City of Clearlake
Local Road Safety Plan (LRSP)

December 30, 2021

Prepared for:

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Clearlake, CA 95422

Lake Area Planning Council
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Prepared by: HEADWAY TRANSPORTATION

2240 St. George Lane, Suite 1
Chico, CA 95926

LOCAL ROAD SAFETY PLAN
CITY OF CLEARLAKE

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Acknowledgements

The Lake Area Planning Council, City of Clearlake staff and project stakeholders were instrumental in the creation of this Local Road Safety Plan. The local knowledge and collaborative attitude of all stakeholders involved helped create a holistic LRSP. Headway Transportation would like to express appreciation to the staff and project stakeholders who contributed to this plan.

Stakeholders

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Statutory Notice

23 U.S.C. 409: US Code – Section 409: Discovery and admission as evidence of certain reports and surveys

Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway- highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

California Government Code - GOV § 7550

This section is included per California Government Code - GOV § 7550 which states that:

"(a) Any document or written report prepared for or under the direction of a state or local agency, that is prepared in whole or in part by nonemployees of the agency, shall contain the numbers and dollar amounts of all contracts and subcontracts relating to the preparation of the document or written report; if the total cost for the work performed by nonemployees of the agency exceeds five thousand dollars ($5,000). The contract and subcontract numbers and dollar amounts shall be contained in a separate section of the document or written report.

(b) When multiple documents or written reports are the subject or product of the contract, the disclosure section may also contain a statement indicating that the total contract amount represents compensation for multiple documents or written reports."

The contract amount for this Clearlake LRSP is $49,980.00. The total contract amount, which included preparation of two LRSP's for the Cities of Lakeport and Clearlake, is $129,951.00.

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Executive Summary

The City of Clearlake Local Roadway Safety Plan (LRSP) established the framework and processes for identifying, evaluating, and prioritizing transportation safety improvements with a goal of reducing fatalities and serious injuries on the local road network. The City of Clearlake LRSP was developed through a process of stakeholder collaboration, public outreach, and crash data analysis.

Clearlake Focus Areas

- ✓ **Distracted Driving**
- ✓ **Impaired Driving**
- ✓ **Pedestrian Safety**
- ✓ **Intersection Safety**
- ✓ **Roadway/Intersection Lighting**
- ✓ **Speeding**
- ✓ **Bicycle Safety**
- ✓ **Lane Departures**

The stakeholder's working group (**page 7**) provided key input and guidance in developing the project vision and mission statements, identifying focus areas, and considering safety strategies and recommendations in line with community goals and other planned projects. The stakeholders will also be key in implementing the plan, measuring outcomes, and updating the plan in the future. The public outreach (**page 9**) prioritized overall safety concerns as well as identified specific locations via an interactive online map. The in-depth crash data analysis (**page 15**) revealed both overall trends as well as "hot spots" of crash densities.

Identified focus areas represent the greatest opportunity for reducing fatal and serious injury crashes throughout the city based on public outreach results and crash data analysis. *Focus Area Strategy Tables* (**page 40**) organized countermeasures and strategies across the four 'E's' of traffic safety- *Engineering, Enforcement, Education, and Emergency Services.*

The Strategy Tables, summarized in **Tables 10-16** and detailed in **Appendix D**, also identify actions, target outputs, responsible parties, performance measures and potential funding opportunities. The document details key steps for successful implementation (**page 51**), non-engineering programs (**page 52**), and details of potential funding sources (**page 54**). This document also includes project packages, concept layouts, cost estimates and Benefit-Cost Ratio (BCR) calculations for two projects that can be used in potential Highway Safety Improvement Program (HSIP) grant applications.

This plan was developed through close coordination with stakeholders, and the public in compliance with the State and Federal guidelines for eligibility to apply for HSIP funding. This document includes the necessary data and analysis to support future grant funding applications for recommended systemic and location specific projects. The LRSP is intended to be a living document, which will be updated every five years using the most up to date crash data to evaluate the performance of implemented countermeasures and re-evaluate focus area selection.



Introduction

Crashes result in almost 3,700 daily fatalities globally and are a leading cause of death for people ages 1-54[1]. The LRSP is a critical need as local roads are less traveled, but tend to have a higher rate of serious injury and fatal crashes. To improve roadway safety, agencies across the US are using historical crash data and input from the public to identify and address the safety issues unique to their local roadways.

Vision and Mission Statement

The vision and mission statements were developed to guide the LRSP and ensure that the final recommendations improve safety while furthering the vision and existing efforts of the City of Clearlake.

Vision Statement

"To help all transportation users in Clearlake reach their destination safely."

Mission Statement

"To reduce the number of fatalities and serious injuries occurring on the roadway system in Clearlake for all users."

[1] https://www.cdc.gov/injury/features/global-road-safety/index.html

LRSP Process

The LRSP process is a standard format for local agencies to evaluate crash data, identify safety focus areas, and select appropriate countermeasures. This process is applied across the US by local agencies and counties alike. The simple six-step LRSP process includes evaluating and updating the plan at regular intervals, typically every four to five years. An LRSP provides the framework for identifying systemic safety issues along local roads based on historical crash data. By evaluating crash data systemically, the LRSP identifies specific focus areas which represent the largest opportunities to improve safety such as pedestrian safety or impaired driving. The LRSP process also identifies hot spot locations with a high number of crashes historically as well as locations which have similar roadway characteristics but may lack a history of crashes.



Exhibit 1. LRSP Development Process (FHWA)

Following the crash analysis, countermeasures are identified based on the types, frequency, and contributing elements of crashes, with a focus on reducing fatal and serious injury crashes. Identified countermeasures fall under one of the four "E's" of traffic safety which include Engineering, Enforcement, Education, and Emergency Services. Countermeasures and strategies in all "E's" are included in the applicable Focus Area and are divided based on the "E" which they address. Education and Enforcement strategies are often best implemented following buy-in from community partners and stakeholders. Developing countermeasures across these four areas of traffic safety ensures a plan which improves traffic safety through a variety of approaches. "Emerging Technologies" is considered a new 5th category and was considered in the countermeasure process.

4 E's of Traffic Safety

Engineering

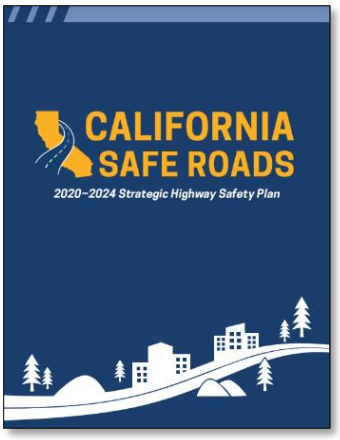
Education

Enforcement

Emergency Services

Implementation of identified countermeasures typically requires additional grant funding for many agencies. As of 2020, the LRSP will be a required document for any agencies applying for HSIP funding. The HSIP is a federal aid program which requires states to develop comprehensive Statewide Highway Safety Plans (SHSPs) focused on reducing fatal and serious injury crashes. The HSIP Grant Program is one of the primary funding mechanisms for roadway safety enhancements across the United States. Each state department of transportation can allocate HSIP funding to local entities for traffic safety projects focused on reducing fatal and serious injury crashes. The California Department of Transportation (Caltrans) will require any agency applying for HSIP funding to first complete an LRSP for funding Cycle 11 and beyond.

Connection with the SHSP



This LRSP builds off the current *2020-2024 Statewide Highway Safety Plan "California Safe Roads" (SHSP)* developed by Caltrans to provide technical assistance in prioritization and deployment of safety countermeasures across the state. The SHSP identifies countermeasures and strategies to address specific safety issues which allows local agencies to leverage road safety planning processes to identify and address local needs based on the SHSP countermeasures. Caltrans identified five "high priority" challenge areas which represent the greatest opportunity for reducing fatal and serious injury crashes across the state:

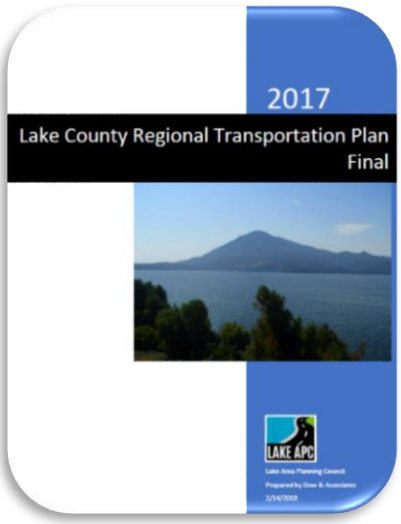
- Pedestrians & Bicyclists
- Intersections
- Impaired Driving
- Lane Departures
- Speed Management / Aggressive Driving

The City of Clearlake LRSP identifies these five high priority challenge areas as focus areas based on the crash data analysis.

Planned Projects and Initiatives

The purpose of the LRSP is to enhance and expand upon other planned projects and safety initiatives in the City of Clearlake. Several roadway improvements projects have been identified in Clearlake. These studies and projects were considered in the LRSP process and countermeasure selection.

2017 Lake County Final Regional Transportation Plan



The Regional Transportation Plan lists the financially constrained projects planned over the next 20 years. This list includes projects on State Highways and local roads. Projects potentially impacting the countermeasures for the LRSP are:

- Lakeshore Drive improvements – including roadway widening, installation of turn lanes, construction of sidewalks (Olympic Drive to Hwy 53)
- Roadway Reconstruction/Rehabilitation (includes roadway widening projects)
- Phillips Avenue Connection – new roadway linking Dam Road Extension with Phillips Avenue
- Roundabout – Dam Road/Dam Rd Extension

- Roundabout – Lakeshore Drive/Olympic Drive
- Roadway Overlay
- Crack sealing/Micro-sealing/Restriping Lakeshore Drive (SR 53 to Olympic Drive) and Olympic Drive (Lakeshore Drive to SR 53)

Active Transportation Plan for Lake County (2016)

The Projects potentially impacting the countermeasures for the LRSP are:

- 18th & Phillips Ave Class II Bikeway
- Civic Center Sidewalks
- Highland Park Sidewalks
- Austin Park Sidewalks
- Dam Road Extension
- Report states that "The City will also be using bond funds to install sidewalks along the frontage of Lakeshore Drive, consistent with the 2014 Lakeshore Drive Downtown Corridor Plan where the City owns the adjacent property."

The draft form of the ***2022 Lake County Regional Transportation Plan/Active Transportation Plan*** is anticipated for adoption in December 2021. Financially constrained projects in the City of Clearlake are:

- Lakeshore Drive improvements – including roadway widening, installation of turn lanes, construction of sidewalks (project limits: Olympic Drive to Hwy 53)
- Lakeshore Drive Rehabilitation (Olympic Street to Calaveras Drive/City Limits)
- 2nd Street/ Modoc Street Overlay (Arrowhead Road to Eastlake Drive)
- Roadway Reconstruction/Rehabilitation (includes roadway widening projects)
- Roundabout – Dam Road
- Roadway Overlay
- Crack sealing/Micro-sealing/Restriping Lakeshore Drive (SR 53 to Olympic Drive) and Olympic Drive (Lakeshore Drive to SR 53)
- Transit Center bike/pedestrian improvements (Active Transportation Plan)
- Dam Road Extension and South Center Drive bike/pedestrian improvements (Active Transportation Plan)

Financially unconstrained projects in the City of Clearlake are:

- Roundabout – Lakeshore Drive/ Olympic Drive
- Roadway Reconstruction/Rehabilitation
- Roadway Overlay
- Approximately 11 Active Transportation projects

Lake Walks Study/Lake County Pedestrian Facility Needs Inventory and Engineered Feasibility Study (2019)



This study recommended 40 projects for pedestrian access and safety improvements throughout Lake County. Projects potentially impacting the countermeasures for the LRSP are:

- Huntington Avenue/ Arrowhead Road
- Burns Valley Road/ Rumsey Road/ Bowers Avenue
- Olympic Drive
- Walnut Avenue/ Olive Street
- Division Street/ Austin Road
- Old Highway 53
- Lakeshore Drive – Olympic Avenue to Redbud Park
- Lakeshore Drive/ 40th Avenue – east of Redbud Park
- Phillips Avenue
- 18th Avenue/ Dam Road Extension/ Dam Road

SR 53 Corridor Study (2011)

This study evaluated interim and long-term alternatives for SR 53 and impacted intersections through Clearlake with the goal of establishing this corridor as an interregional route. The recommendations for the year 2020 were:

- SR 53/ SR 20: improve intersection with roundabout
- SR 53/ Olympic Drive: signalize intersection and add eastbound right-turn lane
- SR 53/ 40th Avenue: add northbound left-turn lane
- SR 53/ Dam Road/ Old Highway 53: add northbound right-turn lane
- Dam Road/ Walmart Driveway: add roundabout control and a northbound left-turn lane
- Phillips Avenue Extension
- SR 20/ SR 53 Roundabout

Most of these projects have been constructed or are planned for the near future. The recommendations for the year 2030 are:

- SR 53/ 40th Avenue: add eastbound and westbound left-turn lanes and a northbound left-turn
- Lane (constructed)
- SR 53/ 18th Avenue: add east and westbound left-turn lanes and a northbound right-turn lane
- SR 53/ Dam Road/ Old Highway 53: add northbound left-turn lane and westbound right-turn lane
- Dam Road/ Walmart Driveway: add eastbound left-turn lane
- SR 53/ SR 29/ Main Street: add southbound right-turn lane

Other long-term recommendations included an interchange at SR 53 at Dam Road, 18th Avenue, or between.

Stakeholder Engagement



Source: FWHA

The stakeholder working group was developed to provide important input and guidance throughout the project including assisting in the development of the project vision and mission statements, identifying focus areas, and considering safety strategies and recommendations. The stakeholders will also be key in implementing the plan, measuring outcomes, and updating the plan in the future.

The stakeholder working group included representatives from numerous City departments and local agencies:

- Lake Area Planning Council
- City of Clearlake
- Clearlake Police Department
- Lake Transit Authority
- Lake County Fire Protection District
- California Department of Transportation (Caltrans) District 1 Office

The first stakeholder working group meeting was held on April 6, 2021, to identify initial issues, concerns, and the LRSP focus areas based on local knowledge and analysis of the most recent five years of crash data. The second stakeholder working group meeting was held June 10, 2021 and discussed the results of the detailed crash data analysis and public outreach efforts. The third stakeholder working group meeting was held on August 24, 2021, and discussed countermeasures, *Focus Area Strategy Tables*, and potential projects.

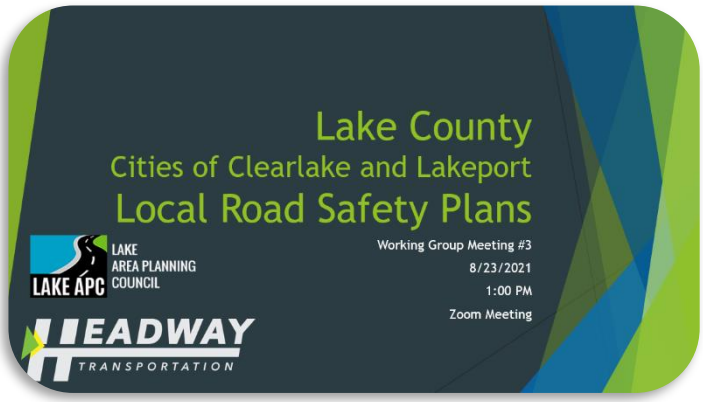


Exhibit 2. Stakeholders Working Group Meeting

A list of stakeholders working group members are included in **Appendix A**.

Focus Area Development

Initial Data Analysis

The first step in the process was to identify the focus areas for the purposes of detailed crash data analysis and public outreach. The initial data analysis reviewed crash patterns and factors. This initial analysis is included in **Appendix B** and summarized as:

- Fatal and serious injury crashes account for 18% of all crashes.
- The most common collision types are Hit Object, Broadside & Rear-End.
- Non-Motorized users (pedestrians and bicyclist) are involved in 83% of fatal and 19% of serious injury crashes.
- Unsafe Speed, Improper Turning and Impairment were the highest primary collision factor for all crash types.
- Unsafe Speed, Wrong Side of the Road, and Pedestrian Violation were the top collision factors for fatal and serious injury crashes.
- 33% of fatal and 50% serious injury crashes involve impairment (even if this was not listed as the top collision factor).
- Motorcycles are involved in 23% serious and injury crashes.



Source: FWHA

Focus Areas

Based on this initial data analysis and stakeholder input, the following focus areas were identified:

- Bicycle Safety
- Distracted Driving
- Impaired Driving
- Intersection Safety
- Lane Departures
- Pedestrian Safety
- Roadway/Intersection Lighting
- Speeding



Source: FWHA

Public Outreach

Public Outreach Methodology

Typical in-person outreach methods were not practical for the public outreach due to the COVID-19 pandemic. Therefore, all public outreach was exclusively online. The project team developed a virtual survey[2] through ArcGIS Survey123 and an interactive public comment map through ArcGIS Online. The survey and map were made open to the public on April 15, 2021 - May 19, 2021. The survey contained a total of five questions including demographics, travel habits, focus area prioritization and an opportunity to provide any comments related to transportation safety. The questions were used to identify the highest priority safety concerns of residents. Survey respondents were provided a link to an interactive map following completion of the survey. The interactive map provided residents with an opportunity to identify specific locations in the City of Clearlake with transportation safety concerns using a georeferenced dot. Respondents could categorize their comments on the map as one of the eight identified focus areas or select the "Other" category if the comment did not fall under one of the focus areas. Respondents were also able to vote in support of comments from other respondents.

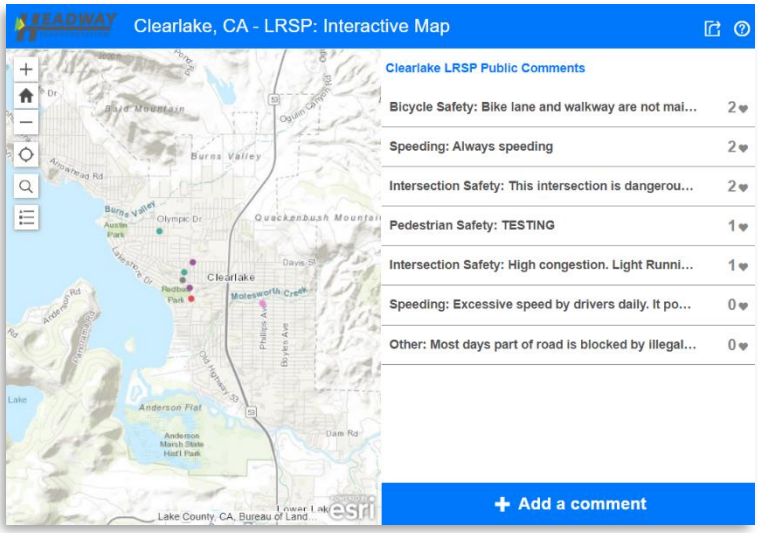


Exhibit 3. Clearlake Public Outreach Interactive Map

A weblink to the survey was distributed to the public through:

- City of Clearlake website
- Lake Area Planning Council Website and Facebook page
- Caltrans Facebook

The initial outreach effort produced a total of:

- 91 completed surveys
- 10 individual georeferenced comments through the interactive map

[2] *Responses were limited to a single completed survey per IP address.*

Public Outreach Survey Results

Input provided through the public outreach survey helped to identify specific locations with perceived safety concerns as well as general input on transportation safety and the roadway network. Full survey responses and interactive map data (withholding respondents' personal information) are included in **Appendix C** and the results are summarized below.

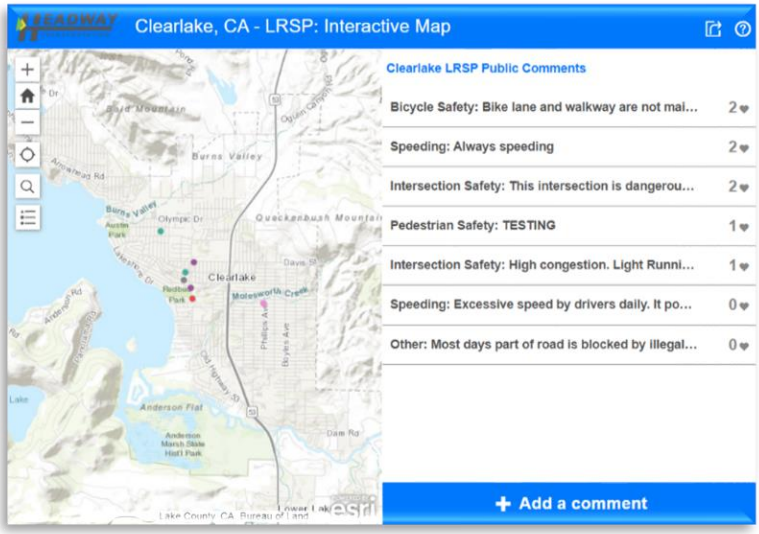


Exhibit 4. Clearlake Public Outreach Interactive Map

Question 1 – What is your primary mode of transportation?

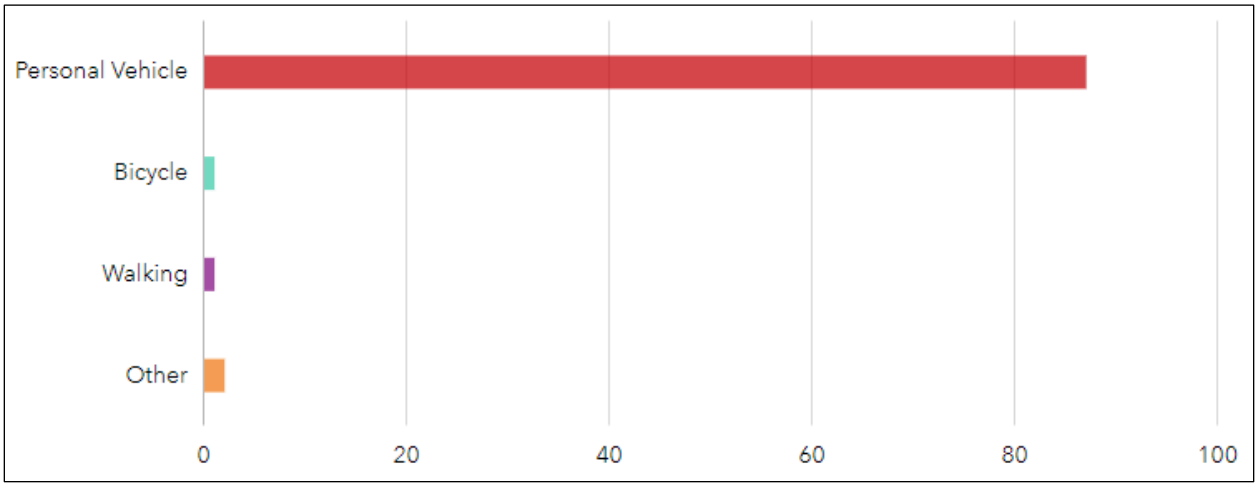


Figure 1. Primary Transportation Mode

Most respondents (95.6%) indicated that their primary mode of transportation is a personal vehicle with other modes including bicycle, walking, and "other" accounting for 4.4%.

Question 2 – What is your age range?

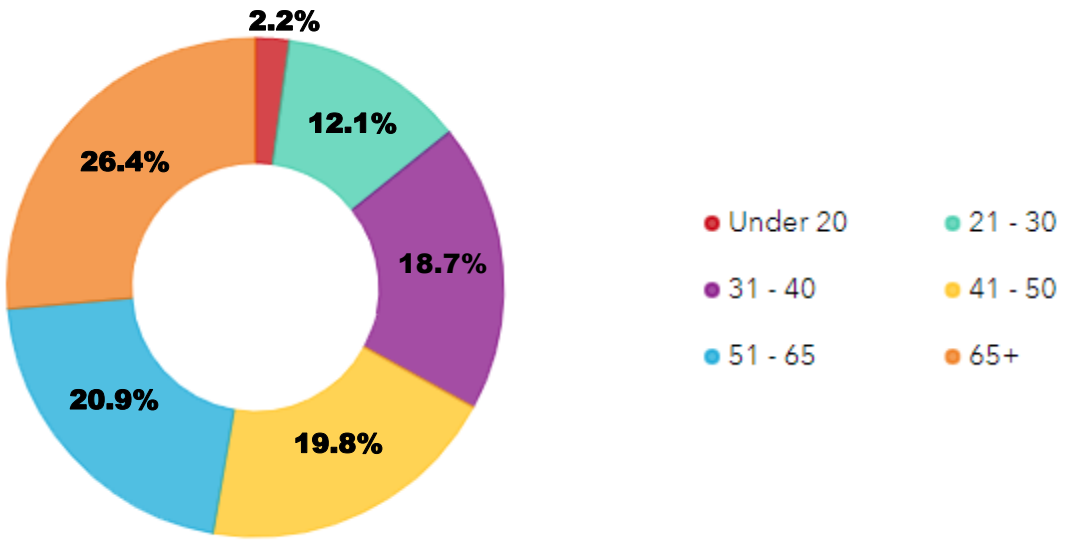


Figure 2. Respondents by Age Range

Survey responses were received from all age ranges, however, respondents tended to be over 40 years old. Nearly one-third (32.9%) of respondents were below the age of 40 and just over 14% of respondents were 30 or below.

Question 3 - Did your travel habits change during COVID restrictions (approximately March 2020-present)?

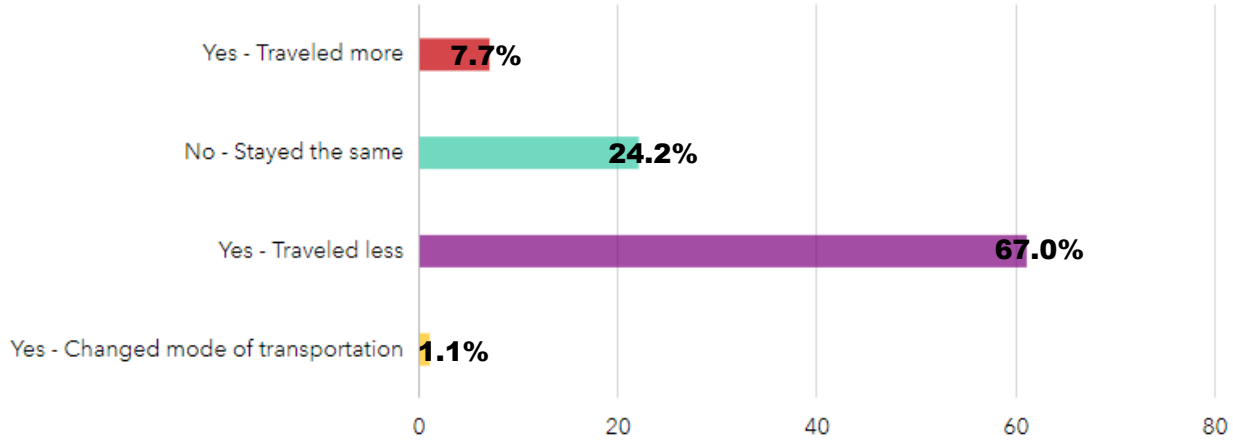


Figure 3. Travel Habits during COVID

This question was included to gauge the impacts of COVID-19 on the transportation network. The response may be used to identify if any planning strategies should be adapted, or how future updates of the LRSP may be impacted. Nearly 8% of respondents indicated that their travel increased during the %COVID-19 restrictions in

contrast to most of respondents (91%) indicating that they traveled the same or less during COVID-19 restrictions. One respondent indicated that COVID-19 restrictions resulted in a modal shift to another form of transportation.

Question 4 – Please rank the following categories based on your personal level of concern regarding each category, with "1" representing the highest concern.

The responses to this question indicated the highest priority transportation safety focus areas for survey respondents. Respondents were asked to place focus areas in a ranked listed based on which they were most concerned about. **Table 1** lists the focus areas in order based on their average weighted scores with the higher scorings indicating more priority/level of concern[3].

Table 1. Focus Area Priority Ranking

Focus Area	Weighted Score
Distracted Driving	5.65
Impaired Drivers	5.34
Pedestrian Safety	4.82
Intersection Safety	4.78
Lighting	4.52
Speeding	4.43
Bicycle Safety	4.22
Lane Departures	2.24

Based on the survey responses, distracted driving and impaired drivers were the highest priority focus areas.

Question 5 – Please enter any comments relating to transportation safety in the City of Clearlake below:

Each response to this question was assessed by the project team and categorized. The three most frequent comment categories and their frequency are shown in **Table 2**. The top comment category focused on intersection safety with half of the comments in this category focusing on the Lakeshore Dr/ Old Hwy 53 intersection. Sidewalk conditions throughout the city and on specific streets were the second most frequent comment type. Lakeshore Drive and 40th Avenue received the highest number of comments regarding the poor quality of sidewalks. Comments regarding the pavement conditions were typically general and tied for the second most frequent comment category. Comments regarding current lighting conditions focused on the need for increased lighting at intersections and for pedestrian and bicycle safety along corridors. Speeding was the fourth most frequent comment type. A focus of speeding issues identified in the comments is on Phillips Ave/ Garner Ave.

[3] *An inverse weighting system was applied to survey responses. For example, a focus area ranked as number one was assigned eight points and a focus area ranked number eight was assigned one point.*

Table 2. Most frequent Question 5 Survey Response Categories

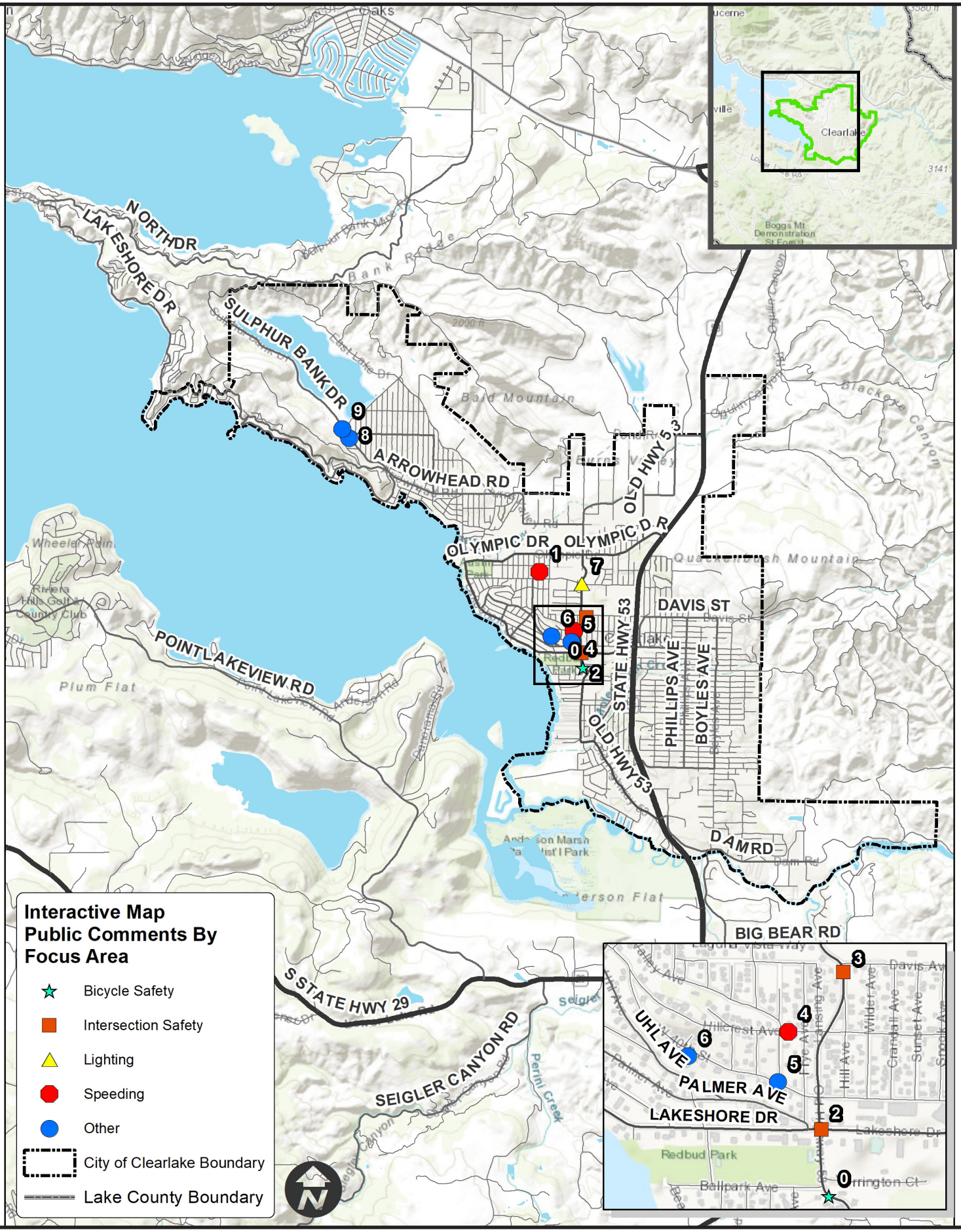
Comment Category	Total Comments
Intersection Safety	12
Poor Sidewalks	11
Roadway Conditions	11
Poor Lighting	10
Speeding	9

Interactive Map Results

The purpose of the interactive City of Clearlake map is to identify the locations with the most public concerns. The interactive public outreach map provided respondents with an opportunity to place a georeferenced dot on a virtual map, select a category from the focus areas, and provide a corresponding transportation safety comment. As shown in **Figure 4,** most comments submitted through the interactive map focused on Intersection Safety and Speeding. Most of the comments were focused on the urban core with a particular emphasis on Old Highway 53, which received a total of four comments.

Appendix C includes a summary table and map of all the interactive map comments. The specific comments and locations identified through the interactive map process, in coordination with the crash data analysis, helped to guide the development of strategies and recommendations to address each focus area.





HEADWAY TRANSPORTATION

NO SCALE

Figure 4

City of Clearlake - Local Road Safety Plan
All Interactive Map Public Comments

Crash Data Analysis

Methodology

Crash data for the most recent five years (2015-2019) was obtained from two primary sources, SWITRS and TIMS. The Statewide Integrated Traffic Records System (SWITRS) is a web-based database that collects and processes crash data. It includes all crash severities with limited geospatial data. The Transportation Injury Mapping System (TIMS) is a geo-referenced web-based database that includes only serious injury and fatal crashes. The SWITRS data was used to identify overall crash trends, while the TIMS data was primarily used to identify hot spots and location-specific safety concerns given the advanced geospatial information. Location-based data from SWITRS was used as available.

The crash data was utilized to identify crash trends and high frequency crash intersections and roadway segments overall and by focus area. Crash rates were considered as traffic volume data was available. Crash rates determine the relative safety considering traffic volumes and length (for roadway segments).

Crash Data Considerations

The LRSP process is largely dependent on the quality of existing crash data records. The data available in the City of Clearlake allows for the identification of overall crash trends and to identify the highest priority areas. However, data fields often have a higher percent of “Not Stated”, “Unknown”, or blank records. This is a typical condition for crash data across the country and is not unique to the City of Clearlake. The analysis is conducted using the best available data.

Overall Crash Trends

Reviewing the total number of crashes year by year helps to identify how the frequency changes year to year. **Figure 5** shows the number of fatal & serious injury crashes and all other crashes by year across the City of Clearlake between 2015 and 2019.



Crashes per Year

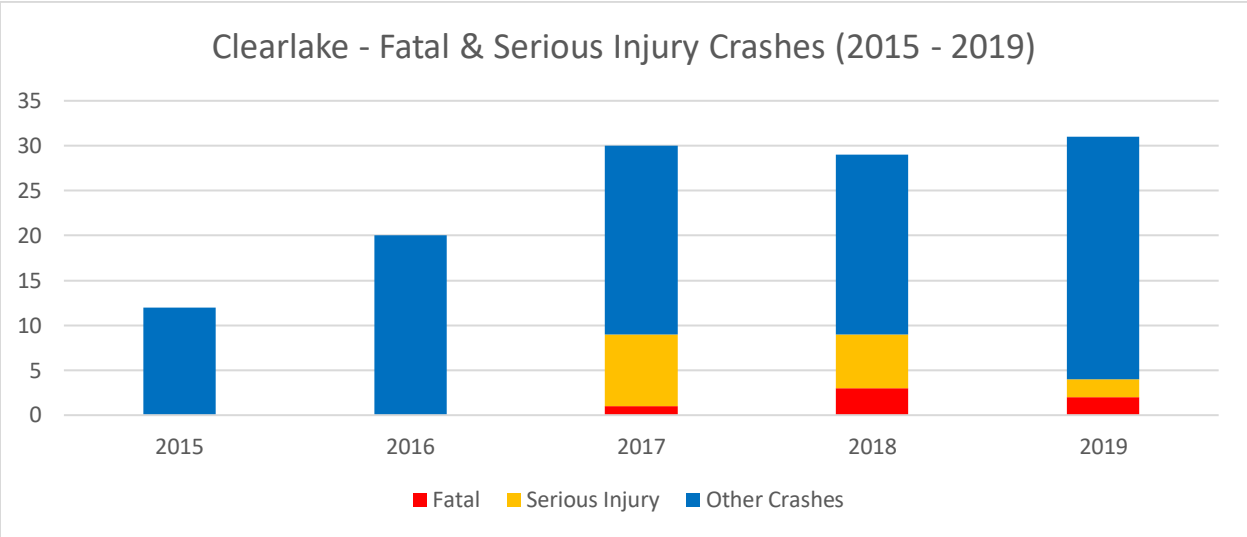


Figure 5. Total Crashes by Year

Crashes by Severity

Figure 6 shows the breakdown of all severities.

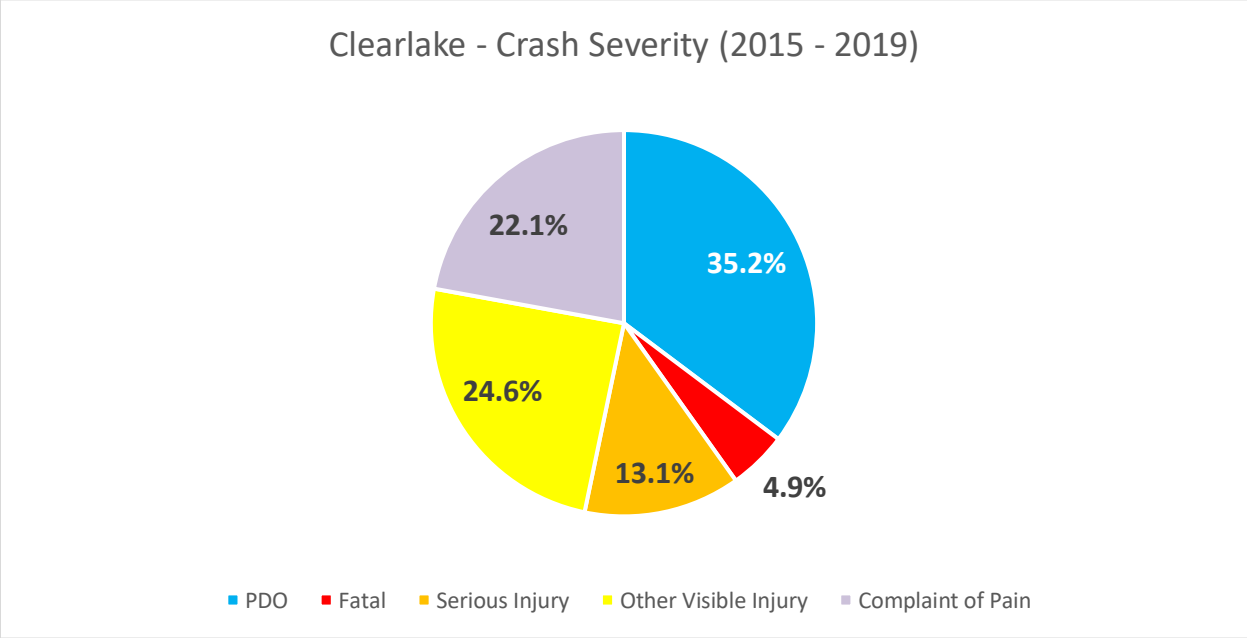
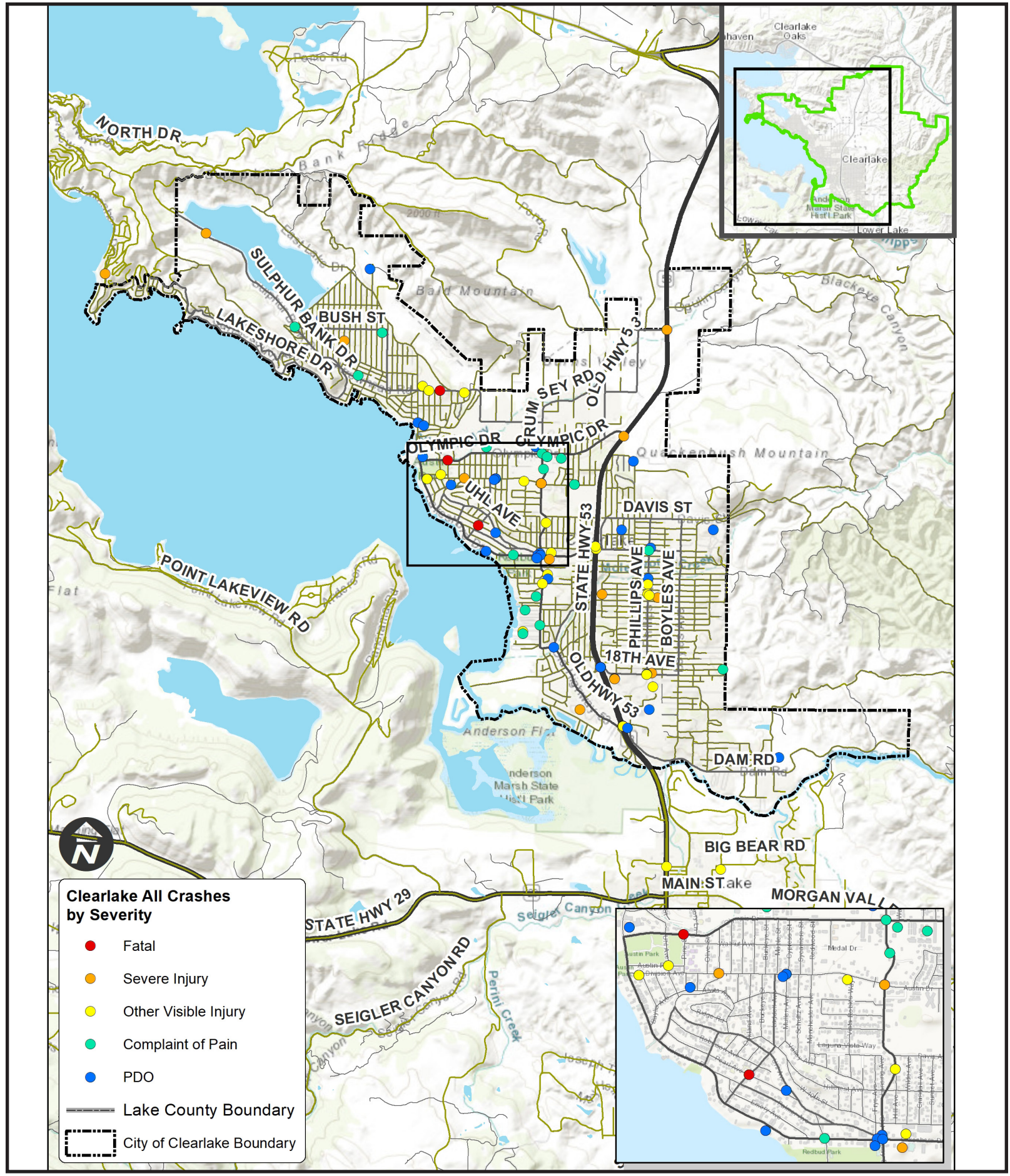


Figure 6. Crash Severity

A total of 122 crashes were recorded in Clearlake between 2015 and 2019. Of these 22 crashes, 18% resulted in a serious injury or fatality. The year 2015 had the lowest reported crashes while 2019 had the highest. The year 2018 had the highest number of serious injury and fatal crashes. A total of six fatalities occurred, with half occurring in 2018.

A map showing the location and type of all crashes is included in **Figure 7,** while **Figure 8** shows a heatmap of crashes in Clearlake.

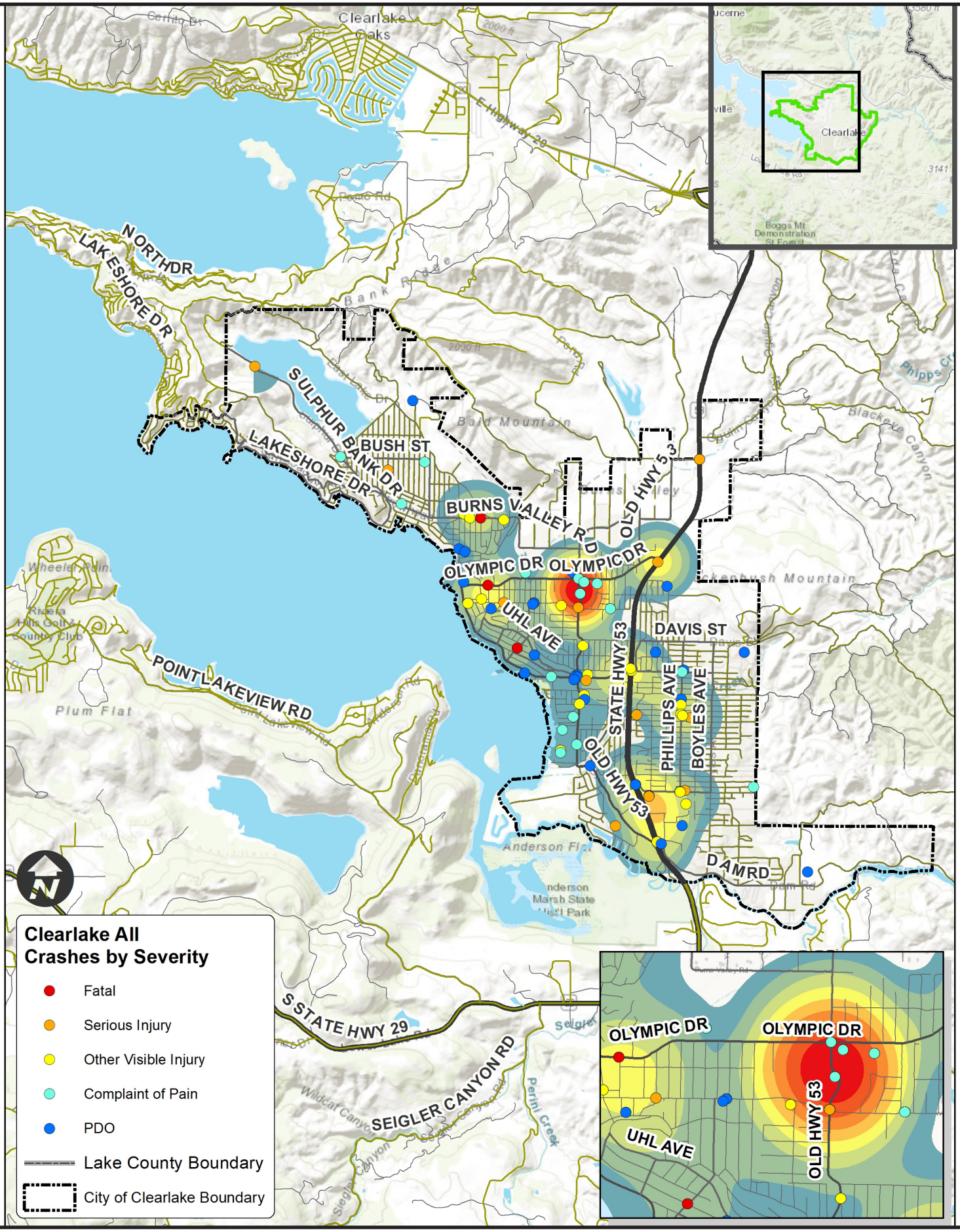


HEADWAY TRANSPORTATION

NO SCALE

Figure 7

City of Clearlake - Local Road Safety Plan
Crashes by Severity (2015 - 2019)



HEADWAY TRANSPORTATION

NO SCALE

Figure 8

City of Clearlake - Local Road Safety Plan
Crash Heat Map (2015 - 2019)

Crash Types

The overall crash types are presented in **Table 3** and identify systemic safety issues and trends.

Table 3. Crash Types

Crash Type	Total Crashes	Percent of All Crashes	Percent of Fatal & Serious Injury Crashes
Head-On	16	13%	27%
Vehicle/Pedestrian	11	9%	23%
Other	7	6%	18%
Sideswipe	10	8%	14%
Hit Object	26	21%	9%
Broadside	26	21%	5%
Rear-End	22	18%	5%
Overturned	4	3%	0%
Total:	122	100%	100%

The most common crash types were hit object, rear-end, and broadside. The most common type of serious injury and fatal crashes were head-on, vehicle/pedestrian, and other which typically represents bicycle crashes.

Primary Collision Factor

Crash records typically include a 'Primary Collision Factor' (PCF) which can help to identify systemic and location specific crash trends. A PCF represents the leading factor that contributed to the crash. This data attribute helps identify major issues, but may overshadow secondary factors such as distracted driving, unsafe speeds, or lighting conditions. The top PCFs are shown in **Figure 9** for all crashes compared to the PFC for serious injury and fatal crashes only.



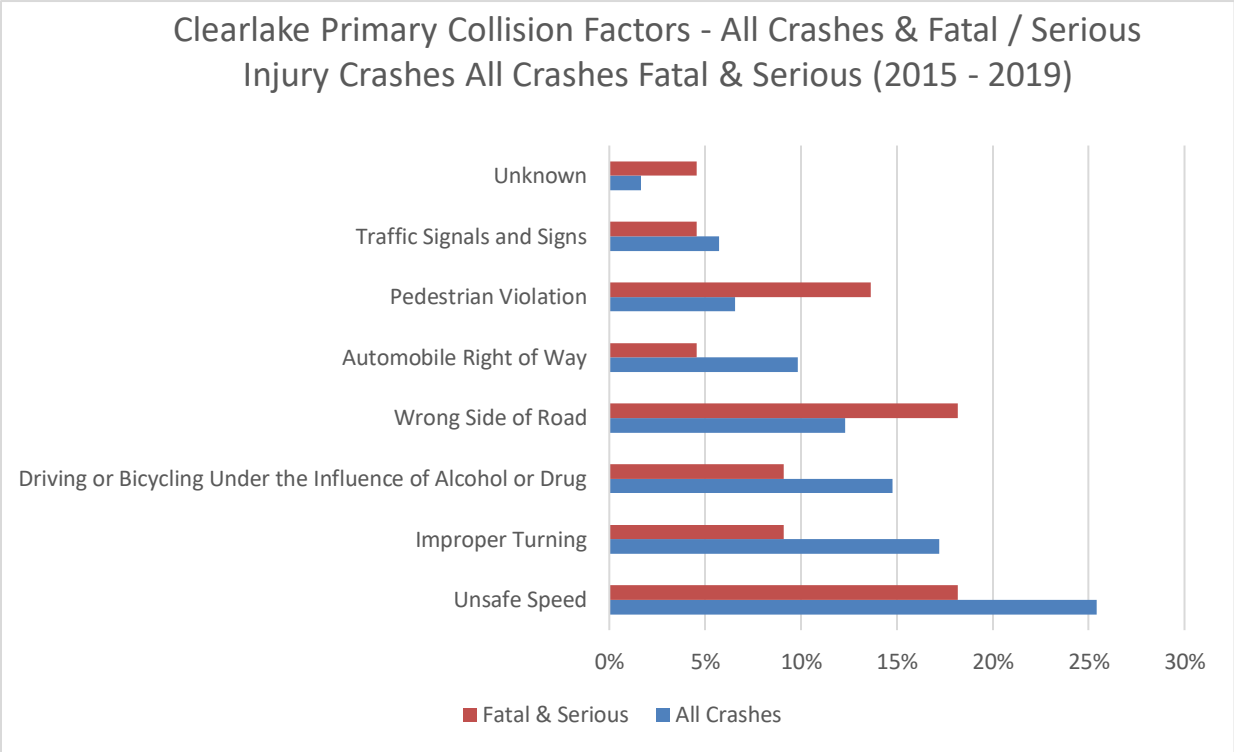


Figure 9. Primary Collision Factors

Unsafe speed, improper turning, and driving under the influence were the most frequent PFCs among all crashes, while unsafe speed, wrong side of the road, and pedestrian violations were the highest factors among fatal and serious injury crashes.

Age Ranges

The age ranges for the at-fault party can identify if a particular age group, typically young or elderly drivers, should be a specific focus area. The age ranges for all crash types, and serious injury and fatal crashes, is shown in **Figure 10**.

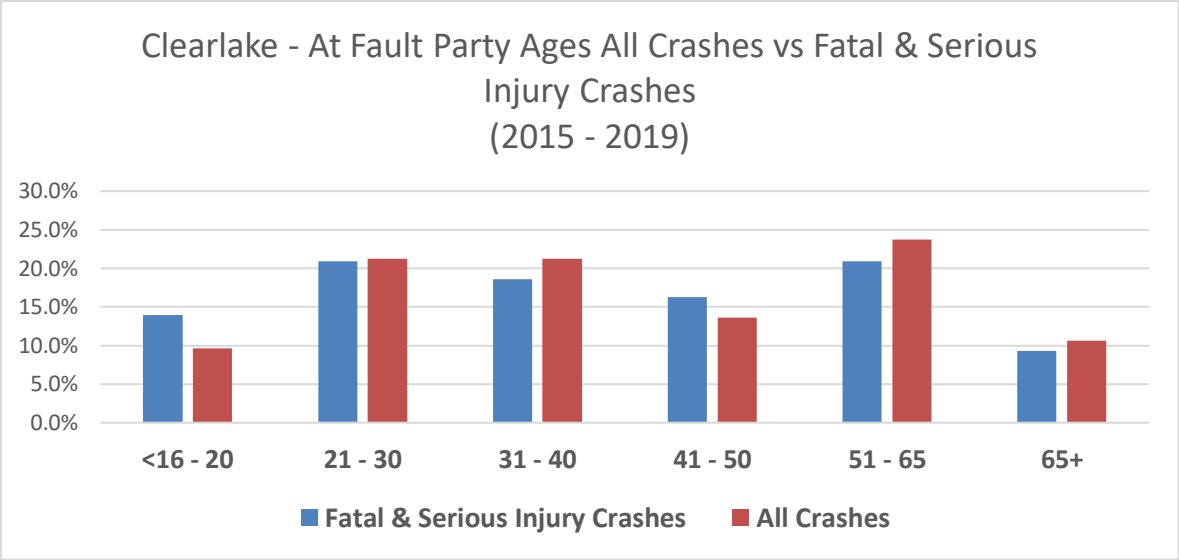


Figure 10. At-Fault Party Ages

The data shows a nearly even distribution across age ranges. The data does not indicate that young or elderly drivers are significantly more likely to be in a serious collision.

Top Intersections

Based on the georeferenced crash data, a total of 48 crashes occurred at intersections in the City of Clearlake, including six fatal crashes and six serious injury crashes. Top intersections with the highest number of crashes were identified using the best georeferenced data available. The intersections in Clearlake with the highest number of crashes are shown in **Table 4**:

Table 4. Top Crash Intersections

Intersection	Control	Total Crashes	Serious Injury and Fatal Crashes
Lakeshore Dr/ Hwy 53	Signalized	5	1
Old Hwy 53/ Austin Rd	Unsignalized	5	1
Hwy 53/ 18th Ave	Signalized	4	1
Old Hwy 53/ SR 53/ Dam Rd	Signalized	4	2
Austin Rd/ Cypress Dr	Unsignalized	3	0
Old Hwy 53/ SR 53	Unsignalized	2	1
Olympic Dr/ Burns Valley Rd/ Old Hwy 53	Signalized	2	1
Phillips Ave/ 18th	Unsignalized	2	0
	Top Intersections:	27	7
	All Intersection Crashes:	48	12

Half of the top intersections are on Old Hwy 53. Lakeshore Drive/ Old Hwy 53 was the most publicly commented intersection but was not the highest in the crash data with two total crashes. The Phillips Ave / 18th Ave intersection was also identified as a safety concern in the public comments. This intersection appears to have been recently improved with enhanced warning signage but exhibits signs of worn striping.



Exhibit 5. Lakeshore Drive/ 40th St/ SR 53

The eight intersections included in **Table 4** above represent over half of all intersection crashes including more than half of the fatal and serious injury crashes at intersections. All fatal and serious injury crashes included in **Table 4** occurred at intersections with Highway 53 or Old Highway 53. The higher posted speeds on Highway 53 (55 mph) compared to the local roadways may contribute to the higher proportion of fatal and serious injury crashes at Highway 53 intersections. The crash types and PCFs for top total crashes at intersections are shown in **Figure 11**.



Exhibit 6. Phillips Ave/ 18th Ave

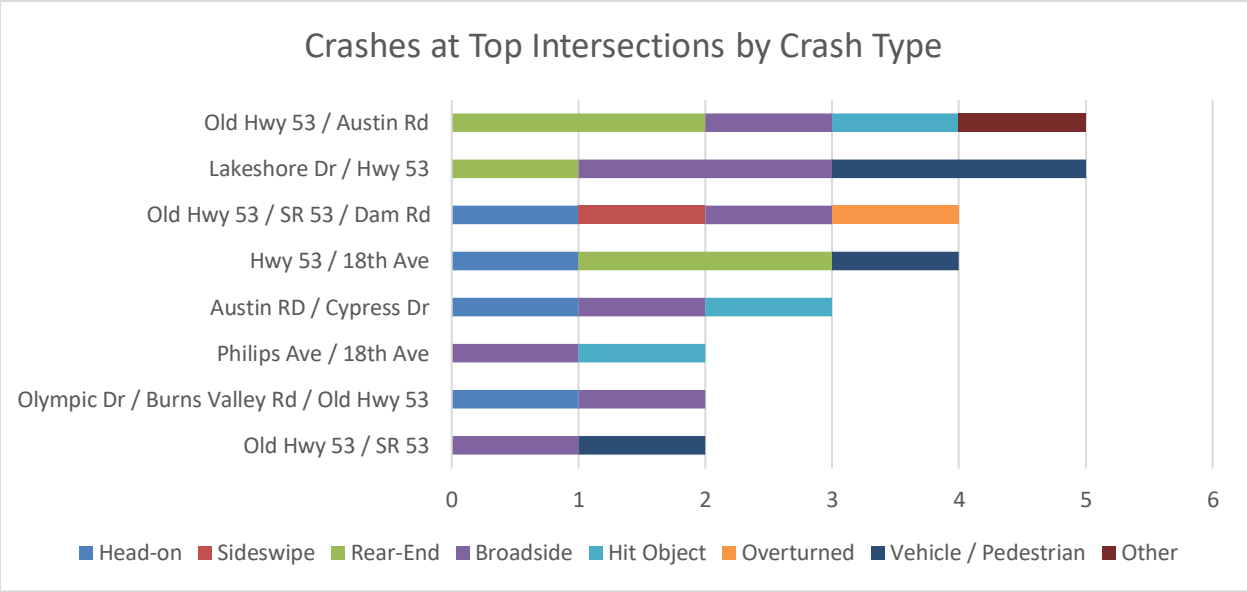
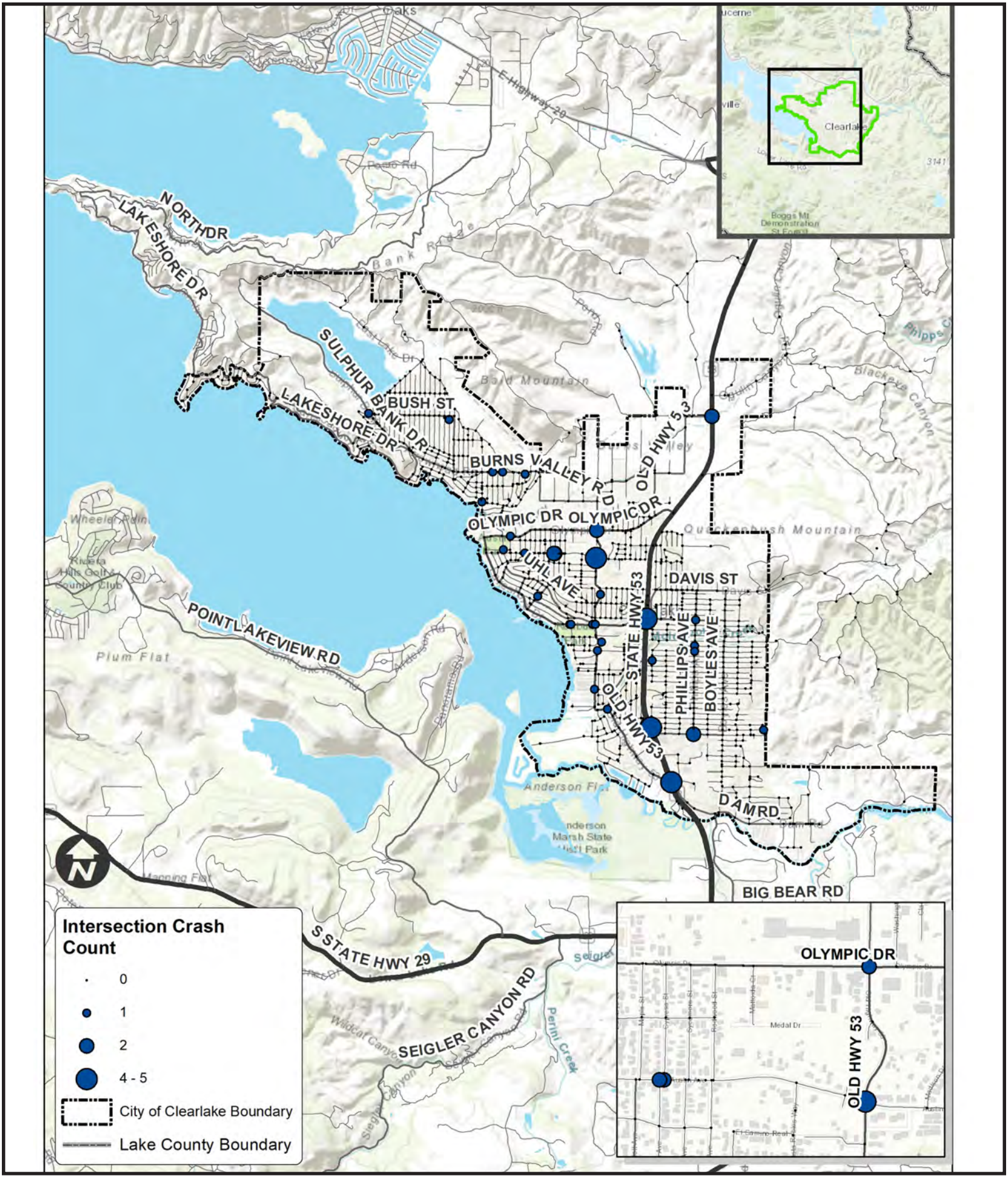


Figure 11. Top Crash Intersections Crash Types

Two intersections tied for the most crashes between 2015 – 2019: Old Hwy 53 / Austin Rd and Lakeshore Dr / Hwy 53. The top crash type at the intersection is broadside and the top primary factor is Unsafe Speed, with 10 of the 27 crashes at top intersections. The intersection crashes are shown on **Figure 12**.



NO SCALE

Figure 12

City of Clearlake - Local Road Safety Plan
Intersection Crash Totals (2015 - 2019)

In addition to the top intersections, stakeholders commented on a section of Clearlake, approximately bordered by Pine Avenue to the west, Parker Avenue to the east, 45th Avenue to the north and 18th Avenue to the south. This area has sections of poor pavement conditions, gravel roads, and lacks stop signs at some intersections. The crash data analysis shows sporadic crashes in this area, some with injuries.

Top Roadway Segments

The roadway segments with the highest number of total crashes, including intersection and non-intersection crashes are shown in **Table 5**.

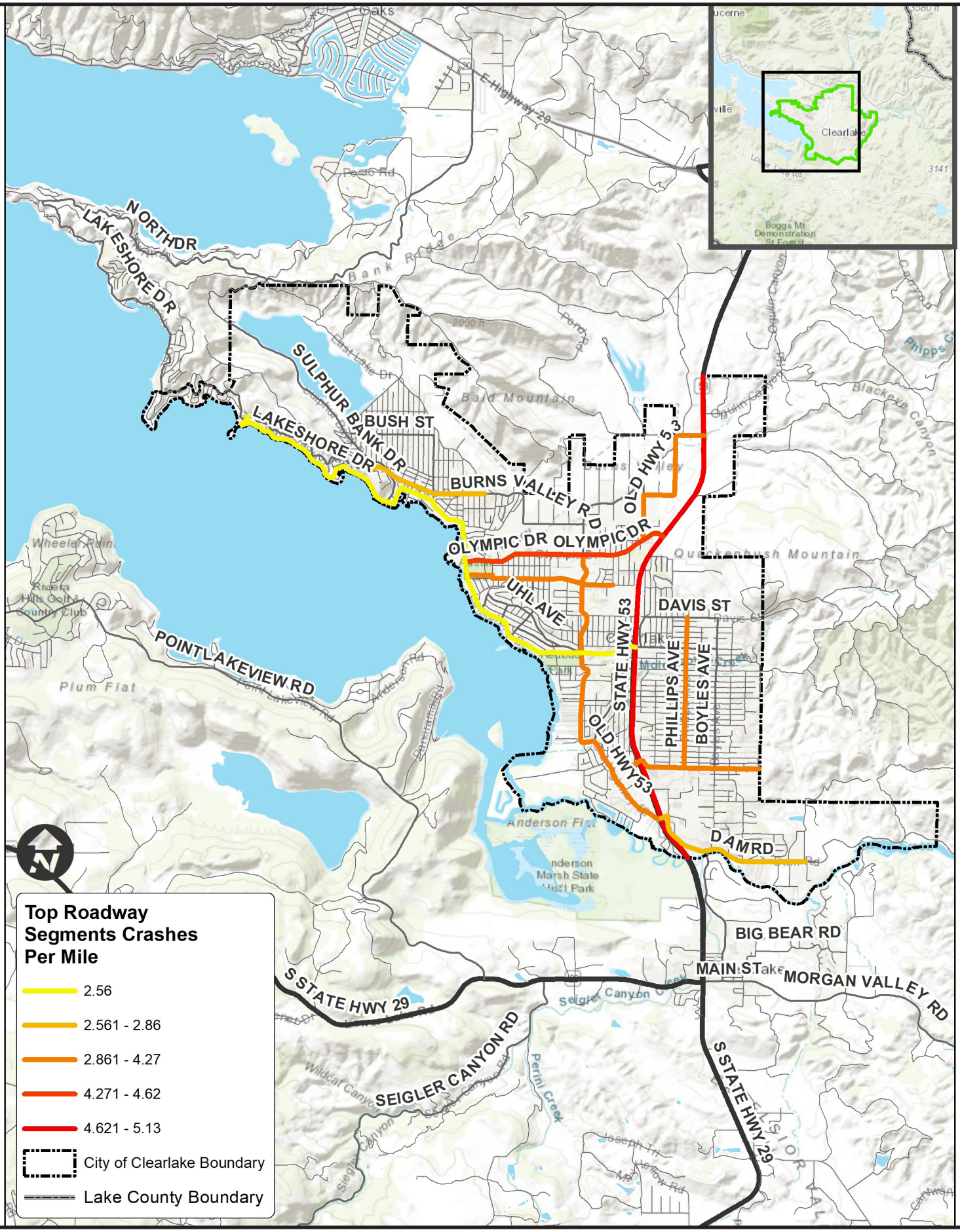
Table 5. Top Roadways

Primary Street	Segment Length	Crashes / mile (2015 – 2019)	Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Grand Total	Percent of All Crashes
Highway 53	4.29	5.13	2	3	7	6	4	22	18.0%
Old Highway 53	4.0	4.0	0	2	4	4	6	16	13.1%
Lakeshore Dr	4.68	2.56	0	3	2	2	5	12	9.8%
Olympic Dr	1.73	4.62	2	0	0	4	2	8	6.6%
18th Ave	1.17	4.27	0	2	0	0	3	5	4.1%
Austin Rd	1.22	4.09	0	2	2	0	1	5	4.1%
Phillips Ave	1.26	3.97	0	0	3	1	1	5	4.1%
State Route 20*	-	-	0	0	3	1	1	5	4.1%
Dam Road	1.40	2.86	0	0	1	0	3	4	3.3
Arrowhead Rd	1.08	2.78	1	0	1	1	0	3	2.5
Top Segments	-	-	5	12	23	19	26	85	69.7%
All Other Streets	-	-	1	4	7	8	17	37	30.3%
Total:	-	-	6	16	30	27	43	122	100%
*Includes crashes mapped well outside the Clearlake boundaries.									

Based on the total number of crashes as well as the corridor length, Highway 53 has the highest total number of crashes per mile from 2015 to 2019. The calculated crash rate on the Highway 53 segment was lower than statewide averages.

Olympic Drive, 18th Avenue, Austin Road, and Old Highway 53 all had more than 4 crashes per mile and experienced a total of two fatal crashes and nine serious injury crashes during this period. Crashes on the top ten roadways represent nearly 70% of all crashes in the City of Clearlake.

A map of the highest crash segments (including intersection and non-intersection crashes) is shown in **Figure 13**.



HEADWAY TRANSPORTATION

NO SCALE

Figure 13

City of Clearlake - Local Road Safety Plan
High Crash Segments (2015 - 2019)

Crashes were further analyzed based on whether they occurred at the intersection or outside of an intersection to identify the roadways that have safety issues at intersections and have safety issues along the roadway segments. Each crash record includes a designation of 'Intersection' which the reporting police officer will identify whether a crash has occurred at an intersection or on a roadway segment outside of the intersection. This designation helps to identify the causes of crashes and more accurately identify the application of safety countermeasures during the next steps of the project.

Roadways with the highest number of non-intersection crashes are shown in **Table 6**.

Table 6. Top Ten Roadway Segments for Non-Intersection Crashes

Roadway	Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Grand Total
Old Highway 53	0	1	4	3	3	10
Lakeshore Dr	0	3	2	0	3	8
Highway 53	2	1	3	3	0	8
Olympic Dr	2	0	0	3	1	6
18th Ave	0	2	0	0	2	4
SR - 29	0	0	0	0	3	3
Sulphur Bank Rd	0	1	0	2	0	3
32nd Ave	0	1	1	0	0	2
Austin Rd	0	0	1	0	1	2
Davis Ave	0	0	0	0	2	2
Top Ten Road Segments Sub-Total	4	9	11	11	15	48
All Other Streets Sub-Total	1	1	6	4	10	22
Total:	5	10	17	15	25	70

Focus Areas

Focus areas establish the priorities of the LRSP and typically relate to areas with the greatest opportunity for reducing fatal and serious injury crashes through safety strategies and countermeasures. The following focus areas represent opportunities to improve roadway safety across the City of Clearlake. Each focus area was identified and verified through a combination of crash data analysis, stakeholder engagement, and public outreach. Crash data patterns and trends were analyzed for specific focus areas.

Intersection Safety

Intersection safety is a primary focus area for improving safety in Clearlake with 36.9% of crashes, and 31.8% of all fatal and serious injury crashes occurring at an intersection as shown in **Figure 14.**



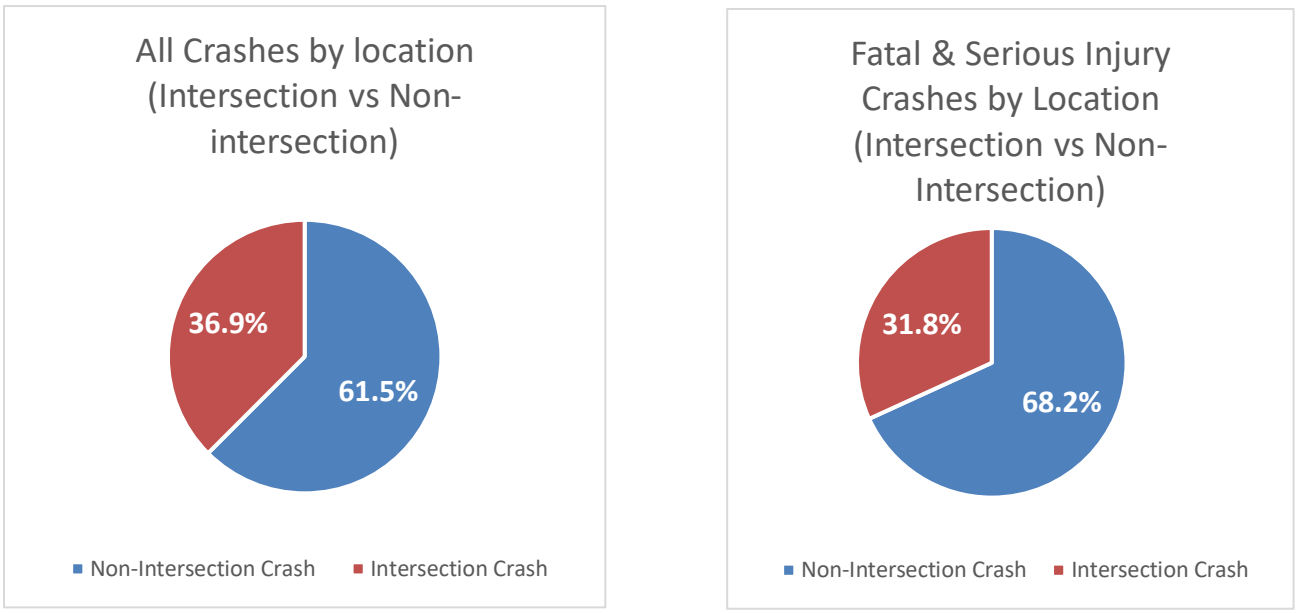


Figure 14. Intersection Crashes

Figure 15 shows the crash types at intersections by severity.

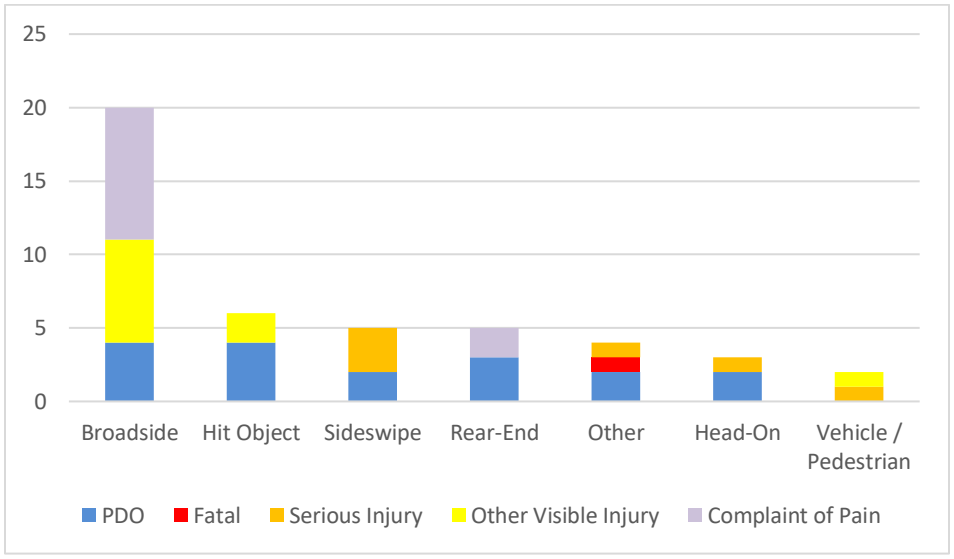


Figure 15. Intersection Crash Types by Severity

Broadside was the most common crash types at intersections while sideswipe, head-on and vehicle / pedestrian crash types all had a serious injury. Most of the top crash intersections are unsignalized (stop-controlled).

Intersection safety was the fourth highest priority in the public outreach. The intersection identified most frequently as a safety concern by Clearlake residents was the intersection of Old Hwy 53 and Lakeshore Drive. This

Broadside was the most common crash types at intersections while sideswipe, head-on and vehicle / pedestrian crash types all had a serious injury. Most of the top crash intersections are unsignalized (stop-controlled).

Intersection safety was the fourth highest priority in the public outreach. The intersection identified most frequently as a safety concern by Clearlake residents was the intersection of Old Hwy 53 and Lakeshore Drive. This intersection accounted for half of all intersection safety related comments. Although this intersection does not have a significant crash history, proactive measures may help reduce safety hazards at this location.

Some countermeasures for unsignalized intersections that may be considered include but are not limited to enhanced pavement markings, oversized signs and removing site obstructions. For all focus areas, potential solutions may be developed systemically or at spot locations based on site evaluations and the appropriate countermeasures to address specific safety concerns, starting with the locations with the highest crash frequencies or serious injury or fatal crashes. Countermeasures at intersections will be recommended with consideration of other planned engineering projects.

Lane Departures

Lane departures focuses on crash types associated with vehicles veering out of the lane and can include head-on, sideswipe, hit object, and overturned type crashes, including when a vehicle runs off the road or crosses into the opposing lane prior to the crash. As shown in **Table 7**, this accounts for half of the total crashes, and nearly half of the serious injury and fatal crashes.

Table 7. Lane Departure Crash Types

Crash Type	Total Crashes	Percent of All Crashes	Percent of Fatal & Serious Injury Crashes
Head-On	16	13.1%	27.3%
Sideswipe	10	8.2%	13.6%
Hit Object	26	21.3%	9.1%
Overturned	4	3.3%	0.0%
Total:	56	45.9%	50.0%



Crashes by severity typically associated with lane departures along roadway segments is shown in **Figure 16**.

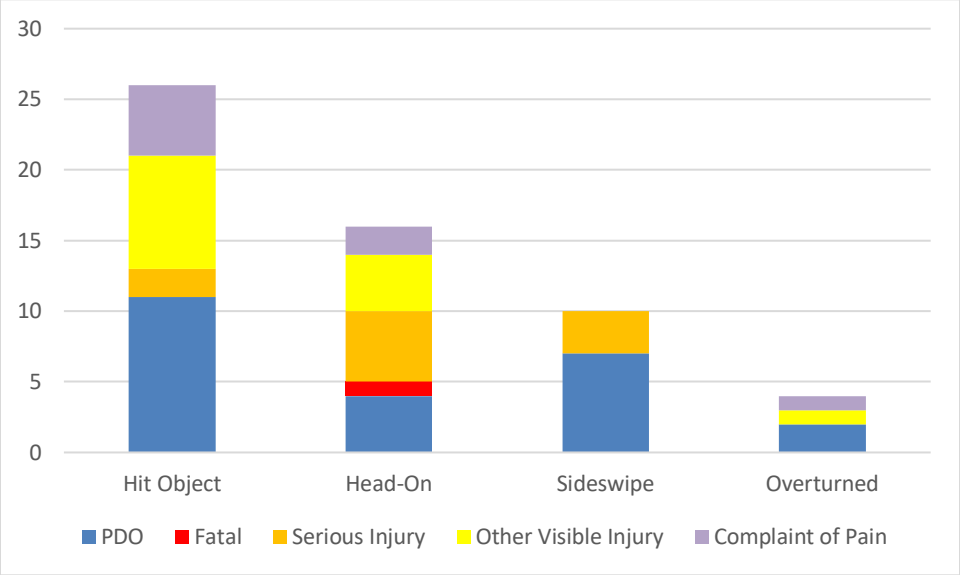


Figure 16. Lane Departure Crash Severities on Roadway Segments

Although results from the public outreach survey indicated lane departures as the lowest priority, speeding, impaired driving, and distracted driving (factors that may contribute to lane departures) are all primary safety concerns in the City of Clearlake.

Some countermeasures for lane departures that may be considered include but are not limited to rumble strips, curve warning signs, enhance markings, delineators and reflectors. Countermeasures for roadway segments will be recommended taking into account other planned engineering projects.

Pedestrian Safety

Pedestrians are vulnerable roadway users and 20% of the serious injury and fatal crashes involved a pedestrian. **Figure 17** shows the pedestrian actions by severity.

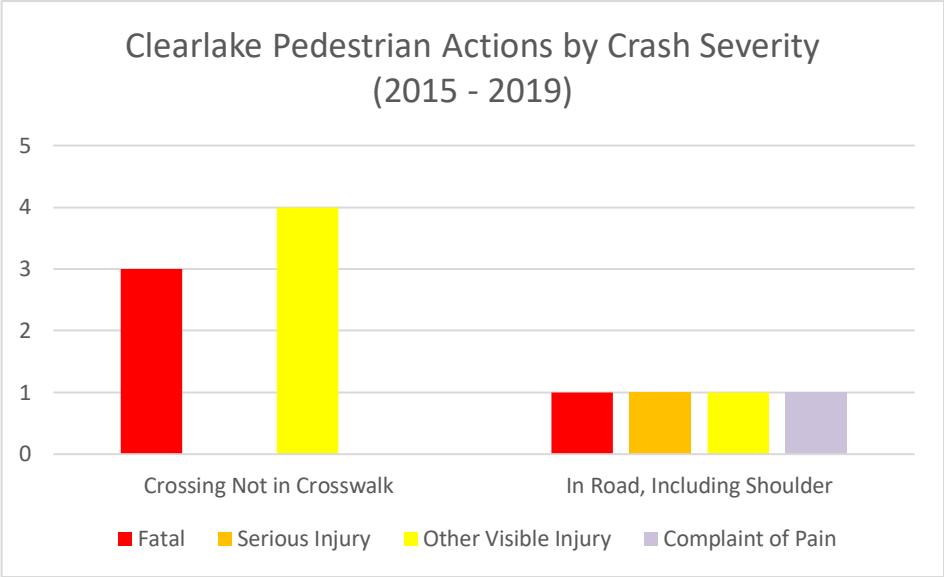


Figure 17. Pedestrian Actions

The pedestrian actions varied, but were most commonly in the roadway and not at an intersection. Of the four pedestrian fatalities, 75% had "Dark – No Street Light" conditions.

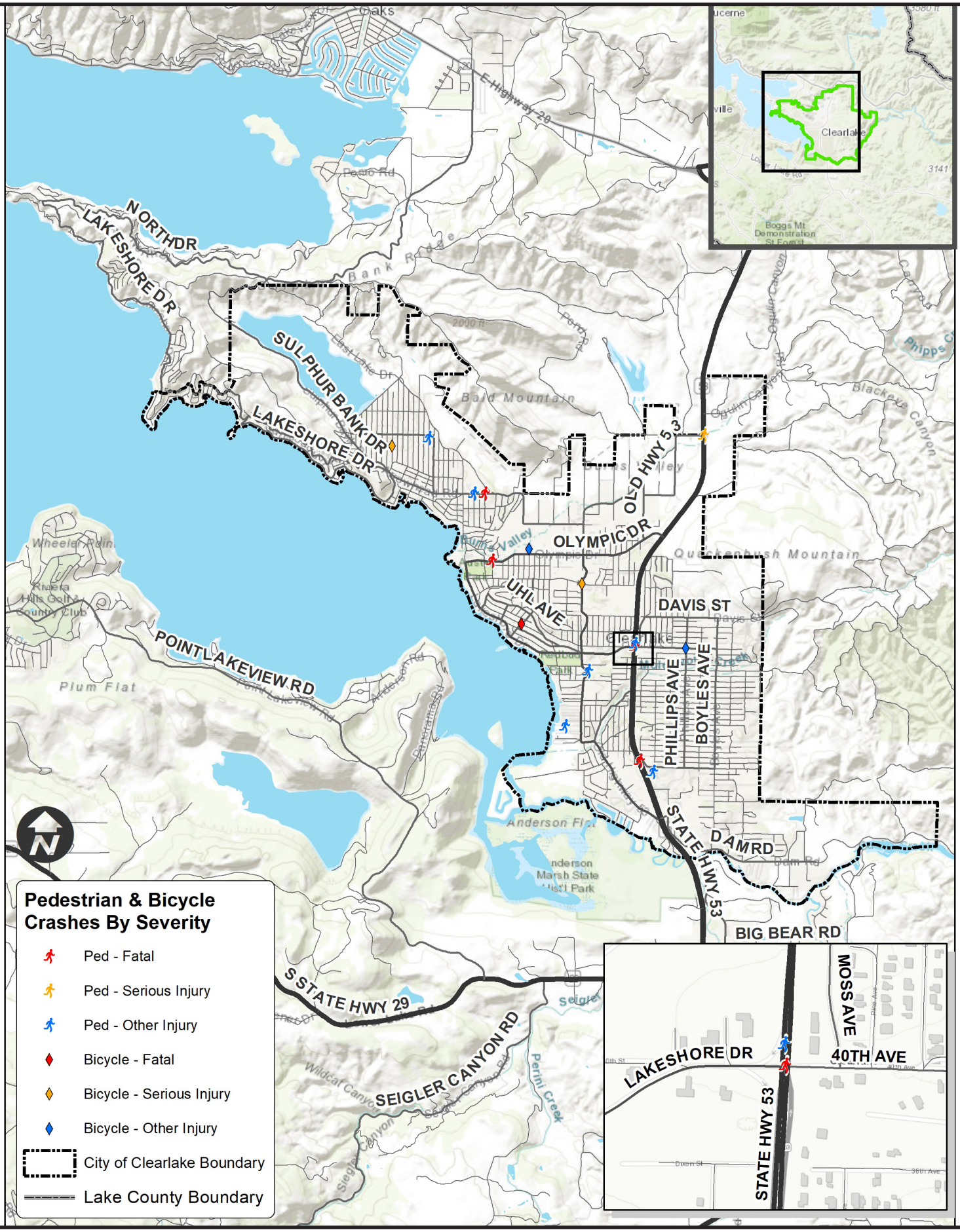
Pedestrian safety was the third highest priority in the public outreach. The second most frequent public comment in the City of Clearlake focused on the current poor condition of sidewalks throughout the City. Many comments indicated that pedestrians must walk along or within the roadway which exacerbates safety concerns due to low levels of roadway and intersection lighting. The specific need to increase lighting for pedestrians and bicyclists was also identified in the public comments.

Some countermeasures for pedestrian safety that may be considered include but are not limited to installing pedestrian crosswalks, enhancing existing pedestrian crosswalks, and adding sidewalks.

Bicycle Safety

A total of 5 bicycle crashes occurred between 2015 – 2019 in the City of Clearlake. All bicycle crashes were categorized as 'Other' crash types except for a single broadside crash. The primary collision factor for bicycle crashes included 'Wrong side of the road', 'Improper Turning', and 'Automobile Right of Way'. Only one bicycle involved crash occurred outside of normal 'Daylight' conditions. A small number of public comments identified the lack of bicycle facilities and poor pavement condition as barriers to riding a bicycle and safety concerns. Potential countermeasures may include bicycle lanes or focus on education and enforcement safety initiatives.

The bicycle and pedestrian crashes are shown on **Figure 18**.



HEADWAY TRANSPORTATION

NO SCALE

Figure 18

City of Clearlake - Local Road Safety Plan
Bicycle & Pedestrian Crashes (2015 - 2019)

Distracted Driving

Crash data typically does not show "distracted driving" as a PCF; however, many crashes are at least partially a result of distracted driving. Over the past decade, the number of potential distractions for drivers has increased dramatically from cellphone usage to on-board touch screen displays within vehicles. This is the most common type of distraction and has resulted in an increase in distracted driving across the nation. The newest crash records include an attribute for cellphone usage and this data attribute should be utilized to evaluate distracted driving in future versions of this LRSP. Distracted driving was identified as the highest priority safety concern by respondents to the public survey.

Potential countermeasures may be addressed through roadway or intersection engineering projects or education and enforcement safety initiatives.

Speeding

Speeding was a primary issue in the data analysis with unsafe speed as the leading PCF in serious injury and fatal crashes and across all crashes. **Table 8** shows the detailed breakdown for crashes with Unsafe Speed as the PCF.

Table 8. Crash Severity by Crash type for crashes with Unsafe Speed as PCF

Crash Type	Crash Severity				Grand Total
	PDO	Severe Injury	Other Visible Injury	Complaint of Pain	
Rear-End	9	1	1	7	18
Head-On	2	1	0	0	3
Broadside	1	0	2	0	3
Hit Object	1	0	2	0	3
Sideswipe	0	1	0	0	1
Overturned	0	0	0	1	1
Vehicle / Pedestrian	0	1	0	0	1
Other	1	0	0	0	1
Total:	14	4	5	8	31

As shown in **Table 8**, crashes involving speeding were more likely to result in rear-end type crashes.

Speeding was a frequently identified safety concern in open-ended survey responses. Potential countermeasures may include speed tables or other traffic calming measures or may be addressed through education and enforcement safety initiatives and may be citywide or specific corridors.



Impaired Driving

Impairment, or driving/bicycling under the influence, was the third highest PCF across all crashes and fourth for serious injury and fatal crashes. **Table 9** shows the age ranges associated with impaired driving crashes.

Table 9. Age Ranges for Impairment Crashes

Age Range	Total Crashes - Alcohol / Drug Impairment
<20	1
21-30	6
31-40	6
41-50	4
51-64	6
65+	1

Figure 19 shows the crash types associated with impaired driving accidents. Hit object, Head-On, and Broadside were the most common crash types.

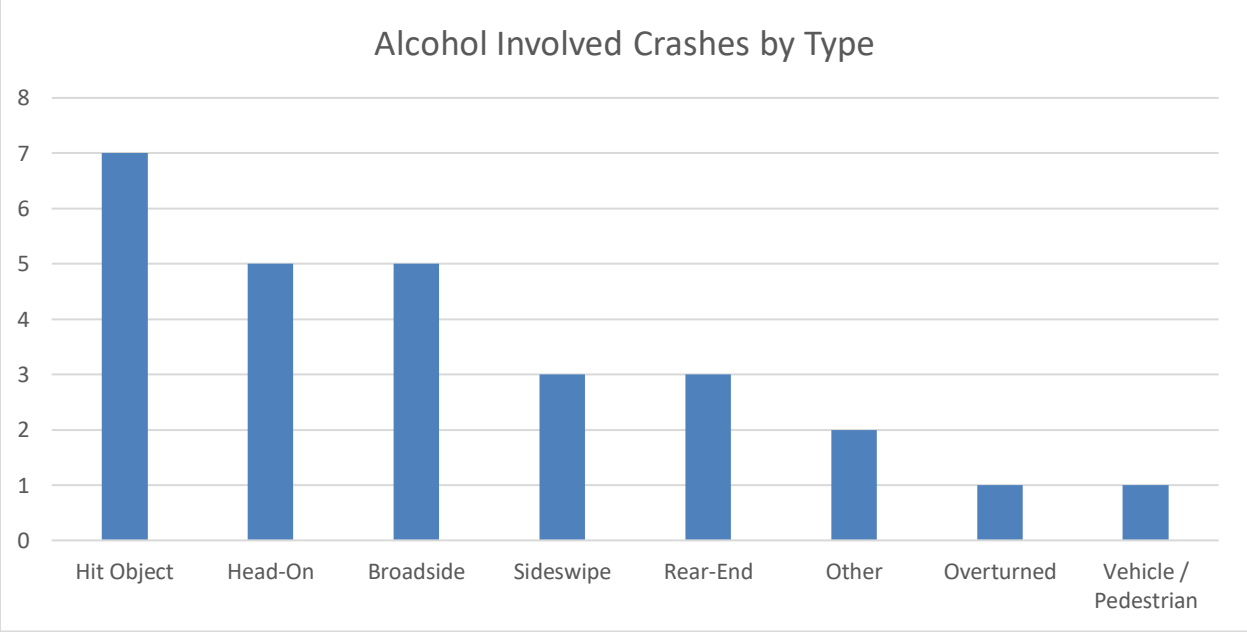


Figure 19. Crash Types Involving Impairment

Impaired drivers were identified as the second highest priority for safety through the public survey. Potential countermeasures may be addressed through education and enforcement safety initiatives.

Roadway/Intersection Lighting

As shown in **Figure 20**, 26% of all crashes and 30% of serious injury and fatal crashes occur during non-daylight hours.

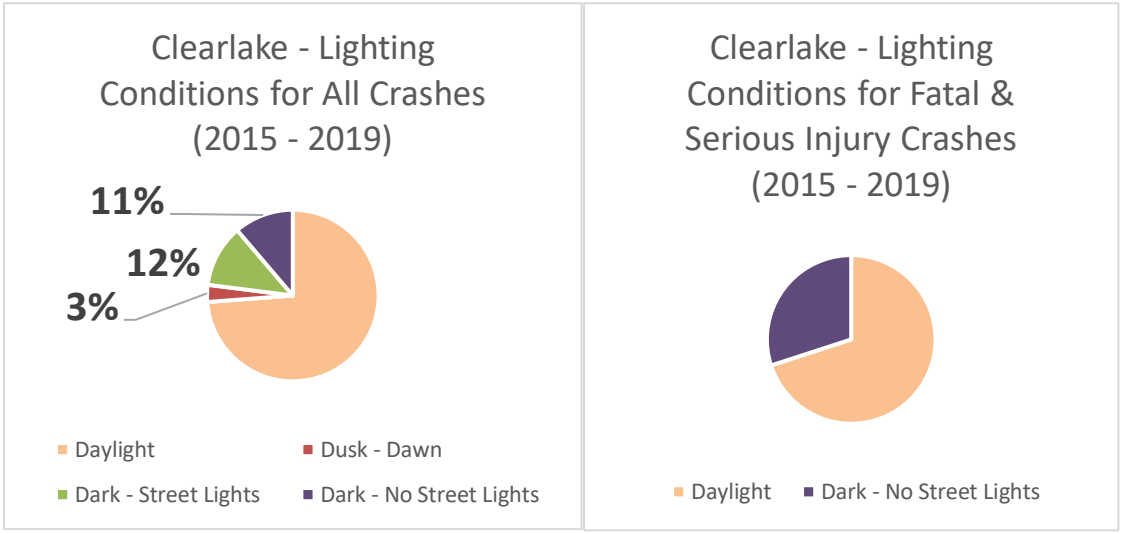
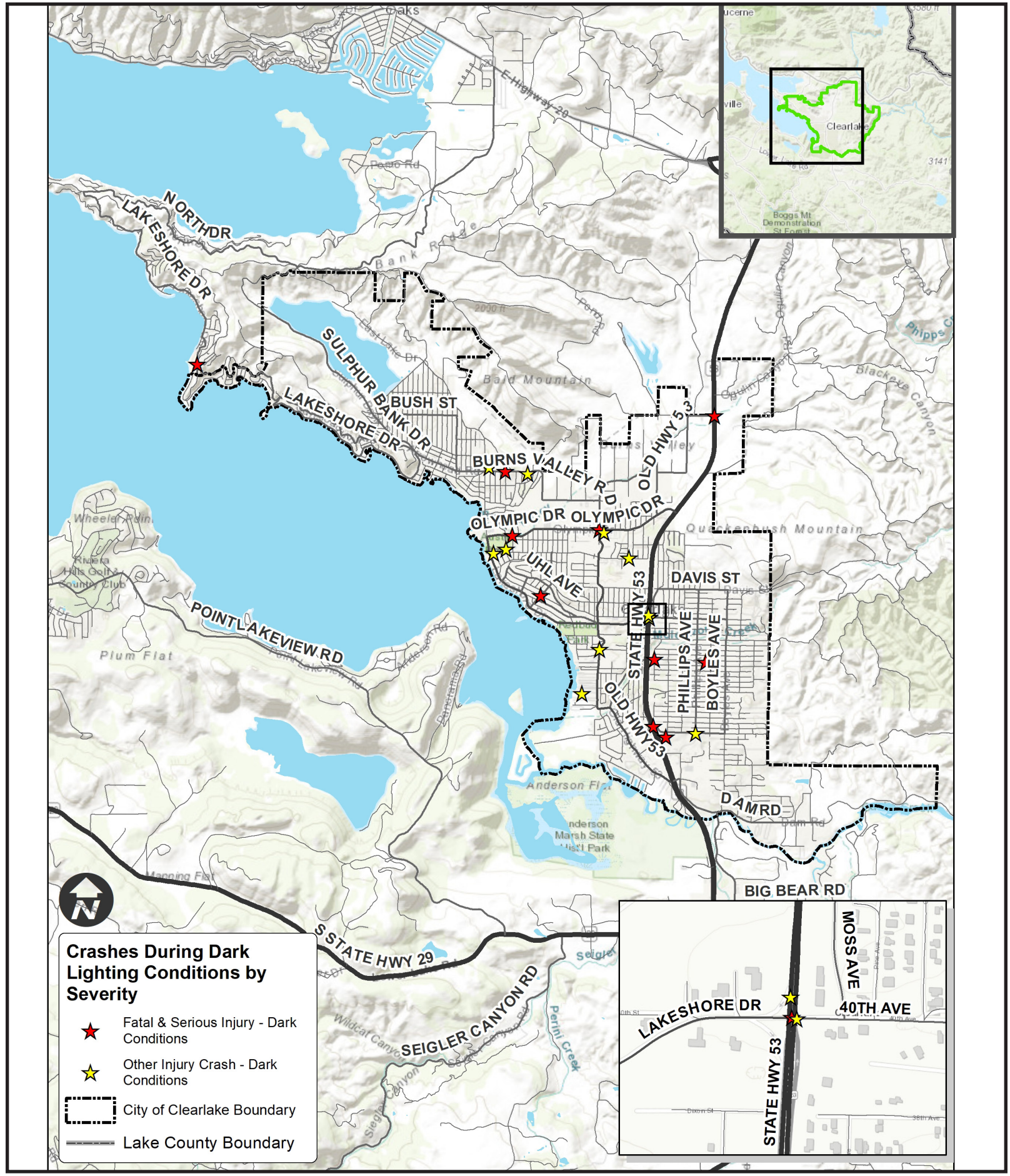


Figure 20. Lighting Conditions

The location of crashes which occurred outside of normal daylight conditions are highlighted in the map on **Figure 21**. It is important to note that 75% of fatal pedestrian crashes occurred under "Dark – No Street Light" lighting conditions.

Poor lighting conditions were the third most frequently mentioned safety concern or issue in the submitted surveys. Additionally, survey respondents also commented regarding poor lighting conditions locally and the impacts to pedestrian and bicycle safety, especially on roadways with limited or intermittent bicycle and pedestrian facilities.

Countermeasures for roadway lighting may be to enhance lighting at locations if identified to have insufficient lighting, starting with locations where nighttime crashes have occured.



HEADWAY TRANSPORTATION

NO SCALE

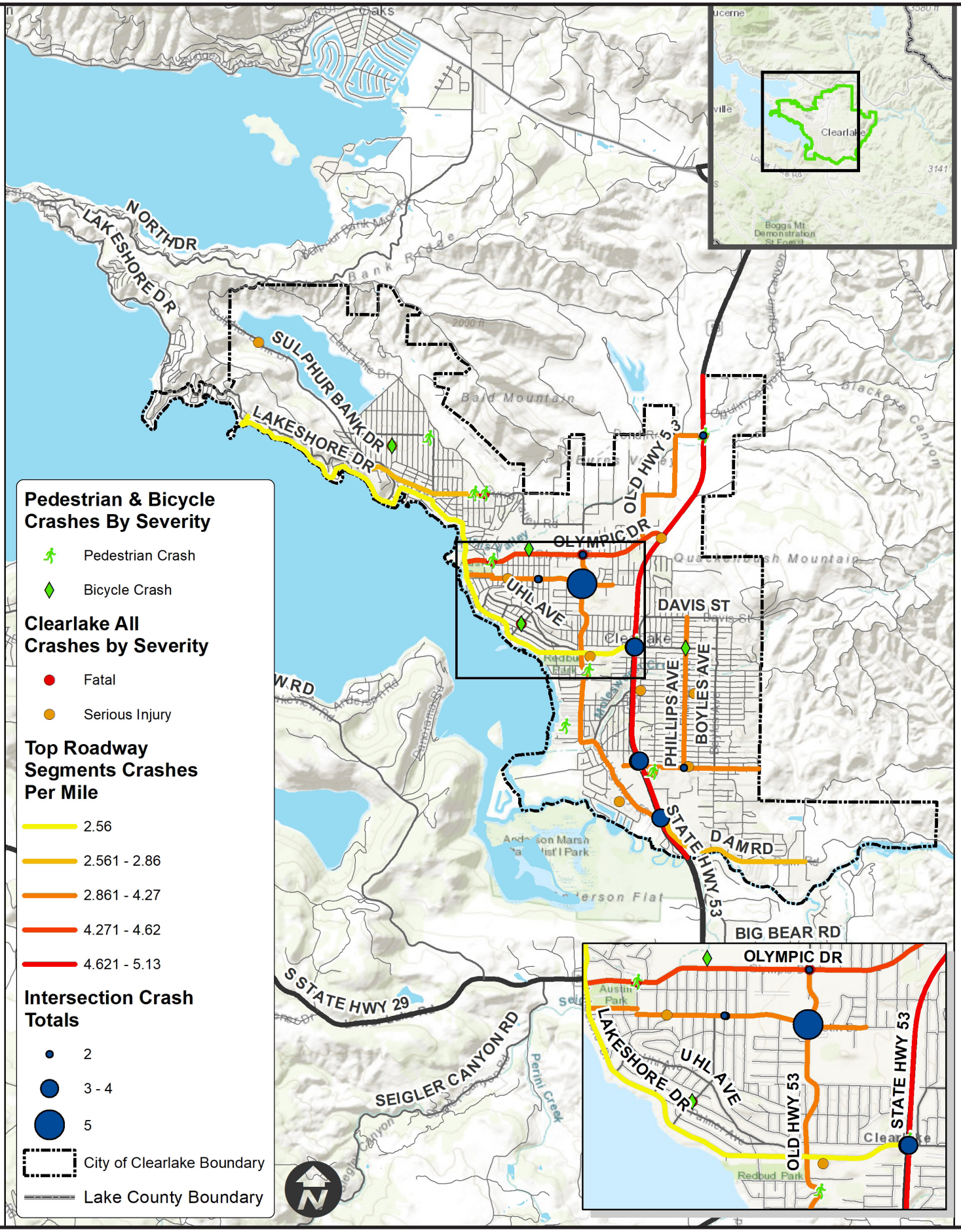
Figure 21

City of Clearlake - Local Road Safety Plan
Dark Lighting Condition Crashes (2015 - 2019)

Some key takeaways from the data analysis and public outreach are:

- ✓ **The pubic is most concerned with distracted driving, impaired driving, intersection safety, and poor sidewalk and roadway conditions.**
- ✓ **Engineering countermeasures will primarily focus on systemic safety measures at intersections and along roadway segments with a high number of crashes and will build upon other planned projects.**
- ✓ **Old Hwy 53 was identified in the crash data and public outreach as an area of concern.**
- ✓ **Enforcement and education initiatives will be recommended to reduce crashes due to distracted and impaired driving.**

Figure 22 presents a graphical summary of the crash data.



HEADWAY TRANSPORTATION

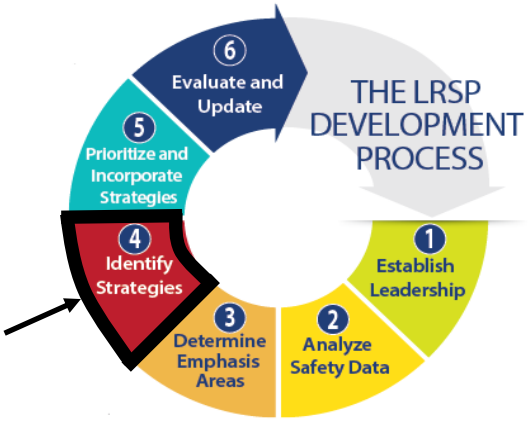
NO SCALE

Figure 22

City of Clearlake - Local Road Safety Plan
Crash Data Summary (2015 - 2019)

Countermeasures

Countermeasures are an action or device designed to negate or offset another[4]. Potential actions, or countermeasures, addressing each Focus Area were compiled into Strategy Tables highlighting the overarching strategy and responsible parties. A separate strategy table was developed for each focus area identifying the key information such as the objectives, success indicators, plan for implementation, and potential funding sources.



Source: FWHA

The Four E's of Traffic Safety

Developing a program of countermeasures and strategies across the four E's of safety planning (Engineering, Education, Enforcement, and Emergency Services) is critical to ensure that the complex issue of local road safety is being addressed in a holistic manner. Countermeasures were developed across the 4 E's specifically selected to address the focus areas in the City of Clearlake. Emerging Technologies, considered a 5th "E", were also explored.

Strategy Tables

Addressing focus areas can involve the implementation of numerous simultaneous strategies across the four E's by a variety of stakeholders including City departments and community partners. The Clearlake *Focus Area Strategy Tables* were developed to clearly define planning level strategies, responsible parties, completion goals, and performance measures for all recommendations. *Focus Area Strategy Tables* include categories for:



- *Engineering* projects and countermeasures to be applied systemically or at spot locations
- *Education* programs designed to address driver behaviors
- *Enforcement* initiatives to increase visibility and curb unwanted driver behavior
- *Emergency Services* projects to increase response times

Not all categories had recommendations for each focus area. Emerging Technologies of traffic safety is future focused and intended to promote the incorporation of advanced technologies in roadway infrastructure to improve safety. The significant cost of stand-alone emerging technology components typically associated with "Smart-City" installations such as a robust 5G network and *smart* infrastructure sensors significantly limits their

[4] https://www.merriam-webster.com/dictionary/countermeasure

practical application within many smaller communities. Small communities can continue to support emerging technologies without significant capital expenditures by making small enhancements to the network. By maintaining high quality lane markings, the City of Clearlake will help to facilitate autonomous vehicles and driver safety features such as “lane departure assist” systems in modern vehicles.

The Strategy Tables include:

- Strategic Linkage
- Objectives and Success Indicators
- Actions and Target Outputs
- Responsible Parties
- Date of completion (short, medium, or long-term)
- Monitoring and Evaluation Parameters
- Potential Funding Opportunities

These Strategy Tables are created to foster collaboration and generate buy-in from stakeholders. A summary of the Strategy Tables is presented in **Tables 10-16**, following the order of priority identified in the public outreach. The full tables are in **Appendix D**.

Table 10. Pedestrian and Bicycle Safety Focus Area Strategy Table

Bicycle & Pedestrian Safety			
	Actions	**Target Output**	**Potential Funding Opportunities**
Education	Safe Routes to School	Safe Routes to School plan created for local elementary and middle school with identified projects and recommended improvements	ATP
	Bike Safety Education for Children	Bike safety instruction for Clearlake children through school or City program	ATP, NHTSA 402
	Active Lighting/ Conspicuity Enhancement	Make pedestrians & bicyclists in the City of Clearlake more visible at night to avoid collisions by providing free lighting equipment and retroreflective clothing	NHTSA 402 NHTSA 405(h)
	Share the Road & Pedestrian Safety Awareness Messaging	Increase driver awareness of pedestrian & bicyclist rights and needs on the roadway	NHTSA 402
Enforcement	School Zone Enforcement	Increase driver awareness of school zone laws through increased enforcement at school zones and provide educational information with issued warnings	ATP, NHTSA 402
Engineering	Systemic Pedestrian Crosswalks Near School	Pedestrian crosswalks implemented at select locations. See details in **Appendix E.**	HSIP, ATP
	Systemic Sidewalk	Sidewalks constructed in various locations throughout the City. See details in **Appendix E**.	HSIP, ATP
	Roadway Improvements and Bicycle Lanes	Improve pavement and incorporate bicycle lanes and sidewalk. See details in **Appendix E**.	HSIP, ATP

Table 11. Intersection Safety Focus Area Strategy Table

Intersection Safety			
	Actions	**Target Output**	**Potential Funding Opportunities**
Engineering	Site Specific - Lakeshore Dr / Hwy 53 (Signalized)	Safety Improvements implemented at selected locations throughout the City, see additional details in **Appendix E**.	HSIP
	Systemic Signalized Intersections		
	Systemic Unsignalized Intersections		
	Systemic Unsignalized Intersections and Roadways		
EMS	Evaluate emergency vehicle detection along priority emergency routes	Increase emergency vehicle detection and response times along priority routes	HSIP*, Other *If Emergency Vehicle involved crashes have occurred at the project location.

Table 12. Distracted Driving Focus Area Strategy Table

Distracted Driving			
	Actions	**Target Output**	**Potential Funding Opportunities**
Education	Distracted Driving Public Outreach Campaign	Local distracted driving messaging campaign using a variety of media outlets	NHTSA 402, NHTSA 405(e)
Enforcement	High-Visibility Cell Phone / Text Messaging Enforcement Campaign	Conduct high visibility enforcement program, contingent on staff resources, to increase awareness of enforcement efforts and to provide citations as needed.	CTFGP, NHTSA 402, NHTSA 405(e)



Table 13. Impaired Driving Focus Area Strategy Table

Impaired Driving			
	Actions	**Target Output**	**Potential Funding Opportunities**
Education	Drunk & Impaired Driving Awareness Campaign	Reduced number of alcohol-involved serious injuries and fatalities	NHTSA 402, NHTSA 405(e)
Enforcement	Passive Alcohol Sensors (PAS)	Equip officers with Passive Alcohol Sensors to increase efficiency of Alcohol Checkpoints and normal traffic stops	NHTSA 402, NHTSA 405(e)
	Publicized Sobriety Checkpoints	Highly publicized sobriety checkpoints conducted regularly to increase perceived risk of arrest for impaired driving	CTFGP, NHTSA 402, NHTSA 405(d)
	High-Visibility Saturation Patrols	Focused patrols around specific areas where impaired-driving crashes are common as part of an on-going saturation program	CTFGP, NHTSA 402, NHTSA 405(d)

Table 14. Lighting Focus Area Strategy Table

Roadway & Intersection Lighting			
	Actions	**Target Output**	**Potential Funding Opportunities**
Engineering	Perform lighting analysis at select locations, starting with those with nighttime crashes, or suspected to have poor lighting	Identified list of locations, potential HSIP project	*Public Works Operational Funding*



Table 15. Speeding Focus Area Strategy Table

Speeding			
	Actions	**Target Output**	**Potential Funding Opportunities**
Education	Speed Kills Campaign	Conduct public outreach campaign about the importance of driving the speed limit and the impact just 5 mph can have on the severity of a crash	NHTSA 402, NHTSA 405(e)
Enforcement	Targeted Speed Enforcement Program	Reduced speeding issues along select corridors through regular and targeted enforcement patrols	NHTSA 402, NHTSA 405(e)
Engineering	Systemic Speeding Management Project	Dynamic Speed Signs and/or portable trailers to inform motorist of speeding. See details in **Appendix E**.	HSIP, NHTSA 402

Table 16. Lane Departures Focus Strategy Table

Lane Departures			
	Actions	**Target Output**	**Potential Funding Opportunities**
Engineering	Systemic Roadway	Improve road visibility and install rumble strips. See details in **Appendix E**.	HSIP, CMAQ

Engineering Countermeasures

Engineering countermeasures can be applied at site-specific locations or systemically. HSIP countermeasures are provided in the *Local Roadway Safety: A Manual for California's Local Road Owners (April 2020)* and as part of the *HSIP Analyzer Manual for BCR Applications*. A table of the countermeasures is included in **Appendix F**. The table shows the countermeasure name, type, applicable crash type(s), crash reduction factors (CRFs), federal funding eligibility, and opportunity for systemic implementation, divided into three groups: signalized intersections, non-signalized intersections, and roadway segments. This data was used as a guide to develop improvements that will



provide potential for funding opportunity. The table is not an exhaustive list of safety improvements; other non-HSIP eligible improvements are also considered and recommended as applicable.

Systemic Applications

Systemic countermeasures were applied to multiple locations based on crash data and similar geometric features. This approach can also be used proactively to apply countermeasures at locations without a significant crash history, but high-risk factors. The HSIP countermeasure table in **Appendix F** indicates if the countermeasure is a "Low" to "Very High" opportunity for systemic implementation. Systemic improvements may be incorporated into regular maintenance activities as budgets allow or achieved through HSIP grant funds.

Site Specific Applications

Projects were also developed for high crash frequency site-specific locations if the risk factors and recommended improvements did not fit into a systemic application.

Other Considerations

Emergency response and evacuation were also considered in the countermeasure selection process. Countermeasures were recommended that would facilitate or not hinder emergency vehicles or an evacuation on key routes.

Potential Engineering Projects

Engineering Countermeasure Projects

Engineering countermeasures were developed through a methodical process. The top locations (roadways and intersections) for crashes or public comments were reviewed to determine the risk factors.

Risk factors identify common roadway or intersection characteristics that may contribute to past crashes or increase the risk of future crashes. *The Federal Highway Administration (FHWA) Systemic Safety Project Selection Tool*[5] includes a list of common risk factors for intersections and roadway segments. Site evaluations were conducted to identify specific risk factors in the roadway network that may be contributing to crash trends noted in the data analysis.

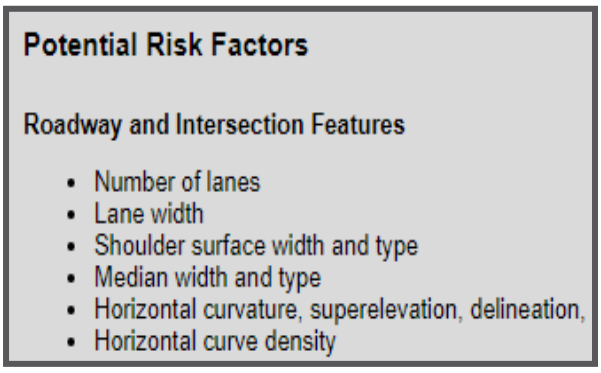


Exhibit 7. Subset of Roadway and Intersection Risk Factors
Source: FHWA Systemic Safety Project Selection Tool

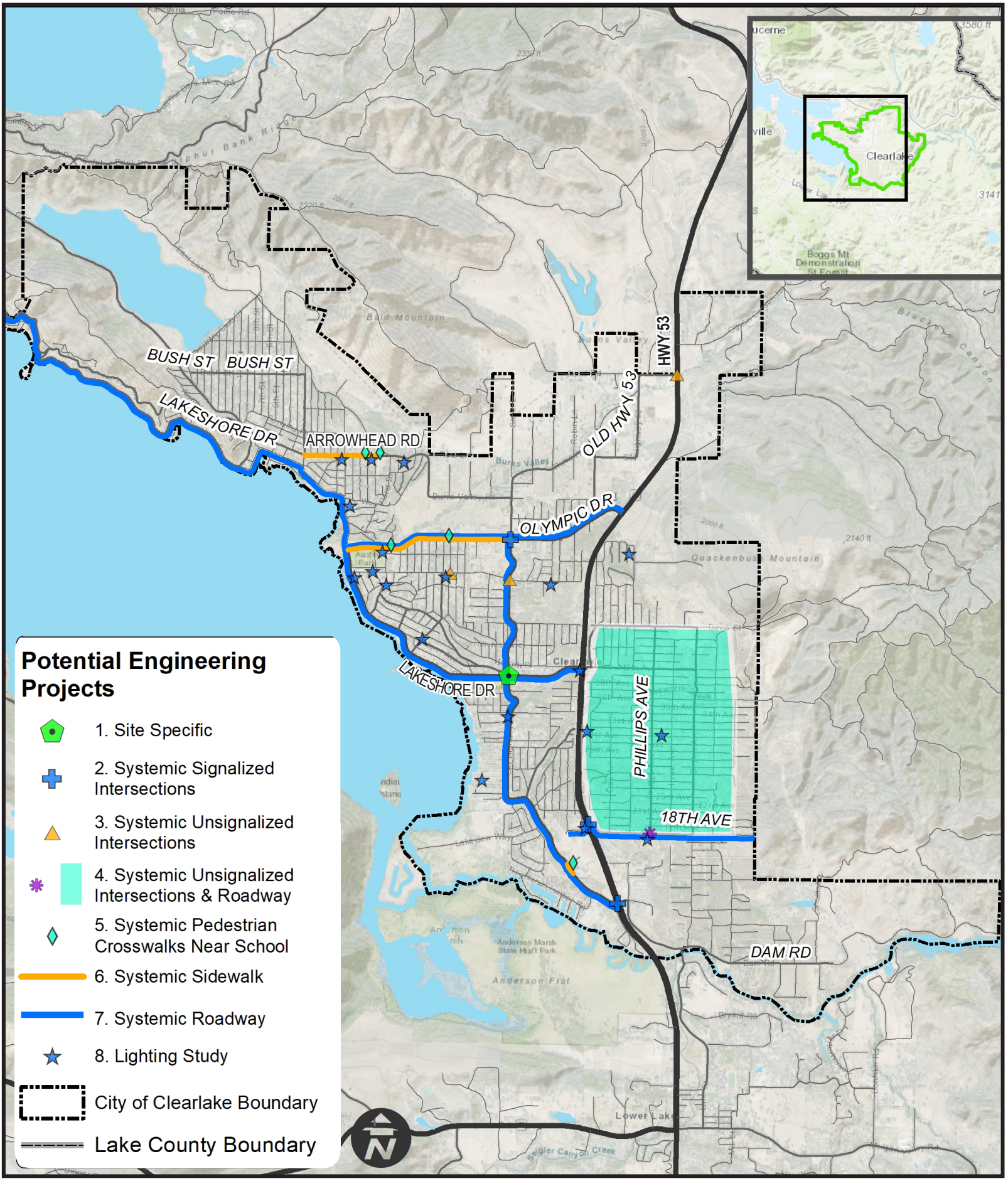
[5] Source: https://safety.fhwa.dot.gov/systemic/fhwasa13019/element1.cfm#el12

Based on the crash data and risk factors, projects were identified as site specific, or systemic if multiple locations exhibited similar features. Projects were assessed at a high-level for the potential for HSIP funding based on the number and severity of crashes, the selected countermeasures, and initial costs estimate. The annual societal costs from the *FHWA BCA Systemic Project Selection Tool*[6] were utilized to quantify crash costs and potential safety benefits.

Projects Overview

Table 17 and **Figure 23** provide an overview of potential engineering projects and locations. Project descriptions are included in **Appendix E**.

[6] Source: https://safety.fhwa.dot.gov/hsip/planning.cfm



HEADWAY TRANSPORTATION

NO SCALE

Figure 23

City of Clearlake - Local Road Safety Plan
Potential Engineering Projects

Table 17. Potential Engineering Projects

ID #	Focus Area	Project	Potential Locations
1	Intersection Safety	Site Specific	Lakeshore Dr/ Hwy 53 (Signalized)
2	Intersection Safety	Systemic Signalized Intersections	Hwy 53/ 18th Ave (Signalized)
			Old Hwy 53/ SR 53 / Dam Rd (Signalized)
			Olympic Dr/ Burns Valley Rd/ Old Hwy 53 (Signalized)
3	Intersection Safety	Systemic Unsignalized Intersections	Old Hwy 53/ Austin Rd (Unsignalized)
			Austin Rd/ Cypress Dr (Unsignalized)
			Old Hwy 53/ SR 53 (Unsignalized)
			Phillips Ave/ 18th
4	Intersection Safety and Lane Departures	Systemic Unsignalized Intersections and Roadways	The Avenues – group of intersections. Approximately bordered by Pine Avenue to the west, Parker Avenue to the east, 45th Avenue to the north, and 18th Avenue to the south.
5	Pedestrian and Bicycle Safety	Systemic Pedestrian Crosswalks Near School	Arrowhead Rd/ Ciwa St
			Arrowhead Rd/ Halika St
			Old Hwy 53/ Airport Rd
			Olympic/ Pine St
			Olympic Dr/ Maple St
6	Pedestrian and Bicycle Safety	Systemic Sidewalk	Arrowhead Rd Near School
			Old Hwy 53/ Airport Rd
			Olympic Street Near School
7	Lane Departures	Systemic Roadway	Old Highway 53
			Lakeshore Drive
			Olympic Drive
			18th Ave
8	Lighting	Lighting Study	Various (see **Figure 21**)
9	Speeding	Systemic Speed Project	Various
10	Pedestrian and Bicycle Safety	Community-Wide Roadway, Bicycle and Pedestrian Improvements	Various



Selected Projects

Methodology

Two projects were selected from the list of thirteen "Potential Engineering Projects" (**Table 17**) for further detail including conceptual layouts, cost estimates, and Benefit-Cost calculations. This supplemental data can be used in preparing an HSIP or other grant application. Additional or different locations and/or countermeasures may be substituted.

The projects, site locations, and countermeasures were selected and refined in coordination with the City considering:

- Possibility of reducing crashes
- BCR and HSIP Potential
- Public outreach
- Fit with community goals or other planned projects
- Considering recently or soon-to-be constructed projects

The HSIP Analyzer Manual (in **Appendix F**) provides guidance, with exceptions, indicating:

- One application may include one or multiple locations
- All the locations in the application must be of the same type: Signalized Intersections (S), Non-Signalized Intersections (NS), or Roadways (R)
- All the locations in the application must receive the same proposed safety improvements, i.e. all the safety countermeasures (CMs) must be applied to all the locations. Up to three (3) safety countermeasures may be used in calculating the benefit of the project. The guidance provides an exception if a few locations are different.
- Project costs should be between $100,000 - $10,000,000

The projects selected were:

- **Intersection Safety – Systemic Unsignalized Intersections**
- **Pedestrian Safety – Systemic Pedestrian Crosswalks Near Schools**

For each project, layouts were prepared showing potential countermeasures selected to reduce crashes and estimated costs. The BCR calculations were performed using the *FHWA "Highway Safety Benefit-Cost Analysis Model"* spreadsheet. This spreadsheet estimates the BCR considering:

- The existing average annual crashes at the combined site by severity, derived from the existing crash data.
- Estimated project costs including engineering, construction, and maintenance.
- The life of the countermeasures and the crash reduction factors, both derived from the HSIP analyzer data in **Appendix F**.
- Other parameters were the defaults built into the spreadsheet.

The project layouts and analysis reports from the BCR spreadsheet are in **Appendix G**.



Implementation Plan

This plan was developed as a guide to facilitate the implementation of the countermeasures and strategies identified under each area. This implementation plan focuses on addressing the high priority or "low-hanging fruit" safety issues first. The plan also focuses on identifying systemic safety improvements to be incorporated into on-going maintenance and safety programs as well as future grant applications. The following sections summarize the plan, highlight key considerations, and identify the next steps. Additional detail for each countermeasure including tentative date of completion, performance measures, and responsible parties, are provided in the *Focus Area Strategy Tables*.



Source: FWHA

Key Steps for Successful LRSP Implementation

In July 2020, the FHWA released guidance (*Implementing a Local Road Safety Plan*) based on best practices and lessons learned by agencies around the country for implementing LRSPs. This guidance identified six key steps:

1. **Maintain Buy-In and Support:** Maintaining and expanding the stakeholder and public support fostered during the development of this LRSP will require on-going communication and coordination through educational materials, news releases, and meetings. Implementation of many non-engineering countermeasures will require partnerships with stakeholders to achieve a successful outcome. The City should identify the specific outreach methods and level of detail that is achievable for continued communications with stakeholders, the general public, and decision makers. Education and Enforcement strategies are often best implemented following buy-in from community partners and stakeholders. It will be critical to work closely with stakeholders and community partners to ensure that resources and efforts are shared whenever possible.

2. **Identify funding mechanisms:** LRSPs are required for future HSIP funding, however, other funding mechanisms can also be used to improve local safety, as identified in the *Focus Area Strategy Tables*.

3. **Identify and prioritize projects:** Projects, programs, and initiatives should be prioritized based on the potential safety improvement and ease of obtaining funding and implementation.

4. **Determine project delivery methods:** Projects identified through this LRSP will be primarily pursued through grant funded projects and initiatives due to existing funding constraints. When possible, countermeasures should be included in on-going maintenance programs and incorporated into other projects.

5. **Evaluate effectiveness:** Performance measures and evaluation metrics are included in the *Focus Area Strategy Tables* for each countermeasure to assist the City of Clearlake in monitoring progress towards implementation and impacts on crash frequency and severity. This living document is intended to be updated every four years. However, the City would benefit from tracking safety metrics annually in order to gauge implementation outcomes on a more frequent basis.

6. **Continue communication and coordination:** Much like #1, it is important to maintain close communication with stakeholders to coordinate efforts whenever possible and provide the public with updates regarding implementation progress and outcomes.

Key Components of Non-Engineering Implementation

The most critical steps for implementation of the non-engineering LRSP countermeasures are building strong public outreach messaging; expanding and leveraging partnerships and collaborations with stakeholders and local agencies; and obtaining grant funding for expanded initiatives and outreach. While all countermeasures identified in the plan are important for improving safety in the City of Clearlake, the following countermeasures and general strategies are most feasible for early implementation and provide the greatest safety benefit from non-engineering countermeasures.

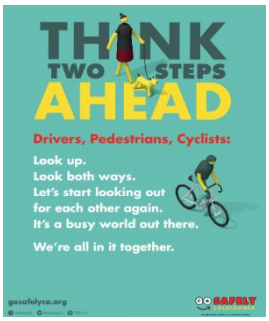


Exhibit 8. Distracted Driving Campaign

Social Media Campaign and Continued Outreach

Providing the public with important safety information and messaging through a variety of platforms including social media, online advertisements, TV, and radio is an important strategy for increasing awareness around safety and reducing crashes. The specific type of media used for each campaign depends on the audience, the message, and available resources. Some outreach campaigns may focus exclusively on social media, and some may require more holistic approaches including more traditional media like TV, newspaper, and radio. However, these larger outreach campaigns may require long time frames for implementation and higher budget considerations. A targeted social media campaign can be implemented quickly with very little budget by utilizing existing messaging, such as those provided by the Caltrans Office of Traffic Safety through the “Go Safely, California” program, highlighted below.

"Go Safely, California" – Public outreach and education materials covering a variety of safety topics including impaired driving, distracted driving, and bicycle and pedestrian safety are available through the **"Go Safely, California"** website. These resources provide local agencies with free and compelling materials to educate the public on the dangers of distracted driving, impaired driving, pedestrian & bicyclist safety, and speeding. Pre-made toolkits are available to supplement existing outreach efforts.



Source: www.gosafelyca.org

Targeted social media messaging campaigns can focus outreach efforts to a particular demographic, such as young drivers between 15 and 23 years of age regarding the potential risks of distracted driving and impaired driving. Targeted messaging campaigns through social media will help to ensure their message is received by those in the target group with minimal budget impacts. Additionally, the reach of social media messages and campaigns may be amplified many times if stakeholders share the safety campaign messages through their own social media accounts. This strategy was utilized during the public outreach process, which resulted in a significantly higher rate of responses than anticipated by the project team.

Partnerships & Collaborations

Roadway safety is a shared responsibility and so too is the implementation of roadway safety plans. The City of Clearlake must work collaboratively with numerous stakeholders and form interdepartmental and interagency partnerships to successfully implement many of the identified strategies. The following strategies will require direct partnerships and close collaboration to be successful:

Bicycle & Pedestrian Trainings

Incorporating pedestrian and bicycle training into the physical education curriculum for elementary school students will require close collaboration between the City, school district, parents, teachers, and students.

The City may work collaboratively to support and enhance existing bicycle safety courses offered by various entities. This may include providing course materials, sponsoring American League of Bicyclists Certified Instructors to train the course, or providing bicycle safety materials to support these on-going trainings. The City should collaborate with these organizations to identify the greatest need.



Exhibit 9. Enhance pedestrian and bicycle training/safety.

The City may work with the Department of Motor Vehicles and other driver instruction providers to include information about bicyclist safety and bicyclists' rights into driver training materials. Changing existing driver training materials is anticipated to be a long process which may require convening driver instruction providers to address the issue holistically at a local level.

Sober Ride Home

Transportation Network Companies such as Uber and Lyft as well as traditional taxi companies may work with the City of Clearlake to provide discounted or free rides home to intoxicated individuals to avoid driving while under the influence of drugs or alcohol. This program may first be focused on specific time periods such as Saint Patrick's Day, New Year's Eve, or Halloween and expanded, based on funding and need, later on.

Responsible Beverage Service (RBS)

Following the passage of Assembly Bill 82, any alcohol server and their manager will be required to have a valid RBS certification from an ABC accredited RBS training provider and pass an online ABC administered RBS exam within 60 calendar days from the first date of employment as of July 1, 2022[7]. The City of Clearlake may work with the local chamber of commerce and local alcohol server training providers to promote face-to-face training programs (taking COVID-19 protocols into consideration) as the standard for local businesses as these programs have been shown to be more effective.

RBS
Responsible
Beverage
Service

Crash Data

To ensure that local data represents the most accurate information, the City Public Works department should update the crash data received from Caltrans with the most up-to-date local data. A lag in reporting periods may result in a crash victim passing away from their injuries, which requires the crash data record to be updated to a fatality. Caltrans currently has a process for updating crash data records; however, data inaccuracies may still exist. To reduce inaccuracies, the City Public Works department and Police departments should convene to conduct a data reconciliation process between the data received from Caltrans and the crash data records collected by the Police department annually. This process will also provide opportunities to re-evaluate how data is collected and reported to best support future safety analysis and include outside agencies (Caltrans, CHP, etc.) in the overall discussion about improving local crash data records and the record keeping process, as appropriate.

Grant Funding

The City and local stakeholders will likely pursue grant opportunities to implement many of the identified countermeasures and strategies. Additionally, the timeframes for implementation will be contingent on obtaining grant funding as well as maintaining existing maintenance and construction funding levels. The following section highlights key considerations for each potential grant funding opportunity. Funding opportunities for each countermeasure and strategy have also been identified in the *Focus Area Strategy Tables*.

[7] https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa09028/resources/countermeasures.pdf

Highway Safety Improvement Program (HSIP)

This federal program is managed by Caltrans and focused on infrastructure projects with nationally recognized crash reduction factors. This is one of the major funding mechanisms for safety projects across California and is closely tied to the LRSP. Agencies must have completed LRSP plans prior to submitting future HSIP applications. Calls for projects under this funding program are typically announced every other year. The next round of HSIP funding is anticipated to open in April 2022. Two potential projects were developed as part of the LRSP for cost estimates and BCR calculations to facilitate HSIP application.

Active Transportation Program (ATP)

This competitive statewide program, managed by Caltrans, consolidates federal and state funding from several sources including the State Senate Bill 1 (SB1), Transportation Alternatives Program (TAP), Bicycle Transportation Account (BTA), and State Safe Routes to School (SRTS). This program is focused on increasing the use of walking and biking by increasing safety and mobility for non-motorized users, advancing regional active transportation efforts, and providing a broad spectrum of projects to benefit many types of active transportation users. Eligible grant applicants include public schools and school districts as well as local, regional, or state agencies. For a project to qualify as a Safe Routes to School project, it must be within two miles of a public school or within the vicinity of a public-school bus stop with the students intended as the primary beneficiaries of the project. This program typically releases calls for projects annually, however, this may be impacted due to COVID-19 and should be monitored closely.



Exhibit 10. Increase safety and mobility for non-motorized users

Congestion Mitigation and Air-Quality Improvement Program (CMAQ)

This flexible federal funding program managed by Caltrans may be used for a variety of projects which further the goals of the Clean Air Act and its amendments on a reimbursable basis. Projects must be included in the Transportation Improvement Program (TIP) to be eligible for this funding stream. This funding may be used for bicycle & pedestrian outreach programs, constructing bicycle and pedestrian facilities which are not exclusively recreational and reduce vehicle trips, and public education and outreach activities.

National Highway & Traffic Safety Administration (NHTSA)

The NHTSA provides traffic safety grants through the California Office of Traffic Safety. Based on the most recent guidance, Caltrans OTS accepts applications for this funding program on a regular annual basis with an annual deadline of January 30th. This timeline may have changed based on impacts from COVID-19. The following grant opportunities were identified as the most applicable to the City of Clearlake's needs.

- *Section 402: State & Community Highway Safety Grant Program* – This versatile funding program can be used for a variety of initiatives focused on reducing deaths and serious injuries on our roadways including enhancing pedestrian and bicycle safety, increasing enforcement of traffic safety laws, improving traffic records, or reducing speeding.

- *Section 405: National Priority Safety Program* – This program authorizes funding to address high priority safety issues across the nation including impaired driving, distracted driving, and non-motorized safety. Funding for each issue is authorized as a separate tier under the Section 405 program.

  - Section 405(d): Impaired Driving Countermeasures – This tier represents 52.5% of the total annual funding for full Section 405 program. These funds are intended for programs which reduce the risk of driving under the influence of alcohol or drugs. A matching share of 20% must be provided by the local agency.

  - Section 405(e): Distracted Driving – A total of 8.5% of Section 405 funds are allocated for distracted driving incentive grants. Funds are intended for programs which reduce the risk of distracted driving.

  - Section 405(h): Non-motorized Safety – 5% of Section 405 is available under this tier for states where the combined bicycle and pedestrian fatalities represent more than 15% of all roadway fatalities in that state based on the most recent FARS data from NHTSA. Funding under this tier requires a 20% match and is only eligible for training law enforcement on state laws applicable to pedestrian and bicycle safety, enforcement mobilizations and campaigns designed to enforce those state laws, or public education and awareness programs designed to inform motorists, pedestrians, and bicyclists.

California Highway Patrol (CHP) Cannabis Tax Fund Grant Program (CTFGP)

Funding for this program comes from the passage of Proposition 64, The Control, Regulate, and Tax Adult Use Marijuana Act (AUMA) in 2016. The intent of this program is to reduce the number of crashes by impaired drivers, increase public awareness related to the dangers of impaired driving, and improve highway safety. The purpose of the funds is to supplement and not supplant funding for current activities and programs. The next application window is anticipated to open in February 2022.

Implementation Timeframes

The desirable timeframe for completion of each countermeasure is identified in each *Focus Area Strategy Table*. The approximate timeframe for completion was broken into three possible timeframes:

- Short-Term: 1 – 2 years
- Medium-Term: 3 – 5 years
- Long-Term: 6 – 10 years

Countermeasures and strategies with Medium- and Long-term implementation timeframes may be revisited during future LRSP update cycles.

Next Steps

This Local Road Safety Plan (LRSP) used a methodical process and input from stakeholders and the public to identify focus areas, analyze crash trends and develop countermeasures across the four E's of safety planning (Engineering, Education, Enforcement, and Emergency Services). The plan includes strategy tables identifying strategies, responsible parties, completion goals, and performance measures, and outlines an implementation plan and potential funding sources.

The LRSP is a living document. The document should be updated every four to five years using the most up to date crash data to evaluate the performance of implemented countermeasures and re-evaluate focus areas.



Source: FWHA

Appendix A
Stakeholder Working Group Member List

Lake County
Clearlake Local Road Safety Plan
Stakeholders*

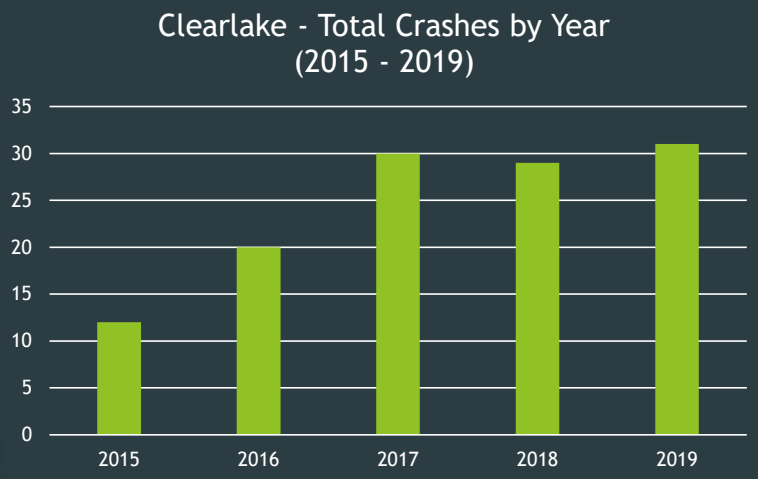
Name	Title	Agency
Danielle Casey	Project Coordinator	Lake Area Planning Council
Lisa Davey-Bates	Executive Director	Lake Area Planning Council
Alexis Pedrotti	Associate Program Planner / Administrator	Lake Area Planning Council
David Swartz	City Engineer	City of Clearlake
Andrew White	Police Chief	Police Department
Mark Mueller	District Area Engineer	Caltrans
James Sookne	Transit Coordinator	Lake Transit Authority/Lake APC
Clarissa Kincy	CEO/Mobility Manager	Lake Links
Willie Sapeta	Fire Chief	Lake County Fire Protection District

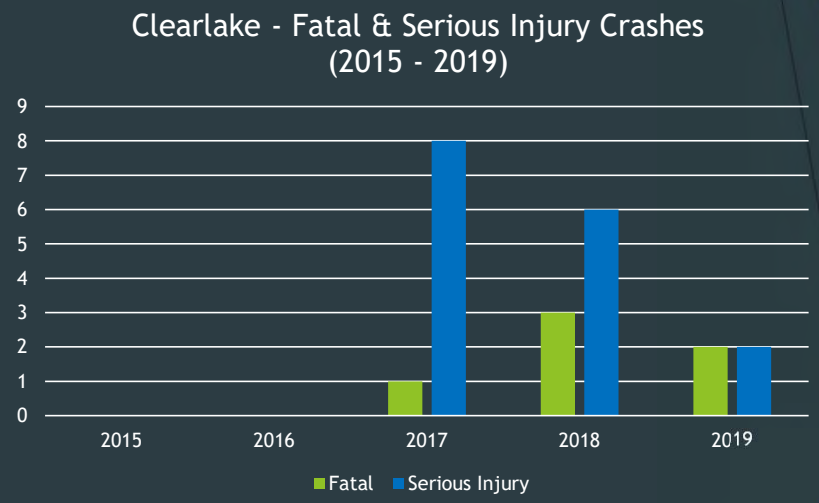
*This list reflects stakeholders that were contacted and participated.

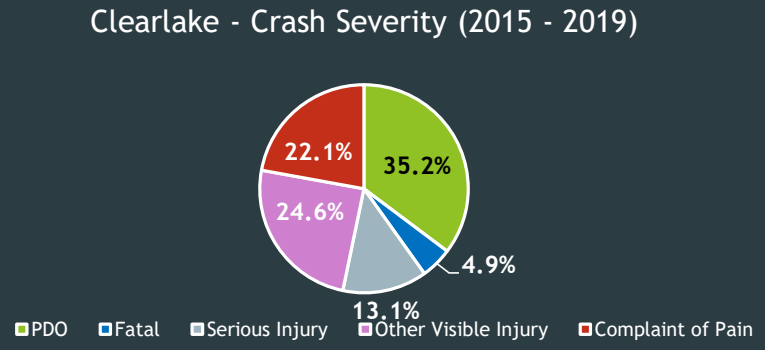
Appendix B
Initial Data Analysis



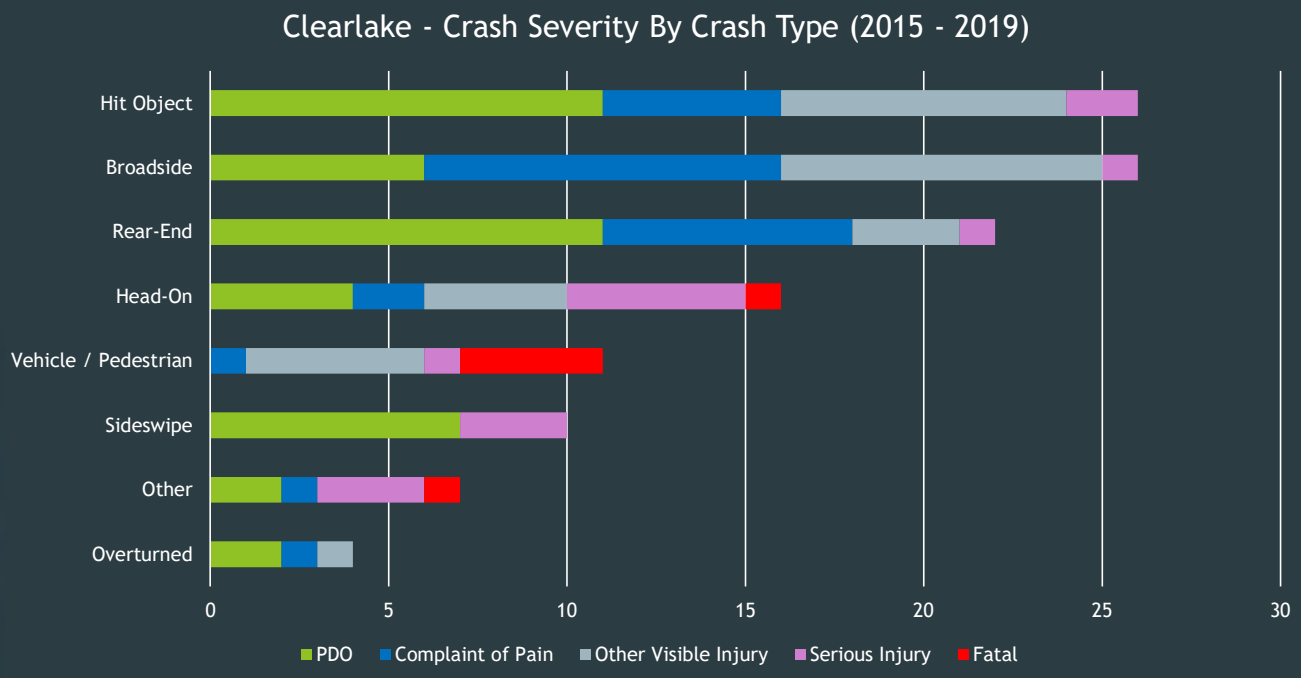
Preliminary Analysis – Overall Clearlake







Preliminary Analysis – Overall Crash Type – Clearlake

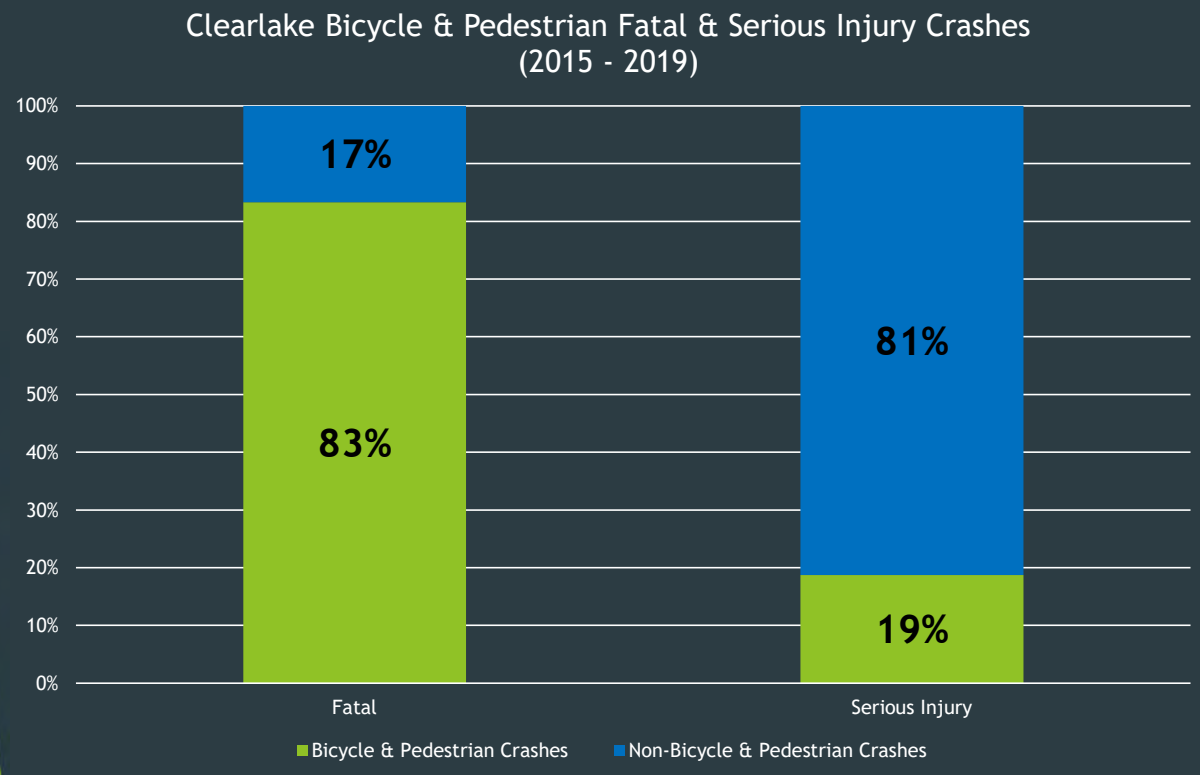


Broadside & Hit Object types account for 42% of all crashes

Pedestrian crashes account for 9% of overall crashes but 22.7% of serious injury and fatal crashes

CITY OF Clearlake 40th ANNIVERSARY 1980-2020

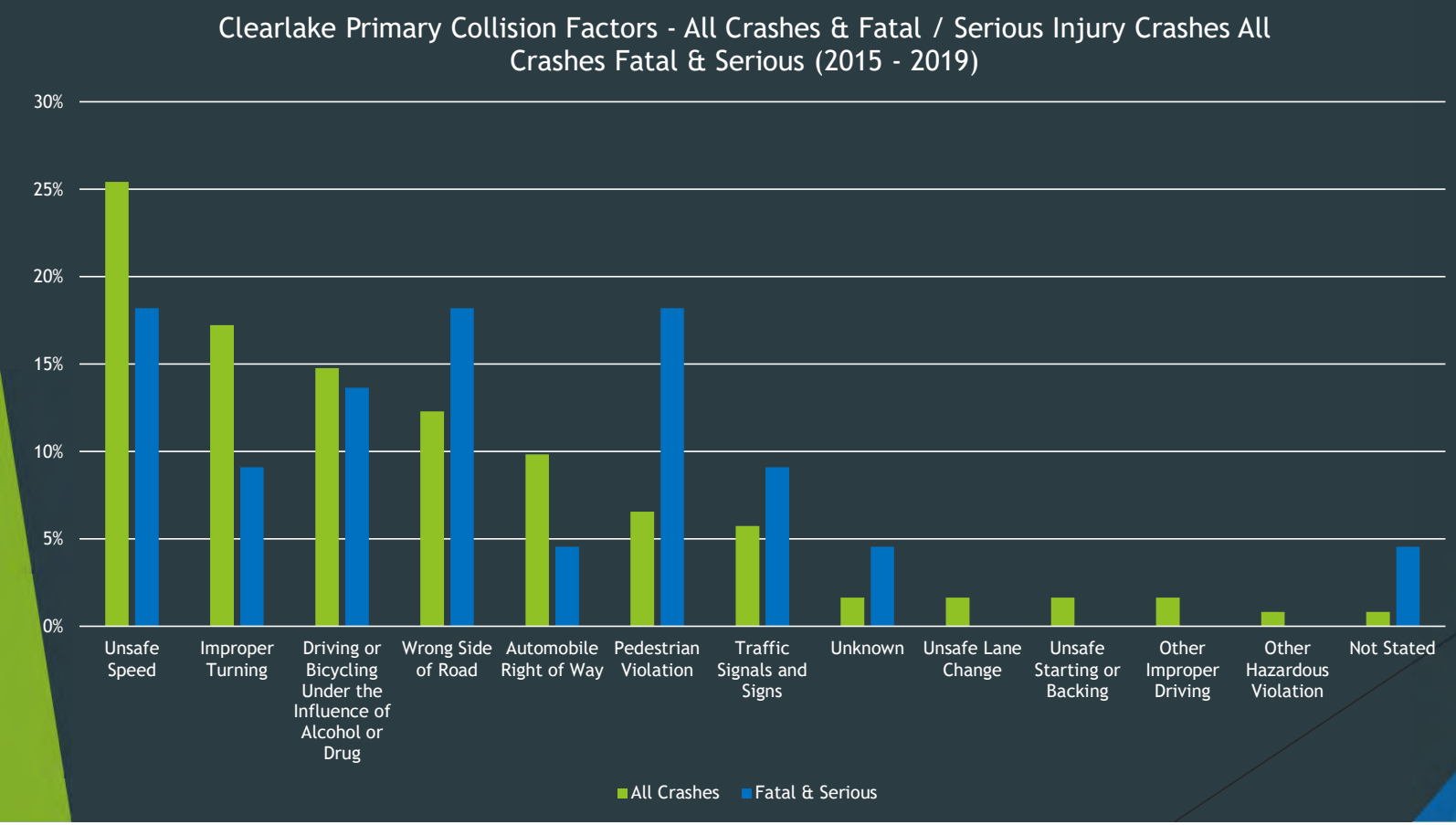
Preliminary Analysis – Bicycle and Pedestrian Crashes - Clearlake



83% of fatal and 19% of serious injury crashes involved a bicyclist or pedestrian

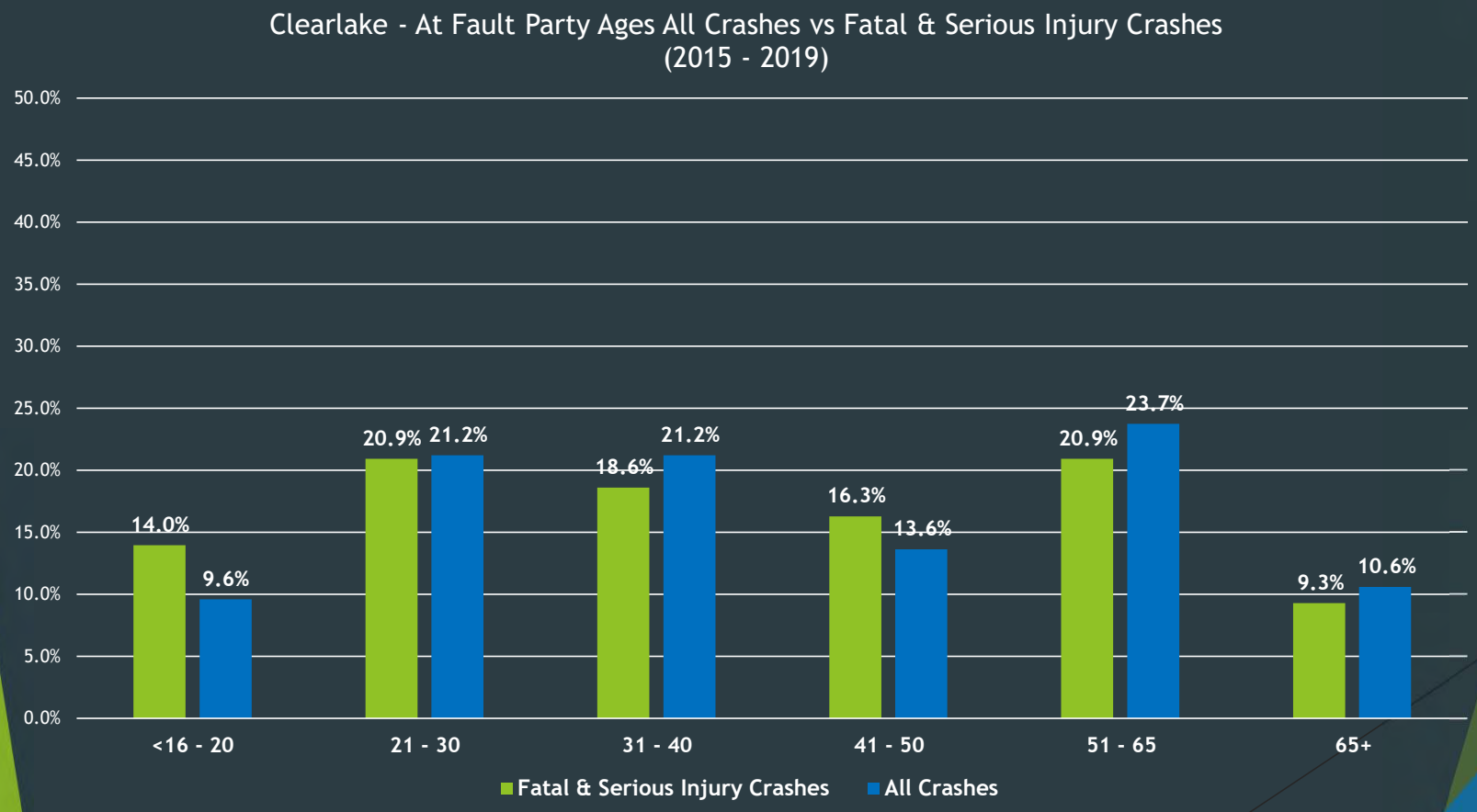
Bicyclists were involved in 5 crashes in Clearlake or 4% of all crashes but 16% of fatal & 12.5% of serious injury crashes

Preliminary Analysis – Overall Crash Factors - Clearlake

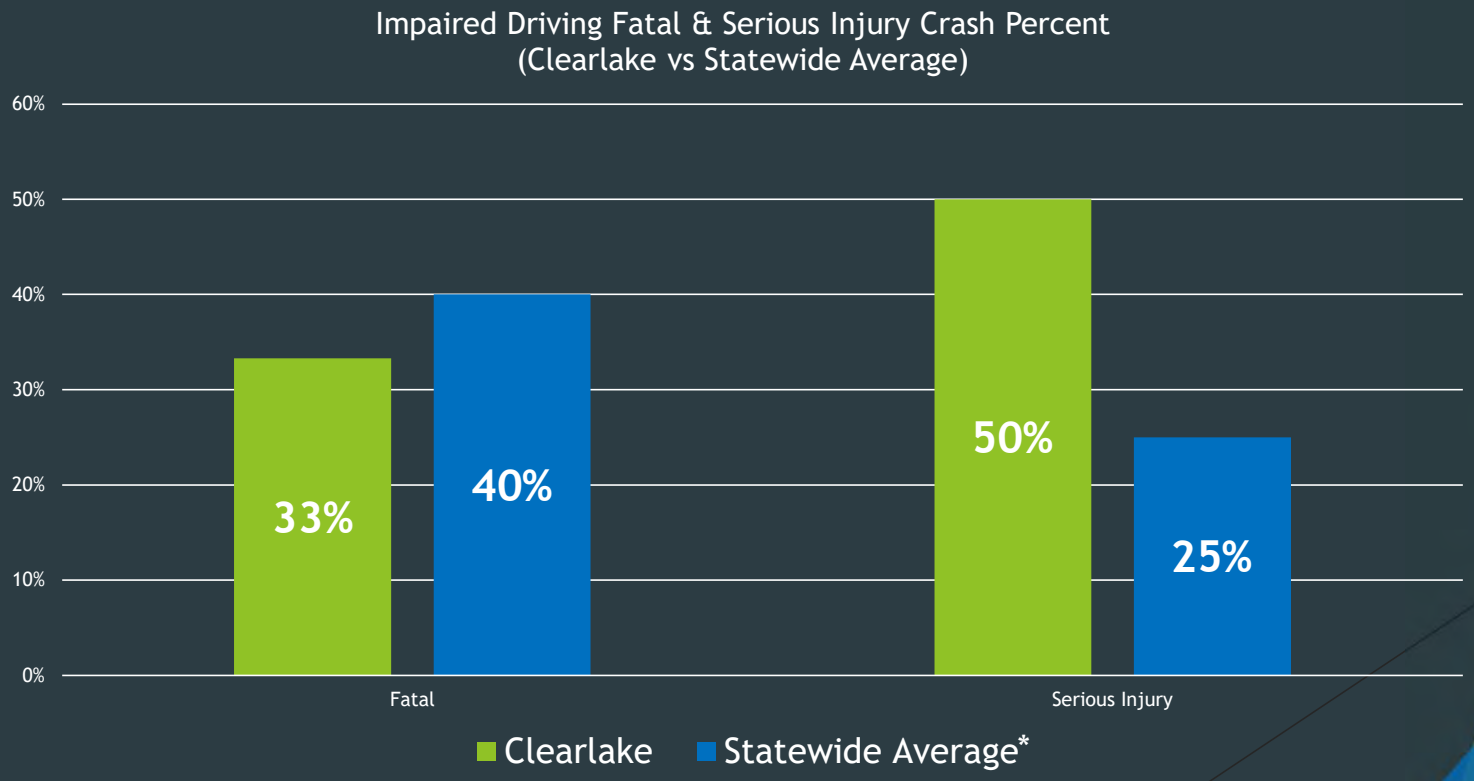


Unsafe Speed, Wrong Side of Road, and Pedestrian Violation account for ***54%*** of all fatal & serious injury crashes

Preliminary Analysis – Age - Clearlake



Preliminary Analysis – Impaired Driving - Clearlake



Source: California Safe Roads 2020 - 2024 SHSP

OTS Crash Rankings - Clearlake

TYPE OF CRASH	VICTIMS KILLED & INJURED	OTS RANKING
Total Fatal and Injury	30	67/101
Alcohol Involved	8	21/101
Had Been Drinking Driver < 21	1	14/101
Had Been Drinking Driver 21 – 34	3	15/101
Motorcycles	5	12/101
Pedestrians	1	84/101
Pedestrians < 15	0	75/101
Pedestrians 65+	0	73/101
Bicyclists	3	42/101
Bicyclists < 15	0	65/101
Composite	24	17/101

TYPE OF CRASH	FATAL & INJURY CRASHES	OTS RANKING
Speed Related	6	57/101
Nighttime (9:00pm – 2:59am)	4	33/101
Hit and Run	2	45/101

23% of Serious and Injury Crashes involve a motorcycle

Source: 2017 Office of Traffic Safety Crash Rankings - Caltrans

OTS Crash Rankings - Clearlake

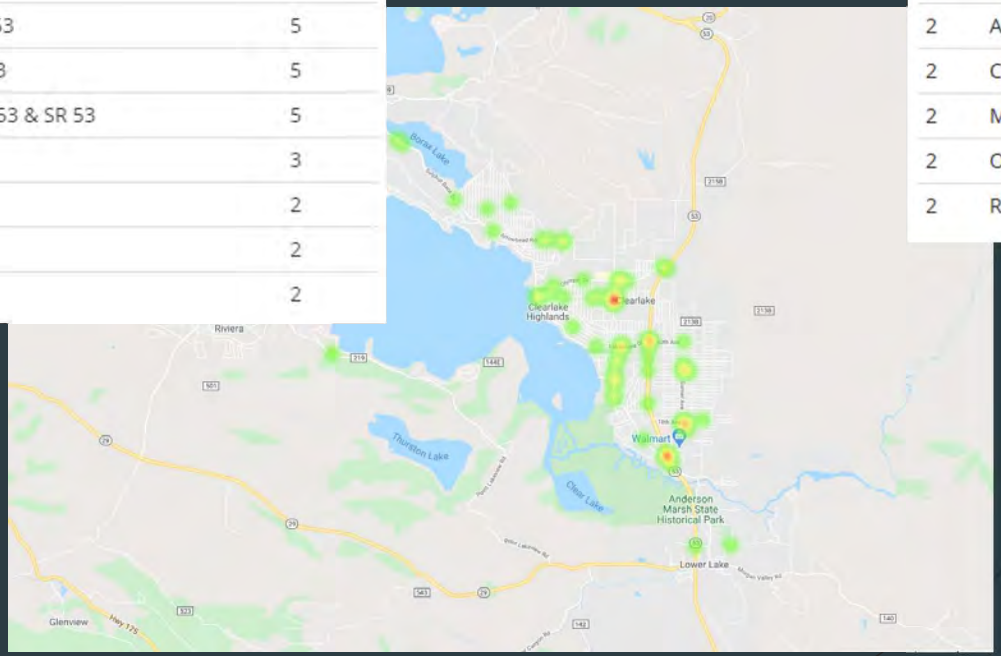
TYPE OF CRASH	VICTIMS KILLED & INJURED	OTS RANKING
Total Fatal and Injury	26	77/102
Alcohol Involved	7	31/102
Had Been Drinking Driver < 21	0	63/102
Had Been Drinking Driver 21 – 34	3	23/102
Motorcycles	3	35/102
Pedestrians	4	47/102
Pedestrians < 15	0	71/102
Pedestrians 65+	1	27/102
Bicyclists	1	77/102
Bicyclists < 15	0	61/102
Composite	18	51/102

TYPE OF CRASH	FATAL & INJURY CRASHES	OTS RANKING
Speed Related	3	79/102
Nighttime (9:00pm – 2:59am)	3	57/102
Hit and Run	2	61/102

Source: 2018 Office of Traffic Safety Crash Rankings - Caltrans

Preliminary Analysis – Top Intersections Clearlake

Rank	Intersection	# of Coll
1	AUSTIN DR & AUSTIN RD & OLD HIGHWAY 53 & OLD STATE HWY 53	6
2	40TH AVE & MOSS AVE	5
2	40TH AVE & SR 53	5
2	CACHE CREEK WAY & OLD HIGHWAY 53	5
2	DAM RD & OLD STATE HWY 53 & SR 53	5
2	OLD HIGHWAY 53 & OLD STATE HWY 53 & SR 53	5
3	18TH AVE & PHILLIPS ST	3
4	ARCATA ST & LAKE DR	2
4	AUSTIN RD & LAKESHORE DR	2
4	BURNS VALLEY RD & LAKE DR	2



Rank	Intersection	# of Coll
1	CACHE CREEK WAY & OLD HIGHWAY 53	2
1	DAM RD & OLD STATE HWY 53 & SR 53	2
1	OLD HIGHWAY 53 & OLD STATE HWY 53 & SR 53	2
2	18TH AVE & PHILLIPS ST	1
2	32ND AVE & IRVING AVE	1
2	AIRPORT RD & OLD HIGHWAY 53	1
2	CIWA ST & ROSE AVE	1
2	MEMORY LN & OLYMPIC DR	1
2	OLYMPIA DR & SR 53	1
2	ROSE AVE & VISTA ST	1

CITY OF Clearlake 40th ANNIVERSARY 1980-2020

Appendix C
Public Outreach Results

Clearlake Survey Results

Object ID	Global ID	Creation Date	What is your primary mode of transportation?	What is your age?	Did your travel habits change during COVID restrictions (approximately March 2020 - Present)?	Please rank the following categories based on your personal level of concern regarding each category, with "1" representing the highest level of concern.	Please enter any comments relating to transportation safety in the City of Clearlake below.
10	07ec2262-4c27-47f3-88f4-3146c65b3ec5	4/15/2021 23:03	personal_vehicle	51_65	No_Stayed_the_same	pedestrian_safety,intersection_safety,bicycle_safety,distracted_driving,Lane_Departures,Speeding,lighting,impaired_drivers	
11	ba2bfa53-cdb3-4b69-85bf-67b484f130db	4/16/2021 17:04	personal_vehicle	51_65	Yes_Traveled_more	pedestrian_safety,bicycle_safety,Speeding,distracted_driving,lighting,impaired_drivers,intersection_safety,Lane_Departures	There are too many people not obeying speed limits off main raids. Racing in Clearlake park.
12	86b2-4575-87a9-6f3f2a51a316	4/16/2021 19:12	personal_vehicle	31_40	Yes_Traveled_less	impaired_drivers,lighting,pedestrian_safety,distracted_driving,bicycle_safety,Speeding,intersection_safety,Lane_Departures	
13	a3e0b70f-4e96-44ff-8167-0cd81990f5ac	4/17/2021 12:26	personal_vehicle	41_50	Yes_Traveled_less	lighting,pedestrian_safety,bicycle_safety,intersection_safety,distracted_driving,impaired_drivers,Speeding,Lane_Departures	
14	a02396f8-4c12-4937-80d2-2499ef3b4407	4/17/2021 18:51	personal_vehicle	41_50	No_Stayed_the_same	lighting,pedestrian_safety,bicycle_safety,Speeding,impaired_drivers,distracted_driving,intersection_safety,Lane_Departures	
15	5273-4018-80d5-a4d511745147	4/18/2021 22:18	personal_vehicle	41_50	No_Stayed_the_same	lighting,impaired_drivers,intersection_safety,distracted_driving,Speeding,pedestrian_safety,Lane_Departures,bicycle_safety	Lighting is a huge problem and would not only create safer roadways but would reduce criminal activity.
16	2a33-48d6-8e6a-d3f52ecc5f95	4/19/2021 0:07	other	41_50	Yes_Traveled_less	bicycle_safety,pedestrian_safety,lighting,distracted_driving,impaired_drivers,intersection_safety,Speeding,Lane_Departures	
17	58a40825-e245-4143-89c6-2aa6538f68b0	4/19/2021 0:13	bicycle	41_50	Yes_Traveled_less	bicycle_safety,lighting,pedestrian_safety,intersection_safety,impaired_drivers,Speeding,distracted_driving,Lane_Departures	Bicycle lanes are not maintained and too little space allowed for bicyclists. There are no lights on streets and a lack of paved walkways.
18	f93c3f74-9c2e-4c21-8009-51ead5b5ddb3	4/19/2021 15:27	personal_vehicle	41_50	No_Stayed_the_same	impaired_drivers,distracted_driving,Speeding,pedestrian_safety,bicycle_safety,Lane_Departures,lighting,intersection_safety	
19	06bdb4db-bca2-449f-8475-3b1c1fda152e	4/21/2021 14:12	personal_vehicle	65+	Yes_Traveled_less	distracted_driving,Speeding,intersection_safety,bicycle_safety,impaired_drivers,lighting,pedestrian_safety,Lane_Departures	

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20	50d05bf4-08eb-43b0-8cc1-4ab90c4a8fcc	4/26/2021 23:18	personal_vehicle	21_30	Yes_Traveled_more	impaired_drivers,bicycle_safety,distracted_driving,intersection_safety,lighting,pedestrian_safety,Speeding,Lane_Departures	Blue cove or glenhaven
21	2b34031a-e8e7-42fd-8c76-1d50c3554aee	4/26/2021 23:24	personal_vehicle	31_40	Yes_Traveled_more	lighting,pedestrian_safety,bicycle_safety,intersection_safety,distracted_driving,impaired_drivers,Speeding,Lane_Departures	Very little side walks, and poor lighting
22	240c5319-b300-4f42-829f-d8cfd0ab5459	4/26/2021 23:31	personal_vehicle	51_65	Yes_Traveled_less	distracted_driving,impaired_drivers,Speeding,intersection_safety,Lane_Departures,pedestrian_safety,lighting,bicycle_safety	The parking lot that serves IGA and the clinic is a nightmare.Every one trying to squeeze out of exit onto lakeshore drive at the same time and no one knows the rules of right of way. The stop sign at the end of Olympic drive and Lakeshore is miserable too! You wait forever to turn onto Lakeshore because no one will let you turn. There should be a signal light there. People have become much more aggressive in the past year.,passing illegally on the right. Tailgating and speeding. As someone who learned how to drive inSan Francisco forty years ago where there is real traffic, the number of rude impatient drivers here is astounding.
23	4c835782-2d93-4c37-893e-e07088f167f8	4/26/2021 23:43	personal_vehicle	31_40	Yes_Changed_mode_of_transportat	impaired_drivers,bicycle_safety,distracted_driving,intersection_safety,lighting,pedestrian_safety,Speeding,Lane_Departures	Shity roads
24	8373d597-045a-4a3f-805b-cd8ed65f5524	4/26/2021 23:46	personal_vehicle	41_50	Yes_Traveled_less	impaired_drivers,bicycle_safety,distracted_driving,intersection_safety,lighting,pedestrian_safety,Speeding,Lane_Departures	Roads suck..cypress at has torn my front end up..even cops have destroyed cars on this street
25	11bdaf91-fb9c-40d5-87b5-8bdbb313fe9e	4/26/2021 23:49	personal_vehicle	65+	Yes_Traveled_less	Speeding,distracted_driving,impaired_drivers,intersection_safety,lighting,pedestrian_safety,Lane_Departures,bicycle_safety	Happen to live on one of the best roads in the City, Garner/Phillips. Since the roadway was repaired speeds have steadily increased and often exceed 55mph! Also noise in the City of Clearlake is unaddressed, from vehicles of all types running without proper exhaust systems. Also can't help but notice the burn out areas at intersections like Hwy 53 and 18th and Hwy 53 and Olympic Aves. In fact throughout most of the City it appears as if "Side Shows" are occurring.
26	ee7b-48b4-8929-b8dca944287c	4/26/2021 23:52	personal_vehicle	31_40	No_Stayed_the_same	pedestrian_safety,bicycle_safety,distracted_driving,impaired_drivers,intersection_safety,lighting,Speeding,Lane_Departures	Vallejo st..horrible road not cement and poor lighting
27	67e5124b-7602-4b0c-8d2d-3db50f344e19	4/27/2021 0:17	personal_vehicle	51_65	Yes_Traveled_less	lighting,Speeding,impaired_drivers,pedestrian_safety,bicycle_safety,distracted_driving,intersection_safety,Lane_Departures	Intersection of Lakeshore and Old Hwy 53. Severe congestion, lots of light-running. Difficulty getting in and out of the Speedway gas station. Also difficulty getting out of the Highlands Plaza (Foods Etc and Clinic) onto Lakeshore
28	d871-4328-898b-c9948ec196fe	4/27/2021 0:18	personal_vehicle	41_50	No_Stayed_the_same	lighting,Speeding,distracted_driving,impaired_drivers,intersection_safety,bicycle_safety,pedestrian_safety,Lane_Departures	
29	d08e-42d9-8805-68beac36fb29	4/27/2021 0:22	personal_vehicle	21_30	Yes_Traveled_less	distracted_driving,pedestrian_safety,bicycle_safety,impaired_drivers,intersection_safety,lighting,Speeding,Lane_Departures	

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30	6566b532-c026-475c-84a4-d53b8ab8123a	4/27/2021 0:30	personal_vehicle	21_30	Yes_Traveled_less	pedestrian_safety,lighting,Lane_Departures,intersection_safety,bicycle_safety,distracted_driving,impaired_drivers,Speeding	
31	1a7393c8-063f-4239-8a0f-ee9528ec95db	4/27/2021 0:40	personal_vehicle	31_40	Yes_Traveled_less	lighting,bicycle_safety,distracted_driving,impaired_drivers,intersection_safety,pedestrian_safety,Speeding,Lane_Departures	Fix the roads why do we pay you people
32	45cfeee8-c573-455b-8cf8-43c126bc8374	4/27/2021 0:51	personal_vehicle	21_30	Yes_Traveled_more	pedestrian_safety,lighting,bicycle_safety,distracted_driving,impaired_drivers,intersection_safety,Speeding,Lane_Departures	
33	e8ce2641-bfa3-4da7-825a-58eace630db4	4/27/2021 1:15	personal_vehicle	21_30	No_Stayed_the_same	intersection_safety,distracted_driving,Speeding,lighting,pedestrian_safety,impaired_drivers,bicycle_safety,Lane_Departures	The entire city is laid out in a way that just makes transportation hazardous. It would be great if road could be resurfaced and widened to allow for safer driving.
34	c0011352-b79a-4b5c-80b1-cb032b4990ca	4/27/2021 1:17	personal_vehicle	41_50	No_Stayed_the_same	intersection_safety,bicycle_safety,distracted_driving,impaired_drivers,lighting,pedestrian_safety,Speeding,Lane_Departures	People running stop signs with or without slowing down in Clearlake Park. Kids on dirt bikes as well as people in cars blow through stop signs along Oak.
35	5b3a-4968-819b-6de6791118ab	4/27/2021 1:37	personal_vehicle	21_30	No_Stayed_the_same	impaired_drivers,pedestrian_safety,distracted_driving,intersection_safety,Lane_Departures,bicycle_safety,Speeding,lighting	
36	4880d22f-b22a-46c6-8538-cad39ee0107b	4/27/2021 2:03	personal_vehicle	41_50	Yes_Traveled_less	pedestrian_safety,lighting,bicycle_safety,Speeding,impaired_drivers,intersection_safety,distracted_driving,Lane_Departures	The current lighting provided by the city is either spotlight or nothing, which does not ensure safety for pedestrians or bicyclists during the dark hours. The roads (e.g. Old Hwy 53 & Olympic Dr) are poorly maintained, are permitted to be left full of debris and without visible lane markings which again leaves the pedestrians/bicyclists in harms way. The speeding and poor drivers is more of a law enforcement issue I feel, which goes down a rabbit hole of staffing, and less of a “let’s put in another round a bout no one knows how to use” or a “ let’s add some rumble strips” path. I personally have no experience with public transportation, but do feel those waiting in dirt fields with no rest area out of the elements should be taken into consideration and the city should consider partnering with or assisting the transit company in finding funding for respectful and safer situations for their riders.
37	5605872e-1573-4bc7-81de-ba45b1f6a38a	4/27/2021 2:05	personal_vehicle	31_40	Yes_Traveled_less	Speeding,intersection_safety,lighting,impaired_drivers,distracted_driving,bicycle_safety,pedestrian_safety,Lane_Departures	Old Hwy 53/Lakeshore Dr. Has an abundance of people running the red traffic light. Also, proper streetlights throughout the city would improve driving ability at night, while also improving pedestrian saftey.
38	7f35b3ec-dc9e-4229-8f23-d9192489bbae	4/27/2021 2:19	personal_vehicle	65+	No_Stayed_the_same	pedestrian_safety,lighting,bicycle_safety,intersection_safety,distracted_driving,impaired_drivers,Speeding,Lane_Departures	40th and Moss ,Lighting bad ,No cross walks , Vehicle head lights blind you and you are unable to see pedestrians . Lakeshore Dr .and Old Highway 53 Vehicles coming out of Speedway making a left hand turn on to Lakeshore Drive are pulling out into traffic blindly should have a divider making vehicle to turn right only .
39	294ca894-9289-473e-8cda-68aecfb6f8bf	4/27/2021 2:50	personal_vehicle	21_30	No_Stayed_the_same	Speeding,impaired_drivers,distracted_driving,intersection_safety,lighting,bicycle_safety,pedestrian_safety,Lane_Departures	

Clearlake Survey Results

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40	d6b1-4047-89a4-e797eb4abf68	4/27/2021 3:07	personal_vehicle	31_40	No_Stayed_the_same	distracted_driving,bicycle_safety,impaired_drivers,intersection_safety,lighting,pedestrian_safety,Speeding,Lane_Departures	The pot holes make it more dangerous than anything
41	7af5f8c7-6c4c-4982-8711-fe03fad50d03	4/27/2021 3:30	personal_vehicle	51_65	Yes_Traveled_less	pedestrian_safety,bicycle_safety,intersection_safety,Speeding,distracted_driving,impaired_drivers,Lane_Departures,lighting	
42	ab785ad4-58bf-4b0d-87be-a4d9ceb28fe5	4/27/2021 4:22	personal_vehicle	21_30	Yes_Traveled_more	Speeding,impaired_drivers,lighting,pedestrian_safety,intersection_safety,distracted_driving,bicycle_safety,Lane_Departures	
43	0517493b-a0fd-46bc-857f-35c16361a70d	4/27/2021 4:29	personal_vehicle	65+	Yes_Traveled_less	bicycle_safety,pedestrian_safety,intersection_safety,Speeding,distracted_driving,impaired_drivers,lighting,Lane_Departures	The lack of pedestrian walkways and wide enough bike lanes on most of Old Highway and Lakeshore Drive (North of Olympic) in concert with blind corners makes it risky for all participants.
44	64d87033-cd33-4b7c-8a51-4dbdba4c4ef3	4/27/2021 5:27	personal_vehicle	31_40	No_Stayed_the_same	lighting,Lane_Departures,intersection_safety,pedestrian_safety,bicycle_safety,distracted_driving,impaired_drivers,Speeding	
45	5e463f6f-09f6-40e2-82cb-3d9958e44cbe	4/27/2021 5:43	personal_vehicle	Under20	Yes_Traveled_less	pedestrian_safety,intersection_safety,bicycle_safety,lighting,Speeding,impaired_drivers,distracted_driving,Lane_Departures	We need more paved side walks and street lights.
46	a0488f0b-4894-492f-86ea-0f9c7796da33	4/27/2021 6:03	personal_vehicle	51_65	Yes_Traveled_less	intersection_safety,pedestrian_safety,distracted_driving,bicycle_safety,lighting,Speeding,Lane_Departures,impaired_drivers	
47	fb85f98a-b355-4729-8fe1-6a4e1230f99d	4/27/2021 12:18	personal_vehicle	51_65	Yes_Traveled_less	impaired_drivers,Speeding,distracted_driving,lighting,pedestrian_safety,intersection_safety,bicycle_safety,Lane_Departures	Palmer and Mullen,lakeshore and Olympic and old 53
48	8a67eec9-e9f7-47ac-8960-85409a1c7615	4/27/2021 14:28	personal_vehicle	41_50	Yes_Traveled_less	pedestrian_safety,bicycle_safety,distracted_driving,impaired_drivers,intersection_safety,lighting,Speeding,Lane_Departures	The sidewalk situation is a mess. There are sections of sidewalk here and there. I don't personally walk much because I have a car, but the few times I have it feels extremely unsafe. Olympic drive was given sidewalks a while back, but Lakeshore dr desperately needs to be worked on. Another place of concern is 40th avenue. Many people walk there and it's extremely dangerous. A safe path up that busy street would be a huge improvement even if a sidewalk was out of the question.
49	1126-4292-8785-f5316c5c217f	4/27/2021 21:29	personal_vehicle	65+	Yes_Traveled_less	bicycle_safety,distracted_driving,impaired_drivers,intersection_safety,lighting,pedestrian_safety,Speeding,Lane_Departures	Couldn't use drag and drop

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50	9eb6baa8-a629-4ef8-8298-45d4273678a7	4/27/2021 21:39	personal_vehicle	65+	Yes_Traveled_less	distracted_driving,impaired_drivers,pedestrian_safety,Speeding,intersection_safety,bicycle_safety,lighting,Lane_Departures	
51	8c68f77c-f956-44a6-866f-4a83311c56f9	4/27/2021 21:44	personal_vehicle	41_50	Yes_Traveled_less	intersection_safety,pedestrian_safety,lighting,Lane_Departures,Speeding,distracted_driving,impaired_drivers,bicycle_safety	
52	791ad4ff-b0ef-429d-87fe-f66b5d7c5e9b	4/27/2021 21:46	personal_vehicle	51_65	Yes_Traveled_less	Lane_Departures,bicycle_safety,distracted_driving,impaired_drivers,intersection_safety,lighting,pedestrian_safety,Speeding	Maybe fix the roads that are already there, that are sort of paved, or were paved and then allowed to stupidly fall apart. Maybe pave the unpaved roads that should have paved decades ago but stupidly were not paved.
53	9807a2af-29f0-4f4e-87d9-10cc5c6ed544	4/27/2021 21:52	personal_vehicle	41_50	Yes_Traveled_less	lighting,intersection_safety,pedestrian_safety,bicycle_safety,impaired_drivers,distracted_driving,Speeding,Lane_Departures	
54	a3625a27-0f79-427f-8837-5e03b753c875	4/27/2021 21:53	personal_vehicle	65+	No_Stayed_the_same	distracted_driving,impaired_drivers,Speeding,intersection_safety,lighting,bicycle_safety,pedestrian_safety,Lane_Departures	
55	853a-4740-8216-ef0cb9429cfc	4/27/2021 22:07	personal_vehicle	31_40	Yes_Traveled_less	impaired_drivers,Lane_Departures,intersection_safety,pedestrian_safety,lighting,distracted_driving,bicycle_safety,Speeding	Needs a pedestrian walkway on fortieth Avenue into the avenues. All lines need to be redone, basically MIA when it rains or at night.
56	d308e606-ac1a-44d8-8484-7b57b705619f	4/27/2021 22:14	personal_vehicle	51_65	Yes_Traveled_more	lighting,bicycle_safety,distracted_driving,impaired_drivers,intersection_safety,pedestrian_safety,Speeding,Lane_Departures	The roads in Clearlake are in serious need of repairs! Especially the residential roads. Street lights are a major necessity.
57	d8778703-ea8d-4fc4-87b5-96eacd562cc0	4/27/2021 22:18	personal_vehicle	51_65	No_Stayed_the_same	distracted_driving,Speeding,impaired_drivers,lighting,bicycle_safety,pedestrian_safety,intersection_safety,Lane_Departures	The speeding and distracted driving are horrible in this city. We need more police officers out there on the streets. I know we can't afford more but that's what we need.
58	74b99f33-c981-4999-8197-0379f611907c	4/27/2021 22:30	personal_vehicle	65+	No_Stayed_the_same	distracted_driving,bicycle_safety,impaired_drivers,intersection_safety,lighting,pedestrian_safety,Speeding,Lane_Departures	
59	2af0f5b5-f718-4d4b-87b0-80b2156d1722	4/27/2021 23:04	personal_vehicle	51_65	Yes_Traveled_less	distracted_driving,impaired_drivers,Speeding,Lane_Departures,pedestrian_safety,intersection_safety,bicycle_safety,lighting	

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60	0b69fcc2-bebf-4ac9-8461-e32ccb8e61a4	4/27/2021 23:07	personal_vehicle	21_30	Yes_Traveled_less	intersection_safety,lighting,Lane_Departures,pedestrian_safety,distracted_driving,impaired_drivers,bicycle_safety,Speeding	
61	4d1f2bca-e974-49c6-8205-cc6cb1a20f95	4/27/2021 23:09	personal_vehicle	21_30	Yes_Traveled_less	pedestrian_safety,bicycle_safety,impaired_drivers,intersection_safety,distracted_driving,Speeding,lighting,Lane_Departures	
62	de7d-495d-82db-35c09f512267	4/27/2021 23:10	personal_vehicle	51_65	Yes_Traveled_less	distracted_driving,Speeding,impaired_drivers,intersection_safety,lighting,pedestrian_safety,bicycle_safety,Lane_Departures	Road maintenance is a must on side streets in Clearlake
63	b3257e0b-e559-45fd-883c-84d9511e629c	4/27/2021 23:14	personal_vehicle	41_50	Yes_Traveled_less	distracted_driving,impaired_drivers,Speeding,intersection_safety,Lane_Departures,pedestrian_safety,bicycle_safety,lighting	Need to stop the riding of dirt bikes and other vehicles not legal for the road within the residential areas.
64	7d6252c7-16ff-4e30-8b12-981916ada7c2	4/27/2021 23:14	personal_vehicle	Under20	Yes_Traveled_less	impaired_drivers,distracted_driving,bicycle_safety,pedestrian_safety,intersection_safety,Speeding,lighting,Lane_Departures	
65	aeb32109-39c3-441d-8077-8c57c5db5429	4/28/2021 0:25	personal_vehicle	31_40	Yes_Traveled_less	Lane_Departures,lighting,impaired_drivers,distracted_driving,pedestrian_safety,intersection_safety,Speeding,bicycle_safety	
66	49356a9c-e5cc-40ad-85a9-19d2d31bc0e6	4/28/2021 0:35	personal_vehicle	65+	No_Stayed_the_same	impaired_drivers,distracted_driving,Speeding,lighting,intersection_safety,pedestrian_safety,Lane_Departures,bicycle_safety	
67	b178-4e21-8587-22bb767db8e5	4/28/2021 0:42	personal_vehicle	51_65	Yes_Traveled_less	Speeding,intersection_safety,impaired_drivers,distracted_driving,pedestrian_safety,bicycle_safety,lighting,Lane_Departures	Intersection at 18th Avenue and Boyles in Clearlake needs to be a 4 way stop. 18th Avenue is like a racetrack and I've seen a lot of accidents at that intersection and a lot of near misses several of which I was involved.
68	afcc0b44-8b5d-4263-8fad-3cd628f8bbd8	4/28/2021 0:47	personal_vehicle	51_65	Yes_Traveled_less	Speeding,intersection_safety,impaired_drivers,distracted_driving,lighting,bicycle_safety,pedestrian_safety,Lane_Departures	
69	7181-473d-88e4-8eafc6f53cff	4/28/2021 0:47	personal_vehicle	65+	Yes_Traveled_less	impaired_drivers,Speeding,pedestrian_safety,distracted_driving,intersection_safety,bicycle_safety,lighting,Lane_Departures	

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Object ID	Global ID	Creation Date	What is your primary mode of transportation?	What is your age?	Did your travel habits change during COVID restrictions (approximately March 2020 - Present)?	Please rank the following categories based on your personal level of concern regarding each category, with "1" representing the highest level of concern.	Please enter any comments relating to transportation safety in the City of Clearlake below.
70	fb19ebfa-eb26-4cb4-8097-9fc9a74ac359	4/28/2021 1:18	personal_vehicle	31_40	Yes_Traveled_less	lighting,pedestrian_safety,intersection_safety,impaired_drivers,distracted_driving,Speeding,Lane_Departures,bicycle_safety	
71	5b43-4bd5-8073-eeb83b0d4340	4/28/2021 2:01	personal_vehicle	65+	No_Stayed_the_same	Speeding,Lane_Departures,distracted_driving,impaired_drivers,intersection_safety,lighting,pedestrian_safety,bicycle_safety	Narrow road with lots of potholes. One way in and out. Fire Hazzard
72	39b1058a-b4d1-4ce5-840b-671232d72f04	4/28/2021 2:23	personal_vehicle	65+	Yes_Traveled_less	intersection_safety,impaired_drivers,distracted_driving,pedestrian_safety,Speeding,bicycle_safety,Lane_Departures,lighting	
73	00ab73fb-d9fe-46de-8f8f-882d279a8063	4/28/2021 3:26	personal_vehicle	65+	Yes_Traveled_less	Speeding,distracted_driving,impaired_drivers,intersection_safety,bicycle_safety,lighting,pedestrian_safety,Lane_Departures	Moore hwy lighting speed control
74	78b5-4097-8853-fbabba16d406	4/28/2021 5:00	personal_vehicle	31_40	Yes_Traveled_less	pedestrian_safety,bicycle_safety,distracted_driving,intersection_safety,Speeding,impaired_drivers,lighting,Lane_Departures	My concern is Clearlake park. It’s difficult to walk and ride a bike on these roads. No side walks, or lights makes it unsafe.
75	9f093b4f-7952-472c-81d6-0e546f158ee5	4/28/2021 7:01	personal_vehicle	65+	Yes_Traveled_less	impaired_drivers,Speeding,distracted_driving,intersection_safety,pedestrian_safety,bicycle_safety,lighting,Lane_Departures	53/20/29 speeding
76	9555-440b-8017-abe38efd8937	4/28/2021 13:32	personal_vehicle	65+	Yes_Traveled_less	Speeding,lighting,distracted_driving,impaired_drivers,Lane_Departures,intersection_safety,bicycle_safety,pedestrian_safety	
77	d660992f-4596-4d7c-871c-a6fdfdafdaba	4/28/2021 15:31	personal_vehicle	65+	Yes_Traveled_less	distracted_driving,Speeding,Lane_Departures,impaired_drivers,pedestrian_safety,intersection_safety,bicycle_safety,lighting	
78	d57183c3-1f48-48d2-8fb7-010b0e58acbd	4/28/2021 18:06	personal_vehicle	51_65	Yes_Traveled_less	distracted_driving,impaired_drivers,Speeding,intersection_safety,pedestrian_safety,lighting,bicycle_safety,Lane_Departures	

Object ID	Global ID	Creation Date	What is your primary mode of transportation?	What is your age?	Did your travel habits change during COVID restrictions (approximately March 2020 - Present)?	Please rank the following categories based on your personal level of concern regarding each category, with "1" representing the highest level of concern.	Please enter any comments relating to transportation safety in the City of Clearlake below.
79	1c1fda2f-fd31-414d-8937-fec51782f204	4/29/2021 5:39	personal_vehicle	31_40	Yes_Traveled_less	Speeding,impaired_drivers,distracted_driving,pedestrian_safety,bicycle_safety,intersection_safety,lighting,Lane_Departures	Old Hwy 53, Lakeshore, Olympic, dirt roads/ back roads. The speeding and tailgating here has substantially increased. There is seeming no regard to what a safe following distance is. You can observe drivers smoking marijuana and other substances, daily. It seems as if many of our traffic laws no long apply to our community. All of the above 1-8 issues are in desperate need of assessment, intervention, follow up and follow through. Also, the five way stop in front of Pomo School, is a drag strip. People are literally burning out, and speeding down the road without regard for the preschoolers and kindergartens who are out to play. The amount of drivers without regard for the school zone and students is sickening. I feel at very least a game camera should be put out on the intersection of acacia and Burns valley road and those who are driving recklessly should have their game posted our children aren't even safe out on their own school yard.
80	83b8-4b25-84e1-54cc571bd960	5/1/2021 2:57	walking	65+	Yes_Traveled_less	distracted_driving,impaired_drivers,intersection_safety,pedestrian_safety,bicycle_safety,lighting,Speeding,Lane_Departures	
81	791a825a-7362-4c8b-8a5e-228093985155	5/5/2021 17:30	personal_vehicle	41_50	Yes_Traveled_less	lighting,pedestrian_safety,bicycle_safety,Speeding,distracted_driving,impaired_drivers,intersection_safety,Lane_Departures	
82	ab6f79fc-3631-4f77-8596-6689ff193e0f	5/5/2021 17:34	personal_vehicle	65+	No_Stayed_the_same	distracted_driving,Speeding,intersection_safety,bicycle_safety,impaired_drivers,lighting,pedestrian_safety,Lane_Departures	intersection old 53 and Lakeshore dr
83	3169-4eab-8143-40f653c08a87	5/10/2021 18:58	personal_vehicle	41_50	Yes_Traveled_less	Speeding,impaired_drivers,distracted_driving,intersection_safety,pedestrian_safety,bicycle_safety,lighting,Lane_Departures	
84	c401b105-f959-407c-82eb-0f5f20f3a096	5/11/2021 18:15	other	51_65	Yes_Traveled_less	intersection_safety,pedestrian_safety,bicycle_safety,distracted_driving,Lane_Departures,impaired_drivers,lighting,Speeding	I get around town by using a power wheelchair, bus system, and also drive a car. Biggest problems are the street wheelchair access curb cuts at intersection of Lakeshore and old highway 53. Only one corner is safely wheelchair accessible, and this is the busiest intersection in center of downtown, and I have had many close calls with vehicles with drivers that can't figure out the maneuvering and semi loss of control that is required from using a wheelchair, just to cross the street. This is a very unsafe and unacceptable situation for people walking, riding bicycles, wheelchair users, and of course, other vehicles,cars, and trucks. The NE and NW corners are pretty much unusable and extremely unsafe for any type of foot traffic, or bicycle users. Also, we need safer sidewalks installed in numerous areas of Lakeshore drive. Most sidewalks are extremely inconsistent, with just patches if sidewalks here and there.
85	3949-4727-84ad-d3291ee690ef	5/12/2021 21:41	personal_vehicle	51_65	Yes_Traveled_less	bicycle_safety,distracted_driving,impaired_drivers,intersection_safety,lighting,pedestrian_safety,Speeding,Lane_Departures	
86	27c17fee-22d5-4ee2-8528-c7e00ef21fb2	5/12/2021 22:13	personal_vehicle	65+	Yes_Traveled_less	Speeding,pedestrian_safety,Lane_Departures,distracted_driving,impaired_drivers,lighting,bicycle_safety,intersection_safety	Speeding vehicles, side show type demonstrations, running red lights, noise (vehicle, animal, outdoor parties with live music) all over City!

Object ID	Global ID	Creation Date	What is your primary mode of transportation?	What is your age?	Did your travel habits change during COVID restrictions (approximately March 2020 - Present)?	Please rank the following categories based on your personal level of concern regarding each category, with "1" representing the highest level of concern.	Please enter any comments relating to transportation safety in the City of Clearlake below.
87	435ee8f9-c077-4f87-82cf-4d03785ce375	5/12/2021 22:58	personal_vehicle	65+	Yes_Traveled_less	lighting,pedestrian_safety,Lane_Departures,bicycle_safety,distracted_driving,impaired_drivers,intersection_safety,Speeding	
88	ea3ce559-f8f4-4785-8c97-5b3071f04e54	5/12/2021 23:31	personal_vehicle	65+	Yes_Traveled_less	Speeding,Lane_Departures,distracted_driving,impaired_drivers,intersection_safety,pedestrian_safety,lighting,bicycle_safety	53/Lakeshore/Moss needs markings
89	87768d2f-f9af-44e8-80a5-b43c78b7c1c3	5/12/2021 23:35	personal_vehicle	41_50	Yes_Traveled_less	pedestrian_safety,lighting,bicycle_safety,intersection_safety,Speeding,Lane_Departures,distracted_driving,impaired_drivers	Sidewalks must be installed along major walking corridors such as Hwy 53, Lakeshore and Olympic. Lighting is needed on many secondary arterial roads.
90	af1c5880-ef62-4052-83c8-7507aa0d6f0d	5/12/2021 23:51	personal_vehicle	65+	Yes_Traveled_less	distracted_driving,bicycle_safety,impaired_drivers,intersection_safety,lighting,pedestrian_safety,Speeding,Lane_Departures	
91	f41b0257-0d4b-431e-85c0-8b39a5eee39a	5/13/2021 0:23	personal_vehicle	65+	Yes_Traveled_less	Speeding,distracted_driving,impaired_drivers,intersection_safety,pedestrian_safety,bicycle_safety,lighting,Lane_Departures	The intersection of Phillips / Garner Avenue and 18th Avenue. Sometimes cars won't stop at that intersection and difficult to see on that hill. Phillips / Garner Avenue is 30 MPH and has become a race track (driving too fast).
92	bb6997ac-0f01-49cc-8d9d-3b13b8428115	5/13/2021 0:30	personal_vehicle	51_65	Yes_Traveled_less	impaired_drivers,distracted_driving,lighting,Speeding,intersection_safety,Lane_Departures,pedestrian_safety,bicycle_safety	
93	15677cf7-7684-4aeb-8ddf-2a970977c573	5/13/2021 1:40	personal_vehicle	31_40	Yes_Traveled_less	impaired_drivers,distracted_driving,intersection_safety,Lane_Departures,lighting,pedestrian_safety,Speeding,bicycle_safety	
94	50c51029-2a4b-4de4-8f8a-e19db1944f68	5/13/2021 4:36	personal_vehicle	31_40	Yes_Traveled_less	impaired_drivers,intersection_safety,lighting,pedestrian_safety,distracted_driving,bicycle_safety,Speeding,Lane_Departures	
95	7d2a232b-01f8-4851-82e9-89e1aa4fdd1d	5/13/2021 12:22	personal_vehicle	31_40	No_Stayed_the_same	Speeding,pedestrian_safety,lighting,distracted_driving,impaired_drivers,intersection_safety,Lane_Departures,bicycle_safety	
96	a08f7ef5-d5c9-43e6-862e-922ed885cc85	5/13/2021 12:23	personal_vehicle	51_65	No_Stayed_the_same	distracted_driving,impaired_drivers,Speeding,intersection_safety,pedestrian_safety,bicycle_safety,Lane_Departures,lighting	

Clearlake Survey Results

Object ID	Global ID	Creation Date	What is your primary mode of transportation?	What is your age?	Did your travel habits change during COVID restrictions (approximately March 2020 - Present)?	Please rank the following categories based on your personal level of concern regarding each category, with "1" representing the highest level of concern.	Please enter any comments relating to transportation safety in the City of Clearlake below.
97	c31f9d8f-7312-4e04-860f-fcbd926c0a1d	5/13/2021 13:58	personal_vehicle	41_50	Yes_Traveled_more	lighting,distracted_driving,impaired_drivers,intersection_safety,Lane_Departures,Speeding,pedestrian_safety,bicycle_safety	
98	be9123cc-f909-4cad-86f8-1ae2ddb74824	5/14/2021 20:40	personal_vehicle	65+	Yes_Traveled_less	Speeding,bicycle_safety,distracted_driving,impaired_drivers,intersection_safety,lighting,pedestrian_safety,Lane_Departures	
99	0da4-41e3-83e3-645ef800abec	5/19/2021 3:08	personal_vehicle	31_40	Yes_Traveled_less	pedestrian_safety,lighting,distracted_driving,impaired_drivers,Speeding,intersection_safety,bicycle_safety,Lane_Departures	Country club drive, leading up to sulpher Bank road. Many potholes, u even road, no road markings, speeding and no lighting to see pedestrian
100	06501cca-f178-43d3-89c1-575f7efabdd4	5/19/2021 21:00	personal_vehicle	21_30	No_Stayed_the_same	lighting,intersection_safety,pedestrian_safety,distracted_driving,impaired_drivers,Lane_Departures,bicycle_safety,Speeding	Add turnouts for passing to make road safer

Appendix D
Focus Area Strategy Tables

Bicycle & Pedestrian Safety

Focus Area Strategy Table

City of Clearlake Local Road Safety Plan

Strategic Linkage

Identified as one of sixteen Challenge Areas in the California Strategic Highway Safety Plan (SHSP) and a High Priority Challenge Area in the forthcoming update to Caltrans SHSP (based on Caltrans materials).

Pedestrians/Vehicle crashes account for 23% of all fatal & serious injury crashes but just 9% of all crashes. Pedestrian safety ranked as the third highest safety concern from local residents on the public outreach survey. Bicycle safety ranked seventh out of eight.

Objectives	Success Indicators
Bicyclist & Pedestrian crashes, injuries, and fatalities are reduced. Pedestrian crashes, injuries, and fatalities in marked crosswalks are eliminated.	Reduction in frequency of crashes, injuries, and fatalities of bicyclists & pedestrians in the City of Clearlake.

	Actions	Target Output	Responsible Parties *(Secondary Parties)*	Date of Completion	Performance Measures	Monitoring and Evaluation	Potential Funding Opportunities
Education	Safe Routes to School	Safe Routes to School plan created for local elementary and middle school with identified projects and recommended improvements	Lake Area Planning Council, City of Clearlake, Konocti Unified School District	Short-term / Medium-term	Short-term: ATP Application submitted for Safe Routes to School Plan (City of Clearlake) Medium-term: Safe Routes to School Plan completed for all eligible KUSD schools	Percentage of students biking & walking to school (gathered during safe routes to school plan and through annual evaluation / monitoring) Total Bicyclists & Pedestrians-involved fatal & serious injury crashes	ATP
	Bike Safety Education for Children	Bike safety instruction for Clearlake children through school or City program	City of Clearlake, Konocti Unified School District *Lake Area Planning Council*	Long-term	Short-term: Pilot bicycle safety program initiated at least one Konocti Unified School District affiliated school Long-term: Bicycle safety program incorporated into Physical Education curriculum across all Konocti Unified elementary schools	Percentage of students biking to school (gathered during safe routes to school plan and through annual evaluation / monitoring)	ATP, NHTSA 402
	Active Lighting / Conspicuity Enhancement	Make pedestrians & bicyclists in the City of Clearlake more visible at night to avoid collisions by providing free lighting equipment and retroreflective clothing	City of Clearlake Public Works & Police Department	Medium-term	Obtain high visibility / retroreflective materials for pedestrians through grant funding or standard procurement Provide high visibility / retroreflective materials for pedestrians at in-person events on a regular and on-going basis (at least semi-annually)	Percent of pedestrian crashes which occur outside of 'Daylight' lighting conditions	NHTSA 402 NHTSA 405(h)
	Share the Road & Pedestrian Safety Awareness Messaging	Increase driver awareness of pedestrian & bicyclist rights and needs on the roadway	City of Clearlake Public Works & Public Information	Short-term	Specific Bicycle & Pedestrian Safety focused outreach campaign funded (grant or existing funding) Implemented outreach campaign for full quarter (3 months)	Pedestrians and Bicyclist-involved crashes percent of all fatal & serious injury crashes	NHTSA 402
Enforcement	School Zone Enforcement	Increase driver awareness of school zone laws through increased enforcement at school zones and provide educational information with issued warnings	City of Clearlake Police Department, Konocti Unified School District	Short-term	Number of completed School Zone Enforcement days Provided educational materials to parents / drivers	Pedestrians and Bicyclist-involved crashes percent of all fatal & serious injury crashes	ATP, NHTSA 402

Bicycle & Pedestrian Safety (Continued)

Focus Area Strategy Table

City of Clearlake Local Road Safety Plan

	Actions	Target Output	Responsible Parties *(Secondary Parties)*	Date of Completion	Performance Measures	Monitoring and Evaluation	Potential Funding Opportunities
Engineering	Systemic Pedestrian Crosswalks Near School	Pedestrian crosswalks implemented at select locations. See details in **Appendix E.**	Lake Area Planning Council & City of Clearlake	Short-term / Long-term	**Short-term**: Grant Application(s) completed **Long-term**: Constructed safety countermeasures	Percent of pedestrian crashes which occur at unsignalized intersections	HSIP, ATP
	Systemic Sidewalk	Sidewalks constructed in various locations throughout the City. See details in **Appendix E**.				Pedestrian involved crashes along roadway segments Total pedestrian fatal & serious injury crashes	HSIP, ATP
	Roadway Improvements and Bicycle Lanes	Improve pavement and incorporate bicycle lanes and sidewalk. See details in **Appendix E**.				Total pedestrian fatal & serious injury crashes	HSIP, ATP
EMS	None identified.						

Intersection Safety

Focus Area Strategy Table

City of Clearlake Local Road Safety Plan

Strategic Linkage

Identified as one of sixteen Challenge Areas in the California Strategic Highway Safety Plan (SHSP) and a High Priority Challenge Area in the forthcoming update to Caltrans SHSP (based on Caltrans materials).

Intersections account for approximately 32% of all fatal & serious injury crashes in the City of Clearlake and ranked as the fourth highest safety concern for residents based on the public outreach survey.

Objectives	Success Indicators
Crashes, injuries, and fatalities at signalized and non-signalized intersections are reduced.	Reduction in frequency of crashes, injuries, and fatalities at signalized and non-signalized intersections.

	Actions	Target Output	Responsible Parties *(Secondary Parties)*	Date of Completion	Performance Measures	Monitoring and Evaluation	Potential Funding Opportunities
Education	None identified.						
Enforcement	Identified enforcement countermeasures in other focus areas also benefit Intersection Safety						
Engineering	Site Specific - Lakeshore Dr / Hwy 53 (Signalized) Systemic Signalized Intersections Systemic Unsignalized Intersections Systemic Unsignalized Intersections and Roadways	Safety Improvements implemented at selected locations throughout the City, see additional details in **Appendix E**.	City of Clearlake Public Works *Lake Area Planning Council*	Short-term / Long-term	**Short-term**: Grant Application(s) completed **Long-term**: Constructed safety countermeasures	Number of total, serious injury & fatal crashes which occur at signalized & non-signalized intersections	HSIP
EMS	Evaluate emergency vehicle detection along priority emergency routes	Increase emergency vehicle detection and response times along priority routes	City of Clearlake Public Works	Medium-term	Emergency vehicle detection system installed along highest priority emergency routes	Number of corridors with emergency vehicle detection systems operational	HSIP*, Other

**If Emergency Vehicle involved crashes have occurred at the project location. If not, other funding necessary.*

Distracted Driving

Focus Area Strategy Table
City of Clearlake Local Road Safety Plan

Strategic Linkage

Identified as one of 16 Challenge Areas in the California Strategic Highway Safety Plan (SHSP).

Distracted driving was ranked as the highest safety concern for local residents based on the public outreach survey.

Objectives	Success Indicators
Increased awareness of safety impacts of distracted driving. Implement successful public outreach and driver engagement efforts to increase awareness.	Reduction in annual citations for cellphone usage or other distracted driving Reduction in Young Driver (Ages 15-20) involved crashes

	Actions	Target Output	Responsible Parties *(Secondary Parties)*	Date of Completion	Performance Measures	Monitoring and Evaluation	Potential Funding Opportunities
Education	Distracted Driving Public Outreach Campaign	Local distracted driving messaging campaign using a variety of media outlets	City of Clearlake - Public Works & Police Lake Area Planning Council	Medium-term	1. Grant funding obtained for specific Distracted Driving outreach campaign 2. Implemented outreach campaign for full quarter (3 months)	Total fatal & serious injury crashes involving distracted driving (cellphone usage, or other distraction)	NHTSA 402, NHTSA 405(e)
Enforcement	High-Visibility Cell Phone / Text Messaging Enforcement Campaign	Conduct high visibility enforcement program, contingent on staff resources, to increase awareness of enforcement efforts and to provide citations as needed. May be combined with High Visibility Enforcement programs from other Focus Areas.	City of Clearlake - Police Department	Short-term / Medium - Term	Short-term: Grant funding obtained for increased High Visibility Enforcement Program Medium-term: High Visibility Enforcement Program established & implemented quarterly	Total fatal & serious injury crashes involving distracted driving (cellphone usage, or other distraction) Number of distracted driving or distracted driving related violations issued during High Visibility program and annually	CTFGP, NHTSA 402, NHTSA 405(e)
Engineering	Engineering projects for Pedestrian / Bicycle Safety, Intersection Safety, and Lane Departures will contribute to improvements to Distracted Driving						
EMS	None identified.						

Impaired Driving

Focus Area Strategy Table

City of Clearlake Local Road Safety Plan

Strategic Linkage

Identified as one of sixteen Challenge Areas in the California Strategic Highway Safety Plan (SHSP) and a High Priority Challenge Area in the forthcoming update to Caltrans SHSP (based on Caltrans materials).

Impaired driving, or Driving/Bicycling under the influence, was the third most common Primary Collision Factor for fatal & serious injury crashes and ranked as the second highest safety concern for residents through the public outreach survey.

Objectives	Success Indicators
Alcohol/drug involved crashes, injuries, and fatalities are reduced.	Reduction in frequency of crashes, injuries, and fatalities involving alcohol and drugs.

	Actions	Target Output	Responsible Parties *(Secondary Parties)*	Date of Completion	Performance Measures	Monitoring and Evaluation	Potential Funding Opportunities
Education	Drunk & Impaired Driving Awareness Campaign	Reduced number of alcohol-involved serious injuries and fatalities	City of Clearlake Public Information & Police Department *Lake Area Planning Counc* il	Short-term	1. Specific Impaired Driving outreach campaign funded (Grant or existing funding) 2. Implemented outreach campaign for full quarter (3 months)	Total Alcohol-involved fatal & serious injury crashes	NHTSA 402, NHTSA 405(e)
Enforcement	Passive Alcohol Sensors (PAS)	Equip officers with Passive Alcohol Sensors to increase efficiency of Alcohol Checkpoints and normal traffic stops	City of Clearlake Police Department, Clearlake Public Works *Lake Area Planning Council*	Medium - Term	1. Grant funding obtained for PAS units to correspond with Publicized Sobriety Checkpoints	Annual number of alcohol/drug-involved crashes Annual DUI Arrests Annual alcohol/drug-involved fatal & serious injury crashes	NHTSA 402, NHTSA 405(e)
	Publicized Sobriety Checkpoints	Highly publicized sobriety checkpoints conducted regularly to increase perceived risk of arrest for impaired driving			1. Grant funding obtained for increased DUI checkpoints 2. DUI Checkpoints publicized and conducted		CTFGP, NHTSA 402, NHTSA 405(d)
	High-Visibility Saturation Patrols	Focused patrols around specific areas where impaired-driving crashes are common as part of an on-going saturation program			1. Grant funding obtained for increased High Visibility Enforcement Program 2. High Visibility Enforcement Program established & implemented quarterly		CTFGP, NHTSA 402, NHTSA 405(d)
Engineering	None identified						
EMS	None identified						

Roadway & Intersection Lighting

Focus Area Strategy Table

City of Clearlake Local Road Safety Plan

Strategic Linkage

A total of 30% of all fatal & serious injury crashes and 75% of fatal pedestrian crashes occurred during non-daylight hours.

Objectives	Success Indicators
Crashes, injuries, and fatalities during 'Dark' or 'Dusk' lighting conditions are reduced. Higher roadway and intersection illumination	Reduction in frequency of crashes, injuries, and fatalities during 'Dark' or 'Dusk' conditions. Achieve higher level of illumination at high crash frequency intersections

	Actions	Target Output	Responsible Parties *(Secondary Parties)*	Date of Completion	Performance Measures	Monitoring and Evaluation	Potential Funding Opportunities
Education	None identified						
Enforcement	None identified						
Engineering	Perform lighting analysis at select locations, starting with those with nighttime crashes, or suspected to have poor lighting	Identified list of locations, potential HSIP project	City of Clearlake Public Works	Short-Term	All locations with crash during 'Dark' Conditions evaluated	Number of completed lighting studies	*Public Works Operational Funding*
EMS	Identified countermeasures under other E's will also benefit Emergency Response Safety						

Speeding

City of Clearlake Local Road Safety Plan
Focus Area Strategy Table

Strategic Linkage

Speed management / Aggressive driving is one of sixteen Challenge Areas in the California Strategic Highway Safety Plan (SHSP) and a High Priority Challenge Area in the latest Caltrans SHSP

'Unsafe Speed' was the most common Primary Collision Factor (PCF) for serious injury & fatal crashes and for all crashes.

Objectives	Success Indicators
Reducing speeding and other aggressive driving behaviors	Serious injury & fatal crashes involving 'Unsafe Speed' are reduced.

	Actions	Target Output	Responsible Parties *(Secondary Party)*	Date of Completion	Performance Measures	Monitoring and Evaluation	Potential Funding Opportunities
Education	Speed Kills Campaign	Conduct public outreach campaign about the importance of driving the speed limit and the impact just 5 mph can have on the severity of a crash	City of Clearlake Public Works & Public Information *Lake Area Planning Council*	Short-term	1. Grant funding obtained for specific Speeding focused outreach campaign 2. Implemented outreach campaign for full quarter (3 months)	Total, fatal & serious injury crashes involving 'Unsafe Speed' Primary Collision Factor	NHTSA 402, NHTSA 405(e)
Enforcement	Targeted Speed Enforcement Program	Reduced speeding issues along select corridors through regular and targeted enforcement patrols	City of Clearlake Public Works *Lake Area Planning Council*	Medium-term	1. Grant funding obtained for Targeted Speed Enforcement Program 2. Targeted Speed Enforcement implemented quarterly along at least three corridors for a full calendar year.	Total, fatal & serious injury crashes involving 'Unsafe Speed' Primary Collision Factor	NHTSA 402, NHTSA 405(e)
Engineering	Systemic Speeding Management Project	Dynamic Speed Signs and/or portable trailers to inform motorist of speeding. See details in **Appendix E**.	City of Clearlake Public Works *Lake Area Planning Council*	Long-term	**Short-term:** HSIP Grant Application(s) completed **Long-term:** Constructed safety countermeasures through successful HSIP or other grant(s)	Total, fatal & serious injury crashes involving 'Unsafe Speed' Primary Collision Factor	HSIP, NHTSA 402
En	None identified.						

Lane Departures

Focus Area Strategy Table

City of Clearlake Local Road Safety Plan

Strategic Linkage

Identified as one of sixteen Challenge Areas in the California Strategic Highway Safety Plan (SHSP) and a High Priority Challenge Area in the forthcoming update to Caltrans SHSP (based on Caltrans materials).

Lane departure type crashes (head-on, sideswipe, hit-object, overturned) accounted for 50% of all fatal & serious injury crashes

Objectives	Success Indicators
Lane Departure type crashes (Head-on, sideswipe, hit object, and overturned) resulting in injuries, and fatalities are reduced.	Reduction in frequency of lane departure type crashes resulting in injuries, and fatalities.

	Actions	Target Output	Responsible Parties *(Secondary Parties)*	Date of Completion	Performance Measures	Monitoring and Evaluation	Funding Opportunities
Education	None identified.						
Enforcement	None identified.						
Engineering	Systemic Roadway	Improve road visibility and friction. See details in **Appendix E**.	City of Clearlake Public Works	Short-term / Long-term	Short-term: Grant Application(s) completed Long-term: Constructed safety countermeasures	Lane departure crashes (head-on, sideswipe, hit object, and overturned) percent of all fatal & serious injury crashes Total lane departure type fatal & serious injury crashes	HSIP, CMAQ
EMS	None identified.						

Appendix E
Potential Engineering Projects

Potential Projects Overview – Clearlake LRSP

1. Intersection Safety – Site Specific - Lakeshore Drive/ 40th / Hwy 53 – Signalized Intersection

Project Description

The potential project is to improve the overall visibility of the intersection and crosswalks with enhanced striping and pavement markings and evaluate the signal timing parameters to determine if modifications or a leading pedestrian interval would improve safety.

Reason for Inclusion

This intersection was tied for the highest number of crashes and had one fatal crash. Two crashes involved a pedestrian.

No major risk factors were noted at the intersection. The intersection has signal ahead warning signs, a pedestrian countdown signal, and the signal heads have backplates. The pedestrian crosswalks and stop bars should be enhanced, and the signal timing should be evaluated (phasing, clearance times, etc) to determine if modifications or a leading pedestrian interval should be implemented.



Lakeshore Drive / SR 53

Countermeasures selected (up to 3 per HSIP application)

No.	Type	Countermeasures Name	Crash Type	CRF	Expected Life Years	HSIP Funding Eligibility	Systemic Approach Opportunity
S03	Signal Modification	Improve signal timing (coordination, phases, red, yellow, or operation)	All	15%	10	50%	Very High
S18PB	Ped and Bike	Install pedestrian crossing	P & B	25%	20	100%	High
S21PB	Ped and Bike	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	P & B	60%	10	100%	Very High
S09	Operation/ Warning	Install raised pavement markers and striping (through intersection)	All	10%	10	100%	Very High

Lakeshore Drive improvements from Olympic Drive to Hwy 53 are included in the *2017 RTP.* Any safety improvements should be coordinated with planned roadway/intersection improvements.

Preliminary Costs, BCR and HSIP Potential

Project costs are low, and given the crash history, the BCR is high. Therefore, the project has high HSIP funding potential. However, the overall project cost may require an exception for HSIP application minimum funding of $100,000. If a standalone project is not practical, this intersection should be combined with the systemic signalized intersection project.

2. Intersection Safety – Systemic Signalized Intersections

Project Description

Improve signal visibility with backplates, new striping/ reflectors and additional advanced warning signs.

Intersections, Reasons for Inclusion, and Risk Factors

Hwy 53 / 18th Avenue

Top intersection for crashes – 4 total, 1 fatal. No major risk factors were noted at the intersection. Stop bars could be enhanced, additional warning signs/ flashing beacons would heighten awareness of an upcoming signal, and the signal timing should be reviewed (phasing, clearance times, etc) to determine if modifications are needed. A raised pedestrian refuge island would allow for a two-stage crossing, although no pedestrian crashes are recorded at this intersection. This intersection is Caltrans owned and operated and is included in a project which includes signal re-timing and coordination. This intersection is also recommended to add east and westbound left-turn lanes and a northbound right-turn lane as part of the *SR 53 Corridor Study*.



Hwy 53 / 18th Avenue

Any safety improvements should be planned in coordination with capacity improvement projects.

Old Hwy 53 / SR 53 / Dam Road

Top intersection for crashes – 4 total, 2 serious. No major risk factors were noted at the intersection. Stop bars could be enhanced, additional warning signs / flashing beacons would heighten awareness of an upcoming signal, and the signal timing should be reviewed (phasing, clearance times, etc) to determine if modifications are needed. It is noted that this intersection is in proximity (less than 500') from the Dam Road/ Dam Road Extension intersection that is planned to be converted to a roundabout.

Olympic Drive / Burns Valley Road / Old Hwy 53

Top intersection for crashes – 2 total, 1 fatal. This intersection exhibited signs of worn pavement and striping. Power lines appear to partially obstruct views of signal heads, pedestrian crosswalks were faded, and signal heads lacked back plates.

Other intersections with similar characteristics may be added for a systemic application.

Countermeasures selected (up to 3 per HSIP application)

No.	Type	Countermeasures Name	Crash Type	CRF	Expected Life Years	HSIP Funding Eligibility	Systemic Approach Opportunity
S03	Signal Modification	Improve signal timing (coordination, phases, red, yellow, or operation)	All	15%	10	50%	Very High
S09	Operation / Warning	Install raised pavement markers and striping (through intersection)	All	10%	10	100%	Very High
S10	Operation / Warning	Install flashing beacons as advance warning (S.I)	All	30%	10	100%	High
S02	Signal Modification	Improve signal hardware: lenses, back plates with retroreflective borders, mounting, size, and number	All	15%	10	100%	Very High

Preliminary Costs, BCR and HSIP Potential

Project costs are medium, depending on the countermeasures selected for each intersection. Given the crash history, the BCR estimate and HSIP potential for funding are high.

3. Intersection Safety – Systemic Unsignalized Intersections

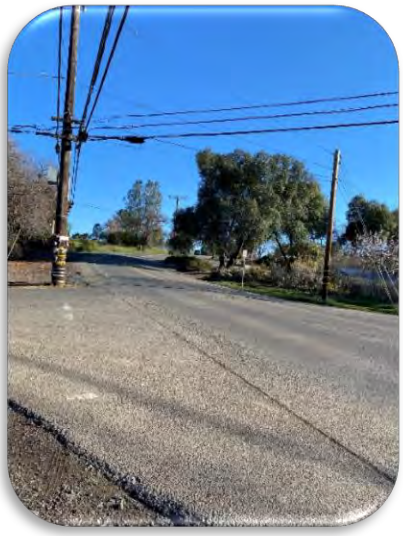
Project Description

Improve intersection visibility with additional signage, flashing beacons and upgraded pavement markings. Slow traffic using traversable rumple strips or speed tables as appropriate.

Intersections, Reasons for Inclusion, and Risk Factors

Old Hwy 53 / Austin Road

Top crash location - 5 total (tied for highest), 1 serious injury. This intersection had worn pavement and striping. Utility poles are located near the intersection, the sidewalk on the east side ends at the intersection, and sidewalks do not exist on the west side. Site distance appears to be partially obstructed due to the roadway curve.



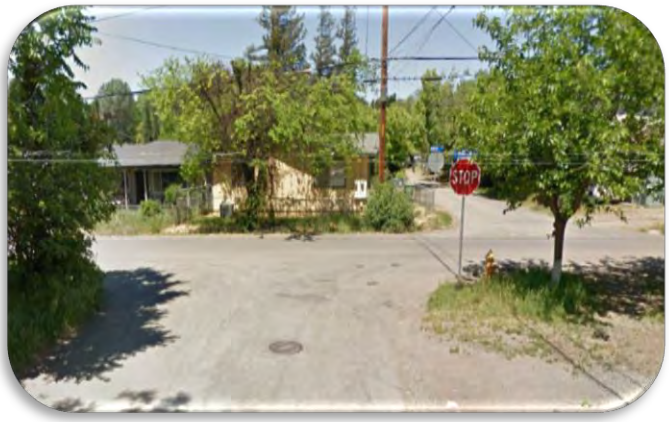
Old Hwy 53 / Austin Rd

Austin Road / Cypress Drive

Top crash location - 3 total, 1 injury. This intersection has poor pavement conditions, no striping, vegetation and utility poles near the intersection, and the intersection is offset. Pavement conditions would need to be improved prior to striping improvements.

Old Hwy 53 / SR 53

Top crash location - 3 total, 1 injury. The intersection could benefit from advanced signage and/ or oversized stop signs for increased visibility. A pedestrian crossing is not appropriate unless sidewalks or a multiuse path are constructed.



Austin Road / Cypress Drive

Phillips / 18th

Top crash location with 2 total crashes. The intersection was recently updated with signage; however, the striping is faded.

Other intersections with similar characteristics may be added for a systemic application.

Countermeasures selected (3 per HSIP application)

No.	Type	Countermeasures Name	Crash Type	CRF	Expected Life Years	HSIP Funding Eligibility	Systemic Approach Opportunity
NS06	Operation / Warning	Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	All	15%	10	100%	Very High
NS07	Operation / Warning	Upgrade intersection pavement markings (NS.I.)	All	25%	10	100%	Very High
NS08	Operation / Warning	Install Flashing Beacons at Stop-Controlled Intersections	All	15%	10	100%	High
NS10	Operation/ Warning	Install transverse rumble strips on approaches	All	20%	10	90%	High
NS11	Operation / Warning	Improve sight distance to intersection (Clear sight triangles)	All	20%	10	90%	High

Speed tables will be considered to slow traffic as appropriate; these are not HSIP eligible.

Preliminary Costs, BCR and HSIP Potential

The project costs are expected to be relatively low, and the BCR and HSIP potential is high given the crash data.

4. Intersection Safety and Lane Departures – Systemic Unsignalized Intersections and Roadways

Project Description

Bring the roadway network and intersections up to standards in the area referred to as the "Avenues." The project would be to improve pavement conditions and install stop signs at intersections.

Intersections, Reasons for Inclusion, and Risk Factors

The area referred to as "the Avenues" is bordered by Pine Avenue to the west, Parker Avenue to the east, 45th Avenue to the north and 18th Avenue to the south. This area has sections of poor pavement conditions, gravel roads and lacks stop signs at some intersections. The crash data analysis shows sporadic crashes in this area, some with injuries.

Preliminary Costs, BCR and HSIP Potential

Costs are to be determined; the project is not expected to be a candidate for HSIP funding.



The Avenues

5. Pedestrian and Bicycle Safety - Systemic Pedestrian Crosswalks Near School

Project Description

Install or upgrade pedestrian crossings near schools. These locations are included in the *Lake Walks Study*.

Intersections, Reasons for Inclusion, and Risk Factors

Arrowhead Road / Ciwa Street
This intersection had 1 fatal pedestrian crash, no pedestrian facilities (crosswalks or sidewalks) and the intersection is near a school. Sidewalks should be installed prior to constructing pedestrian crosswalks.

Arrowhead Road / Halika Street
This intersection had 1 injury pedestrian crash, no pedestrian facilities (crosswalks or sidewalks) and the intersection is near a school. Sidewalks should be installed prior to constructing pedestrian crosswalks.

Old Hwy 53 / Airport Road
This intersection had 1 serious injury pedestrian crash, no pedestrian crosswalks and sidewalks are non-continuous. A pedestrian crosswalk and sidewalks exist approximately 150' away at the school.



Crosswalk near Old Hwy 53 / Airport Road

Olympic Drive / Pine Street
This intersection had 1 fatal pedestrian crash, has a striped continental style crosswalk that could be enhanced with additional safety features, and the intersection is near a school. Bicycle lanes are present on this roadway.

Olympic Drive / Maple Street
This intersection had 1 injury bicycle crash, no pedestrian facilities, and the intersection is near a school. Bicycle lanes are present, and the sidewalk is discontinuous on the south side. The sidewalk network may need to be upgraded prior to constructing pedestrian crosswalks.

It is noted that crosswalks should be installed/upgraded at the most beneficial locations, and not necessarily where a crash occurred. If an adjacent location is more practical to construct a crosswalk this provides a safety benefit for the surrounding area.

Other locations may be added as identified. Several additional intersections had pedestrian or bicycle related crashes but may not be appropriate for crosswalk installation given the roadway conditions and/or sidewalk connectivity:

- Old Hwy 53 / Austin Road
- Austin Road / Cypress Drive

- Old Hwy 53 / SR 53
- Mullen Avenue / Pearl Avenue
- Bush Street / 9th Street
- Old Hwy 53 / Cypress Avenue
- Old Hwy 53 / Putnam Lane
- Phillips Avenue / 40th Avenue
- Second Street / Bush Street



Bush Street / 2nd Street

Countermeasures selected

No.	Type	Countermeasures Name	Crash Type	CRF	Expected Life Years	HSIP Funding Eligibility	Systemic Approach Opportunity
NS21PB	Ped and Bike	Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)	P & B	35%	20	100%	Medium

In addition, Rectangular Rapid Flashing Beacons (RRFB's) may be added if warranted. Other countermeasures such as signage, flashing beacons or pavement markings for school zone awareness may also be included.

Preliminary Costs, BCR and HSIP Potential

The BCR and HSIP potential is high given estimated costs and crash data. The costs would be higher to include constructing sidewalk segments.

6. Pedestrian and Bicycle Safety - Systemic Sidewalk



Arrowhead Road / Ciwa Street near Pomo Elementary School

Project Description

Install sidewalks and/or fill in missing segments to compliment *#5. Systemic Pedestrian Crosswalks Near School*. These projects may be combined.

Roadways, Reasons for Inclusion, and Risk Factors

Arrowhead Road, Old Hwy 53 near Airport Road, Olympic Drive near schools. These locations had pedestrian-involved crashes and are included in the *Lake Walks Study*.

Countermeasures selected

No.	Type	Countermeasures Name	Crash Type	CRF	Expected Life Years	HSIP Funding Eligibility	Systemic Approach Opportunity
R34PB	Ped and Bike	Install sidewalk / pathway (to avoid walking along roadway)	P & B	80%	20	90%	Medium

Preliminary Costs, BCR and HSIP Potential

The cost and HSIP potential to be determined depending on the length of sidewalks needed. This may be combined with project #*5. Pedestrian and Bicycle Safety - Systemic Pedestrian Crosswalks Near School.*

7. Lane Departures - Systemic Roadway



Roadway Reflector

Project Description

Improve road visibility and guide motorists to stay in their lane.

Roadways, Reasons for Inclusion, and Risk Factors

Old Highway 53- 2 serious injury crashes, 16 total crashes, top 5 crashes per mile, top segment for non-intersection crashes. In general, the roadway has curves and somewhat faded striping and bicycle lanes.

Lakeshore Drive - 3 serious injury crashes, 12 total crashes, top segment for non-intersection crashes. In general, the roadway is lined with commercial driveways, has faded striping and bicycle lanes.

Olympic Drive - 2 fatal crashes, 8 total crashes, top 5 crashes per mile, top segment for non-intersection crashes. The roadway has curves, some sections of worn pavement and/or striping and missing sidewalks.

18th Avenue - 2 serious injury crashes, 5 total crashes, top 5 crashes per mile, top segment for non-intersection crashes. This roadway has vertical curves and is a straight roadway with few intersection stops which may contribute to higher speeds, and some sections of worn pavement. A significant portion of the roadway was recently improved with new pavement, striping, bicycle lanes and additional signage.

Countermeasures selected (up to 3 per HSIP application)

No.	Type	Countermeasures Name	Crash Type	CRF	Expected Life Years	HSIP Funding Eligibility	Systemic Approach Opportunity
R22	Operation / Warning	Install / Upgrade signs with new fluorescent sheeting (regulatory or warning)	All	15%	10	100%	Very High
R27	Operation / Warning	Install delineators, reflectors, and/or object markers	All	15%	10	100%	Very High
R28	Operation / Warning	Install edge-lines and centerlines	All	25%	10	100%	Very High
R30	Operation / Warning	Install centerline rumble strips/stripes	All	20%	10	100%	High

Preliminary Costs, BCR and HSIP Potential

The cost is to be determined based on the length of roadways and number of signs. The BCR and HSIP potential is medium-high given the crash data.

8. Lighting – Systemic Lighting Project

Project Description

Consider evaluation of lighting conditions at locations with nighttime crashes or any roadways with potentially insufficient lighting. Upgrade illumination at any locations found to have low levels.



Roadway Lighting

Roadways, Reasons for Inclusion

The locations with nighttime crashes are shown in **Figure 1**. This alone does not indicate a lighting deficiency but rather to consider evaluating the conditions.

Countermeasures selected

For locations with low levels of lighting, Countermeasures RSO1, NS01, S01 should be pursued for funding.

Preliminary Costs, BCR and HSIP Potential

The costs, BCR and HSIP potential would be determined after evaluation of lighting levels.

9. Speeding – Systemic Speed Project

Project Description

Perform speed analyses and deploy portable speed trailers or dynamic/ variable speed warning signs throughout Clearlake at locations identified in the data and public comments.

Countermeasures selected

No.	Type	Countermeasures Name	Crash Type	CRF	Expected Life Years	HSIP Funding Eligibility	Systemic Approach Opportunity
R26	Operation / Warning	Install dynamic/variable speed warning signs	All	30%	10	100%	High

And/or portable speed trailers.

Preliminary Costs, BCR and HSIP Potential

The costs, BCR and HSIP potential are to be determined depending on the roadways found to have excessive speeding.



Variable Speed Sign



Portable Speed Trailer

10. Community-Wide Roadway, Bicycle and Pedestrian Improvements

Project Description

Several areas throughout the city were noted to have worn pavement conditions and lacked sidewalks and bicycle lanes. Sporadic crash locations with pedestrian and bicycle crashes were noted in these areas as indicated in project #***5. Pedestrian and Bicycle Safety - Systemic Pedestrian Crosswalks Near School***. As roadways are improved overtime, consideration should be given to including sidewalks and/or bicycle lanes as appropriate, particularly on roadways identified in the *Lake Walks Study*.

Preliminary Costs, BCR and HSIP Potential

The project costs are to be determined. There is potential for HSIP funding for pedestrian crosswalks, sidewalks and/or bicycle lanes to be incorporated into roadway pavement rehabilitation projects.



Priority Projects for Clearlake from ***Lake Walks Study***

Appendix F
HSIP Analyzer Manual and Countermeasure Table

HSIP Analyzer Manual

(For BCR Applications)

HSIP Analyzer is a PDF form-based software that streamlines the process of cost estimate, safety improvement countermeasure evaluation, crash data input and Benefit Cost Ratio (BCR) calculation. The use of the HSIP Analyzer is required for all applications for Highway Safety Improvement Program (HSIP) Cycle 10 Call for Projects. The completed HSIP Analyzer is one of the required attachments to the HSIP Application Form (Attachment No. 5, last page of the application form).

There are two HSIP application categories: BCR and Funding Set-asides. **This manual provides instructions for using the HSIP Analyzer to prepare a BCR application. Please use the other manual for Funding Set-aside Applications.**

Please review these instructions thoroughly before you start to prepare a BCR application.

For more information regarding the HSIP program, please review the HSIP Guidelines, Local Roadway Safety Manual for California Local Road Owners and other related information at https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/highway-safety-improvement-program.

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For an application that needs a BCR, the HSIP Analyzer consists of the below sections:

- **General Information**

  Provides Application ID, Project Location, Project Description, type of project locations (signalized intersections, non-signalized intersections or roadways), safety countermeasures to be applied, estimated project schedule and other general information.

- **Section I: Construction Cost Estimate and Cost Breakdown**

  Provides estimate for construction items, determines the project's maximum Funding Reimbursement Ratio (FRR).

- **Section II: Project Cost Estimate**

  Provides the cost estimate for the entire project, including all phases (PE, ROW, CON and CE). Also determines the requested HSIP funding amount.

- **Section III. Crash Data**

  Provide crash data for the purpose of calculating the project benefit in Section IV.

- **Section IV. Calculation and Results**

  Calculate the project benefit, the BCR and provide calculation result summaries. Errors are displayed in lieu of calculation results if detected.

One BCR application may include one or multiple locations. Please note:

a. All the locations in the application must be of the same type: Signalized Intersections (S), Non-Signalized Intersections (NS), or Roadways (R). For example, an application may have 5 Non-Signalized Intersections, but it cannot have 2 Non-Signalized Intersections, 1 Signalized Intersection and 2 roadway sections.

b. All the locations in the application must receive the same proposed safety improvements, i.e. all the safety countermeasures (CMs) must be applied to all the locations. Up to three (3) safety countermeasures may be used in calculating the benefit of the project.

If the above criteria are not met, please break your proposed project into multiple applications. Applicants may consider combining the applications into one project during implementation if multiple applications of small sizes are selected for funding. The purpose of this requirement is to evaluate the locations of same characteristics with similar safety concerns together and justify the selection of the locations based on their own expected safety benefits.

Example:

A project includes 20 signalized intersections. CMs "Add Intersection Lighting" (S01) and "Install pedestrian countdown signal heads" (S17PB) will be applied to all 20 intersections. If for another set of 12 intersections only CM S17PB will be installed since lighting exists, these 12 intersections should have a separate application.

Exception 1: If your project has only very few locations that the situation is different from the majority, you may include all locations in one application. Multiple HSIP Analyzer files will be needed if the project includes locations/sites of different types (S, NS and R). Please attach all your HSIP Analyzer files to the application form. Please sum the benefits and calculate the application's BCR as (Total benefits/Total Project Cost). Enter the BCR into the application form.

Example:

A project includes 20 signalized intersections. CMs "Add Intersection Lighting" (S01) and "Install pedestrian countdown signal heads" (S17PB) will be applied to all 20 intersections. If you have 2 more intersections that only CM S17PB will be applied, you may include all 22 intersections in one application. Since all locations are of the same type (S), only one HSIP Analyzer file is needed.

Exception 2: If your project proposes corridor safety improvements which may include a number of signalized intersections, non-signalized Intersections, and roadway sections, you may include all locations in one application which then needs multiple HSIP Analyzer files. All HSIP Analyzer files pertaining to your application must be attached to the last page of the application form. Please sum the benefits and calculate the application's BCR manually as (Total benefits/Total Project Cost). Enter the BCR into the application form.

Exception 3: If your project uses a systemic approach, you may include all locations in one application though the proposed safety improvements may be different. For example, for a project that includes many curve road segments that have an existing or potential roadway-departure crash problem, all road segments can be in one application, though the safety countermeasures may vary. Since all locations are of the same type (R), only one HSIP Analyzer file is needed. Please note the maximum number of safety countermeasures allowed in one HSIP Analyzer file is 3.

General Information

Application ID: Enter the exact Application ID from the Application Form, e.g. 03-Sacramento-1.

Save the completed HSIP Analyzer as file name "HA" + Application ID before you attach it to the last page of the Application Form (e.g. "HA03-Sacramento-1.pdf").

If your application has multiple HSIP Analyzer files (this is rare), please use different file names and attach all to the application form. See the previous page for more explanation.

Project Location: Enter (copy & paste) the exact Project Location from the Application Form.

Project Description: Enter (copy & paste) the exact Project Description from the Application Form.

Application Category, Location Type and Countermeasures:

- Select "Benefit Cost Ratio (BCR)" from the drop-down list;
- Select the location type ("Signalized Intersections", "Non-Signalized Intersections" or "Roadway Sections"). only countermeasures (CMs) pertaining to the selected location type will be displayed in the below drop-down lists for CM selection.
- Number of Intersections and Miles of Roadway: provide number of intersections (if ("Signalized Intersections" or "Non-Signalized Intersections" is selected above) or the length of roadways (if "Roadway Sections" is selected above).
- Select number of countermeasures for the project (1, 2 or 3); and
- Select the name for each countermeasure.

The countermeasures selected here will be populated in Section I (Construction Cost Estimate and Cost Breakdown) and Section III (Crash Data).

If an error message is displayed at the bottom of this page, the message must be cleared before proceeding to the next page. An error message will be displayed if one of the following specific CM rules is violated:

1) S08 and S02 should not be selected together.

   S08 ("Convert signal to mast arm (from pedestal-mounted)") and S02 ("Improve signal hardware: lenses, back-plates, mounting, size, and number") should not be selected together as the work of S02 is considered part of CM S08.

2) Any of the below CMs should not be selected in combination with any other CMs:
   - S16 - Convert intersection to roundabout (from signal);
   - NS03 - Install signals;
   - NS04 - Convert intersection to roundabout (from all way stop);
   - NS05 - Convert intersection to roundabout (from stop or yield control on minor road).

Project information

Most of the information requested in this session is required for Caltrans to meet its annual safety program reporting requirements to the FHWA. Responses to these questions will NOT be used in the scoring, ranking or selection process. The responses will be incorporated in statewide and national safety program assessments and used to determine the health of the overall program and potential areas of focus for future program improvements.

Some of the questions are self-explanatory so not all questions are explained here.

Functional Classification (FC):
Visit https://dot.ca.gov/programs/research-innovation-system-information/office-of-highway-system-information-performance, click "California Road System (CRS) maps" in the middle of the webpage, and determine the Functional Classification (FC) of the road(s) where most of the work will be constructed. If the amounts of work are equal among multiple FCs, use the highest FC. Select the FC from the drop-down list.

Urban/Rural Area:
Select "Urban" or "Rural" from the drop-down list, when most of the proposed work is in urban or rural area.

What is the approximate total cost percentage that is HR3 eligible?
Work in **rural** area and associated with roads functionally classified as "Major Collector", "Minor Collector" and/or "Local", is High-Risk-Rural-Roads (HR3) eligible. HR3 eligible projects, when selected for funding, will be tracked separately due to the FHWA's special requirements. Provide an approximate total cost percentage that is HR3 eligible (rounded to the nearest ten percent).

Annual Average Daily Traffic and Year Collected:

Indicate the existing (or most current) Annual Average Daily Traffic (AADT) volume at the project location and the year the data were collected.

- If the proposed improvement is on a road segment, the AADT is the number of vehicles that use that section of roadway, in both directions, on an average day. You may enter the same number for the Major Road and Minor Road.
- If the proposed improvement is at an intersection, separate the AADT volumes approaching the intersection into Major Road and Minor Road.
- If the proposed improvements span a large distance and/or are spread out over several routes/locations, provide the range of AADT volumes with the high-end input in the "Major Road" field and the low-end input in the "Minor Road" field.

Posted Speed Limit (mph):
Input the highest posted speed within the project limits.

SHSP Challenge Area:
The goal of this question is to tie the improvements to California's Strategy Highway Safety Plan (SHSP). Most projects should fall within one of the Challenge Areas. Select the primary one if multiple Challenge Areas apply. Visit https://dot.ca.gov/programs/traffic-operations/shsp for more details on the California SHSP Challenge Areas.

Is the project focused primarily on "spot location(s)" or "systemic" improvements?
The Local Roadway Safety Manual includes a detailed description of these two approaches. When more than one type of systemic improvements is proposed in one application, applicants need to select a single "primary type".

Approximate percentage of project cost going to improvements related to motorized travel:
HSIP projects benefit a mix of roadway users and modes of travel. For statewide tracking purposes, Caltrans needs to approximate the percent of the overall project costs going to improvements for motorized vs. non-motorized roadway users. Please make the best approximation of the percentage related to motorized travel based on the estimated project cost and the primary goals and objectives of the project.

Project Schedule:

The local agency is expected to deliver the project per the HSIP Program Delivery requirements. The delivery requirements for HSIP Cycle 10 projects are: (1) Preliminary Engineering (PE) Authorization by 9/30/2021; and (2) Construction (CON) Authorization by 12/31/2023.
The exceptions are:

- The milestone of PE authorization does not apply if the project will not use the HSIP funds for PE;
- For a project that a consultant is used for the PE work, an additional time of 6 months is allowed for meeting the CON Authorization milestone. The additional time is for the agency to advertise and select the consultant for the work of the PE phase.

Please answer the below two questions:

- Will this project use HSIP funds for Preliminary Engineering (PE) Phase?
- Will an external consultant be hired to do the PE work?

Then specific delivery requirements for your proposed project, if selected for funding, will be displayed.

Please provide your best estimated dates for the following implementation milestones (leave blank if not applicable). Please make sure the proposed schedule will meet the above delivery requirements.

- PE Authorization Date;
- Environmental Clearance Date;
- Right of Way Clearance Date;
- Final PS&E Date;
- CON Authorization Date;
- Construction Contract Award Date;
- Construction Completion Date; and
- Project Close-Out Date.

Section I: Construction Cost Estimate and Cost Breakdown

The purpose of this section is to:

- Provide a detailed engineer's estimate for construction items. The costs for other phases i.e. Preliminary Engineering (PE), Right of Way (ROW), and Construction Engineering (CE) will be accounted for in Section II.
- Determine the maximum Funding Reimbursement Ratio (FRR) of the project.

****

I.1 Countermeasures (CMs) applied to all locations (from Page No. 1)

The CM information comes from Page No. 1.

I.2 Detailed Engineer's Estimate for Construction Items:

- **Table for Detailed Engineer's Estimate:**

  The gray fields are calculated and read-only. Each line is for one construction item. Click + or – buttons to add a new line or delete an existing line.

  In each line, enter the construction item description, quantity, unit, unit cost, and the cost percentages that are directly attributed to each of the countermeasures (CMs) and OS ("other safety-related components"). The remaining percentage is calculated and goes to NS ("non-safety-related components").

  At the bottom of the table, an overall cost percentage will be calculated for each CM, OS and NS.

- **Contingencies**:

  In general, not all project construction costs are well defined at the time the HSIP applications are prepared. For this reason, applicants are allowed to include Construction Item Contingencies as a percentage of the known construction costs. This is the only project contingencies allowed in an HSIP application. When applicants calculate their Preliminary Engineering (PE) and Construction Engineering (CE) costs as a percentage of the Total Construction Cost, contingencies will automatically be built into the PE and CE costs.

- **Total Construction Cost**:

  The total construction cost is the sum of the construction item costs and the contingencies, rounded up to the nearest hundreds.

I.3 Funding Reimbursement Ratio

The project's maximum FRR is calculated as:

- The smallest of the Funding Eligibility (FE) percentages of the selected CMs, when the percentage of the non-safety- related components is no more than 10%;

  For example, if the FEs of the 3 CMs are 100%, 90% and 100%, and the % of the non-safety- related components is 8%, the project's maximum FRR will be 90%.

- OR the smallest of the FE percentages of the selected CMs minus the percentage of the non-safety-related-components exceeding 10%, when the percentage of the non-safety related components is more than 10%.

  For example, if the FEs of the 3 CMs are 100%, 90% and 100%, and the % of the non-safety- related components is 18%, the project's maximum FRR will be 90%-(18%-10%)=82%.

After the completion of Section I, the following data will be transferred to Section II (Project Cost Estimate) automatically: (1) Total Construction Cost; and (2) Maximum Funding Reimbursement Ratio (FRR). FRR will be used as the maximum "HSIP/Total" percentage allowed in Section II.

Section II: Project Cost Estimate

Section II of the application form is used for the overall project cost estimate including all applicable phases, i.e. Preliminary Engineering (PE), Right of Way (ROW), Construction (CON), and Construction Engineering (CE). All project costs (all phases and funding sources) must be accounted for in this section.

The costs included in the application represent the likely total project cost necessary to fully construct the proposed scope. If the proposed project is a piece of a larger construction project, the entire scope of the larger project must be identified and included in this section even if substantial elements are to be funded by other sources. The Total Project Cost from this section will be used in the later Benefit Cost Ratio (BCR) calculation.

The following data are transferred to this section from Section I:
- *Total Construction Cost;*
- *Maximum Funding Reimbursement Ratio (FRR), i.e. Maximum "HSIP/Total" percentage allowed for this project.*

All the grey fields contain formulas and are read-only.

For each line in the table, enter the total cost (rounded up to the nearest hundred dollars) and the desired HSIP/Total Cost ratio. The desired HSIP/Total ratio cannot be more than the project's maximum FRR. You may click the "Set" button on top of the table to set all "HSIP/Total" percentages to the project's max FRR. The amounts of HSIP Funds and Local/Other Funds will be calculated by the form.

Check Box indicating Agency does NOT request HSIP funds for PE Phase:

If no HSIP funds for the PE Phase are requested, this Check Box will be checked automatically. This information will only be used for project delivery tracking. It will not affect the ranking or selection of applications for funding.

Automatic Data Validation:

Once all costs and ratios are entered, a message will appear if errors are detected, based on the below criteria. Please fix the errors unless justification for exceptions is provided in narrative question no. 3 in the Application Form.

1) The "HSIP Funds" for Construction Items may not be zero.
2) "HSIP Funds" for Preliminary Engineering may not exceed 25% of the HSIP Construction Cost.

   Exception: for low cost systematic projects such as Roadway Safety Signing Audits (RSSA), Caltrans anticipates approving PE costs over 25%. For more information on this type of project, see the example document at the HSIP website.
3) "HSIP Funds" for Right of Way may not exceed 10% of the HSIP Construction Cost.
4) "HSIP Funds" for Construction Engineering may not exceed 15% of the HSIP Construction Cost.
5) "HSIP Funds" may not exceed $10,000,000.
6) To maintain efficiencies in the overall Program and Project Management, the "Total HSIP Funds" must be $100,000 or more. If needed, agencies should consider extending the project limits and /or adding another safety improvement in order to increase both the total project Benefits and Costs.

   Exception: (1) Caltrans recognizes that for some rural agencies with extremely small numbers of crashes, this $100,000 minimum HSIP funding requirement may not be achievable without their applications having low B/C ratios, which may not be fundable. If an agency believes their jurisdiction falls into this category, they may request an exception to this $100,000 minimum funding requirement through their District Local Assistance Engineer; (2) You may combine multiple applications (if selected for funding) in implementation so the combined project has more than $100,000 of HSIP funds.

After the completion of the project cost estimate, "Total Project Cost" will be automatically transferred to Section IV (Calculation and Results).

Section III: Crash Data

The benefit of an HSIP safety project is achieved by reducing potential future crashes due to the application of the safety countermeasures (CMs). In this section, you will need to provide information regarding the historical crash data at the project sites.

Different CMs will reduce crashes of different types during the life of the safety improvements. Depending on the selected CMs for the application, you will be required to fill in one or more crash data tables, for any combination of the five crash types (datasets): "All" , "Night" , Ped& Bike", "Emergency Vehicle", and "Animal" (Each of the later four datasets is a sub-dataset of the "All" dataset.)

If a Roundabout CM (S16 or NS04 or NS05) is selected, additional information (such as roundabout configuration and ADT) is required.

Please refer to the Local Roadway Safety Manual for information.

Please answer the below two questions:

- Please indicate the sources of the crash data. Typical sources include Statewide Integrated Traffic Records System (SWITRS), UCBerkeley SafeTREC TIMS, your locally preferred mapping software (such as Crossroads) or any other data sources.
- Please explain how “incremental approach” has been pursued If CM R15, R16, R17 or R18 is proposed. Please skip this question of none of these CMs are being proposed.

  Countermeasure R15 (Widen shoulder), R16 (Curve shoulder widening (outside only)), R17 (Improve horizontal alignment (flatten curves)) and R18 (Flatten crest vertical curve) are not eligible unless they are done as the last step of an "incremental approach". Applicants need to document they have already installed lower cost and lower impact CMs but the crash rate is unacceptably high. What safety improvements have been pursued and installed at the project sites within the last ten years?

  Applicants need to demonstrate lower cost and lower impact CMs have already installed, such as signing/striping upgrades to MUTCD standards/recommendations, rumble strips, improving pavement friction (High Friction Surface Treatment, or HFST), etc. You have already monitored the crash occurrences after these improvements were installed, and the 'after' crash rate is still unacceptably high. In addition, a summary of the 'before' and 'after' crash analysis is preferred and provided as the last attached to the HSIP Application Form).

  If “incremental approach” has not been pursued while CM R15, R16, R17 or R18 is proposed, please explain why a special exception should be made to your application.

III.1: List of project locations

List all locations/sites included in this project. Please note all locations/sites must be of the location type as entered on page 1.

Location groups: all locations (sites) in the same group must have exactly the same safety countermeasures. No location (site) may be in multiple groups.

One location is pre-populated for each location group. Click “+” button to add a new line, or click “-“ to delete an existing line. Enter a location description for each line.

The locations may be intersections or roadway sections, e.g. “Intersection of A St. and B St.”, “A St. between B St. and C St.”, etc. If your project has a large number of locations, please aggregate some locations into one description, e.g. 10 stop controlled intersections, 5 horizontal curves, etc., as long as they have similar features and the safety improvements to be implemented are the same. Please limit the number of rows in the table to no more than 25.

The locations in this list will be pre-populated in the crash data table(s) for each group in Section III.2.

Grouping example:

A project has 5 road segments. All 5 segments (A, B, C, D & E) utilize CM “Install curve advance warning signs” (R24). In addition, 3 of the 5 segments (C, D & E) utilize “Install edgeline rumble strips/stripes” (R31) as well.

There will be 2 groups for this project:

Group 1: Segments A & B, with CM = R24 only;

Group 2: Segments C, D & E, with 2 CMs (R24 & R31).

Note: we cannot have only one group with all 5 segments, as that will imply all segments will be treated with both R24 and R31.

III.2: Countermeasures and crash data

1) Countermeasures to be applied: The CM information is pre-populated from the inputs on page 1. Each CM has a corresponding crash type that the CM targets. The crash types are: “All”, “Night”, “Ped & Bike”, “Emergency Vehicle” and “Animal”. Each of the later four is a subset of the first. Based on the CMs for the project, only the tables for the required crash data types are displayed.

   Note: If a “**roundabout**” CM, i.e. S16, NS04 or NS05 (CM ID), is used, the below information is required as the benefit calculation for roundabouts is different from the other CMs.

   - Project location: “Urban” or “Rural” (select from dropdown list)
   - Intersection type: “Full Intersection” or “T intersection” (select from dropdown list)
   - Roundabout: “1 lane” or “2 lanes” (select from dropdown list)
   - Average Daily Traffic (ADT), Major Road: ADT on the major road of the intersection
   - Average Daily Traffic (ADT), Minor Road: ADT on the cross road of the intersection

2) Enter the date range of the crash data. The crash data time period must be a minimum of 3 years and a maximum of 5 years. The most recent available crash data must be used.

3) Based on the CMs that are selected, crash data tables of the required categories ("All", "Night", “Ped & Bike", "Emergency Vehicle", and "Animal") are displayed for data entry.

Important information regarding countermeasures and crash data

Below is more information and explanations regarding countermeasures and crash data. Please read and make sure the data provided are correct. Past HSIP calls for projects indicated that the most flaws found in disqualified applications are related to misapplication of countermeasures and miscounting of crash data.

Safety Countermeasures vs. Crash Data Tables

A total of 82 countermeasures are available to be utilized in the HSIP Analyzer. Different countermeasures may target different crash types. For example, installing a new signal at an intersection intends to reduce crashes of all types, while installing pedestrian countdown signal heads only reduces crashes related to pedestrians and bicyclists (Ped & Bike), and adding intersection lighting targets crashes at night only.

For the use of the HSIP Analysis, there are 5 different crash types: “All”, “Night”, “Ped & Bike”, “Emergency Vehicle” and “Animal”. Each of the later four datasets is a sub-dataset of the "All" dataset. Refer to the Appendix for more information. In the 82 countermeasures listed in the Appendix, 59 are for crashes of all types, 18 for Ped&Bike crashes, 3 for night crashes, 1 for crashes with emergency vehicles, and 1 for crashes with animals involved.

Depending on the selected countermeasures, you will be required to fill in one or more crash data tables, for one or a combination of the five crash types. For example, if two countermeasures are utilized in a group – “Install flashing beacons as advance warning” (Countermeasure S10) and “Add intersection lighting” (Countermeasure S01), two crash data tables are required, one for all crashes (for S10) and the other for night crashes (for S01).

Crash Data Table

A Crash Data Table is a summary table of crash data for all the locations included in the project, with one row for one location and one column for a severity. Below is the structure of a Crash Data Table for Ped&Bike crashes.

Example: **Crash Data Table for Crash Type: Pedestrians and Bicyclists Involved**

Location	Fatality	Severe Injury	Injury - Other Visible	Injury - Complaint of Pain	Property Damage Only	Total
Intersection of A St. & B St.	0	1	0	2	4	**7**
Intersection of A St. & C St.	1	1	1	5	4	**12**
Intersection of A St. & D St.	0	2	1	2	10	**15**
Total	1	4	2	9	18	**34**

Safety countermeasures available for use in HSIP Analyzer

The available countermeasures are broken down into three groups (Signalized Intersection, Non-signalized Intersection, and Roadway Segment). The Appendix of this document provides a complete list of the countermeasures. Review **Section 4.0 and Appendix B of the California Local Roadway Safety Manual** before making the final selection of countermeasures to utilize in the BCR calculations. The detailed description of the countermeasures and guidance on how they can be applied will help applicants ensure they are utilizing the most appropriate countermeasures for their projects.

Any single project may use up to three countermeasures. When a countermeasure of a major safety improvement is selected, other incidental elements of the major countermeasure should be not used together with the major one. For example: A project proposing a new signal shall not include countermeasures for lighting, signing, striping, or minor median improvements as they are incidental elements of the new signal and do not represent stand-alone improvements.

Specific rules for some particular countermeasures

Please pay attention to the specific rules and requirements pertaining to CMs NS03, NS14, NS23PB, R08 and R14 (Refer to Appendix B of the California Local Roadway Safety Manual for more details):

1) **NS03, Install signals:**

   All new signals must meet CA MUTCD "safety" warrants: 4, 5 or 7;
   No other intersection CMs can be applied to the intersection crashes in conjunction with this CM.

2) **NS14, Install raised median on approaches (NS.I.)**
   R08, Install raised median

   All new raised medians must not include the removal of the existing roadway structural section and must be doweled into the existing roadway surface.

3) **NS23PB, Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK)):**

   For HAWK or other pedestrian signals, the justification may be Warrant 4, 5 and/or 7, or passing the test in Figure 4F-1/4F-2 in Chapter 4F of CA MUTCD. Please refer to Chapter 4F of CA MUTCD for more details.

4) **R14, Road Diet (Reduce travel lanes from 4 to 3 and add a two way left-turn and bike lanes):**

   "Intersection" crashes can only be applied when they resulted from turning movements that had no designated turn lanes/phases in the existing condition and the Road Diet will provide turn lanes/phases for these movements. This CM does not apply to roadway sections that already included left turn lanes or two way left turn lanes before the lane reductions. New bike lanes are also expected to be part of these projects. Pre-approval from the HSIP program manager is needed for: 1) the use of this CM without removing a

travel lane in each direction and/or without adding new bike lanes; and/or 2) if any pavement is planned to be removed for the purpose of adding landscaping, planter-boxes, or other non-roadway user features.

Crash Data

1) Crash data time period:

   The crash data time period must be **a minimum of 3 years and a maximum of 5 years** and the most recent available crash data must be used.

2) Multiple crash data tables may be needed for a group. Depending on the selected countermeasure(s), different categories of the crash data are required. Each table is for one of the 5 categories (dataset/sub-datasets): All; Night; Ped & Bike; Emergency Vehicle; and Animal.

3) There are three sub-severities of injury crashes: "Severe Injury", "Injury – Other Visible" and "Injury – Complaint of Paint". **If the injury crashes in your agency's crash database do not have more detailed sub-severities, all of the injury crashes must be entered as "Injury – Other Visible".**

4) Every occurrence of crash applied to the countermeasures is be counted as one crash, regardless of the number of vehicles and the number of people involved in the crash. For example, if there is one crash which involved three vehicles and caused two injuries and one fatality, the crash would be tracked in the application as 1 fatal crash.

5) Collision Diagrams and Collision lists:

   Applicants are required to provide Collision Diagrams and Collision Lists as supporting documents (attachments) to the application. The Collision Diagrams and the Collision Lists should be organized so application reviewers can easily identify the collision data and their corresponding project locations.

6) **All crashes applied to a given countermeasure must be within the countermeasures influence-area.** The following are some general criteria to guide the applicants in determining appropriate influence-areas for countermeasures. Before applying these general criteria, it is the applicant's responsibility to ensure that they are reasonable for their particular application. (More guidance relating to each specific countermeasure is included in Section 4 and Appendix B of the California Local Roadway Safety Manual).

   a) New Traffic Signals: All crashes within 250 feet of the new signal.

   b) For intersection improvements, collisions that occurred within 250 feet of the intersection in all directions affected by the improvement may be used. If the distance to the nearest intersection is less than 500 feet, only those collisions that occurred from mid-block may be used.

   c) Longitudinal Improvements (guardrail, raised median, turn pockets, etc): All crashes potentially effected by and within the limits of the improvement.

   d) Signage, striping, delineators, or other warning devices: All crashes potentially effected by and/or within the limits of the driver's potential reaction to the improvements.

   e) The influence-area may be extended beyond the physical improvements and/or the limits above if standard traffic engineering principles, as documented in Caltrans, American Association of State Highway and Transportation Officials (AASHTO) or FHWA publications, suggest it would be appropriate to do so. When the influence-area of the project is not obvious and judgment has been used in identifying the influence-area, it is the applicant's responsibility to provide additional documentation showing the reasonableness of the judgment.

7) Do not include collisions unreported by law enforcement. Collision summary reports that corroborate the collision numbers must be attached to the application. Do not attach the actual collision reports prepared by the law enforcement officer. For applicants using TIMS Query & Map tool to analyze and summarize SWITRS crash data, applicants may find it necessary to add in known crashes that were not included in the TIMS summaries. These crashes may be added manually as long as the agency's safety managers include supporting documentation and a comment and/or signature attesting to the source of these crashes and the accuracy of the total crash data.

8) The safety countermeasures constructed by the projects will not eliminate 100% of the safety risks and future crashes. This is especially true for lower-cost systemic improvements, such as signing and striping projects. Based on this, it is often reasonable for an agency to construct follow-up improvements along a corridor or at a location that has already had an HSIP project constructed. (Example: an agency has completed a striping upgrade project on a corridor. In a later HSIP cycle, the agency proposes a signing project on the same corridor based on an overlapping set of crashes.) For this reason, Caltrans allows agencies to reuse crashes in a current call for projects that have been used in a prior call for projects. It is the agency's responsibility to verify this and document it in the application in the Narrative Questions or separate backup documentation.

Section IV: Calculation and Results

Click the button Calculate to perform the calculation of the benefit and the BCR.

If errors are detected, the calculation will stop, and a table will display the errors. The errors must be fixed prior to the next calculation attempt.

The possible errors are:

- No location type (S/NS/R) is provided.
- No CMs are available for the location type.
- CMs S08 and S02 should not be used together.

  The work of S02 ("Improve signal hardware") is considered as part of CM S08 ("Convert signal to mast arm").
- CM NS3 should not be used with any other CM.

  CM NS3 ("Install signals") should cover any other intersection improvements.
- Roundabout, when selected, should be the only CM.

  The benefit calculation for a roundabout is unique. It is not allowed to have a roundabout and other safety countermeasures in the same project.
- Roundabout is the proposed work but roundabout information is not provided.
- Crash data period is not between 3 and 5 years.
- Num of crashes in a sub-dataset > the num in All dataset.

  For at least one of the severities, the number of crashes in a subset ("Night", "Ped & Bike", "Emergency Vehicle", or "Animal") is more than the corresponding severity in "All" crashes.

After the errors are fixed and the calculation is successfully performed, the results are presented in two tables: "Benefit Summar" and "BCR and other key information". Please transfer the "Total Project Cost" , "HSIP Funds Requested" and the BCR to Page 2 of the HSIP Application Form.

Appendix: List of Countermeasures
(From Local Roadway Safety Manual – Section 4.2)

The list of countermeasures is from Section 4.2 of the Local Roadway Safety Manual. It is provided here for your convenience.

The countermeasures listed in the following three tables have been sorted into 3 categories: Signalized Intersection (S), Non-Signalized Intersection (NS), and Roadway Segment (R). Pedestrian and bicycle related countermeasures have been included in each of these categories, as the consideration of non-motorized travel is important for all roadway classifications and locations. The countermeasures included in these tables are used in the HSIP Analyzer. When selecting countermeasures and CRFs to apply to their specific safety needs, local agency safety practitioners should consider the **availability, applicability**, and **quality** of CMFs, as discussed in section 4.1 of the Local Roadway Safety Manual.

Only Crash Types, CRFs, Expected Lives, and Funding Eligibility of the countermeasures for use in Caltrans local HSIP program are provided. Fields in the countermeasure tables are:

- **Crash Types -** "All", "P & B" (Pedestrian and Bicycle), "Night", "Emergency Vehicle", or "Animal".
- **CRF -** Crash Reduction Factor used for HSIP calls-for-projects.
- **Expected Life -** 10 years or 20 years.
- **Funding Eligibility –** the maximum HSIP funding reimbursement ratio.
    - Forty (45) countermeasures: 100%
    - Thirty-five (36) countermeasures: 90%
    - One (1) countermeasure: 50% (CM No. S03: Improve signal timing, as this CM will improve the signal operation rather than merely the safety.)
- **Systemic Approach Opportunity -** Opportunity to Implement Using a Systemic Approach: "Very High", "High", "Medium" or "Low".

Table 1. Countermeasures for Signalized Intersections

No.	Type	Countermeasure Name	Crash Type	CRF	Expected Life (Years)	HSIP Funding Eligibility	Systemic Approach Opportunity?
S01	Lighting	Add intersection lighting (S.I.)	Night	40%	20	100%	Medium
S02	Signal Mod.	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number	All	15%	10	100%	Very High
S03	Signal Mod.	Improve signal timing (coordination, phases, red, yellow, or operation)	All	15%	10	50%	Very High
S04	Signal Mod.	Provide Advanced Dilemma Zone Detection for high speed approaches	All	40%	10	100%	High
S05	Signal Mod.	Install emergency vehicle pre-emption systems	Emergency Vehicle	70%	10	100%	High
S06	Signal Mod.	Install left-turn lane and add turn phase (signal has no left-turn lane or phase before)	All	55%	20	90%	Low
S07	Signal Mod.	Provide protected left turn phase (left turn lane already exists)	All	30%	20	100%	High
S08	Signal Mod.	Convert signal to mast arm (from pedestal-mounted)	All	30%	20	100%	Medium
S09	Operation/ Warning	Install raised pavement markers and striping (Through Intersection)	All	10%	10	100%	Very High
S10	Operation/ Warning	Install flashing beacons as advance warning (S.I.)	All	30%	10	100%	Medium
S11	Operation/ Warning	Improve pavement friction (High Friction Surface Treatments)	All	55%	10	100%	Medium
S12	Geometric Mod.	Install raised median on approaches (S.I.)	All	25%	20	90%	Medium
S13PB	Geometric Mod.	Install pedestrian median fencing on approaches	P & B	35%	20	90%	Low
S14	Geometric Mod.	Create directional median openings to allow (and restrict) left-turns and u-turns (S.I.)	All	50%	20	90%	Medium
S15	Geometric Mod.	Reduced Left-Turn Conflict Intersections (S.I.)	All	50%	20	90%	Medium
S16	Geometric Mod.	Convert intersection to roundabout (from signal)	All	Varies	20	100%	Low
S17PB	Ped and Bike	Install pedestrian countdown signal heads	P & B	25%	20	100%	Very High
S18PB	Ped and Bike	Install pedestrian crossing (S.I.)	P & B	25%	20	100%	High
S19PB	Ped and Bike	Pedestrian Scramble	P & B	40%	20	100%	High
S20PB	Ped and Bike	Install advance stop bar before crosswalk (Bicycle Box)	P & B	15%	10	100%	Very High
S21PB	Ped and Bike	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	P & B	60%	10	100%	Very High

Table 2. Countermeasures for Non-Signalized Intersections

No.	Type	Countermeasure Name	Crash Type	CRF	Expected Life (Years)	HSIP Funding Eligibility	Systemic Approach Opportunity?
NS01	Lighting	Add intersection lighting (NS.I.)	Night	40%	20	100%	Medium
NS02	Control	Convert to all-way STOP control (from 2-way or Yield control)	All	50%	10	100%	High
NS03	Control	Install signals	All	30%	20	100%	Low
NS04	Control	Convert intersection to roundabout (from all way stop)	All	Varies	20	100%	Low
NS05	Control	Convert intersection to roundabout (from stop or yield control on minor road)	All	Varies	20	100%	Low
NS06	Operation/ Warning	Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	All	15%	10	100%	Very High
NS07	Operation/ Warning	Upgrade intersection pavement markings (NS.I.)	All	25%	10	100%	Very High
NS08	Operation/ Warning	Install Flashing Beacons at Stop-Controlled Intersections	All	15%	10	100%	High
NS09	Operation/ Warning	Install flashing beacons as advance warning (NS.I.)	All	30%	10	100%	High
NS10	Operation/ Warning	Install transverse rumble strips on approaches	All	20%	10	90%	High
NS11	Operation/ Warning	Improve sight distance to intersection (Clear Sight Triangles)	All	20%	10	90%	High
NS12	Operation/ Warning	Improve pavement friction (High Friction Surface Treatments)	All	55%	10	100%	Medium
NS13	Geometric Mod.	Install splitter-islands on the minor road approaches	All	40%	20	90%	Medium
NS14	Geometric Mod.	Install raised median on approaches (NS.I.)	All	25%	20	90%	Medium
NS15	Geometric Mod.	Create directional median openings to allow (and restrict) left-turns and u-turns (NS.I.)	All	50%	20	90%	Medium
NS16	Geometric Mod.	Reduced Left-Turn Conflict Intersections (NS.I.)	All	50%	20	90%	Medium
NS17	Geometric Mod.	Install right-turn lane (NS.I.)	All	20%	20	90%	Low
NS18	Geometric Mod.	Install left-turn lane (where no left-turn lane exists)	All	35%	20	90%	Low
NS19PB	Ped and Bike	Install raised medians / refuge islands (NS.I.)	Ped and Bike	45%	20	90%	Medium
NS20PB	Ped and Bike	Install pedestrian crossing at uncontrolled locations (new signs and markings only)	Ped and Bike	25%	10	100%	High
NS21PB	Ped and Bike	Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)	Ped and Bike	35%	20	100%	Medium
NS22PB	Ped and Bike	Install Rectangular Rapid Flashing Beacon (RRFB)	Ped and Bike	35%	20	100%	Medium
NS23PB	Ped and Bike	Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))	Ped and Bike	55%	20	100%	Low

Table 3. Countermeasures for Roadways

No.	Type	Countermeasure Name	Crash Type	CRF	Expected Life (Years)	HSIP Funding Eligibility	Systemic Approach Opportunity?
R01	Lighting	Add segment lighting	Night	35%	20	100%	Medium
R02	Remove/ Shield Obstacles	Remove or relocate fixed objects outside of Clear Recovery Zone	All	35%	20	90%	High
R03	Remove/ Shield Obstacles	Install Median Barrier	All	25%	20	100%	Medium
R04	Remove/ Shield Obstacles	Install Guardrail	All	25%	20	100%	High
R05	Remove/ Shield Obstacles	Install impact attenuators	All	25%	10	100%	High
R06	Remove/ Shield Obstacles	Flatten side slopes	All	30%	20	90%	Medium
R07	Remove/ Shield Obstacles	Flatten side slopes and remove guardrail	All	40%	20	90%	Medium
R08	Geometric Mod.	Install raised median	All	25%	20	90%	Medium
R09	Geometric Mod.	Install median (flush)	All	15%	20	90%	Medium
R10PB	Geometric Mod.	Install pedestrian median fencing on approaches	P & B	35%	20	90%	Low
R11	Geometric Mod.	Install acceleration/ deceleration lanes	All	25%	20	90%	Low
R12	Geometric Mod.	Widen lane (initially less than 10 ft)	All	25%	20	90%	Medium
R13	Geometric Mod.	Add two-way left-turn lane (without reducing travel lanes)	All	30%	20	90%	Medium
R14	Geometric Mod.	Road Diet (Reduce travel lanes from 4 to 3 and add a two way left-turn and bike lanes)	All	30%	20	90%	Medium
R15	Geometric Mod.	Widen shoulder	All	30%	20	90%	Medium
R16	Geometric Mod.	Curve Shoulder widening (Outside Only)	All	45%	20	90%	Medium
R17	Geometric Mod.	Improve horizontal alignment (flatten curves)	All	50%	20	90%	Low
R18	Geometric Mod.	Flatten crest vertical curve	All	25%	20	90%	Low
R19	Geometric Mod.	Improve curve superelevation	All	45%	20	90%	Medium
R20	Geometric Mod.	Convert from two-way to one-way traffic	All	35%	20	90%	Medium
R21	Geometric Mod.	Improve pavement friction (High Friction Surface Treatments)	All	55%	10	100%	High

Table 3. Countermeasures for Roadways (Continued)

No.	Type	Countermeasure Name	Crash Type	CRF	Expected Life (Years)	HSIP Funding Eligibility	Systemic Approach Opportunity?
R22	Operation/ Warning	Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)	All	15%	10	100%	Very High
R23	Operation/ Warning	Install chevron signs on horizontal curves	All	40%	10	100%	Very High
R24	Operation/ Warning	Install curve advance warning signs	All	25%	10	100%	Very High
R25	Operation/ Warning	Install curve advance warning signs (flashing beacon)	All	30%	10	100%	High
R26	Operation/ Warning	Install dynamic/variable speed warning signs	All	30%	10	100%	High
R27	Operation/ Warning	Install delineators, reflectors and/or object markers	All	15%	10	100%	Very High
R28	Operation/ Warning	Install edge-lines and centerlines	All	25%	10	100%	Very High
R29	Operation/ Warning	Install no-passing line	All	45%	10	100%	Very High
R30	Operation/ Warning	Install centerline rumble strips/stripes	All	20%	10	100%	High
R31	Operation/ Warning	Install edgeline rumble strips/stripes	All	15%	10	100%	High
R32PB	Ped and Bike	Install bike lanes	P & B	35%	20	90%	High
R33PB	Ped and Bike	Install Separated Bike Lanes	P & B	45%	20	90%	High
R34PB	Ped and Bike	Install sidewalk/pathway (to avoid walking along roadway)	P & B	80%	20	90%	Medium
R35PB	Ped & Bike	Install/upgrade pedestrian crossing (with enhanced safety features)	P & B	35%	20	90%	Medium
R36PB	Ped and Bike	Install raised pedestrian crossing	P & B	35%	20	90%	Medium
R37PB	Ped and Bike	Install Rectangular Rapid Flashing Beacon (RRFB)	P & B	35%	20	100%	Medium
R38	Animal	Install animal fencing	Animal	80%	20	90%	Medium

Appendix G
Project Layouts, Cost Estimates and Benefit-Cost Ratio Calculations

Project #1: Intersection Safety – Systemic Unsignalized Intersections



Old Hwy 53/ Austin Rd

Reason for Selection

The project was selected since unsignalized intersections had a significant portion of overall and serious injury crashes and were identified in the public outreach as a top concern. This project presented an opportunity for a systemic application since many of the top crash locations had similar characteristics, or risk factors. The proposed improvements increase visibility and awareness with additional signage, traversable rumble strips and upgraded pavement markings. The sites were selected based on the crash history and characteristics; sites may be added or removed as applicable.

Intersections Crashes by Severity

Systemic Unsignalized Intersections	Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Total
Old Hwy 53 / Austin Rd	0	1	2	2	0	5
Austin Rd / Cypress Dr	0	0	0	1	2	3
Old Hwy 53 / SR 53	0	2	1	0	0	3
Phillips/ 18th	0	0	1	1	0	2
Total	*0*	*3*	*4*	*4*	*2*	*13*

Countermeasures, Costs and BCRs

No.	Type	Countermeasures Name	Crash Type	CRF	Expected Life Years	HSIP Funding Eligibility	Systemic Approach Opportunity
NS06	Operation / Warning	Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	All	15%	10	100%	Very High
NS07	Operation / Warning	Upgrade intersection pavement markings (NS.I.)	All	25%	10	100%	Very High
NS10	Operation / Warning	Install transverse rumble strips on approaches	All	20%	10	90%	High

The benefit-cost ratio (BCR) is calculated in the HSIP application process. The BCR was estimated to be **36.19** using the *Highway Safety Benefit/Cost Analysis Tool* by FHWA and the following assumptions:

- Construction and maintenance costs were derived from layouts (**Figures G1-G4)** and supporting documentation included. The estimated project cost is below the HSIP minimum of $100,000; however, exceptions are allowed. The City may consider adding additional sites or applying with an exception to the $100,000 minimum.
- Estimated annual crashes were calculated as the average of the 5-year crash data.
- The Crash Modification Factor (CMF), calculated as *CMF = 1 - (CRF/100)*, was applied to calculate the predicted reduction in crashes with the countermeasures. *This CMF is applied for the systemic project as a whole; it is noted that not all countermeasures are applied at all sites which may*

impact the calculations. The HSIP Analyzer Manual indicates that all sites should receive the same countermeasures but allows for exceptions.

Prior to completing the HSIP application, the City should verify sites to include and countermeasures with HSIP regulations. The City should verify all improvements, signage, and cost estimates. If needed, the City may choose to break the systemic project into multiple applications, modify countermeasures, add or remove sites.

Project #2: Pedestrian and Bicycle Safety - Systemic
Pedestrian Crosswalks Near School

Reason for Selection

This project was selected because most pedestrian crashes occurred near schools. The similar characteristics of the sites presented an opportunity for a systemic application to install or upgrade pedestrian accommodations. Other sites with pedestrian-related crashes were not included if projects were underway at these locations or for other various reasons.



Crosswalk near Old Hwy 53 / Airport Road

Arrowhead Road/ Ciwa Street and Halika Street – The segment has no pedestrian facilities (crosswalks at the intersections or sidewalks), but sidewalks start nearby, and the intersections are near a school. A crosswalk exists at the Arrowhead Road/ Pomo Road/ Acacia Street/ Huntington Avenue intersection at the school.

Old Hwy 53/ Airport Road – The site has no pedestrian crosswalks at the intersection and sidewalks are non-continuous. A pedestrian crosswalk and sidewalks exist approximately 150' away at the school. Therefore, it is practical to upgrade the existing adjacent crosswalk instead of installing a new one at the intersection. Per the *HSIP Analyzer Manual* for BCR Applications, countermeasures should be within the influence area; however, it is noted that "the influence-area may be extended beyond the physical improvements and/or the limits above if standard traffic engineering principles, as documented in Caltrans, American Association of State Highway and Transportation Officials (AASHTO) or FHWA publications, suggest it would be appropriate to do so. When the influence-area of the project is not obvious and judgment has been used in identifying the influence-area, it is the applicant's responsibility to provide additional documentation showing the reasonableness of the judgment."

This exception should be documented in an application.

Crashes by Severity

Systemic Pedestrian	Fatal	Serious Injury	Other Visible Injury	Complaint of Pain	PDO	Total
Arrowhead Rd / Ciwa St	1	0	0	0	0	1
Arrowhead Rd / Halika St	0	0	1	0	0	1
Old Hwy 53 / Airport Rd	0	1	0	0	0	1
Total	*1*	*1*	*1*	*0*	*0*	*3*

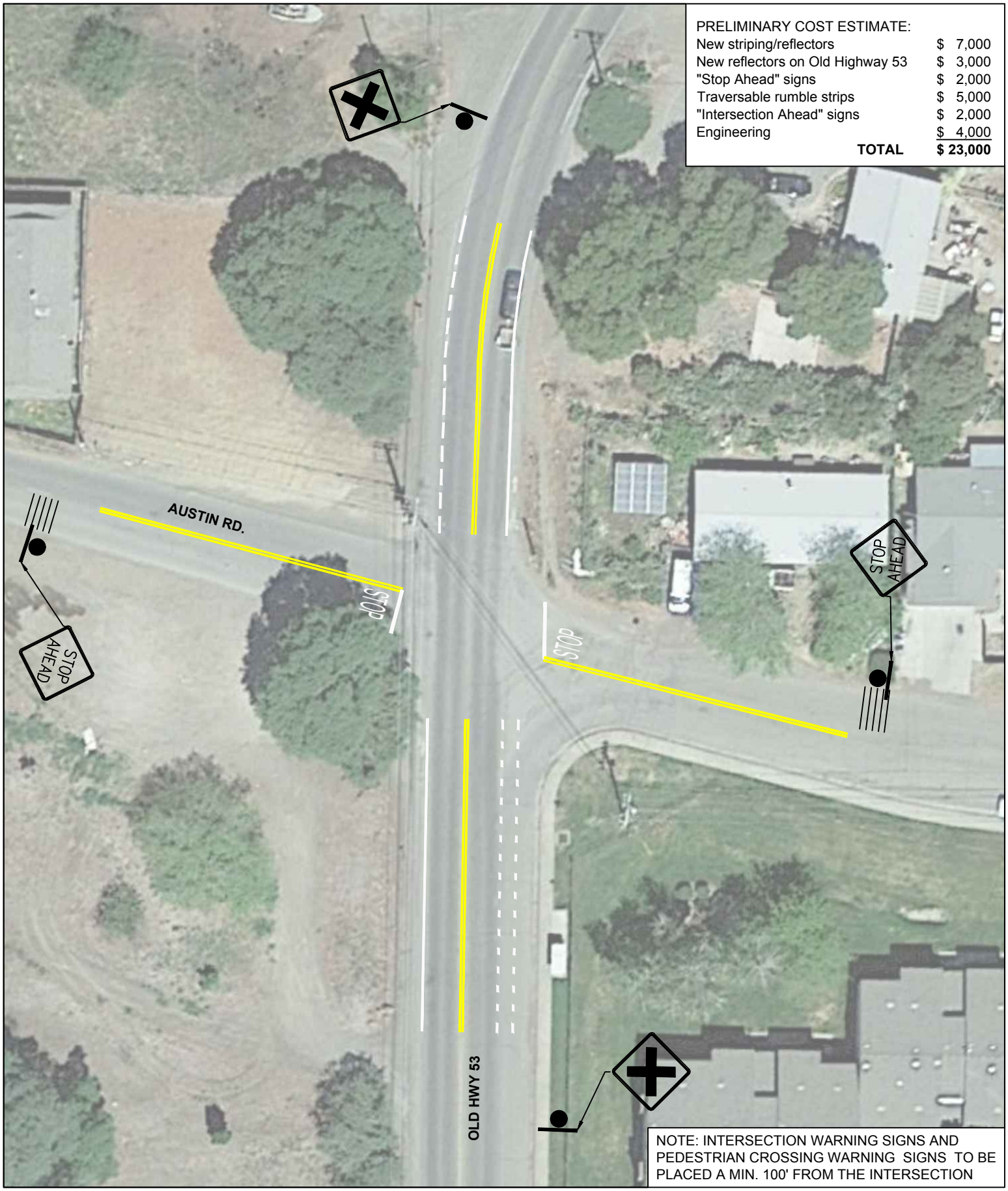
Countermeasures and BCRs

No.	Type	Countermeasures Name	Crash Type	CRF	Expected Life Years	HSIP Funding Eligibility	Systemic Approach Opportunity
R34PB	Ped and Bike	Install sidewalk / pathway (to avoid walking along roadway)	P & B	80%	20	90%	Medium
R35PB	Ped and Bike	Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)	P & B	35%	20	90%	Medium

The BCR is calculated in the HSIP application process. The BCR was estimated to be **136.52** using the *Highway Safety Benefit/Cost Analysis Tool* by FHWA and the following assumptions:

- Construction and maintenance costs were derived from layouts (**Figures G5-G6)** and supporting documentation included.
- Estimated annual crashes were calculated as the average of the 5-year crash data.
- The Crash Modification Factor (CMF), calculated as *CMF = 1 - (CRF/100)*, was applied to calculate the predicted reduction in crashes with the countermeasures. The CMF for the sidewalk was only applied to the data for Arrowhead Road. The *HSIP Analyzer Manual* indicates that all sites should receive the same countermeasures but allows for exceptions.

Prior to completing the HSIP application, the City should verify sites to include and countermeasures with HSIP regulations. The City should verify all improvements, signage, and cost estimates. If needed, the City may choose to break the systemic project into multiple applications, modify countermeasures, add or remove sites.



PRELIMINARY COST ESTIMATE:

New striping/reflectors	$ 7,000
New reflectors on Old Highway 53	$ 3,000
"Stop Ahead" signs	$ 2,000
Traversable rumble strips	$ 5,000
"Intersection Ahead" signs	$ 2,000
Engineering	$ 4,000
TOTAL	**$ 23,000**

NOTE: INTERSECTION WARNING SIGNS AND PEDESTRIAN CROSSING WARNING SIGNS TO BE PLACED A MIN. 100' FROM THE INTERSECTION

HEADWAY TRANSPORTATION

LEGEND

NEW ROADSIDE SIGN

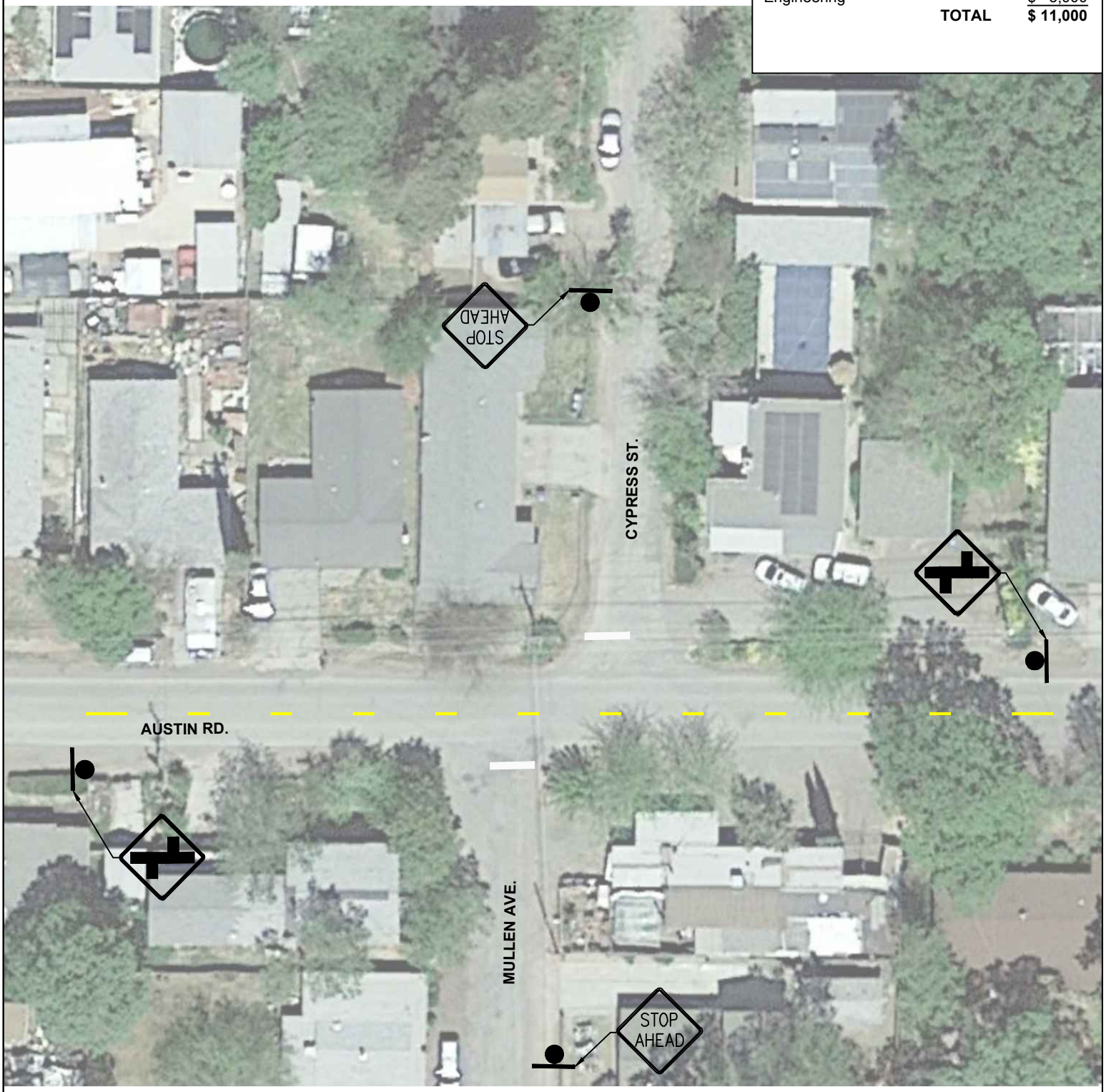
TRAVERSABLE RUMBLE STRIPS

Appendix G-1

City of Clearlake - Local Road Safety Plan
Project Layouts - Systemic Intersection
Old Highway 53 at Austin Rd.

PRELIMINARY COST ESTIMATE:

New striping	$ 4,000
"Intersection Ahead" signs	$ 2,000
"STOP Ahead" signs	$ 2,000
Engineering	$ 3,000
TOTAL	**$ 11,000**



NOTE: INTERSECTION WARNING SIGNS AND PEDESTRIAN CROSSING WARNING SIGNS TO BE PLACED A MIN. 100' FROM THE INTERSECTION

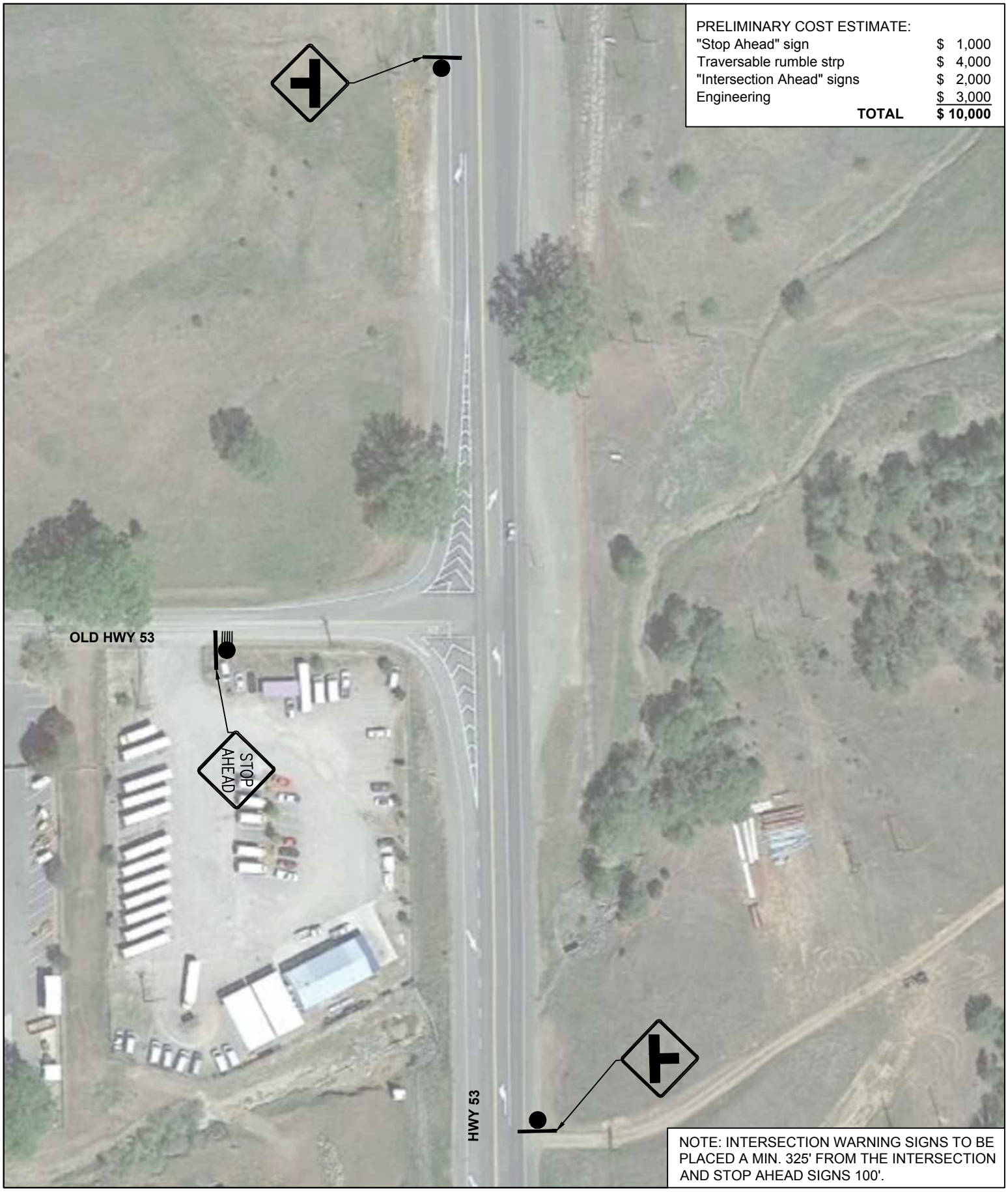
HEADWAY TRANSPORTATION

LEGEND

NEW ROADSIDE SIGN

Appendix G-2

City of Clearlake - Local Road Safety Plan
Project Layouts - Systemic Intersection
Cypress St. at Austin Rd.



PRELIMINARY COST ESTIMATE:

"Stop Ahead" sign	$ 1,000
Traversable rumble strp	$ 4,000
"Intersection Ahead" signs	$ 2,000
Engineering	$ 3,000
TOTAL	**$ 10,000**

NOTE: INTERSECTION WARNING SIGNS TO BE PLACED A MIN. 325' FROM THE INTERSECTION AND STOP AHEAD SIGNS 100'.

HEADWAY TRANSPORTATION

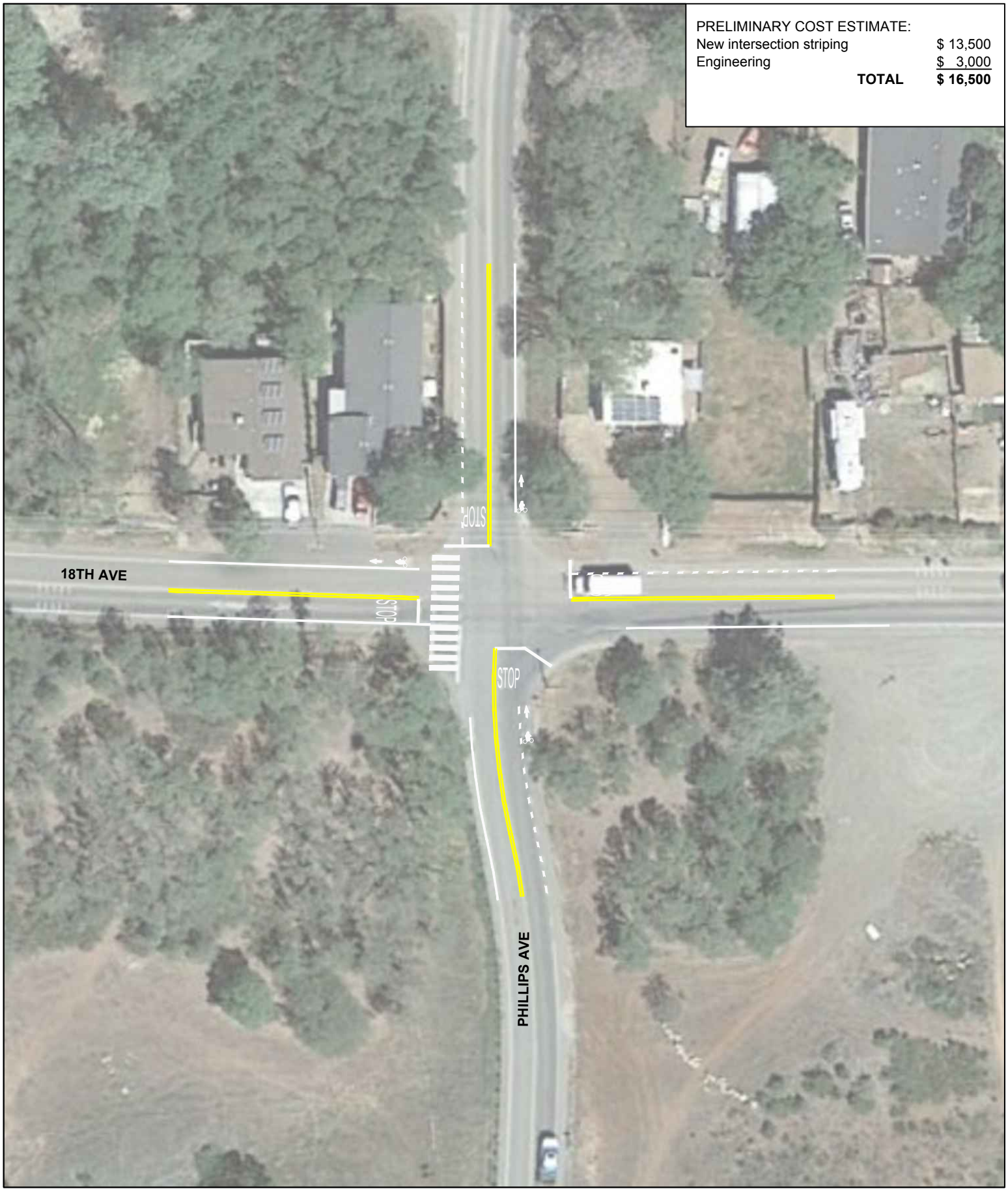
LEGEND

NEW ROADSIDE SIGN

TRAVERSABLE RUMBLE STRIPS

Appendix G-3

City of Clearlake - Local Road Safety Plan
Project Layouts - System Intersection
Old Highway 53 at Highway 53



HEADWAY TRANSPORTATION

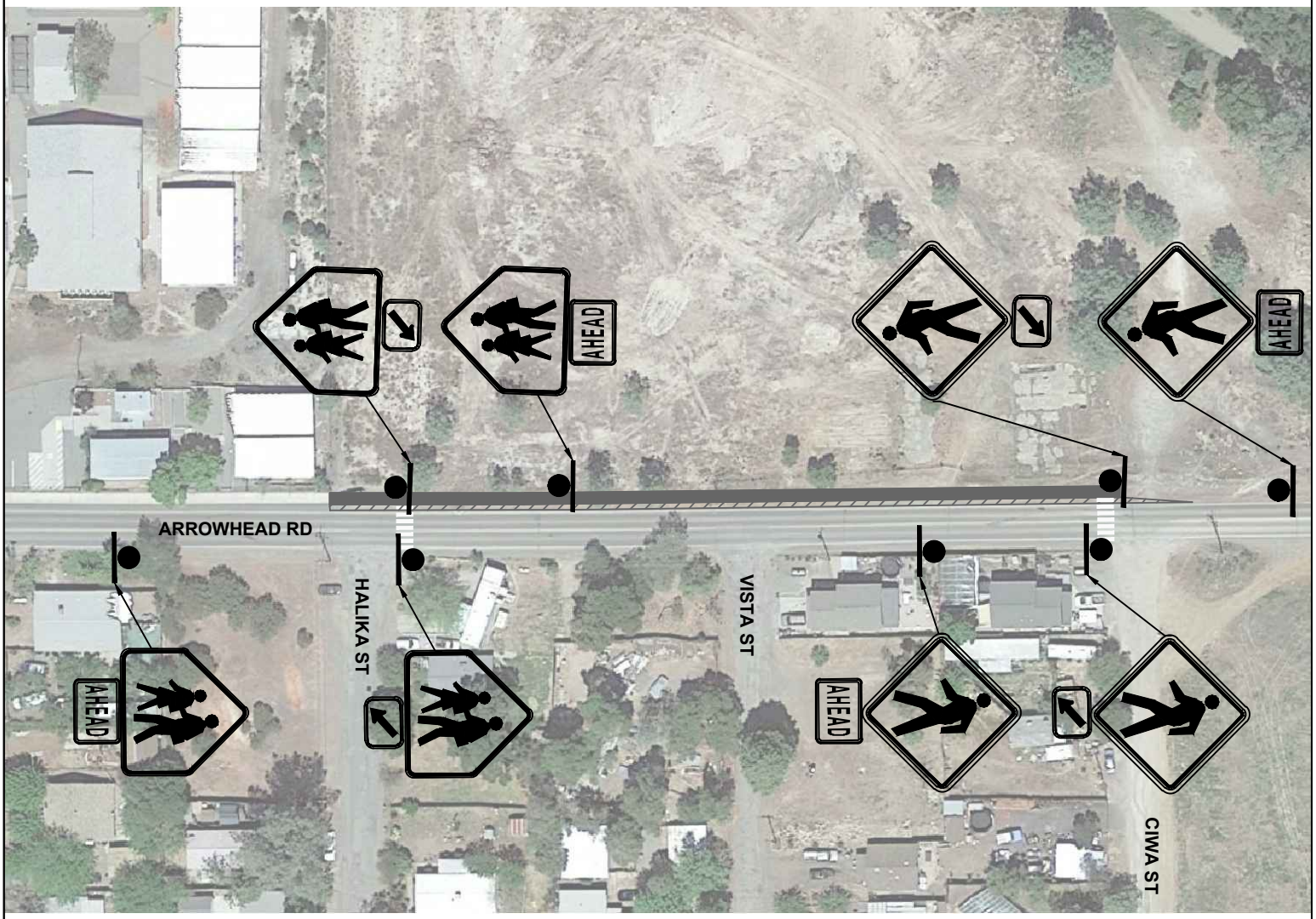
LEGEND

NEW ROADSIDE SIGN

Appendix G-4

City of Clearlake - Local Road Safety Plan
Project Layouts - Systemic Intersection
18th Ave at Phillips Ave.

PRELIMINARY COST ESTIMATE:	
Sidewalk, curb and gutter	$ 90,000
"Pedestrian Crossing" signs	$ 4,000
"Pedestrian Crossing Ahead" signs	$ 4,000
School Zone Ahead" sign	$ 2,000
Pedestrian crossing striping	$ 4,000
Engineering	$ 26,000
TOTAL	**$ 130,000**



NOTE: PEDESTRIAN CROSSING WARNING SIGNS TO BE PLACED A MIN. 100' FROM THE CROSSWALK. MIN. 100' SIGN SEPARATION.

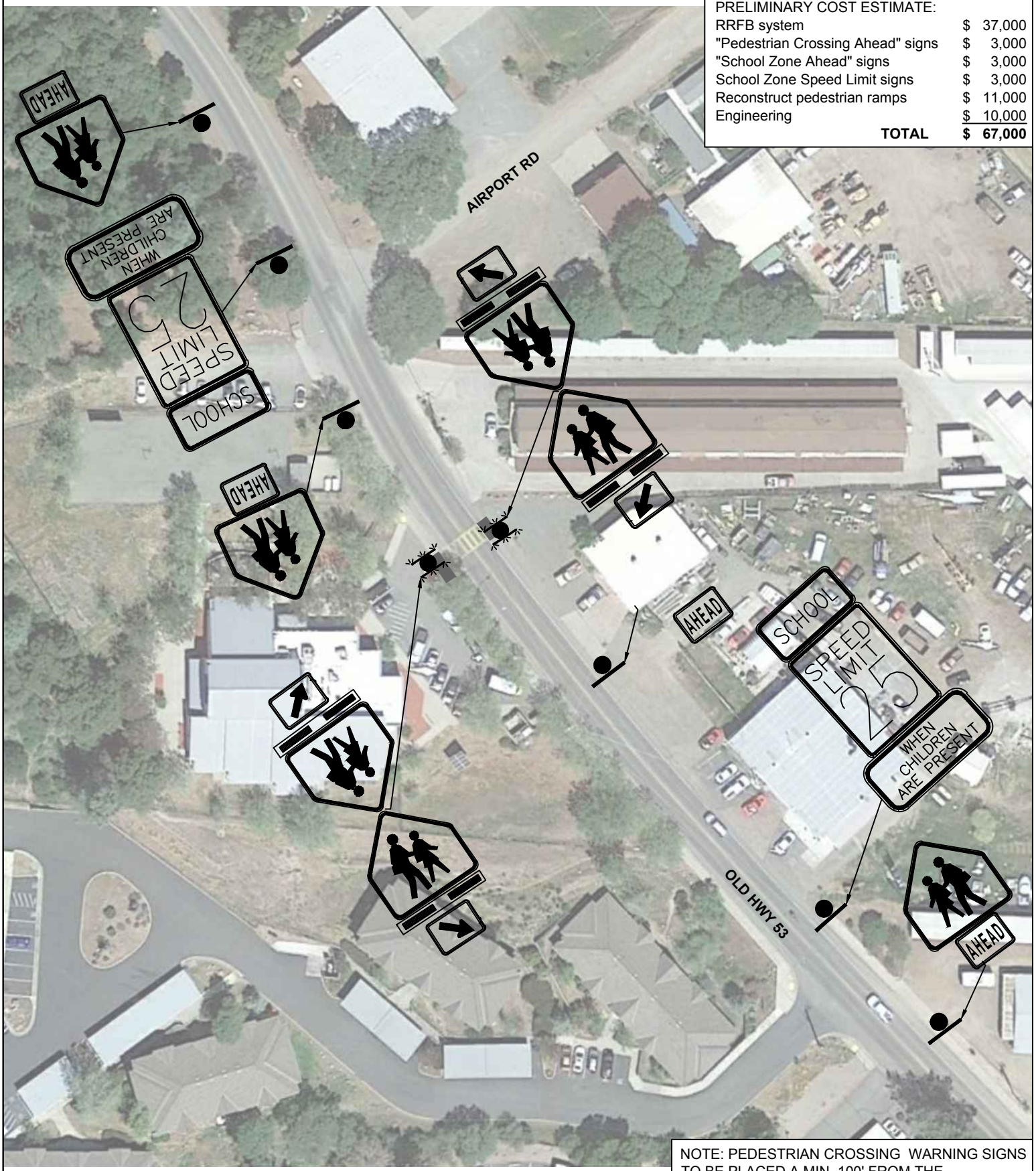
HEADWAY TRANSPORTATION

LEGEND

NEW ROADSIDE SIGN

NEW SIDEWALK, CURB, AND GUTTER

NEW ASPHALT PAVING



PRELIMINARY COST ESTIMATE:

RRFB system	$ 37,000
"Pedestrian Crossing Ahead" signs	$ 3,000
"School Zone Ahead" signs	$ 3,000
School Zone Speed Limit signs	$ 3,000
Reconstruct pedestrian ramps	$ 11,000
Engineering	$ 10,000
TOTAL	**$ 67,000**

NOTE: PEDESTRIAN CROSSING WARNING SIGNS TO BE PLACED A MIN. 100' FROM THE CROSSWALK. MIN. 100' SIGN SEPARATION.

HEADWAY TRANSPORTATION

LEGEND

NEW ROADSIDE SIGN

NEW POST MOUNTED RRFB

RECONSTRUCTED PEDESTRIAN RAMP

Appendix G-6

City of Clearlake - Local Road Safety Plan
Project Layouts - Systemic Pedestrian
Old Highway 53 at Airport Rd

Figure #	Project Location	Countermeasures	Systemic Unsignalized Intersections				
			Initial Cost	HSIP #	Life Cycle	Maintenance Costs	Unit
G-1	**Old Highway 53 / Austin Road**						
Systemic		New striping / reflectors on all approaches in vicinity of intersection	$7,000	NS07	10	$1,100	3 years
Intersections		New reflectors on Old Highway 53	$3,000	NS07	10	$1,000	3 years
		"Stop Ahead" signs on Austin Road	$2,000	NS06	10		
		Traversable rumble strips on Austin Road approach	$5,000	NS10	10	$200	3 years
		"Intersection Ahead" signs on Old Highway 53	$2,000	NS06	10		
		Engineering	$4,000		10		
		SUBTOTAL (Initial Costs Old Highway 53/Austin)	**$23,000**				
G-2	**Cypress Street / Austin Road**						
Systemic		Intersection striping	$4,000	NS07	10	$1,000	3 years
Intersections		"Intersection Ahead" signs	$2,000	NS06	10		
		"Stop Ahead" signs	$2,000	NS06	10		
		Engineering	$3,000				
		SUBTOTAL (Initial Costs Cypress/Austin)	**$11,000**				
G-3	**Old Highway 53 / SR 53**						
Systemic		"Stop Ahead" sign on Old Highway 53	$1,000	NS06	10		
Intersections		Traversable rumble strips on Old Highway 53	$4,000	NS10	10	$100	3 years
		"Intersection Ahead" signs	$2,000	NS06	10		
		Engineering	$3,000				
		SUBTOTAL (Initial Costs Old Highway 53/SR 53)	**$10,000**				
G-4	**Phillips / 18th**						
Systemic		New intersection striping	$13,500	NS07	10	$2,500	3 years
Intersections		Engineering	$4,000				
		SUBTOTAL (Initial Costs Phillips/18th)	**$17,500**				
Total Systemic Unsignalized Project Construction Costs			***$61,500***				

Figure #	Project Location	Countermeasures	Systemic Pedestrian Improvements				
			Initial Cost	HSIP #	Life Cycle	Maintenance Costs	Unit
G-5	**Arrowhead**						
Systemic		Sidewalk on north side between Halika and Ciwa	$90,000	NS22PB	20	$5,000	10 years
Pedestrian		"Pedestrian Crossing" signs	$4,000	NS21PB	20	$2,000	10 years
		"Pedestrian Crossing Ahead" signs	$4,000	NS21PB	20	$2,000	10 years
		"School Zone Ahead" signs	$2,000	NS21PB	20	$500	10 years
		Pedestrian crossing striping	$4,000	NS21PB	20	$2,500	5 years
		Engineering	$26,000				
		SUBTOTAL (Initial Costs Arrowhead)	**$130,000**				
G-6	**Old Highway 53 / Airport**						
Systemic		Flashing "Pedestrian Crossing" signs	$37,000	NS21PB	20	$5,000	5 years
Pedestrian		"Pedestrian Crossing" signs	$3,000	NS21PB	20	$1,000	10 years
		"School Zone Ahead" signs	$3,000	NS21PB	20	$1,000	10 years
		"School Zone Speed Limit" signs	$3,000	NS21PB	20	$1,000	10 years
		Reconstruct pedestrian ramps	$11,000	NS21PB	20	$1,000	10 years
		Engineering	$10,000				
		SUBTOTAL (Initial Costs Old Highway 53/Airport)	**$67,000**				
Total Systemic Pedestrian Project Construction Costs			***$197,000***				

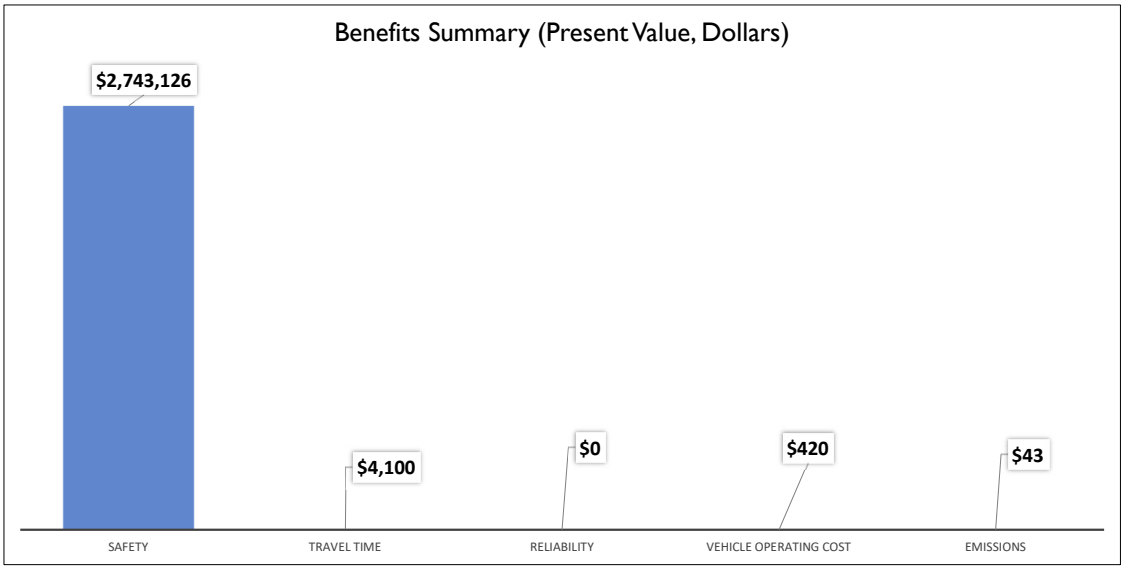
Clearlake Systemic Unsignalized Intersections

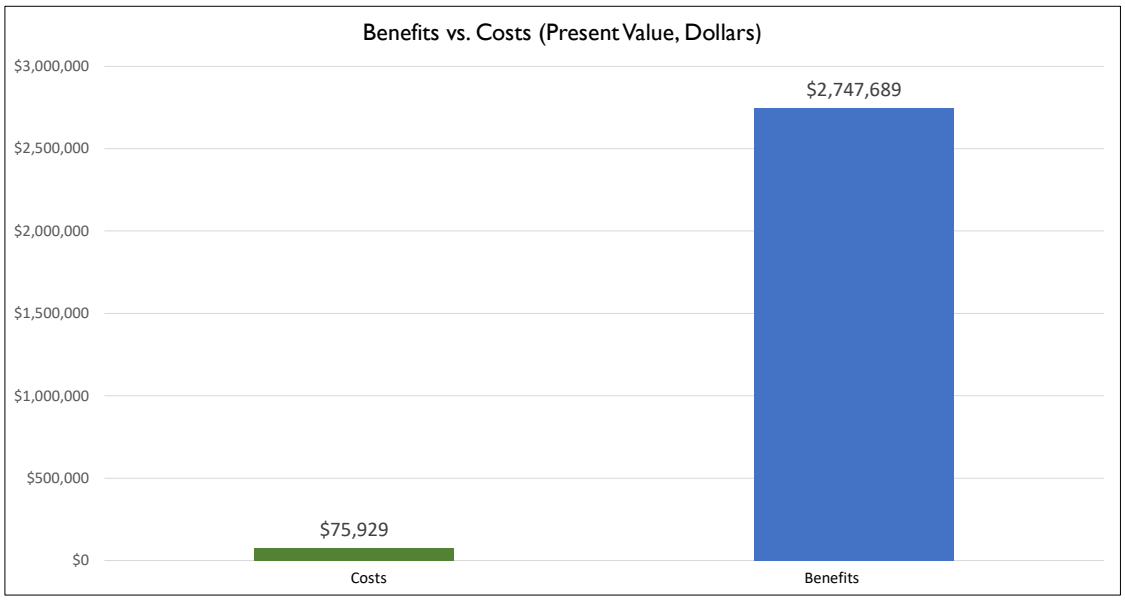
Benefit-Cost Analysis Summary Results

AGENCY: Lake APC/ City of Clearlake **DATE** 1/0/1900

Present Value Costs ($ Dollars)	$75,929
Present Value Benefits ($ Dollars)	$2,747,689
Net Present Value ($ Dollars)	$2,671,760
Benefit / Cost Ratio:	36.19
Discount Rate	3.0%

ITEMIZED BENEFITS ($ Dollars)	Present Value
Safety	$2,743,126
Travel Time	$4,100
Reliability	$0
Vehicle Operating Cost	$420
Emissions	$43
TOTAL BENEFITS	**$2,747,689**





Clearlake Systemic Pedestrian Project

Benefit-Cost Analysis Summary Results

AGENCY: Lake APC/ City of Clearlake **DATE** 1/0/1900

Present Value Costs ($ Dollars)	$223,126
Present Value Benefits ($ Dollars)	$30,460,070
Net Present Value ($ Dollars)	$30,236,945
Benefit / Cost Ratio:	136.52
Discount Rate	3.0%

ITEMIZED BENEFITS ($ Dollars)	Present Value
Safety	$30,444,345
Travel Time	$15,330
Reliability	$0
Vehicle Operating Cost	$395
Emissions	$0
TOTAL BENEFITS	**$30,460,070**

