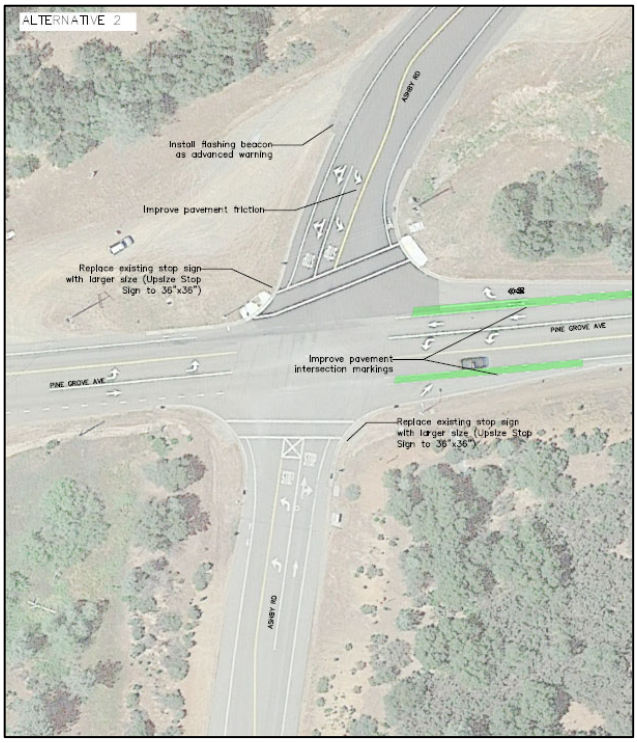


Pine Grove Ave at Cascade Blvd (BCR=1.54)

- Install flashing beacons on existing advance warning sign on Cascade Blvd
- Improve signal hardware

Two alternatives are proposed for intersection mitigations on Pine Grove Avenue and Ashby Road, as seen below. Alternative 1 converts the intersection to an all-way stop (must meet multiway stop warrants before installation) or a roundabout and Alternative 2 proposes enhacements to the current condition. **Figure 7.1** shows a rough sketch of the roundabout alternative. With the higher speeds (posted speed limit of 50 mph) on Pine Grove Avenue and free flowing traffic from Cascade Boulevard to Lake Boulevard, the roundabout can also provide a traffic calming element. In addition, traffic controls on Pine Grove Avenue at Ashby can provide gaps in traffic for the intersection to the east (Coeur D'Alene Avenue and Pine Grove Avenue). Another traffic control alternative is a traffic signal. However, per the preliminary analysis this intersection did not currently meet CA MUTCD warrants for traffic signal installation.





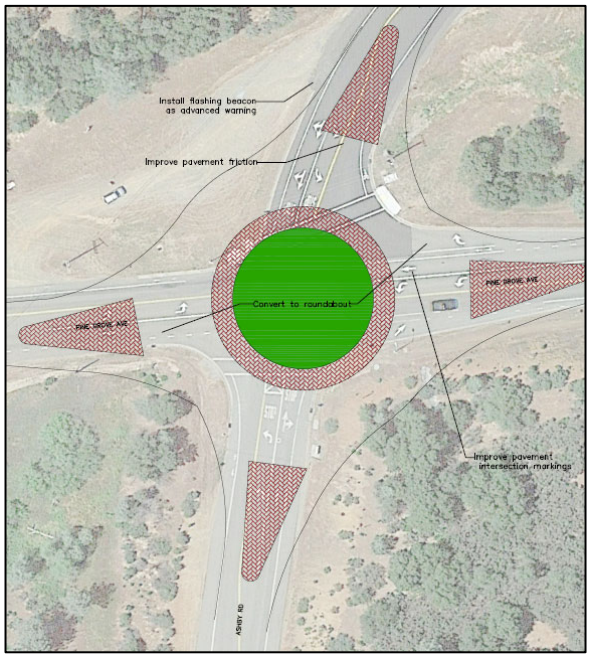
Alternative 1 (All-Way Stop BCR=4.54, Roundabout BCR=1.60)

- Convert intersection to all-way stop or roundabout
- Improve pedestrian accessibility by installing crosswalks on Pine Grove Ave and curb ramps on each corner
- Shorten crosswalk on north leg of Ashby Rd
- Install flashing beacon as advance warning on Ashby Rd
- Improve pavement friction on Ashby Rd
- Improve pavement markings on east leg of Pine Grove Ave by adding green conflict paint on bike lanes

Alternative 2 (BCR=2.35)

- Replace existing stop signs with larger size to increase visibility
- Install flashing beacon as advance warning on Ashby Rd
- Improve pavement friction on Ashby Rd
- Improve pavement markings on east leg of Pine Grove Ave by adding green conflict paint on bike lanes

Figure 7.1 Sketch of Roundabout Alternative



7.1.2 City Segment Analysis

Through the analysis period, there were 30 collisions reported on City of Shasta Lake roadway segments (non-intersection related). A breakdown of roadway collisions on City streets are included in Appendix B. For the roadway segment analysis, there were few collisions on roadways (typically one at a location). Due to the lack of collision patterns and trends, specific engineering solutions could not be identified for them. However, a systemic review of high risk characteristics was evaluated in proposing potential future projects for City roadways. Results of the systemic review is discussed in a subsequent section of this report.

Per the Stakeholder Working Group and current land uses, Ashby Road is an important corridor to focus safety efforts on. Ashby Road, south of Pine Grove Avenue is a growing industrial area. Also, north of the Pine Grove Avenue intersection there is a large wood mill which services large amounts of heavy vehicle traffic and several schools (Central Valley High School and Shasta Lake Elementary and Middle School). There is a large amount of heavy vehicle traffic that traverses this segment and mixes with school traffic. In evaluating future engineering countermeasures, Ashby Road has proposed infrastructure for pedestrian and bicycle accommodations in the submitted ATP grant application.

7.1.3 SR 151 Shasta Dam Boulevard

Countermeasures for state route intersections were determined using strategies from HSIP Cycle 10. The recommended countermeasures for the 6 intersections with the highest Equivalent Property Damage Only (EPDO) ranking are presented in **Appendix D: Recommended Projects.**

7.1.3.1 HSIP Application, Cycle 10

As previously mentioned in **Section 2.4.2**, the City applied for HSIP funding for pedestrian enhancements on three intersections along Shasta Dam Boulevard. See **Appendix A: Previous Safety Plans and Projects** for the HSIP plans.

7.1.4 Identified Challenge Areas

Per the SHSP, the identified challenge areas for the LRSP were as follows:

1. Intersections – Projects were identified for the top intersections with collision severity and frequency.
2. Pedestrians – Pedestrian crossing improvements were identified at intersections and uncontrolled school crosswalks
    - SR 151 has a HSIP application for 3 crossing improvements to include high visibility crosswalks and RRFBs at SR 151 and Shasta Way, Median Ave, and west of Mussel Shoals Ave/Grand Coulee Blvd.
    - Pedestrian crossing enhancement to uncontrolled school crosswalks.
3. Bicycling – Bicycling safety countermeasures/projects were suggested at multiple locations
    - Bicycle green conflict paint and sharrows at the Pine Grove and Ashby Road intersection.
    - SR 151 was identified as a pilot project for Class IV bike lanes (cycle track) in the "*Recommendations to Improve Pedestrian and Bicyclist Safety in the City of Shasta Lake."* This improvement would have to be coordinated with Caltrans.
    - Additional bikeway infrastructure will be captured on Ashby Road, La Mesa Avenue, and Hardenbrook Avenue if the ATP grant application is funded.
    - Best methods for adding safe crossings for people biking is where new pedestrian crossings are added. Assume roadway crossings will be used by people walking, biking, rolling – and ensure safety for all mobility types at roadway crossings. While laws prevent people riding bikes in a crosswalk, accommodation should be made for all mobility types to safely cross.
4. Young Drivers – Additional safety countermeasures intersections and roadways and speeding enforcement. Speeding was the top violation category for City streets and SR 151.
5. Aging Drivers – Additional signage, pavement markings, and roadway delineation.

7.1.5 Systemic Safety Countermeasures

Some systemic safety countermeasures options for the current high risk roadway characteristics are as follows:

- Signalized intersections

- Improve signal hardware to include reflective border on the back plates and new lenses
- Pedestrian countdown signals and Accessible Pedestrian Signal (APS) push buttons
- Friction surface treatment – for approaches (mitigates rear-end collisions)
- Leading pedestrian intervals

- Unsignalized intersections
  - Improve intersection signage and pavement markings
    - Upsize stop signs, add warning signs, and improve pavement markings
  - Install intersection warning signs if stopping sight distance is not sufficiently provided.
- Roadway Segments

  Roadway segments throughout the City were evaluated based on roadway and land use characteristics. Each roadway was rated (high, medium or low) for how likely a countermeasure presented in the LRSM can be applied to it based on engineering judgment and known risk factors (e.g. Speed, roadway width, presence of school, etc.). Results of this analysis is presented in **Appendix D: Recommended Projects**. Countermeasures and locations of high potential are identified below. Safety countermeasures are recommended to be installed after an evaluation of the current conditions is conducted (some of these may already be addressed)

  - Install Guardrails
    - Ashby Road - Between Shasta Dam Boulevard and Pine Grove Ave
    - Twin View Boulevard – Between Pine Grove Avenue and the southern City limits
    - Hill Boulevard – On existing bridge and approach just north of Lake Boulevard
  - Improve pavement friction (High Friction Surface Treatments) at intersection approaches with high speeds and approach to curves.
    - Lake Boulevard – Between Shasta Dam Boulevard and the intersection with Pine Grove Avenue
    - Ashby Road - Between Shasta Dam Boulevard and Pine Grove Ave
    - Cascade Boulevard - Shasta Dam Boulevard to Southern City Limit
    - Twin View Boulevard – Between Pine Grove Avenue and the Southern City limits

- Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)
    - Lake Boulevard – Between Shasta Dam Boulevard and the intersection with Pine Grove Avenue
    - Ashby Road - Between Shasta Dam Boulevard and Pine Grove Ave
    - Cascade Boulevard - Shasta dam Boulevard to Southern City Limit
- Install chevron signs on horizontal curves
    - Lake Boulevard – Between Shasta Dam Boulevard and the intersection with Pine Grove Avenue
    - Ashby Road - Between Shasta Dam Boulevard and Pine Grove Ave
    - Cascade Boulevard - Shasta Dam Boulevard to Pine Grove Ave
    - Twin View Boulevard – Between Pine Grove Avenue and the Southern City limits
- Install curve advance warning signs
    - Black Canyon Road – Between Red Bluff Street and the northern City limit
    - Lake Boulevard – Between Shasta Dam Boulevard and the intersection with Pine Grove Avenue
    - Ashby Road - Between Shasta Dam Boulevard and Pine Grove Ave
    - Cascade Boulevard - Shasta Dam Boulevard to Southern City Limit
    - Twin View Boulevard – Between Pine Grove Avenue and the southern City limits
- Install curve advance warning signs (flashing beacon)
    - Cascade Boulevard - Shasta Dam Boulevard to Pine Grove Ave
    - Twin View Boulevard – Between Pine Grove Avenue and the southern City limits
- Install dynamic/variable speed warning signs (where unsafe speeds are prevalent or in school zones)
    - Ashby Road - Between Shasta Dam Boulevard and Pine Grove Ave
    - La Mesa Avenue – Between Ashby Road and Montana Avenue
    - Vallecito Street - Between Montana Avenue and Washington Ave
    - Flanagan Road – Between Lake Boulevard and end of road
- Install edgelines and centerlines

- Red Bluff Street – Between Montana Avenue and Mussel Shoals Avenue
- Main Street – Between Mussel Shoals Avenue and Shasta Way
- Mussel Shoals Avenue – Between Shasta Dam Boulevard and Black Canyon Road
- Montana Avenue – Between Shasta Dam Boulevard and Red Bluff Street
- Black Canyon Road – Between Red Bluff Street and the Northern City limit
- Toyon Avenue – Between Lake Boulevard and Sacramento Street
- Sacramento Street – Between Toyon Avenue and Shasta Dam Boulevard
- Montana Avenue – Between Shasta Dam Boulevard and Vallecito Street
- Hardenbrook Avenue – Between Shasta Dam Boulevard and its southern terminus

- Install centerline and edgeline rumble strips/stripes
  - Lake Boulevard – Between Shasta Dam Boulevard and the intersection with Pine Grove Avenue
  - Ashby Road - Between Shasta Dam Boulevard and Pine Grove Ave
  - Cascade Boulevard - Shasta dam Boulevard to Southern City Limit
  - Pine Grove Avenue – Between the interchange at Interstate 5 and Ashby Road
  - Twin View Boulevard – Between Pine Grove Avenue and the southern City limits
- Install bike lanes
  - La Mesa Avenue – Between Ashby Road and Montana Avenue
- Install sidewalk/shared-use path (to avoid walking along roadway)
  - Red Bluff Street – Between Montana Avenue and Mussel Shoals Avenue
  - Montana Avenue – Between Shasta Dam Boulevard and Red Bluff Street
  - Hardenbrook Avenue – Between Shasta Dam Boulevard and Black Canyon Road at Red Bluff Street
  - Ashby Road - Between Shasta Dam Boulevard and Pine Grove Ave
  - Montana Avenue – Between Shasta Dam Boulevard and Vallecito Street
  - La Mesa Avenue – Between Ashby Road and Montana Avenue
  - Vallecito Street - Between Montana Avenue and Washington Ave

- Install/upgrade pedestrian crossing (with enhanced safety features)
    - Lake Boulevard – Between Shasta Dam Boulevard and the intersection with Pine Grove Avenue
    - Montana Avenue – Between Shasta Dam Boulevard and Vallecito Street
    - La Mesa Avenue – Between Ashby Road and Montana Avenue
    - Vallecito Street - Between Montana Avenue and Washington Ave
- Install Rectangular Rapid Flashing Beacon (RRFB)
    - Lake Boulevard – Between Shasta Dam Boulevard and the intersection with Pine Grove Avenue
    - Ashby Road - Between Shasta Dam Boulevard and Pine Grove Ave
    - Montana Avenue – Between Shasta Dam Boulevard and Vallecito Street
    - La Mesa Avenue – Between Ashby Road and Montana Avenue
    - Vallecito Street - Between Montana Avenue and Washington Ave
- Mussel Shoals Avenue – Between Shasta Dam Boulevard and Black Canyon Road or Install delineators, reflectors and/or object markers
    - Mussel Shoals Avenue – Between Shasta Dam Boulevard and Black Canyon Road

- Additional safety enhancements could also be made to uncontrolled school crosswalks.
    - In evaluating the uncontrolled school crosswalks in the City of Shasta Lake, the locations below have been identified for additional safety improvements to include RRFBs and improved signage and pavement markings. These locations are as follows:
        - Grand Ave, East of Main Street
        - Vallecito St, West of Deer Creek Road
        - SR 151 at Hardenbrook Avenue
        - Ashby Rd, South of La Mesa Avenue
        - La Mesa Ave, East of Lassen Avenue
        - La Mesa Ave, West of San Gorgonio Avenue

7.1.6 Additional Safety Projects

Besides engineering safety countermeasures, it is important to recommend safety countermeasures to coincide with the other safety E's.

7.2 Non-Engineering Strategies

7.2.1 Education

Education strategies are listed below.

- Based on the current collision data and trends across the state of California and locations in Shasta Lake, an education campaign for drivers and people walking and biking, targeted at the known behaviors that cause collisions, injury and death. The education campaign will address safe driving behaviors and safe street crossing behaviors. Including: 1) the top roadway behaviors that cause collisions and how drivers and people walking and biking can use the roadway most safely; 2) reminding residents to be aware of low-light/low-visibility on roadways, to wear bright clothing or have a flash-light where roadway lighting is not sufficient; 3) the three-foot passing law for safety of people on bikes. (California SHSP, SafeTREC, Vision Zero Network)
- School education campaigns for safe routes to school maps and the recommended path and crossing locations
- Social media blasts and emails on quick education tips for all users (vehicles, pedestrian, bicyclists, transit, etc.)
- Consider working with local community-based organizations to host a - Walk Safe. Ride Safe. Drive Safe - Community Safety Workshop and/or public engagement activities. Continue community engagement and public education with events and in-person or online meetings to discuss and learn together in an ongoing way - about how to support safe roadway behaviors throughout the City of Shasta Lake.
- Education of log truck drivers of reduced speeds in school zones, and route alternatives to/from Interstate 5.

7.2.2 Emerging Technologies

Possible emerging technologies strategies are listed below.

- Emerging Technologies such as Intelligent Transportation Systems (ITS), web or mobile device applications (APP) development or deployment (e.g., Lightguard Traffic Safety Warning APP) or Smart Cities practices
- Crash warning systems
- Communication with traffic signals
- Portable Changeable Message Boards for changes in traffic control, special events, or additional driver information.
- Automated speed enforcement, to be reviewed and assessed for usefulness and improved safety in Shasta Lake.

7.2.3 Enforcement

Enforcement strategies are listed below.

- Targeted speed enforcement
- Additional funding for a periodic (once per month or bi-monthly) dedicated traffic enforcement unit. DUI enforcement would require two deputies at a minimum for public/officer safety. In addition, two deputies could focus efforts on enforcing DUI, speeding, distracted driving, and other dangerous driving enforcement. This dedicated traffic enforcement unit could focus efforts on areas and times of day that were higher risk for collisions.
    - Look to identify any grant opportunities for additional enforcement. Office of Traffic Safety typically administers these grants.
- Enforcement of the traffic signs and signals at locations with violations to right of way.

7.2.4 Emergency Response

Emergency response strategies are suggested below.

- Improvement to response time by installation of an emergency signal for the fire department or ambulance.
- Ability to administer life saving measures on-site of a collision.
- Emergency services pre-emption at signalized intersections.

8. Implementation Process

In evaluating how to implement safety projects, a prioritized lists of projects with additional systemic projects is included in Appendix D: Recommended Projects. The City of Shasta Lake will look for opportunities to incorporate safety enhancements with the Capital Improvement Program. However, it is noted that this funding is very limited and typically used from roadway paving. Additional funding opportunities can come through grant funding to include HSIP, ATP, CMAQ, and Sustainable Communities.

Table 8.1 contains a prioritized list of the proposed intersection projects on City roadways based on their respective benefit-to-cost ratios.

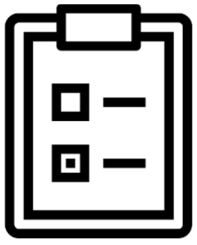
Table 8.1 Priority of Intersection Projects

Location	BCR
Cascade Blvd and Washington Ave/Fell St	76.67
Grand Coulee Blvd and Cascade Blvd	7.17
Main St and Grand River Ave	4.79
Pine Grove Ave and Ashby Rd - AWSC	4.54
Chico St and Median Ave	2.58
Pine Grove Ave and Ashby Rd - Upgrades	2.35
Pine Grove Ave and Ashby Rd - Roundabout	1.60
Cascade Blvd and Pine Grove Ave	1.54
Riddle Rd and Cascade Blvd	1.14

9. Evaluation Process

To evaluate the success of this plan, yearly collision analysis, along with requests for public feedback, can take place and be compared to the established goals.

- **Goal:** Improve the health and vitality of our community.
    - **Measure of Success:** Understand the metrics from Shasta County Health and Human Services Agency and work to improve them through improved community facilities.
- **Goal:** Zero deaths or life altering injuries occur to people using local roads - walking, biking, rolling, and driving by 2030.
    - **Measure of Success:** This can be achieved by smaller reduction goals of 1 fatal or severe injury (FSI) collision reduction per year toward the zero goal.
- **Goal:** Increase walking, biking, rolling (wheelchair, skateboard, scooter, etc.), to the downtown district, to work, and to schools.
    - **Measure of Success:** Increase in multimodal infrastructure and improvements and subsequent pedestrian and bicycle counts. Currently, the City of Shasta Lake does not collect pedestrian and bicycle counts but that might be an addition in capturing this metric.
- **Goal:** Residents report they feel they have safe, comfortable, convenient routes on local roads to get where they need to go - walking, biking, rolling, and driving.
    - **Measure of Success:** Results of public feedback indicate that they feel safer and more comfortable travelling on local roads with the implemented changes to the plan. Construction of more alternative infrastructure to support a walkable and bikeable community. Goal to provide one new facility enhancement or connection each year.



10. Next Steps

The City of Shasta Lake's Local Road Safety Plan was adopted by City Council on January 19, 2021. This safety plan will be a living document and will guide the City's roadway safety needs for the next five years. It will be updated as needed and the goals will be monitored.

11. References

Safety Projects

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Traffic Data

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Surveys

- “Shasta Lake Survey on Walking and Bicycling”, City of Shasta Lake, 2020.
- “2016 Engineering & Traffic Survey: Final Report”, Traffic Works, June 2016, https://www.cityofshastalake.org/DocumentCenter/View/1280/2016-Engineering-and-Traffic-Survey?bidId=.

about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

Kathryn Kleinschmidt
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Appendix A – Previous Safety Plans and Projects

CALTRANS ATP CYCLE 5
CITY OF SHASTA LAKE
ASHBY ROAD, LA MESA AVE, & HARDENBROOK AVE

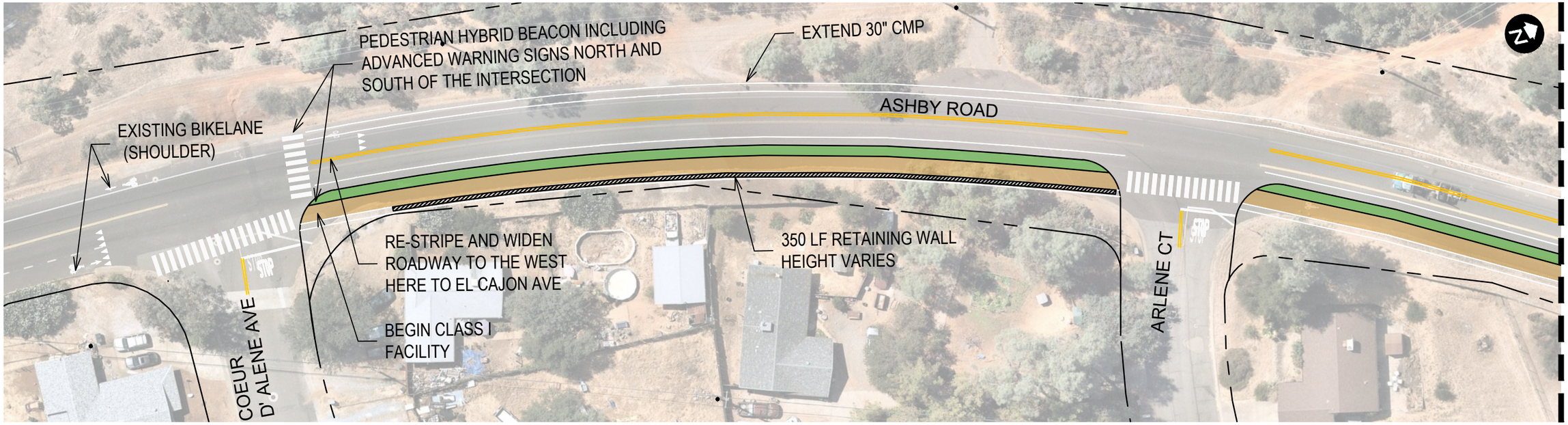
LEGEND

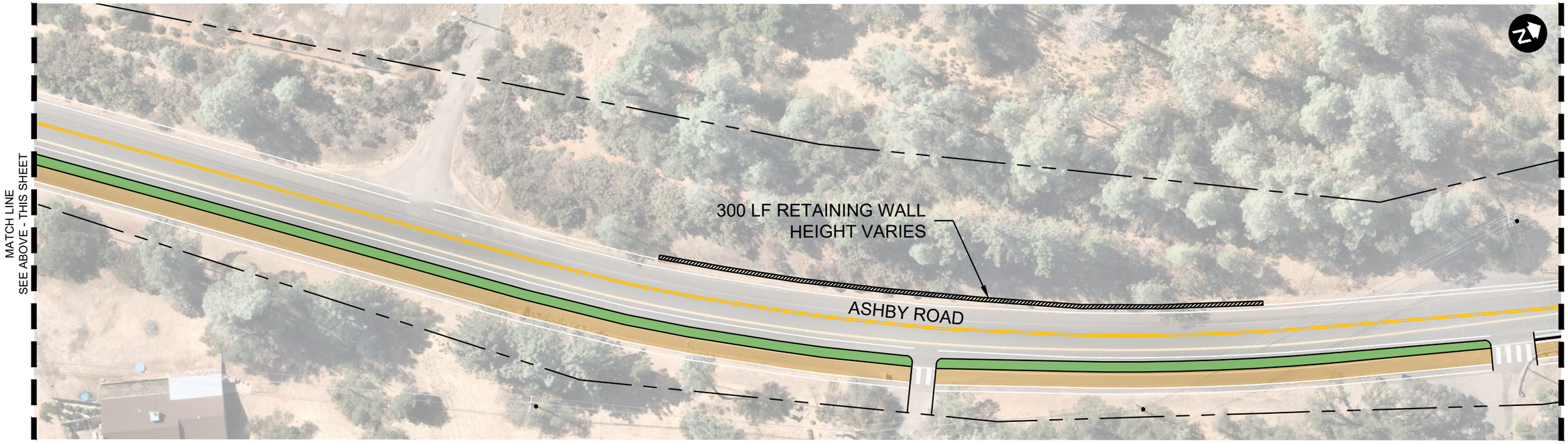
- Sidewalk
- Class I Shared Use Path
- New Asphalt
- Landscape
- Parcel Boundary
- Right of Way Line
- Existing Utility Poles

0 600' 1200'

SHEET 1 OF 9

PLANNING + DESIGN





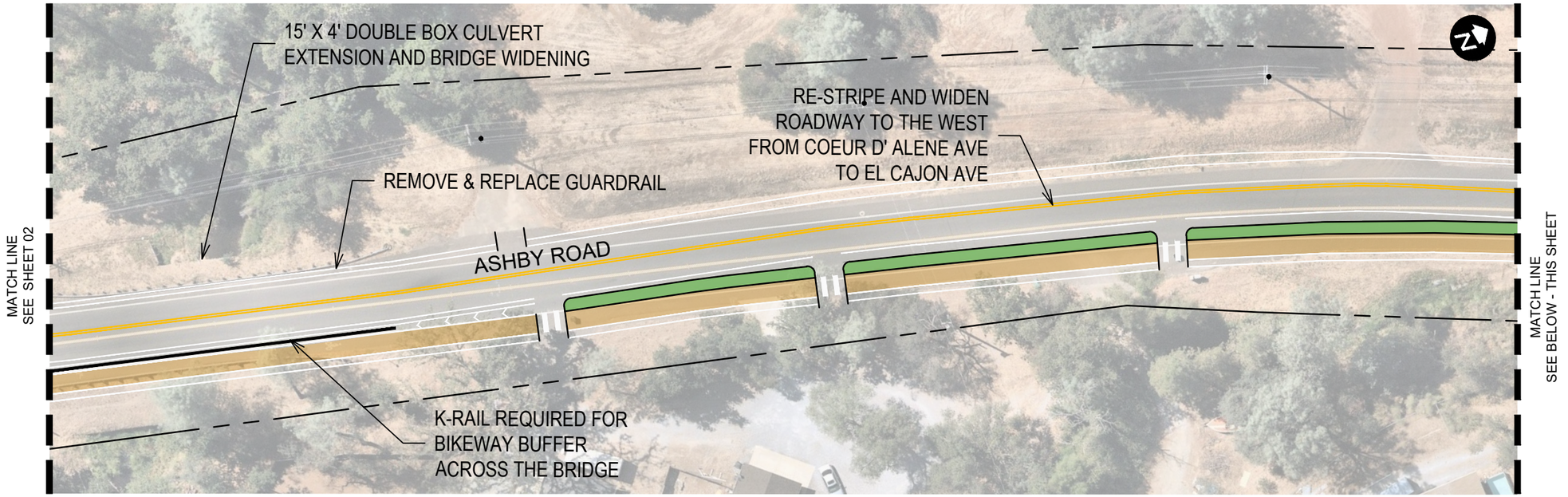
CALTRANS ATP CYCLE 5
CITY OF SHASTA LAKE
ASHBY ROAD, LA MESA AVE, & HARDENBROOK AVE

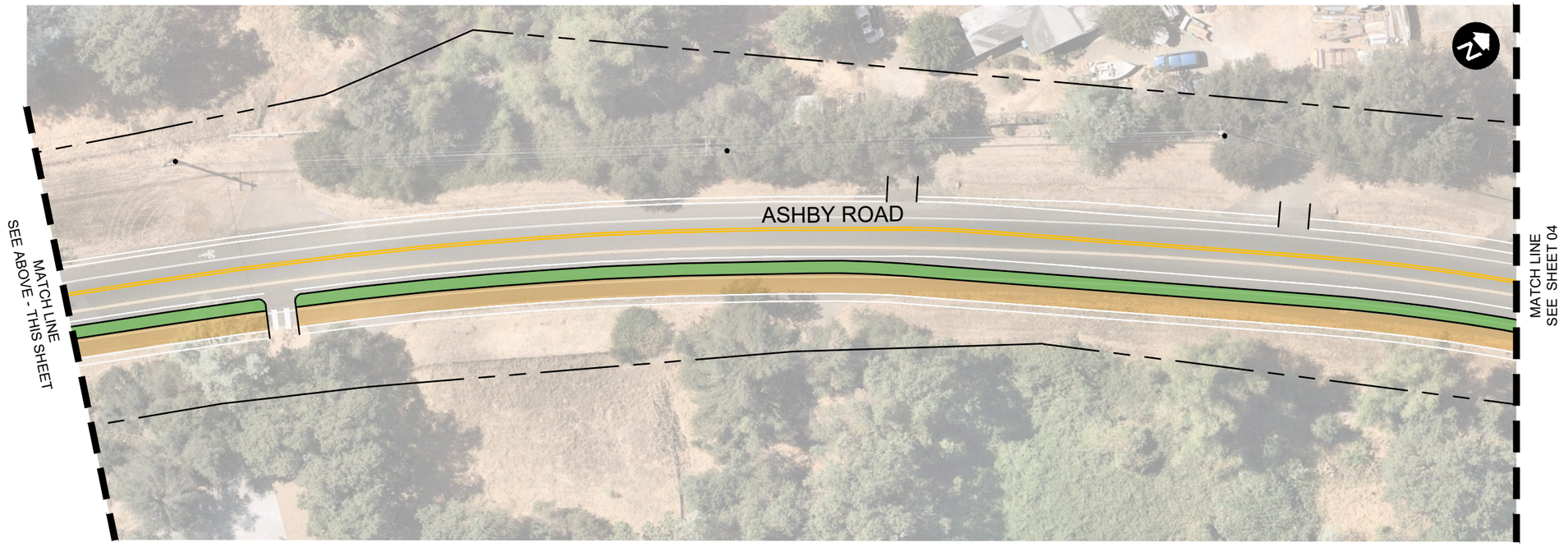
LEGEND

- Sidewalk
- Class I Shared Use Path
- New Asphalt
- Landscape
- Parcel Boundary
- Right of Way Line
- Existing Utility Poles

0 50' 100'

PLANNING + DESIGN





CALTRANS ATP CYCLE 5
CITY OF SHASTA LAKE
ASHBY ROAD, LA MESA AVE, & HARDENBROOK AVE

LEGEND

- Sidewalk
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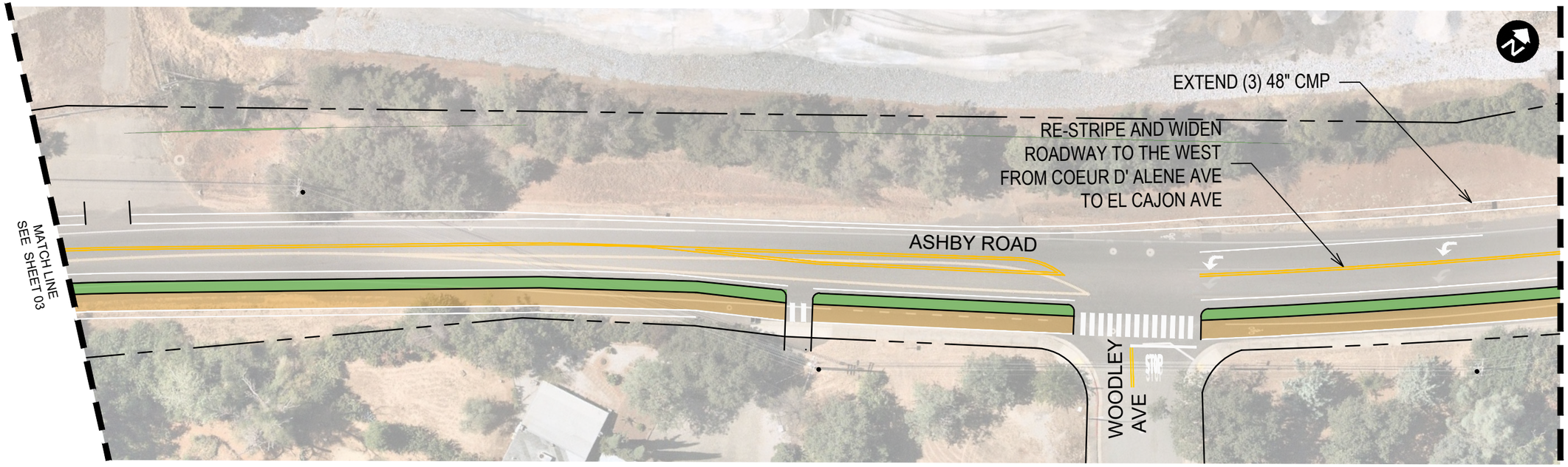
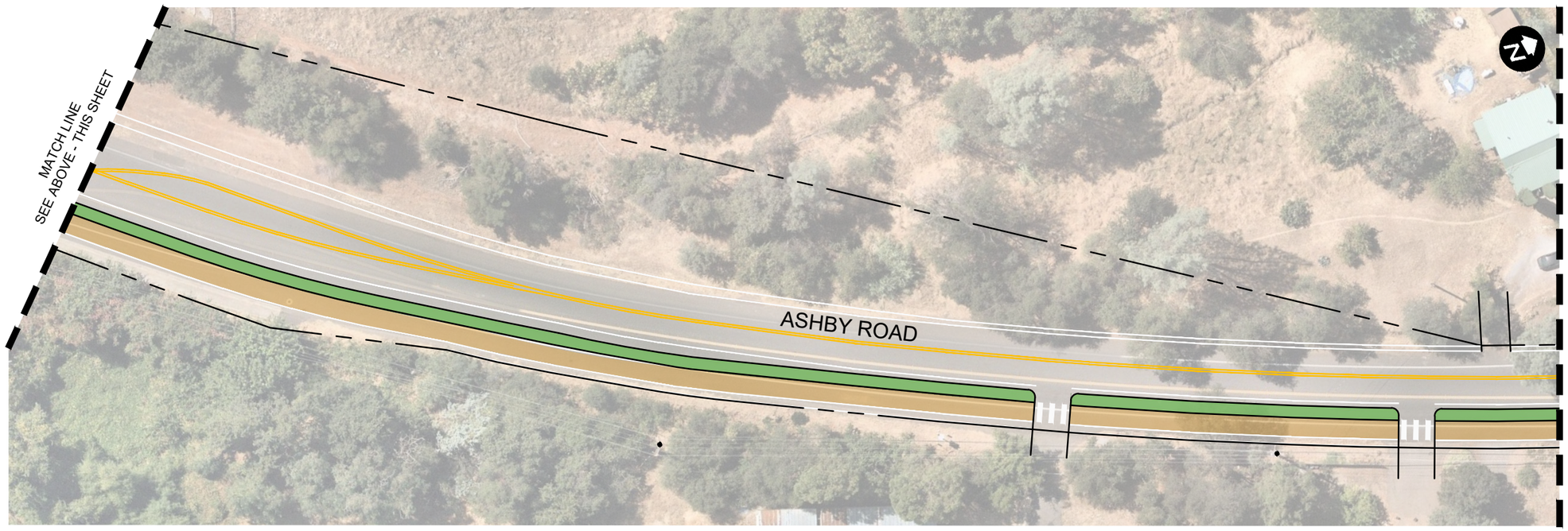
- Landscape
- Parcel Boundary
- Right of Way Line
- ● Existing Utility Poles

0 50' 100'

PLANNING + DESIGN





CALTRANS ATP CYCLE 5
CITY OF SHASTA LAKE
ASHBY ROAD, LA MESA AVE, & HARDENBROOK AVE

LEGEND

- Sidewalk
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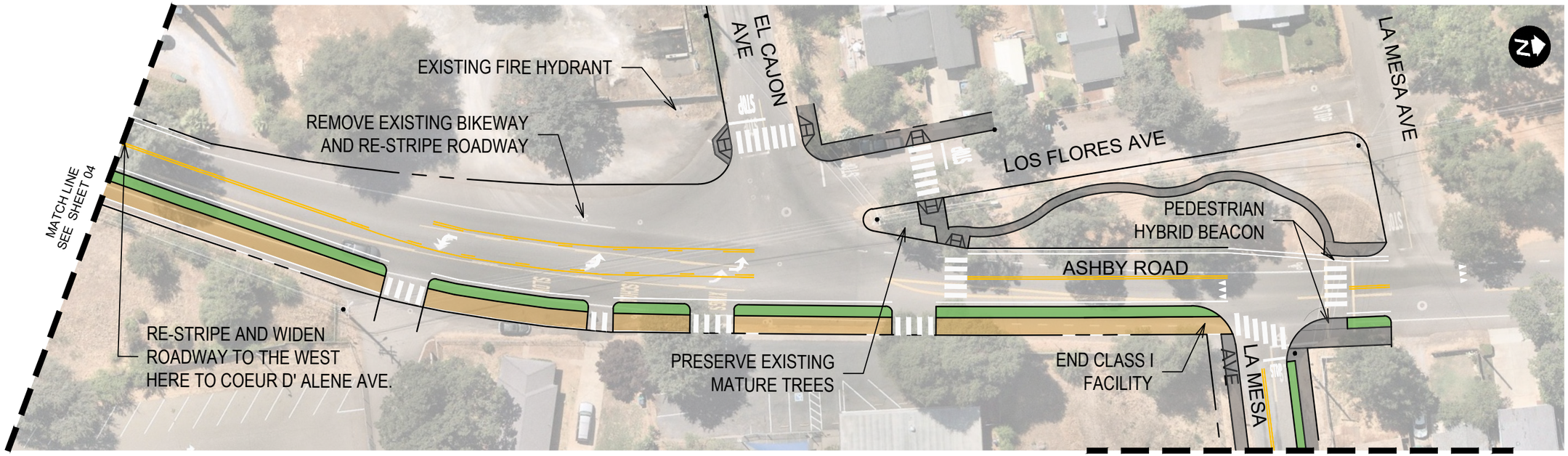
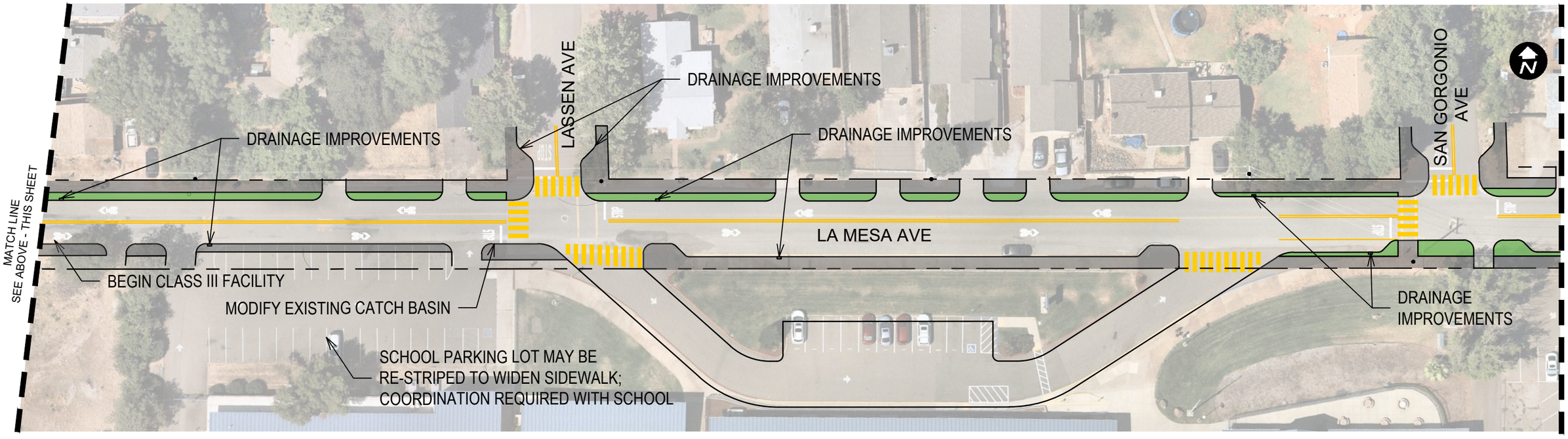
- Parcel Boundary
- Right of Way Line
- • Existing Utility Poles

0 50' 100'

PLANNING + DESIGN





CALTRANS ATP CYCLE 5
CITY OF SHASTA LAKE
ASHBY ROAD, LA MESA AVE, & HARDENBROOK AVE

LEGEND

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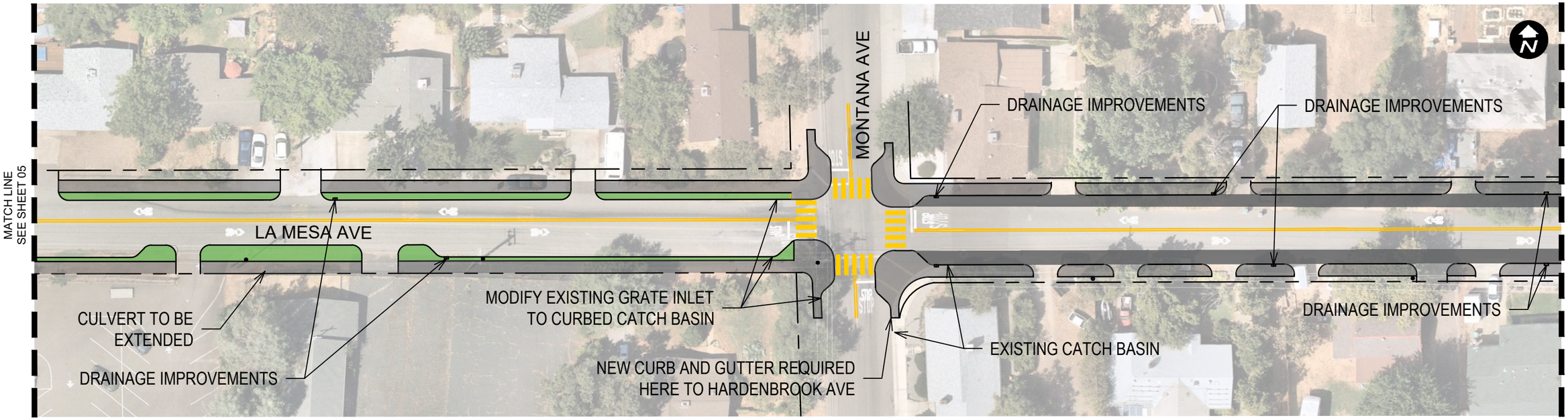
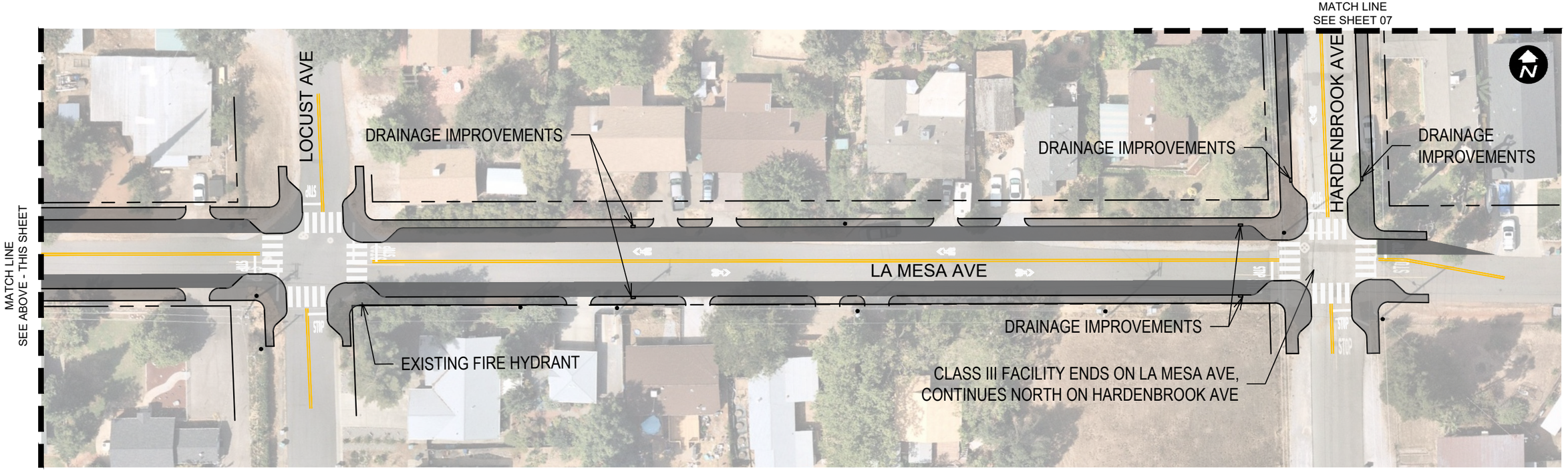
0 50' 100'





CALTRANS ATP CYCLE 5
CITY OF SHASTA LAKE
ASHBY ROAD, LA MESA AVE, & HARDENBROOK AVE

LEGEND

- Sidewalk
- Class I Shared Use Path
- New Asphalt
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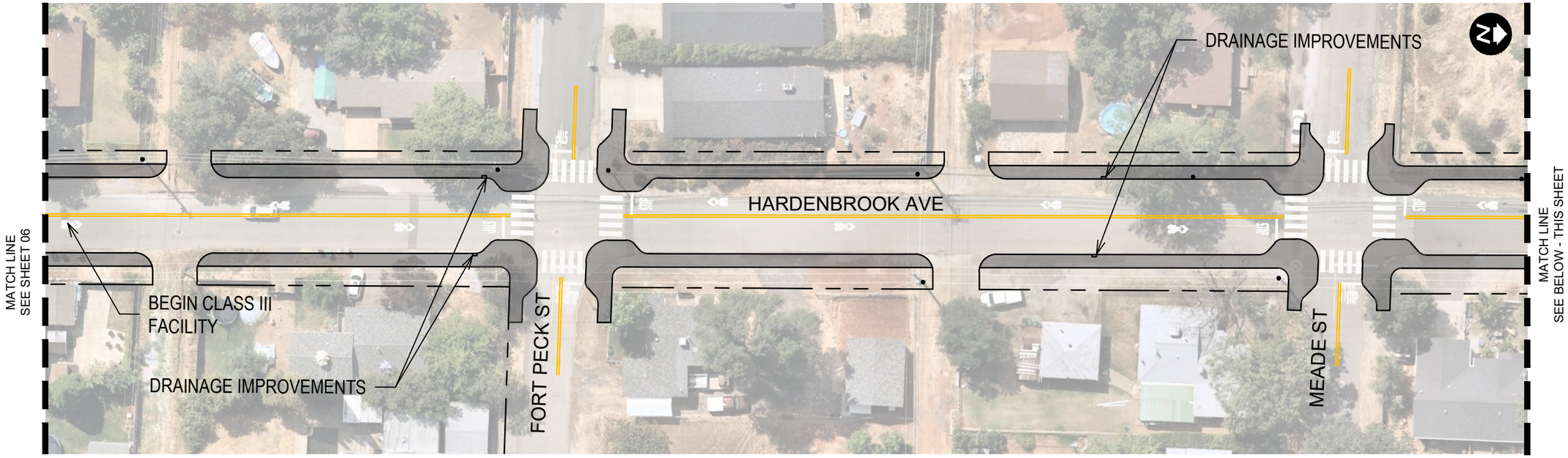
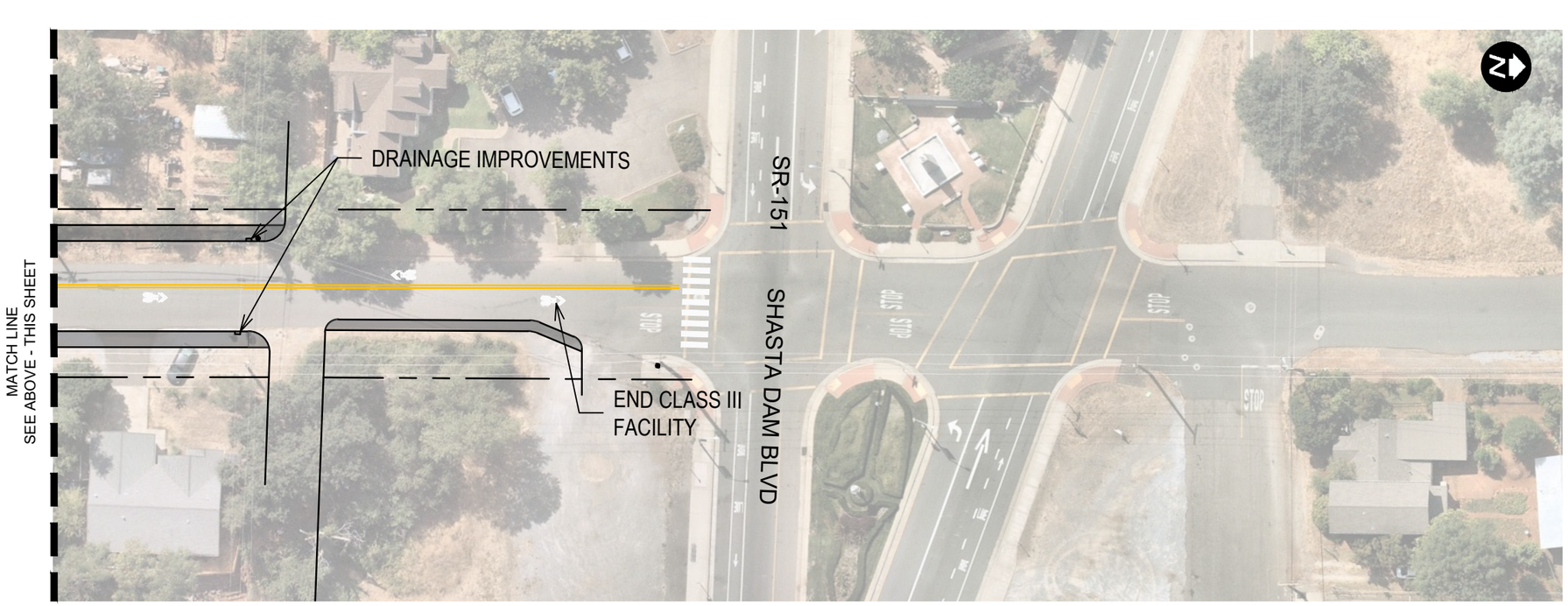
0 50' 100'

alta PLANNING + DESIGN





CALTRANS ATP CYCLE 5
CITY OF SHASTA LAKE
ASHBY ROAD, LA MESA AVE, & HARDENBROOK AVE

LEGEND

- Sidewalk
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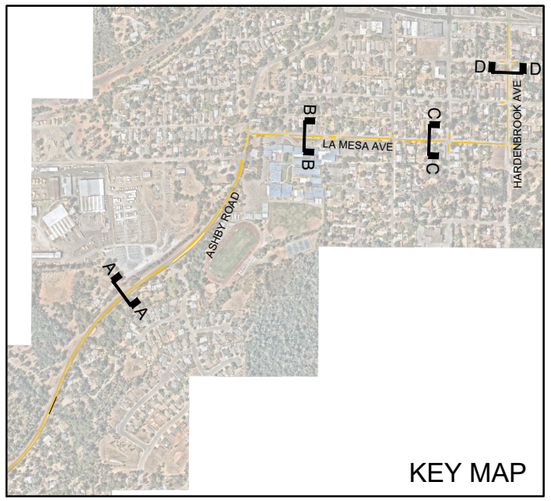
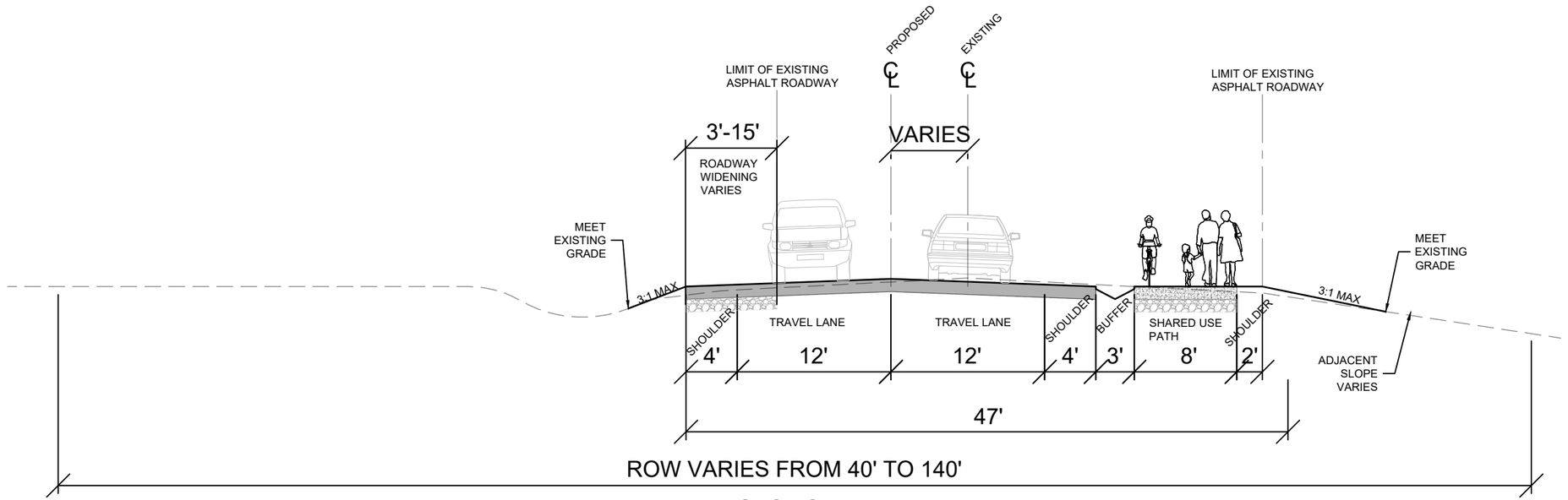
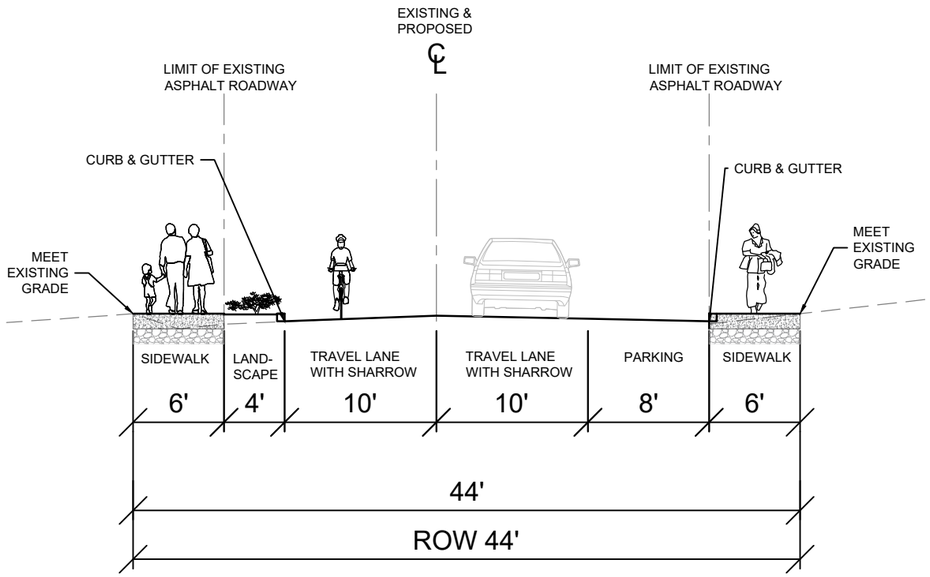
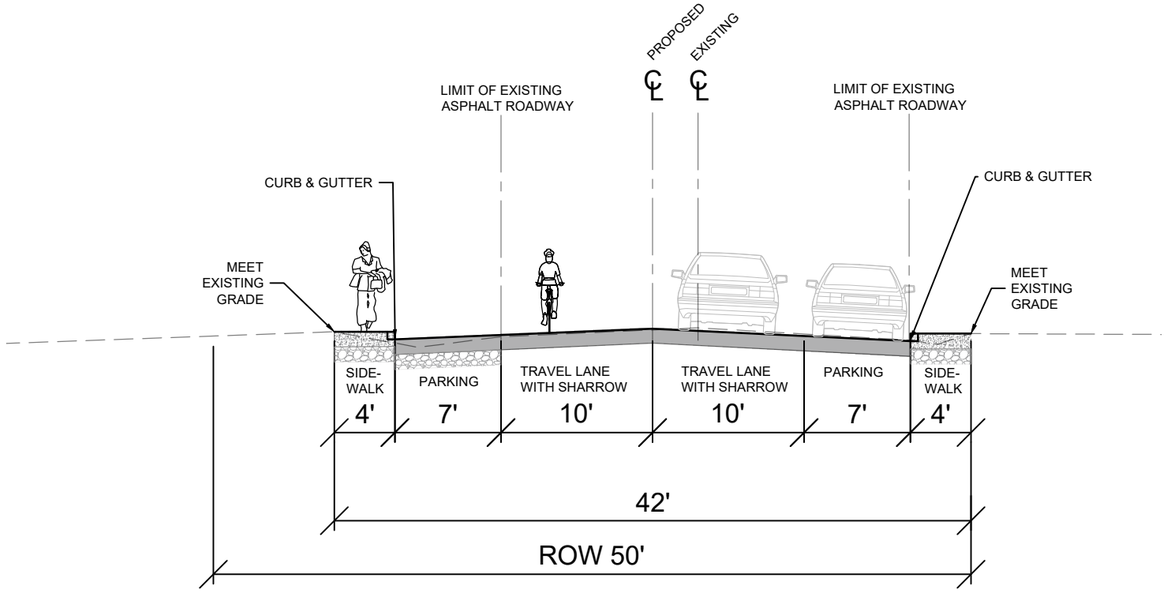




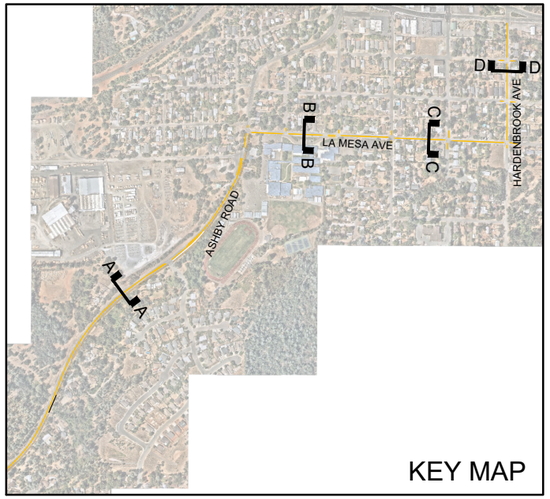
SECTION A:
ASHBY ROAD, TYP. ARLENE CT TO EL CAJON AVE



SECTION B:
LA MESA AVE, TYP. FROM ASHBY RD TO MONTANA AVE



SECTION C:
LA MESA AVE, TYP. FROM MONTANA AVE TO HARDENBROOK AVE



EXAMPLE BICYCLE BOULEVARD CONCEPT

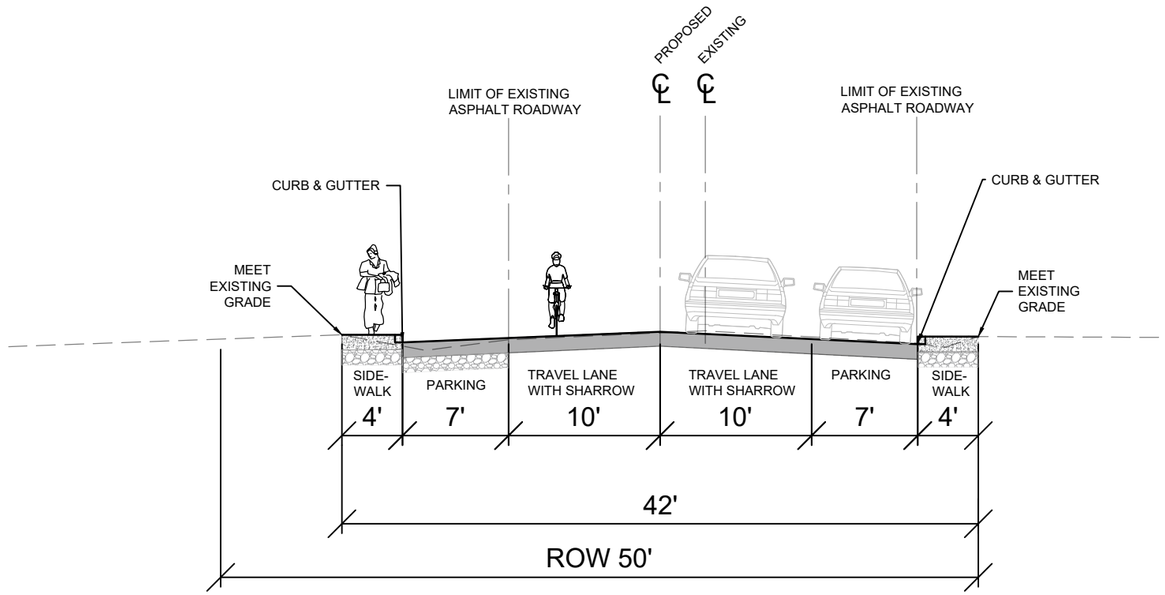
TRAFFIC CALMING STRATEGIES

CURB EXTENSION

TRAFFIC CIRCLE

CHICANE

CHOKERS



SECTION D:
HARDENBROOK AVE, TYP. FROM LA MESA AVE TO SHASTA DAM BLVD

Community Resident Recommendations

Policy Changes

- Adopt a resolution declaring that investments in walking and bicycling are a priority for the City of Shasta Lake and that the City commits to pursuing all potential funding sources for walking and biking projects
- Require consistency of the City's Capital Improvement Program (CIP) with the to-be-adopted General Plan on an annual basis. The updated General Plan will include goals related to complete streets, walking, and bicycling, and the City's CIP investments should work to further those goals.
- Establish a policy specific to the City of Shasta Lake regarding the frequency of marked crossings.
- Evaluate minimum parking requirements in the zoning code and develop new minimum (or even maximum) parking requirements following study of existing parking utilization rates to establish a minimum threshold requirement.

Transformative Project Ideas

- Strong support for focusing competitive grant applications on comprehensive transformations of priority streets that include a package of ped and bike safety improvement components including pedestrian-scale lighting.
- Broad consensus that the City should focus on establishing an East-West Complete Streets Corridor along Shasta Dam Blvd and a North-South Complete Streets Corridor (no specific corridor specified but did identify the need to connect downtown to the Gateway Greenbelt and then beyond to existing Sacramento River Trail system)

Interim, Low-Cost, Quick-Build Strategies (for the City and Caltrans to pursue in tandem with ongoing maintenance/cap improvement projects)

- Signage: One-way signage, gore markings, and warnings on Shasta Dam Blvd on couplet section; updated fluorescent yellow/green school signage
- Enhanced Pedestrian Crossings: upgrade existing standard crosswalks to high-visibility markings; install rectangular rapid flashing beacons (RRFB) at the Taco Shop crossing; evaluate possibility of decorative/art crosswalks
- Code Enforcement: Notify property owners to keep sidewalks clear of overgrown vegetation and sandwich board signs

Priorities for GoShasta Plan

- The following priority destinations should be connected by the regional walking/biking system developed as part of the GoShasta Plan:
    - City of Shasta Lake to Shasta College
    - City of Shasta Lake to Redding (via existing trail systems: Sacramento River Trail, Bureau of Land Management (BLM) trails)
    - City of Shasta Lake to Shasta Dam
    - Improving the "4 Corners" Area at Lake Blvd and Shasta Dam Blvd: implement wayfinding; construct a rest area/parking lot to encourage walking/biking to Shasta Dam rather than driving

California Walks/SafeTREC Recommendations

- Pilot a Separated Bikeway (Class IV or Cycle Track) on Shasta Dam Blvd
- First/Last Mile Connections – Improve Ped and Bike Access to transit: safe access to bus stops for those on foot (typ. within ¼ mile) and those on bike (typ. within ½ mile) with particular focus on downtown core and key destinations such as schools and parks. Could include improved, high

visibility crossings at current crossing locations, additional crossings to facilitate access to transit and nearby destinations, complete sidewalk networks within a ¼ mile radius of RABA (Redding Area Bus Authority) Route 1

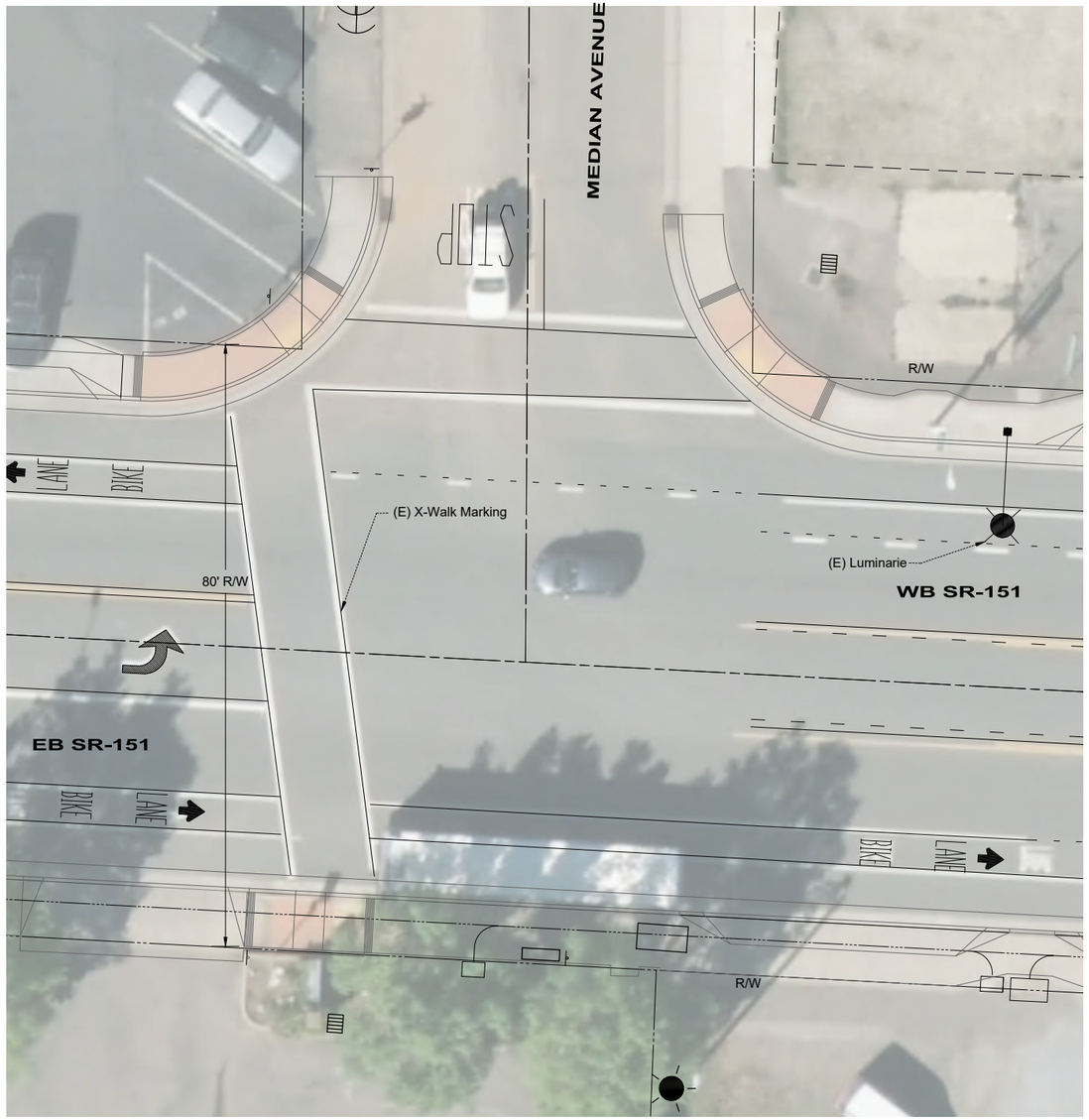
LEGEND

RRFB (2-Way)

RRFB (1-Way)

NOTES:

1. Existing traffic lanes widths and turning movements do not change.
2. No Right of Way in needed.
3. RRFB will be solar/battery powered. No commercial power will be installed.
4. New Luminaire will be connected to commercial power.



EXISTING CONDITION

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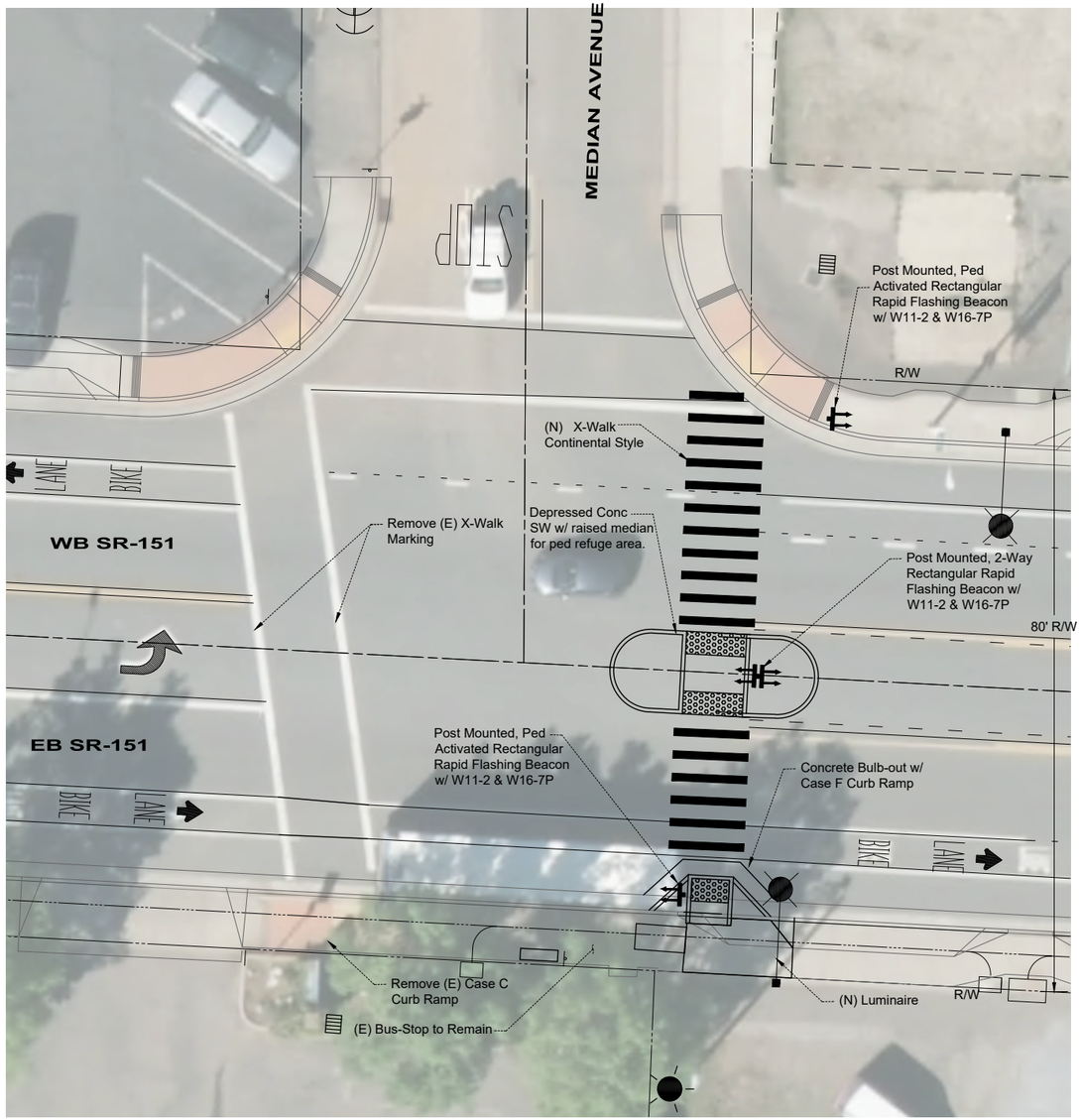


PROPOSED CONDITION

SCALE: 1" = 10'

HALF SIZE PRINT
ACTUAL SCALE IS TWICE WHAT IS SHOWN

No.	Date	Revisions	By	App.

Designed By: JRT
Drawn By: MAJ
Checked By: JRT
Approved:
City Engineer RCE # XXXXX

PRELIMINARY
REGISTERED PROFESSIONAL ENGINEER
WILLIAM S. ROWLEY
No. CIVIL
STATE OF CALIFORNIA
6/30/22

CITY OF SHASTA LAKE
Public Works Department
4477 Main Street, Shasta Lake, CA 96019
(530) 275-7400 ph (530) 275-7462 fax

CITY OF SHASTA LAKE

HSIP Cycle 10 (SA)
Pedestrian Crossing Enhancement
Location 1
SR-151 & Median Avenue

Scale: 1"=10'
Date: 09/21/2020
Sheet X of X

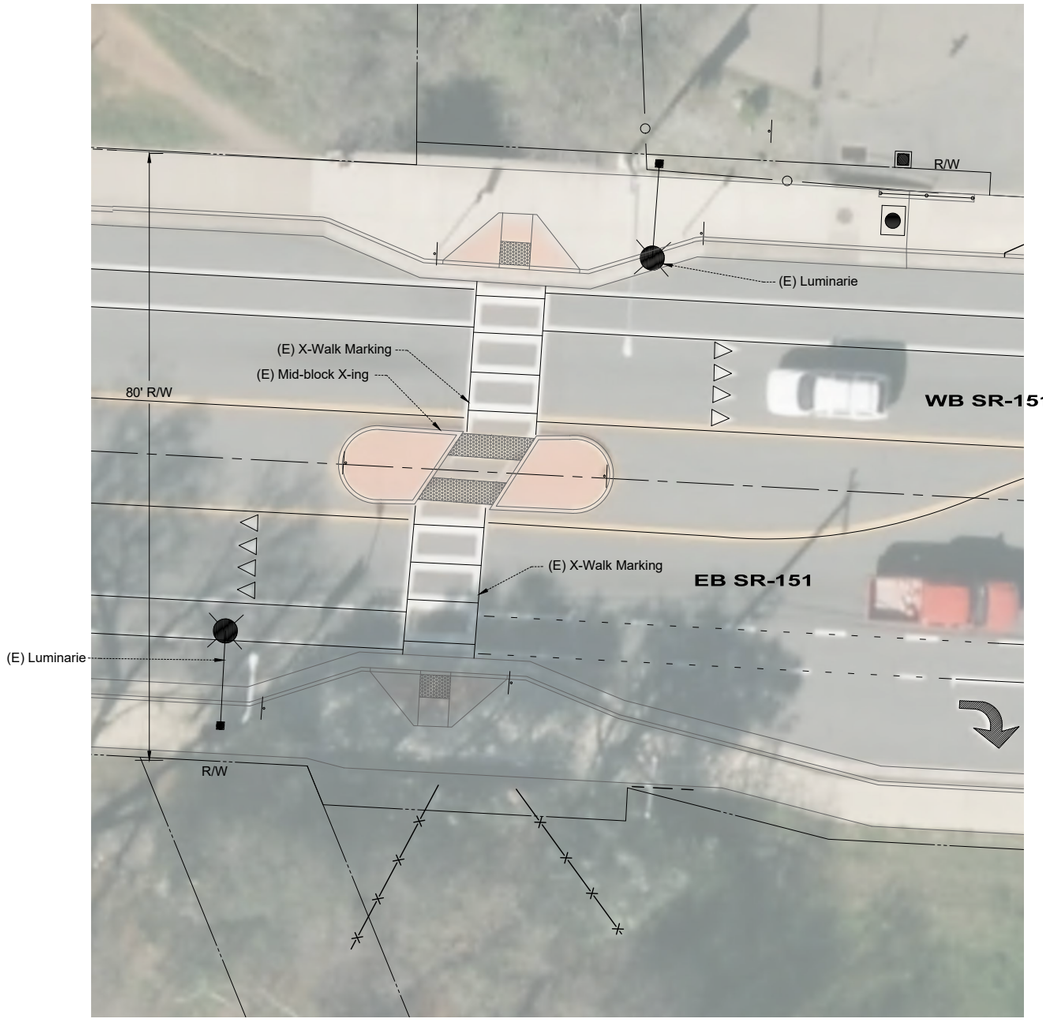
LEGEND

RRFB (2-Way)

RRFB (1-Way)

NOTES:

1. Existing traffic lanes widths and turning movements do not change.
2. No Right of Way in needed.
3. No curb, gutter, sidewalk improvements needed.
4 RRFB will be solar/battery powered. No commercial power will be installed.



EXISTING CONDITION

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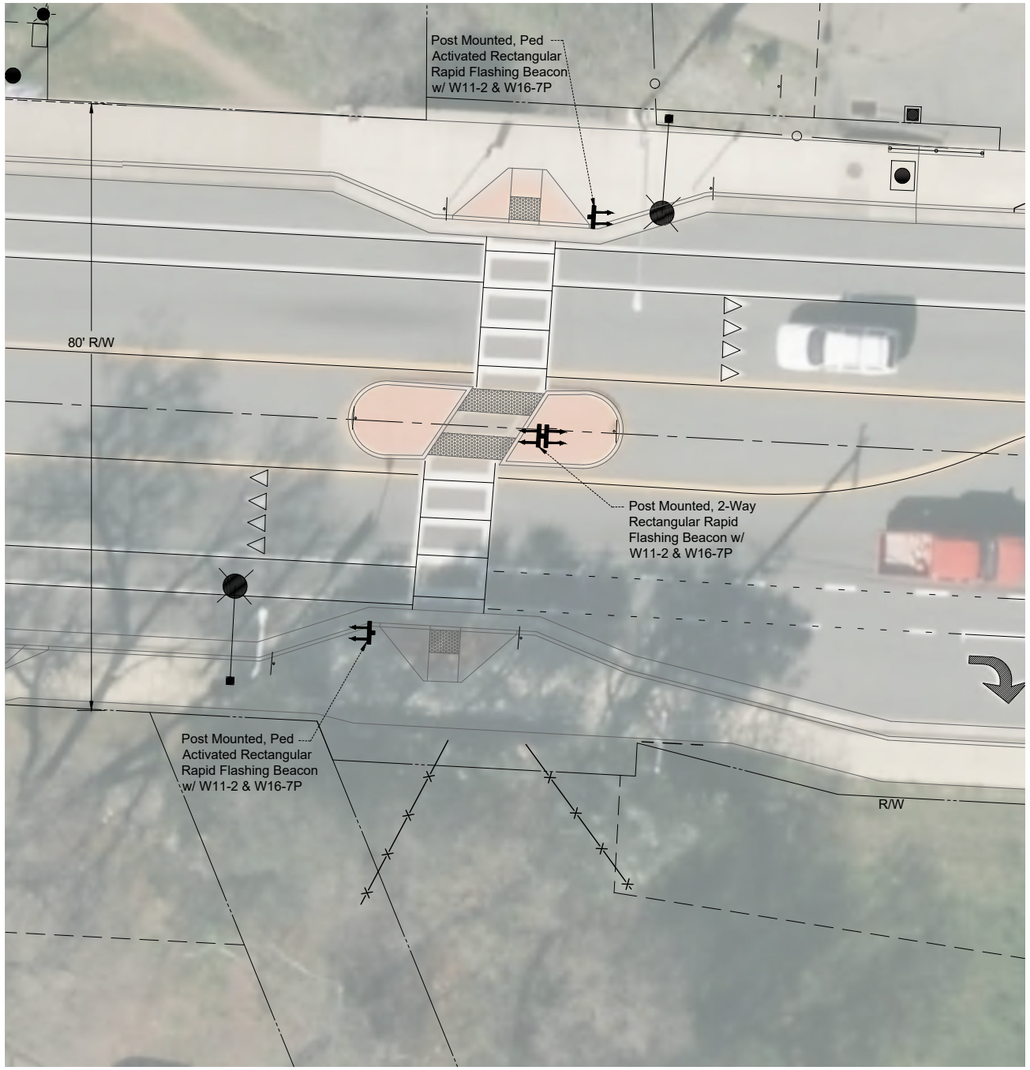

PROPOSED CONDITION

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HALF SIZE PRINT

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No.	Date	Revisions	By	App.

Designed By: JRT
Drawn By: MAJ
Checked By: JRT
Approved: City Engineer RCE # XXXXX

PRELIMINARY

REGISTERED PROFESSIONAL ENGINEER WILLIAM S. ROBINSON No. C 12345 CIVIL 12/30/22 STATE OF CALIFORNIA

CITY OF SHASTA LAKE
Public Works Department
4477 Main Street, Shasta Lake, CA 96019
(530) 275-7400 ph (530) 275-7462 fax

HSIP Cycle 10 (SA) Pedestrian Crossing Enhancement

Location 2 SR-151 Between Grand Coulee & Washington

Scale: 1"=10'

Date: 09/21/2020

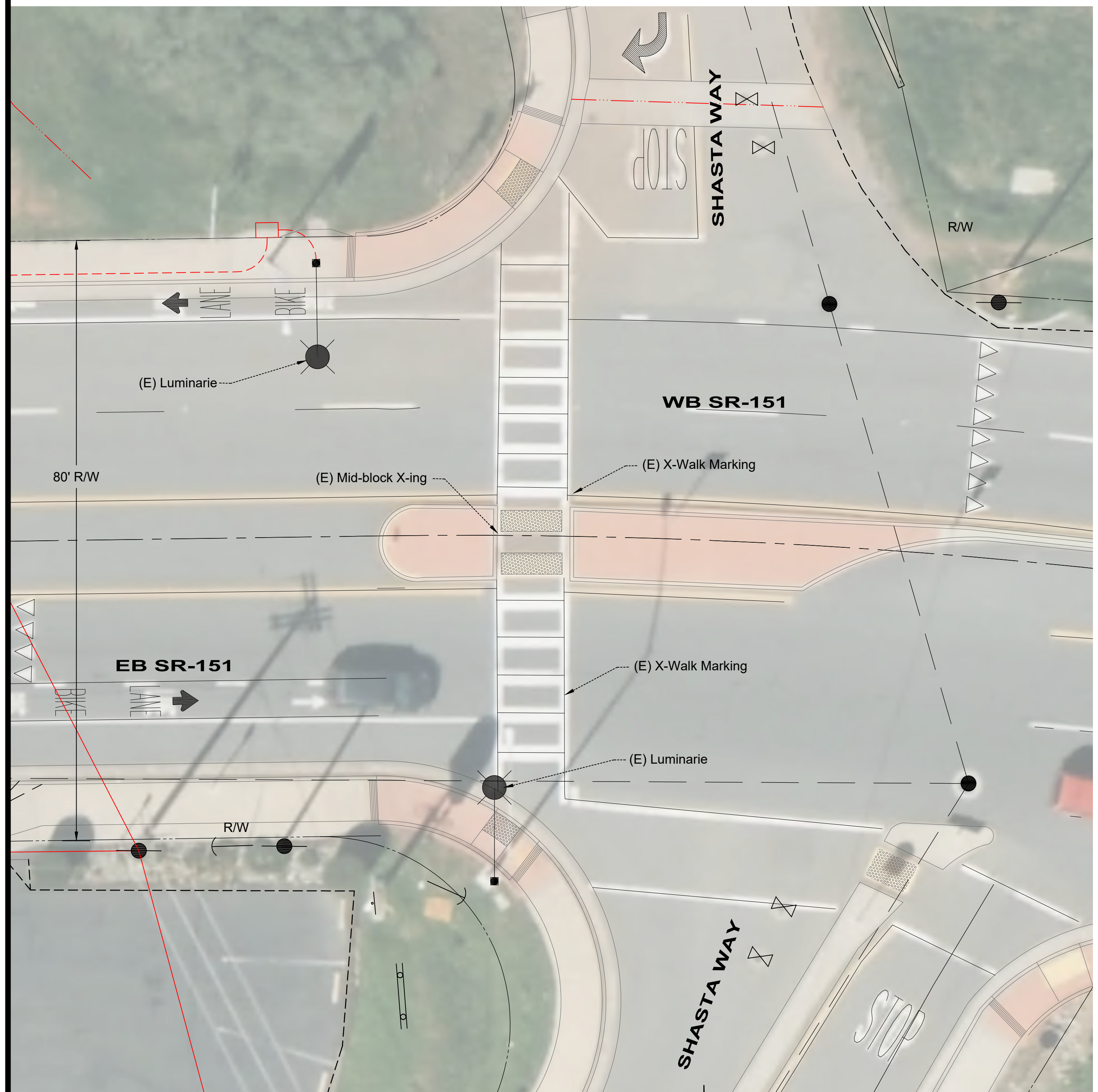
Sheet X of X

LEGEND

- RRFB (2-Way)
- RRFB (1-Way)

NOTES:

1. Existing traffic lanes widths and turning movements do not change.
2. No Right of Way in needed.
3. No curb, gutter, sidewalk improvements needed.
4. RRFB will be solar/battery powered. No commercial power will be installed.



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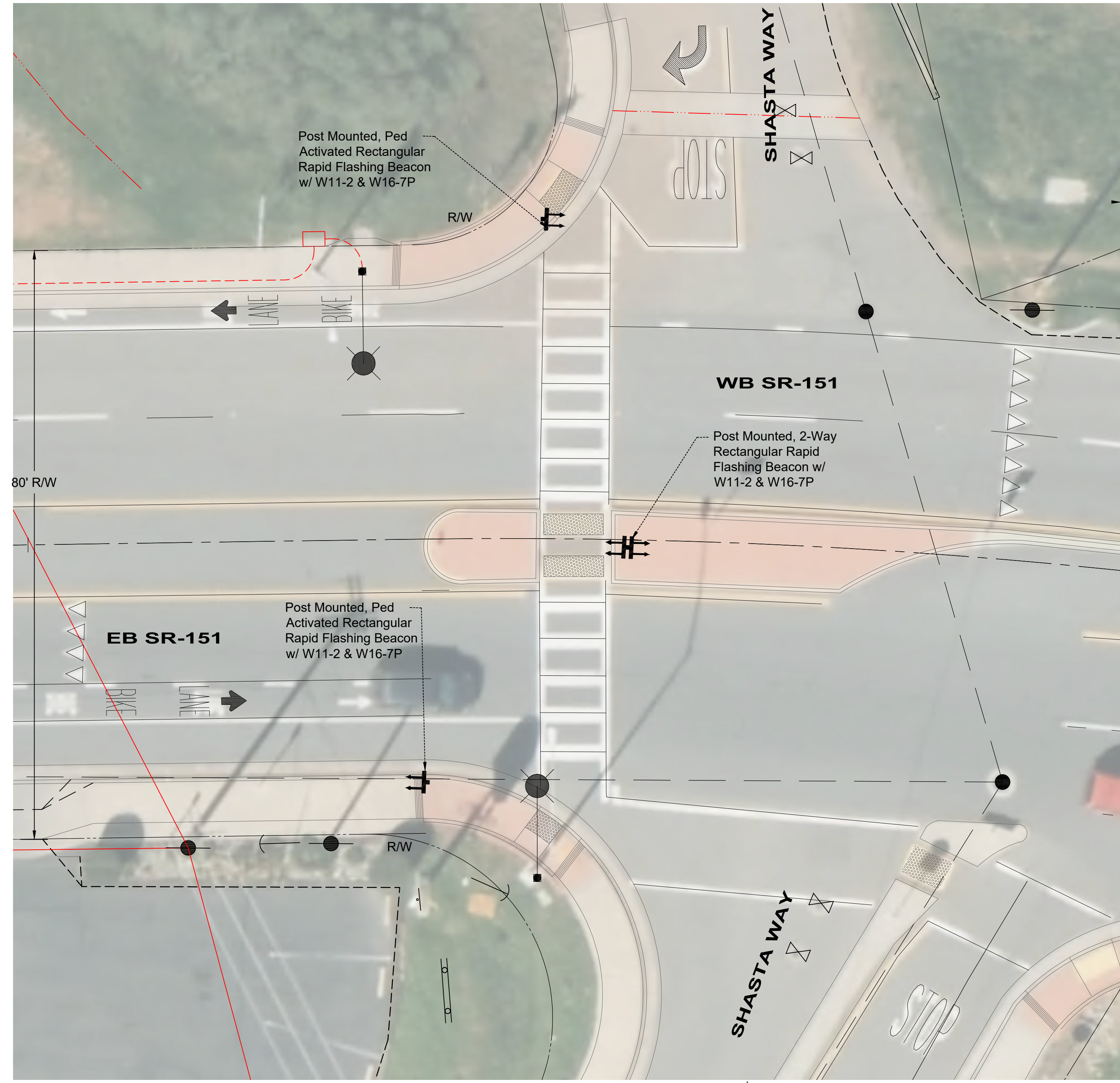

PROPOSED CONDITION

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DO NOT COPY

HALF SIZE PRINT
ACTUAL SCALE IS TWICE WHAT IS SHOWN

No.	Date	Revisions	By	App.

Designed By: JRT
Drawn By: MAJ
Checked By: JRT
Approved:
City Engineer RCE # XXXXX

PRELIMINARY

CITY OF SHASTA LAKE
Public Works Department
4477 Main Street, Shasta Lake, CA 96019
(530) 275-7400 ph (530) 275-7462 fax

HSIP Cycle 10 (SA)
Pedestrian Crossing Enhancement

Location 3
SR-151 & Shasta Way

Scale: 1"=10'
Date: 09/21/2020
Sheet X of X

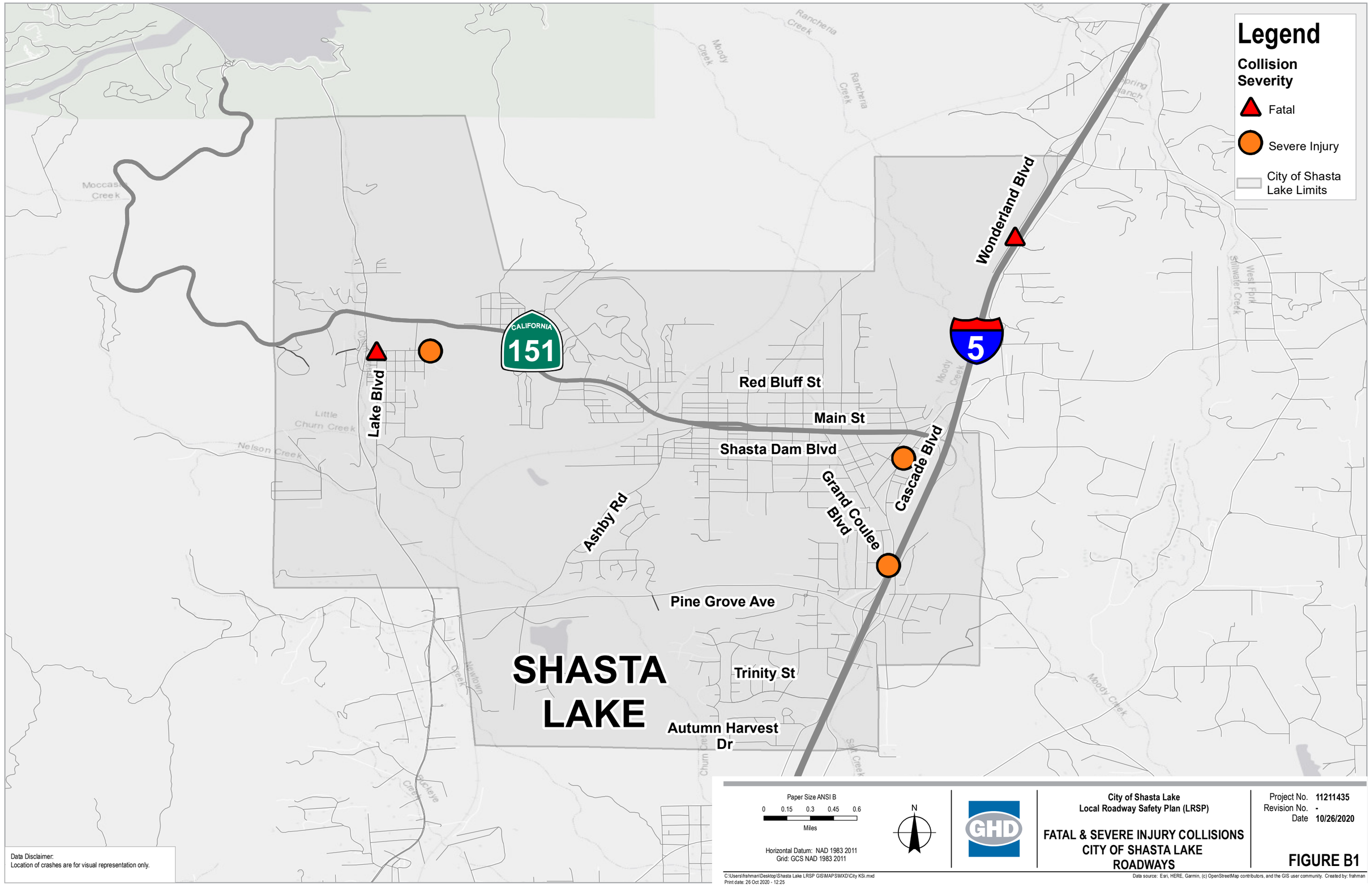
Appendix B – Collision Data

Study Intersections

Intersection #	Name	Severity					Type									Pedestrian	Bicycle*	Year					EPDO	24-HOUR ENTERING VOLUME	Fatal + Injury	Crash Rate (per Million Entering Vehicle)			Total
		Fatal	Injury (Severe)	Injury (Other Visible)	Injury (Complaint of Pain)	Property Damage Only	Head-on	Sideswipe	Rear End	Broadside	Hit Object	Overturned	Vehicle/ Pedestrian	Other/Not Listed	Not Stated			2015	2016	2017	2018	2019				Overall Crash Rate	Fatal Crash Rate	Fatal + Injury Crash rate	
12	GRAND AVE / NELL ORR ST					1			1									1					1		0	-	-	-	1
14	MAIN ST / GRAND RIVER AVE				1	1				2							1		1	1			7		1	-	-	-	2
15	CHICO ST / MEDIAN AVE					1					1									1			1		0	-	-	-	1
16	FRONT ST / HARDENBROOK AVE					1				1								1					1	6600	0	0.083	0	0	1
17	MAIN ST / MONTANA ST					1				1											1		1		0	-	-	-	1
18	CHICO ST / MONTANA ST			1						1							1		1				11		1	-	-	-	1
19	3RD ST / CASCADE BLVD		1						1							1				1			30		1	-	-	-	1
20	GRAND COULEE BLVD / CASCADE BLVD				1	2				1	1	1							1			2	8		1	-	-	-	3
21	MORNINGSTAR WAY / GRAND COULEE BLVD					1			1								1	1					1		0	-	-	-	1
22	SHASTA ST / GRAND COULEE BLVD					1	1											1					1		0	-	-	-	1
23	MEADE ST / CABELLO ST					1				1									1				1		0	-	-	-	1
24	LA MESA AVE / ASHBY RD				1		1													1			6	4840	1	0.113	0	0.113	1
25	EL CAJON AVE / MESQUITE ST					1					1							1					1	480	0	1.142	0	0	1
26	CONCHAS ST / ROUGE RD				1							1						1					6		1	-	-	-	1
27	ROSE AVE / PARK PL	1									1							1					544		1	-	-	-	1
28	FLANAGAN RD / LAKE BLVD					1					1							1					1	3050	0	0.180	0	0	1
29	COEUR D ALENE AVE / ASHBY RD				1										1			1					6		1	-	-	-	1
30	PINE GROVE AVE / ASHBY RD				1	5			1	4	1							2		1	1	2	11	8110	1	0.405	0	0.068	6
31	TRINITY ST / CASCADE BLVD				1	2	1			2									1	1	1		8		1	-	-	-	3
32	TRINITY ST / WEST ST				1					1									1				6		1	-	-	-	1
33	TRINITY ST / BUCKINGHAM DR					1				1									1				1		0	-	-	-	1
34	AUTUMN HARVEST DR / CASCADE BLVD				1					1										1			6		1	-	-	-	1
35	RIDDLE RD / CASCADE BLVD				1	1			1					1					1		1		7		1	-	-	-	2
36	CASCADE/PINE GROVE AVE					3			2	1												3	3	7600	0	0.216	0	0	3
38	CASCADE/WASHINGTON AVE/FELL ST		1									1										1	30		1	-	-	-	1
39	FLOWER ST/ASHBY RD					1								1							1		1	3250	0	0.169	0	0	1
41	HARDENBROOK AVE/FORT PECK ST					1				1											1		1		0	-	-	-	1
42	LAKE BLVD/CONSTRUCTION WAY					1						1										1	1	3050	0	0.180	0	0	1
46	TRINITY ST / SMITH AVE				1					1											1		6		1	-	-	-	1
47	VALLECITO ST/ CABELLO ST					1			1													1	1		0	-	-	-	1
48	WASHINGTON AVE/ SHASTA ST					1					1											1	1		0	-	-	-	1
102	SHASTA DAM BLVD / CASCADE BLVD		1		1	6		2	5				1			1		1	1	3		3	42	15070	2	0.291	0	0.073	8
103	SHASTA DAM BLVD / SHASTA WAY / SHASTA ST			1	1	3			3		1		1			1		1	2	2			20	12490	2	0.219	0	0.088	5
104	SHASTA DAM BLVD/ OREGON AVE					1				1												1	1	11230	0	0.049	0	0	1
105	SHASTA DAM BLVD / GRAND COULEE BLVD				1	1			2													2	7	11440	1	0.096	0	0.048	2
106	SHASTA DAM BLVD / DEER CREEK RD				1					1								1					6	10420	1	0.053	0	0.053	1
107	SHASTA DAM BLVD / GRAND RIVER AVE			1									1			1	1		1				11	9390	1	0.058	0	0.058	1
108	SHASTA DAM BLVD / MEDIAN AVE				1	2			3										1	1		1	8	9780	1	0.168	0	0.056	3
109	EB SHASTA DAM BLVD / LOCUST AVE		1			1		1		1						1			2				31	6700	1	0.164	0	0.082	2
110	EB SHASTA DAM BLVD / MONTANA AVE					2				1	1									1		1	2	6700	0	0.164	0	0	2
111	SHASTA DAM BLVD / ASHBY RD / SAN GORGONIO AVE			1						1									1				11	6360	1	0.086	0	0.086	1
112	SHASTA DAM BLVD / NORTH BLVD					1			1									1					1	6200	0	0.088	0	0	1
113	SHASTA DAM BLVD/RED BLUFF ST			1								1										1	11	6200	1	0.088	0	0.088	1
114	SHASTA DAM BLVD / TWIN LAKE DR				1					1											1		6	3800	1	0.144	0	0.144	1
115	SHASTA DAM BLVD / SACRAMENTO ST					1			1									1					1	3300	0	0.166	0	0	1
Total		1	4	5	17	47	3	3	23	25	9	5	3	2	1	5	4	16	16	14	8	20	868	-	27	-	-	-	74

Study Segments (City Roadways)

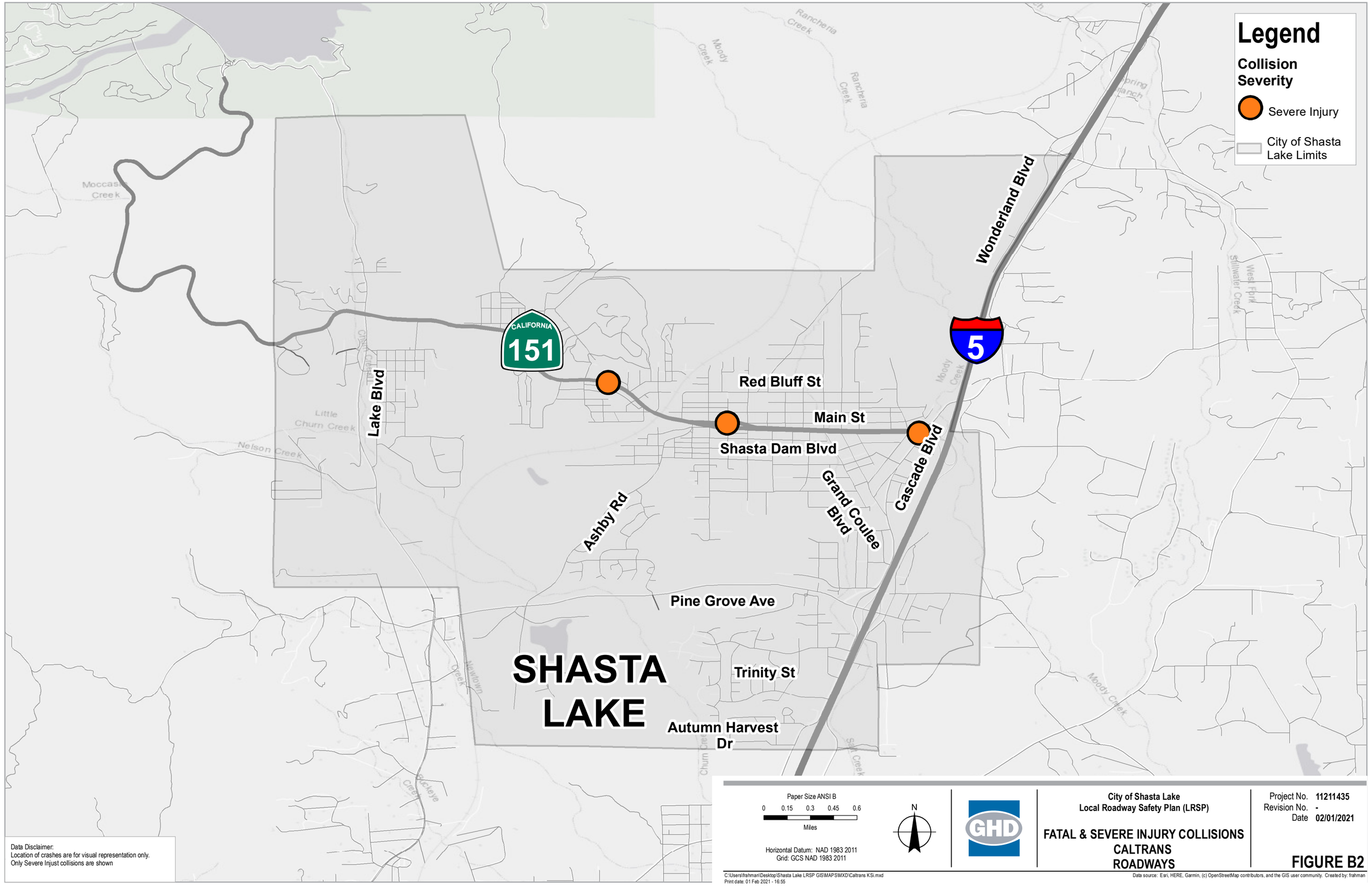
Street Name	Severity					Type								Pedestrian	Bicycle*	Year					EPDO	Total
	Fatal	Injury (Severe)	Injury (Other Visible)	Injury (Complaint of Pain)	Property Damage Only	Head-on	Sideswipe	Rear End	Broadside	Hit Object	Overturned	Vehicle/ Pedestrian	Other/Not Listed			2015	2016	2017	2018	2019		
ASHBY RD			1		4	1	1	1		2						2		1	1	1	15	5
AUTUMN HARVEST WAY					1			1												1	1	1
CASCADE BLVD			3	1	4	1	1	1	2	2	1					4	3	1			43	8
CRAFTSMAN AVE			1						1						1	1					11	1
DYKE ST					1	1										1					1	1
EL CAJON AVE					1	1												1			1	1
FORT PECK ST					1				1								1				1	1
GRAND AVE					1			1									1				1	1
HILL BLVD					1					1						1					1	1
KENNETT RD					1		1										1				1	1
LAKE BLVD			1		1		1		1						1		1	1			12	2
LOS GATOS AVE					1			1											1		1	1
PINE GROVE AVE			1	1	1			1	1	1						1			1	1	18	3
ROSE AVE		1								1							1				30	1
TWIN VIEW BLVD					1				1										1		1	1
WONDERLAND BLVD	1									1							1				544	1
TOTAL	1	1	7	2	19	4	4	6	7	8	1	0	0	0	2	10	9	4	4	3	682	30


Legend
Collision Severity
Fatal
Severe Injury
City of Shasta Lake Limits
Wonderland Blvd
CALIFORNIA
151
5
Lake Blvd
Red Bluff St
Main St
Shasta Dam Blvd
Cascade Blvd
Grand Coulee Blvd
Ashby Rd
Pine Grove Ave
Trinity St
Autumn Harvest Dr
SHASTA LAKE
Moccasin Creek
Little Churn Creek
Nelson Creek
Rancheria Creek
Moody Creek
Newtown Creek
Buckeye Creek
Churn Creek
Stillwater Creek
West Fork Stillwater Creek
Data Disclaimer:
Location of crashes are for visual representation only.
Paper Size ANSI B
0 0.15 0.3 0.45 0.6
Miles
Horizontal Datum: NAD 1983 2011
Grid: GCS NAD 1983 2011
N
GHD
City of Shasta Lake
Local Roadway Safety Plan (LRSP)
FATAL & SEVERE INJURY COLLISIONS
CITY OF SHASTA LAKE
ROADWAYS
Project No. 11211435
Revision No. -
Date 10/26/2020
FIGURE B1
C:\Users\frahman\Desktop\Shasta Lake LRSP GIS\MAPS\MXD\City KSi.mxd
Print date: 26 Oct 2020 - 12:25
Data source: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community. Created by: frahman

Intersection ID	Intersection Name	Total Collisions
30	PINE GROVE AVE / ASHBY RD	6
20	GRAND COULEE BLVD / CASCADE BLVD	3
31	TRINITY ST / CASCADE BLVD	3
36	CASCADE/PINE GROVE AVE	3
14	MAIN ST / GRAND RIVER AVE	2
35	RIDDLE RD / CASCADE BLVD	2
12	GRAND AVE / NELL ORR ST	1
15	CHICO ST / MEDIAN AVE	1
16	FRONT ST / HARDENBROOK AVE	1
17	MAIN ST / MONTANA ST	1
18	CHICO ST / MONTANA ST	1
19	3RD ST / CASCADE BLVD	1
21	MORNINGSTAR WAY / GRAND COULEE BLVD	1
22	SHASTA ST / GRAND COULEE BLVD	1
23	MEADE ST / CABELLO ST	1
24	LA MESA AVE / ASHBY RD	1
25	EL CAJON AVE / MESQUITE ST	1
26	CONCHAS ST / ROUGE RD	1
27	ROSE AVE / PARK PL	1
28	FLANAGAN RD / LAKE BLVD	1
29	COEUR D ALENE AVE / ASHBY RD	1
32	TRINITY ST / WEST ST	1
33	TRINITY ST / BUCKINGHAM DR	1
34	AUTUMN HARVEST DR / CASCADE BLVD	1
38	CASCADE/WASHINGTON AVE/FELL ST	1
39	FLOWER ST/ASHBY RD	1
41	HARDENBROOK AVE/FORT PECK ST	1
42	LAKE BLVD/CONSTRUCTION WAY	1
46	TRINITY ST / SMITH AVE	1
47	VALLECITO ST/ CABELLO ST	1
48	WASHINGTON AVE/ SHASTA ST	1

Intersection ID	Intersection Name	Crash Rate
25	EL CAJON AVE / MESQUITE ST	1.142
30	PINE GROVE AVE / ASHBY RD	0.405
36	CASCADE/PINE GROVE AVE	0.216
28	FLANAGAN RD / LAKE BLVD	0.180
42	LAKE BLVD/CONSTRUCTION WAY	0.180
39	FLOWER ST/ASHBY RD	0.169
24	LA MESA AVE / ASHBY RD	0.113
16	FRONT ST / HARDENBROOK AVE	0.083

Intersection ID	Intersection Name	EPDO
27	ROSE AVE / PARK PL	544
19	3RD ST / CASCADE BLVD	30
38	CASCADE/WASHINGTON AVE/FELL ST	30
18	CHICO ST / MONTANA ST	11
30	PINE GROVE AVE / ASHBY RD	11
20	GRAND COULEE BLVD / CASCADE BLVD	8
31	TRINITY ST / CASCADE BLVD	8
14	MAIN ST / GRAND RIVER AVE	7
35	RIDDLE RD / CASCADE BLVD	7
26	CONCHAS ST / ROUGE RD	6
29	COEUR D ALENE AVE / ASHBY RD	6
32	TRINITY ST / WEST ST	6
34	AUTUMN HARVEST DR / CASCADE BLVD	6
46	TRINITY ST / SMITH AVE	6
24	LA MESA AVE / ASHBY RD	6
36	CASCADE/PINE GROVE AVE	3
12	GRAND AVE / NELL ORR ST	1
15	CHICO ST / MEDIAN AVE	1
17	MAIN ST / MONTANA ST	1
21	MORNINGSTAR WAY / GRAND COULEE BLVD	1
22	SHASTA ST / GRAND COULEE BLVD	1
23	MEADE ST / CABELLO ST	1
33	TRINITY ST / BUCKINGHAM DR	1
41	HARDENBROOK AVE/FORT PECK ST	1
47	VALLECITO ST/ CABELLO ST	1
48	WASHINGTON AVE/ SHASTA ST	1
25	EL CAJON AVE / MESQUITE ST	1
28	FLANAGAN RD / LAKE BLVD	1
42	LAKE BLVD/CONSTRUCTION WAY	1
39	FLOWER ST/ASHBY RD	1
16	FRONT ST / HARDENBROOK AVE	1


Legend
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Wonderland Blvd
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Cascade Blvd
Pine Grove Ave
SHASTA LAKE
Trinity St
Autumn Harvest Dr
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Only Severe Injust collisions are shown
Paper Size ANSI B
0 0.15 0.3 0.45 0.6
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Horizontal Datum: NAD 1983 2011
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City of Shasta Lake
Local Roadway Safety Plan (LRSP)
FATAL & SEVERE INJURY COLLISIONS
CALTRANS
ROADWAYS
Project No. 11211435
Revision No. -
Date 02/01/2021
FIGURE B2
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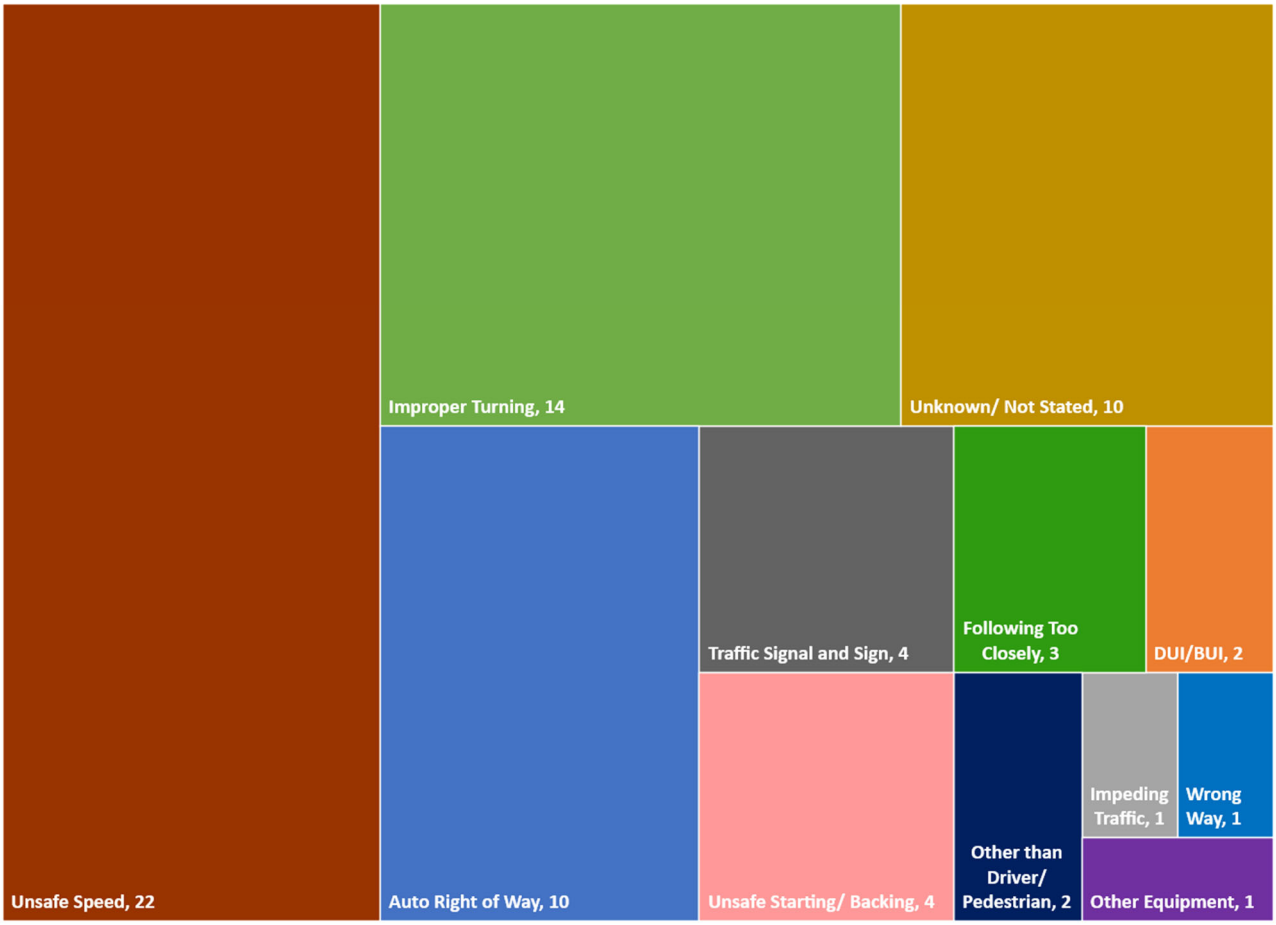
Print date: 01 Feb 2021 - 16:55
Data source: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community. Created by: frahman

Intersection ID	Intersection Name	Total Collisions
102	SHASTA DAM BLVD / CASCADE BLVD	8
103	SHASTA DAM BLVD / SHASTA WAY / SHASTA ST	5
108	SHASTA DAM BLVD / MEDIAN AVE	3
105	SHASTA DAM BLVD / GRAND COULEE BLVD	2
109	EB SHASTA DAM BLVD / LOCUST AVE	2
110	EB SHASTA DAM BLVD / MONTANA AVE	2
104	SHASTA DAM BLVD/ OREGON AVE	1
106	SHASTA DAM BLVD / DEER CREEK RD	1
107	SHASTA DAM BLVD / GRAND RIVER AVE	1
111	SHASTA DAM BLVD / ASHBY RD / SAN GORGONIO AVE	1
112	SHASTA DAM BLVD / NORTH BLVD	1
113	SHASTA DAM BLVD/RED BLUFF ST	1
114	SHASTA DAM BLVD / TWIN LAKE DR	1
115	SHASTA DAM BLVD / SACRAMENTO ST	1

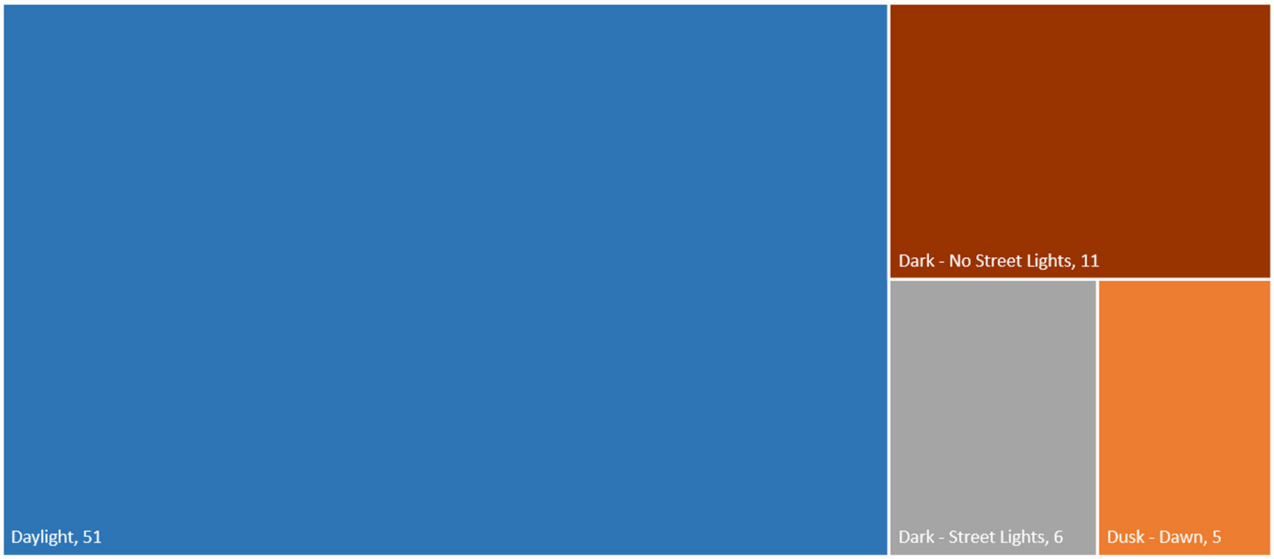
Intersection ID	Intersection Name	EPDO
102	SHASTA DAM BLVD / CASCADE BLVD	42
109	EB SHASTA DAM BLVD / LOCUST AVE	31
103	SHASTA DAM BLVD / SHASTA WAY / SHASTA ST	20
107	SHASTA DAM BLVD / GRAND RIVER AVE	11
111	SHASTA DAM BLVD / ASHBY RD / SAN GORGONIO AVE	11
113	SHASTA DAM BLVD/RED BLUFF ST	11
108	SHASTA DAM BLVD / MEDIAN AVE	8
105	SHASTA DAM BLVD / GRAND COULEE BLVD	7
106	SHASTA DAM BLVD / DEER CREEK RD	6
114	SHASTA DAM BLVD / TWIN LAKE DR	6
110	EB SHASTA DAM BLVD / MONTANA AVE	2
104	SHASTA DAM BLVD/ OREGON AVE	1
112	SHASTA DAM BLVD / NORTH BLVD	1
115	SHASTA DAM BLVD / SACRAMENTO ST	1

Intersection ID	Intersection Name	Crash Rate
102	SHASTA DAM BLVD / CASCADE BLVD	0.291
103	SHASTA DAM BLVD / SHASTA WAY / SHASTA ST	0.219
108	SHASTA DAM BLVD / MEDIAN AVE	0.168
115	SHASTA DAM BLVD / SACRAMENTO ST	0.166
109	EB SHASTA DAM BLVD / LOCUST AVE	0.164
110	EB SHASTA DAM BLVD / MONTANA AVE	0.164
114	SHASTA DAM BLVD / TWIN LAKE DR	0.144
105	SHASTA DAM BLVD / GRAND COULEE BLVD	0.096
113	SHASTA DAM BLVD/RED BLUFF ST	0.088
112	SHASTA DAM BLVD / NORTH BLVD	0.088
111	SHASTA DAM BLVD / ASHBY RD / SAN GORGONIO AVE	0.086
107	SHASTA DAM BLVD / GRAND RIVER AVE	0.058
106	SHASTA DAM BLVD / DEER CREEK RD	0.053
104	SHASTA DAM BLVD/ OREGON AVE	0.049

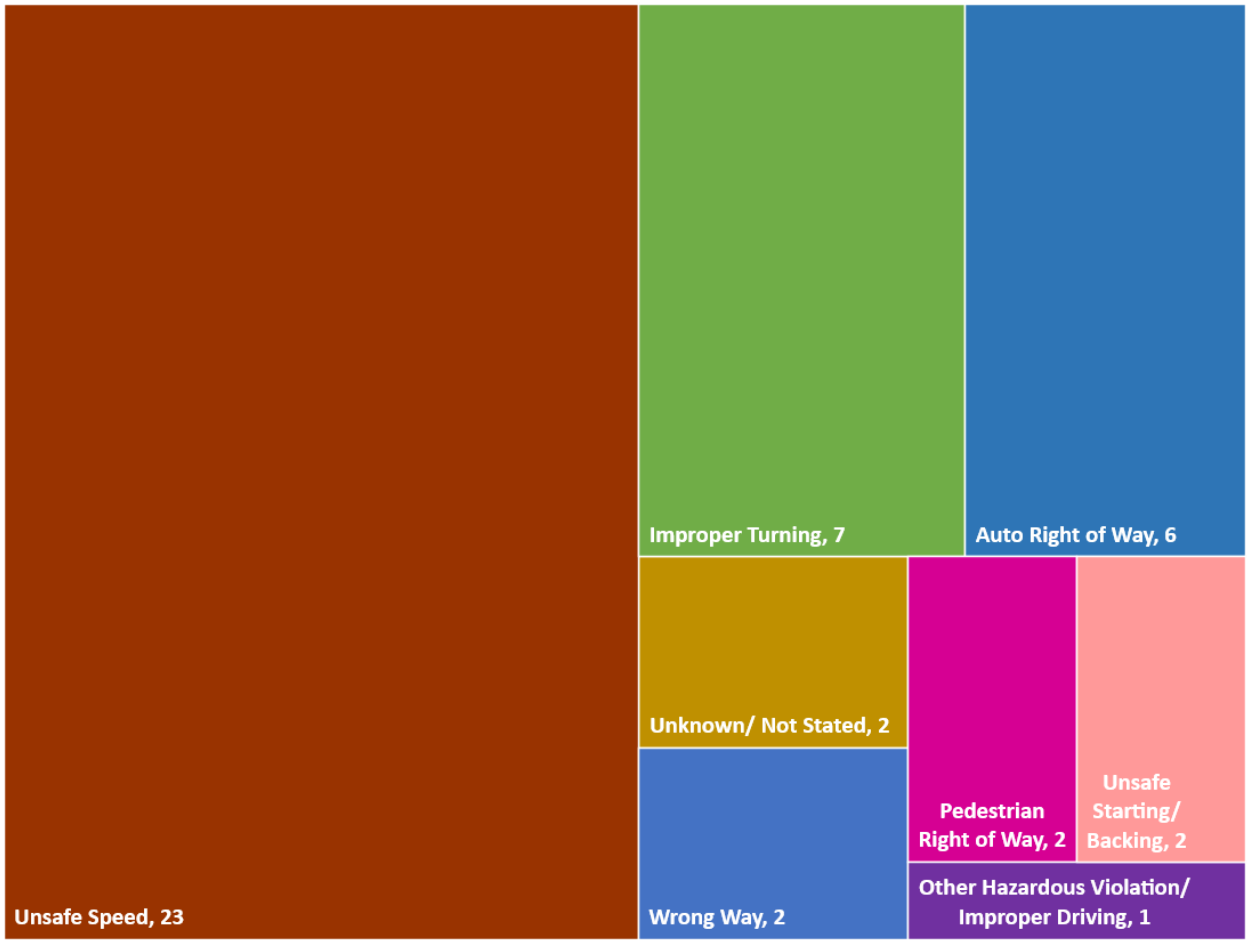
Violation Category – City Roadways



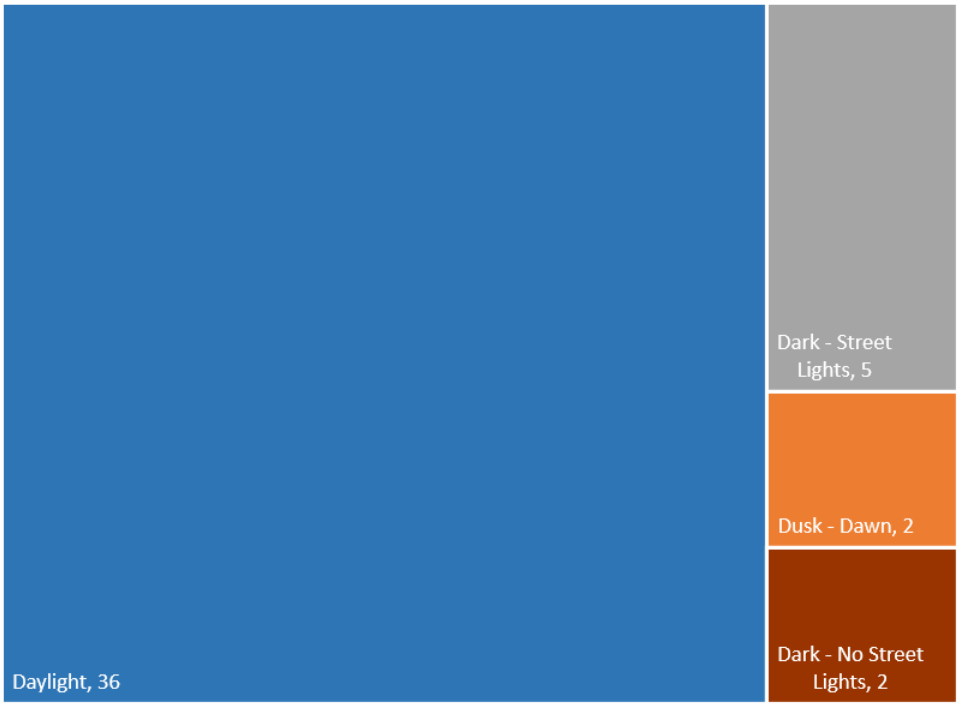
Lighting – City Roadways



Violation Category – Caltrans Roadways (SR 151)



Lighting – Caltrans Roadways (SR 151)



Appendix C – Stakeholder and Public Input

Shasta Lake LRSP Public Comments

Public Comment from Email	*Response*
I've lived in SL for about eleven years. In my opinion, the speed limit on Shasta Dam Blvd is far too high. Aside from being a safety issue, the high speed limit has historically discouraged street-facing businesses and foot traffic, and has contributed to the unfriendly and unwelcoming "feel" of the town. The speed limit on Grand Coulee is also way too high for a residential street.	Thank you for taking the time to provide feedback. I will document your comments in the Local Road Safety Plan (LRSP). In the LRSP, we will have a comment and response matrix. As you might know, Caltrans has jurisdiction over Shasta Dam Boulevard (SR 151) but since they are part of the stakeholder group, I will pass this information on to them. Also, the speed limits are set per speed surveys but I will follow up with the City of Shasta Lake to see when the last speed survey was conducted on Grand Coulee. Please let me know if you have any other comments.
Public Comment from Facebook	*Response*
Get the lumber trucks to use Pine Grove would be the most important. Come up with a better evacuation plan. Using only the Blvd during Carr was a disaster. Pine Grove should also have been used. - But the city maintains repairs to Pine Grove and Ashby. Shasta Dam Blvd is maintained by Cal Trans. You can see why they use the Blvd - that may be, but there are already trucks using it to go to Knauf and others in the industrial park. I'm not thinking about the road use as much as the safety factor. I see trucks (not all, but many) traveling way too fast on the Blvd.	
Install sidewalks on deer creek rd that goes all the way down to the Rams school. Vehicles go way too fast down this road while children are walking to and from school. There is so much traffic because of the school in the am and the afternoon.	
Having speed bumps installed on our street would be wonderful. People use it as a cutoff between Shasta Dam Blvd and Grand Coulee - and drive WAY too fast (I've almost been hit). The little kids in our neighborhood are no longer allowed to ride their bikes because it's not safe.	
I agree with Bob Nelson. The trucks coming down the Blvd are a hazard to the community	
Repave side streets would be a good thing.	

Widen SR 151 to 2 lanes on each side with the ada compliant bike and pedestrians lanes. Repave Cascade Blvd with pavement that lasts 100 years (Concrete). Install more bike lanes on side streets - as a property owner on the Blvd., I can say that won't work. The road use to be two lanes each way. In the early-mid 2000s the current road was established to accommodate the bike lanes and sidewalks. I lost, for pennies on the dollar, 11 feet of frontage(which I'm required by agreement to maintain). Without taking out most businesses on the Blvd, adding two more lines and an pedestrian walkway can be done.	

Appendix D – Recommended Projects

Countermeasures for City Intersections

Intersection Priority	Intersection	EPDO	Total Crashes	Intersection type	Countermeasure Number	CRF	Recommended Countermeasures
1	ROSE AVE / PARK PL	544	1	Uncontrolled	NS06	15%	1) Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs (two-way directional arrow)
2	FRONT ST/ LOCUST AVE	30	1	TWSC	-		1) Improve pedestrian crossing,
					NS22PB	35%	2) Install Rectangular Rapid Flashing Beacon (RRFB)
3	3RD ST / CASCADE BLVD	30	1	TWSC	-	-	1) Increase enforcement/DUI checkpoints,
					-	-	2) Educate the public about pedestrian/bicycle visibility at night
4	CASCADE/WASHINGTON AVE/FELL ST	30	1	TWSC	-	-	1) Add guardrail for the drainage basin along Cascade,
					-	-	2) Delineate drainage basin with object markers for each approach,
					NS06	15%	3) Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs
5	PINE GROVE AVE / ASHBY RD	11	6	TWSC	NS02	50%	1a) Convert to all-way STOP control (from 2-way or Yield control) OR
					NS05	Varies	1b) Convert intersection to roundabout (from stop or yield control on minor road),
					-	-	2) Adjust pedestrian crossing on north leg to be more perpendicular,
					-	-	3) Enhance pavement markings for bicycles to include green conflict paint and a sharrow on the westbound right turn lane,
					NS06	15%	4) Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs
					NS07	25%	5) Upgrade intersection pavement markings (NS.I.),
					NS09	30%	6) Install flashing beacons as advanced warning (NS.I.),
6	CHICO ST / MEDIAN AVE	11	1	AWSC	NS06	15%	1) Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs,
					NS11	20%	2) Improve sight distance to intersection (Clear Sight Triangles)
7	GRAND COULEE BLVD / CASCADE BLVD	8	3	TWSC	-	-	1) Reconstruct intersection to be perpendicular and relocate light pole,
					NS18	20%	2) Install right-turn lane (NS.I),
					NS09	30%	3) Install flashing beacons as advanced warning (NS.I),
					NS07	25%	4) Upgrade intersection pavement markings (NS.I.)
8	TRINITY ST / CASCADE BLVD	8	3	TWSC	NS06	15%	1) Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs,
					NS09	30%	2) Install flashing beacons as an advanced warning (NS.I)
9	MAIN ST / GRAND RIVER AVE	7	2	TWSC	NS06	15%	1) Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs,
					NS07	25%	2) Upgrade intersection pavement markings (NS.I.)
10	RIDDLE RD / CASCADE BLVD	7	2	TWSC	NS07	25%	1) Upgrade intersection pavement markings (NS.I.),
					NS12	55%	2) Improve pavement friction (High Friction Surface Treatment),
					-	-	3) Add advance "STOP AHEAD" warning sign and pavement marking,
					NS06	15%	4) Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs,
					NS10	20%	5) Install transverse rumble strips on approaches
11	CASCADE/PINE GROVE AVE	3	3	Signal	S10	30%	1) Install flashing beacon on existing advance warning (S.I.),
					S02	15%	2) Improve signal hardware: lenses, back-plates with reflective borders, mounting, size, and number

Countermeasures for Caltrans Intersections

Intersection Priority	Intersection	EPDO	Total Crashes	Intersection type	Countermeasure Number	CRF	Recommended Countermeasures
1	SHASTA DAM BLVD / CASCADE BLVD	42	8	Signal	S03	15%	1) Improve signal timing (coordination, phases, red, yellow, or operation),
					S10	30%	2) Install flashing beacons as advance warning (S.I.),
					S21PB	60%	3) Modify signal phasing to implement a Leading Pedestrian Interval (LPI),
					S20PB	15%	4) Install advance stop bar before crosswalk (Bicycle Box)
2	SHASTA DAM BLVD / SHASTA WAY / SHASTA ST	20	5	TWSC	-	-	1) Improve uncontrolled crossing on SR 151,
					NS22PB	35%	2) Install Rectangular Rapid Flashing Beacon (RRFB)
3	EB SHASTA DAM BLVD / LOCUST AVE	12	2	TWSC	-	-	1) Improve uncontrolled crossing on SR 151,
					NS22PB	35%	2) Install Rectangular Rapid Flashing Beacon (RRFB)
4	SHASTA DAM BLVD / GRAND RIVER AVE	11	1	TWSC	-	-	1) Evaluate the best location for a pedestrian crossing,
					NS19PB	35%	2) Install raised medians / refuge islands (NS.I.)
5	SHASTA DAM BLVD / ASHBY RD / SAN GORGONIO AVE	11	1	TWSC	-	-	Not applicable, as this intersection was recently improved
6	SHASTA DAM BLVD/RED BLUFF ST	11	1	TWSC	NS07	25%	1) Upgrade intersection pavement markings (NS.I.),
					NS06	15%	2) Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs,
					NS17	20%	3) Evaluate westbound right turn lane

Segment	Mitigation List R01 Add segment lighting	R02 Remove or relocate fixed objects outside of Clear Recovery Zone	R03 Install Median Barrier	R04 Install Guardrail	R08 Install raised median	R13 Add two-way left-turn lane (without reducing travel lanes)	R14 Reduce number of travel lanes from 4 to 3	R21 Improve pavement friction (High Friction Surface Treatments)	R22 Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)	R23 Install chevron signs on horizontal curves	R24 Install curve advance warning signs	R25 Install curve advance warning signs (flashing beacon)	R26 Install dynamic/variable speed warning signs	R27 Install delineators, reflectors and/or object markers	R28 PB Install edge-lines and centerlines	R30 Install centerline rumble strips/stripes	R31 Install edgeline rumble strips/stripes	R32 PB Install bike lanes	R34 PB Install sidewalk/pathway (to avoid walking along roadway)	R35 PB Install/upgrade pedestrian crossing (with enhanced safety features)	R37 PB Install Rectangular Rapid Flashing Beacon (RRFB)	Pavement condition	other
Red Bluff Street – Between Montana Avenue and Mussel Shoals Avenue	Medium (possible)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Medium (possible)	N/A	N/A	N/A	Medium (posible)	Medium (posible)	High	N/A	N/A	N/A	High	N/A	N/A	Mediu m	Install Sharrow (repaved in front of Townhall)
Main Street – Between Mussel Shoals Avenue and Shasta Way	Medium (possible)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low (not a lot of signs)	N/A	N/A	N/A	Medium (posible)	Medium (posible)	High	N/A	N/A	N/A	Medium	N/A	N/A	Good	Install Sharrow
Mussel Shoals Avenue – Between Shasta Dam Boulevard and Black Canyon Road	Medium (possible)	High (lot of trees close to pavement)	N/A	N/A	N/A	N/A	N/A	N/A	Medium (possible)	N/A	N/A	N/A	Medium (posible)	High (lot of objects)	High	N/A	N/A	N/A	Medium	N/A	N/A	Mediu m	Install Sharrow
Montana Avenue – Between Shasta Dam Boulevard and Red Bluff Street	Medium (possible)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low (few signs)	N/A	N/A	N/A	Medium (posible)	Low (objects are away from roadway)	High	N/A	N/A	Low (space avaialbe	High (already exisits for half the segment)	N/A	N/A	Mediu m	Install Sharrow
Hardenbrook Avenue – Between Shasta Dam Boulevard and Black Canyon Road at Red Bluff Street	Medium (possible)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Medium (possible)	N/A	N/A	N/A	Medium (posible)	Medium (posible)	medium (centerline existing)	N/A	N/A	N/A	High	N/A	N/A	Mediu m	Install Sharrow
Black Canyon Road – Between Red Bluff Street and the northern City limit	Medium (possible)	Low (bushes and tree stumps)	N/A	N/A	N/A	N/A	N/A	N/A	Medium (possible)	low (few horizontal curves)	High (no sign for exisitng curves)	N/A	Medium (possible)	Low (objects are away from roadway)	High	N/A	N/A	N/A	Medium	N/A	N/A	Poor	Install Sharrow
Lake Boulevard – Between Shasta Dam Boulevard and the intersection with Pine Grove Avenue	Medium (possible)	N/A	N/A	Medium (certain Locations)	N/A	N/A	N/A	High (at approaches to intx and curves)	High (lots of warning signs)	High	High (no sign exists)	N/A	Medium (possible)	Low (objects are away from roadway)	N/A	High (high speed)	High (high speed)	N/A (exists)	Low (Rural Area)	High (at Toyon Ave)	High (at Toyon Ave)	Good	
Ashby Road - Between Shasta Dam Boulevard and Pine Grove Ave	Medium (possible)	N/A	N/A	High (multiple Locations)	Low (at intx approaches)	N/A	N/A	High (at approaches to intx and curves)	High (lots of warning signs)	High	High (no sign exists)	Low (at some curves)	High (Near School)	Low (objects are away from roadway)	N/A	High (high speed)	High (high speed)	N/A (exists)	High (near the school)		High (2 intx near school)	Good	
Hill Boulevard – Connection to Lake Boulevard at the south and north ends	Low	Low (bushes at some locations)	N/A	Low (toward terminus of segment)	N/A	N/A	N/A	Low (toward the limits of the corridor)	Low (few signs)	Low (at curves)	Low (at curves)	N/A	Low	Low (few fixed object)	N/A	N/A	N/A	Medium (between Ashby to Ranchera)	Low (Rural residential Street)	N/A	N/A	Mediu m	Possible Sharrow in Southern terminus
Toyon Avenue – Between Lake Boulevard and Sacramento Street	Low	Low (few objects)	N/A	N/A	N/A	N/A	N/A	N/A	Low (few signs)	N/A (no Curve)	N/A (no Curve)	N/A (no Curve)	N/A	N/A	High (aerial shows no pavement markings)	N/A	N/A	N/A	Low (Rural residential Street)	N/A	N/A	Good	N/A
Sacramento Street – Between Toyon Avenue and Shasta Dam Boulevard	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low (few signs)	N/A (no Curve)	N/A (no Curve)	N/A (no Curve)	N/A	N/A	High (aerial shows no pavement markings)	N/A	N/A	N/A	Low (Rural residential Street)	N/A	N/A	Good	N/A
Montana Avenue – Between Shasta Dam Boulevard and Vallecito Street	Low	Low (few objects)	N/A	N/A	N/A	N/A	N/A	N/A	Medium	N/A (no Curve)	N/A (no Curve)	N/A (no Curve)	Medium (wide street, possible speeding)	Low (few fixed object)	High (aerial shows no pavement markings)	N/A	N/A	Medium (pavement width available)	High (exists along east side, possibly add to west, route to school)	High (near the School)	High (near the School)	Mediu m	The pavement width is wide
Hardenbrook Avenue – Between Shasta Dam Boulevard and its southern terminus	Low	N/A (no Objects)	N/A	N/A	N/A	N/A	N/A	N/A	Low (few signs)	N/A (no Curve)	N/A (no Curve)	N/A (no Curve)	Low	N/A	High (aerial shows no pavement markings)	N/A	N/A	Low (pavement Width Available)	Low	Low (pedestrian crossing at one location)	Low (pedestrian crossing at one location)	Poor	N/A

Mitigation List

Segment	R01	R02	R03	R04	R08	R13	R14	R21	R22	R23	R24	R25	R26	R27	R28	R30	R31	R32P B_	R34P B_	R35P B_	R37P B_		
	Add segment lighting	Remove or relocate fixed objects outside of Clear Recovery Zone	Install Median Barrier	Install Guardrail	Install raised median	Add two-way left-turn lane (without reducing travel lanes)	Reduce lanes: travel lanes from 4 to 3	Improve pavement friction (High Friction Surface Treatments)	Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)	Install chevron signs on horizontal curves	Install curve advance warning signs	Install curve advance warning signs (flashing beacon)	Install dynamic/variable speed warning signs	Install delineators, reflectors and/or object markers	Install edge-lines and centerlines	Install centerline rumble strips/stripes	Install edgeline rumble strips/stripes	Install bike lanes	Install sidewalk/pathway (to avoid walking along roadway)	Install/upgrade pedestrian crossing (with enhanced safety features)	Install Rectangular Rapid Flashing Beacon (RRFB)	Pavement condition	other
La Mesa Avenue – Between Ashby Road and Montana Avenue	Medium (possible)	N/A (no Objects)	N/A	N/A	N/A	low (possible)	N/A	N/A	Low (few Signs need to be upgraded)	N/A (no Curve)	N/A (no Curve)	N/A (no Curve)	High (School zone)	N/A	Medium (Edge Lines needed)	N/A	N/A	High (pavement width Available, school zone, part of ATP application)	High (school zone)	High (school crossings)	High (school crossings)	Mediu m	N/A
Vallecito Street – Between Montana Avenue and Washington Ave)	Medium (possible)	N/A (no Objects)	N/A	N/A	N/A	N/A	N/A	N/A	Low (few Signs need to be upgraded)	N/A (no Curve)	N/A (no Curve)	N/A (no Curve)	High (School zone)	N/A	N/A (striping exists)	N/A	N/A	N/A	N/A (exists along one side, no space on other)	High (school crossings)	High (school crossings)	Mediu m	Install Sharrow
Grand Coulee Boulevard – Between Shasta Dam Boulevard and Cascade Boulevard	Medium (possible)	Low (few objects)	N/A	N/A	N/A	N/A	N/A	Medium (at curves and at terminus approach)	Low (few Signs need to be upgraded)	Medium (few curves needs chevron)	Low (at curves)	Low (at curves)	Low (possible)	Low (few objects need markers)	Medium (Edge Lines needed)	Low (possible)	Low (possible)	Medium (pavement width avaialable)	Low (Rural residential Street)	N/A	N/A	Mediu m	Install Sharrow
Casade Boulevard - Shasta dam Boulevard to Pine Grove Ave	Low	N/A (no Objects)	N/A	Low (one location)	N/A	N/A	N/A	High (at approaches to intersection)	High (warning signs)	High (multiple curves)	High (multiple locations)	High (multiple locations)	Medium (possibly appraoch to residential areas)	N/A	N/A (striping exists)	High (high speed roads)	High (high speed roads)	Low (possible, shoulder exists)	Low (possible implementation along one direction)	N/A	N/A	Good	Install Sharrow
Cascade Boulevard –Pine Grove Ave and the southern City limit	Low	N/A (no Objects)	N/A	Low (few potential locations)	N/A	N/A	N/A	High (at approaches to intersections and curves)	High (warning signs)	Medium (possible few locations)	Medium (multiple Locations)	Medium (multiple Locations)	Medium (possibly appraoch to intersections)	N/A	N/A (striping exists)	High (high speed roads)	High (high speed roads)	Low (possible, shoulder exists)	Low (possible implementation along one direction)	N/A	N/A	Good	Install Sharrow
Pine Grove Avenue – Between the interchange at Interstate 5 and Ashby Road	Low	N/A (no Objects)	N/A	N/A	N/A	N/A	N/A	Medium (possible at intersection approach)	Medium (warining signs)	N/A	N/A	N/A	Medium (possibly appraoch to intersections)	N/A	N/A (striping exists)	High (high speed roads)	High (high speed roads)	N/A (Already exists)	Low (poissble, but low demand)	N/A (No Crossings)	N/A (No Crossings)	Good	bike conflict markers at intersection?
Twin View Boulevard – Between Pine Grove Avenue and the southern City limits	Low	N/A (no fixed object)	N/A	High (multiple locations)	N/A	N/A (no pavemen t width)	N/A	High (at curves and at intersection approach)	Medium	High (multiple curves)	High (multiple curves)	High (multiple curves)	Medium (at intersection approcahes)	N/A	N/A (Exists)	High (high speed roads)	High (high speed roads)	Medium (possible on shoulder)	Medium (sidewalk avaiable at some locations)	N/A (No Crossings)	N/A (No Crossings)	Mediu m	Sharrow
Riddle Road - Wintun to Cascade Boulevard	Low-lighting at intersections	Low (few objects)	N/A	N/A	N/A	N/A	N/A	Medium (at intersection approach with Cascade Blvd)	Medium (sign upgrades at intersection with Cascade Blvd and advance warning signs)	Chevrons or directional arrow where Riddle Rd-curves into Wintub	Low (low speed roadway and curves on approach to intersection	N/A	Low (possible but very short segment)	N/A	Medium (No pavement markings but residential low speed roadway)	N/A	N/A	Medium (pavement width avaialable but parking might need to be restricted)	Low (Continuous sidewalk along the side with development)	N/A (No Crossings)	N/A (No Crossings)	Good	Sharrow