Local Roadway Safety Plan

Final Report

June 2023

TJKM

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PICO RIVERA

FIGURES

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APPENDICES

GLOSSARY

4 E's – Abbreviation for Education, Enforcement, Engineering, and Emergency Medical Services (EMS): A traffic engineering approach for improving safety on the roadways.

ACS – Abbreviation for American Community Survey: A U.S. Census survey that helps local officials, community leaders, and businesses understand the changes taking place in their communities.

ADT – Abbreviation for average daily traffic: Refers to vehicle traffic volumes.

BCR – Abbreviation for benefit-cost ratio: Indicator used to quantify project benefits in relation to project costs.

LRSP – Abbreviation for local road safety plan. A document that provides a framework for identifying, analyzing, and prioritizing roadway safety improvements on local roads.

CRF – Abbreviation for crash reduction factor: The percentage of expected effect of a countermeasure or safety project to decrease collisions.

Collision Severity – Defined as the intensity of collisions typically in the following categories: fatal (F), severe injury (SI), other visible injury and complaint of pain (Other), and property damage only (PDO).

EMS – Abbreviation emergency medical services.

EPDO – Abbreviation for equivalent property damage only.

FHWA – Abbreviation for Federal Highway Administration: The federal agency responsible managing the nation's highway system, including bridges and tunnels.

HSIP – Abbreviation for Highway Safety Improvement Program: A roadway safety funding program managed by Caltrans, California State Department of Transportation.

KSI – Abbreviation for killed and severe injury collisions.

LRSM – Abbreviation for Local Roadway Safety Manual: A Manual for California's Local Road Owners.

Primary Violation Factor/Primary Collision Factor – Defined as contributing causes of collisions.

SWITRS - Abbreviation for Statewide Integrated Traffic Records System: A database managed by California Highway Patrol that collects and processes data gathered from collision scenes.

TIMS - Abbreviation for Transportation Injury Mapping System: A collision database managed by UC Berkeley SafeTREC system.

EXECUTIVE SUMMARY

The City of Pico Rivera's Local Road Safety Plan (LRSP) is a comprehensive plan that creates a framework to systematically identify and analyze traffic safety related issues and recommend projects and countermeasures. It aims to reduce killed and severe injury (KSI) collisions through a prioritized list of improvements that can enhance safety on local roadways.

The LRSP takes a proactive approach to addressing safety needs. It is viewed as a guidance document that can be a source of information and ideas. It will also be a living document, one that is routinely reviewed and updated by City staff and their safety partners to reflect evolving collision trends and community needs and priorities. With the LRSP as a guide, the City will be able to apply for grant funds, such as the federal Highway Safety Improvement Program (HSIP). This document summarizes an analysis of collisions that occurred in Pico Rivera, identifies high-injury locations, and recommends countermeasures at each of these high-risk locations.

GOALS OF THE LRSP

The goals are summarized as follows:

- Systematically identify and analyze active transportation problems and recommend improvements.
- Improve the safety of all road users by using proven effective countermeasures.
- Coordinate with key stakeholders to implement roadway safety improvements and response within Pico Rivera.
- Continually leverage existing resources to secure additional funding for safety improvements. Seek consistent funding until the vision is fulfilled.
- Ensure safety improvements are made in a manner that is fair and equitable for all Pico Rivera residents, especially disenfranchised communities.
- Serve as an informational document toward the development of a program to eliminate traffic deaths and severe injuries utilizing both sound engineering principals and a Vision Zero approach.

PROCESS

The systemic approach in preparing the LRSP involves the following steps:

- Develop plan goals and objectives
- Analyze collision data
- Meet with stakeholders/safety partners
- Determine focus areas and identify crash reduction strategies
- Prioritize countermeasures/projects
- Prepare the LRSP

COLLISION DATA

Collision data was obtained for a five-year period from 2017 to 2021 from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS) and the University of California at Berkeley SafeTREC's Transportation Injury Mapping Service (TIMS). For the purpose of this report the data was analyzed for a five-year period from 2017 to 2021 from TIMS' Traffic Collision Database.

COLLISION TREND

Key findings on patterns and trends:

- A total of 3,194 collisions occurred between 2017 and 2021.
- There were 19 fatalities, 62 collisions resulted in severe injuries, 242 resulted in a visible injury, 366 resulted in a complaint of pain injury, and 2,505 resulted in property damage only (PDO) collisions.
- The year 2018 had highest number of collisions with 740 collisions, and 2020 had the lowest number of collisions with 492 collisions.
- The highest number of injury collisions occurred within 250 feet of an intersection (84%).
- Rear-end and sideswipe collisions, each accounted for 29% of total collisions. 30% of broadside collisions resulted into KSI collisions.
- Improper turning accounted for 31% of all collisions, followed by unsafe speed (21%).
- Most of the KSI collisions occurred between 8:00 p.m. and 10:00 p.m.
- 64% of all collisions were motor vehicle involved with other motor vehicles followed by motor vehicle involved with a parked motor vehicle (17%), and fixed objects (9%).
- There were approximately a total of 64 bicycle and pedestrian collisions during the study period.

HIGH RISK LOCATIONS

The collision analysis was performed on all City streets. The corridors were ranked to show the top 10 high-collision intersections and top 10 high-collision roadway segments.

Key findings of identifying high-risk intersections are as follows:

- There were a total of 85 injury collisions that occurred at intersections
- 20 collisions led to KSI collisions
- The intersection of Slauson Avenue and Paramount Boulevard had the highest number of injury collisions overall (14 injury collisions)

Key findings of identifying high-risk roadway segment are as follows:

- There were a total of 369 injury collisions that occurred on roadway segments
- 48 collisions led to KSI collisions
- Rosemead Boulevard within city limits had the highest number of injury collisions with 90, followed by Whittier Boulevard with 63 injury collisions

EMPHASIS AREAS

Emphasis areas are focus areas for the LRSP that are identified through the comprehensive collision analysis of the identified high injury locations within the City of Pico Rivera. The six emphasis area identified for the City of Pico Rivera are:

1. Improve intersection safety
2. Address rear-end collisions
3. Address broadside collisions
4. Reduce unsafe speed violations
5. Address nighttime collisions
6. Reduce improper turning violations

VIABLE SAFETY PROJECTS

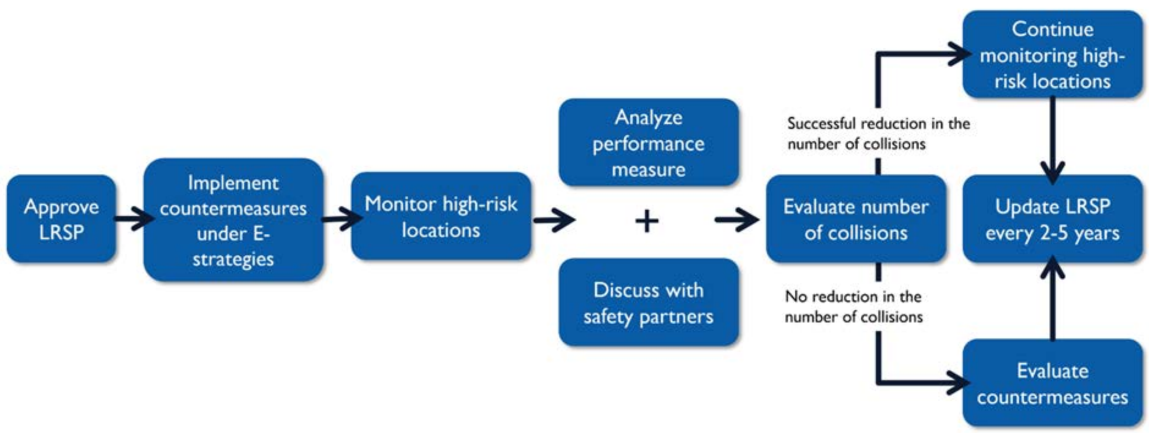
A set of six safety projects were created for the high-risk intersections and roadway segments. The federal grant funding was awarded to two of these safety projects (Project 4 and Project 6) through the HSIP program in March 2023.

- Project 1: Signalized Intersections: Install striping through intersection, Install raised median on approaches.
- Project 2: Unsignalized Intersections: Install Traffic Signals, Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK)), install Rectangular Rapid Flashing Beacon (RRFB).
- Project 3: Citywide Signal Timing: Improve signal timing (coordination, phases, red, yellow, or operation), Install emergency vehicle pre-emption systems.
- Project 4 (HSIP Application): Citywide Signal Upgrade: Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number. Install pedestrian countdown signal heads. Install advance stop bar before crosswalk (Bicycle Box).

- Project 5: Roadway Segments: Install dynamic/variable speed warning signs, Install delineators, reflectors and/or object markers.
- Project 6 (HSIP Application): Citywide Sign Upgrade: Install/Upgrade signs with new fluorescent sheeting (regulatory or warning).

IMPLEMENTATION AND EVALUATION

The LRSP is a guidance document that is recommended to be updated every two to five years in coordination with the safety partners. The LRSP document provides engineering, education, enforcement, and emergency medical service (EMS) related countermeasures that can be implemented throughout the City to reduce KSI collisions. It is recommended that the City of Pico Rivera implement the selected projects in high-collision locations in coordination with other projects proposed for the City's infrastructure development in their future Capital Improvement Plans. After implementing countermeasures, the performance measures for each emphasis area should be evaluated periodically to determine effectiveness. The most important measure of success of the LRSP should be reducing KSI collisions throughout the City. If the number of KSI collisions does not decrease over time, then the emphasis areas and countermeasures should be re-evaluated.



Report Organization

CHAPTER 1 – INTRODUCTION

The Introduction describes what an LRSP is and details the study area. It also summarizes the systemic approach involved in preparing the LRSP and goal and objectives of the plan.

CHAPTER 2 – SAFETY PARTNERS AND PUBLIC OUTREACH

Involvement of safety partners is critical in the success of the LRSP. For the City of Pico Rivera, this included the City Staff, Los Angeles (LA) County Sheriff's office, LA County Fire Department, El Rancho Unified School District, City consultants (Willdan and TKM Engineering) and Pico Rivera residents. This chapter summarizes the public outreach involvement of the stakeholders in the LRSP process.

CHAPTER 3 – EXISTING PLANNING EFFORTS

This chapter summarizes City and regional planning documents and projects that are relevant to the LRSP. It ensures that the recommendations of the LRSP are in line with existing goals, objectives, policies, or projects.

CHAPTER 4 – COLLISION DATA AND ANALYSIS

This chapter summarizes the collision data analysis approach and presents preliminary as well as detailed collision analysis and findings in the study area.

CHAPTER 5 – EMPHASIS AREAS

This chapter identifies the top six emphasis areas for the City and the safety strategies for each.

CHAPTER 6 – COUNTERMEASURE IDENTIFICATION

This chapter identifies the engineering countermeasures were selected for each of the high-risk locations and for the emphasis areas. These were based off of approved countermeasures from the Caltrans Local Roadway Safety Manual (LRSM) used in HSIP grant calls for projects. The intention is to give the City potential countermeasures for each location that can be implemented either in future HSIP calls for projects, or using other funding sources, such as the City's Capital Improvement Program. Non-engineering countermeasures were also selected using the 4 E's strategies, and are included with the emphasis areas.

CHAPTER 7 – SAFETY PROJECTS

This chapter summarizes the list of viable safety projects applicable to the high-risk intersections and roadway segments, along with the cost for implementation and their benefit cost ratio.

CHAPTER 8 – IMPLEMENTATION AND EVALUATION

This chapter summarizes the process of implementation, monitoring, evaluation, and future updates.

1 | INTRODUCTION

1 INTRODUCTION

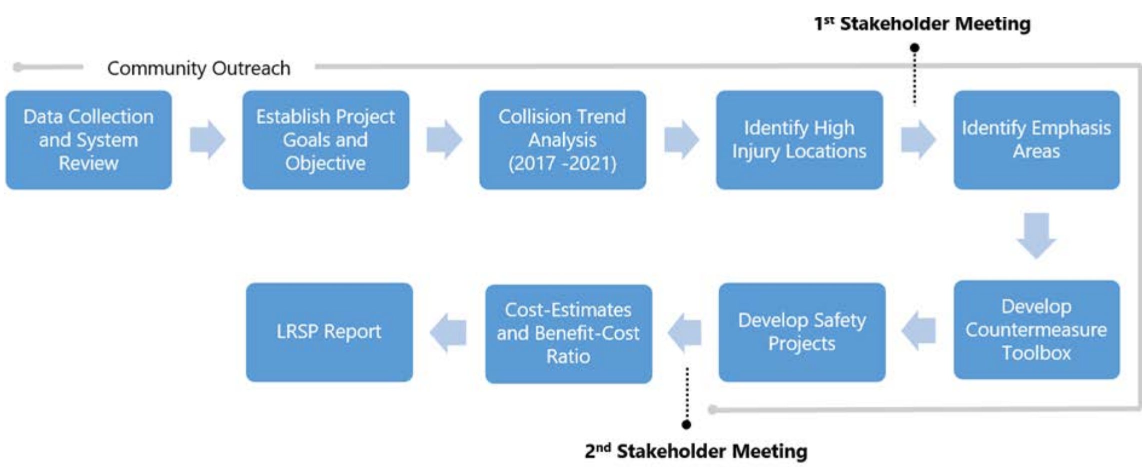
What is an LRSP?

The LRSP is a localized data-driven traffic safety plan that provides opportunities to address unique roadway safety needs and reduce the number of KSI collisions. The LRSP creates a framework to systematically identify and analyze traffic safety-related issues, and recommend safety projects and countermeasures. It facilitates the development of local agency partnerships and collaboration, resulting in the development of a prioritized list of improvements that can qualify for HSIP funding. The LRSP is a proactive approach to addressing safety needs and is viewed as a living document that can be constantly reviewed and revised to reflect evolving trends, and community needs and priorities.

PROCESS

The systemic approach in preparing the LRSP involves the following steps:

- Develop plan goals and objectives
- Analyze collision data
- Meet with stakeholders/safety partners
- Determine focus areas and identify crash reduction strategies
- Prioritize countermeasures/projects
- Prepare the LRSP



Goals and Objectives

GOAL 1: SYSTEMATICALLY IDENTIFY AND ANALYZE ACTIVE TRANSPORTATION PROBLEMS AND RECOMMEND IMPROVEMENTS

Objective 1: Use the Systemic Safety Analysis data-driven process to identify traffic collisions in Pico Rivera, (with an emphasis on KSI collisions); where, when, and how they are occurring, and implement appropriate and proven countermeasures.

Objective 2: Improve roadway planning, design, operations, and connectivity to enhance safety and mobility for all modes, and for users of all ages and abilities.

Objective 3: Implement traffic calming strategies to discourage speeding and other unsafe driving behaviors on residential streets.

Objective 4: Ensure that all recommended improvements are consistent with City of Pico Rivera goals, as well as State and Federal plans and goals (such as, but not limited to: California Strategic Highway Safety Plan, and the FHWA Local and Rural Road Safety Program).

Objective 5: Review existing City policies and recommend improvements to ensure that they meet current best practices in the realm of traffic safety.

GOAL 2: IMPROVE THE SAFETY OF ALL ROAD USERS BY USING PROVEN EFFECTIVE COUNTERMEASURES

Objective 1: Identify safety issues and locations/hot spots where bicycle and pedestrian collisions occur in Pico Rivera, and treat with appropriate and effective engineering countermeasures.

Objective 2: Provide educational programs for bicyclists, pedestrians, and motorists to inform on how to be safe in the public right-of-way; either through after-school programs, law enforcement programs, or other public/private sponsored programs.

Objective 3: Improve sidewalks, walkways, and crossings to be free of hazards and to minimize conflicts with vehicular traffic.

Objective 4: Prioritize improvements that promote Safe Routes to School (SRTS) efforts or are located near schools.

GOAL 3: COORDINATE WITH KEY STAKEHOLDERS TO IMPLEMENT ROADWAY SAFETY IMPROVEMENTS AND RESPONSE WITHIN PICO RIVERA

Objective 1: Coordinate between City Departments, LA County Sheriff and Fire Department, and EMS agencies to ensure a coordinated response to traffic safety, including:

- Implementation of safety improvements
- Public education on safely traveling in the public right-of-way, regardless of mode
- Enforcement of traffic safety laws in the public right-of-way
- Minimizing impacts to emergency response times.

Objective 2: Coordinate with local, regional, and state partners (such as LA Metropolitan Transportation Authority [Metro], LA County, or Caltrans), to identify and address traffic safety issues and ensure a coordinated response.

GOAL 4: CONTINUALLY LEVERAGE EXISTING RESOURCES TO SECURE ADDITIONAL FUNDING FOR SAFETY IMPROVEMENTS

Objective 1: Ensure the LRSP meets HSIP guidelines in order to apply for funding for identified countermeasures.

Objective 2: Provide a list of prioritized locations and improvements that guide City investments and grant funding applications.

Objective 3: Identify and prioritize specific types of countermeasures to address identified safety issues, for systemic implementation citywide.

Objective 4: Continually seek funding sources to implement engineering, education, enforcement, equity, and emergency response solutions to roadway safety issues in Pico Rivera.

GOAL 5: ENSURE THAT SAFETY IMPROVEMENTS ARE MADE IN A MANNER THAT IS FAIR AND EQUITABLE FOR ALL PICO RIVERA RESIDENTS, ESPECIALLY DISENFRANCHISED COMMUNITIES

Objective 1: Utilize public input to identify traffic issues and locations and inform prioritization based on community desires and needs.

Objective 2: Provide a forum for residents to submit traffic safety related concerns; and for City staff and officials to respond to such concerns.

Objective 3: Where feasible, implement community outreach to inform the public about upcoming safety improvements and seek input regarding viability and impacts while building trust and confidence to actively participate in such decisions.

Objective 4: Ensure the consideration of equity when selecting where to make traffic safety improvements and establish metrics by which to make equitable decisions.

Objective 5: Identify groups with a special interest in roadway safety and help build their capacity to support the city in outreach efforts, including SRTS and Safe Routes for Seniors Programs.

GOAL 6: SERVE AS AN INFORMATIONAL DOCUMENT TOWARD THE DEVELOPMENT OF A PROGRAM TO ELIMINATE TRAFFIC DEATHS AND SEVERE INJURIES UTILIZING BOTH SOUND ENGINEERING PRINCIPALS AND A VISION ZERO APPROACH

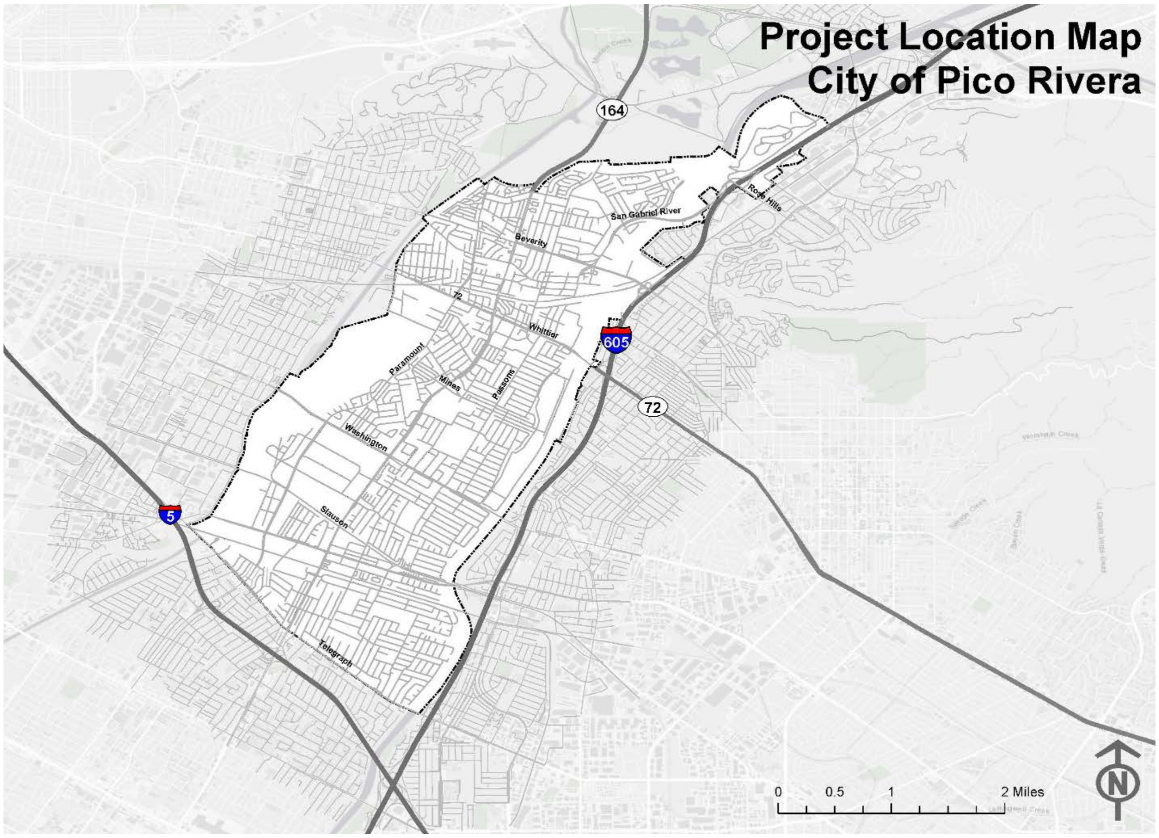
Objective 1: A program that summarizes specific changes to policies, standards, enforcement procedures, education efforts, infrastructure improvement, and other action items will assist the City towards zero fatalities and serious injuries.

Objective 2: This program could be implemented in an equitable manner, accounting for historic inequities in transportation and safety investments within Pico Rivera.

Study Area

The City of Pico Rivera, located in LA County, California, covers a total area of 8.9 square miles, of which 8.3 square miles is land and 0.6 square miles is water, including the Rio Hondo Channel and San Gabriel River. Pico Rivera is located on the eastern edge of the LA basin, and on the southern edge of the area known as the San Gabriel Valley. The City's estimated population is 62,088 (US Census 2020). Rosemead Boulevard, Paramount Boulevard, Whittier Boulevard, Slauson Avenue, Washington Boulevard, Beverly Boulevard, and Telegraph Road are main thoroughfares that connect the City with nearby cities, Interstate 605 (I-605), and Interstate 5 (I-5). The study area is mapped in **Figure 1** on the following page.

Figure 1. Study Area



According to five-year estimates from the American Community Survey (ACS) 2021[1] from the U.S. Census, 80% of Pico Rivera commuters get to work by driving alone, more than both the LA County and State rate of driving commuters. The second most common method of commuting to work in the city is carpooling at 9%. The different modes of transportation used by Pico Rivera residents to commute to work are shown in **Table 1** below.

Table 1. Pico Rivera Commute to Work Census Data

Commute to Work	Pico Rivera	LA County	California
Drive Alone	80%	63%	64%
Carpool	9%	9%	8%
Public Transportation	2%	3%	2%
Walked	1%	2%	2%
Work from Home	6%	21%	21%
Other	2%	2%	2%

Source: Data from the Census Bureau ACS five-year estimate 2021

[1] https://data.census.gov/table?q=Pico+Rivera+city,+California&t=Transportation&tid=ACSDT5Y2021.B08141

2 | SAFETY PARTNERS

2 SAFETY PARTNERS

Safety partners are vital to the development and implementation of an LRSP. For the City of Pico Rivera, these include City Staff, LA County Sheriff's office, LA County Fire Department, El Rancho Unified School District, City Consultants (Willdan and TKM Engineering), and Pico Rivera residents. These stakeholders attended two virtual stakeholder meetings, held on September 21, 2022 and December 6, 2022, to review project goals and findings and solicit feedback and comments.

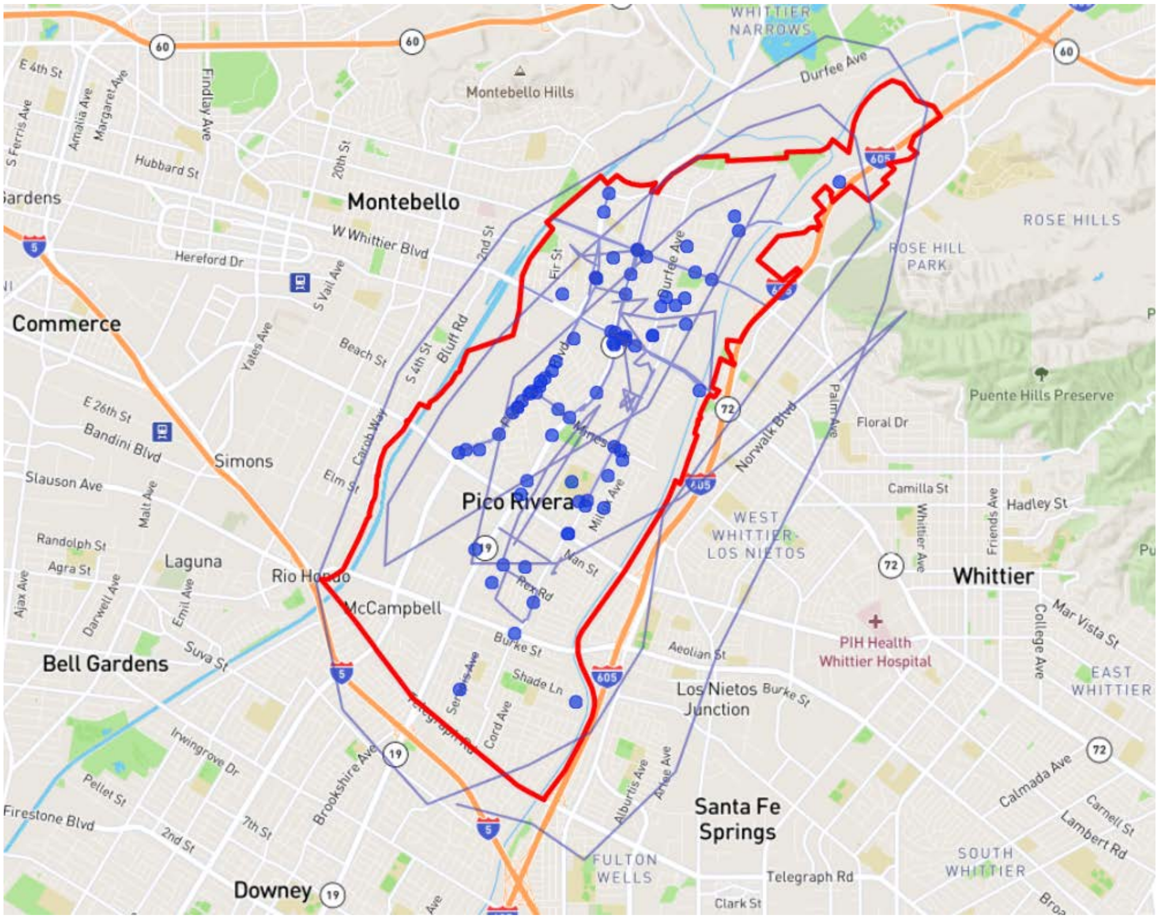
Figure 2. Zoom Meeting from Stakeholder Meeting #1

This stakeholder outreach was supplemented by a project website with an interactive platform. The interactive map was used to solicit input from City of Pico Rivera residents and stakeholders outside the confines of traditional meetings.

Figure 3. Pico Rivera LRSP Project Website

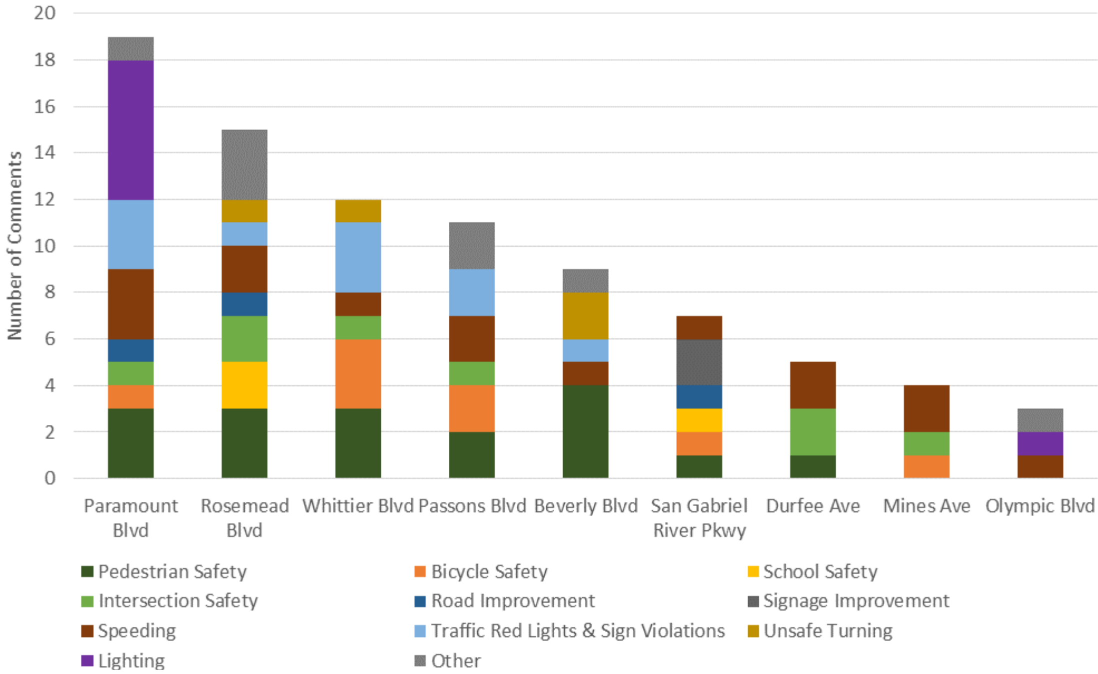
In total, 116 comments were received through the project website and interactive map platform for Pico Rivera. The most comments were received about Paramount Boulevard, Rosemead Boulevard, and Whittier Boulevard, and the most common concerns were speeding, bicycle, and pedestrian safety and traffic light and sign violations. The results of the interactive map are shown below in **Figure 4**, and summarized in **Figure 5**. In **Figure 4**, each dot and line represents a comment provided by a community member.

Figure 4. Interactive Map Comment Responses



Please note that the blue lines over the City refer to specific comments from the Community regarding the need for more safe space for bicycle riders and pedestrians.

Figure 5. Public Comments on Traffic Safety by Location



Note: Corridors with less than three comments are not listed in this summary. Categories with less than four comments are included in 'Other'. Category was chosen based on the primary issue listed in the comment. Each comment was assigned to the major road if at an intersection.

The community comments collected through Interactive map platform is included in **Appendix A**.

3 | EXISTING PLANNING EFFORTS

3 EXISTING PLANNING EFFORTS

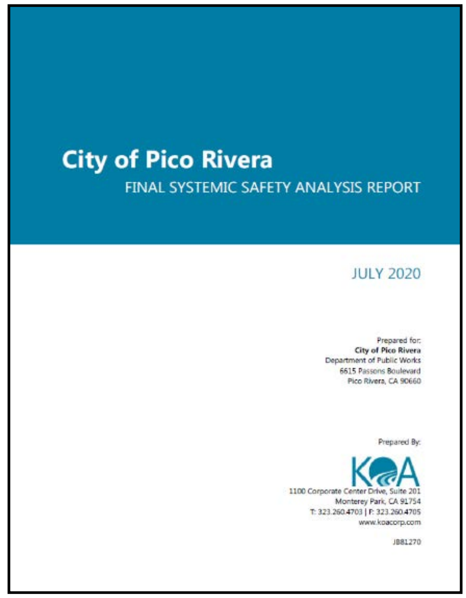
This chapter summarizes the planning documents, projects underway, and studies reviewed for the City of Pico Rivera LRSP. The purpose of this chapter is to ensure the LRSP vision, goals, and E's strategies (Education, Enforcement, Engineering, and EMS) are aligned with prior planning efforts, planned transportation projects, and non-infrastructure programs for the City. The documents reviewed are listed below:

- City of Pico Rivera Final Systemic Safety Analysis Report (2020)
- Pico Rivera General Plan | Circulation Element (2014)
- City of Pico Rivera Strategic Plan (2022-2023)
- Pico Rivera Regional Bikeway Project (2019)
- Pico Rivera Urban Greening Plan (2015)
- Pico Rivera Capital Improvement Plan | Fiscal Year (2021- 2023)
- Gateway Cities Strategic Transportation Plan (2016)
- Pico Rivera Safe Routes to School Program, 2013-2015 (2015)
- Lakewood/Rosemead Boulevard Master Plan and Complete Street Evaluation (2018)
- Washington Boulevard Transit Oriented Development Specific Plan (2019)
- Historic Whittier Boulevard Revitalization Program Specific Plan and Multimodal Plan
- Whittier Boulevard Bike Trail Connection to Pico Rivera State Historic Park (2018)
- Historic Whittier Boulevard Bike and Pedestrian Bridge (2021-2022)
- Gold Line East Side Extension Transit Oriented Development Plan (2017)
- Telegraph Road Over San Gabriel River Bridge (2021)
- Washington Boulevard Bridge Over Rio Hondo Channel (2022)
- Metro Eastside Gold Line Project (2022)
- High Speed Rail Phase II (2021)
- Citywide Parking Analysis (2019)
- LA County Long Range Transportation Plan | LRTP (2020)
- LA County Traffic Improvement Plan (2008)
- LA County Bicycle Master Plan | Final Plan (2012)
- LA County A Plan for Safer Roadways | Vision Zero (2020-2025)

The following sections include brief descriptions of these documents and how they inform the development of the LRSP. A detailed list of relevant policies and projects is listed in **Appendix B** (Summary of Planning Documents).

CITY OF PICO RIVERA SYSTEMIC SAFETY ANALYSIS REPORT (SSAR) (2020)

The City of Pico Rivera Systemic Safety Analysis Report (SSAR) analyzes collision data, assesses infrastructure deficiencies through an inventory of roadway system elements, and identifies roadway safety solutions on a citywide basis. The SSAR includes; crash data source and analysis techniques, crash patterns within the City, crash data analysis, field investigation, proposed safety countermeasures, safety improvement projects, collision reduction benefits, cost estimation, prioritization of safety projects, and recommended projects for HSIP Cycle 10. The SSAR focused on analysis of four principal corridors within the City: Whittier Boulevard, Passons Boulevard, Slauson Avenue, and Paramount Boulevard.


City of Pico Rivera
FINAL SYSTEMIC SAFETY ANALYSIS REPORT

JULY 2020

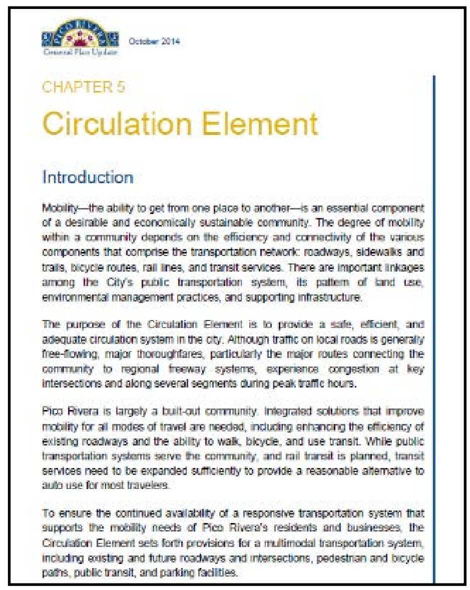
Prepared for:
City of Pico Rivera
Department of Public Works
6615 Passons Boulevard
Pico Rivera, CA 90660

Prepared By:
KOA
1100 Corporate Center Drive, Suite 201
Monterey Park, CA 91754
T: 323.260.4703 | F: 323.260.4705
www.koacorp.com

JB81270

PICO RIVERA GENERAL PLAN | CIRCULATION ELEMENT (2014)

The General Plan Circulation Element identifies safe, reliable and accessible transportation needs, through policies and standards to enhance its design and maintenance of an integrated multi-modal transportation system. The element sets forth provisions for a multimodal transportation system, including existing and future roadways and intersections, pedestrian and bicycle paths, public transit, and parking facilities. An analysis of the existing transportation system is included in the element, as well as a set of policies to guide the development of Pico Rivera's transportation system. These goals and policies inform City's LRSP to improve roadway safety for active transportation users while encouraging users to choose walking, bicycling, and transit as a mode of transportation in Pico Rivera to reduce traffic trips and improve environmental quality.


October 2014

CHAPTER 5

Circulation Element

Introduction

Mobility—the ability to get from one place to another—is an essential component of a desirable and economically sustainable community. The degree of mobility within a community depends on the efficiency and connectivity of the various components that comprise the transportation network: roadways, sidewalks and trails, bicycle routes, rail lines, and transit services. There are important linkages among the City's public transportation system, its pattern of land use, environmental management practices, and supporting infrastructure.

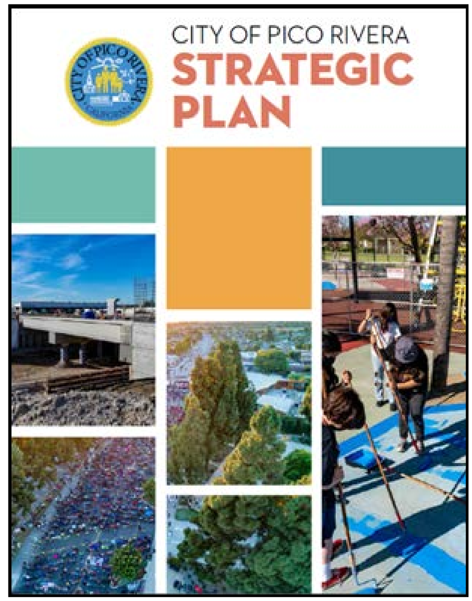
The purpose of the Circulation Element is to provide a safe, efficient, and adequate circulation system in the city. Although traffic on local roads is generally free-flowing, major thoroughfares, particularly the major routes connecting the community to regional freeway systems, experience congestion at key intersections and along several segments during peak traffic hours.

Pico Rivera is largely a built-out community. Integrated solutions that improve mobility for all modes of travel are needed, including enhancing the efficiency of existing roadways and the ability to walk, bicycle, and use transit. While public transportation systems serve the community, and rail transit is planned, transit services need to be expanded sufficiently to provide a reasonable alternative to auto use for most travelers.

To ensure the continued availability of a responsive transportation system that supports the mobility needs of Pico Rivera's residents and businesses, the Circulation Element sets forth provisions for a multimodal transportation system, including existing and future roadways and intersections, pedestrian and bicycle paths, public transit, and parking facilities.

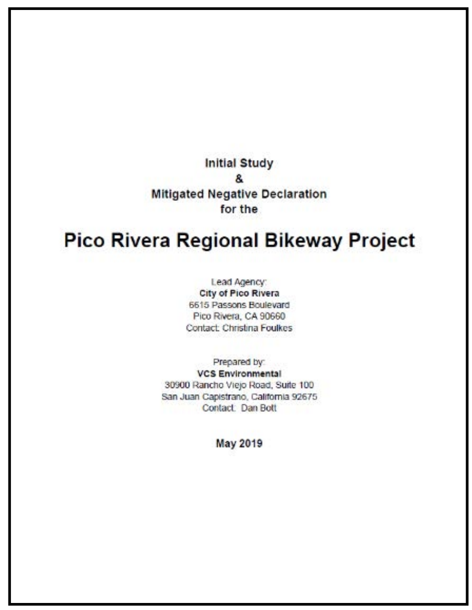
CITY OF PICO RIVERA STRATEGIC PLAN (2022-2023)

The fundamental components of the Strategic Plan is to include a mission, vision, and values statements, and concise goals, strategies, and actions. It also includes shared vision of transportation and warehousing, educational services, healthcare and social assistance. The plan includes providing city services, stewardship resources, and encouraging infrastructure improvements benefiting residents, businesses, and visitors. The plan includes data collected from the public outreach and engagement strategies in order develop the strategic plan. The improvements identified in this plan will inform the safety improvements and connectivity strategies to be recommended in the City's LRSP.



PICO RIVERA REGIONAL BIKEWAY PROJECT (2023-2024)

The Regional Bikeways Project involves the construction of a Class IV Bikeway and associated water quality and road improvements to Mines Avenue between Paramount Boulevard and the San Gabriel River. This document contains the Initial Study and Mitigated Negative Declaration for the project as required by the California Environmental Quality Act (CEQA). The project includes implementation shared road design for both pedestrian and bicycle, road upgrades using landscape planters, physical barriers, and on-street parking. The improvements identified in this plan will inform the safety improvements and strategies to be recommended in the City's LRSP for countermeasures in the area.



Initial Study
&
Mitigated Negative Declaration
for the

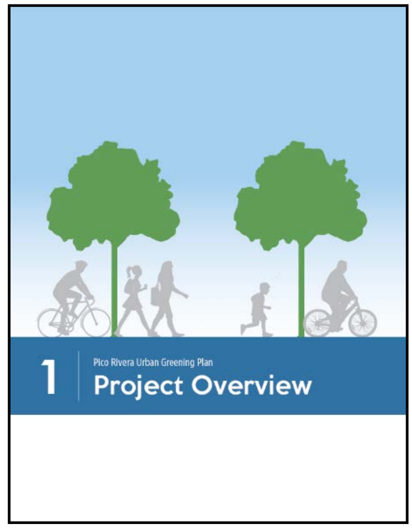
Pico Rivera Regional Bikeway Project

Lead Agency:
City of Pico Rivera
6615 Passons Boulevard
Pico Rivera, CA 90660
Contact: Christina Foulkes

Prepared by:
VCS Environmental
30900 Rancho Viejo Road, Suite 100
San Juan Capistrano, California 92675
Contact: Dan Bott

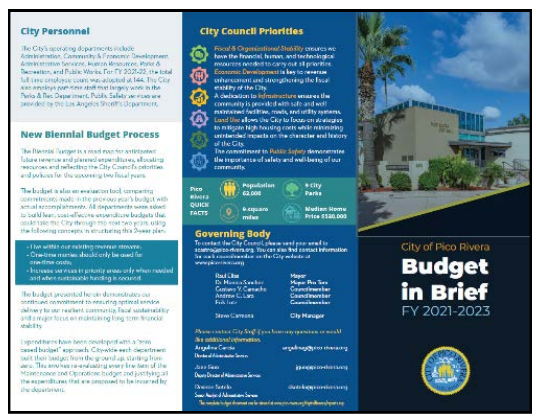
May 2019

PICO RIVERA URBAN GREENING PLAN (2015)



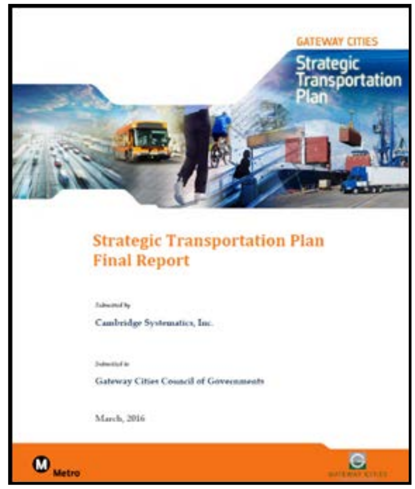
The City of Pico Rivera's Urban Greening Plan (UGP) presents projects that provide a safe and connected bicycle network and pedestrian improvements, creates a unifying street tree canopy for more walkable and bikeable neighborhoods, and identifies prospective green spaces and hydrology improvements. The Urban Greening Plan establishes a system of green streets by incorporating walking, biking, storm water management, and street trees within Pico Rivera's streets. Additionally, the plan provides recommendations on how to successfully implement and maintain these green streets. The City has experienced the cumulative impacts of environmental, social, and economic vulnerabilities that affect quality of life and the built environment. This plan addresses many of these issues by providing a safe and connected multi-modal transportation system, unifying street tree palette, and opportunities for storm water management. The plan through policies and standards has addressed key objectives which reflect proposed improvements and pedestrian/bike management to operate and manage site pedestrian/bike requirements.

PICO RIVERA CAPITAL IMPROVEMENT PLAN (2021-2023)



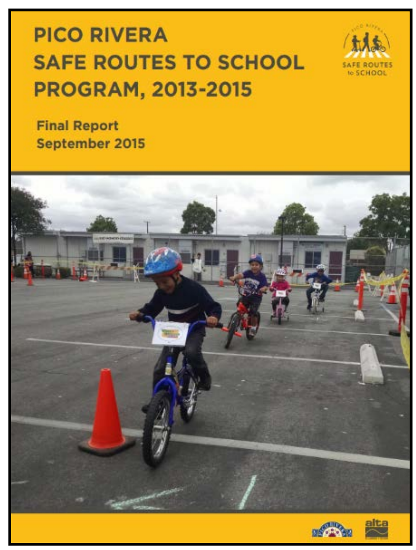
The City of Pico Rivera’s Capital Improvement Program (CIP) is a planning document for long-term fiscal sustainability and to support City’s quality of life by providing improved design, construction and renovation of major capital projects. Over $10 million in traffic projects are planned for FY 2021-2022. The financial plan is developed by City Staff and is adopted by the City Council as a guide for prioritization of various projects to accomplish community goals. The CIP reflects to meet annual goals and funding availability, prioritized capital projects and community needs. These improvements influence Pico Rivera’s built and natural environment and help guide the trajectory of future growth or change. The improvements identified in this plan will inform the safety improvements and strategies to be recommended in the City’s LRSP to ensure consistency.

GATEWAY CITIES STRATEGIC TRANSPORTATION PLAN (2016)



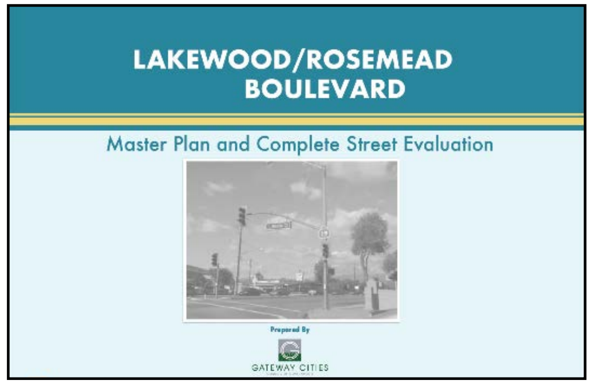
The Strategic Transportation Plan (STP) includes studies to improve the complex transportation network within the Gateway Cities of LA County. The STP encompasses all modes of surface transportation in the Gateway Cities, including local and regional arterial highways, freeways, local and regional transit, park and ride lots, and active transportation. This plan uses new, state-of-the-art multimodal modeling and analysis to develop a strategic plan for sub regional travel throughout the Gateway Cities and connecting to the Southern California region. The plan has been developed a collaborative process that included significant input, review and approval of all of the jurisdictions throughout the process of developing the plan. The primary objectives of the Gateway Cities Council of Governments (GCCOG) is coordination of transportation infrastructure among its member agencies, neighboring jurisdictions and other regional agencies including the LA County Metro. The improvements identified in this plan will inform the safety improvements and strategies to be recommended in the City's LRSP to ensure consistency.

PICO RIVERA SAFE ROUTES TO SCHOOL PROGRAM, 2013-2015 (2015)



The plan includes comprehensive goals to support traveling to school by active modes, and to improve traffic safety for children who walk and bike to school. The plan talks about various strategies and recommendations to encourage active transportation amongst children to walk or bike to school. These strategies include SRTS Coordinator and Task Force and branding development, spreading awareness through websites, educational programs, encouragement programs, evaluation programs, and enforcement programs. Part of the engineering and traffic improvements, the City also focuses on expanding the bike and walkable routes system to school from nearby communities and also focuses on better connectivity throughout the city. The plan focuses of the strengths of active transportation and strategies for safer routes to school to be recommended in the City's LRSP.

LAKEWOOD/ ROSEMEAD BOULEVARD MASTER PLAN AND COMPLETE STREET EVALUATION (2018)

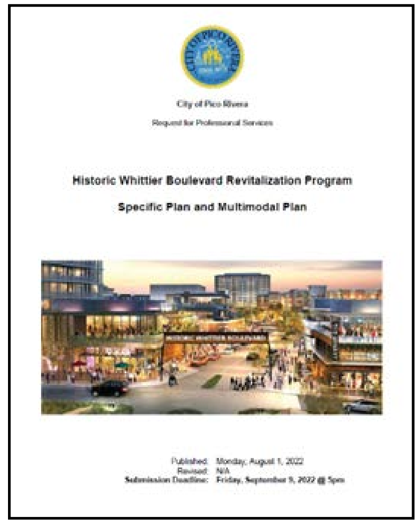


The plan includes comprehensive goals to support comprehensive multimodal transportation, and enhance sustainability of the communities and address regional transportation needs. The plan talks about various strategies and recommendations to improve commute to school and implement complete street plans, enhance pedestrian and bicycle plans, and improve traffic operations. There strategies will provide opportunities to revitalize the corridor through urban design, mixed used-development and improved transit, bike, and pedestrian connectivity. Implementing improvements will attract more development and commercial businesses. The plan focuses on multi-use, increases multi-modal connectivity and better transit facilities, and infrastructure to be recommended in the City's LRSP.

WASHINGTON BOULEVARD TRANSIT ORIENTED DEVELOPMENT SPECIFIC PLAN (2019)

The Washington Boulevard and Rosemead Transit Oriented Development (TOD) Specific Plan address revitalization and reuse of the Washington/Rosemead area of future Gold Lone extension in the City of Pico Rivera. The plan creates a framework that strategically assesses and executes an implementation plan an also provides a compact multi-modal, mixed-use, and sustainable environment for the community. The plan also establishes a vibrant, interconnected community-oriented environment that reinforces and reuses, revitalization of the community. The plan would certainly enhance pedestrian and bicycle connectivity and create better mobility options. TOCs include land use planning and community development policies that maximize access to transit as a key organizing principle and acknowledge mobility as an integral part of the urban fabric. The plan also concentrates on sustainable and mixed used solutions as part this specific plan. The plan focuses on multi-use, increases multi-modal connectivity and better transit facilities, and infrastructure to be recommended in the City's LRSP.

HISTORIC WHITTIER BOULEVAD REVITALIZATION PROGRAM SPECIFIC PLAN AND MULTIMODAL PLAN (2022)


City of Pico Rivera

Request for Professional Services

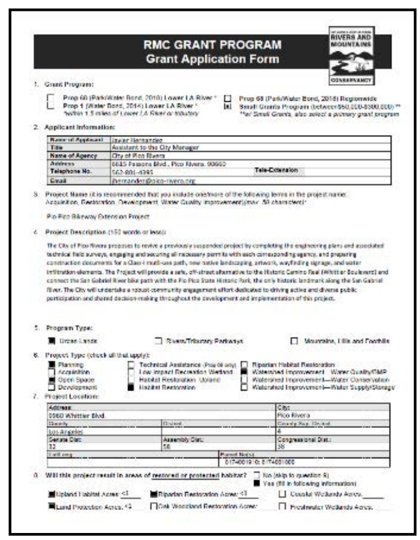
Historic Whittier Boulevard Revitalization Program

Specific Plan and Multimodal Plan

Published: Monday, August 1, 2022
Revised: N/A
Submission Deadline: Friday, September 9, 2022 @ 5pm

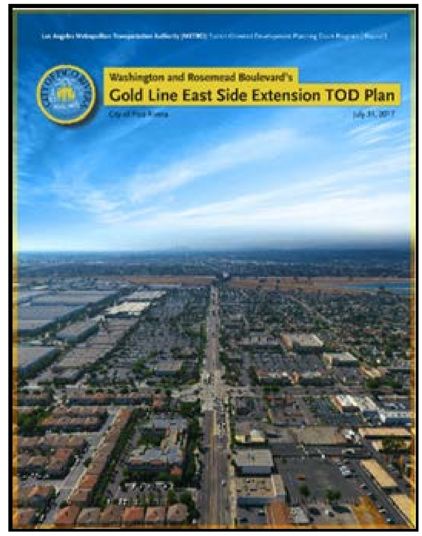
The plan is a data driven, community-oriented standards and guidelines that will serve as blueprint for future development of the corridor, hounding, and infrastructure along the corridors that spurs smart growth, mobility and economic activity while retaining the integrity and identify the needs of the community. The revitalization program would enhance multimodal and streetscape design plan, overlay and landscape median improvements of the corridors. The plan includes citywide multi-modal connectivity which will help to close the digital divide in the City and will open access network will allow for multiple service providers to use the network to offer more choice to consumers. The plan also define goals for better connectivity in the unincorporated areas in the City. The plan focuses on incorporating sustainability, resiliency, accessibility, complete streets, and multi-modal transportation to be recommended in the City's LRSP.

WHITTIER BOULEVAD BIKE TRAIL CONNECTION TO PIO PICO STATE HISTORIC PARK (2018)


RMC GRANT PROGRAM
Grant Application Form

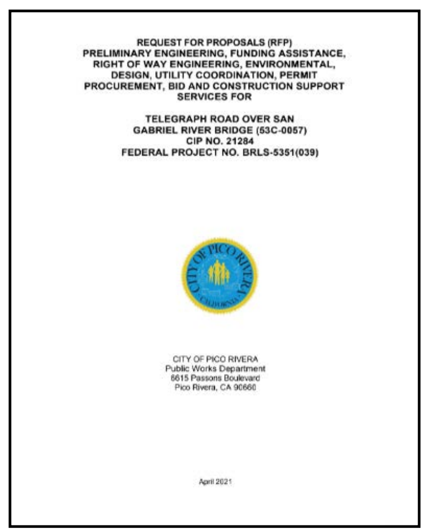
The City proposes a project to propose Class I multi-use path, new native landscaping, artwork, wayfinding signage, and water infiltration elements. This project will provide a safe, off-street alternative to the Historic Camino Real (Whittier Boulevard) and connect the San Gabriel River bike path with the Pio Pico State Historic Park. The project proposes extended Class I regional bikeway network and promote safe, active modes of transportation as a meaningful way to reduce greenhouse gas (GHG) emissions. The project is focuses on the urban land use considering the goals and policies of the local, regional and State planning criteria. The project would improve access to the Pio Pico State Park with active transportation and improve connectivity within the city. The project focuses on incorporating sustainability, accessibility, improved infrastructure, and active transportation to be recommended in the City's LRSP.

GOLD LINE EAST SIDE EXTENSION TOD PLAN (2017)



The TOD Plan supports municipalities across LA County to advance comprehensive transit-supportive planning efforts. Metro has a vested interest in planning efforts around transit stations that promote, encourage and support transit riders and the interface between public transportation and surrounding communities. Metro's Transit Supportive Planning Toolkit (Toolkit) will be the basis for how Metro will evaluate grant applications for Metro's Grant Program and how grant-funded planning efforts are advanced. Interested parties must demonstrate how their proposed project will advance Metro's goals of encouraging transit supportive planning efforts and increasing transit ridership. Transit supportive places are areas where the presence of effective and predictable transit can be enhanced through appropriate patterns and types of development. This can be achieved through practices such as community-scaled density, diverse land use mix, reduced reliance upon private automobiles, and enhanced infrastructure for pedestrians, bicyclists, and people of all ages and abilities. The project focuses on incorporating sustainability, accessibility, improved infrastructure, and active transportation to be recommended in the City's LRSP.

TELEGRAPH ROAD OVER SAN GABRIEL RIVER BRIDGE (2021)


REQUEST FOR PROPOSALS (RFP)
PRELIMINARY ENGINEERING, FUNDING ASSISTANCE, RIGHT OF WAY ENGINEERING, ENVIRONMENTAL, DESIGN, UTILITY COORDINATION, PERMIT PROCUREMENT, BID AND CONSTRUCTION SUPPORT SERVICES FOR

TELEGRAPH ROAD OVER SAN GABRIEL RIVER BRIDGE (53C-0057)
CIP NO. 21284
FEDERAL PROJECT NO. BRLS-5351(039)

CITY OF PICO RIVERA
Public Works Department
6615 Passons Boulevard
Pico Rivera, CA 90660

April 2021

The goal of the project is to replace the bridge utilizing the most cost effective methods and with consideration of the visual context of the bridge within the City. The proposed project work shall include, but not be limited to the replacement of the bridge, access roadways, driveways, and any necessary removal of existing facilities, detours, stage construction, bridge approaches, and any necessary utility relocations. The bridge replacement would require three stages of construction. Four lanes of traffic maintains on the existing bridge. Traffic lanes periodically closes to facilitate certain construction activities during the construction phase of the project. During the construction phases a one traffic lane will be provided on the newly constructed northerly portion of the bridge and one lane will be provided in the southern portion of the bridge. The project focuses on incorporating improved accessibility, improved infrastructure to be recommended in the City's LRSP.

WASHINGTON BOULEVARD BRIDGE OVER RIO HONDO CHANNEL (2022)

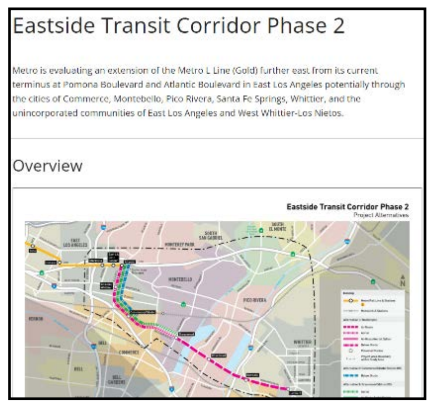

REQUEST FOR PROPOSALS (RFP)
PRELIMINARY ENGINEERING, FUNDING ASSISTANCE, RIGHT OF WAY ENGINEERING, ENVIRONMENTAL, DESIGN, UTILITY COORDINATION, PERMIT PROCUREMENT, BID AND CONSTRUCTION SUPPORT SERVICES FOR
WASHINGTON BOULEVARD BRIDGE OVER RIO HONDO CHANNEL (53C-0471),
CIP NO. 21285,
FEDERAL PROJECT NO. BRLS-5351(040)

CITY OF PICO RIVERA
Public Works Department
8615 Passons Boulevard
Pico Rivera, CA 90660

June 2, 2022

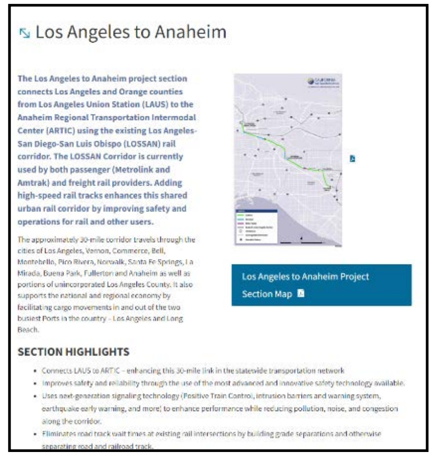
The study of the project includes life cycle cost analysis which determines removal and replacement of the bridge. This proposal of the improvements to the bridge would improve ADT volume in the city and will have great impact of the communities and commercial centers. This proposal would refine traffic analysis to determine the number of lanes provided to each direction of traffic. The construction phases involves closure of the center if the bridge with four lanes available to each direction of traffic. The proposal also involves the closure of both the northernmost and southernmost portions of the bridge and also leaving open two lanes to each direction of traffic. It also involves the closure if center of the bridge leaving two lanes of traffic open to each direction. The study focuses on incorporating improved accessibility and infrastructure to be recommended in the City's LRSP.

METRO EASTSIDE GOLD LINE PROJECT (2022)



The Metro is evaluating an extension of the Metro L Line (Gold) further east from its current terminus at Pomona Boulevard and Atlantic Boulevard in East Los Angeles potentially through the Cities of Commerce, Montebello, Pico Rivera, Santa Fe Springs, Whittier, and the unincorporated communities of East LA and West Whittier-Los Nietos. The purpose of the Eastside Transit Corridor Phase 2 project is to provide a transit connection to the Metro Gold Line Eastside Extension linking communities farther east of LA to the regional transit network, to improve mobility within the project study area by enhancing transit options, and to address projected growth in an environmentally responsible manner. Additional considerations supporting the need for the Eastside Transit Corridor Phase 2 project include: increased travel demand and projected land use changes; a project area that comprises more than 50% of external trip destinations to Central LA and LA Central Business District; large concentrations of population and employment presently creating mobility and accessibility challenges; and the high level of automobile congestion on local arterial and highway networks in the project area. The plan focuses on incorporating sustainability, better accessibility and connectivity to be recommended in the City's LRSP.

HIGH SPEED RAIL PHASE II (2021)


Los Angeles to Anaheim

The Los Angeles to Anaheim project section connects Los Angeles and Orange counties from Los Angeles Union Station (LAUS) to the Anaheim Regional Transportation Intermodal Center (ARTIC) using the existing Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor. The LOSSAN Corridor is currently used by both passenger (Metrolink and Amtrak) and freight rail providers. Adding high-speed rail tracks enhances this shared urban rail corridor by improving safety and operations for rail and other users.

The approximately 30-mile corridor travels through the cities of Los Angeles, Vernon, Commerce, Bell, Montebello, Pico Rivera, Norwalk, Santa Fe Springs, La Mirada, Buena Park, Fullerton and Anaheim as well as portions of unincorporated Los Angeles County. It also supports the national and regional economy by facilitating cargo movements in and out of the two busiest Ports in the country – Los Angeles and Long Beach.

Los Angeles to Anaheim Project Section Map

SECTION HIGHLIGHTS

- Connects LAUS to ARTIC – enhancing this 30-mile link in the statewide transportation network
- Improves safety and reliability through the use of the most advanced and innovative safety technology available.
- Uses next-generation signaling technology (Positive Train Control, intrusion barriers and warning system, earthquake early warning, and more) to enhance performance while reducing pollution, noise, and congestion along the corridor.
- Eliminates road track wait times at existing rail intersections by building grade separations and otherwise separating road and railroad track.

The approximately 30-mile corridor travels through the Cities of LA, Pico Rivera, Norwalk, Santa Fe Springs, La Mirada, Buena Park, Fullerton, and Anaheim as well as portions of unincorporated LA County. Adding high-speed rail tracks enhances this shared urban rail corridor by improving safety and operations for rail and other users. Corridor is currently used by both passenger (Metrolink and Amtrak) and freight rail providers. This proposed project would enhance this 30-mile link in the statewide transportation network. Improves safety and reliability through the use of the most advanced and innovative safety technology available. Eliminates road track wait times at existing rail intersections by building grade separations and otherwise separating road and railroad track. Reduces passenger delays caused by mixing freight and passenger services and provides the capacity for more convenient and easier to use passenger service and schedules. The plan also define goals for better connectivity in the unincorporated areas in the City. The plan focuses on incorporating accessibility and improved connectivity to be recommended in the City's LRSP.

SB I-605 BEVERLY BOULEVARD INTERCHANGE IMPROVEMENTS (2020)

The project consists of replacing the southern bound I-605 on-ramp and off-ramp with a diamond configuration that includes a direct on-ramp and off-ramp, ramp metering and a new signal at Beverly Boulevard allowing for access to both directions of the street. The California Department of Transportation (Caltrans) in cooperation with the LA County Metro and the GCCOG proposes to improve the southern I-605 Beverley Boulevard Interchange through ramp reconfiguration, removal of the collector-distributor road, and provisions of a new signaled intersection at Beverley Boulevard to allow for eastbound and westbound movement. The plan also define goals for better connectivity in the unincorporated areas in the City. The plan focuses on incorporating sustainability, resiliency, accessibility, and multi-modal transportation to be recommended in the City's LRSP.

PICO RIVERS CITYWIDE PARKING ANALYSIS (2019)

WALKER CONSULTANTS

MEMORANDUM
PICO RIVERA PARKING ANALYSIS – PHASE ONE

37-8833.00

DATE: June 20, 2019
TO: Hector Hernandez
COMPANY: City of Pico Rivera
ADDRESS: 6615 Passons Boulevard
CITY/STATE: Pico Rivera, CA
COPY TO: Steffen Turoff, Tania Schleck
FROM: Daniel Garcia
PROJECT NAME: Pico Rivera Parking Analysis
PROJECT NUMBER: 37-8833.00

INTRODUCTION

To better serve the needs of the City's residents, businesses, and visitors, the City of Pico Rivera engaged Walker Consultants ("Walker") to perform an analysis of parking conditions identified as concerns by City residents, elected officials and staff. To realize the analysis, a representative number of areas and locations throughout the City were chosen for study. Based in part on comments received in public meetings, the areas selected for study are thought to exemplify problem areas, and meant to serve as a representative sample of land uses that can be found throughout the city. The study area consists of 29 sub-areas that are allocated throughout the City proper, from Friendship Avenue in the north, to Telegraph Road in the south. The analysis consists of two phases:

Phase One
Phase One includes a review and summary of current parking conditions. To gauge current conditions, Walker observed parking utilization patterns within each of the sub-areas during projected peak hours for each area, based on the predominant land use, and conducted observations of parking behaviors and quantification of parking demand within those sub-areas.

Phase Two
Consists of a review and recommendations of municipal code parking requirements informed by the findings and observations from Phase One.

This memorandum covers only Phase One of the parking analysis.

SUMMARY OF FINDINGS

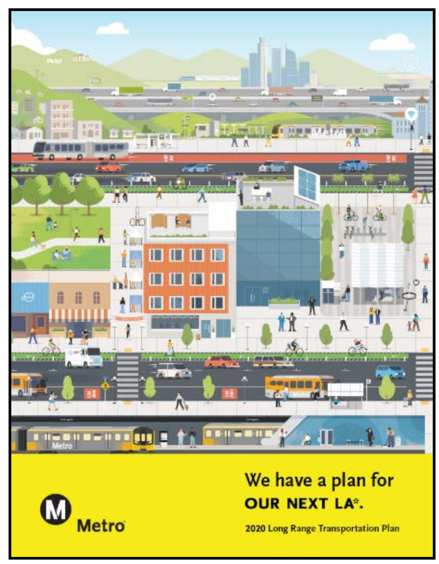
The purpose of the Phase One parking analysis is to understand current parking conditions throughout the city by studying a number of areas that represent parking conditions and various neighborhoods throughout the City. The areas selected are meant to be representative of the parking issues found in the city at large. The following summary presents the overall findings and themes that resulted from Phase One of the parking analysis.

A map of the Study Area, showing the location of each sub-area, can be found on page 4 of this document.

After several days of occupancy counts, observations, and analysis, the key takeaways of the current conditions analysis are as follows:

The parking analysis consists of parking utilization patterns within each of the sub areas during projected peak hours for each area, based on the predominant land use, and conducted observations of parking behaviors and quantification of parking demand within those sub areas. Phase two consists of a review and recommendations of municipal code parking requirements informed by the findings and observations from Phase I. The purpose of the Phase I parking analysis is to understand current parking conditions throughout the City by studying a number of areas that represent parking conditions and various neighborhoods throughout the City. The areas selected are meant to be representative of the parking issues found in the City at large. The plan also define goals for parking analysis and reduce congestion in the City. The plan focuses on incorporating high demand parking spaces and reduce the impact of parking congestion in the City to be recommended in the City's LRSP.

LA COUNTY LONG RANGE TRANSPORTATION PLAN (2020)

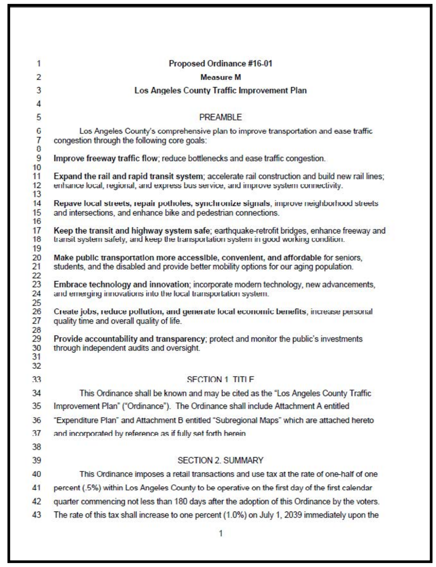


The plan outlines Metro's visionary outcome is to double the share of transportation modes other than solo driving. The Plan lays out the future roadmap for the County to bring more transportation infrastructure and improved access to transit, resilient, and vibrant future for LA County. It focuses on better transit, less congestion, complete streets, and access to opportunities. The actions and goals guide the equity of the City to ensure affordable transportation choices for the needs and sustainability for improved streets and transportation planning.

The plan also focuses strengths of active transportation connections, community amenities and trail system within the City. The improvements identified in this plan will inform the safety improvements and strategies to be recommended in the City's LRSP to ensure consistency.

LA COUNTY TRAFFIC IMPROVEMENT PLAN (2008)

The plan includes comprehensive goals to improve transportation and ease traffic congestion through improved freeway traffic flow, expand the rail and rapid transit system, repave local streets, repair potholes, synchronize signals, keep the transit and highway system safe, make public transportation more accessible, convenient and affordable, invest in transportation infrastructure. The plan also focuses on expanding the rail/subway/bus system, and also focuses on better connectivity throughout the county. The plan focuses of the strengths of active transportation and strategies for safety improvements to be recommended in the City's LRSP.



Proposed Ordinance #16-01
Measure M
Los Angeles County Traffic Improvement Plan

PREAMBLE

Los Angeles County's comprehensive plan to improve transportation and ease traffic congestion through the following core goals:

Improve freeway traffic flow; reduce bottlenecks and ease traffic congestion.

Expand the rail and rapid transit system; accelerate rail construction and build new rail lines; enhance local, regional, and express bus service, and improve system connectivity.

Repave local streets, repair potholes, synchronize signals, improve neighborhood streets and intersections, and enhance bike and pedestrian connections.

Keep the transit and highway system safe; earthquake-retrofit bridges, enhance freeway and transit system safety, and keep the transportation system in good working condition.

Make public transportation more accessible, convenient, and affordable for seniors, students, and the disabled and provide better mobility options for our aging population.

Embrace technology and innovation; incorporate modern technology, new advancements, and emerging innovations into the local transportation system.

Create jobs, reduce pollution, and generate local economic benefits, increase personal quality time and overall quality of life.

Provide accountability and transparency; protect and monitor the public's investments through independent audits and oversight.

SECTION 1. TITLE

This Ordinance shall be known and may be cited as the "Los Angeles County Traffic Improvement Plan" ("Ordinance"). The Ordinance shall include Attachment A entitled "Expenditure Plan" and Attachment B entitled "Subregional Maps" which are attached hereto and incorporated by reference as if fully set forth herein.

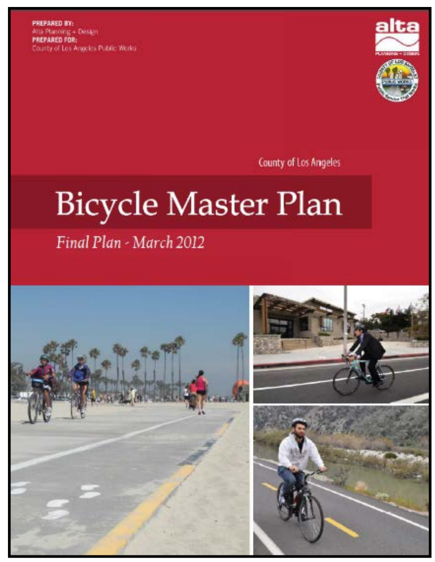
SECTION 2. SUMMARY

This Ordinance imposes a retail transactions and use tax at the rate of one-half of one percent (.5%) within Los Angeles County to be operative on the first day of the first calendar quarter commencing not less than 180 days after the adoption of this Ordinance by the voters. The rate of this tax shall increase to one percent (1.0%) on July 1, 2039 immediately upon the

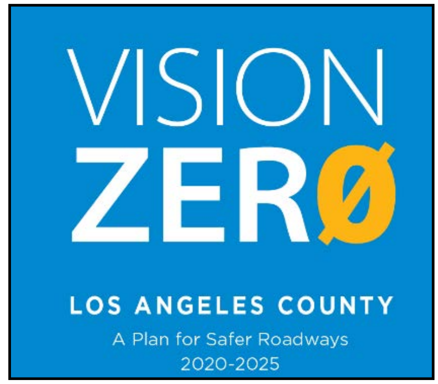
1

LA COUNTY BICYCLE MASTER PLAN | FINAL PLAN (2012)

The LA County Bicycle Master Plan provides direction for improving mobility of bicyclists and encouraging more bicycle ridership within the county by expanding the existing bikeway network, connecting gaps, addressing constrained areas, providing for greater local and regional connectivity, and encouraging more residents to bike. The plan also focuses on projects that improve safety and convenience for bicycle commuters within the County. The plan explores various options for street designs and innovative bicycle lane treatments. The recommendation includes bicycle infrastructure improvements, bicycle-related programs, implementation strategies and policy, and design guidelines to incorporate additional improvements to transportation facilities in the County. The goals and policies included in the plan have helped develop and implement bicycle-friendly policies, programs, and infrastructure. The improvements identified in this plan will inform the safety improvements and strategies to be recommended in the City's LRSP.



LA COUNTY A PLAN FOR SAFER ROADWAYS | VISION ZERO (2020-2025)



The LA County Vision Zero Plan in a five-year plan focusing on achieving the goals of eliminating traffic-related fatalities on unincorporated County roadways by 2035. The plan also includes elements which will reduce sever injuries and traffic collisions in the long term. The plan identifies vision for the future objectives and actions to enhance traffic safety in collaboration with government and community partners. The plan also includes health equity, data- driven process, and transparency regulating several goals and objectives. The plan describes potential findings for ped/bike safety and countermeasures to reduce collisions and traffic congestion. Vision Zero supports and complements and help achieve multiple County policies, plans, and actions to create healthier, sustainable, and more vibrant communities. The improvements identified in this plan will inform the safety improvements and strategies to be recommended in the City's LRSP.

4 | COLLISION DATA AND ANALYSIS

4 COLLISION DATA AND ANALYSIS

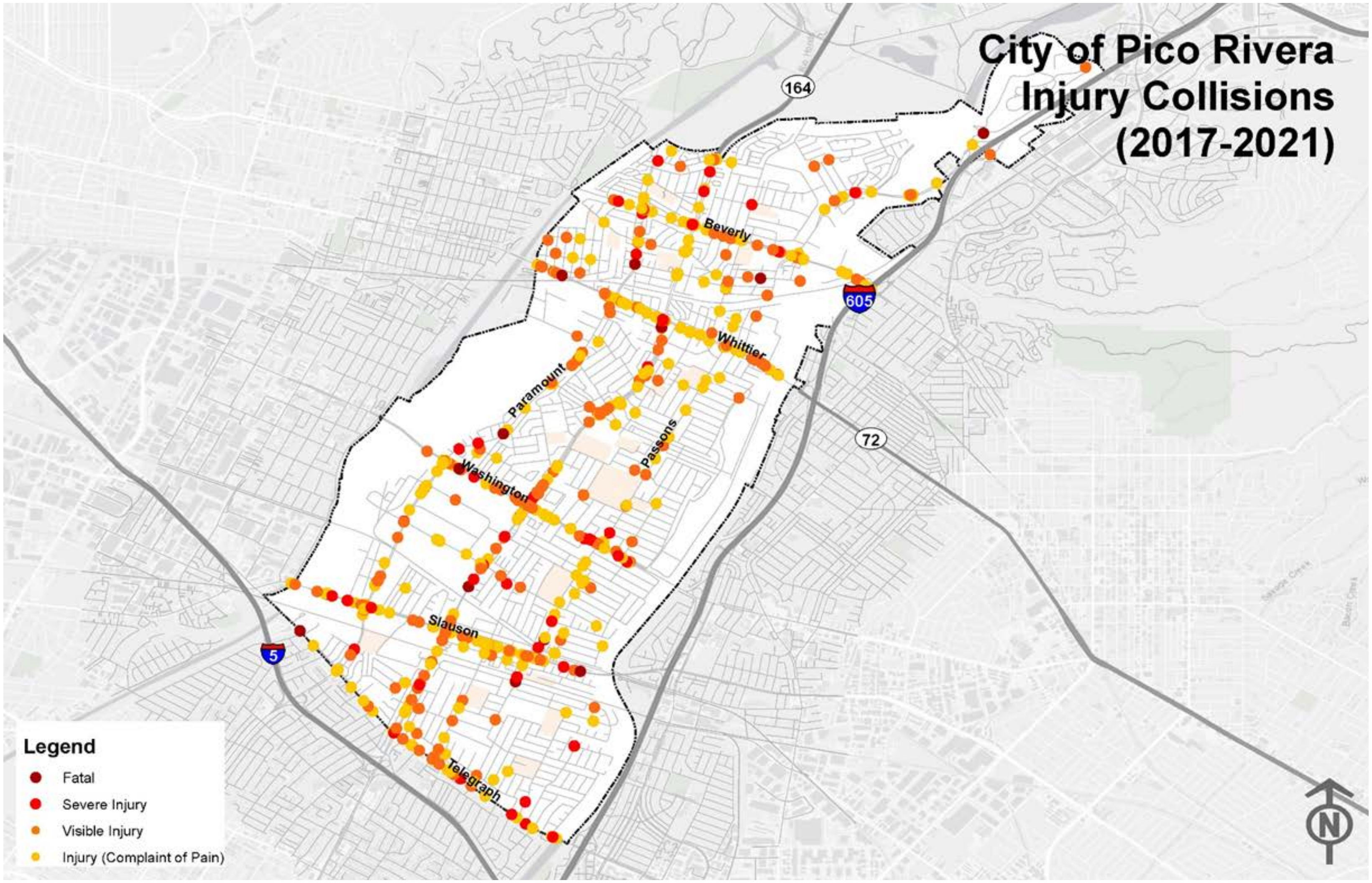
This chapter summarizes the results of the collision analysis that have occurred in the City of Pico Rivera between January 1, 2017 and December 31, 2021, as part of the LRSP. This chapter includes the following sections:

- Data Collection
- Collision Data Analysis
- Fatal and Severe Injury Collision Analysis
- Geographic Collision Analysis
- High Injury Network
- Summary

The LRSP focuses on systemically identifying and analyzing traffic safety issues and recommends appropriate safety improvements. The chapter starts with a comprehensive analysis of collisions of all severity types in the City of Pico Rivera and compares this with KSI collisions. Factors such as collision severity, type of collision, primary collision factor, lighting, weather, and time were analyzed. Following this, a more detailed analysis was conducted for KSI collisions that have occurred on the City's roadways including analyzing intersection and roadway segment collisions separately.

Figure 6 illustrates all the injury collisions that have occurred in the City of Pico Rivera from January 1, 2017 to December 31, 2021.

Figure 6. Injury Collisions in the City of Pico Rivera (2017-2021)



Data Collection

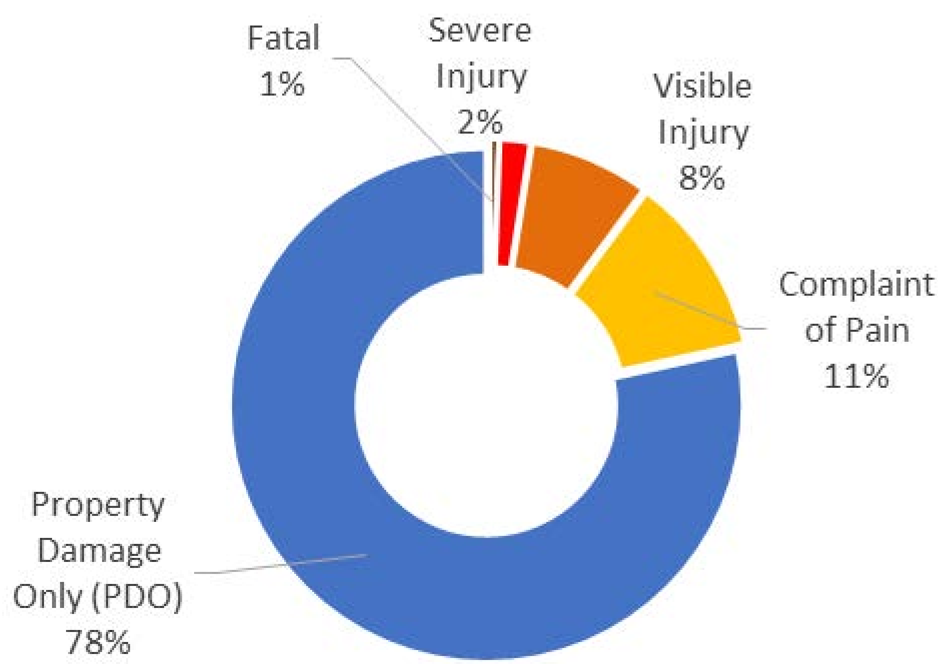
Collision data helps to understand different factors that might be leading to collisions and influencing collision patterns in a given area. For the purpose of this analysis, five-years of jurisdiction-wide collision data (2017 to 2021) was retrieved from Transportation Injury Mapping System (TIMS) and SWITRS. The collision data was analyzed and plotted in ArcMap to identify high-risk intersections and roadways segments.

Collision Analysis

COLLISION ANALYSIS BY SEVERITY

There were a total of 3,194 collisions reported on the City of Pico Rivera roads from 2017 to 2021. Out of these, 2,505 were PDO collisions (78%). 366 collisions led to a complaint of pain injury (11%), and 242 collisions (8%) led to a visible injury. There were 81 KSI (killed and severe injury) collisions, of which 62 collisions (2%) led to a severe injury and 19 collisions (1%) led to a fatality. **Figure 7** illustrates the classification of all collisions based on severity.

Figure 7. Collisions by Severity (2017-2021)



The analysis first includes a comparative evaluation between all collisions and KSI collisions, based on various factors including (but not limited to): collision trend, primary collision factor, collision type, facility type, motor vehicle involved with, weather, lighting, and time of the day. Following this, a comprehensive analysis is conducted for only KSI collisions. KSI collisions cause the most damage to those affected and to infrastructure. The aftermath of these collisions can lead to great expenses for jurisdiction administration. The LRSP process thus focuses on these collision locations to proactively identify and counter safety issues leading to these KSI collisions.

The collision data was separated by facility type, i.e. based on collisions occurring on intersections and roadway segments. For the purposes of the analysis and in accordance with HSIP guidelines, a collision was designated to have occurred at an intersection if it occurred within 250 feet of it. The reported collisions categorized by facility type and collision severity are presented in **Table 2**.

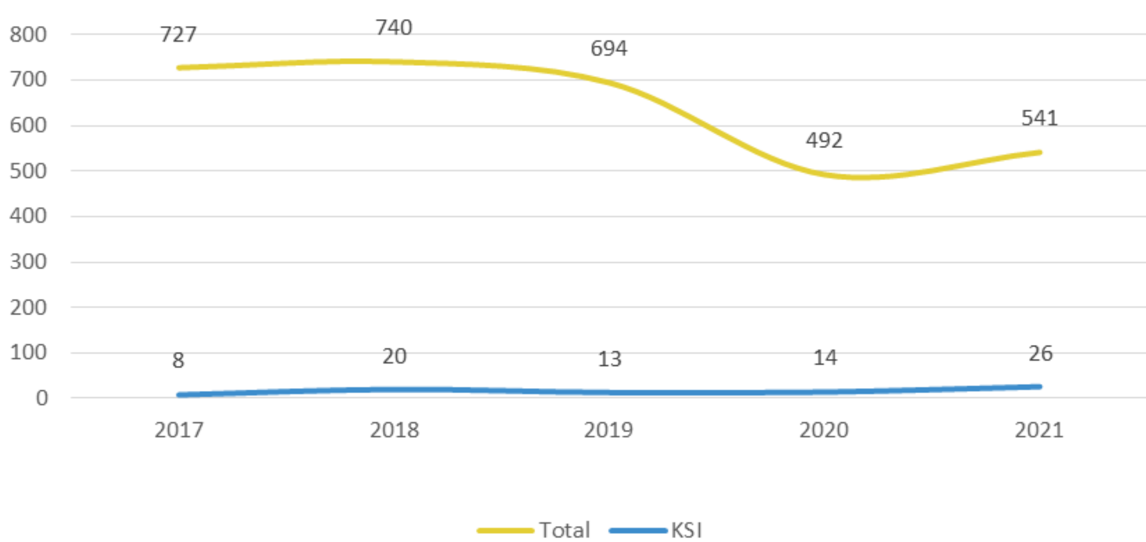
Table 2. Collision by Severity and Facility Type

Collision Severity	Roadway Segment	Intersection	Total
Fatal	4	15	**19**
Severe Injury	16	46	**62**
Visible Injury	47	195	**242**
Complaint of Pain	59	307	**366**
Property Damage Only	370	2,135	**2,505**
Total	**496**	**2,698**	**3,194**

YEARLY COLLISION TREND

The number of reported total collisions observed a steady trend between 2017 and 2019, decreased significant during 2020 and increased again in 2021. The year with the highest number of total collisions was 2018 (740 collisions), while the year with the lowest number of total collisions was 2020 (492 collisions). A total of 81 KSI collisions occurred in the City of Pico Rivera during the study period, it was observed that KSI collisions percentage was higher during the pandemic years (2020 and 2021). Overall, this shows that during the pandemic the total number of collisions were lower but the severity of collisions higher than normal, which could be lesser number of vehicles within the system. The least number of KSI collisions occurred in 2017 (eight collisions), while the most occurred in 2021 (26 collisions). **Figure 8** illustrates the five-year collision trend for all collisions, and KSI collisions.

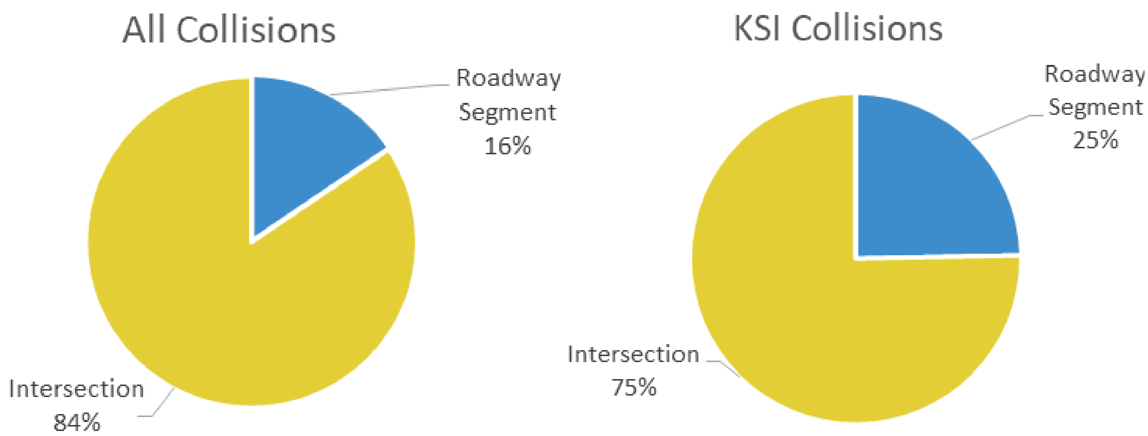
Figure 8. Five-Year Collision Trend



ROADWAY SEGMENT VS INTERSECTION

When evaluating the locations of collisions, most collisions occurred at intersections and not along roadway segments. In the City of Pico Rivera, 84% of all collisions (2,698 collisions) occurred at intersections whereas 16% (496 collisions) occurred on roadway segments. The proportion of roadway segment collisions is slightly higher (25%) when looking only at KSI collisions. This classification by facility type is illustrated in **Figure 9**.

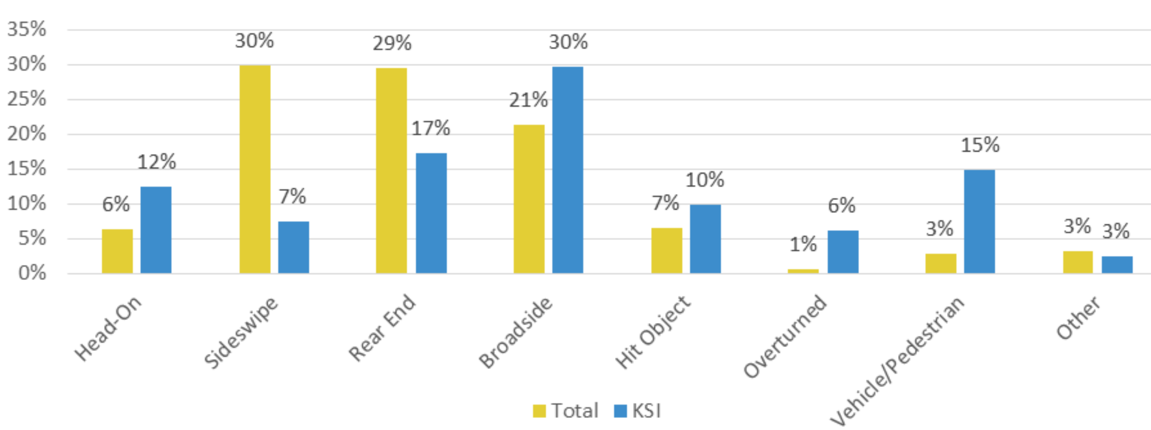
Figure 9. Roadway Segment vs. Intersection: All Collisions vs. KSI Collisions



COLLISION TYPE

For all collisions, the most commonly occurring collision types were sideswipe collisions (30%) and rear end collisions (29%). The collision types for KSI collisions follow a different pattern, where the most commonly occurring collision type was broadside collisions (30%), rear end collisions (17%) and vehicle/pedestrian (15%). **Figure 10** illustrates the collision type for all collisions as well as KSI collisions.

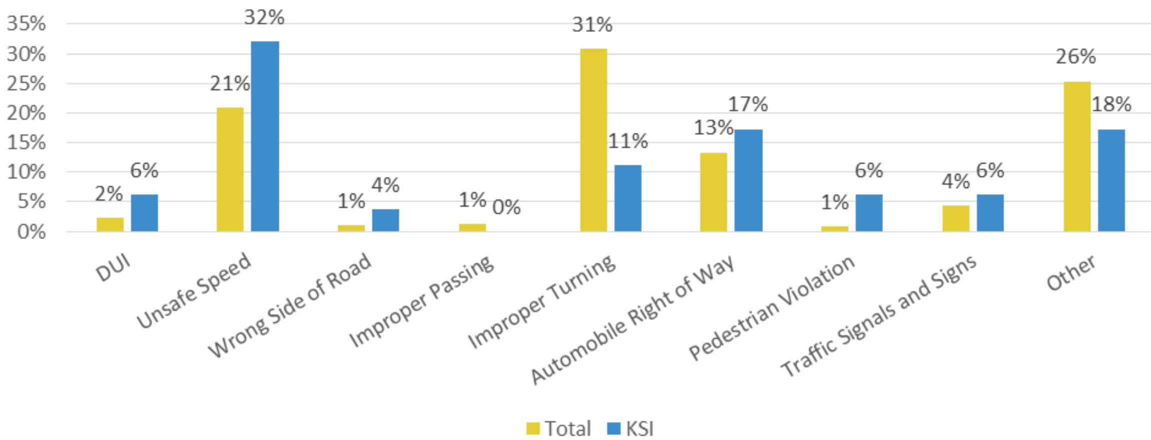
Figure 10. Collision Type - All Collisions vs KSI Collisions



PRIMARY VIOLATION CATEGORY

For all collisions, the top three primary violation categories were observed to be improper turning (31%), unsafe speed (21%), and automobile right of way (13%). The top two primary violation categories for KSI collisions were unsafe speed (32%), and automobile right-of-way (17%). **Figure 11** illustrates the violation category for all collisions and KSI collisions.

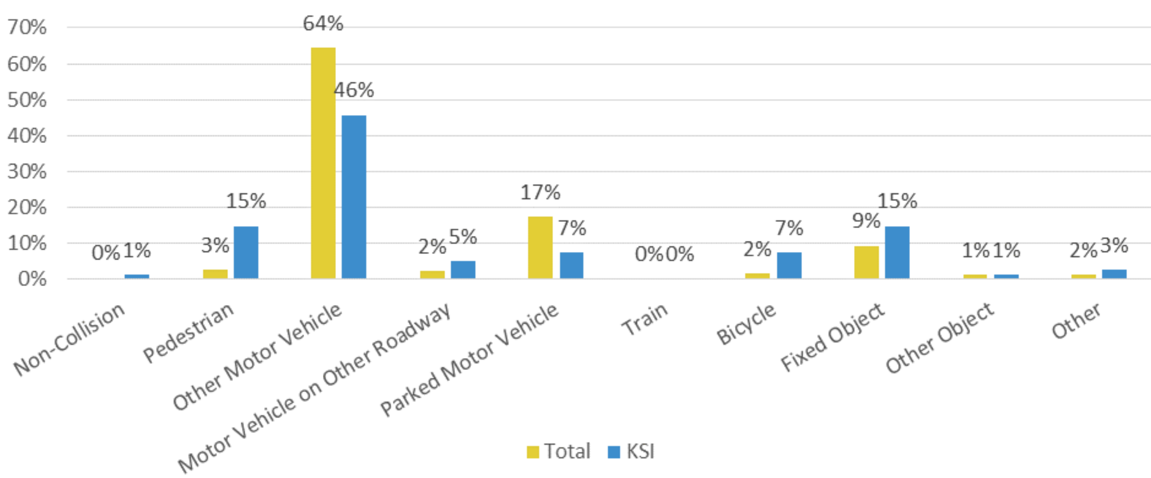
Figure 11. Primary Violation Categories: All Collisions vs KSI



MOTOR VEHICLE INVOLVEMENT

For all collisions, 64% of the collisions occurred by motor vehicles colliding with other vehicles. This was followed by motor vehicles involved with parked motor vehicle (17%) and fixed object (9%). For KSI collisions, 46% involved other motor vehicle, 15% of the collisions involved a fixed object and 15% involved pedestrian. **Figure 12** illustrates the motor vehicle involvement with different vehicle or mode type for all collisions as well as KSI collisions.

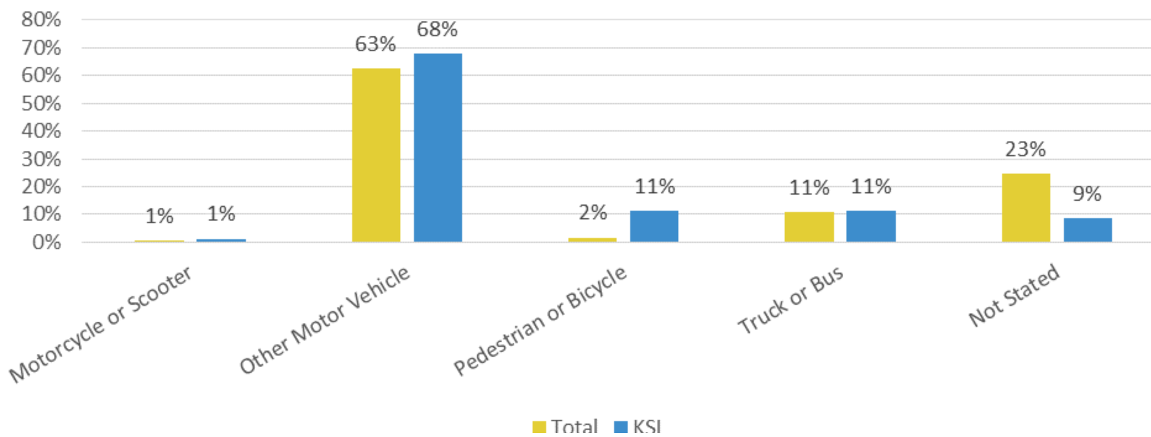
Figure 12. Motor Vehicle Involved With: All Collisions vs KSI Collisions



TRANSPORTATION MODES

The modes category provides a more detailed breakdown of the vehicle type at fault in the collision. For all collisions, the majority were caused by motor vehicles (63%). Collisions caused by motor vehicles (68%) also makes up the majority of KSI collisions, but pedestrian or bicycle caused collisions and truck or bus were both the same percentage (11%). **Figure 13** illustrates the percentage for all collisions as well as KSI collisions by mode.

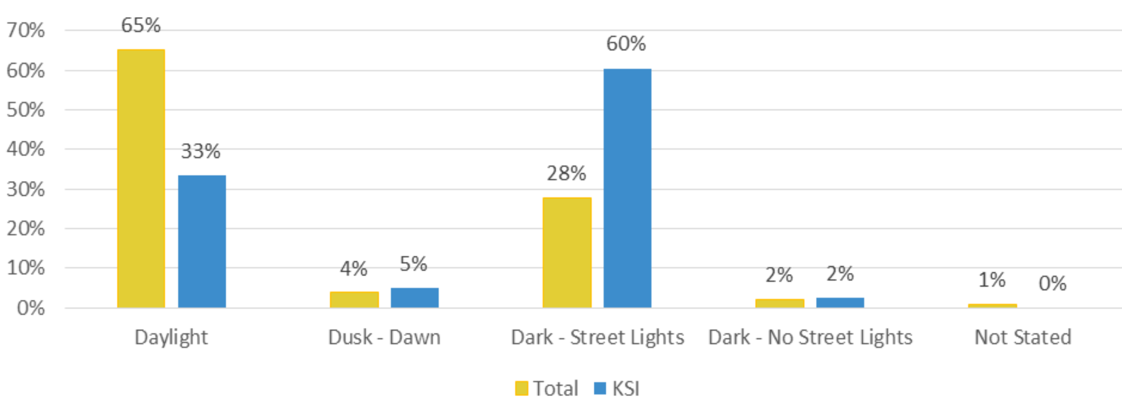
Figure 13. Transportation Modes: All Collisions vs KSI Collisions



LIGHTING

For all collisions, 65% of collisions occurred in daylight, while 28% of collisions occurred in the dark on streets with streetlights. For KSI collisions, a higher percentage of crashes occurred in nighttime conditions, with 33% of collisions having occurred in daylight and 60% of collisions occurred in the dark on streets with street lights. **Figure 14** illustrates the lighting condition for all collisions and KSI collisions.

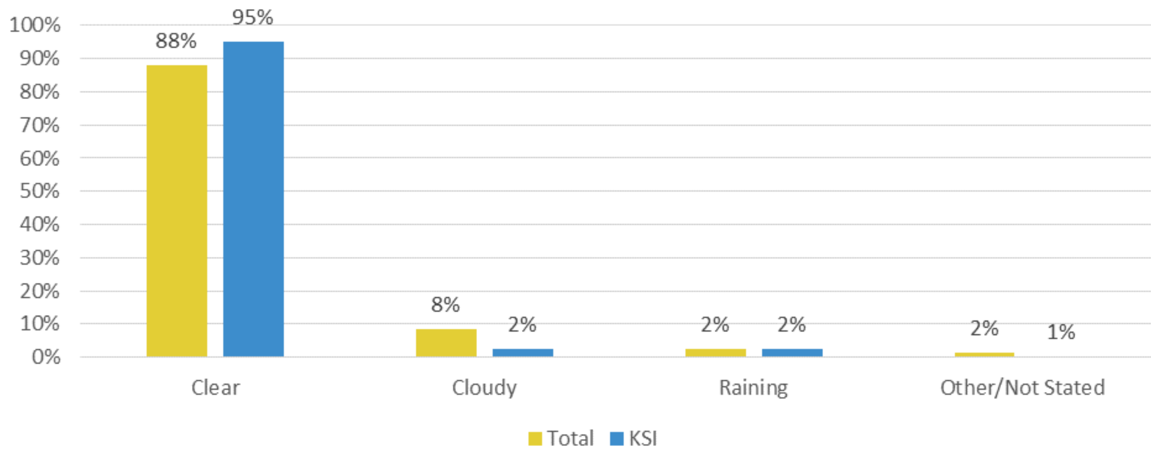
Figure 14. Lighting Conditions: All Collisions vs KSI Collisions



WEATHER

For all collisions, the vast majority occurred during clear weather conditions (88%). For KSI collisions similar trends have been observed, with 95% of the collisions having occurred during clear weather conditions. **Figure 15** illustrates the percent distribution of weather conditions during occurrence of collisions of all severity as well as KSI collisions.

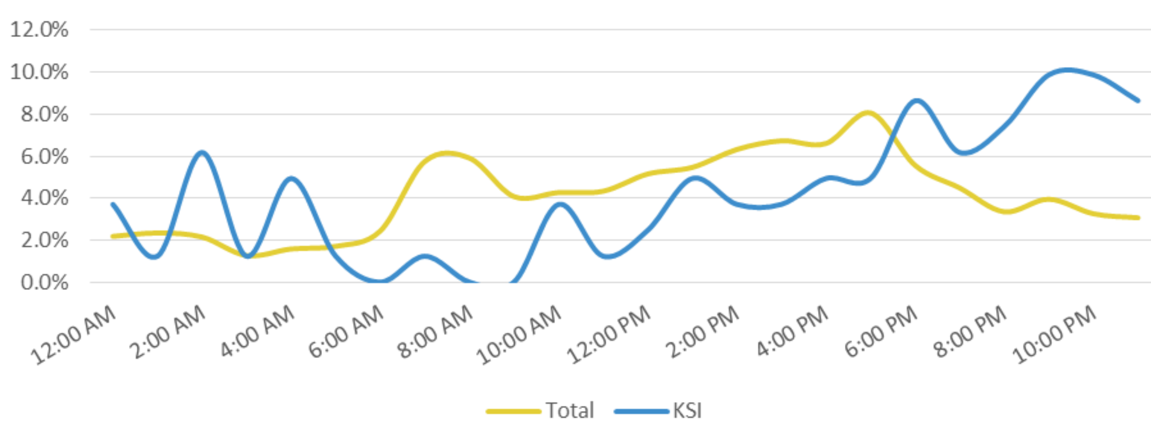
Figure 15. Weather Conditions: All Collisions vs KSI Collisions



TIME OF THE DAY

For all collisions, the time period with the most number of collisions was between 5:00 p.m. to 6:00 p.m. (8%), while the time period with the fewest number of collisions was between 3:00 a.m. to 4:00 a.m. (1%). For all KSI collisions, the maximum number of collisions occurred between 9:00 p.m. to 11:00 p.m., and while the time period with the fewest number of collisions was between 8:00 a.m. to 10:00 a.m. **Figure 16** illustrates the percentage of collisions occurring during each hour of the day for all collisions as well as KSI collisions.

Figure 16. Time of the Day: All Collisions vs KSI



Killed and Severe Injury Collisions

This section describes a detailed collision analysis performed for KSI collisions occurring at roadway segments and intersections in the City of Pico Rivera. Of the total 81 KSI collisions that occurred during the study period, 20 collisions (25%) occurred on roadway segments and 61 collisions (75%) occurred at intersections. This distribution is illustrated in **Figure 17** below.

Figure 17. Intersection vs. Roadway Segment Collisions – KSI Collisions

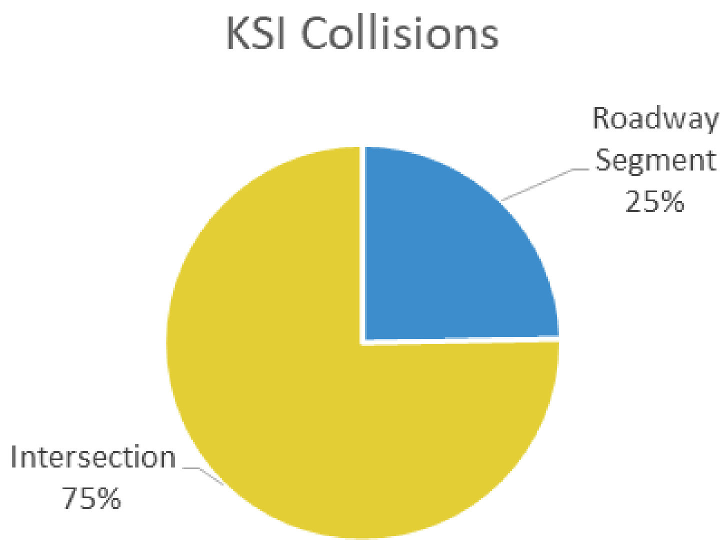
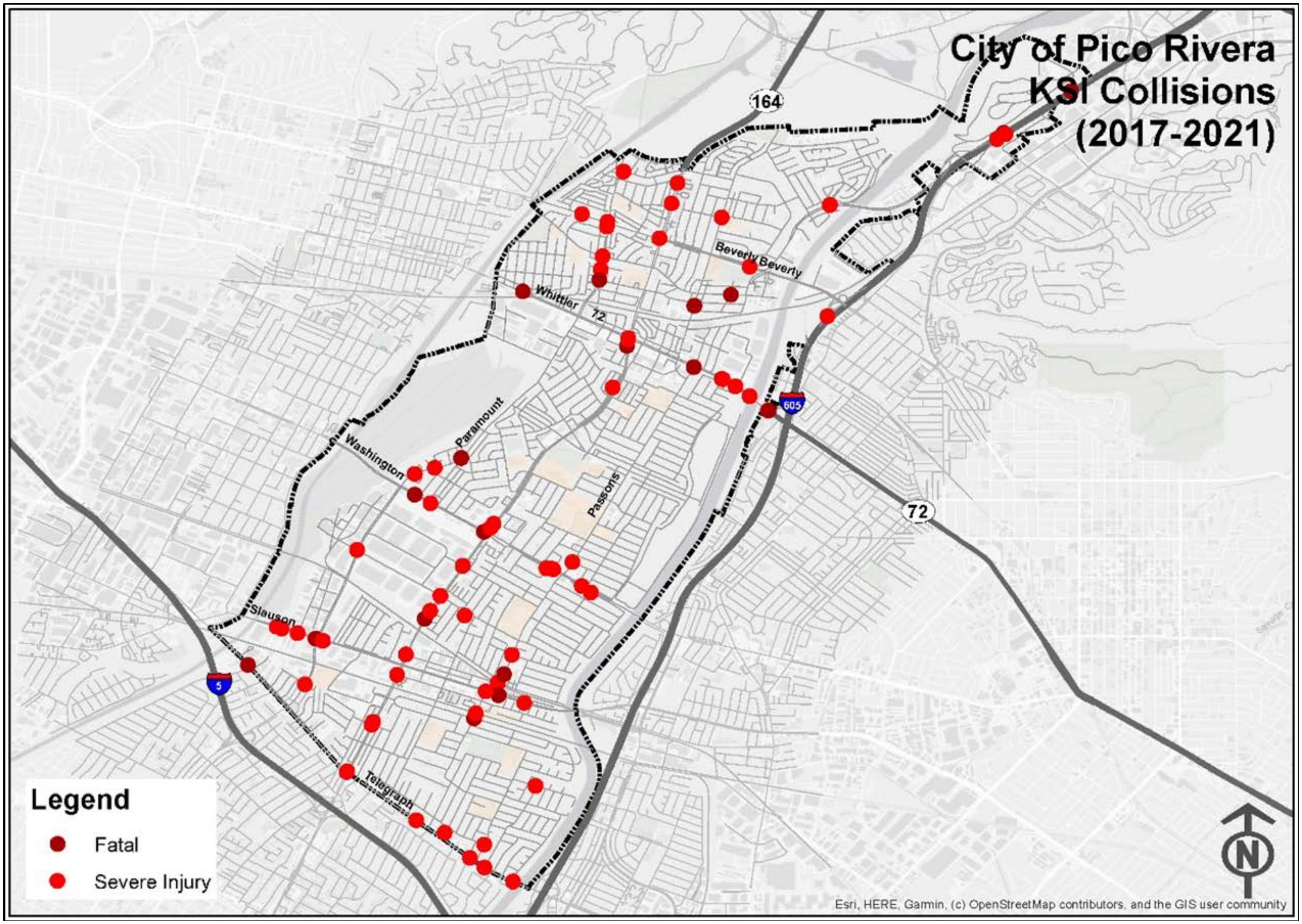


Figure 18 maps the KSI collisions that occurred the City of Pico Rivera during the study period.

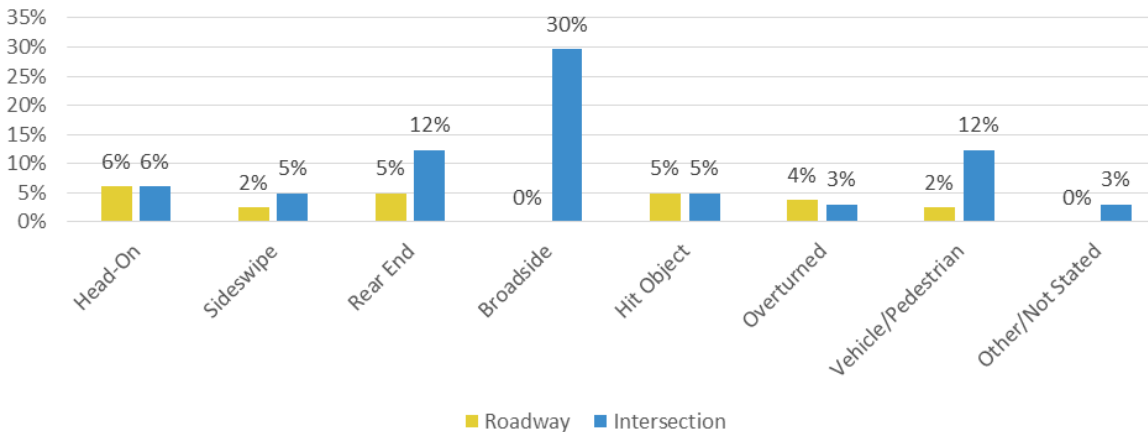
Figure 18. KSI Collisions (2017-2021)



COLLISION TYPE

The most common KSI collision types were broadside (30%) and rear end collisions (17%). These collisions were most likely to occur at intersections, along with vehicle/pedestrian collisions (14%). **Figure 19** shows KSI collisions by locations as well as the collision type.

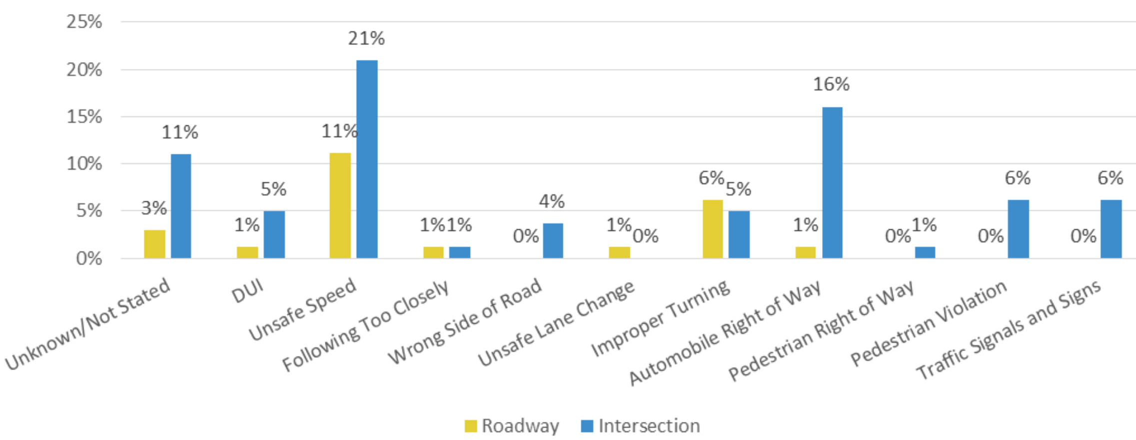
Figure 19. KSI Collision Type



PRIMARY VIOLATION CATEGORY

The most common primary violation types among KSI collisions were unsafe speed (32%), automobile right of way (17%) and improper turning (11%). These KSI collisions majorly occurred at intersections. Unsafe speed was the most common violation category along intersections, as well as at roadway segments. **Figure 20** shows fatal and severe injury collisions as well as the location type and violation category.

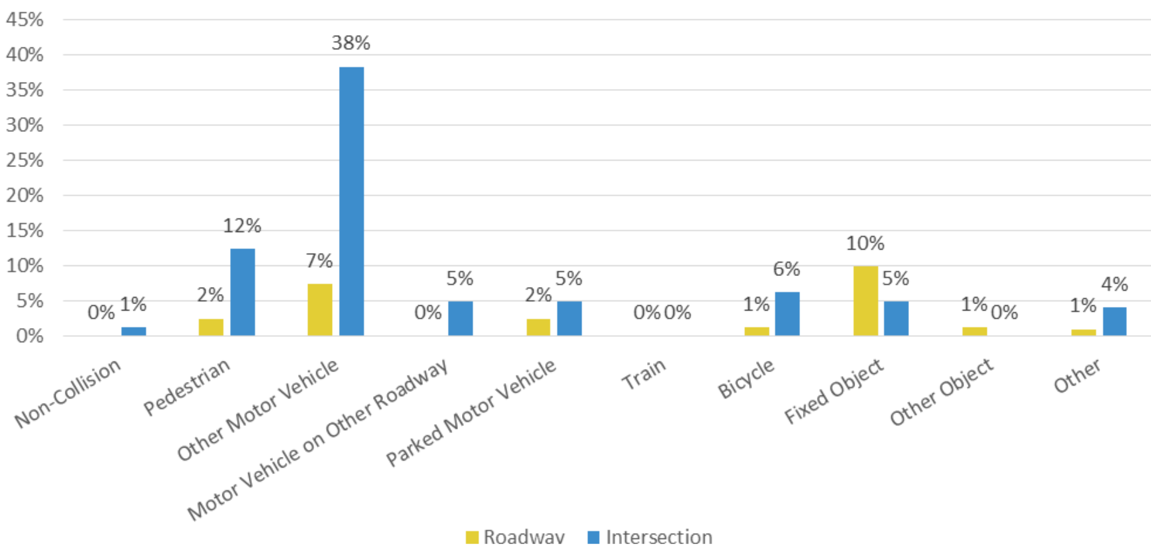
Figure 20. KSI Collisions: Violation Category



MOTOR VEHICLE INVOLVED WITH

KSI collisions involving another vehicle (46% of all KSI collisions) was the most common type majorly occurring at intersections. Another most common collisions were collision with pedestrian (14%) and fixed objects (15%). **Figure 21** shows KSI collisions locations as well as the collision type.

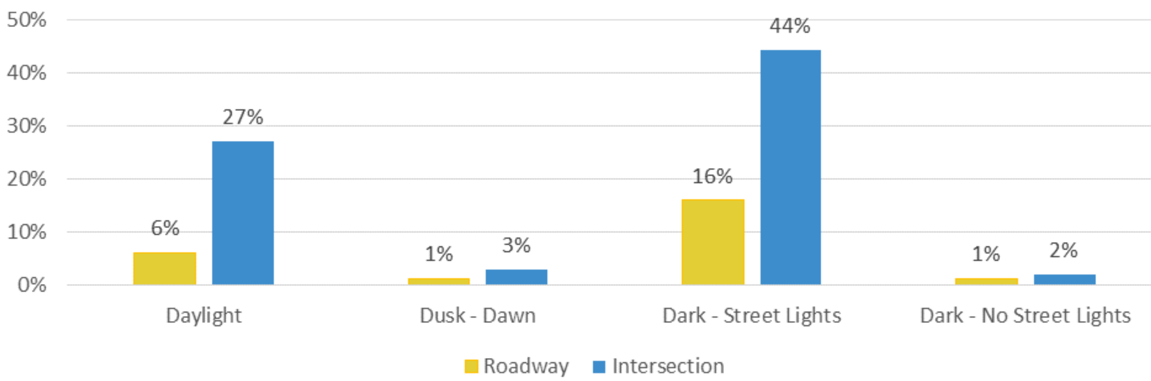
Figure 21. KSI Collisions: Motor Vehicle Involved With



LIGHTING CONDITIONS

Most KSI collisions occurred in the dark with street lights (60%). The second most common lighting for KSI collisions was collisions that occurred at intersections in daylight (27%). **Figure 22** shows KSI collisions locations as well as lighting conditions.

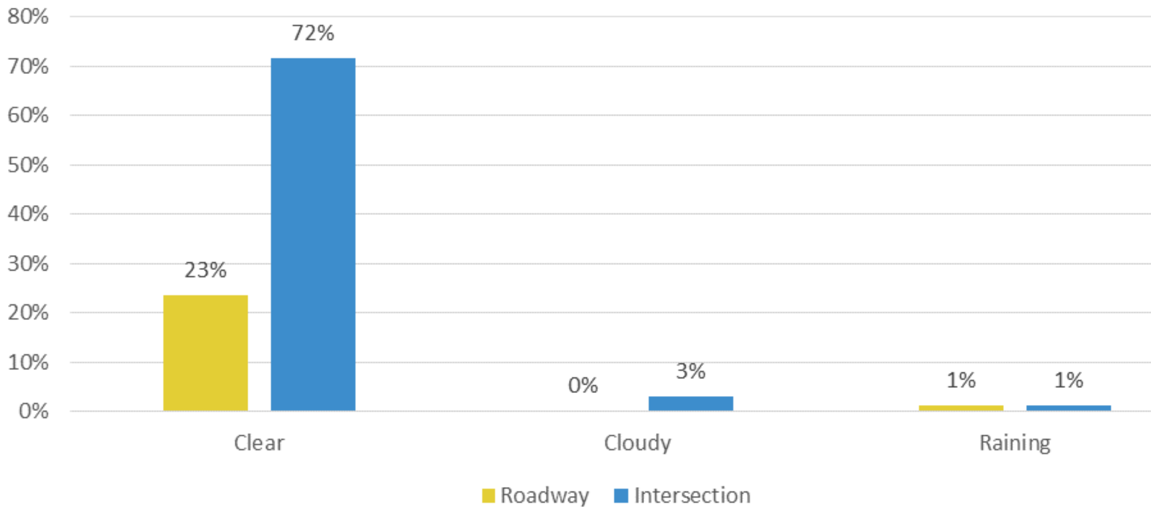
Figure 22. KSI Collisions: Lighting Conditions



WEATHER CONDITIONS

The majority of KSI collisions occurred during clear weather primarily at intersections (72%). **Figure 23** shows KSI collisions locations as well as weather conditions.

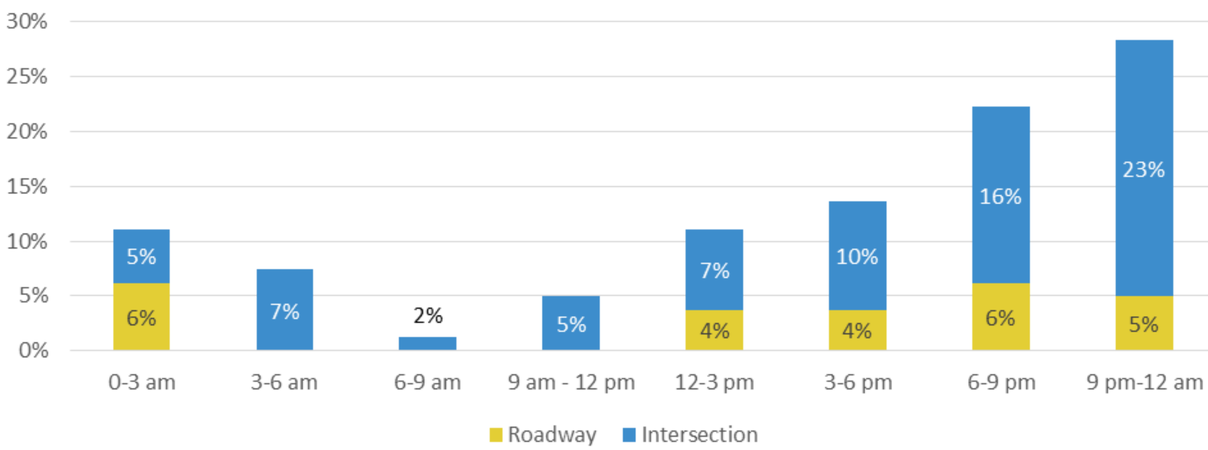
Figure 23. KSI Collisions: Weather Conditions



TIME OF THE DAY

The time duration with the most KSI collisions was during 9:00 p.m. to 12:00 a.m. These primarily occurred at intersections, though the most number of roadway segment KSI collisions also occurred between 12:00 a.m. and 3:00 a.m. and 6:00 p.m. and 9:00 p.m. **Figure 24** shows KSI collisions by location type and time of day.

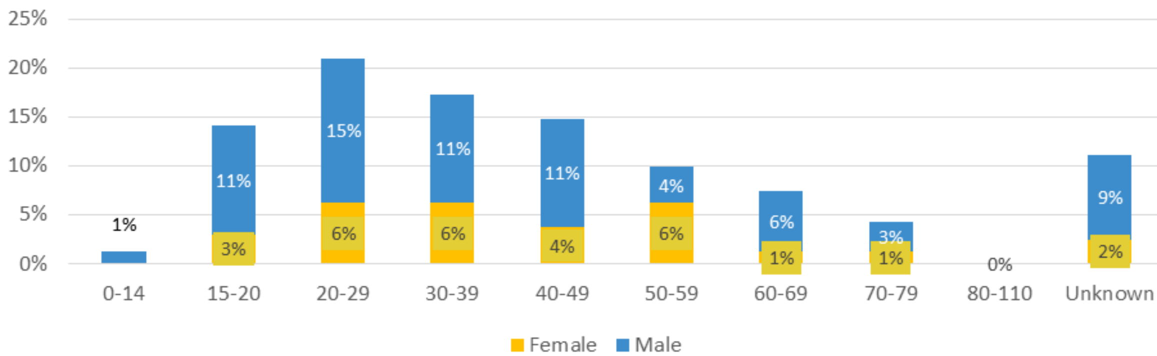
Figure 24. KSI Collisions: Time of Day



GENDER VS AGE

For KSI collisions, the gender of the party at fault was split between female and male. Parties at fault from the age group of 20-29 years accounts for the largest percentage (21%) of all KSI collisions. Parties at fault under 40 years of age accounts for slightly more than half (54%) of all KSI collisions. **Figure 25** illustrates the gender and age of the party at fault for KSI collisions.

Figure 25. KSI Collisions by Gender and Age



Geographic Collision Analysis

This section describes a detailed geographic collision analysis performed for injury collisions occurring on roadway segments and at intersections in the City of Pico Rivera. Although previous charts use total (including fatal, injury and PDO) collisions and KSI collisions, the below analysis uses only KSI collisions to identify five main collision factors that highlight the top collision trends in the City of Pico Rivera. These five collision factors were identified to be broadside collisions, unsafe speed violations, nighttime collisions, rear end collisions, and improper turning violations.

BROADSIDE COLLISIONS

Broadside collisions represented the highest proportion of all injury collisions (29%), and similar trend for KSI collisions (30%). **Figure 26** shows the distribution of broadside collisions throughout the City of Pico Rivera between 2017 and 2021. The intersections of Paramount Boulevard/Whittier Boulevard and Passons Boulevard and Slauson Avenue have a higher concentration of broadside collisions.

UNSAFE SPEED VIOLATIONS

28% of all injury collisions in Pico Rivera were caused by unsafe speed. However, 32% of all KSI collisions were due to unsafe speed violation.

Figure 27 shows the distribution of unsafe speed collisions throughout the City of Pico Rivera between 2017 and 2021. Paramount Boulevard, Whittier Boulevard, Slauson Avenue and Telegraph Road have a higher concentration of unsafe speed collisions.

NIGHTTIME COLLISIONS

Collisions occurring at night represented 36% of all injury collisions, but rose significantly to 67% for KSI only collisions, indicating that lighting may be a factor in KSI collisions. **Figure 28** shows the distribution of nighttime collisions throughout the City of Pico Rivera between 2017 and 2021. Beverly Boulevard, Paramount Boulevard, Rosemead Boulevard and Whittier Boulevard have a higher concentration of nighttime collisions.

REAR END COLLISIONS

Rear end collisions caused 29% of all injury collisions, and 17% when considering only KSI collisions. **Figure 29** shows the distribution of rear end collisions throughout the City of Pico Rivera between 2017 and 2021. Telegraph Road, Slauson Avenue, Washington Boulevard, and Whittier Boulevard have a higher concentration of rear end collisions.

IMPROPER TURNING VIOLATIONS

Improper turning violations accounted for 19% of all injury collisions, and nearly similar trend of 11% was observed when considering only KSI collisions. **Figure 30** shows the distribution of injury collisions due to improper turning throughout the City of Pico Rivera between 2017 and 2021.

The following figures detail concentrations of each of the above five collision factors on roadways throughout Pico Rivera. All injury collisions, whether they occurred at an intersection or roadway segment, are considered in these maps (for example, roads where a particular collision factor is more concentrated may have collisions that occurred at an intersection within the segment, or along the segment itself away from an intersection). Note that below maps were created using all injury collisions and does not include PDO collisions.

Figure 26. Broadside Collisions (2017-2021)

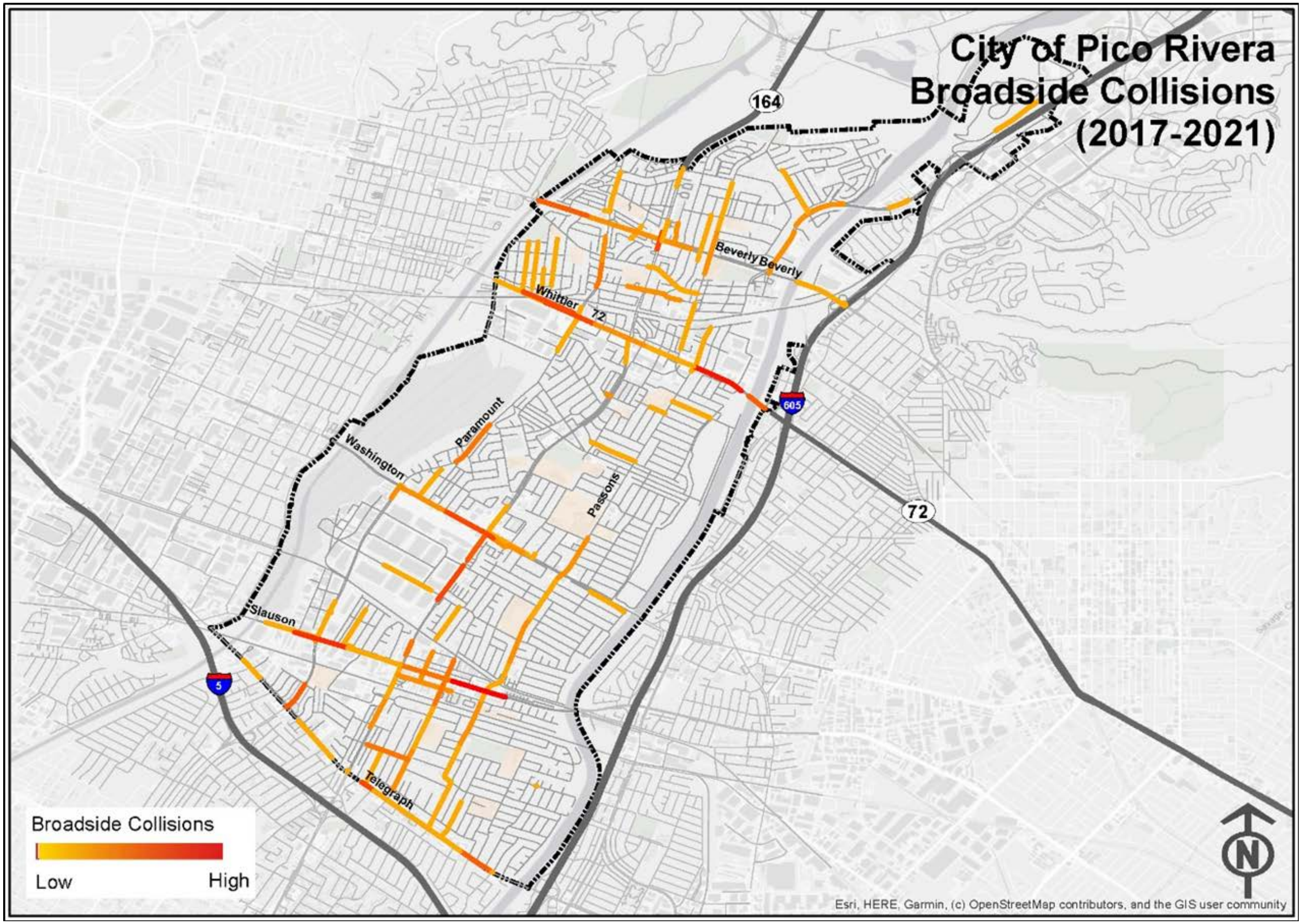


Figure 27. Unsafe Speed Violations (2017-2021)

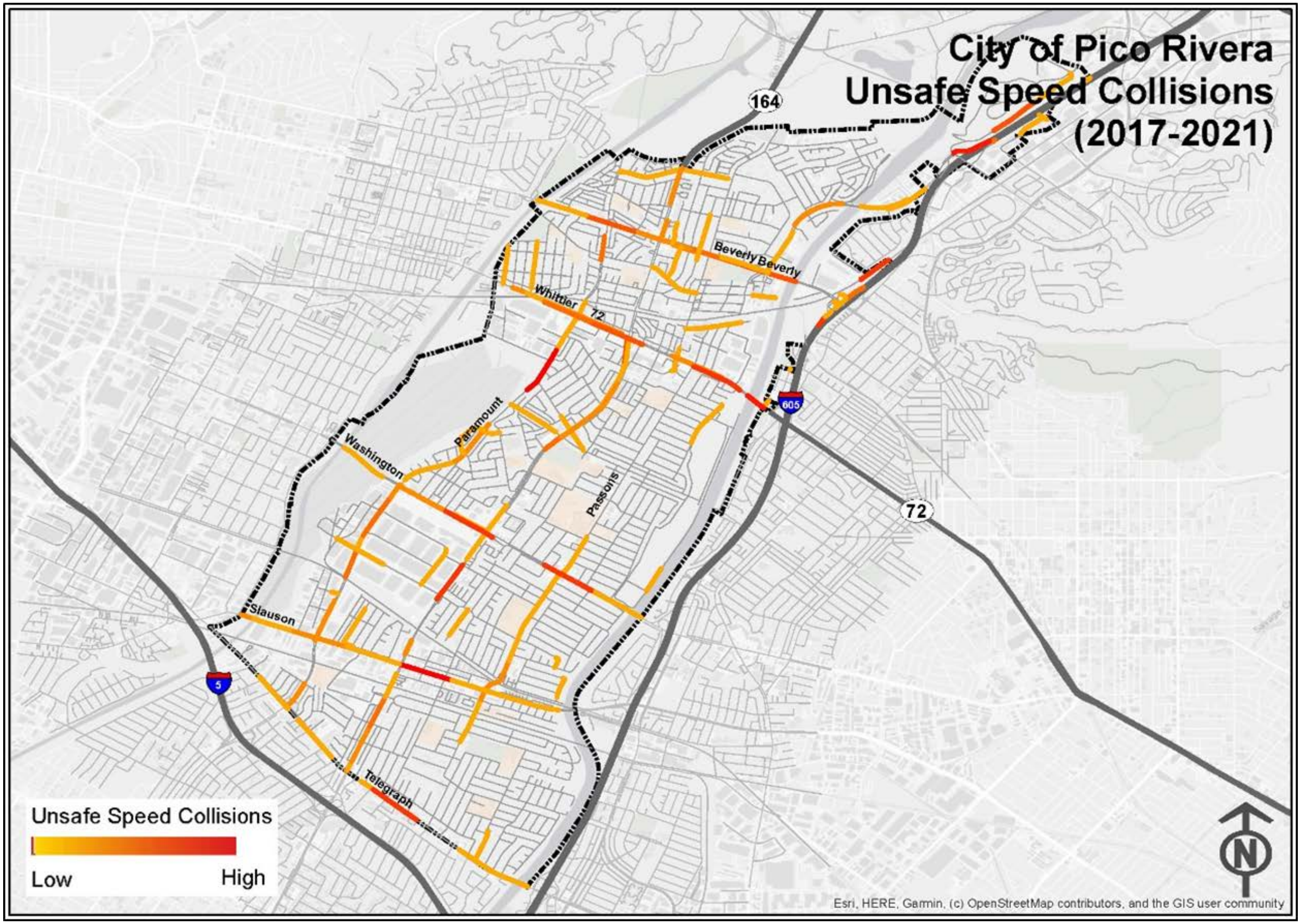


Figure 28. Nighttime Collisions (2017-2021)

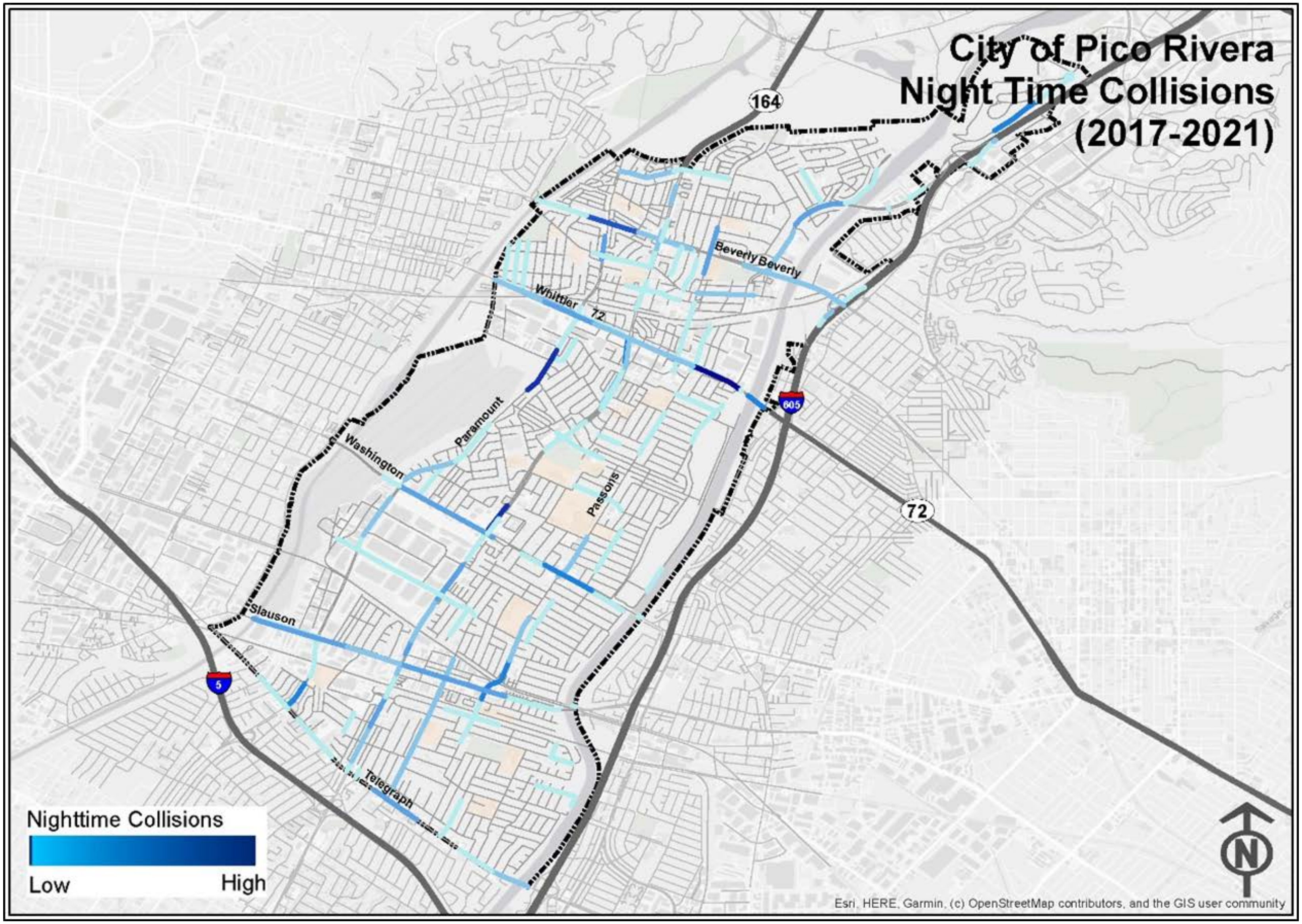


Figure 29. Rear End Collisions (2017-2021)

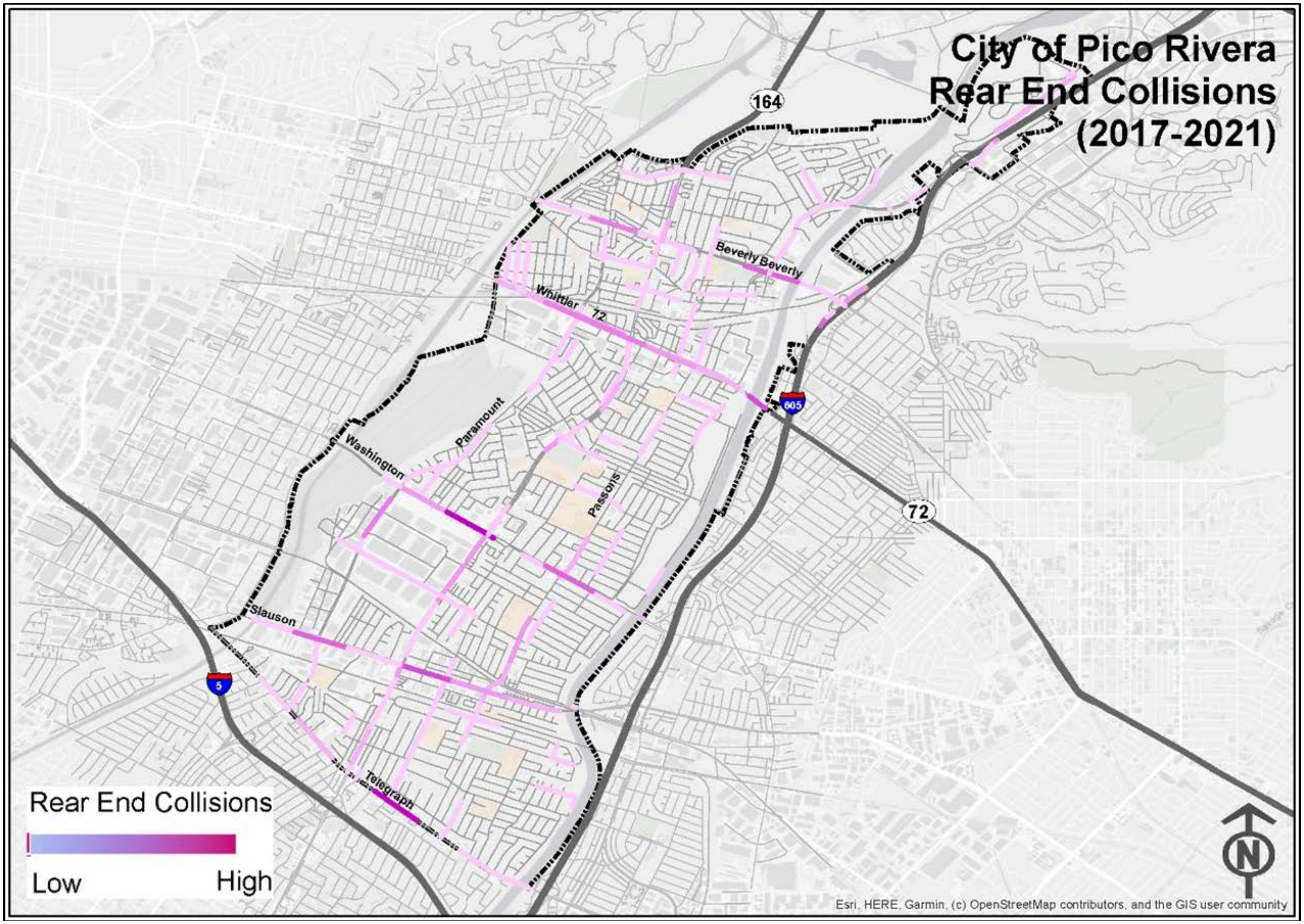
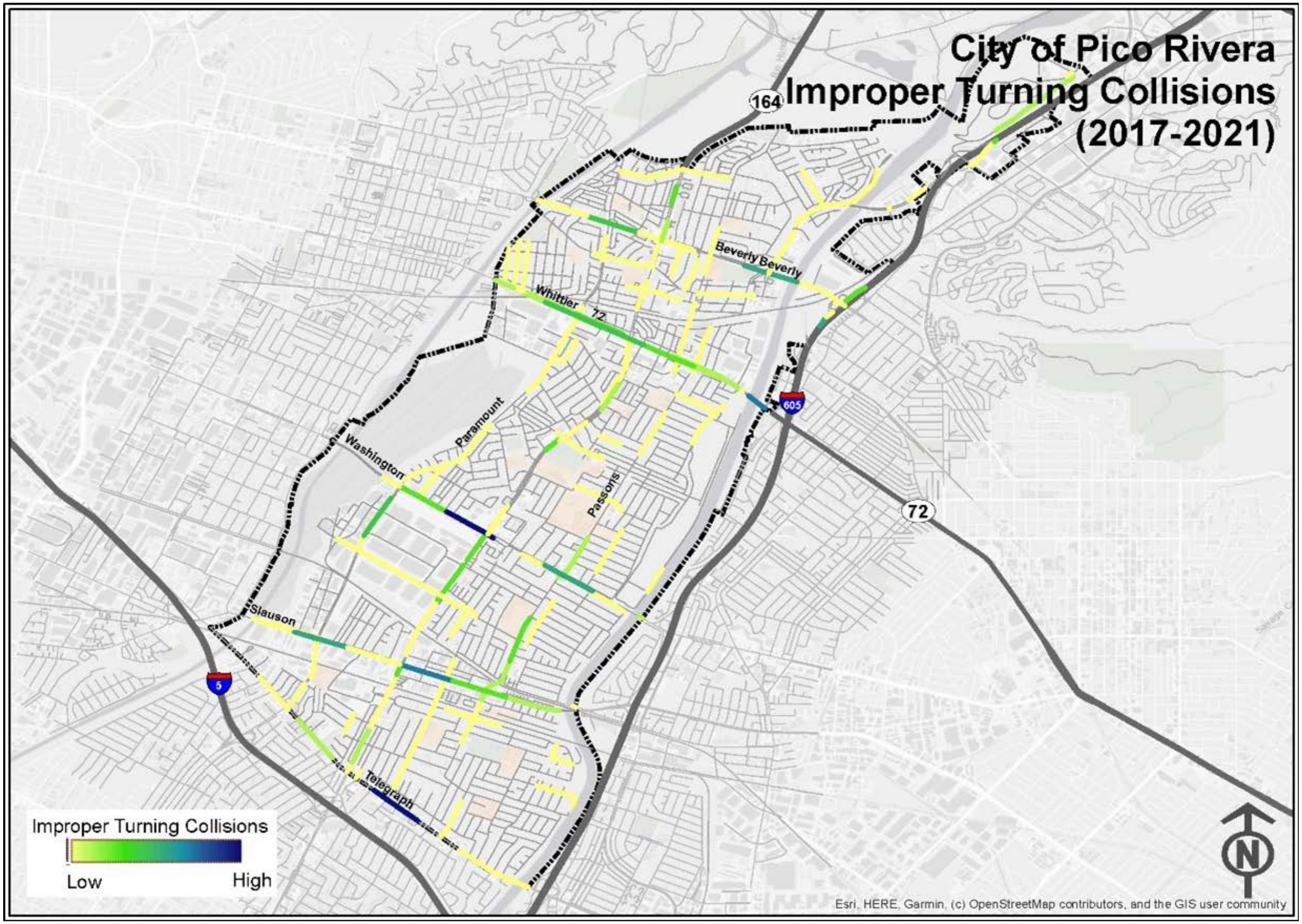


Figure 30. Improper Turning Violations (2017-2021)



Collision Severity Weight

Equivalent Property Damage Only (EPDO) method was used to identify the high severity collision network. The EPDO method accounts for both the severity and frequency of collisions by converting each collision to an equivalent number of PDO collisions. The EPDO method assigns a crash cost and score to each collision according to the severity of the crash weighted by the comprehensive crash cost. These EPDO scores are calculated using a simplified version of the comprehensive crash costs per HSIP Cycle 11 grant application. The weights used in the analysis are shown below in **Table 3**.

Table 3. EPDO Score used in HSIP Cycle 11

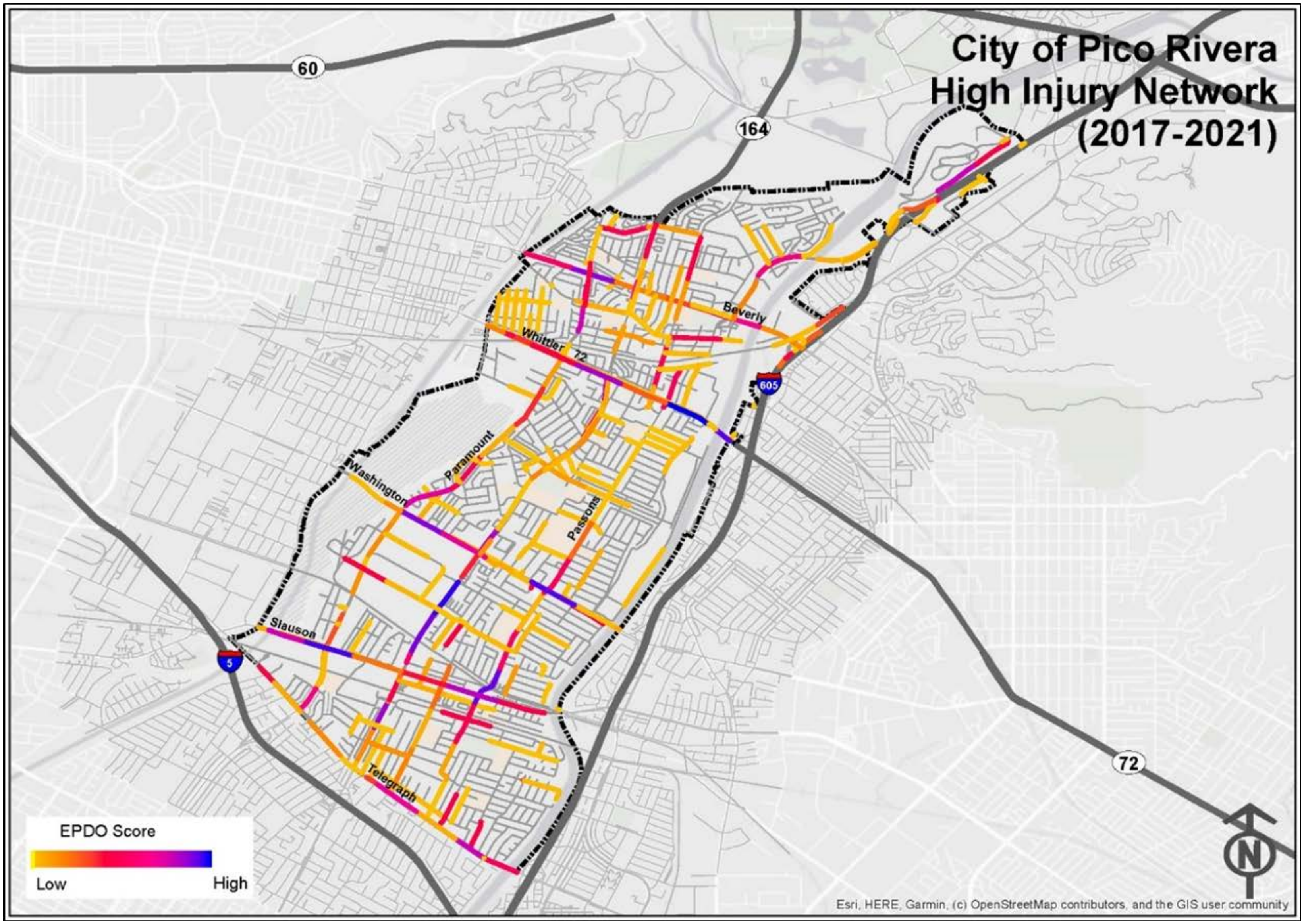
Collision Severity	EPDO Score
Fatal and Severe Injury Combined	165*
Visible Injury	11
Possible Injury	6
PDO	1

*This is the score used in HSIP Cycle 11 for collisions on roadways segments, to simplify the analysis this study uses the same score for all KSI collisions regardless of location.

EPDO is used because it provides a methodology for the project team to understand the locations in Pico Rivera that are experiencing the most severe crashes. Because of the high score given to KSI crashes, locations that have these types of crashes are more likely to receive a higher EPDO score than other locations that may have more collisions, but fewer KSI collisions. Locations that have the highest EPDO scores are selected for inclusion in the High Collision Network, shown in the next section. Identified intersections are scored based on collisions occurring at or within 250 feet of the intersection, while roadway segment locations are identified based on collisions that occur along the segment, except directly at an intersection (0 feet from intersection per SWITRS and TIMS data). Identifying the locations with the most severe crashes allows the team to focus recommended solutions and countermeasures at these locations.

The EPDO scores for all collisions can then be aggregated in a variety of ways to identify collision patterns, such as location hot-spots. The weighted collisions for the City of Pico Rivera were geolocated onto Pico Rivera's road network. GIS is then used to calculate the EPDO score for each roadway segment and intersection citywide, which is then ranked according to its score. **Figure 31** shows the location and geographic concentration of all collisions (those that occurred at intersections and along roadway segments) by their EPDO score.

Figure 31. EPDO Score

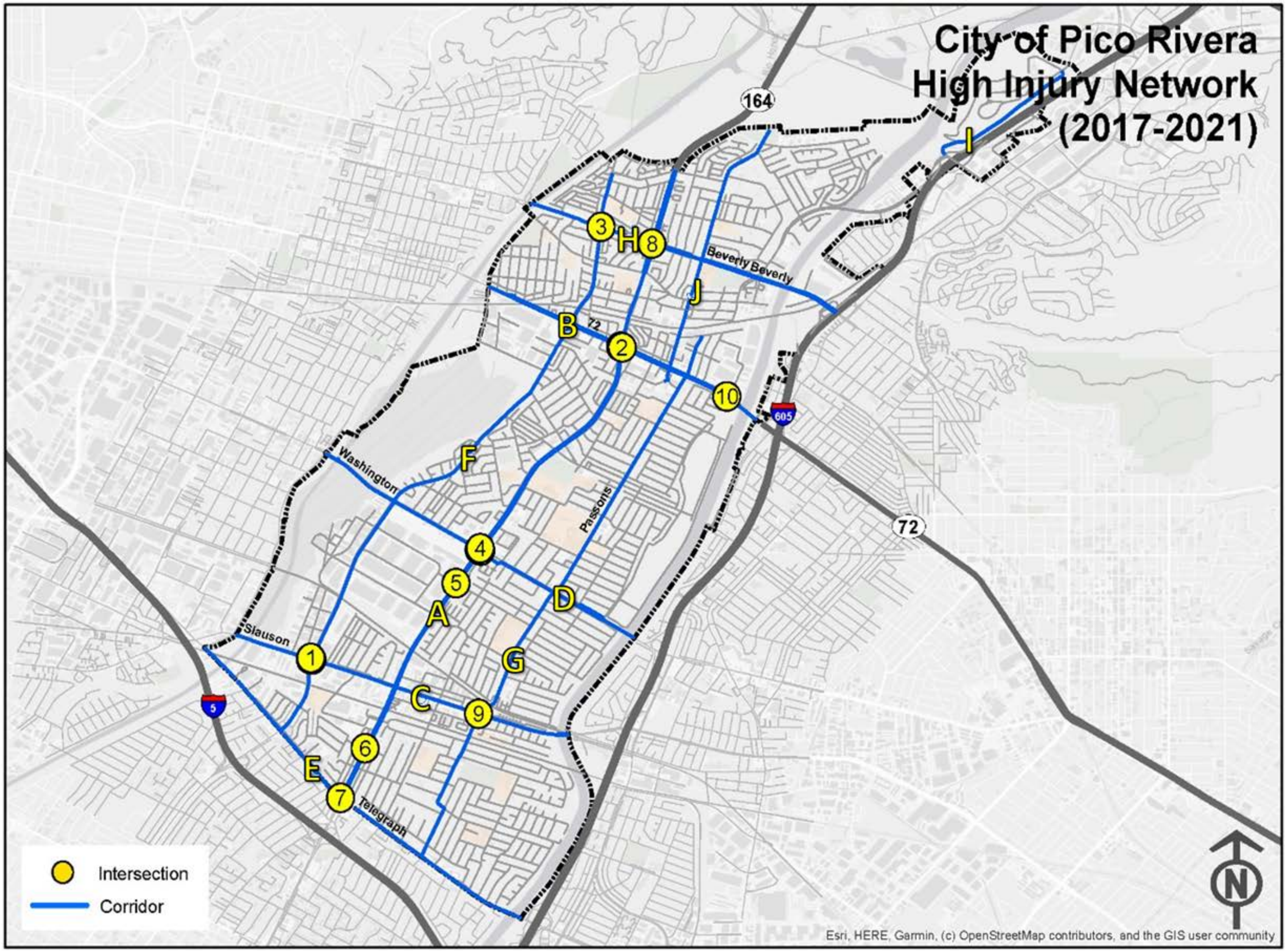


High Injury Network

Following the detailed collision analysis, the next step was to identify the high-injury roadway segments and intersections in Pico Rivera. The methodology for scoring the high injury locations is the same method as used in the collision severity weight section. **Figure 32** shows the top 10 high-injury roadway segments, and top 10 high-injury intersections.

For the purposes of the high injury network analysis, intersections include collisions that occurred within 250 feet of it, and roadway segments include all collisions that occurred along the roadway except for collisions that occurred directly at an intersection. Such collisions are assigned a zero value in distance from intersection value column in the SWITRS.

Figure 32. High Injury Network



INTERSECTION RANKINGS BASED ON COLLISION ANALYSIS

There was 10 intersections that identified as high collision intersections. There were a total of 85 injury collisions and 20 KSI collisions that occurred at these intersections during the five-year study period (2017-2021). The intersection of Slauson Avenue and Paramount Boulevard had the highest number of KSI collisions with the highest severity weight.

Table 4 lists the top 10 identified high-risk intersections along with the number of injury collisions, the number of KSI collisions, and the severity weight for each intersection.

Table 4. High Injury Intersections

ID	Intersection	Total Injury Collisions	Severity Weight
1	Slauson Ave and Paramount Blvd	14	581
2	Rosemead Blvd and Whittier Blvd	8	535
3	Beverly Blvd and Paramount Blvd	14	530
4	Rosemead Blvd and Washington Blvd	10	422
5	Rosemead Blvd and Danbridge St	7	365
6	Rosemead Blvd and Maxine St	5	358
7	Rosemead Blvd and Telegraph Rd	4	342
8	Beverly Blvd and Rosemead Blvd	9	248
9	Slauson Ave and Passons Blvd	10	244
10	Gregg Rd and Whittier Blvd	8	227

In addition to the collision analysis, comments received from the community, stakeholders, and City staff were also analyzed to identify additional intersections which have observed significant near misses and a need for safety improvements. These intersections and recommended countermeasure are listed in **Table 15**.

CORRIDOR RANKINGS BASED ON COLLISION ANALYSIS

10 corridors were identified as high injury corridors. There was a total 369 injury collisions and 48 KSI collisions on these corridors during the five-year study period (2017-2021). The Rosemead Boulevard corridor had the highest number of KSI collisions with 18.

On the following page, **Table 5** lists the top 10 identified high-collision corridors along with the number of injury collisions, the number of KSI collisions, corridor length, and the severity weight for each corridor.

Table 5. High Injury Corridors

ID	Corridor	Total Injury Collisions	KSI Collisions	Length (miles)	Severity Weight
A	Rosemead Blvd: From/To City Limits	90	15	4.4	2,777
B	Whittier Blvd/ SR 72: From/ To City Limits	63	8	1.6	1,452
C	Slauson Ave: From/To City Limits	55	8	1.8	1,379
D	Washington Blvd: From/To City Limits	38	10	2.0	1,237
E	Telegraph Rd: From/To City Limits	29	6	2.5	850
F	Paramount Blvd: Gallatin Rd to Telegraph Rd	24	9	4.0	820
G	Passons Blvd: Stephens St to City Limit	26	7	3.6	648
H	Beverly Blvd: From/To City Limits	32	4	1.8	560
I	Rooks Rd: Sports Arena Dr to San Gabriel River Pkwy	7	0	0.9	519
J	Durfee Ave: Kruse Road to Jackson St	8	1	1.6	205

In addition to the collision analysis, the comments received from the community, stakeholders, and City staff were also analyzed to identify additional roadway segments which have observed significant near misses and a need for safety improvements. These segments and recommended countermeasures are listed in **Table 15**.

Summary of Collision Analysis

Between 2017 and 2021, a total of 689 injury collisions occurred within the City of Pico Rivera, of which 81 resulted in a KSI. Among all injury collisions, the most prominent collision types were broadside and rear-end collisions, while unsafe speed and improper turning were the most common violation types. The corridor with the most number of KSI crashes was Rosemead Boulevard, while the intersection with the most KSI crashes was Slauson Boulevard and Paramount Boulevard.

Five prominent collision factors that emerged were: **broadside collisions, unsafe speed violation, nighttime collisions, rear-end collisions, and improper turning violations**. Each of these is described in turn.

Broadside collisions represented the highest proportion of all injury collisions (29%), and similar trend for KSI collisions (30%). The intersections of Paramount Boulevard/Whittier Boulevard and Passons Boulevard and Slauson Avenue have a higher concentration of broadside collisions. Broadside collisions can potentially be mitigated by improving the signal timing and phasing, improving the visibility of traffic control device, providing protected left turn phase.

28% of all injury collisions in Pico Rivera were caused by unsafe speed. Higher numbers of these collisions were experienced on Paramount Boulevard, Whittier Boulevard, Slauson Avenue, and Telegraph Road. Speeding can be mitigated through the introduction of traffic calming, which can be a combination of street narrowing, medians, bulb outs at intersections, or Complete Streets elements like high visibility crosswalks, bike lanes, and wider sidewalks. Driver education and speed enforcement, either through radar trailers or officer patrols, can also help to mitigate instances of unsafe speed violations.

Collisions occurring at night represented only 36% of all injury collisions, but rose significantly to 67% for KSI collisions. Higher numbers of these collisions occurred on Beverly Boulevard, Paramount Boulevard and Rosemead Boulevard. Many different factors can contribute to nighttime collisions, such as low lighting levels that can be targeted with countermeasure, but extraneous factors can also contribute to nighttime injury such as alcohol use or sleepiness/fatigue. Improvements such as installing new lighting, upgrading existing lighting to a higher lumen, installing and upgrade signs with new fluorescent sheeting, and installing pedestrian improvements with lighting elements such as rectangular rapid flashing beacons (RRFBs) and HAWKs can help make these locations safer for all road users.

Rear end collisions caused 29% of all injury collisions, and 17% when considering only KSI collisions. Telegraph Road, Slauson Avenue, Washington Boulevard, and Whittier Boulevard have a higher concentration of rear end collisions. Rear-end collisions can be mitigated by improving curb radii, providing special phase for left- turning traffic, improving advance warning devices, reducing speed on approaches, and adding all red-clearances.

Improper turning violations accounted for 19% of all injury collisions and nearly similar trend of 11% was observed when considering only KSI collisions. Improper turning collisions can be reduces by upgrading intersection pavement markings, installing flashing beacons at intersections, improving sight distance to intersection, providing directional median openings for left and right turns, and adding a right lane.

Note that the locations identified in this Chapter are based on technical analysis of past collisions. However, additional locations were reviewed and recommendations were provided based on input from the stakeholders and general public comments and suggestions. Chapter 7 discusses the additional locations and recommended countermeasures.

The next steps in the LRSP is to identify Emphasis Areas based on the collision analysis presented in this Chapter. The most prominent collision types, violations, and human behaviors is selected for inclusion as an Emphasis Area, as these represent the most prominent traffic safety issues in Pico Rivera. Each Emphasis Area is accompanied with strategies corresponding to the 4 E's of safety (**E**ngineering, **E**nforcement, **E**ducation, and **E**MS) to comprehensively make the City of Pico Rivera safer for all modes of transportation.

5 | EMPHASIS AREAS

5 EMPHASIS AREAS

Emphasis areas are focus areas that are identified through analyzing the characteristics of collisions that have occurred in the City of Pico Rivera within the five-year period collected (2017-2021). Emphasis areas help in identifying appropriate safety strategies and countermeasures that have the greatest potential to reduce collisions occurring at roadway segments and intersections. This Chapter summarizes six emphasis areas identified for the City of Pico Rivera. These emphasis areas were derived by focusing on the collisions that have occurred on the high-injury network identified in collision analysis for City of Pico Rivera.

There are a number of different approaches to traffic safety studies. Some methodologies focus more on a reactive and responsive approach and others focus on a more proactive systemic approach to traffic safety data. A reactive approach to road safety is based on the analysis of existing crash data. Road safety improvements proposed are considered in reaction to identified safety problems brought to light by crashes that have occurred after the road has been designed, and built, and opened. Traditional reactive road safety engineering processes include such activities as information collection and management (crash information systems), identification of problem locations on the road network, analysis, development, and implementation of countermeasures. The Hazard Elimination Program or a jurisdictions high crash location list are examples of reactive approaches to crash frequency and/or severity reduction. A proactive approach focuses on the evolving "Science of Safety", that is, what is known about the evolving specific safety implications of highway design and operations decisions. The proactive approach applies this knowledge to the roadway design process or to the implementation of improvement plans on existing roads to diminish the potential of crashes occurring prior to the road being built or reconstructed. The Empirical Bayes method is an example of such proactive traffic safety approach that attempts to predict future crashes based on roadway typologies. Most methodologies use a balance of both reactive and systemic safety approaches.

Based on the systemic safety analysis that helped identified high-injury intersections and roadway segments, the top risk factors and emphasis areas determined for traffic safety in the City of Pico Rivera are as follows:

- Improve intersection safety
- Address rear-end collisions
- Address broadside collisions
- Reduce unsafe speed violations
- Address nighttime collisions
- Reduce improper turning violations

The consolidated high-injury collision database can be found in **Appendix C**.

The 4 E's of Traffic Safety

LRSP utilizes a comprehensive approach to safety incorporating "4 E's of traffic safety": **E**ngineering, **E**nforcement, **E**ducation and **E**mergency **M**edical **S**ervices **(EMS)**. This approach recognizes that not all locations can be addressed solely by infrastructure improvements. Incorporating the 4 E's of traffic safety is often required to ensure the successful implementation of significant safety improvements and reduce the severity and frequency of collisions throughout a jurisdiction.

Some of the common violation types that may require a comprehensive approach are speeding, failure-to-yield to pedestrians, red-light running, aggressive driving, failure to wear safety belts, distracted driving, and driving while impaired. When locations are identified as having these types of violations, coordination with the appropriate law enforcement agencies is needed to arrange visible targeted enforcement to reduce the potential for future driving violations and related crashes and injuries.

To improve safety, education efforts can also be used to supplement and improve the efficiency of enforcement, and vice versa. Education can also be employed in the short-term to address high crash locations until the recommended infrastructure project can be implemented, and addressed under Engineering improvements and countermeasures. Similarly, EMS entails strategies around supporting organizations that provide rapid response and care when responding to collisions causing injury, by stabilizing victims and transporting them to facilities.

Existing Traffic Safety Efforts in the City of Pico Rivera

The City of Pico Rivera already has previously prepared safety strategies corresponding to the 4 E's of traffic safety. The strategies detailed in this Chapter can supplement these existing programs and concentrate them on high injury collision locations and crash types. These initiatives are summarized in **Table 6** on the following page.

Table 6. Existing Programs Summary

Document/ Program	Description	E's Addressed
The City of Pico Rivera System Safety Analysis Report (2018)	This report evaluates city-wide crash trends and identifies potential solutions. A recommended set of countermeasures were provided based on analysis of four principal corridors within the City: Whittier Blvd, Passons Blvd, Slauson Ave, and Paramount Blvd.	Engineering
Pico Rivera Urban Greening Plan (2015)	This plan presents projects that provide a safe and connected bicycle network and pedestrian improvements. These improvement includes signal timing and calibration, pedestrian countdown signal, raised crosswalks, corner curb extension, and bike lanes.	Engineering
Pico Rivera Safe Routes to School Program, 2013-2015 (2015)	The plan includes comprehensive goals to support traveling to school by active modes, and to improve traffic safety for children who walk and bike to school. The strategies include SRTS coordinator and task force and branding development, spreading awareness through websites, educational programs, encouragement programs, evaluation programs, enforcement programs, and improvement of the bike and walkable routes system to school from nearby communities.	Engineering, Education, Enforcement
LA County Traffic Improvement Plan (2008)	The plan includes comprehensive goals to improve transportation and ease traffic congestion through improved freeway traffic flow, expand the rail and rapid transit system, repave local streets, repair potholes, synchronize signals, keep the transit and highway system safe, make public transportation more accessible, convenient and affordable, invest in transportation infrastructure.	Engineering
LA County A Plan For Safer Roadways | Vision Zero (2020-2025)	The LA County Vision Zero Plan in a five-year plan focusing on achieving the goals of eliminating traffic- related fatalities on unincorporated County roadways by 2035. The plan also includes health equity, data- driven process, and transparency regulating several goals and objectives. The plan describes potential findings for pedestrian/bike safety and countermeasures to reduce collisions and traffic congestion.	Engineering, Education, Enforcements, EMS

Factors Considered in the Determination of Emphasis Areas

This section presents collision data analysis of collision type, collision factors, facility type, and roadway geometries, analyzed for the various emphasized areas. Emphasis areas were determined by factors that led to the highest amount of injury collisions, with a specific emphasis on KSI collisions. The City of Pico Rivera experienced a total of 404 injury collisions at high injury network locations during the 2017-2021 study period, including 57 KSI collisions. The data presented in each emphasis area is based on these collisions. This section also presents comprehensive programs, policies, and countermeasures to reduce collisions in specific emphasis areas.

Note: Engineering countermeasures are based on the Caltrans LRSM and are used in HSIP calls for projects. They are categorized as follows:

- S = Signalized Intersections Countermeasures
- NS = Non-Signalized Intersections Countermeasures
- R = Roadway Segments Countermeasures

An excerpt of the Caltrans LRSM providing additional details on each countermeasure is included in **Appendix D**.

EMPHASIS AREA 1 – IMPROVE INTERSECTION SAFETY

Intersection collisions made up the vast majority of collisions occurring on the Pico Rivera high injury network during the study period, with a total of 75%. The 65% of KSI collisions also occurred at intersections. The following collision data is based on only intersection collisions on the high injury network in the City of Pico Rivera, followed by 4 E's strategies selected to address intersection collisions.

34%
Unsafe Speed

38%
Rear-End Collisions

10%
Pedestrian Collisions

Table 7. Emphasis Area 1 Strategies

Objective: Reduce the number of KSI collisions at intersections			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct public information and education campaign for intersection safety laws regarding traffic signals, stop signs, and turning left or right.	Number of education campaigns or residents reached.	City/LA County Sheriff Department
Enforcement	Targeted enforcement at high-injury intersections to monitor right-of-way violations, speed limit laws and other violations that occur at intersections.	Decrease in number of citations and/or warnings issued over time due to increased driver compliance.	LA County Sheriff Department
Engineering	• S02, Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number • S03, Improve signal timing • S09, Install striping (through Intersection) • S16/NS04/NS05, Convert intersection to roundabout • S20PB, Install advance stop bar before crosswalk • NS06, Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs • NS07, Upgrade intersection pavement markings • NS08, Install Flashing Beacons at Stop-Controlled Intersections • NS09, Install flashing beacons as advance warning (Non-Signalized Intersection) (NS.I.) • NS11, Improve sight distance to intersection (Clear Sight Triangles) • NS13, Install splitter-islands on the minor road approaches • NS14, Install raised median on approaches • NS19PB, Install raised medians (refuge islands) • Automated Red-light Enforcement	Number of intersections improved.	City
EMS	• S05, Install emergency vehicle pre-emption systems • Improve resource of deployment for emergency responses to collision sites • Ensure emergency routes are clear and well defined	EMS vehicle response time.	City/LA County LA County Fire Department & EMS Response Teams

EMPHASIS AREA 2 – ADDRESS REAR END COLLISIONS

150 (38%) of the high injury network collisions were rear-end collisions, including 13 KSI collisions. The following is based on only rear-end injury collisions on the high injury network intersections and roadway segments, followed by 4 E's strategies to address them.

63% **Unsafe Speed**

77% **Occurred at Intersections**

22% **Occurred on Whittier**

Table 8. Emphasis Area 2 Strategies

Objective: Reduce the number of rear end KSI collisions			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct public information and education campaign for safety laws regarding unsafe speed and improper turning and its dangers.	Number of education campaigns or residents reached.	City/LA County Sheriff Department
Enforcement	Targeted enforcement at high-injury locations where unsafe speed violations and improper turning are more common. Deploy a radar trailer at locations where instances of unsafe speed is more prevalent	Decrease in number of citations and/or warnings issued over time due to increased driver compliance.	LA County Sheriff Department
Engineering	• S02, Improve signal hardware • S09, Install striping (Through Intersection) • S10, Install flashing beacons as advance warning (S.I.) • S16/NS04/NS05, Convert intersection to roundabout • NS07, Upgrade intersection pavement markings (NS.I.) • NS08, Install Flashing Beacons at Stop-Controlled Intersections • R22, Install/Upgrade signs with new fluorescent sheeting • R27, Install delineators, reflectors and/or object markers • R26, Install dynamic/variable speed warning signs • R28, Install edge-lines and centerlines • Decrease width of travel lanes • Simplify turn configurations • Decrease curb radius of intersections • Traffic calming strategies where appropriate	Number of locations improved.	City
EMS	• S05, Install emergency vehicle pre-emption systems • Improve resource of deployment for emergency responses to collision sites • Ensure emergency routes are clear and well defined	EMS vehicle response time.	City/LA County Fire Department & EMS Response Teams

EMPHASIS AREA 3 – REDUCE UNSAFE SPEED VIOLATIONS

136 (32%) of the high injury network collisions were rear-end collisions, including 20 KSI collisions. The following is based on only unsafe speed injury collisions on the high injury network intersections and roadway segments, followed by 4 E's strategies to address them.

70%	75%	23%
Rear-End Collisions	Occurred at Intersections	Occurred on Whittier

Table 9. Emphasis Area 3 Strategies

Objective: Reduce the number of KSI rear end and unsafe speed collisions			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct public information and education campaign for safety laws regarding unsafe speed and its dangers.	Number of education campaigns or residents reached.	City/LA County Sheriff Department
Enforcement	Targeted enforcement at high-injury locations where unsafe speed violations are more common. Deploy a radar trailer at locations where instances of unsafe speed is more prevalent	Decrease in number of citations and/ or warnings issued over time due to increased driver compliance.	LA County Sheriff Department
Engineering	• S02, Improve signal hardware • S09, Install striping (Through Intersection) • S16/NS04/NS05, Convert intersection to roundabout • NS07, Upgrade intersection pavement markings (NS.I.) • NS10, Install transverse rumble strips on approaches • R08, Install Raised Medians • R22, Install/Upgrade signs with new fluorescent sheeting • R27, Install delineators, reflectors and/or object markers • R26, Install dynamic/variable speed warning signs • R28, Install edge-lines and centerlines • Decrease width of travel lanes • Simplify turn configurations • Decrease curb radius of intersections • Traffic calming strategies where appropriate	Number of locations improved.	City
EMS	• S05, Install emergency vehicle pre-emption systems • Improve resource of deployment for emergency responses to collision sites • Ensure emergency routes are clear and well defined	EMS vehicle response time.	City/LA County Fire Department & EMS Response Teams

EMPHASIS AREA 4 – ADDRESS BROADSIDE COLLISIONS

90 (22%) of the high injury network collisions were broadside collisions, including 13 KSI collisions. The following collision data is based on only broadside injury collisions on the high injury network intersections and roadway segments of the City of Pico Rivera, followed by 4 E's strategies to address them.

43% Automobile Right of Way Violation

29% Occurred at Night

71% Occurred at Intersection

Table 10. Emphasis Area 4 Strategies

Objective: Reduce the number of KSI broadside collisions			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct public information and education campaigns for intersection safety laws regarding traffic lights, stop signs and turning left or right.	Number of education campaigns or residents reached.	City/LA County Sheriff Department
Enforcement	Targeted enforcement at high-injury locations where violations that lead to broadside collisions are more common, such as automobile right of way and traffic signal/stop sign violations.	Decrease in number of citations and/ or warnings issued over time due to increased driver compliance.	LA County Sheriff Department
Engineering	• S02, Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number • S03, Improve signal timing (coordination, phases, red, yellow, or operation) • S07, Provide protected left turn phase (left turn lane already exists) • S08, Convert signal to mast arm (from pedestal-mounted) • S09, Install striping (Through Intersection) • S12, Install raised median on approaches • S16/NS04/NS05, Convert intersection to roundabout • NS02, Convert to all-way STOP control (from 2-way or Yield control) • NS03, Install signals • NS06, Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs • NS07, Upgrade intersection pavement markings (NS.I.) • NS08, Install flashing beacons at stop controlled intersections • NS09, Install flashing beacons as advance warning (NS.I.) • NS11, Improve sight distance to intersection (Clear Sight Triangles) • NS13, add splitter-islands on the minor road approaches • NS14, install raised median on approaches • R08, Install raised medians	Number of locations improved to mitigate broadside collisions.	City
EMS	• S05, Install emergency vehicle pre-emption systems • Improve resource of deployment for emergency responses to collision sites • Ensure emergency routes are clear and well defined	EMS vehicle response time.	City/LA County Fire Department & EMS Response Teams

EMPHASIS AREA 5 – ADDRESS NIGHTTIME COLLISIONS

149 (37%) of high injury network collisions occurred at night or in low light (dawn/dusk) conditions, including 39 KSI collisions. The following collision data is based on only nighttime injury collisions on the high injury network intersections and roadway segments of the City of Pico Rivera, followed by 4 E's strategies selected to address nighttime collisions.

36% **Unsafe Speed Violations**

36% **Rear End Collisions**

18% **Involves Fixed Object**

Table 11. Emphasis Area 5 Strategies

Objective: Reduce the number of KSI collisions that occur at night or dawn/dusk			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Develop an awareness program to inform motorists of safe nighttime driving habits and the dangers of drunk driving, as well as high-injury collision locations and the most common violations/collision types occurring at night.	Number of education campaigns or residents reached.	City/LA County Sheriff Department
Enforcement	Targeted enforcement at high-injury intersections and roadway locations where nighttime collisions are more common. Establish DUI checkpoints at night and enforce over speeding where appropriate.	Decrease in number of citations and/ or warnings issued over time due to increased driver compliance.	LA County Sheriff Department
Engineering	• S01, Add intersection lighting (Signalized Intersection => S.I.) • S02, Improve signal hardware • S10, Install flashing beacons as advance warning (S.I.) • NS01, Add intersection lighting • NS06, Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs • NS07, Upgrade intersection pavement markings (NS.I.) • NS08, Install Flashing Beacons at Stop-Controlled Intersections • NS09, Install flashing beacons as advance warning (NS.I.) • NS22PB, Install Rectangular Rapid Flashing Beacon (RRFB) • R01, Add Segment Lighting • R02, Remove or relocate fixed objects outside of Clear Recovery Zone • R22, Install/Upgrade signs with new fluorescent sheeting (regulatory or warning) • R27, Install delineators, reflectors and/or object markers • R28, Install edge-lines and centerlines	Number of locations improved.	City
EMS	• S05, Install emergency vehicle pre-emption systems • Improve resource of deployment for emergency responses to collision sites • Ensure emergency routes are clear and well defined	EMS vehicle response time.	City/LA County Fire Department & EMS Response Teams

EMPHASIS AREA 6 – REDUCE IMPROPER TURNING VIOLATIONS

A total of 78 (19%) high injury network collisions are classified as improper turning violations. However, of these 78 collisions, 10 led to a fatality or severe injury. The following collision data is based on only hit object injury collisions on the high injury network intersections and roadway segments of the City of Pico Rivera, followed by 4 E's strategies selected to reduce improper turning collisions.

30% **Sideswipe Collisions**

20% **Involves Fixed Object**

71% **At Intersections**

Table 12. Emphasis Area 6 Strategies

Objective: Reduce the number of KSI collisions that occur due to improper turning			
	Strategy	**Performance Measure**	**Agencies/ Organizations**
Education	Conduct public information and education campaigns on risks that can lead to improper turning, such as distracted driving, driving under the influence, disregard of lane markings and signs.	Number of education campaigns or residents reached.	City/LA County Sheriff Department
Enforcement	Targeted enforcement at high-injury locations where improper turning collisions are more common.	Decrease in number of citations and/or warnings issued over time due to increased driver compliance.	LA County Sheriff Department
Engineering	• S03, Improve signal timing (coordination, phases, red, yellow, or operation) • S06, Install left-turn lane and add turn phase (signal has no left-turn lane or phase before) • S07, Provide protected left turn phase (left turn lane already exists) • S08, Convert signal to mast arm (from pedestal-mounted) • S09, Install striping (Through Intersection) • S12, Install raised median on approaches (S.I.) • S16/NS04/NS05, Convert intersection to roundabout • NS11, Improve sight distance to intersection (Clear Sight Triangles) • NS16, Reduced Left-Turn Conflict Intersections (NS.I.) • NS17, Install right-turn lane (NS.I.) • NS18, Install left-turn lane (where no left-turn lane exists) • R01, Add Segment Lighting • R02, Remove or relocate fixed objects outside of Clear Recovery Zone • R08, Install raised medians	Number of locations improved.	City
EMS	• S05, Install emergency vehicle pre-emption systems • Improve resource of deployment for emergency responses to collision sites • Ensure emergency routes are clear and well defined • Increase the number of EMS personnel taking Traffic Incident Management Training	EMS vehicle response time.	City/LA County Fire Department & EMS Response Teams

6 | COUNTERMEASURE SELECTION

6 COUNTERMEASURE SELECTION

Identification of Countermeasures

Upon the identification of high-risk locations and Emphasis Areas, the next step was to identify appropriate safety countermeasures. The Caltrans LRSM provides 82 countermeasures, of which 21 are eligible in the current HSIP call for signalized intersections, 23 for un-signalized intersections, and 38 for roadway segments. The LRSM provides guidance on where to apply the countermeasures including the crash types each countermeasure would address, and a Crash Reduction Factor (CRF) for each countermeasure. The Federal Highway Administration (FHWA) CMF Clearinghouse and published research papers were reviewed by the project team to gain additional insight on CRFs and effectiveness of specific countermeasures.

The project team conducted a thorough review of the high-risk locations (intersections and roadway segments) using aerial photography and Google Maps Street View software. Countermeasures were confirmed after review by City staff and virtual and in-person site visits. Crash characteristics of all collisions occurring on the High Injury Network were considered. After combining the physical and collision characteristics, the project team developed a table of preliminary countermeasures that address each of the identified emphasis areas. The table was refined by selecting up to five countermeasures for each high-risk location that were most commonly recommended among all emphasis areas. By doing this, the project team was able to identify countermeasures with the greatest opportunity for systemic implementation.

Countermeasure Toolbox

Engineering countermeasures were selected for each of the high-risk locations and for the emphasis areas. These were based off of approved countermeasures from the Caltrans LRSM used in HSIP grant calls for projects. The intention is to give the City potential countermeasures for each location that can be implemented either in future HSIP calls for projects, or using other funding sources, such as the City's Capital Improvement Program. Non-engineering countermeasures were also selected using the 4 E's strategies, and are included with the emphasis areas. The countermeasure toolbox in **Appendix E** details the countermeasures for each high-risk location and emphasis area, separated by intersections and roadway segments. While not all of these countermeasures are included in the resulting safety projects, they are included to give the City a toolbox for implementing future safety improvements through other means, such as the City's Capital Improvement Program.

Table 13 provides a description of each potential countermeasure along with the CRF, federal funding eligibility, and opportunity for systemic implementation. An excerpt of the LRSM, detailing each available HSIP countermeasure referenced in the recommendations tables, is included as **Appendix D**.

Table 13. Potential Countermeasures Selected for City of Pico Rivera

Code	Countermeasure Name	Countermeasure Description	CRF	Federal Funding	Systemic Approach Opportunity
S02	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number	Includes New LED lighting, signal back plates, retro-reflective tape outlining the back plates, or visors to increase signal visibility, larger signal heads, relocation of the signal heads, or additional signal heads.	15%	90%	Very High
S03	Improve signal timing (coordination, phases, red, yellow, or operation)	Includes adding phases, lengthening clearance intervals, eliminating or restricting higher-risk movements, and coordinating signals at multiple locations.	15%	50%	Very High
S09	Install raised pavement markers and striping (Through Intersection)	Adding clear pavement markings can guide motorists through complex intersections. When drivers approach and traverse through complex intersections, drivers may be required to perform unusual or unexpected maneuvers.	10%	90%	Very High
S10	Install flashing beacons as advance warning (S.I.)	Increased driver awareness of an approaching signalized intersection and an increase in the driver's time to react.	30%	90%	Medium
S11	Improve pavement friction (High Friction Surface Treatments)	Improving the skid resistance at locations with high frequencies of wet road crashes and/or failure to stop crashes.	55%	90%	Medium
S12	Install raised median on approaches (S.I.)	Raised medians next to left turn lanes at intersections offer a cost effective means for reducing crashes and improving operations at higher volume intersections.	25%	90%	Medium
S13PB	Install pedestrian median fencing on approaches	Signalized Intersections with high pedestrian-generators nearby (e.g. transit stops) may experience a high volumes of pedestrians J-walking across the travel lanes at mid-block locations instead of walking to the intersection and waiting to cross during the walk-phase.	30%	90%	Low

Code	Countermeasure Name	Countermeasure Description	CRF	Federal Funding	Systemic Approach Opportunity
S20PB	Install advance stop bar before crosswalk (Bicycle Box)	Signalized Intersections with a marked crossing, where significant bicycle and/or pedestrians volumes are known to occur.	15%	90%	Very High
S21PB	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	Intersections with signalized pedestrian crossing that have high turning vehicles volumes and have had pedestrian vs. vehicle crashes.	60%	90%	Very High
NS01	Add intersection lighting (NS.I.)	Provision of lighting at intersection.	40%	90%	Medium
NS02	Convert to all-way STOP control (from 2-way or Yield control)	Unsignalized intersection locations that have a crash history and have no controls on.	25%	90%	Low
NS06	Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	Additional regulatory and warning signs at or prior to intersections will help enhance the ability of approaching drivers to perceive them.	15%	90%	Very High
NS11	Improve sight distance to intersection (Clear Sight Triangles)	Unsignalized intersections with restricted sight distance and patterns of crashes related to lack of sight distance where sight distance can be improved by clearing roadside obstructions without major reconstruction of the roadway.	20%	90%	High
NS22PB	Install Rectangular Rapid Flashing Beacon (RRFB)	RRFB includes pedestrian-activated flashing lights and additional signage that enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings. It uses an irregular flash pattern that is similar to emergency flashers on police vehicles. RRFBs are installed at unsignalized intersections and mid-block pedestrian.	35%	90%	Medium
R01	Add Segment Lighting	Provision of lighting along roadways.	35%	90%	Medium

Code	Countermeasure Name	Countermeasure Description	CRF	Federal Funding	Systemic Approach Opportunity
R02	Remove or relocate fixed objects outside of Clear Recovery Zone	Known locations or roadway segments prone to collisions with fixed objects such as utility poles, drainage structures, trees, and other fixed objects, such as the outside of a curve, end of lane drops, and in traffic islands. A clear recovery zone should be developed on every roadway, as space is available. In situations where public right-of-way is limited, steps should be taken to request assistance from property owners, as appropriate.	35%	90%	High
R08	Install Raised Median	Adding raised medians is a particularly effective strategy as it adds to or reallocates the existing cross section to incorporate a buffer between the opposing travel lanes and reinforces the limits of the travel lane. Raised median may also be used to limit unsafe turning movements along a roadway.	25%	90%	Medium
R10PB	Install pedestrian median fencing	Roadway segments with high pedestrian-generators and pedestrian-destinations nearby (e.g. transit stops) may experience a high volume of pedestrians J-walking across the travel lanes at mid-block locations instead of walking to the nearest intersection or designated mid-block crossing. When this safety issue cannot be mitigated with shoulder, sidewalk and/or crossing treatments, then installing a continuous pedestrian barrier in the median may be a viable solution.	35%	90%	Low
R21	Improve pavement friction (High Friction Surface Treatments)	Improving the skid resistance at locations with high frequencies of wet road crashes and/or failure to stop crashes.	55%	90%	High
R22	Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)	Additional or new signage can address crashes caused by lack of driver awareness or compliance of roadway signing.	15%	90%	Very High

Code	Countermeasure Name	Countermeasure Description	CRF	Federal Funding	Systemic Approach Opportunity
R23	Install chevron signs on horizontal curves	Roadways that have an unacceptable level of crashes on relatively sharp curves during periods of light and darkness.	40%	90%	Very High
R26	Install dynamic/ variable speed warning signs	Includes the addition of dynamic speed warning signs (also known as Radar Speed Feedback Signs).	30%	90%	High
R27	Install delineators, reflectors and/or object markers	Installation of delineators, reflectors and/or object markers are intended to warn drivers of an approaching curve or fixed object that cannot easily be removed.	15%	90%	Very High
R30	Install centerline rumble strips/stripes	Center Line rumble strips/stripes can be used on virtually any roadway – especially those with a history of head-on crashes.	20%	90%	High
R36PB	Install Raised Pedestrian Crossing	Roadway segments with no controlled crossing for a significant distance in high-use midblock crossing areas and/or multilane roads locations. Flashing beacons, curb extensions, medians and pedestrian crossing islands and/ or other safety features should be added to complement the standard crossing elements.	35%	90%	Medium

* Code: S - Signalized intersection improvements
NS - Non-signalized intersection improvements
R - Roadway segment improvements

7 | VIABLE SAFETY PROJECTS

7 VIABLE SAFETY PROJECTS

This chapter summarizes the process of selecting safety projects as part of the analysis for Pico Rivera's LRSP. The next step after the identification of high-injury locations, emphasis areas and applicable countermeasures was to identify location specific safety improvements for all high-risk roadway segments and intersections.

Specific countermeasures and improvements were selected from the 2022 LRSM from Caltrans, where:

- S refers to improvements at signalized locations,
- NS refers to improvements at non-signalized locations, and
- R refers to improvements at roadway segments.

The corresponding number refers to the countermeasure number in the LRSM (2022). The countermeasures were grouped into safety projects for high-risk intersections and roadway segments. A total of six safety projects were developed. All countermeasures were identified based on the technical teams' assessment of viability that consisted of extensive analysis, observations, City staff input, and stakeholder/community input. The most applicable and appropriate countermeasures as identified have been grouped together to form projects that can help make high-risk locations safer.

Table 14 lists the safety projects for high-risk intersections and roadway segments, along with total base planning level cost (2022 dollar amounts) estimates and the resultant preliminary Benefit/Cost (B/C) Ratio. The "Total Benefit" estimates were calculated for the proposed improvements being evaluated in the proactive safety analysis. This "Total Benefit" is divided by the "Total Cost per Location" estimates for the proposed improvements, giving the resultant B/C Ratio. The B/C Ratio Calculation follows the methodology as mentioned in the LRSM (2022). Additionally, based on community comments received from the survey portal and Stakeholder Meetings, additional locations with traffic safety concerns were identified and countermeasure were recommended for locations listed in **Table 15**.

Appendix F lists the detailed methodology to calculate B/C Ratio, as well as the complete cost, benefit and B/C Ratio calculation spreadsheet.

These safety projects were chosen based on the previously completed collisions analysis, which was used to identify main collision attributes that were found to be leading factors of KSI in Pico Rivera. These collision factors are shown below, as well as viable safety projects that can help address these factors.

Broadside Collisions: For KSI collisions in Pico Rivera, 30% of collisions were broadside collisions. This is slightly higher than its share of collisions of all severity (29%). Broadside collisions can potentially be mitigated by increasing the visibility of an intersection through updated pavement markings, new or updated signage, lighting, advance flashing beacons, and improving sight distance.

Unsafe Speed Violations: 32% of KSI collisions in Pico Rivera were due to unsafe speed violations, compared to 28% of collisions of all severity. Countermeasures such as traffic calming, dynamic speed warning signs, road diet can all help to address unsafe speed violation collisions.

Nighttime Collisions: 67% of KSI collisions in Pico Rivera were nighttime collisions, compared to 36% of collisions of all severity. These collisions can potentially be mitigated with installing or upgrading street lighting with higher lumen, installing delineators, reflectors and object markers, adding fluorescent sheeting to traffic signs, and installing flashing beacons.

Rear End Collisions: 29% of collisions of all severity were rear end collisions. It also makes up 17% of KSI collisions. Rear end collisions can potentially be mitigated through upgrading signal hardware or adding retroreflective borders, improving signal timing, upgrading/ adding intersection warning signs, or adding flashing beacons in advance of intersections. Methods to reduce speeding, such as traffic calming, can also help to address rear end collisions.

Improper Turning Collisions: For KSI collisions in the City of Pico Rivera, 11% of collisions occurred due to improper turning violation. It also contributed to 19% of all injury collisions. Countermeasures such as improving sight distance at intersections, installing dedicated left turn lanes, median splitter islands on minor road approaches, and raised medians can help to mitigate improper turning caused collisions.

The next step in the process will be to secure grant funding for the recommended safety projects. It should be noted that while the LRSP projects were based on high-risk locations, HSIP applications can be expanded to include many locations across the city, which is reflected in Projects 3, 4, and 6. As part of this scope, TJKM prepared and submitted two HSIP Cycle 11 applications for Projects 4 and 6. Apart from this scope, the City also submitted a third project for safety around several school sites in the City. All applications were funded in March 2023. Each application is included in the **Appendix G**.

Table 14 shows the list of identified projects for the City of Pico Rivera, with a preliminary cost estimate for each location and the resulting benefit-cost ratio of the project (the title of each countermeasure is located in Table 14).

Table 14. List of Viable Safety Projects

Location	CM1	CM2	CM3	Cost per Location	Total Cost	B/C Ratio
Project 1: Signalized Intersections: Install striping through intersection (for turning movements and offset intersections), install raised median on approaches						
Slauson Ave and Paramount Blvd	S09			$3,696	$183,400	115.5
Rosemead Blvd and Whittier Blvd	S09			$4,099		
Beverly Blvd and Paramount Blvd	S09			$3,696		
Rosemead Blvd and Washington Blvd	S09	S12		$151,375		
Rosemead Blvd and Telegraph Rd	S09			$7,900		
Slauson Ave and Passons Blvd	S09			$3,024		
Gregg Rd and Whittier Blvd	S09			$40,446		
Project 2: Unsignalized Intersections: Install signals, install pedestrian signal (including HAWK), install RRFB (when warranted, additional study warrant required)						
Rosemead Blvd and Danbridge St	NS03*			$870,800	$3,507,700	5.44
Rosemead Blvd and Maxine St	NS03*			$870,800		
Durfee Ave and Olympic Blvd^			NS22PB	$172,060		
Beverly Rd and Canal Way^	NS03*			$870,800		
Durfee Ave and West St^		NS23PB		$361,620		
Paramount Blvd and Maris Ave^		NS23PB		$361,620		
Project 3: Citywide Signal Timing: Improve signal timing (coordination, phases, red, yellow, or operation), install emergency vehicle pre-emption systems (where applicable)						
Citywide Signalized Intersections	S03	S05		$1,459,350	$1,459,350	24.48
Project 4 (HSIP Application): Citywide Signal Upgrade: Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number, install pedestrian countdown signal heads, install advance stop bar before crosswalk (Bicycle Box)						
Citywide Signalized Intersections	S02	S17PB	S20PB	$2,130,800	$2,130,800	39.24
Project 5: Roadway Segments: Install dynamic/variable speed warning signs (radar feedback sign), install delineators, reflectors and/or object markers						
Rosemead Blvd: From/To City Limits	R26	R27		$123,130	$533,120	284.79
Whittier Blvd/SR 72: From/To City Limits	R26	R27		$71,190		
Slauson Ave: From/To City Limits		R27		$15,540		
Washington Blvd: From/To City Limits		R27		$8,820		
Telegraph Rd: From/To City Limits	R26	R27		$85,400		
Paramount Blvd: Gallatin Rd to Telegraph Rd	R26	R27		$107,240		
Passons Blvd: Stephens St to City Limit		R27		$4,200		
Beverly Blvd: From/To City Limits		R27		$12,600		
Rooks Rd: Sports Arena Dr to San Gabriel River Pkwy	R26	R27		$96,600		
Durfee Ave: Kruse Road to Jackson St		R27		$8,400		

Location	CM1	CM2	CM3	Cost per Location	Total Cost	B/C Ratio
Project 6 (HSIP Application): Citywide Sign Upgrade: Install/upgrade signs with new fluorescent sheeting (regulatory or warning)						
Citywide Roadways	R22			$3,607,625	$2,821,300	32.82

Notes: CM – countermeasure. B/C ratio is the dollar amount of benefits divided by the cost of the countermeasure.

*NS03 (Install Signals) countermeasure is applicable only if Signal Warrant is met at respective locations. If not, NS23PB (HAWK) as a first alternative and NS22PB (Rapid flashing Beacon) as a second alternative is recommended.

^Locations identified from public comments and Stakeholder input.

Table 15. Additional Locations Identified from Public Comments and Recommended Countermeasures

Location	CM1	CM2	CM3
Beverly Blvd and San Gabriel River Pkwy^	S21PB		
Paramount Blvd and Mines Ave^	S17PB	S20PB	S21PB
Stephens St and Passons Blvd^	NS11	NS08	Restrict on-street parking
Paramount Blvd and Maris Ave^	NS14	NS18	
Rosemead Blvd: From/To City Limits	R02		
Beverly Blvd: From/To City Limits	R02		
Olympic Blvd^	Traffic Calming measures e.g. speed humps, curb extensions		
Paramount Blvd: Mines Ave and Washington Blvd^	R08	R34PB	

Notes: CM – countermeasure.

^Locations identified from public comments and Stakeholder input.

Countermeasure Name
S02 - Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number
S03 - Improve signal timing (coordination, phases, red, yellow, or operation)
S05 - Install emergency vehicle pre-emption systems
S09 - Install raised pavement markers and striping (Through Intersection)
S12 - Install raised median on approaches
S17PB - Install pedestrian countdown signal heads
S20PB - Install advance stop bar before crosswalk (Bicycle Box)
S21PB - Modify signal phasing to implement a Leading Pedestrian Interval (LPI)
NS03 - Install signals
NS08 - Install Flashing Beacons at Stop-Controlled Intersections
NS11 - Improve sight distance to intersection (Clear Sight Triangles)
NS14 - Install raised median on approaches (NS.I.)
NS18 - Install left-turn lane (where no left-turn lane exists)
NS22PB- Install Rectangular Rapid Flashing Beacon (RRFB)
NS23PB - Install Pedestrian Signal (including Pedestrian Hybrid Beacon [HAWK])
R02 - Remove or relocate fixed objects outside of Clear Recovery Zone
R08 - Install raised median
R22 - Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)
R26 - Install dynamic/variable speed warning signs
R27 - Install delineators, reflectors, and/or object markers
R34PB - Install sidewalk/pathway (to avoid walking along roadway)

8 | IMPLEMENTATION AND EVALUATION

8 IMPLEMENTATION AND EVALUATION

This chapter describes the steps the City may take to evaluate the success of this plan and steps needed to update the plan in the future. The LRSP is a guidance document and requires periodic updates to assess its efficacy and re-evaluate potential solutions. It is recommended to update the plan every two to five years in coordination with the identified safety partners. This document was developed based on community needs, stakeholder input, and collision analysis conducted to identify priority emphasis areas throughout the City. The implementation of strategies under each emphasis area would aim to reduce KSI collisions in the coming years.

Implementation

The LRSP is a guidance document that is recommended to be updated every two to five years in coordination with the safety partners. The LRSP document provides Engineering, Education, Enforcement, and EMS-related countermeasures that can be implemented throughout the City to reduce KSI collisions. It is recommended that the City of Pico Rivera implement the selected projects in high-collision locations as well as safety concerns identified by stakeholders and the community in coordination with other projects proposed for the City's infrastructure development in their future Capital Improvement Plans. After implementing countermeasures, the performance measures for each emphasis area should be evaluated periodically. The most important measure of success of the LRSP should be reducing KSI collisions throughout the City. If the number of KSI collisions does not decrease over time, then the emphasis areas and countermeasures should be re-evaluated.

As community feedback and comment were an important component of the crafting of these projects and countermeasures, continuing the collection of community feedback and comment will be equally as important as these are implemented. The success of these countermeasures and projects will not only depend on data collection but also how the community and users use and interact with these over a period of time.

The safety project prioritization list is identified (**Table 16**) for the top three projects based on the B/C Ratio of the project. In addition, KSI and total collisions near the project locations and total expected benefit from the project is also noted in Table 16.

Note that the two citywide projects (Project 4: Citywide Signal Upgrade and Project 6: Citywide Sign Upgrade) have already been awarded funding through HSIP Cycle 11, so these two projects are not included in this list.

Table 16. Safety Project Prioritization List

Priority Ranking	Project	KSI Collisions	Total Collisions	Total Expected Benefit	BCR
1	Project 5: Roadway Segments: Install dynamic/variable speed warning signs, Install delineators, reflectors, and/or object markers.	68	2,554	$151,878,243	284.79
2	Project 1: Signalized Intersections: Install Striping Through Intersection, Install raised median on approaches.	20	354	$21,182,945	115.5
3	Project 3: Citywide Signal Timing: Improve signal timing (coordination, phases, red, yellow, or operation), Install emergency vehicle pre-emption systems.	47	1,285	$35,725,958	24.48

Funding is a critical component of implementing any safety project. While the HSIP program is a common source of funding for safety projects, there are numerous other funding sources that could be pursued for such projects. (See **Table 17** below).

Table 17. List of Potential Funding Sources

Funding Source	Funding Agency	Amount Available	Next Call for Projects	Applicable E's	Notes
Active Transportation Program	Caltrans, California Transportation Commission, MTC	~$450 million per cycle (every two years)	2024	Engineering, Education	Can use used for most active transportation related safety projects as well as education programs? Funding available through Caltrans or MTC
Highway Safety Improvement Program (HSIP)	Caltrans	Varies	2024	Engineering	Most common grant source for safety projects
Office of Traffic Safety Grants	California Office of Traffic Safety	Varies by grant	Closes January 31st annually	Education, Enforcement, Emergency Response	10 grants available to address various components of traffic safety
Affordable Housing and Sustainable Communities Program	Strategic Growth Council and Dept. of Housing and Community Development	~$10-15 million per award	TBD; most recent in 2023	Engineering, Education	Must be connected to affordable housing projects; typically focuses on bike/pedestrian infrastructure/ programs
Urban Greening	California Natural Resources Agency	$28.5 million	TBD; most recent in 2022	Engineering	Focused on bike/pedestrian infrastructure and greening public spaces

Funding Source	Funding Agency	Amount Available	Next Call for Projects	Applicable E's	Notes
Local Streets and Road Maintenance and Rehabilitation	CTC (distributed to local agencies)	$1.5 billion statewide	N/A; distributed by formula	Engineering	Typically pays for road maintenance type projects
RAISE Grant	USDOT	~$1.5 billion	2023	Engineering	Typically used for larger infrastructure projects
Sustainable Transportation Equity Project	California Air Resources Board	~$19.5 million	TBD; most recent call in 2023	Engineering, Education	Targets projects that will increase transportation equity in disadvantaged communities
Transformative Climate Communities	Strategic Growth Council	~$105 million	TBD; most recent call in 2022	Engineering	Funds community-led projects that achieve major reductions in greenhouse gas emissions in disadvantaged communities
Safe Streets and Roads for All (SS4A)	USDOT	$200k - $50 million	2023	Engineering	Two types of SS4A grants available: Action Plan Grants and Implementation Grants
Clean California Local Grant Program	Caltrans	$100 – 5 million per award	2023	Engineering	Funding for local communities to beautify and improve local streets and roads, tribal lands, parks, pathways, and transit centers
Sales Tax Exclusion (STE) Program	State Treasurer's Office	$100 million	Ongoing	Engineering	Provide incentives - a sales and use tax exclusion to manufacturers purchasing equipment to promote alternative energy, advanced transportation and recycling, as well as advanced manufacturing
Countywide Sales Tax Measures (Measures R, M and Proposition C)	Los Angeles County	Distributed by formula	Annually	Engineering, Education	Typically used by City as a match for other grant funds

Monitoring and Evaluation

For the success of the LRSP, it is crucial to monitor and evaluate the 4 E-strategies continuously. Monitoring and evaluation help provide accountability, ensures the effectiveness of the countermeasures for each emphasis area, and help making decisions on the need for new strategies. The process would help the City make informed decisions regarding the implementation plan's progress and accordingly, update the goals and objectives of the plan.

After implementing countermeasures, the strategies should be evaluated annually as per their performance measures. The evaluation should be recorded in a before-after study to validate the effectiveness of each countermeasure as per the following observations:

- Number of KSI collisions
- Number of police citations
- Number of public comments and concerns

Evaluation should be conducted during similar time periods and durations each year. The most important measure of success of the LRSP should be reduction in KSI collisions throughout the City. If the number of KSI collisions doesn't decrease initially, then the countermeasures should be evaluated as per the other observations, as mentioned above. The effectiveness of the countermeasures should be compared to the goals for each emphasis area.

LRSP Update

The LRSP is a guidance document and is recommended to be updated every two to five years after adoption. After monitoring performance measures focused on the status and progress of the 4 E's strategies in each emphasis area, the next LRSP update can be tailored to resolve any continuing safety problems. An annual stakeholder meeting with the safety partners is also recommended to discuss the progress for each emphasis area and oversee the implementation plan. The document should then be updated as per the latest collision data, emerging trends, and the 4 E's strategies' progress and implementation. This LRSP is a living document that will be used to apply for HSIP, Active Transportation Plan (ATP), Safe Streets and Roads for All (SS4A) funding grants in future cycles. **Table 17** above outlines additional potential funding sources.

Reports Discovery and Admission into Evidence of Certain Reports, Surveys, and Information

Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose reflected to this Report, 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 identified or addressed in the reports, surveys, schedules, lists, or other data pursuant to 23 U.S.C. Section 148(h)(4).

APPENDIX A:
Summary of
Community Comments

Respondent ID	#	Lat	Long	Intersection	Name	What traffic-related concern do you have at this location?	Mode	Pertinent Issue
7mi4wpl4k8u9	1	33.979444	-118.090156	Y	Passons Blvd	pedestrian crossing and pavement striping safety concerns	Pedestrian	Pedestrian Safety
46hdf6v69j64	2	33.979454	-118.090063	Y	Passons Blvd	vehicle traffic is very fast through this intersection. very little protection and visibility for people walking and biking, especially school aged youth.	Motor Vehicle	Intersection Safety
46hdf6v69j64	3	33.979454	-118.090063	Y	Passons Blvd	vehicle traffic is very fast through this intersection. very little protection and visibility for people walking and biking, especially school aged youth.	Motor Vehicle	Speeding
46hdf6v69j64	4	33.979454	-118.090063	Y	Passons Blvd	vehicle traffic is very fast through this intersection. very little protection and visibility for people walking and biking, especially school aged youth.	Pedestrian	Pedestrian Safety
46hdf6v69j64	5	33.979454	-118.090063	Y	Passons Blvd	vehicle traffic is very fast through this intersection. very little protection and visibility for people walking and biking, especially school aged youth.	Bicycle	Bicycle Safety
8p9esk2dax27	6	34.007443	-118.071079	Y	Beverly Blvd	No Leading Pedestrian Intervals. Potential pedestrian and vehicle conflict when cars make right turn on green.	Pedestrian	Pedestrian Safety
8p9esk2dax27	7	34.007443	-118.071079	Y	Beverly Blvd	No Leading Pedestrian Intervals. Potential pedestrian and vehicle conflict when cars make right turn on green.	Motor Vehicle	Unsafe Turning
377jgo33dn49	8	34.001715	-118.084415	N	Whittier Blvd	Signal lighting for intersections should be adjusted so that all thru traffic goes first, so the turn pockets can fill up. So we are not waiting for two lights to change.	Motor Vehicle	Intersection Safety
3tn6t6yjo2n3	9	34.000966	-118.089285	N	Dulin Ave	Road is full of bumps and holes from all the trucks that use it	Motor Vehicle	Road Improvement
7vd3bgn7um98	10	33.962304	-118.104461	Y	Serapis Ave	Drivers do not stop at the stop sign and speed especially when there are children walking to school.	Motor Vehicle	Traffic Red Lights & Sign Violations
947c3bu9kf73	11	34.014323	-118.068014	Y	Woodford St	The paint at this stop sign has faded. It needs to be repainted(possibly larger) so that cars will stop. Many cars do not come to a complete stop at this stop sign. Can a stop sign with flashing lights(solar powered) be installed too?	Motor Vehicle	Signage Improvement
947c3bu9kf73	12	34.014323	-118.068014	Y	Woodford St	The paint at this stop sign has faded. It needs to be repainted(possibly larger) so that cars will stop. Many cars do not come to a complete stop at this stop sign. Can a stop sign with flashing lights(solar powered) be installed too?	Motor Vehicle	Intersection Safety
947c3bu9kf73	13	34.012811	-118.067444	Y	San Gabriel River Pkwy	The lines separating the bike lanes have faded. It's not safe for bike riders to ride on either side of San Gabriel River Parkway. Can more signs be posted reminding drivers to make them aware of the bike lanes?	Bicycle	Bicycle Safety
947c3bu9kf73	14	34.012811	-118.067444	Y	San Gabriel River Pkwy	The lines separating the bike lanes have faded. It's not safe for bike riders to ride on either side of San Gabriel River Parkway. Can more signs be posted reminding drivers to make them aware of the bike lanes?	Bicycle	Signage Improvement

Respondent ID	#	Lat	Long	Intersection	Name	What traffic-related concern do you have at this location?	Mode	Pertinent Issue
947c3bu9kf73	15	34.018129	-118.054114	Y	San Gabriel River Pkwy	This portion of San Gabriel River Parkway is in dire need of repairs. Both sides have pot holes and uneven asphalt. This entryway into pico Rivera desperately needs some TLC.	Motor Vehicle	Road Imporvement
2sl2l966xk77	16	33.988737	-118.103711	Y	Paramount Blvd	Due to the curve, traffic coming from the neighborhoods can't see oncoming traffic.	Motor Vehicle	Visibility
2sl2l966xk77	17	34.009811	-118.084069	N	Los Toros Ave	Passerby's tend to speed not realizing that it curves.	Motor Vehicle	Visibility
8r4rni3yia73	18	34.00547	-118.077067	Y	Beverly Rd	Contacted the city several times about installing speed bumps as cars speed at about 50-at times 60 miles per hour. They install the meter readers for a day or two, and of course there is not enough evidence by speeders noticing the speed reader and same issue, the next day when the speed reader is taken down, cars speeding in a residential area as well as large trucks passing by to the meat factory. A total mess, can't even pull out of my driveway safely as cars speed.	Motor Vehicle	Speeding
8r4rni3yia73	19	33.995717	-118.093933	N	Paramount Blvd	Cars don't respect the speed limit and cause accident. Too many accidents have happened here.	Motor Vehicle	Speeding
8r4rni3yia73	20	34.00795	-118.081739	Y	Beverly Rd	A traffic light is needed to turn left or right, before a accident happens, cars don't give the right aways.	Motor Vehicle	Intersection Safety
8r4rni3yia73	21	33.990316	-118.092199	Y	Rosemead Blvd	A traffic light needs to be installed, people with children are always crossing because the next crossing light is far off from where many of the fields are where children play. Cars speed all the time	Motor Vehicle	Intersection Safety
8r4rni3yia73	22	33.990316	-118.092199	Y	Rosemead Blvd	A traffic light needs to be installed, people with children are always crossing because the next crossing light is far off from where many of the fields are where children play. Cars speed all the time	Motor Vehicle	Speeding
9m33kc74roa3	23	34.016817	-118.084733	Y	Paramount Blvd	More lighting from paramount bl. Gallatin rd to mines ave. To dark	Motor Vehicle	Lighting
9m33kc74roa3	24	34.005829	-118.090831	Y	Olympic Blvd	This street to dark no lighting	Motor Vehicle	Lighting
9m33kc74roa3	25	33.998379	-118.091642	Y	Paramount Blvd	To dark	Motor Vehicle	Lighting
9m33kc74roa3	26	33.99653	-118.093162	N	Paramount Blvd	To dark	Motor Vehicle	Lighting
9m33kc74roa3	27	33.994875	-118.095235	Y	Paramount Blvd	To dark	Motor Vehicle	Lighting
9m33kc74roa3	28	33.993398	-118.096766	N	Paramount Blvd	To dark	Motor Vehicle	Lighting
9m33kc74roa3	29	33.997399	-118.092206	Y	Paramount Blvd	To dark people hot divider	Motor Vehicle	Lighting
3es98utd333c	30	33.983107	-118.087543	Y	Passons Blvd	People be running the light on red.	Motor Vehicle	Traffic Red Lights & Sign Violations
3es98utd333c	31	33.982268	-118.085364	Y	Millux Ave	People run the stop sign almost everyday.	Motor Vehicle	Traffic Red Lights & Sign Violations
3es98utd333c	32	33.985884	-118.084871	Y	Eglise Ave	Stop sign needed people some times don't bother to yield to oncoming traffic	Motor Vehicle	Signage Improvement

Respondent ID	#	Lat	Long	Intersection	Name	What traffic-related concern do you have at this location?	Mode	Pertinent Issue
7og2wxb27nh3	33	33.992262	-118.089825	Y	Rosemead Blvd	There should be more protection in the dividers on Rosemead between Mines and Whittier on the sides. There are far too many accidents. There is noise pollution. The walls shake when the cars and semi trucks are speeding in all times of day. Either plants or concrete walls or a combination of both should help.	Motor Vehicle	Corridor Safety
9bp47s4ln479	34	34.004599	-118.075813	Y	Olympic Blvd	Speeding cars driving down the street. Narrow street with cars parked on both sides of the road causes congestion during the day, especially on weekends.	Motor Vehicle	Speeding
9bp47s4ln479	35	34.004599	-118.075813	Y	Olympic Blvd	Speeding cars driving down the street. Narrow street with cars parked on both sides of the road causes congestion during the day, especially on weekends.	Motor Vehicle	Narrow Roadway
4kg972ej2bt4	36	34.002533	-118.074453	Y	Tobias Ave	There should be a stop sign on Tobias and Stephens St because cars often don't stop which can cause collisions.	Motor Vehicle	Intersection Safety
4kg972ej2bt4	37	34.002533	-118.074453	Y	Tobias Ave	There should be a stop sign on Tobias and Stephens St because cars often don't stop which can cause collisions.	Motor Vehicle	Intersection Safety
74ppa2i2weu8	38	34.007618	-118.086478	Y	Paramount Blvd	Vehicle doesn't sto	Motor Vehicle	Traffic Red Lights & Sign Violations
74ppa2i2weu8	39	34.007488	-118.086351	Y	Paramount Blvd	Cars doesn't stop because too much cars park there	Motor Vehicle	Traffic Red Lights & Sign Violations
86a6yvm8vz39	40	33.987578	-118.082813	Y	Dicky St	Cars are always driving by fast, a night they hardly ever stop. We already called city hall about a year ago and nothing has been done	Motor Vehicle	Speeding
7j4uim7x47y8	41	34.00994	-118.07971	Y	Beverly Blvd	It is more of a Pedestrian safety- due to the fence being covered…..cars that are exiting (from Norm's parking lot) making a right turn are not able to see if Pedestrians are approaching exit driveway…..I am very cautious when I exit but I don't think it's safe for Pedestrians or bicyclists. Thank you!	Pedestrian	Pedestrian Safety
7j4uim7x47y8	42	34.00994	-118.07971	Y	Beverly Blvd	It is more of a Pedestrian safety- due to the fence being covered…..cars that are exiting (from Norm's parking lot) making a right turn are not able to see if Pedestrians are approaching exit driveway…..I am very cautious when I exit but I don't think it's safe for Pedestrians or bicyclists. Thank you!	Motor Vehicle	Unsafe Turning
432sn7wez3hw	43	33.974152	-118.100192	N	Cravell Ave	This street is a dead end street and it's been dangerous how cars drive with so much speed it can kill a child or pedestrian. Please consider a speed bump.	Motor Vehicle	Speeding
432sn7wez3hw	44	33.976026	-118.098648	Y	Rex Rd	This street connects to the elementary school and kids are always walking home. With this street being loopy and staggering sometimes cars drive fast and they can't see if a pedestrian or another car is coming. Several accidents have occurred here and even into the home wall by this streets, speed is an issue.	Motor Vehicle	Speeding

Respondent ID	#	Lat	Long	Intersection	Name	What traffic-related concern do you have at this location?	Mode	Pertinent Issue
432sn7wez3hw	45	33.976026	-118.098648	Y	Rex Rd	This street connects to the elementary school and kids are always walking home. With this street being loopy and staggering sometimes cars drive fast and they can't see if a pedestrian or another car is coming. Several accidents have occurred here and even into the home wall by this streets, speed is an issue.	Motor Vehicle	School Safety
3a7d7gay7lxp	46	33.996237	-118.093812	N	Paramount Blvd	Between Haney and Carron on Paramount cars speed around that corner. There was a big accident on Sunday October 30th. The speeding is out of control. A traffic light is needed. Thanks	Motor Vehicle	Speeding
7lz388lhx276	47	33.971993	-118.09469	Y	Passons Blvd	Large vehicles park on this corner of Passons Blvd creating a blind spot and making it difficult for cars coming out of Bascom and attempting to turn Northbound on Passons. The front end of cars are forced to enter the south side lanes and with the blind spot created, it makes for a very dangerous situation. Request to paint curb red on Passons Blvd. (corner of passons and bascom) All other corners are painted red on passons. This is the only corner that doesn't have the paint.	Motor Vehicle	Improper Parking
3yi397isg6f9	48	33.988677	-118.101802	Y	Candace Ave	The intersection doesn't have stops on either side.	Motor Vehicle	Intersection Safety
9zf942ynn627	49	33.989021	-118.083917	Y	Mines Ave	wide intersection, long cross walk times, impatient drivers	Motor Vehicle	Intersection Safety
9zf942ynn627	50	34.000153	-118.081191	Y	Whittier Blvd	lots of red light running by cars, walk signal sometimes doesn't activate	Motor Vehicle	Traffic Red Lights & Sign Violations
9zf942ynn627	51	34.001561	-118.083857	Y	Rosemead Blvd	illegal u-turns from southbound Rosemead to northbound to reach chic-fil-a	Motor Vehicle	Traffic Red Lights & Sign Violations
9zf942ynn627	52	34.000433	-118.08406	Y	Rosemead Blvd	pedestrians cross the street here	Pedestrian	Pedestrian Safety
9zf942ynn627	53	34.00074	-118.082494	Y	Whittier Blvd	pedestrians cross the street here, needs a crosswalk	Pedestrian	Pedestrian Safety
9zf942ynn627	54	34.001225	-118.078954	Y	West Blvd	sightline issues at intersection corner due to illegal parking on West Blvd	Motor Vehicle	Improper Parking
9zf942ynn627	55	34.001023	-118.082823	Y	Whittier Blvd	new bus layover for Metro 265, causes difficulty in making right turn from San Gabriel to Whittier Blvd	Motor Vehicle	Unsafe Turning
9zf942ynn627	56	34.010567	-118.080882	Y	Beverly Blvd	widened interesection increaes walk cross time	Pedestrian	Pedestrian Safety
9zf942ynn627	57	33.995032	-118.086305	Y	Rosemead Blvd	crosswalk needed, people cross here	Pedestrian	Pedestrian Safety
2ex8ttn79vi4	58	33.992762	-118.097427	Y	Paramount Blvd	Difficult to cross this street to access park in the next neighborhood. Unsafe due to vehicles not stopping or there is no signage/crosswalk	Motor Vehicle	Traffic Red Lights & Sign Violations
2ex8ttn79vi4	59	33.992762	-118.097427	Y	Paramount Blvd	Difficult to cross this street to access park in the next neighborhood. Unsafe due to vehicles not stopping or there is no signage/crosswalk	Pedestrian	Pedestrian Safety
73yvf9d2cr46	60	34.01073	-118.080908	Y	Rosemead Blvd	The size of this intersection is ridiculous and crossing the 5 lane road is incredibly intimidating. Please don't build any more of these as it will decrease the safety of pedestrians.	Pedestrian	Pedestrian Safety

Respondent ID	#	Lat	Long	Intersection	Name	What traffic-related concern do you have at this location?	Mode	Pertinent Issue
8wxm6ceo2bo9	61	33.990369	-118.099278	Y	Paramount Blvd	We need a light. The vehicle are driving over 50 mph from Mines to Washington Blvd. I live near This location an need to pass over to drop off and pick up my daughter from school. Silverette Dr. / Paramount Blvd. please help.	Motor Vehicle	Speeding
8wxm6ceo2bo9	62	33.990369	-118.099278	Y	Paramount Blvd	We need a light. The vehicle are driving over 50 mph from Mines to Washington Blvd. I live near This location an need to pass over to drop off and pick up my daughter from school. Silverette Dr. / Paramount Blvd. please help.	Motor Vehicle	Intersection Safety
8eb8rto3teo7	63	33.995072	-118.094916	Y	Paramount Blvd	Cars are not watching pedestrians cross the street, my family and I have almost got hit multiple times crossing the street to get to the dam	Pedestrian	Pedestrian Safety
8eb8rto3teo7	64	33.993118	-118.091377	Y	Manzanar Ave	There should be a stop sign	Motor Vehicle	Signage Improvement
23e2k3igj9t4	65	34.014865	-118.085373	Y	Paramount Blvd	With the speed of cars they don't stop to give the right away to pedestrians. There's multiple tiles I have to wait 5 minutes until I can cross with my child during rush hours. A signal light that is visible big enough to notice that it's a cross walk. This is dangerous	Pedestrian	Pedestrian Safety
23e2k3igj9t4	66	34.005815	-118.082493	Y	Rosemead Blvd	A signal light needs to be installed. There's been times where I almost crash because there's so much traffic going to north Ranchito school that parents rush and don't put the signal when turning. It's a mess in the mornings and afternoons. Notices couple of crashes in that intersection as well as children and parents almost run over as that crosswalk is to cross to the elementary.	Motor Vehicle	School Safety
23e2k3igj9t4	67	34.005815	-118.082493	Y	Rosemead Blvd	A signal light needs to be installed. There's been times where I almost crash because there's so much traffic going to north Ranchito school that parents rush and don't put the signal when turning. It's a mess in the mornings and afternoons. Notices couple of crashes in that intersection as well as children and parents almost run over as that crosswalk is to cross to the elementary.	Motor Vehicle	Intersection Safety
23e2k3igj9t4	68	34.005374	-118.074587	Y	Canal Way	A signal light needs to be installed, cars speed up to 50 without stopping at the stop sign. Speed bumps should be installed Cars race in the middle of the night. Called the city couple of times they install the speed meter cars don't speed as they see it once it's removed they continue.	Motor Vehicle	Intersection Safety
23e2k3igj9t4	69	34.005374	-118.074587	Y	Canal Way	A signal light needs to be installed, cars speed up to 50 without stopping at the stop sign. Speed bumps should be installed Cars race in the middle of the night. Called the city couple of times they install the speed meter cars don't speed as they see it once it's removed they continue.	Motor Vehicle	Speeding

Respondent ID	#	Lat	Long	Intersection	Name	What traffic-related concern do you have at this location?	Mode	Pertinent Issue
2wf29ubx7fy8	70	33.961036	-118.089113	N	Greenvale Ave	Too fast of drivers on Greenvale and myron. Not safe for children who play and ride bikes. Maybe speed bumps are necessary	Motor Vehicle	Speeding
368mww8img97	71	33.968531	-118.097247	Y	Passons Blvd	Visibility of on coming traffic traveling south on Passons difficult to see when making a left turn from northbound Passons onto Slauson without green arrow.	Motor Vehicle	Visibility
3hc6pn79nnc3	72	34.01102	-118.074304	N	Dork St	Speeding cars thru a very damaged private rd. Too many outsiders using it to avoid traffic on Beverly Blvd	Motor Vehicle	Speeding
4h4dau8dvo93	73	33.985262	-118.095489	Y	Rosemead Blvd	jaywalking. even with a fence in place many people cross here at all hours	Pedestrian	Other -Jaywalking
6ax9ikn4p6o6	74	33.975825	-118.095738	N	Citronell Ave	There is little organization and high traffic during school morning and school release times. Also, need speed bumps to control speeding.	Motor Vehicle	School Safety
6ax9ikn4p6o6	75	33.975825	-118.095738	N	Citronell Ave	There is little organization and high traffic during school morning and school release times. Also, need speed bumps to control speeding.	Motor Vehicle	Speeding
7th6svk7i778	76	34.0013	-118.078897	Y	Durfee Ave	The new roadway underpass construction on Durfee Avenue between Whittier Boulevard and Beverly Road has helped the city's traffic going north and south but many cars are speeding and even ignoring the stop sign in the corner of Durfee Avenue and West Street, which makes it dangerous for pedestrians including the many students that walk by, especially now that it gets dark earlier. I think it would be a good idea to add speed bumps before the stop sign going south on Durfee. Also adding a street light button that lights up the stop sign and street so pedestrians can cross would be great.	Pedestrian	Pedestrian Safety
7th6svk7i778	77	34.0013	-118.078897	Y	Durfee Ave	The new roadway underpass construction on Durfee Avenue between Whittier Boulevard and Beverly Road has helped the city's traffic going north and south but many cars are speeding and even ignoring the stop sign in the corner of Durfee Avenue and West Street, which makes it dangerous for pedestrians including the many students that walk by, especially now that it gets dark earlier. I think it would be a good idea to add speed bumps before the stop sign going south on Durfee. Also adding a street light button that lights up the stop sign and street so pedestrians can cross would be great.	Motor Vehicle	Speeding

Respondent ID	#	Lat	Long	Intersection	Name	What traffic-related concern do you have at this location?	Mode	Pertinent Issue
7th6svk7i778	78	34.0013	-118.078897	Y	Durfee Ave	The new roadway underpass construction on Durfee Avenue between Whittier Boulevard and Beverly Road has helped the city's traffic going north and south but many cars are speeding and even ignoring the stop sign in the corner of Durfee Avenue and West Street, which makes it dangerous for pedestrians including the many students that walk by, especially now that it gets dark earlier. I think it would be a good idea to add speed bumps before the stop sign going south on Durfee. Also adding a street light button that lights up the stop sign and street so pedestrians can cross would be great.	Motor Vehicle	Intersection Safety
7th6svk7i778	79	34.004484	-118.077758	Y	Durfee Ave	This is another street where cars speed by and ignore the pedestrian walking sign. I have seen cars nearly missing hitting people. Another flashing stop sign would be good here.	Motor Vehicle	Speeding
7th6svk7i778	80	34.004484	-118.077758	Y	Durfee Ave	This is another street where cars speed by and ignore the pedestrian walking sign. I have seen cars nearly missing hitting people. Another flashing stop sign would be good here.	Motor Vehicle	Intersection Safety
4pd8bmy76t38	81	34.008156	-118.073198	Y	Beverly Blvd	1. Cars consistently running red lights at high speeds. 2. Unsafe crossing conditions between residential neighborhood and park.	Motor Vehicle	Traffic Red Lights & Sign Violations
4pd8bmy76t38	82	34.008156	-118.073198	Y	Beverly Blvd	1. Cars consistently running red lights at high speeds. 2. Unsafe crossing conditions between residential neighborhood and park.	Pedestrian	Pedestrian Safety
86y7tns4sry6	83			N	Railton St	Street needs to be repaved	Motor Vehicle	Road Imporvement
8p9esk2dax27	84			N	San Gabriel River Pkwy	There is no stop sign on Stephens st and passons blvd. cars are always passing full speed. There has been 3 accidents where a driver has hit a parked car and we have students walking along that area .	Motor Vehicle	Signage Improvement
8p9esk2dax27	85			N	San Gabriel River Pkwy	There is no stop sign on Stephens st and passons blvd. cars are always passing full speed. There has been 3 accidents where a driver has hit a parked car and we have students walking along that area .	Motor Vehicle	Speeding
8p9esk2dax27	86			N	San Gabriel River Pkwy	There is no stop sign on Stephens st and passons blvd. cars are always passing full speed. There has been 3 accidents where a driver has hit a parked car and we have students walking along that area .	Motor Vehicle	School Safety
8p9esk2dax27	87			Y	San Gabriel River Pkwy	No sidewalk. have to walk/run on the street	Pedestrian	Pedestrian Safety
8p9esk2dax27	88			N	Whittier Blvd	hard to share space with cars and parked cars while biking, aggressive passing, squeezed between parked and passing cars	Bicycle	Bicycle Safety
8p9esk2dax27	89			Y	Passons Blvd	WB Whittier, parked vehicles force cyclist to take the travel lane, this section could be a bike lane except for allowed street parking, there are parking lots available	Bicycle	Bicycle Safety

Respondent ID	#	Lat	Long	Intersection	Name	What traffic-related concern do you have at this location?	Mode	Pertinent Issue
8p9esk2dax27	90			Y	Mines Ave	EB Whittier Blvd, cars use first lane next to curb to pass at high speed, causes conflict with cyclist riding as far to the right as feasible (as required by law)	Bicycle	Bicycle Safety
8p9esk2dax27	91			Y	Mines Ave	EB Whittier Blvd, cars use first lane next to curb to pass at high speed, causes conflict with cyclist riding as far to the right as feasible (as required by law)	Motor Vehicle	Speeding
8p9esk2dax27	92			N	Beverly Blvd	both directions, narrowed street width causes conflict between high speed cars and cyclists	Motor Vehicle	Narrow Roadway
8p9esk2dax27	93			N	Beverly Blvd	both directions, narrowed street width causes conflict between high speed cars and cyclists	Motor Vehicle	Speeding
3tn6t6yjo2n3	94			Y	Bequette Ave	backed up traffic from in-n-out blocks crosswalk, bus stop, and makes drivers dangerously swerve as they cross Rosemead along EB Whittier	Motor Vehicle	Slow Moving Traffic
4eho9rtv4kow	95			N	Serapis Ave	very narrow sidewalk forces people to step into roadway to pass each other, especially if they have shopping carts, strollers, bikes	Pedestrian	Sidewalk Improvement
9m33kc74roa3	96			Y	Paramount Blvd	Cyclists are forced to take a general purpose lane instead of riding closer to shoulder due to 4-5 parked cars, Rosemead Blvd could fit bike lanes (north limits to Washington) except for these 4-5 cars	Bicycle	Bicycle Safety
7og2wxb27nh3	97			N	Rosemead Blvd	NB Riosemead re-striped to 3 lanes from Beverly Rd to Beverly Blvd, returns to 2 lanes after Beverly Blvd. Cars use right travel lane to pass at high speed. Causes conflict with cyclists using rightmost lane as required by law	Motor Vehicle	Unsafe Turning
7og2wxb27nh3	98			Y	Bradhurst St	little space for cycling, danger with cars pulling out from parking and not seeing cyclists	Bicycle	Bicycle Safety
4kg972ej2bt4	99			N	Stephens St	Parked cars force conflict between cyclists and drivers in travel lane	Bicycle	Bicycle Safety
4kg972ej2bt4	100			Y	Stephens St	Vehicles speeding not safe for children to be outside	Motor Vehicle	Speeding
74ppa2i2weu8	101			N	Paramount Blvd	All streets need to be re done. Especially near the schools and district and Whittier Blvd where the water collects and cars don't see the road and when driven over it messes up our vehicles and tires.	Motor Vehicle	Road Imporvement
2e9fek3imu76	102			Y	Passons Blvd	Speeding vehicles and accidents in recent years include fatal accident. Maybe extend median	Motor Vehicle	Speeding
8wkx3zl93c96	103			Y	Stephens St	The wide street leads to speeding often and there are usually children around due to the park. Traffic calling would be useful here	Motor Vehicle	Speeding
9zf942ynn627	104			N	Mines Ave	People use this loop as a race track at night, there are currently no speed bumps in this loop and this is a neighborhood with children and an elementary school on the corner. I worry a speed bump won't be installed until after a tragic accident occurs	Motor Vehicle	Speeding

Respondent ID	#	Lat	Long	Intersection	Name	What traffic-related concern do you have at this location?	Mode	Pertinent Issue
9zf942ynn627	105			Y	Passons Blvd	Uncontrolled, unmonitored, overloaded zero enforcement of commercial vehicle traffic	Motor Vehicle	Traffic Red Lights & Sign Violations
9zf942ynn627	106			N	Whittier Blvd	Uncontrolled, unmonitored overloaded zero enforcement of Commercial Vehicles	Motor Vehicle	Traffic Red Lights & Sign Violations
9zf942ynn627	107			N	Whittier Blvd	Uncontrolled, unmonitored, overloaded zero enforcement of Commercial Vehicles	Motor Vehicle	Traffic Red Lights & Sign Violations
9zf942ynn627	108			N	Whittier Blvd	It needs to have more space for bicicle riders and more access for pedestrians with signage and a light so we can all cross safety and have traffic stop so is easy to cross	Pedestrian	Pedestrian Safety
9zf942ynn627	109			N	Whittier Blvd	It needs to have more space for bicicle riders and more access for pedestrians with signage and a light so we can all cross safety and have traffic stop so is easy to cross	Bicycle	Bicycle Safety
9zf942ynn627	110			N	Whittier Blvd	Speeding, no stoplights, no bike lane, no sidewalk for trail entrance	Motor Vehicle	Speeding
9zf942ynn627	111			N	Whittier Blvd	Speeding, no stoplights, no bike lane, no sidewalk for trail entrance	Bicycle	Bicycle Safety
9zf942ynn627	112			N	Whittier Blvd	Speeding, no stoplights, no bike lane, no sidewalk for trail entrance	Pedestrian	Pedestrian Safety
9zf942ynn627	113			N	Rosemead Blvd	This street has drivers going 35+ to get the signal. There are houses and an elementary school on it. I think some speed bumps would encourage proper residential speed	Motor Vehicle	Speeding
9zf942ynn627	114			N	Rosemead Blvd	This street has drivers going 35+ to get the signal. There are houses and an elementary school on it. I think some speed bumps would encourage proper residential speed	Motor Vehicle	School Safety
9zf942ynn627	115			N	Rosemead Blvd	This street has drivers going 35+ to get the signal. There are houses and an elementary school on it. I think some speed bumps would encourage proper residential speed	Motor Vehicle	Road Safety
9zf942ynn627	116			N	Rosemead Blvd	Need to add a center divider on the curve on paramount to prevent any vehicle accidents. Head on collision happened recently	Motor Vehicle	Road Imporvement

APPENDIX B:
Summary of Planning Documents

Appendix B: Summary of Planning Documents

<table>
<tr><th>Document</th><th>Highlights</th></tr>
<tr><td>Pico Rivera Systemic Safety Analysis Report (2020)</td><td>The SSAR focused on four main corridors for analysis and improvements. They were Whittier Boulevard, Passons Boulevard, Slauson Avenue, and Paramount Corridor.

For Whittier Boulevard, the following intersections were analyzed: Rosemead Boulevard, Paramount Boulevard, Durfee Avenue, Gregg Avenue, Passons Boulevard, Millux Avenue and Lindsey Avenue. The following roadway segments were also analyzed: The whole Whittier corridor and the portions from Esperanza Avenue and Gregg Road and Rosemead Boulevard to Paramount Boulevard.

For Passons Boulevard Corridor, the following intersections were analyzed: Washington Boulevard, Slauson Avenue, Rex Road, and Rivera Road. The roadway segments analyzed were: Washington Boulevard to Rex Road and Rex Road to Rivera Road.

For Slauson Avenue, intersections analyzed were: Rosemead Boulevard, Paramount Boulevard, Reeve Road, Serapis Avenue, and Crossway Drive. Roadway segments analyzed were Paramount Boulevard to Serapis Avenue and Serapis Avenue to Songfest Drive.

The Paramount Boulevard intersections analyzed included: Gallatin Road, Beverly Boulevard, Beverly Road, Loch Lomond Drive, Mines Avenue, Maris Avenue, Washington Boulevard, Rex Road, Trojan Street, Slauson Avenue, Maxine Street, and Telegraph Road. Roadway segments included: Beverly Boulevard to Gallatin Road, Whittier Boulevard to Mines Avenue, Mines Avenue to Washington Boulevard, and Washington Boulevard to Rex Road.

Safety Countermeasures were recommended at additional intersections and roadway segments.

The additional intersections analyzed with countermeasures recommended included:
Beverly Boulevard and Durfee Avenue
Rex Road and Rosemead Boulevard
Rosemead Boulevard and Danbridge Street
Beverly Boulevard and Pine Street</td></tr>
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Document	Highlights
	• Beverly Boulevard and Sandoval Avenue • Kilgarry Avenue and Danbridge Street • Rosemead Boulevard and Havewood Drive Roadway segments included: • Gallatin Road from Paramount Boulevard to Rosemead Boulevard • Kruse Road from Durfee Avenue to Narrows Drive • Mines Avenue from Paramount Boulevard to San Gabriel River
Pico Rivera General Plan | Circulation Element (2014)	The Circulation Element presents the City's policies for achieving and maintaining safe, efficient, and reliable mobility for residents, visitors, goods, and services throughout the community. Through implementation of this Element, the City seeks to: **Goals** o Establish and maintain a safe and efficient roadway and highway network with adequate carrying capacity during peak travel hours; o Make provisions for local and regional transit services that represent viable alternatives to automobile travel during peak commuting hours as well as adequately accommodating the needs of transit-dependent residents throughout the day; o Support the community's local economy by providing for the movement of needed goods by truck and rail without impacting the community's residential neighborhoods; o Enhance the ability of children to safely access schools, parks, and library facilities by walking or riding bicycles; and o Provide adequate and accessible parking facilities. o Build a walkable city, reduce traffic congestion, improve transit, and expand the bicycle network. **Goals, Objectives ,Policies and Implementation Actions:** Complete Streets: **Goal 5.1** Promote active living, improve local air quality, and enhance the livability of the community through an integrated multimodal network that serves all users within the City and offers convenient mobility options, including vehicular travel, transit services, bicycle routes, and pedestrian paths.

Document	Highlights
	Policy 5.1-1 Multimodal Options. Make transportation mode shifts possible by designing, operating, and maintaining streets to enable safe and convenient access and travel for all users—pedestrians, bicyclists, transit riders, and people of all ages and abilities, as well as freight and motor vehicle drivers—and to foster a sense of place in the public realm. **Implementation Programs for Policy 5.1-1:** Work with Montebello Bus Lines to determine the feasibility and desirability of relocating the existing terminal along Passons Boulevard and Jackson Street to a different location (potentially along Washington Boulevard) to anchor higher intensity transit-oriented development. **Policy 5.1-2 Serve All Users.** Provide a safe, efficient, and accessible transportation network that meets the needs of all users in the community, including seniors, youth, and the disabled, and contributes to the community's quality of life by: • Balancing the needs of all users of the public rights-of-way by providing safe and convenient travel and access for bicyclists, transit riders, freight and motor vehicle drivers, and people of all ages and abilities. • Designing streets to accommodate larger vehicles such as buses, fire service vehicles, and freight delivery trucks without compromising pedestrian and bicycle safety. • Providing safe and comfortable access for persons with disabilities. • Providing public open space that integrates amenities including street trees and landscaping, street and sidewalk lighting, transit facilities, street furniture, water features, and public art work. **Policy 5.1-3 Complete Streets.** Accommodate other modes of travel such as bicycling and walking when implementing roadway improvements, where feasible. • Promote the use of transit by improving the efficiency of transit systems and creating safe and attractive walking environments. • Promote the ability to walk by providing safe and comfortable pedestrian facilities and traffic signal timing that allows for the safe crossing of major roadways by pedestrians.

Document	Highlights
	• Provide street lighting that is attractive, functional, and appropriate to the character and scale of the neighborhood or area, and that contributes to vehicular, pedestrian, and bicycle safety. • Demand-actuated traffic signals should include push buttons to signal the need for pedestrians to cross, and include audible signals and countdown signs to assist the disabled in crossing streets. • Demand-actuated traffic signals corresponding with bicycle routes should include bicycle sensitive loop detectors or push buttons adjacent to the curb. • Permit the sharing or parallel development of pedestrian walkways with bicycle paths, where this can be safely accomplished, in order to maximize the use of public rights-of-way. • Require the construction of attractive walkways in new residential, commercial, office, and industrial developments, including provision of shading for pedestrian paths. • Maximize visibility and access for pedestrians, and encourage the removal of barriers for safe and convenient movement of pedestrians. **Policy 5.1-4 Smart Growth Development.** Integrate transportation and land use decisions to enhance opportunities for development that is compact, walkable, and transit oriented. **Policy 5.1-5 Access to Key Locations.** Strive to provide multimodal access throughout the City, but especially to key locations such as employment centers, schools, parks medical facilities, libraries, and grocery stores. **Policy 5.1-6 System Expansion.** Require new development to contribute funds to area-wide transit improvements to expand the system and increase efficiency. **Policy 5.1-7 Transit Ridership.** "Utilize the Gateway Cities 2014 Strategic Transportation Plan as a guide to analyze proposed and future transportation projects that affect transit ridership, personal vehicle travel, and other modes at a local and regional level.

Document	Highlights
	Policy 5.1-8 Context-Sensitive Street Standards. Design and operate streets and intersections to be sensitive to adjacent land uses and districts and to all roadway users, including transit, bicycles, and pedestrians, where appropriate. **Policy 5.1-9 Roadway Sizing.** Provide appropriate roadway sizing in the city. Where roads are wider than traffic requires, consider converting surplus land to landscaped medians, bicycle lanes, and wider sidewalks to make the roadway more pedestrian and bicycle friendly. **Policy 5.1-10 Amenities.** Improve streetscape amenities around the city, including bus shelters and trash receptacles to create an enhanced environment and encourage usage. **Goal 5.2** **A roadway system that ensures the safe and efficient movement of people, goods, and services.** **Policy 5.2-1 Roadway Plan.** Plan, design, and improve roadways in accordance with Figure 5-1 Circulation Plan. **Policy 5.2-2 Level of Service Objective.** Strive to achieve and maintain operations at intersections at LOS D or better at peak travel times within the City. o In those locations where this objective is infeasible, implement all feasible mitigation measures. o Require all development projects to provide their fair share (in the form of physical improvements and/or fee payment) for all feasible improvements. **Policy 5.2-3 Alternative Measures to Increase Efficiency.** Maximize the operational efficiency of the roadway system by developing alternative measures where improvements are needed but are not feasible to implement. Measures can include traffic demand management programs, consolidation of driveways, and prohibiting on-street parking to ease congestion.

Document	Highlights
	Policy 5.2-4 Intersections. Identify intersection improvements needed throughout the city to provide acceptable levels of service to maintain consistency with the Circulation Element. Implementation Program for Policy 5.2-4: o Prioritize needed intersection improvements. o Identify potential funding sources for needed intersection improvements. o As funds for intersection improvements become available, make improvements to priority intersections. **Policy 5.2-5 Bridge Widening.** Work with surrounding jurisdictions and the Southern California Association of Governments to plan for and secure funding for needed future bridge improvements over the Rio Hondo and San Gabriel Rivers. **Policy 5.2-6 Roadway Capacity.** Create additional roadway capacity along Passons Boulevard and other roadways, where feasible, through elimination of on-street parking (either all day or during peak hours), as well as other street improvements that can be made within the existing right-of-way. **Policy 5.2-7 Park and Ride Lots.** Maintain the existing park and ride lot at Pico Park and explore adding additional lots within the city to encourage carpooling, including at Smith Park. **Policy 5.2-8 Medians.** Identify proposed locations for enhanced medians within the community to improve the existing streetscape. **Policy 5.2-9 Private Streets.** Private streets, where permitted, shall provide for adequate circulation and emergency vehicle access. Private streets that will accommodate more than 50 vehicles per hour in the peak hour or that are designed for on-street parking shall be designed to public street standards. The design of other private streets shall be subject to the review and approval of the Public Works Director. Prior to their approval, adequate provisions for the long term maintenance of private streets shall be ensured. Private streets shall be improved to public street standards prior to acceptance of dedications to the City.

Document	Highlights
	Policy 5.2-10 Traffic Studies. Require the preparation of site-specific traffic studies for new development proposals that are determined by the City to have the potential to impact traffic. **Policy 5.2-11 Funding Sources.** Pursue and develop funding sources for the maintenance and rehabilitation of the transportation system. **Policy 5.2-12 Regional Coordination.** Continue to coordinate transportation and land use plans and policies with local and regional planning agencies, and incorporate the Regional Transportation Plan, where feasible. This includes: o Continuing to work with Caltrans and neighboring cities to minimize any o cumulative significant impacts on State facilities, including Interstate 5, o State Route 60, and State Route 605. o Participation in the development of a fair share fee program if required by Caltrans, to address mitigation of significant impacts to the above listed state facilities. **Policy 5.2-13 Regional Trips.** Coordinate with adjacent jurisdictions and regional agencies to address the impacts of trips originating outside of and passing through the city. **Policy 5.2-14 Transportation Demand Management.** Promote transportation demand management programs, as appropriate, for uses with substantial traffic generating characteristics. **Policy 5.2-15 Traffic Calming.** Consider development of a traffic calming program and implementation of traffic calming measures, where appropriate and feasible, to minimize the impacts on the use of local streets by vehicular traffic and to maintain the health, safety and livability of the neighborhoods. **Policy 5.2-16 Pavement Maintenance.** Utilize the 2012-2017 Pavement Management Program for the ongoing maintenance of city streets. **Goal 5.4 A balanced transportation system where bicycling and walking are alternative methods to the automobile.**

Document	Highlights
	Policy 5.4-1 Continuous Network. Provide a safe and continuous bicycle and pedestrian network that links neighborhoods, parks, schools, libraries, commercial development, major employers, and other frequently visited destinations as a means of improving health in the city. **Policy 5.4-2 Roadway Improvement Projects.** Incorporate bicycle and pedestrian features within roadway improvement projects, when feasible. **Policy 5.4-3 Bicycle Network.** Design and implement a functional bicycle network by expanding bicycle routes, striping bicycle lanes where feasible, providing signage for bicycle routes, and providing adequate bicycle parking at City facilities. **Policy 5.4-4 Bicycle Support Facilities.** Require bicycle parking and support facilities at new industrial, commercial, institutional developments, and transit facilities, as appropriate. **Policy 5.4-5 River Bike Trails.** Improve, maintain, and expand bike trails along the Rio Hondo and San Gabriel river corridors. **Policy 5.4-6 Pedestrian Network.** Improve the pedestrian network by incorporating streetscape improvements such as shade trees, plantings, lighting, and street furniture. **Policy 5.4-7 Sidewalk Deficiencies.** Improve areas with sidewalk deficiencies to increase walking in Pico Rivera. **Policy 5.4-8 ADA.** Incorporate American with Disabilities Act (ADA) requirements to create an accessible pedestrian system that can serve all users. **Policy 5.4-9 Regional System.** Coordinate with surrounding jurisdictions, regional agencies, and non-profit groups to improve the Emerald Necklace Park Network, a loop trail system of parks and greenways which includes areas within the City of Pico Rivera. **Goal 5.5** **Well-managed parking opportunities that are balanced with traffic congestion and other City priorities.**

Document	Highlights
	Policy 5.5-1 Parking Standards. Ensure that City parking standards are appropriate to the use and location of existing and new development. **Policy 5.5-2 Older, Strip Commercial.** Develop off-street parking solutions for older, strip commercial developments only where reducing or eliminating on street parking will improve carrying capacity and reduce congestion. Such solutions might include, but are not limited to, parking restrictions during peak travel hours or provision of joint use off-street parking facilities. **Policy 5.5-3 On-Street Parking Turnover.** Implement parking management tools that maximize on-street parking turnover, where appropriate. **Policy 5.5-4 Shared Parking.** Encourage parking in shared surface lots to make the most efficient use of land, while maximizing shared parking opportunities for uses with varied peak parking standards.
City of Pico Rivera Strategic Plan (2022-2023)	Strategic plans are a vital tool for local jurisdictions to ensure that the priorities set by the City Council are conveyed in the organization's goals, that strategies are clearly defined to meet those goals, and the overall city government is accountable for meeting the community's needs. • The fundamental components of a strategic plan include mission, vision and values statements, and concise goals, strategies, and actions. Defining the mission of the organization provides a starting point for the planning process; the vision defines the end goal, and the values guide how the organization will behave to reach that goal. **Goals and Strategies:** **Fiscal and Organization Sustainability:** Create a city government built to adapt to change. **Strategies:** o Build a more transparent and sustainable fiscal system to improve trust and efficiency. o Identify and implement opportunities for financial efficiency. o Improve organizational effectiveness to reduce costs and streamline efforts. o Foster organizational sustainability to ensure long-term stability. o Develop, retain, and acquire an effective team within the city.

Document	Highlights
	Economic Development and Land use Encourage the development of vacant/underutilized space, creatively plan for growth and engage the business community to transform the city as an economic and cultural hub. **Strategies** o Foster an environment that promotes diverse business growth, attraction, retention, and housing opportunities in the city. o Create special assessment districts to finance and facilitate economic development. o Facilitate public infrastructure improvements that enhance safety, accessibility, and mobility. o Establish the City of Pico Rivera as an environmentally friendly, sustainable community that attracts green industries. **Infrastructure** Plan, fund, build and maintain reliable and cost- effective infrastructure that contributes to enhancing quality of life. **Strategies:** o Prepare and update master plans to ensure up-to-date planning, innovative practices, sustainable methods, and future technology. o Develop funding policies and strategies to invest in infrastructure planning, construction, and maintenance. o Complete construction of necessary infrastructure projects to implement master plans in a timely manner. o Facilitate a high-level of maintenance of City infrastructure to reduce increased costs from prolonged deferral. **Community Engagement** Foster a connected, collaborative and actively participating city and workforce. Strategies: o Increase community participation and inclusion to cultivate a powerful sense of community pride and public awareness. o Continue city communications and media content to inform, involve, and empower stakeholders. o More effectively communicate information to be transparent, open, and accountable.

Document	Highlights
Pico Rivera Regional Bikeway Project (2019)	**Circulation Element** **Goals and Policies applicable to this project:** • **Goal 5.1** Promote active living, improve local air quality, and enhance the livability of the community through an integrated multimodal network that serves all users within the City and offers convenient mobility options, including vehicular travel, transit services, bicycle routes, and pedestrian paths. o **Policy 5.1-1 Multimodal Options**: Make transportation mode shifts possible by designing, operating, and maintaining streets to enable safe and convenient access and travel for all users—pedestrians, bicyclists, transit riders, and people of all ages and abilities, as well as freight and motor vehicle drivers—and to foster a sense of place in the public realm. o **Policy 5.1-3 Complete Streets:** Accommodate other modes of travel such as bicycling and walking when implementing roadway improvements, where feasible. Demand-actuated traffic signals corresponding with bicycle routes should include bicycle sensitive loop detectors or push buttons adjacent to the curb. Permit the sharing or parallel development of pedestrian walkways with bicycle paths, where this can be safely accomplished, in order to maximize the use of public rights-of-way. o **Policy 5.1-9 Roadway Sizing**: Provide appropriate roadway sizing in the city. Where roads are wider than traffic requires, consider converting surplus land to landscaped medians, bicycle lanes, and wider sidewalks to make the roadway more pedestrian and bicycle friendly. • **Goal 5.4** A balanced transportation system where bicycling and walking are alternative methods to the automobile. o **Policy 5.4-1 Continuous Network**: Provide a safe and continuous bicycle and pedestrian network that links neighborhoods, parks, schools, libraries, commercial development, major employers, and other frequently visited destinations as a means of improving health in the city. o **Policy 5.4-2 Roadway Improvement Projects**: Incorporate bicycle and pedestrian features within roadway improvement projects, when feasible.

Document	Highlights
	○ **Policy 5.4-3 Bicycle Network:** Design and implement a functional bicycle network by expanding bicycle routes, striping bicycle lanes where feasible, providing signage for bicycle routes, and providing adequate bicycle parking at City facilities. Project Proposed: ○ Mines Avenue Class IV Bikeway ○ Mines Avenue Bikeway Bridge ○ Dunlap Crossing Road Bikeways
Pico Rivera Urban Greening Plan (2015)	**Goals for Trees along Transit Corridors:** ○ Increase canopy cover using upright species and varying height to add interest. ○ Encourage infill of existing vacancies where feasible. ○ Plant trees in patterns where feasible. Plant tall and short, fine textured with coarse textured to add interest to the street. ○ Use predominantly columnar or vase-shaped species in the parkway. ○ Median islands can be planted with broader crowing species and accented with specimen palms or other trees that can be used for wayfinding purposes. Bicycle and Pedestrian Corridors: These streets should have consistent character due to bicycle and pedestrian improvements for non-motorized users, and their connections within Pico Rivera and surrounding cities. Areas identified as Bike/Ped focus can use trees that are more diverse than the Commercial and Transit areas. ○ Streets that have bicycle facilities and connections to schools, parks and retail. ○ Streets that should have wayfinding, consistent tree palette and adequate shade for pedestrians. ○ Provide trees species that can be kept at 8 feet from grade to allow room for bicyclists. ○ Decrease summer peak temperatures and sun exposure by increasing large crowning shade trees where parkway space allows. ○ Avoid species with large hard pods or other obstructions that might land in the street.

Document	Highlights
	○ New tree planting should take into consideration that a bicyclist needs at least 3 feet of lateral clearance to operate and avoid trees that might encroach on that space. **Type of Green Streets:** ○ **Commercial Green Streets:** Emphasizes specific branding to establish a strong retail presence. The street includes coordinated streetscape furnishings. Surrounding buildings are typically mixed-use with ground floor retail. ○ **Transit Green Street:** Highlights the transit stops on specific streets. These streets focus on creating safe, attractive pedestrian and/or bicycle connections as a priority to allow optimized access to transit stops. **Pedestrian/bike Green Street:** Creates a comfortable and safe walking environment which includes a bicycle facility or access to school and parks. The street design focuses on walking, biking, and connecting major origins and destinations. **Neighborhood Green Street:** Enhances the walking environment, attracting more pedestrians and creating open space opportunities in residential neighborhoods. Design elements may include different paving materials and textures, landscaping that is adjacent to the roadway, and curb less streets. **Pedestrian Facilities Element** The commercial green street is primarily concerned with the pedestrian environment, and safe routes for pedestrians should be provided, including: ○ Timing of intersections and signal calibration ○ Raised crosswalks and pedestrian signal countdowns ○ Wide sidewalks with adequate street lighting ○ Pedestrian parklets ○ Access to adjacent retail **Standard Improvement:** ○ Corner Curb Extension ○ Pedestrian Scale Lighting ○ Marked Crosswalks ○ Parkway Plants ○ Ped Signals (Countdown) ○ Street trees

Document	Highlights
	○ Special Paving in Sidewalk Zone ○ New Signal and Signal Calibration ○ Street Furnishings ○ Class 3 Bike Routes Class2 Bike Lane **Bicycle Facilities Element:** In addition to walking, people may walk to a bus stop. It is important for adjacent streets to provide safe bicycle routes. Bicycle facilities include: ○ Class 3 bike routes with sharrow markings and roadway signage that bikes may take the lane. ○ Bike lanes if right of way exists.
Pico Rivera Capital Improvement Plan (2021-2023)	The City's Departments have various initiatives for FY 2021-2023 using the City's Council's Major priorities as a guide. • The budget presented herein demonstrates our continued commitment to ensuring optimal service delivery to our resilient community, fiscal sustainability and a major focus on maintaining long-term financial stability. • Expenditures have been developed with a "zero based budget" approach. City-wide each department built their budget from the ground up, starting from zero. • This involves re-evaluating every line item of the Maintenance and Operations budget and justifying all the expenditures that are proposed to be incurred by the department. ○ Recognizing the need for preventative maintenance and repairs to preserve City facilities and infrastructure, the City Council continues to fund multiple capital projects. ○ The Capital Improvement Program (CIP) is a long range fiscal forecast, which identifies major public improvements to the City's infrastructure over the next five years. ○ The City's CIP encompasses street and roadway improvements, park projects, information technology upgrades, facilities infrastructure improvements and other large-scale capital projects. ○ The five-year CIP plan has been developed in accordance with the recommendations set forth in the master plans completed over the last year that include water, wastewater, storm drain, Americans with Disabilities Act (ADA) and Pavement Management Program (to assess the condition of our streets).

Document	Highlights
	The total CIP budget for the five-year period of FY 2021-26 is $187 million. Of this amount, over $114 million represents continuing projects and $73 million in new project funding being requested for FY 2021-22. **City Council Priorities:** • Fiscal and Organizational Sustainability • Economic Development • Infrastructure • Land Use • Public Safety
Gateway Cities Strategic Transportation Plan (2016)	The STP encompasses all modes of surface transportation in the Gateway Cities, including: o Local and regional arterial highways; o Freeways; o Local and regional transit; o Park-and-ride lots; o Active transportation; and o Goods movement and logistics. **Active Transportation Policy Issues:** o **Coordinated Planning.** Although regional connectivity requires regional coordination, active transportation infrastructure planning and implementation are typically conducted at the jurisdictional level. Differing local preferences and priorities can create institutional obstacles to planning and implementation of bicycle or pedestrian infrastructure. Enhanced coordination between jurisdictions, Metro and the GCCOG is a sub-regional priority. o **Integrated Construction**. Transit, roadway, and major utility projects near major transit hubs should incorporate the improvements identified in this ATP and local plans. Interagency coordination will maximize the limited investment dollars available, and minimize disruptions associated with construction projects. o **Safety.** Perceived safety and personal security are important determinants of whether one will choose to walk or bicycle over other means of transportation. Surveys indicate that many do not feel safe or comfortable riding on streets that exhibit high vehicle volumes and travel speeds, or that do not provide marked or separated bicycle lanes.

Document	Highlights
	○ **Connectivity**. The ability to access one's destination is a critical factor when considering transportation modes. Common barriers to accessibility for bicyclists and pedestrians in the Gateway Cities include gaps in the network of bike routes, lanes, and paths; impassable or non-existent sidewalks; linear barriers such as freeways, train tracks, and long blocks; and insufficient infrastructure to facilitate roadway crossings. Traveling long distances can be a barrier to active transportation, thus connecting bicycling and walking to transit is vital for enabling longer trips. **Transit Policy Issues:** ○ **Invest in service and operational improvements that improve the frequency and reliability of existing services.** Funding and financing should be used to preserve and maintain existing services. Where possible, investments should strive to enhance transit service frequency and reliability. ○ **Invest in enhanced personal security features**. Improve personal security of both patrons and employees at bus stops, stations and on buses by investing in enhanced lighting, closed-circuit cameras, and monitoring. ○ **Invest in transit access safety features**. Local jurisdictions and transit agencies share a mutual interest in improving first and last mile access to transit stations and stops. Transit agencies and jurisdictions should work together to improve the safety of bicyclists and pedestrians by addressing hazardous road crossings, removing barriers to access, and improving station area maintenance (e.g. pavement conditions). ○ **Invest in providing real-time arrival and departure information to customers.** Provide real-time bus arrival and departure information to improve system reliability and reduce uncertainty among transit users. ○ Invest in improved transit station and stop amenities to meet the needs of persons with disabilities and senior citizens. Ensure bus stops comply with Americans with Disabilities Act requirements. ○ **Invest in context-sensitive amenities at bus stops.** One size does not fit all when it comes to improving station/stop amenities. The needs of each station and stop in the transit system vary based on location, ridership demand, customer base,

Document	Highlights
	and other context-specific factors. Benches, shading, and other amenities should be implemented to meet the specific needs of each bus stop. ○ **Provide fare incentives to key transit users through regionally coordinated program.** Encourage targeted discounts for students, persons with disabilities, senior citizens, and/or participating employers. ○ **Improve coordination between transit agencies.** Regional constraints require regional solutions. Move toward improved regional cooperation between municipal transit providers and Metro to address system deficiencies, including a compatible fare collection payment system that meets the needs of customers.
Pico Rivera Safe Routes to School Program, 2013-2015 Final Report (2015)	Safe Routes to School (SRTS) is a national movement to support children and families in traveling to school by active modes, and to improve traffic safety for children who walk and bicycle. **SRTS Coordinator Responsibilities:** ○ Meet with school principals and introduce the program. ○ Meet with City departments and local groups to build relationships and partnerships. ○ Attend existing parent group meetings to obtain feedback on challenges to walking/biking and program opportunities. ○ Coordinate logistics with City, District and school staff. ○ Schedule Talk the Talk trainings, citywide bike festival, and other events. ○ Reports findings at Task Force meetings. **Walk Audit Recommendations:**

Location	Observed Change	Lead Agency
Klinedale Ave at Florpark St		Install RRFB (South Side)
Klinedale Ave at Florpark St	MUTCD signage is outdated	Replace existing signage with yellow-green S1-1 and W16-7P (Assembly B) signs

Document	Highlights		
	Florpark St between Hasty Ave and Klinedale Ave	Motor vehicle encroachment onto sidewalk creates obstacles for walkers.	Widen sidewalks to reduce motor vehicle encroachment and improve visibility
	Hasty Ave at Florpark St	No crosswalk on east side.	Construct a crosswalk (east side)
	Hasty Ave at Florpark St	No tactile domes on NE curb ramp.	Install tactile domes on NE curb ramps.
	Nova St at Orange Ave	No tactile domes on NE and SE curb ramps.	Install tactile domes on NE and SE curb ramps.
	Nova St at Orange Ave	MUTCD signage is outdated.	Replace existing signage with yellow-green S1-1 and W16-7P (Assembly B) signs.
	Orange Ave at Sunglow St	No tactile domes on NW, NE and SE curb ramps.	Install tactile domes on NW, NE and SE curb ramps.
	Orange Ave at Sunglow St	No crosswalk on east side.	Construct crosswalk (east side)
	Orange Ave at Sunglow St	MUTCD signage is outdated.	Replace existing signage with yellow-green S1-1 and W16-7P (Assembly B) signs.

Document	Highlights
Lakewood/Rosemead Boulevard Master Plan and Complete Street Evaluation	**Focus Area:** o **Lakewood Blvd at PCH:** This focus area is generally consistent with the "Residential Calming" street designation. o **Lakewood Blvd at I-405:** This focus area is generally consistent with the "Principal Route" street designation. o **Lakewood Blvd at Del Amo Blvd:** This focus area is generally consistent with the "Downtown Lifestyle" street designation. o **Lakewood Blvd at SR- 91:** These focus areas are generally consistent with the "Residential Calming," "Principle Route," and "Urban Activity" street designations. o **Lakewood Blvd at Alondra Blvd:** These focus areas are generally consistent with the "Residential Calming," "Principle Route," and "Urban Activity" street designations. o **Lakewood Blvd at Somerset Blvd & Future Eco Rapid Corridor:** These focus areas are generally consistent with the "Residential Calming," "Principle Route," and "Urban Activity" street designations. o **Lakewood Blvd at Firestone**: This focus area is generally consistent with "Residential Calming" street designations. o **Lakewood Blvd at Mines Ave:** This focus area is generally consistent with "Residential Calming" street designations. **Objectives:** o Identify improvements to reduce transportation related greenhouse gases o Identify concepts for creating sustainable communities o Identify and develop community to school or safe routes to school plans o Identify and develop Complete Street plans and streetscape plans o Identify and develop bike and pedestrian safety enhancement plans

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	o Identify traffic operations and safety enhancements opportunities **Goals:** o Corridor enhancements for multimodal mobility, access, safety and linkages o Transit improvement opportunities to preserve transit facilities and optimize transit infrastructure o Accessibility and connectivity of the multimodal transportation network **Proposed Projects;** o Reducing the Corridor's use as an I-405, SR-91, I-105, and I-5 relieve arterial and maximizing its ability to serve the communities as a complete street with enhanced/increased development o At-Grade Crossing Proposed for the West Santa Ana Branch Light Rail Line at Lakewood Boulevard o Reduce recurrent intersection delay and improve travel time reliability and information, fuel consumption, and emissions on designated truck route arterials through cross-jurisdictional signal coordination and updated signal controllers and systems Focus will be on the connectivity and relationship between the various transit lines. Proper evaluation of the transit connectivity relies on overall public circulation. Attention will be directed to the following planning elements: o Pedestrian pathways, such as sidewalks, need to occur throughout the community in order to effectively connect neighborhoods with facilities and amenities, such as parks, schools, businesses and social locations. o Sidewalks and/or trails are to be separated from adjacent streets by parkways and infiltration planters as presented in the streetscape, which are consistent with the Sustainable Strategies. o Crosswalks are to be clearly delineated and shall include paving enhancements for easy identification and traffic calming.
Washington Boulevard Transit Oriented Development Specific Plan (2019)	**Goals:** o Enhancement of economic development successes in the area o Creation of a mixed-used, compact, and multi-modal environment o Promotion if sustainable principles in design and development.

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	○ Enhancement of the pedestrian scale and function of the built environment ○ Establishment of a complementary mix of cultural uses, public spaces and outdoor activities ○ Providing stronger connections with local neighborhoods and connectively with mobility options ○ Promoting a family-oriented, culturally enriched healthy lifestyle ○ Celebration and reinforcement of Pico Rivera's character and history ○ Support future regional transportation and transit planning objectives ○ Positioning the City to be highly competitive in securing future grant funding and alternative funding and financing options. **Policies affecting the Specific Plan Project Area:** **Circulation:** ○ GP Policy 5.1-1 Multimodal Options. Make transportation mode shifts possible by designing, operating, and maintaining streets to enable safe and convenient access and travel for all users—pedestrians, bicyclists, transit riders, and people of all ages and abilities, as well as freight and motor vehicle drivers—and to foster a sense of place in the public realm ○ GP Policy 5.1-2 Serve All Users. Provide a safe, efficient, and accessible transportation network that meets the needs of all users in the community, including seniors, youth, and the disabled, and contributes to the community's quality of life ○ GP Policy 5.1-4 Smart Growth Development. Integrate transportation and land use decisions to enhance opportunities for development that is compact, walkable, and transit oriented. ○ GP Policy 5.1-7 Transit Ridership. "Utilize the Gateway Cities 2014 Strategic Transportation Plan as a guide to analyze proposed and future transportation projects that affect transit ridership, personal vehicle travel, and other modes at a local and regional level. ○ GP Policy 5.4-8 ADA. Incorporate American with Disabilities Act (ADA) requirements to create an accessible pedestrian system that can serve all users. **General Plan Land Use:** ○ GP Policy 3.6-2 Sustainable Development. Promote land development practices that reduce energy and water

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	consumption, pollution, greenhouse gas emissions, and disposal of waste materials. o GP Policy 3.8-2 Reuse and Intensification. Promote the reuse of vacant, underutilized and inefficient commercial uses for more economically productive purposes, including higher intensity businesses, housing admixed-use development. o GP Policy 3.8-3 Revitalization of Obsolete and Underused Properties. Encourage the consolidation of small parcels, joint public-private partnerships and land clearance and resale, to facilitate revitalization of underused and obsolete commercial properties. o GP Policy 3.6-3 Code Enforcement. Improve the appearance of substandard structures, properties and signage through improved code enforcement efforts, which is the primary means to ensure that properties are well-maintained. o GP Policy 3.7-2 Neighborhood Revitalization. Promote revitalization of neighborhoods in need by maintaining public improvements, encouraging infill development compatible with the scale and character of existing development, and supporting public and private efforts to upgrade and maintain neighborhood appearance and the existing housing stock. o GP Policy 3.7-5 Innovative Housing. Encourage development of innovative forms of housing that increase the diversity of affordable housing options in the city and provide additional quality housing options for residents of all income levels. o GP Policy 3.11-2 Specific Plans. Support the preparation and adoption of new specific plans consistent with policies pertaining to the redevelopment of properties within opportunity areas to assure achievement of the intended scale, character and quality of development **General Plan Housing;** o GP Policy 2.1: Support and promote the creation of new opportunities for affordable housing. o GP Policy 3.2: Pursue the feasibility of providing additional senior housing opportunities in the City. **Opportunity Areas and Corridors: (Washington and Rosemead Intersection)** o Ensure that any new transit-oriented development in this area is carefully planned by requiring a Specific Plan or Master Plan to

Document	Highlights
	ensure an appropriate mix of land uses, high quality design, and that infrastructure, amenities and services needed to adequately serve the development are provided. o Should the proposed above-grade transit station associated with the Gold Line Eastside Extension be developed, ensure that opportunities to enhance visibility of commercial uses, improved transit connections in the city and improved pedestrian access are addressed. o Support ongoing improvement of commercial properties in this area through programs of financial assistance, code enforcement, business investment district and partnerships with local businesses. **Opportunity Areas and Corridors: (Washington and Paramount Intersection)** o Implement Safe Routes to School recommendations to encourage the safety of children attending the school's further north. o Enhance the intersection through special lighting, signage, landscaping, architectural elements, paving and other unique features to reinforce its location as a key entry to the civic center. o Strengthen pedestrian and bicycle linkages between businesses at the intersection, to adjacent neighborhoods and to the Civic Center. **Zoning:** o GP Policy 4.2: Establish a mixed-use overlay zone and increase minimum density in identified areas to meet the City's housing need. o GP Policy 5.1: Continue to support changes to the City's Zoning Ordinance as a means to streamline the development process. The specific plan area is currently zoned for R-I–Residential Infill. o South of the site is currently zoned for P-F–Public Facilities, IPD–Industrial Planned Development and S-F–Single Family Residential; o West of the site is currently zoned for-G–General Industrial; o North of the site is currently zoned for C-I–General Commercial, C-G–Community Commercial, and S-F–Single Family Residential; o And east of the site is currently zoned for S-F–Single Family Residential, R-M–Multi-Family Residential, and C-G–Community Commercial.

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	Economic Development; o Policy 7.3-13 Workplace Alternatives. Promote the establishment of workplace alternatives, including home occupations and telecommuting to reduce peak hour congestion, including permitting home occupations in all residential districts. o Policy 7.3-14 Business Incubators. Encourage the development of technology incubators to promote entrepreneurship and support start-up companies. **Findings;** **Bike and Pedestrian access:** Potential for bike lanes along Washington boulevard to created increased access to the proposed Metro transit stop and to connect the Class I bike lanes along Rio Hondo and San Gabriel River. **Bike and Pedestrian access:** Increased pedestrian safety measures including additional crosswalks along Paramount, Rosemead and Washington to slow traffic and provide safer routes for residents to walk to work, nearby retail center, or to school. **Complete Neighborhoods:** Additional retail uses that serve immediate need of the surrounding community, including supermarkets and grocery stores, restaurants and eateries, and activity centers or open space parks to serve nearby neighborhoods. **Complete Neighborhoods:** Current housing conditions include majority single family residential, there are opportunities for increased multifamily housing as a part of mixed-use developments in commercial centers off Washington or infill residential development such as town =homes or condos. **Connectivity:** Washington Boulevard has the highest levels of collisions and lowest levels of service during peak traffic hours. Increased bicycle pedestrian services om Washington would provide additional routes of access to the proposed Metro Transit Stops.
Historic Whittier Boulevard Revitalization Program Specific Plan and Multimodal Plan	**Goals and Objectives:** o Develop a comprehensive assessment and analysis of the existing conditions, challenges and opportunities within the Whittier Boulevard and Durfee Avenue corridors and surrounding communities. o Establish a clear vision, mission, goals and objectives that will serve as the guiding principles for the major chapters of the Specific plan which aligns with the City's General Plan.

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	○ Develop data driven, community- oriented standards and guidelines that will serve as the blueprint for future development, housing and infrastructure along the corridors that spurs smart growth, mobility and economic activity while retaining the integrity and identify of the community it serves. ○ Develop a technical specific plan that incorporates modern industry standards and practices such as but not limited to form based code, sustainability, resiliency, accessibility, complete streets, multi-modal transportation and more. The project area generally encompasses the east-west Whittier Boulevard commercial corridor between the western city boundary shared with the City of Montebello and the eastern city boundary shared with the City of Whittier (see image below). The project area also includes a portion of the north-south Durfee Avenue corridor extending from Bartolo Avenue on the north end to Passons Boulevard on the south end. Please be advised that these project boundaries are not exact and are subject to change throughout the planning process. **Focused Areas:** ○ Land use planning and zoning ○ Mixed-use development with an emphasis on affordable housing ○ Parks, open, and recreation space ○ Urban streetscape, landscape and architectural design ○ Creative funding and financing mechanisms (e.g special assessment districts) ○ Multimodal transportation and mobility ○ Social justice, equity, diversity, and inclusion ○ Technology advancements and disruptive innovations in community development ○ Environment sustainability, climate change and resiliency ○ Public health and wellness ○ Public safety and security ○ Strategic partnership and leveraging resources ○ Private sector influence on community and economic development ○ Civil engineering

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	○ Environmental compliance ○ Communications, content creation, 3D modelling **Whittier Boulevard Overlay & Landscape Median Improvements:** ○ The Whittier Blvd Overlay Project consists of removing/grinding 2-inches of the existing asphalt and replaced with a 2-inch asphalt rubber hot mix from Paramount Boulevard to Durfee Avenue. ○ The Whittier Boulevard Landscape Median Improvements consist of the beautification of the median islands along Whittier Boulevard from Paramount Boulevard to the east City limits. ○ Some of the main improvements include the installation of an irrigation system, hardscape, drought tolerant plants and trees. **Pico Rivera Bikeway Extension Project:** ○ In partnership with the RMC, the City seeks to complete the engineering design plans for a Class-I multi-use trail adjacent to Whittier Blvd. ○ Connect the San Gabriel River bike path with the Pico Rivera State Historic Park, the only California State Historic Landmark along the San Gabriel River. **Multimodal & Streetscape Design Plan:** ○ Funded by the Caltrans Sustainable Communities Grant Program, the multimodal and streetscape design plan will serve as the formal transportation/circulation element of the Specific Plan and satisfy the independent deliverable of the Caltrans grant. ○ Through creative streetscape designs, this plan will explore and define a built environment that prioritizes the safety of vulnerable road users while promoting a more walkable, bikeable and transit-friendly community.
Whittier Boulevard Bike Trail Connection to Pio Pico State Historic Park (2018)	• Equitably engage the public, especially disenfranchised communities, while building capacity, trust, and confidence to actively participate in civic decision-making processes, • Increase access to cultural centers, historic landmarks, parks, open, and recreation space with an emphasis on Disadvantaged Communities; • Extend the Class-I regional bikeway network and promote safe, active modes of transportation as a meaningful way to reduce greenhouse gas emissions and improve public health outcomes;

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	• Beautify areas of the City that contribute to visual blight and instill a greater sense of social stewardship for public facilities among the public; • Boost climate resilience by educating the public, restoring natural habitats, improving water quality, reducing GHG, and utilizing renewable energy and/or reusable materials. • The Project will include localized wayfinding and directional signage to guide patrons to local attractions and destinations such as the historic park, the river bike path, and local transit stops. The signage will comply with regionally established standards and where possible exercise design discretion for interpretive signage and community-oriented education/information boards. • The Project will establish a new Class-I multi-use trail to accommodate safe passage between the San Gabriel River bike path and Pio Pico State Historic Park. The existing roadway condition does not include a bike lane and the sidewalk satisfies the minimum design standards for pedestrian use. The new trail will be ADA compliant and will be completely separated from vehicular traffic to accommodate a wide range of users, especially vulnerable road users. • The Project will activate and beautify an area that is otherwise considered visual blight due to the lack of landscape maintenance and regular illegal dumping. • The Project will add to the existing regional bikeway network by extending a Class-I trail connection from the San Gabriel River to the existing Pio Pico State Historic Park.
Gold Line East Side Extension TOD Plan (2017)	Transit Supportive Planning elements: 1. Compact Design: Higher density, especially within a quarter or half mile of a transit facility, can impact travel behavior by providing more opportunities to live in close proximity to transit. 2. Street and Network Connectivity: Well-connected streets and non-automobile networks bring destinations closer together, reduce travel distances, and improve pedestrian and bicycle access to adjacent areas and uses. 3. Affordable Housing: Low-income residents often have some of the highest rates of transit ridership. Adding new affordable housing near transit can improve access to employment, health

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	care and education opportunities, and reduce commuting cost for low-income families. 4. Transit Prioritization, accessibility and area design: Prioritizing transit and active transportation as the first and highest priority of a circulation network may result in increased transit service, through better travel times and speeds, which can result in significant transit ridership improvements. 5. Transportation Demand Management: TDM strategies influence a variety of factors to encourage greater transportation system efficiency, including trip mode, trip timing, travel safety and trip cost. 6. Complete Neighborhood: Complete neighborhoods include variety of housing options, retail and commercial services, and community services. Complete neighborhoods bring land uses and amenities closer together, reduce travel distances, and allow for more non- automobile trips. 7. Site Layout, Parking Layout & Building Design: Placing buildings towards the edges of streets and public spaces help create walkable urban environments. 8. Commercial Stabilization, Business Retention & Expansion: Commercial stabilization measures can help protect and encourage existing small, local businesses that serve the needs of neighborhood residents. 9. Parking Management: Efficient parking management can reduce the parking supply needed, allowing an increase in land use intensity, mix of uses, wider sidewalks and bike networks. 10. Pedestrian and Bicycle Circulation: Adding pedestrian and bicycle amenities to station areas and connecting those facilities to the surrounding area can create a more accessible transit environment, encouraging new riders.
Telegraph Road Over San Gabriel River Bridge (2021)	• The goal of the project is to replace the bridge utilizing the most cost effective methods and with consideration of the visual context of the bridge within the City. • The proposed project work shall include, but not be limited to the replacement of the bridge, access roadways, driveways, and any necessary removal of existing facilities, detours, stage construction, bridge approaches, and any necessary utility relocations.

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	• The bridge replacement would require three stages of construction. Four lanes of traffic maintains on the existing bridge. Traffic lanes periodically closes to facilitate certain construction activities during the construction phase of the project. • During the construction phases a one traffic lane will be provided on the newly constructed northerly portion of the bridge and one lane will be provided in the southern portion of the bridge.
Washington Boulevard bridge over Rio Hondo Channel (2022)	• The study of the project includes life cycle cost analysis which determines removal and replacement of the bridge. • This proposal of the improvements to the bridge would improve ADT volume in the city and will have great impact of the communities and commercial centers. • This proposal would refine traffic analysis to determine the number of lanes provided to each direction of traffic. The construction phases involves closure of the center if the bridge with 4 lanes available to each direction of traffic. • The proposal also involves the closure of both the northernmost and southernmost portions of the bridge and also leaving open two lanes to each direction of traffic. It also involves the closure if center of the bridge leaving 2 lanes of traffic open to each direction.
Metro Eastside Gold Line Project	The Public Participation Plan for the Eastside Transit Corridor Phase 2 project provides an efficient, proactive and comprehensive guide to community outreach efforts throughout the Draft EIS/EIR and Advanced Conceptual Engineering phases of this project. This Plan builds on the foundation of the public engagement effort developed during the Alternatives Analysis. The public involvement and consensus building effort for this project has several goals and objectives; it will: • Utilize an inclusive outreach strategy that both informs and maximizes input from a broad range of project stakeholders; Provide forums for residents, businesses and community leaders to participate in the planning process;

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	• Create multiple opportunities for the generation of ideas, comments and possible mitigation measures; and, • Establish a forum for educating stakeholders on a regular basis as the project evolves.
High Speed Rail Phase II	• The Los Angeles to Anaheim project section connects Los Angeles and Orange counties from Los Angeles Union Station (LAUS) to the Anaheim Regional Transportation Intermodal Center (ARTIC) using the existing Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor. The LOSSAN Corridor is currently used by both passenger (Metrolink and Amtrak) and freight rail providers. Adding high-speed rail tracks enhances this shared urban rail corridor by improving safety and operations for rail and other users. • The approximately 30-mile corridor travels through the cities of Los Angeles, Vernon, Commerce, Bell, Montebello, Pico Rivera, Norwalk, Santa Fe Springs, La Mirada, Buena Park, Fullerton and Anaheim as well as portions of unincorporated Los Angeles County. It also supports the national and regional economy by facilitating cargo movements in and out of the two busiest Ports in the country – Los Angeles and Long Beach. • Connects LAUS to ARTIC – enhancing this 30-mile link in the statewide transportation network • Improves safety and reliability through the use of the most advanced and innovative safety technology available. • Uses next-generation signaling technology (Positive Train Control, intrusion barriers and warning system, earthquake early warning, and more) to enhance performance while reducing pollution, noise, and congestion along the corridor. • Eliminates road track wait times at existing rail intersections by building grade separations and otherwise separating road and railroad track.

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	• Reduces passenger delays caused by mixing freight and passenger services and provides the capacity for more convenient and easier to use passenger service and schedules. • Four proposed stations: LAUS, ARTIC, Norwalk/Santa Fe Springs and Fullerton.
SB I-605 Beverley Blvd. Interchange Improvement Project	• The project consists of replacing the southern bound I-605 on-ramp and off-ramp with a diamond configuration that includes a direct on-ramp and off-ramp, ramp metering and a new signal at Beverly Boulevard allowing for access to both directions of the street. • The California Department of Transportation (Caltrans) in cooperation with the Los Angeles County Metropolitan Transportation Authority (Metro) and the Gateway cities council of governments (GCCOG) proposes to improve the southern I-605 Beverley Boulevard Interchange through ramp reconfiguration, removal of the collector-distributor road, and provisions of a anew signaled intersection at Beverley Boulevard to allow for eastbound and westbound movement. • The plan also define goals for better connectivity in the unincorporated areas in the City.
Pico Rivera Citywide Parking Analysis (2019)	The purpose of the Phase One parking analysis is to understand current parking conditions throughout the city by studying a number of areas that represent parking conditions and various neighborhoods throughout the City. The areas selected are meant to be representative of the parking issues found in the city at large. The following summary presents the overall findings and themes that resulted from Phase One of the parking analysis. The level of parking Congestion observed among sub areas with the same land uses varied significantly. Some areas were found to experience parking issues. Others did not. • For example, not all sub areas characterized as Single Family Residential (SF) zones were found to have parking congestion issues.

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	• Subarea F's parking congestion is likely due to the physical characteristics of the neighborhood i.e., older, smaller lots and structures, and driveways) meaning that more cars may be parking On-street because there is limited off -street space. • Off all the Single Family Residential (SF) sub-areas characteristics of the neighborhood meaning that more cars may be parking on- street because there is limited off-street space. • Multiple Family Residential (RM) Zones were observed to have high on street parking utilization, including sub- area M and T. This is typical in many multifamily zones throughout Southern California. • Residential streets near parks with youth and adult sports leagues appeared to experience spillover does not appear to be an issue during off- peak park hours. • Commercial Planned Development (CPD) sub-areas appear to have sufficient parking even with restaurant additions. • Commercial spillover into residential streets seems to occur in some sub- areas, the level of spillover does not yet appear to have reached a critical point.
LA County Long Range Transportation Plan (2020)	As outlined in the *Vision 2028 Strategic Plan*, Metro's visionary outcome is to double the share of transportation modes other than solo driving. The Plan details five goals: o Provide high-quality mobility options that enable people to spend less time traveling o Deliver outstanding trip experiences for all users of the transportation system o Enhance communities and lives through mobility and access to opportunity o Transform LA County through regional collaboration and national leadership o Provide responsive, accountable, and trustworthy governance within the Metro organization **Strategic Plan goals:** o **Better Transit:**

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	Provide more transit options with improved quality and service. - Transit Projects - Bus Improvements - New Mobility Options ○ **Less Congestion:** Managing the transportation system to reduce the amount of time people spend in traffic. - Roadway Improvements - Congestion Managements - Goods Movements ○ **Complete Streets:** Making streets and sidewalks safe and convenient for everyone, to support healthy neighborhoods. - Bike and Pedestrian Projects - Local Streets Improvements - Station and Stop Access Enhancement ○ **Access to Opportunity:** Investing in communities to expand access to jobs, housing and mobility options. - Workforce initiatives - Support for Local Business - Transit Orients Communities Transit improvements in the 2020 LRTP, including the expansion of Metro Rail and Bus Rapid Transit, will help add more than 1,000,000 daily transit trips, an increase of 81%. For commute trips, this has the potential to increase transit mode share for daily trips to and from work from 8.8% to 14.7%. **Complete Streets:** Complete streets create a comprehensive, integrated network that utilizes infrastructure and design to allow safe and convenient travel along streets for all users. This means better connectivity and integration of all transportation modes, including active transportation, private vehicles, transit and commercial deliveries. Complete streets provide safer crossing and roadway facilities for bicyclists and pedestrians, have more greenery and fewer potholes, and help create a more environmentally sustainable transportation system.
LA County Traffic Improvement Plan (2008)	**Projects funded under traffic improvement plan**:

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	• Transit Operating and Maintenance Sub fund, for Metro Rail Operations program funds, Transit Operations (Metro and Municipal Providers) program funds, ADA Paratransit for the disabled and metro discounts for seniors and students program funds. o Metro Rail Operations program funds are eligible to be used for Metro Rail State of Good Repair. o Transit Operations program funds are eligible to be used for Metro State of Good Repair. • Transit, First/Last Mile (Capital) Sub fund, for Transit Construction (including System Connectivity Projects – Airports, Union Station, and Countywide BRT) program funds and Metro State of Good Repair program funds. This sub fund shall include a Transit Contingency Sub fund. • Highway, Active Transportation, Complete Streets (Capital) sub fund, for Highway Construction (including System Connectivity Projects – Ports, Highway congestion Programs and Goods Movement) program funds and Metro Active Transportation Bicycle, Pedestrian, Complete Streets) program funds. This sub fund shall include a Highway Contingency Sub fund. • Local Return/Regional Rail Sub fund, for local Return program fuds and regional rail program funds. **Expenditure Plan Major Projects:** Such expenditures shall commence in the fiscal year identified in the column "Groundbreaking Start Date," or in the subsequent two fiscal years, except that expenditures for preconstruction costs may commence sooner.
LA County Bicycle Master Plan (2012)	The purpose of creating a Bicycle Master Plan for the County of Los Angeles, and how the community has been involved in the planning process. It also presents the benefits of bicycling, describing how a bicycle-friendly County will contribute to resolving general complex issues that affect the quality of life of its residents. **Goals, policies and implementation Actions:** The Goals, Policies, and Implementation Actions necessary to implement the Plan. The overarching goal of the Plan is to increase bicycling throughout the County of Los Angeles through the development and implementation of bicycle-friendly policies, programs, and infrastructure. To achieve this, the Plan identified the following goals:

Document	Highlights
	Goal 1 - Bikeway System: Expanded, improved, and interconnected system of County bikeways and bikeway support facilities. **Goal 2 - Safety:** Increased safety of roadways for all users. **Goal 3 - Education**: Develop education programs that promote safe bicycling. **Goal 4 - Encouragement Programs**: Encourage County residents to walk or ride a bike for transportation and recreation. **Goal 5 - Community Support**: Community supported bicycle network. **Goal 6 - Funding**: Funded Bikeway Plan. **Policies:** o **Policy 1.1** Construct the bikeways proposed in 2012 County of Los Angles Bicycle Master Plan over the next 20 years. o **Policy 1.2** Amend the County Code to encourage additional bikeways and bicycle support facilities. o **Policy 1.3** Coordinate with developers to provide bicycle facilities that encourage biking and link to key destinations. o **Policy 1.4** Support the development of bicycle facilities that encourage new riders. o **Policy 1.5** Complete regular updates of the bicycle master plan to be current with policies and requirements for grant funding and to improve network. o **Policy 1.6** Develop a bicycle parking policy. o **Policy 2.1** Implement projects that improve the safety of bicyclists at key locations. o **Policy 2.2** Encourage alternative streets standards that improve safety such as lane reconfigurations and traffic calming o **Policy 2.3** Support traffic enforcement activities that increase bicyclist's safety. o **Policy 2.4** Evaluate impacts on bicycles when designing new or reconfiguring streets o **Policy 2.5** Improve and enhance the County's suggested routes to school programs. o **Policy 2.7** Support the use of the Model Design Manual for living streets and design as a references for DPW. o **Policy 3.1** Provide bicycle education for all road users, children and adults o **Policy 3.2** Create safety education campaigns aimed at bicycle and motorists (eg: public service announcements, brochures)

Document	Highlights
	○ **Policy 3.3** Train county staff working a streets design, construction and maintenance projects to consider the safety of bicycles in their work. ○ **Policy 3.4** Support training for the California Highway Patrol (CHP) ○ **Policy 4.2** Support organized riders or cycling events, including those that may include periodic streets closures in the unincorporated areas. ○ **Policy 4.2** Encourage non-automobile commuting ○ Policy 4.3 Develop maps and wayfinding's signage and striping to assist navigating the regional bikeways.
LA County A Plan for safer Roadways (2020-2025)	**Guiding principles:** Three guiding principles will direct decision making as the County implements Vision Zero actions: ○ **Health Equity:** Reduce gaps in health outcomes by addressing the practices that disadvantage some populations over others and lead to health inequities. ○ **Data-driven process:** Identify where and why traffic collisions are happening and prioritize projects and programs in these areas. ○ **Transparency:** Maintain regular communication with the public about progress, and how the County is working to enhance traffic safety. **Objectives**: Based on meetings with community members, County departments, and partner agencies, a clear set of actions has been developed for the next five years to move closer to the goal of eliminating traffic fatalities and severe injuries. These actions include efforts to update, expand, and establish new processes, policies, trainings, projects, and programs. The actions are organized into five objectives. These objectives represent the County's priorities and help put the guiding principles into action. ○ Enhance County Processes and Collaboration ○ Address Health Inequities and Protect Vulnerable Users ○ Collaborate with Communities to Enhance Roadway Safety ○ Foster a Culture of Traffic Safety ○ Be Transparent, Responsive, and Accountable

APPENDIX C:
Consolidated High Injury Collision Database

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
6718588	2017	2018-02-16	1900	2017-11-18	1036	10	496223
8333966	2017	2017-04-06	1900	2017-02-01	1630	16	529141
7200183	2017	2019-04-08	1900	2017-03-24	200	2	499039
8333982	2017	2017-04-06	1900	2017-02-01	815	8	519559
8328558	2017	2017-03-28	1900	2017-03-02	1635	16	279454
8367984	2017	2017-05-23	1900	2017-02-22	1600	16	526017
8333596	2017	2017-03-30	1900	2017-02-13	1545	15	448685
8420677	2017	2018-03-21	1900	2017-06-16	1805	18	614453
8333974	2017	2017-04-06	1900	2017-02-27	935	9	455303
8409600	2017	2017-07-26	1900	2017-06-23	1415	14	455303
8333978	2017	2017-04-06	1900	2017-02-16	1730	17	448685
8333992	2017	2017-03-30	1900	2017-03-04	325	3	499039
8409923	2017	2017-07-26	1900	2017-06-24	1155	11	455303
8410026	2017	2017-07-24	1900	2017-06-13	830	8	525863
8334722	2017	2017-04-03	1900	2017-02-18	1330	13	525145
8421353	2017	2017-08-07	1900	2017-07-13	940	9	448685
8337030	2017	2017-05-15	1900	2017-03-14	1600	16	529141
8467823	2017	2017-10-19	1900	2017-08-03	213	2	499039
8338117	2017	2017-04-10	1900	2017-01-18	1244	12	525145
8473129	2017	2017-11-28	1900	2017-09-07	1450	14	525863
8338962	2017	2017-12-27	1900	2017-01-26	1510	15	434616
8345503	2017	2017-04-13	1900	2017-01-24	650	6	455303
8576786	2018	2018-03-16	1900	2018-02-18	1930	19	529571
8345507	2017	2017-04-13	1900	2017-01-29	1115	11	455303
8345585	2017	2017-04-13	1900	2017-03-14	845	8	455303
8576798	2018	2018-03-19	1900	2018-02-22	1840	18	530373
8597531	2018	2018-04-23	1900	2018-03-07	1400	14	507891
8345589	2017	2017-04-13	1900	2017-03-16	1930	19	447574
8345593	2017	2017-04-13	1900	2017-03-14	1320	13	455303
8639513	2018	2018-06-26	1900	2018-05-14	1620	16	524199
8365127	2017	2017-05-15	1900	2017-03-26	1225	12	455303
8639625	2018	2018-06-26	1900	2018-05-21	1530	15	524199
8365131	2017	2017-05-15	1900	2017-03-19	700	7	524199
8365143	2017	2017-05-15	1900	2017-03-13	1745	17	529141

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
6718588	1512	6	5	5	1954	0
8333966	1518	3	5	5	1954	0
7200183	1517	5	5	5	1954	0
8333982	1517	3	5	5	1954	0
8328558	1519	4	5	5	1954	0
8367984	1519	3	5	5	1954	0
8333596	1515	1	5	5	1954	0
8420677	1516	5	5	5	1954	0
8333974	1518	1	5	5	1954	0
8409600	1517	5	5	5	1954	0
8333978	1510	4	5	5	1954	0
8333992	1511	6	5	5	1954	0
8409923	1516	6	5	5	1954	0
8410026	1516	2	5	5	1954	0
8334722	1517	6	5	5	1954	0
8421353	1519	4	5	5	1954	0
8337030	1517	2	5	5	1954	0
8467823	1510	4	5	5	1954	0
8338117	1515	3	5	5	1954	0
8473129	1510	4	5	5	1954	0
8338962	1516	4	5	5	1954	0
8345503	1513	2	5	5	1954	0
8576786	1510	7	5	5	1954	0
8345507	1510	7	5	5	1954	0
8345585	1518	2	5	5	1954	0
8576798	1518	4	5	5	1954	0
8597531	15	3	5	5	1954	0
8345589	1517	4	5	5	1954	0
8345593	1510	2	5	5	1954	0
8639513	1514	1	5	5	1954	0
8365127	1519	7	5	5	1954	0
8639625	1512	1	5	5	1954	0
8365131	1515	7	5	5	1954	0
8365143	1519	1	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
6718588	0	0		0	151T1	DURFEE AV
8333966	0	0		0	151T2	ROSEMEAD BL
7200183	0	0		0	151T3	ROSEMEAD BL
8333982	0	0		0	151T4	ROSEMEAD BL
8328558	0	0		0	151T2	SLAUSON AV
8367984	0	0		0	151T2	PASSONS BL
8333596	0	0		0	151T2	PASSONS BL
8420677	0	0		0	151T2	ROSEMEAD BL
8333974	0	0		0	151T1	PASSONS BL
8409600	0	0		0	151T1	ROSEMEAD BL
8333978	0	0		0	151T2	BEVERLY BL
8333992	0	0		0	151T3	ROSEMEAD BL
8409923	0	0		0	151T1	ROSEMEAD BL
8410026	0	0		0	DAYS	ROSEMEAD BL
8334722	0	0		0	151T1	ROSEMEAD BL
8421353	0	0		0	151T1	SLAUSON AV
8337030	0	0		0	151T2	SLAUSON AV
8467823	0	0		0	151T3	BEVERLY BL
8338117	0	0		0	151T1	WASHINGTON BL
8473129	0	0		0	0AM	BEVERLY BL
8338962	0	0		0	151T4	ROSEMEAD AV
8345503	0	0		0	151T1	ROSEMEAD BL
8576786	0	0		0	151T2	BEVERLY BL
8345507	0	0		0	151T1	PARAMOUNT BL
8345585	0	0		0	151T1	TELEGRAPH RD
8576798	0	0		0	1517Z	ROSEMEAD BL
8597531	0	0		0	151T4	SLAUSON AV
8345589	0	0		0	151T2	SLAUSON AV
8345593	0	0		0	151T1	BEVERLY BL
8639513	0	0		0	151	ROSEMEAD BL
8365127	0	0		0	151T1	PASSONS BL
8639625	0	0		0	151T2	BEVERLY BL
8365131	0	0		0	151T3	ROSEMEAD BL
8365143	0	0		0	151T2	TELEGRAPH RD

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
6718588	OLYMPIC BL	82	S	N	Y	A
8333966	SLAUSON AV	30	S	N	Y	C
7200183	REX RD	889	S	N	N	A
8333982	DANBRIDGE ST	0		N	Y	A
8328558	PASSONS BL	470	E	N	N	A
8367984	SLAUSON AV	0		Y	Y	A
8333596	WASHINGTON BL	162	N	N	Y	A
8420677	DANBRIDGE ST	15	S	N	Y	A
8333974	BURKE ST	27	N	N	Y	B
8409600	DANBRIDGE ST	0	N	N	Y	A
8333978	ROSEMEAD BL	100	W	N	Y	A
8333992	LAS POSAS ST	115	N	N	Y	A
8409923	DANBRIDGE ST	4	S	N	Y	A
8410026	DANBRIDGE ST	0		Y	Y	A
8334722	WASHINGTON BL	43	W	N	Y	A
8421353	PASSONS BL	24	E	N	Y	A
8337030	SERAPIS AV	125	E	N	Y	A
8467823	PARAMOUNT BL	0		Y	Y	A
8338117	ROSEMEAD BL	106	E	N	Y	A
8473129	PARAMOUNT BL	0		Y	Y	A
8338962	BERMUDEZ AV	86	N	N	Y	A
8345503	OLYMPIC BL	15	S	N	Y	B
8576786	ROSEMEAD BL	35	E	N	Y	A
8345507	BEVERLY RD	38	S	N	Y	A
8345585	ARRINGTON AV	9	W	N	Y	A
8576798	SLAUSON AV	56	S	N	Y	A
8597531	PASSONS BL	0		N	Y	A
8345589	SERAPIS AV	115	W	N	Y	A
8345593	ACACIA AV	18	W	N	Y	A
8639513	WHITTIER BL	0		Y	Y	A
8365127	BURKE ST	17	W	N	Y	B
8639625	ROSEMEAD BL	0		Y	Y	B
8365131	WASHINGTON BL	20	S	N	Y	A
8365143	CORD AV	50	E	N	Y	A

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
6718588	-	N				
8333966	-	N				
7200183	-	N				
8333982	-	N				
8328558	-	N				
8367984	-	N				
8333596	-	N				
8420677	-	N				
8333974	-	N				
8409600	-	N				
8333978	-	N				
8333992	-	N				
8409923	-	N				
8410026	-	N				
8334722	-	N				
8421353	-	N				
8337030	-	N				
8467823	-	N				
8338117	-	N				
8473129	-	N				
8338962	-	N				
8345503	-	N				
8576786	-	N				
8345507	-	N				
8345585	-	N				
8576798	-	N				
8597531	-	N				
8345589	-	N				
8345593	-	N				
8639513	-	N				
8365127	-	N				
8639625	-	N				
8365131	-	N				
8365143	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
6718588						Y
8333966						
7200183						N
8333982						N
8328558						Y
8367984						N
8333596						Y
8420677						N
8333974						N
8409600						Y
8333978						Y
8333992						N
8409923						N
8410026						Y
8334722						N
8421353						N
8337030						N
8467823						Y
8338117						N
8473129						Y
8338962						N
8345503						N
8576786						N
8345507						Y
8345585						Y
8576798						N
8597531						N
8345589						Y
8345593						Y
8639513						
8365127						Y
8639625						
8365131						Y
8365143						N

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
6718588	1	1	2	2	A	-
8333966	4	0	2	3	A	-
7200183	1	1	0	2	A	-
8333982	4	0	1	2	A	-
8328558	4	0	1	3	A	-
8367984	4	0	1	3	A	-
8333596	4	0	3	3	A	-
8420677	2	0	1	2	A	-
8333974	4	0	1	2	A	-
8409600	4	0	2	2	A	-
8333978	4	0	1	2	A	-
8333992	3	0	1	2	A	-
8409923	4	0	1	2	D	-
8410026	4	0	1	2	A	-
8334722	4	0	1	2	A	-
8421353	3	0	1	2	A	-
8337030	4	0	1	1	A	-
8467823	4	0	1	2	A	-
8338117	4	0	1	3	A	-
8473129	4	0	1	2	D	-
8338962	4	0	1	3	A	-
8345503	3	0	1	2	A	-
8576786	4	0	1	2	A	-
8345507	3	0	2	2	A	-
8345585	4	0	1	2	A	-
8576798	4	0	1	3	A	-
8597531	3	0	1	2	A	-
8345589	4	0	1	2	A	-
8345593	4	0	2	2	A	-
8639513	4	0	2	2	A	-
8365127	4	0	1	2	A	-
8639625	3	0	1	2	A	-
8365131	3	0	2	3	A	-
8365143	4	0	2	2	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
6718588	21	22106		N	D	C	A
8333966	21	22106		N	C	C	A
7200183	1	23153	A	F	G	G	A
8333982	9	21802		F	D	C	A
8328558	3	22350		N	C	C	A
8367984	21	22106		N	C	C	A
8333596	8	22107		F	A	D	A
8420677	0	21956	B	N	G	B	D
8333974	21	22106		N	D	C	A
8409600	8	22107		N	D	C	A
8333978	9	21801		N	D	D	A
8333992	8	22107		N	C	E	A
8409923	0	0		N	D	C	A
8410026	9	21802	A	N	D	C	A
8334722	21	22106		N	C	C	A
8421353	0	21651	1	N	D	G	A
8337030	8	22107		N	E	I	A
8467823	3	22350		N	A	I	A
8338117	3	22350		N	C	C	A
8473129	0	0		N	B	C	A
8338962	3	22350		N	C	C	A
8345503	8	22100	A	N	A	G	A
8576786	12	21453		N	D	C	A
8345507	3	22350		N	D	C	A
8345585	8	22100	B	N	D	C	A
8576798	4	21703		N	C	C	A
8597531	3	22350	A	N	C	C	A
8345589	3	22350	A	N	C	C	A
8345593	9	21801	A	N	D	C	A
8639513	3	22350		N	C	C	A
8365127	3	22350		N	D	C	A
8639625	8	22107		N	C	C	A
8365131	1	23153	A	N	C	C	A
8365143	7	21658	A	N	B	C	A

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
6718588	A	H	-	A	-	0
8333966	B	H	-	B	A	0
7200183	A	H	-	C	D	0
8333982	A	H	-	A	D	0
8328558	A	H	-	A	D	0
8367984	A	H	-	A	A	0
8333596	A	H	-	A	D	0
8420677	A	H	-	A	D	0
8333974	A	D	-	A	A	0
8409600	A	H	-	A	A	0
8333978	A	H	-	C	D	0
8333992	A	H	-	C	D	0
8409923	A	H	-	A	A	0
8410026	A	H	-	A	D	0
8334722	A	H	-	A	A	0
8421353	A	H	-	A	A	0
8337030	A	H	-	A	D	0
8467823	A	H	-	C	A	0
8338117	A	H	-	A	A	0
8473129	A	H	-	A	A	0
8338962	A	H	-	A	A	0
8345503	A	H	-	A	A	0
8576786	A	H	-	C	A	0
8345507	A	H	-	A	A	0
8345585	A	H	-	A	A	0
8576798	A	H	-	C	A	0
8597531	A	H	-	A	A	0
8345589	A	H	-	C	D	0
8345593	A	H	-	A	A	0
8639513	A	H	-	A	A	0
8365127	A	H	-	A	A	0
8639625	A	H	-	A	A	0
8365131	A	H	-	A	A	0
8365143	A	H	-	A	A	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
6718588					Y	
8333966					Y	
7200183		Y			Y	Y
8333982			Y		Y	
8328558					Y	
8367984					Y	
8333596					Y	
8420677	Y				Y	
8333974					Y	
8409600					Y	
8333978					Y	
8333992					Y	
8409923					Y	
8410026					Y	
8334722					Y	
8421353		Y			Y	
8337030					Y	
8467823					Y	
8338117					Y	
8473129					Y	
8338962					Y	
8345503		Y			Y	
8576786					Y	
8345507					Y	
8345585					Y	
8576798					Y	
8597531					Y	
8345589					Y	
8345593					Y	
8639513					Y	
8365127					Y	
8639625			Y		Y	
8365131					Y	Y
8365143					Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
6718588	D	22	0	2	0	0
8333966	A	1	0	0	2	0
7200183	A	1	0	0	0	0
8333982	-		0	0	1	0
8328558	A	1	0	0	1	0
8367984	A	7	0	0	1	0
8333596	D	22	0	0	3	0
8420677	N	60	1	0	0	0
8333974	A	7	0	0	1	0
8409600	D	22	0	0	2	0
8333978	A	1	0	0	1	0
8333992	A	1	0	1	0	0
8409923	-	-	0	0	1	0
8410026	A	1	0	0	1	0
8334722	A	1	0	0	1	0
8421353	L	4	0	1	0	0
8337030	A	1	0	0	1	0
8467823	A	1	0	0	1	0
8338117	-		0	0	1	0
8473129	-	-	0	0	1	0
8338962	-		0	0	1	0
8345503	A	1	0	1	0	0
8576786	A	1	0	0	1	0
8345507	A	1	0	1	1	0
8345585	A	1	0	0	1	0
8576798	A	1	0	0	1	0
8597531	A	1	0	1	0	0
8345589	A	1	0	0	1	0
8345593	A	7	0	0	2	0
8639513	A	1	0	0	2	0
8365127	A	1	0	0	1	0
8639625	C	2	0	1	0	0
8365131	A	1	0	1	1	0
8365143	A	1	0	0	2	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
6718588	0	0	0	0	0	-
8333966	0	0	0	0	0	-
7200183	0	1	0	0	0	-
8333982	0	0	0	0	1	-
8328558	0	0	0	0	0	-
8367984	0	0	0	0	0	-
8333596	0	0	0	0	0	-
8420677	1	0	0	0	0	-
8333974	0	0	0	0	0	-
8409600	0	0	0	0	0	-
8333978	0	0	0	0	0	-
8333992	0	0	0	0	0	-
8409923	0	0	0	0	0	-
8410026	0	0	0	0	0	-
8334722	0	0	0	0	0	-
8421353	0	0	1	0	0	-
8337030	0	0	0	0	0	-
8467823	0	0	0	0	0	-
8338117	0	0	0	0	0	-
8473129	0	0	0	0	0	-
8338962	0	0	0	0	0	-
8345503	0	0	1	0	0	-
8576786	0	0	0	0	0	-
8345507	0	0	0	0	0	-
8345585	0	0	0	0	0	-
8576798	0	0	0	0	0	-
8597531	0	0	0	0	0	-
8345589	0	0	0	0	0	-
8345593	0	0	0	0	0	-
8639513	0	0	0	0	0	-
8365127	0	0	0	0	0	-
8639625	0	0	0	0	1	-
8365131	0	0	0	0	0	-
8365143	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
6718588	-	0	0	LOS ANGELES	PICO RIVERA	-118.0778348	34.00433396	165
8333966	-	0	0	LOS ANGELES	PICO RIVERA	-118.1051241	33.97087279	6
7200183	-	0	0	LOS ANGELES	PICO RIVERA	-118.1028982	33.97528273	165
8333982	-	0	0	LOS ANGELES	PICO RIVERA	-118.09936	33.98019	6
8328558	-	33.96807	-118.09569	LOS ANGELES	PICO RIVERA	-118.0957741	33.9681051	6
8367984	-	0	0	LOS ANGELES	PICO RIVERA	-118.09723	33.96854001	6
8333596	-	0	0	LOS ANGELES	PICO RIVERA	-118.0897343	33.9796767	6
8420677	-	0	0	LOS ANGELES	PICO RIVERA	-118.0993863	33.98015518	165
8333974	-	0	0	LOS ANGELES	PICO RIVERA	-118.0976181	33.9677191	6
8409600	-	0	0	LOS ANGELES	PICO RIVERA	-118.09936	33.98019	6
8333978	-	0	0	LOS ANGELES	PICO RIVERA	-118.081318	34.01067682	6
8333992	-	0	0	LOS ANGELES	PICO RIVERA	-118.079969	34.01382609	11
8409923	-	0	0	LOS ANGELES	PICO RIVERA	-118.099367	33.98018071	6
8410026	-	0	0	LOS ANGELES	PICO RIVERA	-118.09936	33.98019	6
8334722	-	0	0	LOS ANGELES	PICO RIVERA	-118.0972339	33.98311946	6
8421353	-	0	0	LOS ANGELES	PICO RIVERA	-118.0971557	33.96851764	11
8337030	-	0	0	LOS ANGELES	PICO RIVERA	-118.1005913	33.96956771	6
8467823	-	0	0	LOS ANGELES	PICO RIVERA	-118.0859101	34.01213006	6
8338117	-	0	0	LOS ANGELES	PICO RIVERA	-118.0968662	33.98306339	6
8473129	-	0	0	LOS ANGELES	PICO RIVERA	-118.0859101	34.01213006	6
8338962	-	0	0	LOS ANGELES	PICO RIVERA	-118.1045584	33.97218011	6
8345503	-	0	0	LOS ANGELES	PICO RIVERA	-118.0825361	34.00576112	11
8576786	-	34.01063919	-118.0809708	LOS ANGELES	PICO RIVERA	-118.0809021	34.01054764	6
8345507	-	0	0	LOS ANGELES	PICO RIVERA	-118.0863759	34.00882665	11
8345585	-	0	0	LOS ANGELES	PICO RIVERA	-118.108483	33.95988553	6
8576798	-	0	0	LOS ANGELES	PICO RIVERA	-118.1051559	33.97080612	6
8597531	-	0	0	LOS ANGELES	PICO RIVERA	-118.097229	33.96854019	11
8345589	-	0	0	LOS ANGELES	PICO RIVERA	-118.1013348	33.96978981	6
8345593	-	0	0	LOS ANGELES	PICO RIVERA	-118.0831352	34.01124807	6
8639513	-	0	0	LOS ANGELES	PICO RIVERA	-118.0839767	34.00131989	6
8365127	-	0	0	LOS ANGELES	PICO RIVERA	-118.09767	33.96760647	6
8639625	-	0	0	LOS ANGELES	PICO RIVERA	-118.0810089	34.01058197	11
8365131	-	0	0	LOS ANGELES	PICO RIVERA	-118.0971944	33.98317324	11
8365143	-	0	0	LOS ANGELES	PICO RIVERA	-118.1012739	33.95488199	6

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
8666255	2018	2018-09-18	1900	2018-06-15	1830	18	430275
8367988	2017	2017-05-23	1900	2017-02-14	1425	14	527458
8710565	2018	2018-10-18	1900	2018-09-17	750	7	455303
8373706	2017	2017-06-02	1900	2017-04-25	1931	19	530167
8374484	2017	2017-06-02	1900	2017-04-20	1320	13	489531
8713716	2018	2018-10-19	1900	2018-09-11	550	5	517839
8744884	2018	2018-12-03	1900	2018-10-16	1615	16	430275
8377724	2017	2017-06-12	1900	2017-04-23	2013	20	529141
8781402	2018	2019-01-22	1900	2018-11-22	730	7	530862
8374496	2017	2017-06-02	1900	2017-04-23	2225	22	499039
8374532	2017	2017-06-07	1900	2017-04-22	1035	10	435303
8783980	2018	2019-01-23	1900	2018-11-20	745	7	430275
8376150	2017	2017-05-31	1900	2017-01-14	1702	17	12323
8784336	2018	2019-02-28	1900	2018-12-29	705	7	455303
8817233	2019	2019-03-19	1900	2019-02-27	1118	11	455303
8377728	2017	2017-06-12	1900	2017-04-23	1114	11	525145
8941064	2019	2019-09-26	1900	2019-08-29	2103	21	499039
8379184	2017	2017-06-17	1900	2017-04-24	1530	15	525145
8937145	2019	2019-09-25	1900	2019-08-22	1515	15	430275
8383147	2017	2017-06-13	1900	2017-05-11	1250	12	455303
8954314	2019	2019-10-09	1900	2019-08-27	1145	11	534561
8383650	2017	2017-06-08	1900	2017-05-03	820	8	532522
9015895	2019	2020-01-10	1900	2019-11-10	1823	18	499039
8387363	2017	2018-03-19	1900	2017-05-06	205	2	530167
8977646	2019	2019-11-22	1900	2019-09-26	1140	11	430275
8399988	2017	2017-07-06	1900	2017-05-22	1725	17	499039
8399992	2017	2017-07-06	1900	2017-05-08	1353	13	525145
9100498	2020	2020-06-12	1900	2020-02-02	1710	17	527449
8400000	2017	2017-07-06	1900	2017-05-19	1610	16	529141
9105299	2020	2020-08-03	1900	2020-04-06	1505	15	599039
8402098	2017	2017-07-14	1900	2017-04-18	1530	15	515160
9126484	2020	2020-09-16	1900	2020-06-01	1340	13	455303
8403041	2017	2017-07-06	1900	2017-05-05	2030	20	529141
8409474	2017	2017-07-25	1900	2017-05-23	804	8	525145

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
8666255	1510	5	5	5	1954	0
8367988	1512	2	5	5	1954	0
8710565	1511	1	5	5	1954	0
8373706	1517	2	5	5	1954	0
8374484	1516	4	5	5	1954	0
8713716	1516	2	5	5	1954	0
8744884	1516	2	5	5	1954	0
8377724	1512	7	5	5	1954	0
8781402	1511	4	5	5	1954	0
8374496	1518	7	5	5	1954	0
8374532	1516	6	5	5	1954	0
8783980	1510	2	5	5	1954	0
8376150		6	5	5	1954	0
8784336	1516	6	5	5	1954	0
8817233	1516	3	5	5	1954	0
8377728	1518	7	5	5	1954	0
8941064	1513	4	5	5	1954	0
8379184	1510	1	5	5	1954	0
8937145	1512	4	5	5	1954	0
8383147	1517	4	5	5	1954	0
8954314	1515	2	5	5	1954	0
8383650	1518	3	5	5	1954	0
9015895	1517	7	5	5	1954	0
8387363	1514	6	5	5	1954	0
8977646	1510	4	5	5	1954	0
8399988	1517	1	5	5	1954	0
8399992	1513	1	5	5	1954	0
9100498	1514	7	5	5	1954	0
8400000	1513	5	5	5	1954	0
9105299	1510	1	5	5	1954	0
8402098	1510	2	5	5	1954	0
9126484	1517	1	5	5	1954	0
8403041	1520	5	5	5	1954	0
8409474	1515	2	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
8666255	0	0		0	151T2	BEVERLY BL
8367988	0	0		0	151T1	WHITTIER BL
8710565	0	0		0	151T1	BEVERLY BL
8373706	0	0		0	151T2	SLAUSON AV
8374484	0	0		0	151M2	ROSEMEAD BL
8713716	0	0		0	151T3	ROSEMEAD BL
8744884	0	0		0	151T2	TELEGRAPH RD
8377724	0	0		0	151T2	WHITTIER BL
8781402	0	0		0	151T1	BEVERLY BL
8374496	0	0		0	151T3	ROSEMEAD BL
8374532	0	0		0	151T1	SLAUSON AV
8783980	0	0		0	151T1	ROSEMEAD BL
8376150	0	0		0	4	TELEGRAPH RD
8784336	0	0		0	151T1	SLAUSON AV
8817233	0	0		0	151T1	SLAUSON AV
8377728	0	0		0	151T1	SLAUSON AV
8941064	0	0		0	151T3	ROSEMEAD BL
8379184	0	0		0	151T1	BEVERLY BL
8937145	0	0		0	151T1	BEVERLY BL
8383147	0	0		0	151T1	ROSEMEAD BL
8954314	0	0		0	151T1	ROSEMEAD BL
8383650	0	0		0	152K	TELEGRAPH RD
9015895	0	0		0	151T2	SLAUSON AV
8387363	0	0		0	151T3	ROSEMEAD BL
8977646	0	0		0	151T1	BEVERLY BL
8399988	0	0		0	151T2	SLAUSON AV
8399992	0	0		0	151T1	ROSEMEAD BL
9100498	0	0		0	151T2	ROSEMEAD BL
8400000	0	0		0	151T2	ROSEMEAD BL
9105299	0	0		0	151T2	BEVERLY BL
8402098	0	0		0	151F	WHITTIER BL
9126484	0	0		0	151T1	SLAUSON AV
8403041	0	0		0	151T2	WASHINGTON BL
8409474	0	0		0	151T1	WASHINGTON BL

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
8666255	ROSEMEAD BL	8	W	N	Y	A
8367988	GREGG RD	500	E	N	N	A
8710565	ROSEMEAD BL	40	E	N	Y	A
8373706	ROSEMEAD BL	150	E	N	Y	A
8374484	REX RD	254	N	N	N	A
8713716	DANBRIDGE ST	50	S	N	Y	A
8744884	FERNADEL AV	4	N	N	Y	A
8377724	ESPERANZA AV	125	W	N	Y	A
8781402	ROSEMEAD BL	100	W	N	Y	A
8374496	SLAUSON AV	169	S	N	Y	A
8374532	PARAMOUNT BL	41	W	N	Y	A
8783980	BEVERLY BL	15	S	N	Y	A
8376150	SERAPIS AV	10	E	N	Y	A
8784336	ROSEMEAD BL	8	E	N	Y	A
8817233	ROSEMEAD BL	21	E	N	Y	A
8377728	SERAPIS AV	94	W	N	Y	A
8941064	WHITTIER BL	0		Y	Y	A
8379184	ROSMEAD BL	150	W	N	Y	A
8937145	PARAMOUNT BL	90	E	N	Y	A
8383147	REX RD	74	N	N	Y	A
8954314	DANBRIDGE ST	0		Y	Y	A
8383650	ARRINGTON AV	6	E	N	Y	A
9015895	PASSONS BL	0		Y	Y	A
8387363	VERNER ST	15	N	N	Y	A
8977646	ROSEMEAD BL	50	E	N	Y	B
8399988	PASSONS BL	429	E	N	N	A
8399992	COFFMAN AND PICO RD	250	S	N	Y	A
9100498	SLAUSON AV	0		Y	Y	A
8400000	COFFMAN AND PICO RD	20	N	N	Y	A
9105299	PARAMOUTN BL	0		Y	Y	A
8402098	PARAMOUNT BL	300	W	N	N	A
9126484	PASSONS BL	24	W	N	Y	A
8403041	ROSEMEAD BL	350	W	N	N	A
8409474	MILLUX AV	280	E	N	N	A

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
8666255	-	N				
8367988	-	N				
8710565	-	N				
8373706	-	N				
8374484	-	N				
8713716	-	N				
8744884	-	N				
8377724	-	N				
8781402	-	N				
8374496	-	N				
8374532	-	N				
8783980	-	N				
8376150	-	N				
8784336	-	N				
8817233	-	N				
8377728	-	N				
8941064	-	N				
8379184	-	N				
8937145	-	N				
8383147	-	N				
8954314	-	N				
8383650	-	N				
9015895	-	N				
8387363	-	N				
8977646	-	N				
8399988	-	N				
8399992	-	N				
9100498	-	N				
8400000	-	N				
9105299	B	N				
8402098	-	N				
9126484	-	N				
8403041	-	N				
8409474	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
8666255						N
8367988						N
8710565						Y
8373706						N
8374484						Y
8713716						N
8744884						N
8377724						Y
8781402						Y
8374496						Y
8374532						N
8783980						N
8376150						N
8784336						Y
8817233						Y
8377728						Y
8941064						N
8379184						N
8937145						N
8383147						Y
8954314						Y
8383650						N
9015895						N
8387363						Y
8977646						N
8399988						Y
8399992						N
9100498						Y
8400000						N
9105299						N
8402098						Y
9126484						Y
8403041						Y
8409474						Y

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
8666255	3	0	1	2	A	-
8367988	3	0	1	2	A	-
8710565	4	0	1	2	A	-
8373706	4	0	1	2	A	-
8374484	4	0	1	3	A	-
8713716	3	0	1	2	A	-
8744884	4	0	1	2	A	-
8377724	2	0	1	2	A	-
8781402	4	0	1	1	A	-
8374496	4	0	1	2	A	-
8374532	4	0	1	2	A	-
8783980	3	0	1	2	A	-
8376150	4	0	1	2	A	-
8784336	3	0	1	2	A	-
8817233	3	0	2	3	A	-
8377728	4	0	1	2	A	-
8941064	2	0	3	5	A	-
8379184	4	0	1	2	A	-
8937145	4	0	1	2	A	-
8383147	4	0	1	2	A	-
8954314	2	0	1	2	A	-
8383650	3	0	1	2	A	-
9015895	2	0	1	2	A	-
8387363	3	0	1	1	A	-
8977646	4	0	2	2	A	-
8399988	4	0	2	3	A	-
8399992	3	0	1	2	A	-
9100498	3	0	3	4	A	-
8400000	4	0	1	2	A	-
9105299	3	0	3	2	A	-
8402098	3	0	1	2	A	-
9126484	3	0	1	3	A	-
8403041	4	0	1	2	A	-
8409474	3	0	1	2	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
8666255	8	22107		M	D	C	A
8367988	3	22350		N	C	C	A
8710565	3	22350		N	C	C	A
8373706	3	22350		N	C	D	A
8374484	3	22350		N	C	C	A
8713716	0	21945	A	N	B	B	D
8744884	8	22107		N	G	B	D
8377724	9	21801	A	N	D	C	A
8781402	3	22350	A	N	E	I	A
8374496	1	23153	A	F	C	C	A
8374532	3	22350		N	C	C	A
8783980	10	21950	A	N	G	B	B
8376150	3	22350		M	C	C	A
8784336	0	0		N	D	C	A
8817233	0	24153	A	F	D	C	A
8377728	8	22107		N	B	C	A
8941064	12	22450		N	D	C	A
8379184	11	21954	A	N	G	B	D
8937145	3	22350		N	C	C	A
8383147	3	22350	A	N	C	C	A
8954314	9	21801	A	N	D	D	A
8383650	11	21954	A	N	G	B	D
9015895	10	21950		N	G	B	B
8387363	3	22350		M	E	I	A
8977646	3	22350		N	C	C	A
8399988	9	21801	A	N	D	C	A
8399992	8	22107		N	C	E	A
9100498	12	21453	A	N	A	C	A
8400000	4	21703		N	C	C	A
9105299	12	21453	A	N	D	C	A
8402098	1	23153	A	F	C	C	A
9126484	8	22107		N	C	-	A
8403041	8	22107		N	C	C	A
8409474	3	22350		N	C	C	A

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
8666255	A	H	-	A	A	0
8367988	A	H	-	A	A	0
8710565	A	H	-	A	A	0
8373706	A	H	-	C	A	0
8374484	A	H	-	A	A	0
8713716	A	-	-	D	D	0
8744884	A	H	-	A	A	0
8377724	A	H	-	C	A	0
8781402	A	H	-	A	A	0
8374496	A	H	-	C	D	0
8374532	A	H	-	A	A	0
8783980	A	H	-	A	A	0
8376150	A	H	-	A	A	0
8784336	A	H	-	A	A	0
8817233	A	H	-	A	A	0
8377728	A	H	-	A	D	0
8941064	A	H	-	C	A	0
8379184	A	H	-	A	D	0
8937145	A	H	-	A	A	0
8383147	A	H	-	A	A	0
8954314	A	H	-	A	-	0
8383650	A	H	-	A	D	0
9015895	A	H	-	C	A	0
8387363	A	H	-	C	D	0
8977646	A	H	-	A	A	0
8399988	A	H	-	A	D	0
8399992	A	H	-	A	D	0
9100498	A	H	-	A	A	0
8400000	A	H	-	A	A	0
9105299	B	H	-	A	B	0
8402098	A	-	-	A	A	0
9126484	A	H	-	A	A	0
8403041	A	H	-	A	A	0
8409474	-	-	-	-	D	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
8666255					Y	
8367988					Y	
8710565					Y	
8373706					Y	
8374484					Y	
8713716	Y				Y	
8744884	Y				Y	
8377724			Y		Y	
8781402					Y	
8374496					Y	Y
8374532					Y	
8783980	Y				Y	
8376150					Y	
8784336					Y	
8817233					Y	
8377728					Y	
8941064					Y	
8379184	Y				Y	
8937145					Y	
8383147					Y	
8954314					Y	
8383650	Y				Y	
9015895	Y				Y	
8387363					Y	
8977646					Y	
8399988			Y		Y	
8399992					Y	
9100498					Y	
8400000					Y	
9105299					Y	
8402098					Y	Y
9126484					Y	
8403041			Y		Y	
8409474					Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
8666255	-	99	0	1	0	0
8367988	A	1	0	1	0	0
8710565	D	22	0	0	1	0
8373706	A	1	0	0	1	0
8374484	A	1	0	0	1	0
8713716	N	60	0	1	0	0
8744884	A	1	0	0	1	0
8377724	A	1	1	0	0	0
8781402	A	1	0	0	1	0
8374496	A	1	0	0	1	0
8374532	A	1	0	0	1	0
8783980	A	1	0	1	0	0
8376150	A	1	0	0	1	0
8784336	D	22	0	1	0	0
8817233	A	7	0	2	0	0
8377728	A	1	0	0	1	0
8941064	A	1	1	0	2	0
8379184	N	60	0	0	1	0
8937145	A	1	0	0	1	0
8383147	A	1	0	0	1	0
8954314	A	1	1	0	0	0
8383650	N	60	0	1	0	0
9015895	A	1	1	0	0	0
8387363	A	1	0	1	0	0
8977646	D	22	0	0	2	0
8399988	A	1	0	0	2	0
8399992	A	1	0	1	0	0
9100498	A	1	0	1	2	0
8400000	A	1	0	0	1	0
9105299	A	1	0	3	0	0
8402098	A	1	0	1	0	0
9126484	A	7	0	1	0	0
8403041	C	2	0	0	1	0
8409474	A	1	0	1	0	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
8666255	0	0	0	0	0	-
8367988	0	0	0	0	0	-
8710565	0	0	0	0	0	-
8373706	0	0	0	0	0	-
8374484	0	0	0	0	0	-
8713716	1	0	0	0	0	-
8744884	1	0	0	0	0	-
8377724	0	0	0	0	1	-
8781402	0	0	0	0	0	-
8374496	0	0	0	0	0	-
8374532	0	0	0	0	0	-
8783980	1	0	0	0	0	-
8376150	0	0	0	0	0	-
8784336	0	0	0	0	0	-
8817233	0	0	0	0	0	-
8377728	0	0	0	0	0	-
8941064	0	0	0	0	0	-
8379184	1	0	0	0	0	-
8937145	0	0	0	0	0	-
8383147	0	0	0	0	0	-
8954314	0	0	0	0	0	-
8383650	1	0	0	0	0	-
9015895	1	0	0	0	0	-
8387363	0	0	0	0	0	-
8977646	0	0	0	0	0	-
8399988	0	0	0	0	1	-
8399992	0	0	0	0	0	-
9100498	0	0	0	0	0	-
8400000	0	0	0	0	0	-
9105299	0	0	0	0	0	-
8402098	0	0	0	0	0	-
9126484	0	0	0	0	0	-
8403041	0	0	0	0	1	-
8409474	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
8666255	-	34.01070023	-118.0810013	LOS ANGELES	PICO RIVERA	-118.0810318	34.0105896	11
8367988	-	0	0	LOS ANGELES	PICO RIVERA	-118.0727585	33.99596665	11
8710565	-	0	0	LOS ANGELES	PICO RIVERA	-118.0808868	34.01054382	6
8373706	-	0	0	LOS ANGELES	PICO RIVERA	-118.1046305	33.97080059	6
8374484	-	0	0	LOS ANGELES	PICO RIVERA	-118.1009891	33.97798109	6
8713716	-	33.98020172	-118.0992966	LOS ANGELES	PICO RIVERA	-118.0994492	33.98007584	11
8744884	-	33.96559906	-118.1140976	LOS ANGELES	PICO RIVERA	-118.1143417	33.96548843	6
8377724	-	0	0	LOS ANGELES	PICO RIVERA	-118.0709902	33.99462412	165
8781402	-	0	0	LOS ANGELES	PICO RIVERA	-118.0813217	34.01067734	6
8374496	-	0	0	LOS ANGELES	PICO RIVERA	-118.1052822	33.97051513	6
8374532	-	0	0	LOS ANGELES	PICO RIVERA	-118.1131257	33.97345092	6
8783980	-	34.01200104	-118.0823975	LOS ANGELES	PICO RIVERA	-118.0810242	34.01054001	11
8376150	-	0	0	LOS ANGELES	PICO RIVERA	-118.106415	33.9584722	6
8784336	-	0	0	LOS ANGELES	PICO RIVERA	-118.1050644	33.97093964	11
8817233	-	33.97101974	-118.1050797	LOS ANGELES	PICO RIVERA	-118.1050262	33.97092438	11
8377728	-	0	0	LOS ANGELES	PICO RIVERA	-118.10127	33.96976976	6
8941064	-	34.00146103	-118.0839386	LOS ANGELES	PICO RIVERA	-118.0839767	34.00131989	165
8379184	-	0	0	LOS ANGELES	PICO RIVERA	-118.0814721	34.01072523	6
8937145	-	0	0	LOS ANGELES	PICO RIVERA	-118.0856323	34.01204681	6
8383147	-	0	0	LOS ANGELES	PICO RIVERA	-118.1013162	33.97756953	6
8954314	-	33.98009109	-118.0992737	LOS ANGELES	PICO RIVERA	-118.0993576	33.98019028	165
8383650	-	0	0	LOS ANGELES	PICO RIVERA	-118.108445	33.95985935	11
9015895	-	33.96870041	-118.0973129	LOS ANGELES	PICO RIVERA	-118.097229	33.96854019	165
8387363	-	0	0	LOS ANGELES	PICO RIVERA	-118.084062	33.9993	11
8977646	-	34.01050186	-118.0808029	LOS ANGELES	PICO RIVERA	-118.0808029	34.01050186	6
8399988	-	0	0	LOS ANGELES	PICO RIVERA	-118.0959006	33.96814404	6
8399992	-	0	0	LOS ANGELES	PICO RIVERA	-118.094657	33.986486	11
9100498	-	33.97101974	-118.1049271	LOS ANGELES	PICO RIVERA	-118.1050873	33.97095108	11
8400000	-	0	0	LOS ANGELES	PICO RIVERA	-118.094243	33.987107	6
9105299	-	34.01200867	-118.0857925	LOS ANGELES	PICO RIVERA	-118.0857925	34.01200867	11
8402098	-	0	0	LOS ANGELES	PICO RIVERA	-118.0895695	34.00374421	11
9126484	-	33.96871185	-118.0974121	LOS ANGELES	PICO RIVERA	-118.0973053	33.96856308	11
8403041	-	0	0	LOS ANGELES	PICO RIVERA	-118.0981251	33.9837441	6
8409474	-	0	0	LOS ANGELES	PICO RIVERA	-118.0871468	33.97771534	11

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
8409475	2017	2017-07-25	1900	2017-05-31	1930	19	529141
9152722	2020	2020-10-28	1900	2020-08-21	1600	16	524199
8409584	2017	2017-07-26	1900	2017-06-06	1630	16	525863
9153572	2020	2020-10-14	1900	2020-08-13	2108	21	499039
9255336	2021	2021-05-11	1900	2021-04-03	2221	22	499039
8410018	2017	2017-07-24	1900	2017-06-16	910	9	455303
8410030	2017	2017-07-24	1900	2017-06-12	2205	22	499039
9255337	2021	2021-05-11	1900	2021-04-19	1210	12	430275
9265579	2021	2021-05-24	1900	2021-04-03	32	0	499039
8410034	2017	2017-07-24	1900	2017-06-04	35	0	499039
8410038	2017	2017-11-16	1900	2017-06-02	2335	23	5291U1
9265595	2021	2021-05-24	1900	2021-04-20	2208	22	646149
9276088	2021	2021-08-26	1900	2021-07-01	2100	21	523026
8419765	2017	2017-08-07	1900	2017-06-07	1810	18	489531
9286677	2021	2021-07-29	1900	2021-06-12	2315	23	499039
8421063	2017	2017-08-07	1900	2017-06-20	1700	17	526351
8421150	2017	2017-08-04	1900	2017-06-28	1400	14	455303
9300070	2021	2021-08-27	1900	2021-06-29	1410	14	430275
8421162	2017	2017-08-04	1900	2017-06-10	1850	18	529141
9300071	2021	2021-08-31	1900	2021-06-16	2122	21	536467
9351168	2021	2021-11-17	1900	2021-10-21	855	8	455303
8422793	2017	2017-08-16	1900	2017-06-08	1625	16	S29141
9351169	2021	2021-11-22	1900	2021-10-20	1130	11	455303
9351318	2021	2021-11-22	1900	2021-09-26	1611	16	523026
8441458	2017	2017-09-14	1900	2017-08-01	835	8	455303
9364411	2021	2021-12-02	1900	2021-10-23	310	3	621336
8441847	2017	2017-09-15	1900	2017-07-21	1325	13	530167
9381197	2021	2022-02-02	1900	2021-12-20	1430	14	529141
8441851	2017	2017-09-15	1900	2017-07-29	1425	14	453848
8441855	2017	2017-09-14	1900	2017-07-25	326	3	530376
8441863	2017	2017-09-14	1900	2017-07-04	1725	17	529141
8441871	2017	2017-09-14	1900	2017-07-21	1703	17	532522
8441875	2017	2017-09-27	1900	2017-07-12	1245	12	JRODRI
8467778	2017	2019-04-10	1900	2017-08-07	709	7	455303

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
8409475	1517	3	5	5	1954	0
9152722	1516	5	5	5	1954	0
8409584	1514	2	5	5	1954	0
9153572	1518	4	5	5	1954	0
9255336	1517	6	5	5	1954	0
8410018	1513	5	5	5	1954	0
8410030	1511	1	5	5	1954	0
9255337	1513	1	5	5	1954	0
9265579	1519	6	5	5	1954	0
8410034	1516	7	5	5	1954	0
8410038	1510	5	5	5	1954	0
9265595	1513	2	5	5	1954	0
9276088	1510	4	5	5	1954	0
8419765	1516	3	5	5	1954	0
9286677	1510	6	5	5	1954	0
8421063	1516	2	5	5	1954	0
8421150	1514	3	5	5	1954	0
9300070	1518	2	5	5	1954	0
8421162	1516	6	5	5	1954	0
9300071	1510	3	5	5	1954	0
9351168	1510	4	5	5	1954	0
8422793	1514	4	5	5	1954	0
9351169	1510	3	5	5	1954	0
9351318	1510	7	5	5	1954	0
8441458		2	5	5	1954	0
9364411	1513	6	5	5	1954	0
8441847	1510	5	5	5	1954	0
9381197	1511	1	5	5	1954	0
8441851	1511	6	5	5	1954	0
8441855	1513	2	5	5	1954	0
8441863	1520	2	5	5	1954	0
8441871	1510	5	5	5	1954	0
8441875	1516	3	5	5	1954	0
8467778	1520	1	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
8409475	0	0		0	151T2	PASSONS BL
9152722	0	0		0	151T2	PARAMOUNT BL
8409584	0	0		0	0PM	WHITTIER BL
9153572	0	0		0	151T3	ROSEMEAD BL
9255336	0	0		0	151T3	SLAUSON AV
8410018	0	0		0	151T1	PARAMOUNT BL
8410030	0	0		0	151T3	GALLATIN RD
9255337	0	0		0	151T1	ROSEMEAD BL
9265579	0	0		0	151T3	SLAUSON AV
8410034	0	0		0	151T3	ROSEMEAD BL
8410038	0	0		0	151T3	WHITTIER BL
9265595	0	0		0	151T2	ROSEMEAD BL
9276088	0	0		0	151T2	BEVERLY BL
8419765	0	0		0	151T2	SLAUSON AV
9286677	0	0		0	151T3	BEVERLY BL
8421063	0	0		0	151T2	WASHINGTON BL
8421150	0	0		0	151T1	WHITTIER BL
9300070	0	0		0	151T1	ROSEMEAD BL
8421162	0	0		0	151T2	SLAUSON AV
9300071	0	0		0	151T2	BEVERLY BL
9351168	0	0		0	151T1	ROSEMEAD BL
8422793	0	0		0	151T2	WHITTIER BL
9351169	0	0		0	151T4	ROSEMEAD BL
9351318	0	0		0	151T2	ROSEMEAD BL
8441458	0	0		0		WHITTIER BL
9364411	0	0		0	151T3	BEVERLY BL
8441847	0	0		0	151T1	WHITTIER BL
9381197	0	0		0	151T1	BEVERLY BL
8441851	0	0		0	151T2	BEVERLY BL
8441855	0	0		0	151T3	PARAMOUNT BL
8441863	0	0		0	151T2	ROSEMEAD BL
8441871	0	0		0	151T2	WHITTIER BL
8441875	0	0		0	151T1	PARAMOUNT BL
8467778	0	0		0	151T1	WASHINGTON BL

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
8409475	CALL ST	5	S	N	Y	A
9152722	MAXINE ST	10	S	N	Y	A
8409584	ROSEMEAD BL	300		N	N	A
9153572	BEVERLY BL	17	N	N	Y	A
9255336	PASSONS BL	39	E	N	Y	A
8410018	MARIS AV	2	N	N	Y	A
8410030	ROSEMEAD BL	81	E	N	Y	A
9255337	WHITTIER BL	36	S	N	Y	A
9265579	PASSONS BL	0		Y	Y	A
8410034	BERMUDEZ ST	263	N	N	N	A
8410038	IVY ST	60	W	N	Y	A
9265595	WHITTIER BL	32	S	N	Y	A
9276088	PARAMOUNT BL	0		Y	Y	A
8419765	PARAMOUNT PL	30	W	N	Y	A
9286677	ROSEMEAD BL	34	W	N	Y	A
8421063	PARAMOUNT BL	20	W	N	Y	A
8421150	MILLUX AV	3	W	N	Y	A
9300070	SLAUSON AV	68	S	N	Y	A
8421162	BOLLENBACHER DR	4	E	N	Y	A
9300071	PARAMOUNT BL	37	W	N	Y	A
9351168	BEVERLY BL	10	N	N	Y	A
8422793	GREGG RD	15	W	N	Y	A
9351169	BEVERLY BL	10	N	N	Y	A
9351318	WHITTIER BL	0		Y	Y	A
8441458	MYRTLE ST	70	E	N	Y	B
9364411	ROSEMEAD BL	0		Y	Y	B
8441847	PARAMOUNT BL	200	W	N	Y	A
9381197	ROSEMEAD BL	20	W	N	Y	A
8441851	SANDOVAL AV	220	E	N	Y	A
8441855	DUNLAP CROSSING RD	125	S	N	Y	A
8441863	WASHINGTON BL	420	S	-	N	A
8441871	PARAMOUNT BL	389	W	N	N	A
8441875	WASHINGTON BL	148	S	N	Y	A
8467778	ROSEMEAD BL	84	W	N	Y	A

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
8409475	-	N				
9152722	-	N				
8409584	-	N				
9153572	-	N				
9255336	-	N				
8410018	-	N				
8410030	-	N				
9255337	-	N				
9265579	-	N				
8410034	-	N				
8410038	-	N				
9265595	-	N				
9276088	-	N				
8419765	-	N				
9286677	-	N				
8421063	-	N				
8421150	-	N				
9300070	-	N				
8421162	-	N				
9300071	-	N				
9351168	-	N				
8422793	-	N				
9351169	-	N				
9351318	-	N				
8441458	-	N				
9364411	-	N				
8441847	-	N				
9381197	-	N				
8441851	-	N				
8441855	-	N				
8441863	-	N				
8441871	-	N				
8441875	-	N				
8467778	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
8409475						N
9152722						Y
8409584						Y
9153572						N
9255336						N
8410018						Y
8410030						Y
9255337						Y
9265579						N
8410034						Y
8410038						Y
9265595						N
9276088						Y
8419765						N
9286677						N
8421063						N
8421150						N
9300070						Y
8421162						Y
9300071						N
9351168						Y
8422793						N
9351169						Y
9351318						N
8441458						Y
9364411						Y
8441847						N
9381197						Y
8441851						Y
8441855						Y
8441863						N
8441871						N
8441875						
8467778						Y

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
8409475	4	0	1	2	A	-
9152722	4	0	2	3	A	-
8409584	4	0	1	3	A	-
9153572	3	0	1	2	A	-
9255336	3	0	3	2	A	-
8410018	4	0	1	2	A	-
8410030	4	0	1	1	A	-
9255337	4	0	1	1	A	-
9265579	3	0	1	2	A	-
8410034	4	0	2	1	A	-
8410038	3	0	3	2	A	-
9265595	2	0	4	4	A	-
9276088	2	0	3	2	A	-
8419765	4	0	1	2	A	-
9286677	3	0	3	2	A	-
8421063	3	0	2	2	A	-
8421150	4	0	1	2	A	-
9300070	3	0	2	2	A	-
8421162	4	0	2	2	A	-
9300071	4	0	1	3	A	-
9351168	4	0	1	2	A	-
8422793	3	0	1	2	C	-
9351169	3	0	1	2	A	-
9351318	2	0	4	3	A	-
8441458	4	0	1	3	A	-
9364411	3	0	2	2	A	-
8441847	3	0	1	2	A	-
9381197	2	0	2	2	A	-
8441851	4	0	1	3	A	-
8441855	4	0	2	2	A	-
8441863	4	0	1	2	A	-
8441871	4	0	2	2	A	-
8441875	4	0	2	3	A	-
8467778	1	1	0	2	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
8409475	9	21802	A	N	D	C	A
9152722	3	22350		F	D	C	A
8409584	4	21703		N	-	C	A
9153572	8	22107		N	B	C	A
9255336	21	22106		N	C	C	A
8410018	3	22350		N	C	C	A
8410030	8	22107		N	E	I	A
9255337	3	22350		N	E	I	A
9265579	12	21453		M	D	C	A
8410034	8	22107		N	E	I	A
8410038	9	21801	A	N	D	C	A
9265595	3	22350		N	B	C	A
9276088	12	21453	A	N	D	C	A
8419765	9	21802	A	F	D	C	A
9286677	3	22350		M	C	C	A
8421063	8	22107		N	C	C	A
8421150	11	21954	A	N	B	B	E
9300070	9	21804	A	N	D	C	A
8421162	9	21801	A	N	D	C	A
9300071	4	21703		N	C	C	A
9351168	12	21453		N	D	C	A
8422793	18	0		N	G	B	D
9351169	12	21453		N	D	C	A
9351318	0	20001	A	M	C	C	A
8441458	3	22350		N	C	B	A
9364411	9	21801		M	D	C	A
8441847	5	21651		N	D	G	A
9381197	12	21453	A	N	D	C	A
8441851	4	21703		N	C	C	A
8441855	8	22107		F	A	C	A
8441863	9	21801	A	N	D	C	A
8441871	9	21801	A	N	D	C	A
8441875	8	22107		N	D	C	A
8467778	11	21955		N	A	B	D

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
8409475	A	H	-	B	A	0
9152722	A	H	-	A	D	0
8409584	A	H	-	A	A	0
9153572	A	H	-	C	D	0
9255336	A	H	-	B	A	0
8410018	A	H	-	A	D	0
8410030	A	H	-	C	D	0
9255337	A	H	-	A	A	0
9265579	A	H	-	C	A	0
8410034	A	H	-	C	D	0
8410038	A	H	-	C	D	0
9265595	A	H	-	C	A	0
9276088	A	H	-	C	A	0
8419765	A	H	-	A	A	0
9286677	A	H	-	C	D	0
8421063	A	H	-	A	A	0
8421150	A	H	-	A	D	0
9300070	A	H	-	A	D	0
8421162	A	H	-	A	D	0
9300071	A	H	-	C	A	0
9351168	A	D	-	A	A	0
8422793	A	H	-	A	A	0
9351169	A	H	-	A	A	0
9351318	A	H	-	A	A	0
8441458	A	H	-	A	A	0
9364411	A	D	-	C	A	0
8441847	A	H	-	A	A	0
9381197	A	H	-	A	A	0
8441851	A	H	-	A	A	0
8441855	A	H	-	C	D	0
8441863	A	H	-	A	D	0
8441871	A	H	-	A	A	0
8441875	A	H	-	A	D	0
8467778	A	H	-	A	A	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
8409475					Y	
9152722					Y	
8409584					Y	
9153572					Y	
9255336					Y	
8410018					Y	
8410030					Y	
9255337					Y	
9265579					Y	
8410034					Y	
8410038					Y	
9265595					Y	
9276088					Y	
8419765					Y	
9286677					Y	
8421063					Y	
8421150	Y				Y	
9300070					Y	
8421162					Y	
9300071					Y	
9351168					Y	
8422793	Y				Y	
9351169			Y		Y	
9351318					Y	
8441458					Y	
9364411					Y	
8441847		Y			Y	
9381197					Y	
8441851					Y	
8441855					Y	
8441863					Y	
8441871					Y	
8441875					Y	
8467778	Y				Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
8409475	A	1	0	0	1	0
9152722	A	7	0	0	2	0
8409584	D	22	0	0	1	0
9153572	A	7	0	1	0	0
9255336	A	1	0	3	0	0
8410018	A	1	0	0	1	0
8410030	A	1	0	0	1	0
9255337	A	8	0	0	1	0
9265579	A	1	0	1	0	0
8410034	A	1	0	0	2	0
8410038	A	1	0	1	2	0
9265595	A	1	1	1	2	0
9276088	A	1	1	2	0	0
8419765	A	1	0	0	1	0
9286677	A	1	0	3	0	0
8421063	A	7	0	1	1	0
8421150	N	60	0	0	1	0
9300070	A	7	0	1	1	0
8421162	A	1	0	0	2	0
9300071	A	1	0	0	1	0
9351168	A	7	0	0	1	0
8422793	-	-	0	1	0	0
9351169	A	7	0	1	0	0
9351318	A	1	3	1	0	0
8441458	A	7	0	0	1	0
9364411	A	1	0	2	0	0
8441847	L	4	0	1	0	0
9381197	A	1	1	0	1	0
8441851	A	1	0	0	1	0
8441855	A	1	0	0	2	0
8441863	A	1	0	0	1	0
8441871	A	1	0	0	2	0
8441875	A	1	0	0	2	0
8467778	N	60	0	0	0	1

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
8409475	0	0	0	0	0	-
9152722	0	0	0	0	0	-
8409584	0	0	0	0	0	-
9153572	0	0	0	0	0	-
9255336	0	0	0	0	0	-
8410018	0	0	0	0	0	-
8410030	0	0	0	0	0	-
9255337	0	0	0	0	0	-
9265579	0	0	0	0	0	-
8410034	0	0	0	0	0	-
8410038	0	0	0	0	0	-
9265595	0	0	0	0	0	-
9276088	0	0	0	0	0	-
8419765	0	0	0	0	0	-
9286677	0	0	0	0	0	-
8421063	0	0	0	0	0	-
8421150	1	0	0	0	0	-
9300070	0	0	0	0	0	-
8421162	0	0	0	0	0	-
9300071	0	0	0	0	0	-
9351168	0	0	0	0	0	-
8422793	1	0	0	0	0	-
9351169	0	0	0	0	1	-
9351318	0	0	0	0	0	-
8441458	0	0	0	0	0	-
9364411	0	0	0	0	0	-
8441847	0	0	1	0	0	-
9381197	0	0	0	0	0	-
8441851	0	0	0	0	0	-
8441855	0	0	0	0	0	-
8441863	0	0	0	0	0	-
8441871	0	0	0	0	0	-
8441875	0	0	0	0	0	-
8467778	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
8409475	-	0	0	LOS ANGELES	PICO RIVERA	-118.0945153	33.97257701	6
9152722	-	0	0	LOS ANGELES	PICO RIVERA	-118.1140594	33.9691658	6
8409584	-	0	0	LOS ANGELES	PICO RIVERA	-118.08398	34.0013201	6
9153572	-	34.01073837	-118.0809631	LOS ANGELES	PICO RIVERA	-118.0809937	34.01062393	11
9255336	-	33.96855927	-118.096962	LOS ANGELES	PICO RIVERA	-118.0971069	33.96850204	11
8410018	-	0	0	LOS ANGELES	PICO RIVERA	-118.097396	33.99271436	6
8410030	-	0	0	LOS ANGELES	PICO RIVERA	-118.078698	34.01694949	6
9255337	-	34.00130081	-118.0838013	LOS ANGELES	PICO RIVERA	-118.083992	34.0012207	6
9265579	-	33.96854019	-118.0972137	LOS ANGELES	PICO RIVERA	-118.097229	33.96854019	11
8410034	-	0	0	LOS ANGELES	PICO RIVERA	-118.1043501	33.97263335	6
8410038	-	0	0	LOS ANGELES	PICO RIVERA	-118.0957163	34.00647423	11
9265595	-	34.00109863	-118.0839462	LOS ANGELES	PICO RIVERA	-118.083992	34.00123215	165
9276088	-	34.0121994	-118.065918	LOS ANGELES	PICO RIVERA	-118.085907	34.01213074	165
8419765	-	0	0	LOS ANGELES	PICO RIVERA	-118.1116232	33.97301727	6
9286677	-	34.01068115	-118.0814972	LOS ANGELES	PICO RIVERA	-118.0811157	34.01061249	11
8421063	-	0	0	LOS ANGELES	PICO RIVERA	-118.1052825	33.98758307	11
8421150	-	0	0	LOS ANGELES	PICO RIVERA	-118.0752387	33.99754394	6
9300070	-	33.97079849	-118.1047974	LOS ANGELES	PICO RIVERA	-118.1051636	33.9707756	11
8421162	-	0	0	LOS ANGELES	PICO RIVERA	-118.1106076	33.97272623	6
9300071	-	34.01219177	-118.0864029	LOS ANGELES	PICO RIVERA	-118.0860214	34.01216507	6
9351168	-	34.01050186	-118.0810013	LOS ANGELES	PICO RIVERA	-118.0810013	34.01060486	6
8422793	-	0	0	LOS ANGELES	PICO RIVERA	-118.0740364	33.99686782	11
9351169	-	34.01050186	-118.0810013	LOS ANGELES	PICO RIVERA	-118.0810013	34.01060486	11
9351318	-	34.00175095	-118.0838776	LOS ANGELES	PICO RIVERA	-118.0839767	34.00131989	165
8441458	-	0	0	LOS ANGELES	PICO RIVERA	-118.0944381	34.00592746	6
9364411	-	34.00370026	-118.0450974	LOS ANGELES	PICO RIVERA	-118.0810089	34.01058197	11
8441847	-	0	0	LOS ANGELES	PICO RIVERA	-118.0892758	34.00362033	11
9381197	-	34.0104599	-118.0808487	LOS ANGELES	PICO RIVERA	-118.0810699	34.01060104	165
8441851	-	0	0	LOS ANGELES	PICO RIVERA	-118.0725568	34.00791747	6
8441855	-	0	0	LOS ANGELES	PICO RIVERA	-118.0926337	33.99703176	6
8441863	-	0	0	LOS ANGELES	PICO RIVERA	-118.097873	33.98223341	6
8441871	-	0	0	LOS ANGELES	PICO RIVERA	-118.0896177	34.00387686	6
8441875	-	0	0	LOS ANGELES	PICO RIVERA	-118.1054839	33.98720373	6
8467778	-	0	0	LOS ANGELES	PICO RIVERA	-118.0973915	33.98334592	165

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
8467783	2017	2017-10-19	1900	2017-06-12	2200	22	525203
8467494	2017	2017-10-23	1900	2017-09-05	1325	13	489531
8467514	2017	2017-10-20	1900	2017-08-17	830	8	531575
8467762	2017	2017-11-21	1900	2017-08-31	736	7	525145
8467765	2017	2017-12-13	1900	2017-04-05	1630	16	524199
8167560	2018	2020-05-26	1900	2018-02-11	400	4	529141
8467782	2017	2017-12-06	1900	2017-08-13	1630	16	279454
8465632	2018	2019-02-19	1900	2018-09-16	51	0	530070
8467811	2017	2017-10-19	1900	2017-07-18	1610	16	529141
8467815	2017	2017-10-19	1900	2017-07-31	1615	16	529141
8467820	2017	2017-10-16	1900	2017-09-01	1850	18	499039
8467827	2017	2017-10-19	1900	2017-08-22	1555	15	529141
8467828	2017	2017-10-16	1900	2017-09-04	620	6	455303
8467835	2017	2017-10-19	1900	2017-08-25	2024	20	499039
8469508	2018	2018-06-28	1900	2018-02-28	1732	17	279454
8473125	2017	2017-11-28	1900	2017-09-18	1635	16	529141
8473133	2017	2017-11-28	1900	2017-09-03	1530	15	529141
8473137	2017	2017-11-28	1900	2017-09-04	2120	21	529141
8482233	2017	2017-11-06	1900	2017-05-22	1230	12	434616
8485234	2017	2017-12-04	1900	2017-10-01	2225	22	499039
8485238	2017	2017-12-04	1900	2017-10-11	1230	12	455303
8485242	2017	2017-12-04	1900	2017-10-10	1857	18	530167
8485246	2017	2017-12-04	1900	2017-10-18	730	7	455303
8485250	2017	2017-12-04	1900	2017-10-17	1214	12	525145
8496577	2017	2018-02-17	1900	2017-10-11	750	7	455303
8503327	2017	2018-02-06	1900	2017-09-26	1530	15	529141
8504069	2017	2018-06-13	1900	2017-10-23	1700	17	525203
8504128	2017	2018-06-13	1900	2017-11-15	1915	19	487233
8506089	2017	2017-12-06	1900	2017-08-20	1016	10	527458
8517018	2017	2018-01-03	1900	2017-11-10	1741	17	499039
8517416	2017	2018-01-09	1900	2017-10-30	1856	18	524199
8519378	2017	2018-01-04	1900	2017-10-06	1910	19	499039
8526742	2017	2018-01-11	1900	2017-11-17	823	8	448685
8526746	2017	2018-01-12	1900	2017-11-18	438	4	517839

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
8467783	1516	1	5	5	1954	0
8467494	1519	2	5	5	1954	0
8467514	1516	4	5	5	1954	0
8467762	1513	4	5	5	1954	0
8467765	1510	3	5	5	1954	0
8167560	1512	7	5	5	1954	0
8467782	1519	7	5	5	1954	0
8465632	1517	7	5	5	1954	0
8467811	1516	2	5	5	1954	0
8467815	1512	1	5	5	1954	0
8467820	1512	5	5	5	1954	0
8467827	1515	2	5	5	1954	0
8467828	1511	1	5	5	1954	0
8467835	1513	5	5	5	1954	0
8469508	1513	3	5	5	1954	0
8473125	1519	1	5	5	1954	0
8473133	1513	7	5	5	1954	0
8473137	1512	1	5	5	1954	0
8482233	1517	1	5	5	1954	0
8485234	1518	7	5	5	1954	0
8485238	1514	3	5	5	1954	0
8485242	1517	2	5	5	1954	0
8485246	1511	3	5	5	1954	0
8485250	1514	2	5	5	1954	0
8496577	1515	3	5	5	1954	0
8503327	1517	2	5	5	1954	0
8504069	1516	1	5	5	1954	0
8504128	1514	3	5	5	1954	0
8506089		7	5	5	1954	0
8517018	1513	5	5	5	1954	0
8517416	1513	1	5	5	1954	0
8519378	1514	5	5	5	1954	0
8526742	1512	5	5	5	1954	0
8526746	1514	6	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
8467783	0	0		0	1510	SLAUSON AV
8467494	0	0		0	151M2	SLAUSON AV
8467514	0	0		0	152K	ROSEMEAD BL
8467762	0	0		0	151T1	WASHINGTON BL
8467765	0	0		0	152E	WHITTIER BL
8167560	0	0		0	151B	WHITTIER BL
8467782	0	0		0	151T2	TELEGRAPH RD
8465632	0	0		0	151T3	PASSONS BL
8467811	0	0		0	151T2	PARAMOUNT BL
8467815	0	0		0	151T2	WHITTIER BL
8467820	0	0		0	151T2	BEVERLY BL
8467827	0	0		0	151T2	PASSONS BL
8467828	0	0		0	151T1	BEVERLY BL
8467835	0	0		0	151T2	WHITTIER BL
8469508	0	0		0	151M1	ROSEMEAD BL
8473125	0	0		0	151T2	TELEGRAPH RD
8473133	0	0		0	151T2	MINES AV
8473137	0	0		0	151T2	DURFEE AV
8482233	0	0		0	151T1	WASHINGTON BL
8485234	0	0		0	151T3	SLAUSON AV
8485238	0	0		0	151T1	WHITTIER BL
8485242	0	0		0	151T2	SLAUSON AV
8485246	0	0		0	151T1	BEVERLY BL
8485250	0	0		0	151T1	MILLUX AV
8496577	0	0		0	151T1	ROSEMEAD BL
8503327	0	0		0	151TZ	SLAUSON AV
8504069	0	0		0	151T2	PARAMOUNT BL
8504128	0	0		0	151T2	ROSEMEAD BL
8506089	0	0		0	151T1	ROSEMEAD BL
8517018	0	0		0	151T2	WHITTIER BL
8517416	0	0		0	151T2	PARAMOUNT BL
8519378	0	0		0	151T2	DURFEE AV
8526742	0	0		0	151T1	WHITTIER BL
8526746	0	0		0	151T3	ROSEMEAD BL

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
8467783	INDUSTRY AV	630	W	N	N	A
8467494	PASSONS BL	150	E	N	Y	A
8467514	TERRADELL ST	300	S	N	N	A
8467762	PARAMOUNT BL	270	E	N	N	A
8467765	CHURCH AV	50	E	N	Y	A
8167560	MILLUX AV	8	W	N	Y	A
8467782	TRUE AV	637	E	N	N	A
8465632	RIVERA RD	16	N	N	Y	A
8467811	SLAUSON AV	5	N	N	Y	A
8467815	GREGG RD	210	E	N	Y	A
8467820	DURFEE AV	126	W	N	Y	A
8467827	WASHINGTON BL	50	N	N	Y	A
8467828	DURFEE AV	39	E	N	Y	A
8467835	IVY ST	124	W	N	Y	A
8469508	MINES AV	430	S	N	N	A
8473125	KLINEDALE AV	4	E	N	Y	A
8473133	PARAMOUNT BL	60	E	N	Y	A
8473137	BEVERLY BL	2	N	N	Y	A
8482233	HASTY AV	89	E	N	Y	A
8485234	SERAPIS AV	193	W	N	Y	A
8485238	GREGG RD	18	W	N	Y	A
8485242	PASSONS BL	528	E	N	N	A
8485246	DELAND AV	15	E	N	Y	A
8485250	WHITTIER BL	2	S	N	Y	A
8496577	MARKET PL	7	N	N	Y	A
8503327	PASSONS BL	160	W	N	Y	A
8504069	TROJAN AV	15	S	N	Y	A
8504128	WHITTIER BL	300	S	N	N	A
8506089	MAXINE ST	30	S	N	Y	A
8517018	ROSEMEAD BL	229	W	N	Y	A
8517416	DUNLAP CROSSING RD	70	N	N	Y	A
8519378	WHITTIER BL	36	S	N	Y	A
8526742	ROSEMEAD BL	100	E	N	Y	A
8526746	WHITTIER BL	300	S	N	N	A

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
8467783	-	N				
8467494	-	N				
8467514	-	N				
8467762	-	N				
8467765	-	N				
8167560	-	N				
8467782	-	N				
8465632	-	N				
8467811	-	N				
8467815	-	N				
8467820	-	N				
8467827	-	N				
8467828	-	N				
8467835	-	N				
8469508	-	N				
8473125	-	N				
8473133	-	N				
8473137	-	N				
8482233	-	Y				
8485234	-	N				
8485238	-	N				
8485242	-	N				
8485246	-	N				
8485250	-	N				
8496577	-	N				
8503327	-	N				
8504069	-	N				
8504128	-	N				
8506089	-	N				
8517018	-	N				
8517416	-	N				
8519378	-	N				
8526742	-	N				
8526746	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
8467783						Y
8467494						N
8467514						N
8467762						N
8467765						N
8167560						Y
8467782						Y
8465632						Y
8467811						N
8467815						N
8467820						Y
8467827						Y
8467828						Y
8467835						Y
8469508						Y
8473125						N
8473133						Y
8473137						Y
8482233						Y
8485234						Y
8485238						N
8485242						Y
8485246						Y
8485250						N
8496577						N
8503327						Y
8504069						N
8504128						N
8506089						Y
8517018						N
8517416						N
8519378						N
8526742						Y
8526746						Y

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
8467783	2	0	1	1	A	-
8467494	4	0	1	2	D	-
8467514	4	0	1	3	A	-
8467762	4	0	1	2	A	-
8467765	4	0	2	3	A	-
8167560	1	1	0	4	A	-
8467782	4	0	1	2	A	-
8465632	1	1	1	1	A	-
8467811	4	0	1	2	A	-
8467815	3	0	1	2	A	-
8467820	4	0	2	2	A	-
8467827	4	0	1	2	A	-
8467828	4	0	1	2	A	-
8467835	4	0	1	3	A	-
8469508	3	0	1	3	A	-
8473125	4	0	1	2	A	-
8473133	4	0	1	2	A	-
8473137	4	0	1	2	A	-
8482233	4	0	1	1	A	-
8485234	4	0	1	1	A	-
8485238	4	0	1	2	A	-
8485242	4	0	1	2	A	-
8485246	3	0	1	3	A	-
8485250	4	0	1	2	A	-
8496577	3	0	1	2	A	-
8503327	4	0	2	2	A	-
8504069	3	0	1	2	A	-
8504128	4	0	1	2	D	-
8506089	4	0	1	2	A	-
8517018	4	0	2	3	A	-
8517416	4	0	1	3	A	-
8519378	4	0	1	2	A	-
8526742	4	0	1	2	A	-
8526746	3	0	1	1	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
8467783	3	22350		N	F	I	A
8467494	0	0		N	B	C	A
8467514	3	22350		N	C	C	A
8467762	3	22350		N	C	C	A
8467765	3	22350		M	C	D	A
8167560	1	23153	A	N	G	B	D
8467782	8	22107		F	B	C	A
8465632	1	23153	A	N	E	I	A
8467811	5	21650	1	N	H	G	A
8467815	11	21954	A	N	G	B	D
8467820	4	21703		N	C	C	A
8467827	5	21650		N	A	C	A
8467828	1	23153	A	N	C	C	A
8467835	1	23152	B	N	C	C	A
8469508	3	22350		N	C	C	A
8473125	9	21801	A	N	D	C	A
8473133	3	22350		N	E	I	A
8473137	5	21650		N	D	G	A
8482233	1	23152	A	M	E	I	A
8485234	8	22107		N	A	I	A
8485238	12	21453	A	F	B	B	B
8485242	9	21801	A	N	D	E	A
8485246	3	22350		N	C	C	A
8485250	5	21650	1	N	D	G	A
8496577	9	21801	A	N	B	B	B
8503327	8	22107		N	B	C	A
8504069	9	21801		N	H	C	A
8504128	0	0		M	H	A	A
8506089	3	22350		N	B	D	A
8517018	3	22350		N	C	E	A
8517416	3	22350		N	C	C	A
8519378	3	22350		F	C	C	A
8526742	3	22350		N	C	D	A
8526746	3	22350		N	A	I	A

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
8467783	A	H	-	C	D	0
8467494	A	H	-	A	D	0
8467514	A	-	-	A	A	0
8467762	A	-	-	A	D	0
8467765	A	H	-	C	A	0
8167560	A	H	-	C	D	0
8467782	A	H	-	A	D	0
8465632	A	H	-	C	A	0
8467811	A	H	-	A	A	0
8467815	A	H	-	A	D	0
8467820	A	H	-	A	D	0
8467827	A	H	-	A	A	0
8467828	A	H	-	A	A	0
8467835	A	H	-	C	D	0
8469508	A	H	-	A	A	0
8473125	A	H	-	A	D	0
8473133	A	H	-	A	A	0
8473137	A	H	-	C	A	0
8482233	A	G	-	A	D	0
8485234	A	H	-	C	D	0
8485238	A	H	-	A	A	0
8485242	A	H	-	C	A	0
8485246	A	H	-	A	A	0
8485250	A	H	-	A	D	0
8496577	A	H	-	A	A	0
8503327	A	H	-	A	D	0
8504069	A	H	-	A	D	0
8504128	A	H	-	C	-	0
8506089	-	-	-	A	A	0
8517018	A	H	-	C	D	0
8517416	A	H	-	C	D	0
8519378	A	H	-	C	D	0
8526742	A	H	-	A	D	0
8526746	A	H	-	C	D	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
8467783					Y	
8467494				Y	Y	
8467514					Y	
8467762					Y	
8467765					Y	
8167560	Y				Y	Y
8467782					Y	Y
8465632					Y	Y
8467811		Y			Y	
8467815	Y				Y	
8467820					Y	
8467827					Y	
8467828					Y	Y
8467835					Y	Y
8469508					Y	
8473125					Y	
8473133					Y	
8473137		Y			Y	
8482233					Y	Y
8485234					Y	
8485238	Y				Y	
8485242					Y	
8485246					Y	
8485250		Y			Y	
8496577	Y				Y	
8503327					Y	
8504069					Y	
8504128			Y		Y	
8506089			Y		Y	
8517018					Y	
8517416					Y	
8519378					Y	
8526742					Y	
8526746					Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
8467783	A	1	1	0	0	0
8467494	-	-	0	0	1	0
8467514	A	1	0	0	1	0
8467762	A	1	0	0	1	0
8467765	A	1	0	0	2	0
8167560	D	22	0	0	0	1
8467782	A	8	0	0	1	0
8465632	A	1	1	0	0	0
8467811	L	4	0	0	1	0
8467815	N	60	0	1	0	0
8467820	A	1	0	0	2	0
8467827	A	1	0	0	1	0
8467828	A	1	0	0	1	0
8467835	A	1	0	0	1	0
8469508	A	1	0	1	0	0
8473125	A	1	0	0	1	0
8473133	A	1	0	0	1	0
8473137	L	4	0	0	1	0
8482233	D	22	0	0	1	0
8485234	A	1	0	0	1	0
8485238	A	1	0	0	1	0
8485242	A	1	0	0	1	0
8485246	A	1	0	1	0	0
8485250	L	4	0	0	1	0
8496577	A	1	0	1	0	0
8503327	A	1	0	0	2	0
8504069	A	1	0	1	0	0
8504128	-	-	0	0	1	0
8506089	C	3	0	0	1	0
8517018	A	1	0	0	2	0
8517416	A	1	0	0	1	0
8519378	A	7	0	0	1	0
8526742	A	1	0	0	1	0
8526746	-		0	1	0	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
8467783	0	0	0	0	0	-
8467494	0	0	0	0	0	-
8467514	0	0	0	0	0	-
8467762	0	0	0	0	0	-
8467765	0	0	0	0	0	-
8167560	0	0	0	0	0	-
8467782	0	0	0	0	0	-
8465632	0	0	0	0	0	-
8467811	0	0	1	0	0	-
8467815	1	0	0	0	0	-
8467820	0	0	0	0	0	-
8467827	0	0	0	0	0	-
8467828	0	0	0	0	0	-
8467835	0	0	0	0	0	-
8469508	0	0	0	0	0	-
8473125	0	0	0	0	0	-
8473133	0	0	0	0	0	-
8473137	0	0	1	0	0	-
8482233	0	0	0	0	0	-
8485234	0	0	0	0	0	-
8485238	1	0	0	0	0	-
8485242	0	0	0	0	0	-
8485246	0	0	0	0	0	-
8485250	0	0	1	0	0	-
8496577	1	0	0	0	0	-
8503327	0	0	0	0	0	-
8504069	0	0	0	0	0	-
8504128	0	0	0	0	0	-
8506089	0	0	0	0	1	-
8517018	0	0	0	0	0	-
8517416	0	0	0	0	0	-
8519378	0	0	0	0	0	-
8526742	0	0	0	0	0	-
8526746	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
8467783	-	0	0	LOS ANGELES	PICO RIVERA	-118.116671	33.9745344	165
8467494	-	0	0	LOS ANGELES	PICO RIVERA	-118.0967657	33.96840022	6
8467514	-	0	0	LOS ANGELES	PICO RIVERA	-118.1091272	33.96300691	6
8467762	-	0	0	LOS ANGELES	PICO RIVERA	-118.1044835	33.98714829	6
8467765	-	0	0	LOS ANGELES	PICO RIVERA	-118.0768932	33.99838805	6
8167560	-	33.99765015	-118.0752563	LOS ANGELES	PICO RIVERA	-118.0752563	33.99755096	165
8467782	-	0	0	LOS ANGELES	PICO RIVERA	-118.0947927	33.95093112	6
8465632	-	33.58126831	-118.0543594	LOS ANGELES	PICO RIVERA	-118.09552	33.97013092	165
8467811	-	0	0	LOS ANGELES	PICO RIVERA	-118.1129946	33.97342295	6
8467815	-	0	0	LOS ANGELES	PICO RIVERA	-118.0735098	33.99643416	11
8467820	-	0	0	LOS ANGELES	PICO RIVERA	-118.0767375	34.00923331	6
8467827	-	0	0	LOS ANGELES	PICO RIVERA	-118.0900034	33.97946763	6
8467828	-	0	0	LOS ANGELES	PICO RIVERA	-118.07623	34.00907191	6
8467835	-	0	0	LOS ANGELES	PICO RIVERA	-118.0959044	34.00655341	6
8469508	-	33.99119949	-118.0911407	LOS ANGELES	PICO RIVERA	-118.0911484	33.99133682	11
8473125	-	0	0	LOS ANGELES	PICO RIVERA	-118.0981701	33.95276275	6
8473133	-	0	0	LOS ANGELES	PICO RIVERA	-118.0946792	33.9950745	6
8473137	-	0	0	LOS ANGELES	PICO RIVERA	-118.0763484	34.00911531	6
8482233	-	0	0	LOS ANGELES	PICO RIVERA	-118.0873169	33.97763386	6
8485234	-	0	0	LOS ANGELES	PICO RIVERA	-118.1015749	33.96986551	6
8485238	-	0	0	LOS ANGELES	PICO RIVERA	-118.0740436	33.99687338	6
8485242	-	0	0	LOS ANGELES	PICO RIVERA	-118.0955949	33.96805027	6
8485246	-	0	0	LOS ANGELES	PICO RIVERA	-118.07732	34.00923	11
8485250	-	0	0	LOS ANGELES	PICO RIVERA	-118.0752329	33.99753508	6
8496577	-	0	0	LOS ANGELES	PICO RIVERA	-118.096098	33.984358	11
8503327	-	0	0	LOS ANGELES	PICO RIVERA	-118.0977259	33.96868744	6
8504069	-	0	0	LOS ANGELES	PICO RIVERA	-118.1117716	33.9758184	11
8504128	-	0	0	LOS ANGELES	PICO RIVERA	-118.0840873	34.00050293	6
8506089	-	0	0	LOS ANGELES	PICO RIVERA	-118.1078699	33.96537474	6
8517018	-	0	0	LOS ANGELES	PICO RIVERA	-118.084655	34.00159965	6
8517416	-	0	0	LOS ANGELES	PICO RIVERA	-118.0922358	33.99744669	6
8519378	-	0	0	LOS ANGELES	PICO RIVERA	-118.0794365	33.99923378	6
8526742	-	0	0	LOS ANGELES	PICO RIVERA	-118.0836935	34.00118512	6
8526746	-	0	0	LOS ANGELES	PICO RIVERA	-118.0840873	34.00050293	11

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
8526758	2017	2018-01-11	1900	2017-11-17	1647	16	529141
8526761	2017	2018-01-09	1900	2017-10-26	1820	18	529141
8544844	2017	2018-02-05	1900	2017-12-07	1740	17	455303
8544848	2017	2018-02-05	1900	2017-12-06	805	8	455303
8544852	2017	2018-02-06	1900	2017-12-25	1615	16	530373
8561174	2018	2018-02-27	1900	2018-01-09	1726	17	448685
8561182	2017	2018-03-06	1900	2017-12-20	2340	23	517839
8561209	2018	2018-02-23	1900	2018-01-11	1106	11	525145
8561217	2018	2018-02-23	1900	2018-01-16	1245	12	489531
8561221	2018	2018-02-23	1900	2018-01-08	1355	13	455303
8561754	2017	2018-02-23	1900	2017-12-16	1950	19	529141
8561999	2018	2018-02-26	1900	2018-01-31	805	8	507891
8576166	2018	2018-03-20	1900	2018-02-15	2310	23	499039
8576225	2017	2018-03-20	1900	2017-12-19	2016	20	496223
8576766	2018	2018-03-19	1900	2018-02-15	1244	12	525145
8576770	2018	2018-03-19	1900	2018-02-10	1438	14	525145
8576778	2018	2018-03-16	1900	2018-02-14	1455	14	529571
8576794	2018	2018-03-19	1900	2018-02-03	1200	12	525145
8577020	2017	2018-05-08	1900	2017-08-04	1043	10	525145
8577780	2018	2018-03-27	1900	2018-03-05	1200	12	455303
8577790	2018	2018-03-27	1900	2018-02-02	1222	12	525145
8577794	2018	2018-03-27	1900	2018-02-17	1836	18	623022
8587108	2018	2018-04-18	1900	2018-02-03	1333	13	525145
8597543	2018	2018-04-24	1900	2018-03-12	1649	16	529571
8603750	2018	2018-05-08	1900	2018-04-11	1720	17	529141
8603847	2018	2018-05-08	1900	2018-03-16	1050	10	525145
8610716	2018	2018-05-14	1900	2018-04-08	1131	11	525145
8610720	2018	2018-05-09	1900	2018-04-01	1112	11	525145
8617703	2018	2018-06-13	1900	2018-04-05	151	1	517839
8623091	2018	2018-05-31	1900	2018-04-23	845	8	525145
8623095	2018	2018-05-31	1900	2018-04-20	2350	23	529571
8623178	2018	2018-05-30	1900	2018-03-22	1237	12	525145
8624509	2018	2018-06-06	1900	2018-04-28	2330	23	529571
8624517	2018	2018-06-05	1900	2018-05-01	1815	18	448685

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
8526758	1513	5	5	5	1954	0
8526761	1510	4	5	5	1954	0
8544844	1513	4	5	5	1954	0
8544848	1516	3	5	5	1954	0
8544852	1517	1	5	5	1954	0
8561174	1516	2	5	5	1954	0
8561182	1514	3	5	5	1954	0
8561209	1515	4	5	5	1954	0
8561217	1517	2	5	5	1954	0
8561221	1513	1	5	5	1954	0
8561754	1515	6	5	5	1954	0
8561999	1813	3	5	5	1954	0
8576166	1518	4	5	5	1954	0
8576225	1510	2	5	5	1954	0
8576766	1519	4	5	5	1954	0
8576770	1517	6	5	5	1954	0
8576778	1518	3	5	5	1954	0
8576794	1511	6	5	5	1954	0
8577020	1514	5	5	5	1954	0
8577780	1515	1	5	5	1954	0
8577790	1516	5	5	5	1954	0
8577794	1516	6	5	5	1954	0
8587108	1517	6	5	5	1954	0
8597543	1519	1	5	5	1954	0
8603750	1516	3	5	5	1954	0
8603847	1512	5	5	5	1954	0
8610716	1510	7	5	5	1954	0
8610720	1513	7	5	5	1954	0
8617703	1516	4	5	5	1954	0
8623091	1510	1	5	5	1954	0
8623095	1516	5	5	5	1954	0
8623178	1518	4	5	5	1954	0
8624509	1517	6	5	5	1954	0
8624517	1513	2	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
8526758	0	0		0	151T2	REX RD
8526761	0	0		0	151T2	ROSEMEAD BL
8544844	0	0		0	151T2	ROSEMEAD BL
8544848	0	0		0	151T1	PARAMOUNT BL
8544852	0	0		0	151T2	PASSONS BL
8561174	0	0		0	151T2	PARAMOUNT BL
8561182	0	0		0	151D	ROSEMEAD BL
8561209	0	0		0	151T1	WASHINGTON BL
8561217	0	0		0	151M2	SLAUSON AV
8561221	0	0		0	151T1	WASHINGTON BL
8561754	0	0		0	151T2	WASHINGTON BL
8561999	0	0		0	151T4	MINES AV
8576166	0	0		0	151B	ROSEMEAD BL
8576225	0	0		0	151T4	WHITTIER BL
8576766	0	0		0	151T1	SLAUSON AV
8576770	0	0		0	151T1	PASSONS BL
8576778	0	0		0	151T2	SLAUSON AV
8576794	0	0		0	151T1	BEVERLY BL
8577020	0	0		0	151T1	BRADHURST ST
8577780	0	0		0	151T1	WASHINGTON BL
8577790	0	0		0	151T1	WASHINGTON BL
8577794	0	0		0	152H	PARAMOUNT BL
8587108	0	0		0	151T1	ROSEMEAD BL
8597543	0	0		0	151T2	SLAUSON AV
8603750	0	0		0	151T2	SLAUSON AV
8603847	0	0		0	151T1	BEVERLY BL
8610716	0	0		0	151T1	PARAMOUNT BL
8610720	0	0		0	151T1	PARAMOUNT BL
8617703	0	0		0	151T3	PARAMOUNT BL
8623091	0	0		0	151T1	PARAMOUNT BL
8623095	0	0		0	151T2	SLAUSON AV
8623178	0	0		0	151T1	TELEGRAPH RD
8624509	0	0		0	151T2	ROSEMEAD BL
8624517	0	0		0	151T2	WHITTIER BL

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
8526758	ROSEMEAD BL	5	W	N	Y	A
8526761	IBSEN ST	52	S	N	Y	A
8544844	MARKET PL	76	N	N	Y	A
8544848	WARVALE ST	8	S	N	Y	A
8544852	RIVERA RD	92	N	N	Y	A
8561174	MERCURY LN	156	S	N	Y	C
8561182	SHENANDOAH AV	100	S	N	Y	A
8561209	ROSEMEAD BL	165	E	N	Y	A
8561217	PASSONS BL	430	E	N	N	A
8561221	CROSSWAY DR	3	W	N	Y	C
8561754	MILLUX AV	5	E	N	Y	A
8561999	ROSEMEAD BL	89	W	N	Y	A
8576166	MANZANAR AV	223	S	N	Y	-
8576225	PARAMOUNT BL	300	W	N	N	A
8576766	SERAPIS AV	4	E	N	Y	A
8576770	BASCOM ST	9	N	N	Y	A
8576778	SERAPIS AV	313	E	N	N	A
8576794	SANDOVAL AV	100	E	N	Y	A
8577020	ROSEMEAD BL	99	E	N	Y	B
8577780	BEQUETTE AV	177	W	N	Y	A
8577790	ROSEMEAD BL	43	W	N	Y	A
8577794	SLAUSON BL	60	N	N	Y	A
8587108	WASHINGTON BL	14		N	Y	A
8597543	PASSONS BL	375	E	N	N	A
8603750	PARAMOUNT BL	330	W	N	N	A
8603847	DURFEE AV	82	W	N	Y	A
8610716	OLYMPIC BL	30	N	N	Y	A
8610720	UNSER ST	30	N	N	Y	A
8617703	TELEGRAPH RD	65	N	N	Y	A
8623091	OLYMPIC BL	23	N	N	Y	A
8623095	PARAMOUNT BL	20	N	N	Y	A
8623178	CHANEY AV	329	E	N	N	C
8624509	REX RD	582	S	N	N	A
8624517	PARAMOUNT BL	412	E	N	N	A

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
8526758	-	N				
8526761	-	N				
8544844	-	N				
8544848	-	N				
8544852	-	N				
8561174	-	N				
8561182	-	N				
8561209	-	N				
8561217	-	N				
8561221	-	N				
8561754	-	N				
8561999	-	N				
8576166	-	N				
8576225	-	N				
8576766	-	N				
8576770	-	N				
8576778	-	N				
8576794	-	N				
8577020	-	N				
8577780	-	N				
8577790	-	N				
8577794	-	N				
8587108	-	N				
8597543	-	N				
8603750	-	N				
8603847	-	N				
8610716	-	N				
8610720	-	N				
8617703	-	N				
8623091	-	N				
8623095	-	N				
8623178	-	N				
8624509	-	N				
8624517	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
8526758						
8526761						N
8544844						N
8544848						N
8544852						N
8561174						Y
8561182						Y
8561209						N
8561217						Y
8561221						N
8561754						N
8561999						N
8576166						Y
8576225						Y
8576766						N
8576770						N
8576778						N
8576794						N
8577020						N
8577780						Y
8577790						N
8577794						N
8587108						N
8597543						N
8603750						N
8603847						N
8610716						N
8610720						N
8617703						Y
8623091						Y
8623095						N
8623178						N
8624509						N
8624517						Y

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
8526758	4	0	1	2	D	-
8526761	4	0	1	2	A	-
8544844	4	0	1	2	A	-
8544848	4	0	1	2	A	-
8544852	4	0	1	2	A	-
8561174	3	0	1	2	A	-
8561182	3	0	2	2	A	-
8561209	4	0	3	4	A	-
8561217	3	0	2	2	A	-
8561221	4	0	1	2	A	-
8561754	4	0	1	2	D	-
8561999	3	0	1	2	A	-
8576166	4	0	1	2	A	-
8576225	4	0	1	2	A	-
8576766	4	0	1	2	A	-
8576770	4	0	1	2	A	-
8576778	4	0	1	2	A	-
8576794	4	0	1	2	A	-
8577020	4	0	1	2	A	-
8577780	4	0	2	2	A	-
8577790	4	0	1	2	A	-
8577794	4	0	2	2	A	-
8587108	4	0	2	2	A	-
8597543	3	0	1	2	A	-
8603750	4	0	1	2	A	-
8603847	3	0	1	2	A	-
8610716	3	0	3	2	A	-
8610720	4	0	1	2	A	-
8617703	4	0	1	4	A	-
8623091	4	0	3	2	A	-
8623095	2	0	1	2	A	-
8623178	2	0	4	2	A	-
8624509	2	0	1	1	A	-
8624517	4	0	3	3	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
8526758	0	0		N	G	B	B
8526761	7	21658	A	N	B	C	A
8544844	3	22350		N	C	C	A
8544848	3	22350		N	C	C	A
8544852	8	22107		N	A	C	A
8561174	3	22350		N	C	C	A
8561182	3	22350		N	A	C	A
8561209	9	21804	A	N	A	C	A
8561217	9	21804	A	N	D	C	A
8561221	21	22106		N	D	C	A
8561754	0	0		F	G	B	C
8561999	8	22107		N	B	C	A
8576166	9	21804	A	N	B	C	A
8576225	9	21804	A	N	C	C	A
8576766	9	21801	A	N	G	B	B
8576770	21	22106	A	N	G	B	E
8576778	9	21801	A	N	D	C	A
8576794	3	22350	A	N	C	C	A
8577020	8	22107		M	B	C	A
8577780	9	21801	A	N	D	C	A
8577790	3	22350		N	C	C	A
8577794	4	21703		N	C	C	A
8587108	3	22350		M	C	C	A
8597543	9	21801	A	N	D	C	A
8603750	21	22106		N	C	C	A
8603847	3	22350	A	N	C	C	A
8610716	9	21802	A	N	D	C	A
8610720	9	21802	A	N	D	C	A
8617703	8	22107		N	B	C	A
8623091	9	21802	A	N	D	C	A
8623095	12	21453	A	N	D	C	A
8623178	3	22350	A	N	C	E	A
8624509	7	21658	A	N	F	I	A
8624517	9	21801	A	N	D	D	A

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
8526758	A	H	-	A	A	0
8526761	A	H	-	B	D	0
8544844	A	H	-	C	A	0
8544848	A	H	-	A	A	0
8544852	A	H	-	A	A	0
8561174	B	H	-	C	A	0
8561182	A	H	-	D	D	0
8561209	A	H	-	A	D	0
8561217	A	H	-	A	D	0
8561221	B	H	-	A	A	0
8561754	A	H	-	C	D	0
8561999	A	H	-	A	D	0
8576166	-	-	-	C	D	0
8576225	A	H	-	C	D	0
8576766	A	H	-	A	A	0
8576770	A	H	-	A	D	0
8576778	A	H	-	A	D	0
8576794	A	H	-	A	D	0
8577020	-	-	-	-	D	0
8577780	A	H	-	A	B	0
8577790	A	H	-	A	A	0
8577794	A	H	-	C	A	0
8587108	A	H	-	A	A	0
8597543	A	H	-	A	A	0
8603750	A	H	-	A	A	0
8603847	A	H	-	A	D	0
8610716	A	-	-	A	D	0
8610720	A	H	-	A	D	0
8617703	A	H	-	C	D	0
8623091	A	H	-	A	D	0
8623095	-	H	-	C	A	0
8623178	B	H	-	A	D	0
8624509	A	H	-	C	D	0
8624517	A	H	-	A	D	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
8526758	Y				Y	
8526761					Y	
8544844					Y	
8544848					Y	
8544852					Y	
8561174					Y	
8561182					Y	
8561209					Y	
8561217					Y	
8561221					Y	
8561754	Y				Y	
8561999			Y		Y	
8576166					Y	
8576225					Y	Y
8576766	Y				Y	
8576770	Y				Y	
8576778			Y		Y	
8576794					Y	
8577020					Y	
8577780					Y	
8577790					Y	
8577794					Y	
8587108					Y	
8597543					Y	
8603750					Y	
8603847					Y	
8610716					Y	
8610720					Y	
8617703					Y	
8623091					Y	
8623095					Y	
8623178					Y	
8624509					Y	
8624517					Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
8526758	-	-	0	0	1	0
8526761	A	1	0	0	1	0
8544844	A	1	0	0	1	0
8544848	A	1	0	0	1	0
8544852	A	1	0	0	1	0
8561174	A	1	0	1	0	0
8561182	A	1	0	2	0	0
8561209	A	1	0	0	3	0
8561217	A	7	0	2	0	0
8561221	A	8	0	0	1	0
8561754	-	-	0	0	1	0
8561999	A	1	0	1	0	0
8576166	D	22	0	0	1	0
8576225	-		0	0	1	0
8576766	A	1	0	0	1	0
8576770	A	1	0	0	1	0
8576778	A	1	0	0	1	0
8576794	A	1	0	0	1	0
8577020	-		0	0	1	0
8577780	A	1	0	0	2	0
8577790	A	1	0	0	1	0
8577794	A	1	0	0	2	0
8587108	A	1	0	0	2	0
8597543	A	1	0	1	0	0
8603750	A	1	0	0	1	0
8603847	-		0	1	0	0
8610716	A	1	0	1	2	0
8610720	-		0	0	1	0
8617703	A	1	0	0	1	0
8623091	A	1	0	0	3	0
8623095	A	1	1	0	0	0
8623178	A	1	1	0	3	0
8624509	A	1	1	0	0	0
8624517	A	1	0	0	3	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
8526758	1	0	0	0	0	-
8526761	0	0	0	0	0	-
8544844	0	0	0	0	0	-
8544848	0	0	0	0	0	-
8544852	0	0	0	0	0	-
8561174	0	0	0	0	0	-
8561182	0	0	0	0	0	-
8561209	0	0	0	0	0	-
8561217	0	0	0	0	0	-
8561221	0	0	0	0	0	-
8561754	1	0	0	0	0	-
8561999	0	0	0	0	1	-
8576166	0	0	0	0	0	-
8576225	0	0	0	0	0	-
8576766	1	0	0	0	0	-
8576770	1	0	0	0	0	-
8576778	0	0	0	0	1	-
8576794	0	0	0	0	0	-
8577020	0	0	0	0	0	-
8577780	0	0	0	0	0	-
8577790	0	0	0	0	0	-
8577794	0	0	0	0	0	-
8587108	0	0	0	0	0	-
8597543	0	0	0	0	0	-
8603750	0	0	0	0	0	-
8603847	0	0	0	0	0	-
8610716	0	0	0	0	0	-
8610720	0	0	0	0	0	-
8617703	0	0	0	0	0	-
8623091	0	0	0	0	0	-
8623095	0	0	0	0	0	-
8623178	0	0	0	0	0	-
8624509	0	0	0	0	0	-
8624517	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
8526758	-	0	0	LOS ANGELES	PICO RIVERA	-118.1014636	33.97740776	6
8526761	-	0	0	LOS ANGELES	PICO RIVERA	-118.0804833	34.01225206	6
8544844	-	33.98467	-118.09694	LOS ANGELES	PICO RIVERA	-118.096095	33.984584	6
8544848	-	0	0	LOS ANGELES	PICO RIVERA	-118.1111	33.97763	6
8544852	-	0	0	LOS ANGELES	PICO RIVERA	-118.0954401	33.97032798	6
8561174	-	33.59357071	-118.6269379	LOS ANGELES	PICO RIVERA	-118.1072159	33.98485565	11
8561182	-	33.9987	-118.08426	LOS ANGELES	PICO RIVERA	-118.0844198	33.9983862	11
8561209	-	33.98289871	-118.0965805	LOS ANGELES	PICO RIVERA	-118.0967026	33.98297501	6
8561217	-	33.96823883	-118.0957031	LOS ANGELES	PICO RIVERA	-118.0958939	33.96814346	11
8561221	-	0	0	LOS ANGELES	PICO RIVERA	-118.1003418	33.9848938	6
8561754	-	0	0	LOS ANGELES	PICO RIVERA	-118.087916	33.97811283	6
8561999	-	33.99264908	-118.0900497	LOS ANGELES	PICO RIVERA	-118.0903091	33.99226379	11
8576166	-	33.96648026	-118.1072006	LOS ANGELES	PICO RIVERA	-118.086174	33.99551773	6
8576225	-	0	0	LOS ANGELES	PICO RIVERA	-118.0895695	34.00374421	6
8576766	-	33.96968842	-118.1009064	LOS ANGELES	PICO RIVERA	-118.1009674	33.96967697	6
8576770	-	33.9719696	-118.0946884	LOS ANGELES	PICO RIVERA	-118.09478	33.9719429	6
8576778	-	33.96936035	-118.0999832	LOS ANGELES	PICO RIVERA	-118.1000137	33.96938705	6
8576794	-	34.00788879	-118.0725479	LOS ANGELES	PICO RIVERA	-118.0729218	34.00804138	6
8577020	-	0	0	LOS ANGELES	PICO RIVERA	-118.0880276	33.9930651	6
8577780	-	33.98236084	-118.0956879	LOS ANGELES	PICO RIVERA	-118.0955658	33.98234558	6
8577790	-	0	0	LOS ANGELES	PICO RIVERA	-118.0972748	33.983284	6
8577794	-	0	0	LOS ANGELES	PICO RIVERA	-118.1129303	33.97356415	6
8587108	-	33.78303146	-118.0971527	LOS ANGELES	PICO RIVERA	-118.0971603	33.98321915	6
8597543	-	33.96825027	-118.0957336	LOS ANGELES	PICO RIVERA	-118.0960693	33.96819687	11
8603750	-	33.97299957	-118.1139984	LOS ANGELES	PICO RIVERA	-118.1140137	33.97373962	6
8603847	-	33.99877167	-118.0778503	LOS ANGELES	PICO RIVERA	-118.0765991	34.00918961	11
8610716	-	34.00667953	-118.0865936	LOS ANGELES	PICO RIVERA	-118.0866623	34.00680923	11
8610720	-	0	0	LOS ANGELES	PICO RIVERA	-118.0991135	33.99058533	6
8617703	-	33.96770859	-118.1155624	LOS ANGELES	PICO RIVERA	-118.1156235	33.9671936	6
8623091	-	0	0	LOS ANGELES	PICO RIVERA	-118.0866699	34.00679016	6
8623095	-	33.96858978	-118.0920334	LOS ANGELES	PICO RIVERA	-118.11306	33.97343063	165
8623178	-	33.95692825	-118.1039734	LOS ANGELES	PICO RIVERA	-118.1036911	33.9565773	165
8624509	-	33.97592926	-118.1023331	LOS ANGELES	PICO RIVERA	-118.1023941	33.97601318	165
8624517	-	34.01390076	-118.5238495	LOS ANGELES	PICO RIVERA	-118.0875015	34.00282669	6

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
8624899	2018	2018-08-20	1900	2018-05-22	1611	16	525865
8626640	2018	2018-06-06	1900	2018-04-26	1815	18	529571
8629762	2018	2018-06-06	1900	2018-04-29	330	3	499039
8629770	2018	2018-06-06	1900	2018-04-15	200	2	499039
8629986	2018	2018-06-05	1900	2018-05-02	2250	22	529571
8629994	2018	2018-06-05	1900	2018-05-07	1520	15	530373
8638727	2018	2018-06-21	1900	2018-04-17	2345	23	499039
8641246	2018	2018-07-03	1900	2018-06-01	1120	11	455303
8648591	2018	2019-02-13	1900	2018-10-15	1400	14	430275
8657602	2018	2018-08-23	1900	2018-07-03	1435	14	455303
8657925	2018	2018-08-14	1900	2018-06-28	1710	17	529141
8657961	2018	2018-08-14	1900	2018-06-21	550	5	534714
8657965	2018	2018-08-14	1900	2018-06-21	1305	13	455303
8658042	2018	2018-09-27	1900	2018-07-16	920	9	455303
8658046	2018	2018-09-27	1900	2018-07-13	1730	17	532522
8658062	2018	2018-09-27	1900	2018-07-09	1445	14	455303
8664582	2018	2018-07-31	1900	2018-06-02	1023	10	507891
8664586	2018	2018-07-31	1900	2018-06-15	1915	19	430275
8664637	2018	2018-07-26	1900	2018-05-30	1220	12	455303
8666243	2018	2018-07-31	1900	2018-06-14	445	4	530376
8666247	2018	2018-07-31	1900	2018-06-12	555	5	499039
8682002	2018	2018-09-17	1900	2018-07-25	2034	20	529141
8682006	2018	2018-09-17	1900	2018-07-31	1740	17	430275
8682010	2018	2018-09-17	1900	2018-07-15	1353	13	455303
8682014	2018	2018-09-17	1900	2018-07-26	700	7	529141
8682018	2018	2018-09-17	1900	2018-07-14	230	2	496487
8682034	2018	2018-09-14	1900	2018-07-31	720	7	45530
8682119	2018	2018-09-18	1900	2018-08-05	1920	19	430275
8682123	2018	2018-09-18	1900	2018-08-08	1900	19	430275
8682127	2018	2018-09-18	1900	2018-08-09	2210	22	499039
8710532	2018	2018-10-18	1900	2018-08-28	2111	21	499039
8710536	2018	2018-10-18	1900	2018-08-24	1700	17	499039
8710570	2018	2018-10-23	1900	2018-08-26	25	0	517839
8713712	2018	2018-10-18	1900	2018-09-20	625	6	430275

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
8624899	1516	2	5	5	1954	0
8626640	1510	4	5	5	1954	0
8629762	1519	7	5	5	1954	0
8629770	1515	7	5	5	1954	0
8629986	1510	3	5	5	1954	0
8629994		1	5	5	1954	0
8638727	1513	2	5	5	1954	0
8641246	1514	5	5	5	1954	0
8648591	1517	1	5	5	1954	0
8657602	1517	2	5	5	1954	0
8657925	1517	4	5	5	1954	0
8657961	1511	4	5	5	1954	0
8657965	1513	4	5	5	1954	0
8658042	1516	1	5	5	1954	0
8658046	1510	5	5	5	1954	0
8658062	1518	1	5	5	1954	0
8664582	1518	6	5	5	1954	0
8664586	1516	5	5	5	1954	0
8664637	1516	3	5	5	1954	0
8666243	1517	4	5	5	1954	0
8666247	1516	2	5	5	1954	0
8682002	1518	3	5	5	1954	0
8682006	1517	2	5	5	1954	0
8682010	1516	7	5	5	1954	0
8682014	1518	4	5	5	1954	0
8682018	1518	6	5	5	1954	0
8682034	1510	2	5	5	1954	0
8682119	1512	7	5	5	1954	0
8682123	1511	3	5	5	1954	0
8682127	1511	4	5	5	1954	0
8710532	1511	2	5	5	1954	0
8710536	1517	5	5	5	1954	0
8710570	1517	7	5	5	1954	0
8713712	1516	4	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
8624899	0	0		0	152B	PARAMOUNT BL
8626640	0	0		0	151T2	PARAMOUNT BL
8629762	0	0		0	151B	TELEGRAPH RD
8629770	0	0		0	151B	ROSEMEAD BL
8629986	0	0		0	151T2	PARAMOUNT BL
8629994	0	0		0	151T2	PASSONS BL
8638727	0	0		0	151T3	ROSEMEAD BL
8641246	0	0		0	151T1	ROSEMEAD BL
8648591	0	0		0	151T1	SLAUSON AV
8657602	0	0		0	151T1	SLAUSON AV
8657925	0	0		0	151	SLAUSON AV
8657961	0	0		0	151T3	SAN GABRIEL RIVER PKWY
8657965	0	0		0	151T1	ROSEMEAD BL
8658042	0	0		0	151T1	TELEGRAPH RD
8658046	0	0		0	151T2	WHITTIER BL
8658062	0	0		0	151T1	SLAUSON AV
8664582	0	0		0	151T1	TELEGRAPH RD
8664586	0	0		0	151T2	SLAUSON AV
8664637	0	0		0	151T1	PARAMOUNT BL
8666243	0	0		0	151D	SLAUSON AV
8666247	0	0		0	151T3	SLAUSON AV
8682002	0	0		0	151T1	PARAMOUNT BL
8682006	0	0		0	151T2	SLAUSEN AV
8682010	0	0		0	151T1	ROSEMEAD BL
8682014	0	0		0	151T1	TELEGRAPH RD
8682018	0	0		0	151T3	ROSEMEAD BL
8682034	0	0		0	151T1	BEVERLY RD
8682119	0	0		0	151T2	BEVERLY BL
8682123	0	0		0	151T2	ROSEMEAD BL
8682127	0	0		0	151T3	BEVERLY BL
8710532	0	0		0	151T3	SAN GABRIEL RIVER PKWY
8710536	0	0		0	151T2	WASHINGTON BL
8710570	0	0		0	151T3	ROSEMEAD BL
8713712	0	0		0	151T1	SLAUSON AV

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
8624899	MERCURY LN	360	S	N	N	A
8626640	BEVERLY RD	15	N	N	Y	A
8629762	TRUE AV	800	E	N	N	A
8629770	WASHINGTON BL	378	N	N	N	A
8629986	BEVERLY BL	42	S	N	Y	A
8629994	REX RD	200	N	N	Y	A
8638727	WASHINGTON BL	210	N	N	Y	A
8641246	HAVENWOOD AV	44	N	N	Y	A
8648591	PASSONS BL	387	E	N	N	A
8657602	PASSONS BL	428	E	N	N	A
8657925	SERAPIS AV	145	W	N	Y	A
8657961	BEVERLY BL	150	N	N	Y	B
8657965	MINES AV	197	N	N	Y	A
8658042	SERAPIS AV	59	E	N	Y	A
8658046	COLUMBIA AV	83	W	N	Y	A
8658062	BEQUETTE AV	307	E	N	N	A
8664582	ROSEMEAD BL	56	W	N	Y	A
8664586	ROSEMEAD BL	410	W	N	N	A
8664637	REX RD	582	S	N	N	B
8666243	REEVE RD	25	E	N	Y	A
8666247	INDUSTRIAL AV	659	W	N	N	A
8682002	REX RD	20	N	N	Y	A
8682006	BEQUETTE AV	150	W	N	Y	A
8682010	REX RD	578	S	N	N	A
8682014	CHANEY AV	3	W	N	Y	A
8682018	TERRADELL ST	215	S	N	Y	A
8682034	ROSEMEAD BL	49	W	N	Y	A
8682119	DURFEE AV	85	W	N	Y	A
8682123	GALLATIN RD	26	S	N	Y	A
8682127	PARAMOUNT BL	26	W	N	Y	A
8710532	ROSEHILLS RD	11308	S	N	N	A
8710536	KILGARRY AV	110	E	N	Y	A
8710570	REX RD	16	S	N	Y	A
8713712	INDUSTRY AV	21	E	N	Y	B

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
8624899	-	N				
8626640	-	N				
8629762	-	N				
8629770	-	N				
8629986	-	N				
8629994	-	N				
8638727	-	N				
8641246	-	N				
8648591	-	N				
8657602	-	N				
8657925	-	N				
8657961	-	N				
8657965	-	N				
8658042	-	N				
8658046	-	N				
8658062	-	N				
8664582	-	N				
8664586	-	N				
8664637	-	N				
8666243	-	N				
8666247	-	N				
8682002	-	N				
8682006	-	N				
8682010	-	N				
8682014	-	N				
8682018	-	N				
8682034	-	N				
8682119	-	N				
8682123	-	N				
8682127	-	N				
8710532	-	N				
8710536	-	N				
8710570	-	N				
8713712	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
8624899						N
8626640						N
8629762						Y
8629770						N
8629986						N
8629994						Y
8638727						Y
8641246						N
8648591						Y
8657602						Y
8657925						N
8657961						N
8657965						N
8658042						N
8658046						Y
8658062						N
8664582						N
8664586						Y
8664637						Y
8666243						N
8666247						Y
8682002						Y
8682006						Y
8682010						Y
8682014						Y
8682018						Y
8682034						Y
8682119						N
8682123						N
8682127						N
8710532						N
8710536						N
8710570						Y
8713712						Y

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
8624899	4	0	1	2	A	-
8626640	3	0	2	3	A	-
8629762	4	0	1	2	A	-
8629770	2	0	1	2	A	-
8629986	2	0	1	2	A	-
8629994	4	0	1	4	A	-
8638727	2	0	3	2	A	-
8641246	4	0	1	2	D	-
8648591	1	1	2	2	A	-
8657602	3	0	2	2	A	-
8657925	4	0	2	2	A	-
8657961	4	0	1	2	A	-
8657965	3	0	1	2	A	-
8658042	4	0	1	2	A	-
8658046	4	0	5	3	A	-
8658062	4	0	1	2	A	-
8664582	4	0	3	4	A	-
8664586	3	0	4	2	A	-
8664637	3	0	1	2	A	-
8666243	4	0	1	2	A	-
8666247	4	0	2	2	A	-
8682002	2	0	1	2	A	-
8682006	3	0	2	4	A	-
8682010	2	0	2	3	A	-
8682014	3	0	1	2	A	-
8682018	4	0	1	4	A	-
8682034	4	0	1	2	A	-
8682119	4	0	1	2	A	-
8682123	4	0	1	2	A	-
8682127	3	0	2	2	A	-
8710532	3	0	1	2	A	-
8710536	2	0	1	3	C	-
8710570	4	0	4	2	A	-
8713712	4	0	1	1	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
8624899	4	21703		N	C	C	A
8626640	9	21801	A	N	A	C	A
8629762	8	22107		F	B	C	A
8629770	8	22107		F	B	C	A
8629986	3	22350		N	D	C	A
8629994	8	22107		N	B	C	A
8638727	8	22107		N	F	C	A
8641246	0	0		N	G	B	E
8648591	8	22107		N	A	C	A
8657602	9	21801	A	N	D	C	A
8657925	4	21703		N	C	C	A
8657961	9	21801	A	N	D	C	A
8657965	3	22350		N	C	C	A
8658042	3	22350		N	C	C	A
8658046	3	22350		N	C	C	A
8658062	5	21650	1	N	A	G	A
8664582	16	24002	A	N	C	C	A
8664586	3	22350		N	C	C	A
8664637	3	22350		N	C	C	A
8666243	21	22106		N	A	C	A
8666247	9	21801	A	N	D	C	A
8682002	3	22350		N	G	C	A
8682006	3	22350		N	C	C	A
8682010	8	22107		N	G	B	F
8682014	8	22107		N	E	C	A
8682018	1	23152	A	N	B	E	A
8682034	0	16028		N	D	C	A
8682119	7	21658	A	N	B	C	A
8682123	3	22350		N	-	C	A
8682127	3	22350		F	C	C	A
8710532	8	22107		N	C	I	A
8710536	18	0		N	C	C	A
8710570	3	22350		N	C	C	A
8713712	8	22107		N	E	I	A

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
8624899	A	H	-	A	A	0
8626640	A	H	-	A	A	0
8629762	A	H	-	C	D	0
8629770	A	-	-	C	D	0
8629986	A	H	-	C	A	0
8629994	A	H	-	A	A	0
8638727	A	-	-	C	D	0
8641246	A	H	-	A	D	0
8648591	A	H	-	A	D	0
8657602	A	H	-	A	A	0
8657925	A	H	-	A	D	0
8657961	A	D	-	A	A	0
8657965	A	H	-	A	A	0
8658042	A	H	-	A	A	0
8658046	A	H	-	A	A	0
8658062	-	H	-	A	D	0
8664582	A	H	-	A	D	0
8664586	A	H	-	A	D	0
8664637	A	H	-	A	D	0
8666243	A	H	-	C	D	0
8666247	A	-	-	A	D	0
8682002	A	H	-	C	A	0
8682006	A	H	-	A	D	0
8682010	A	H	-	A	D	0
8682014	A	H	-	A	D	0
8682018	-	H	-	C	D	0
8682034	A	H	-	A	A	0
8682119	A	H	-	B	A	0
8682123	A	H	-	A	A	0
8682127	A	-	-	C	D	0
8710532	A	-	-	C	D	0
8710536	A	-	-	A	D	0
8710570	A	H	-	C	A	0
8713712	A	H	-	B	D	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
8624899					Y	
8626640					Y	
8629762					Y	
8629770					Y	
8629986					Y	
8629994					Y	
8638727					Y	
8641246	Y				Y	
8648591					Y	
8657602					Y	
8657925					Y	
8657961					Y	
8657965					Y	
8658042					Y	
8658046					Y	
8658062		Y			Y	
8664582					Y	
8664586					Y	
8664637				Y	Y	
8666243			Y		Y	
8666247					Y	
8682002					Y	Y
8682006					Y	
8682010	Y				Y	
8682014					Y	
8682018					Y	
8682034					Y	
8682119					Y	
8682123					Y	
8682127					Y	
8710532					Y	
8710536					Y	
8710570					Y	
8713712					Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
8624899	A	1	0	0	1	0
8626640	A	1	0	2	0	0
8629762	A	1	0	0	1	0
8629770	A	1	1	0	0	0
8629986	A	1	1	0	0	0
8629994	A	1	0	0	1	0
8638727	A	1	2	1	0	0
8641246	-	-	0	0	1	0
8648591	A	7	0	1	1	0
8657602	A	1	0	2	0	0
8657925	A	1	0	0	2	0
8657961	-		0	0	1	0
8657965	A	8	0	1	0	0
8658042	A	1	0	0	1	0
8658046	A	1	0	0	5	0
8658062	L	4	0	0	1	0
8664582	D	22	0	0	3	0
8664586	A	1	0	1	3	0
8664637	M	47	0	1	0	0
8666243	A	1	0	0	1	0
8666247	A	1	0	0	2	0
8682002	-		1	0	0	0
8682006	A	1	0	1	1	0
8682010	A	1	1	1	0	0
8682014	A	1	0	1	0	0
8682018	A	1	0	0	1	0
8682034	A	1	0	0	1	0
8682119	A	1	0	0	1	0
8682123	A	1	0	0	1	0
8682127	A	1	0	2	0	0
8710532	A	1	0	1	0	0
8710536	-	-	1	0	0	0
8710570	A	1	0	0	4	0
8713712	A	1	0	0	1	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
8624899	0	0	0	0	0	-
8626640	0	0	0	0	0	-
8629762	0	0	0	0	0	-
8629770	0	0	0	0	0	-
8629986	0	0	0	0	0	-
8629994	0	0	0	0	0	-
8638727	0	0	0	0	0	-
8641246	1	0	0	0	0	-
8648591	0	0	0	0	0	-
8657602	0	0	0	0	0	-
8657925	0	0	0	0	0	-
8657961	0	0	0	0	0	-
8657965	0	0	0	0	0	-
8658042	0	0	0	0	0	-
8658046	0	0	0	0	0	-
8658062	0	0	1	0	0	-
8664582	0	0	0	0	0	-
8664586	0	0	0	0	0	-
8664637	0	0	0	0	0	-
8666243	0	0	0	0	1	-
8666247	0	0	0	0	0	-
8682002	0	0	0	0	0	-
8682006	0	0	0	0	0	-
8682010	2	0	0	0	0	-
8682014	0	0	0	0	0	-
8682018	0	0	0	0	0	-
8682034	0	0	0	0	0	-
8682119	0	0	0	0	0	-
8682123	0	0	0	0	0	-
8682127	0	0	0	0	0	-
8710532	0	0	0	0	0	-
8710536	0	0	0	0	0	-
8710570	0	0	0	0	0	-
8713712	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
8624899	-	0	0	LOS ANGELES	PICO RIVERA	-118.1075592	33.984375	6
8626640	-	34.00888824	-118.0863876	LOS ANGELES	PICO RIVERA	-118.0863571	34.00897217	11
8629762	-	33.95069885	-118.0941467	LOS ANGELES	PICO RIVERA	-118.0943146	33.95073318	6
8629770	-	33.98416901	-118.0963135	LOS ANGELES	PICO RIVERA	-118.096489	33.98409271	165
8629986	-	34.00902939	-118.0863724	LOS ANGELES	PICO RIVERA	-118.0859222	34.0120163	165
8629994	-	0	0	LOS ANGELES	PICO RIVERA	-118.0940247	33.97377014	6
8638727	-	33.00893021	-118.0863419	LOS ANGELES	PICO RIVERA	-118.0967865	33.98370361	165
8641246	-	33.88584137	-118.0847321	LOS ANGELES	PICO RIVERA	-118.0855408	33.9960556	6
8648591	-	33.96849823	-119.0970993	LOS ANGELES	PICO RIVERA	-118.0960312	33.96818542	165
8657602	-	33.96825027	-118.0957184	LOS ANGELES	PICO RIVERA	-118.0959015	33.96814346	11
8657925	-	33.96989822	-118.1014023	LOS ANGELES	PICO RIVERA	-118.1014252	33.96981812	6
8657961	-	34.00774002	-118.0707703	LOS ANGELES	PICO RIVERA	-118.0707321	34.00777435	6
8657965	-	33.99237823	-118.0895309	LOS ANGELES	PICO RIVERA	-118.089592	33.99246597	11
8658042	-	0	0	LOS ANGELES	PICO RIVERA	-118.1062927	33.95838547	6
8658046	-	34.0026207	-118.0866013	LOS ANGELES	PICO RIVERA	-118.0865936	34.00259018	6
8658062	-	33.9699707	-118.1020813	LOS ANGELES	PICO RIVERA	-118.1020813	33.97002411	6
8664582	-	33.96160889	-118.110878	LOS ANGELES	PICO RIVERA	-118.1102905	33.96113968	6
8664586	-	33.9715004	-118.1069031	LOS ANGELES	PICO RIVERA	-118.1063385	33.97137451	11
8664637	-	0	0	LOS ANGELES	PICO RIVERA	-118.1098022	33.98009109	11
8666243	-	0	0	LOS ANGELES	PICO RIVERA	-118.0988541	33.96902847	6
8666247	-	33.97470093	-118.1169128	LOS ANGELES	PICO RIVERA	-118.116717	33.974665	6
8682002	-	33.98184967	-118.109108	LOS ANGELES	PICO RIVERA	-118.1091843	33.98166275	165
8682006	-	33.97029877	-118.1035004	LOS ANGELES	PICO RIVERA	-118.1034927	33.97045135	11
8682010	-	33.97586823	-118.102478	LOS ANGELES	PICO RIVERA	-118.1023941	33.97602463	165
8682014	-	33.95719147	-118.1045532	LOS ANGELES	PICO RIVERA	-118.104538	33.95715714	11
8682018	-	0	0	LOS ANGELES	PICO RIVERA	-118.1090164	33.96321869	6
8682034	-	34.00769043	-118.0822067	LOS ANGELES	PICO RIVERA	-118.0818939	34.00794601	6
8682119	-	34.01063156	-118.0813293	LOS ANGELES	PICO RIVERA	-118.0766144	34.00919342	6
8682123	-	0	0	LOS ANGELES	PICO RIVERA	-118.0789871	34.016922	6
8682127	-	34.01227951	-118.0864487	LOS ANGELES	PICO RIVERA	-118.0859909	34.01215363	11
8710532	-	34.01543045	-118.0560684	LOS ANGELES	PICO RIVERA	-118.0709076	34.00738907	11
8710536	-	33.98001099	-118.091362	LOS ANGELES	PICO RIVERA	-118.0915833	33.97996902	165
8710570	-	33.97732925	-118.1012726	LOS ANGELES	PICO RIVERA	-118.1014786	33.97736359	6
8713712	-	33.97529984	-118.1164017	LOS ANGELES	PICO RIVERA	-118.1146545	33.97393036	6

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
8713724	2018	2018-10-18	1900	2018-09-18	1608	16	529571
8713728	2018	2018-10-18	1900	2018-09-10	925	9	455303
8713747	2018	2018-10-19	1900	2018-08-31	1500	15	430275
8713751	2018	2018-10-19	1900	2018-08-29	1520	15	529141
8741877	2018	2018-11-30	1900	2018-10-22	255	2	499039
8741881	2018	2018-12-10	1900	2018-10-29	1210	12	430275
8741922	2018	2018-12-03	1900	2018-10-04	2025	20	499039
8741930	2018	2018-12-03	1900	2018-10-04	900	9	468968
8741934	2018	2019-01-03	1900	2018-10-02	2220	22	530376
8741938	2018	2018-12-03	1900	2018-10-19	815	8	455303
8744892	2018	2018-12-03	1900	2018-10-29	830	8	430275
8744896	2018	2018-12-03	1900	2018-10-25	750	7	453303
8758422	2018	2019-01-19	1900	2018-11-13	1615	16	529571
8759362	2018	2018-12-19	1900	2018-10-13	143	1	517839
8776563	2018	2019-01-17	1900	2018-12-19	730	7	430275
8780916	2018	2019-01-23	1900	2018-11-16	915	9	434616
8781306	2018	2019-01-30	1900	2018-12-02	1500	15	430275
8783943	2018	2020-05-22	1900	2018-12-01	1805	18	529141
8784328	2019	2019-02-15	1900	2019-01-02	1325	13	455303
8784360	2019	2019-02-15	1900	2019-01-16	1150	11	453303
8784534	2019	2019-02-13	1900	2019-01-02	1620	16	529141
8784538	2019	2019-02-13	1900	2019-01-13	815	8	434616
8784724	2018	2019-02-28	1900	2018-12-27	1810	18	499039
8784792	2018	2019-02-15	1900	2018-12-31	255	2	499039
8792482	2019	2019-02-21	1900	2019-01-17	2300	23	499039
8811955	2018	2019-03-12	1900	2018-12-20	1820	18	430275
8813407	2019	2019-03-08	1900	2019-02-06	1625	16	529141
8813489	2019	2019-03-07	1900	2019-02-08	2154	21	499039
8813576	2019	2019-03-20	1900	2019-02-03	2159	21	517839
8813640	2019	2019-03-07	1900	2019-01-22	710	7	529141
8817201	2019	2019-03-19	1900	2019-02-15	1843	18	499039
8817538	2019	2019-03-15	1900	2019-02-02	1650	16	515181
8817540	2019	2019-03-15	1900	2019-02-14	1754	17	515181
8817548	2019	2019-03-15	1900	2019-02-12	1820	18	529141

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
8713724	1518	2	5	5	1954	0
8713728	1518	1	5	5	1954	0
8713747	1515	5	5	5	1954	0
8713751	1510	3	5	5	1954	0
8741877	1513	1	5	5	1954	0
8741881	1517	1	5	5	1954	0
8741922	1517	4	5	5	1954	0
8741930	1515	4	5	5	1954	0
8741934	1513	2	5	5	1954	0
8741938	1518	5	5	5	1954	0
8744892	1517	1	5	5	1954	0
8744896	1512	4	5	5	1954	0
8758422	1513	2	5	5	1954	0
8759362	1513	6	5	5	1954	0
8776563	1511	3	5	5	1954	0
8780916	1515	5	5	5	1954	0
8781306	1515	7	5	5	1954	0
8783943	1519	6	5	5	1954	0
8784328	1517	3	5	5	1954	0
8784360	1516	3	5	5	1954	0
8784534	1512	3	5	5	1954	0
8784538	1515	7	5	5	1954	0
8784724	1517	4	5	5	1954	0
8784792	1517	1	5	5	1954	0
8792482	1513	4	5	5	1954	0
8811955	1512	4	5	5	1954	0
8813407	1513	3	5	5	1954	0
8813489	1513	5	5	5	1954	0
8813576	1517	7	5	5	1954	0
8813640	1514	2	5	5	1954	0
8817201	1518	5	5	5	1954	0
8817538	1520	6	5	5	1954	0
8817540	1516	4	5	5	1954	0
8817548	1515	2	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
8713724	0	0		0	151T2	SLAUSON AV
8713728	0	0		0	151T1	TELEGRAPH RD
8713747	0	0		0	151T1	WASHINGTON BL
8713751	0	0		0	151T2	PARAMOUNT BL
8741877	0	0		0	151T3	ROSEMEAD BL
8741881	0	0		0	151T1	WASHINGTON BL
8741922	0	0		0	151T2	PASSONS BL
8741930	0	0		0	151T1	WASHINGTON BL
8741934	0	0		0	151T3	CANDACE AV
8741938	0	0		0	151T1	TELEGRAPH RD
8744892	0	0		0	151T1	PASSONS BL
8744896	0	0		0	151T1	DURFEE AV
8758422	0	0		0	151T1	WHITTIER BL
8759362	0	0		0	151T3	WHITTIER BL
8776563	0	0		0	151T1	ROSEMEAD BL
8780916	0	0		0	151T3	WASHINGTON BL
8781306	0	0		0	151T1	ROSEMEAD BL
8783943	0	0		0	151	MYRON ST
8784328	0	0		0	151T1	PASSONS BL
8784360	0	0		0	151T1	PARAMOUNT BL
8784534	0	0		0	15T2	WHITTIER BL
8784538	0	0		0	151T1	DUNLAP CROSSING RD
8784724	0	0		0	151T2	WASHINGTON BL
8784792	0	0		0	151T3	PASSONS BL
8792482	0	0		0	151T3	WASHINGTON BL
8811955	0	0		0	151T4	WHITTIER BL
8813407	0	0		0	151T2	WASHINGTON BL
8813489	0	0		0	151T2	ROSEMEAD BL
8813576	0	0		0	151T3	SLAUSON AV
8813640	0	0		0	151T1	WHITTIER BL
8817201	0	0		0	151T2	TELEGRAPH RD
8817538	0	0		0	151T2	ROSEMEAD BL
8817540	0	0		0	151T2	ROSEMEAD BL
8817548	0	0		0	151	MINES AV

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
8713724	SERAPIS AV	86	E	N	Y	A
8713728	SERAPIS AV	29	E	N	Y	A
8713747	PASSONS BL	148	W	N	Y	A
8713751	BEVERLY BL	325	N	N	N	A
8741877	MANZANAR AV	277	N	N	N	A
8741881	LOCH ALENE AV	180	W	N	Y	A
8741922	BASCOM ST	15	N	N	Y	A
8741930	ROSEMEAD BL	300	E	N	N	A
8741934	CARRON ST	150	S	N	Y	A
8741938	ARRINGTON AV	22	E	N	Y	A
8744892	BASCOM ST	28	N	N	Y	E
8744896	WHITTIER BL	257	N	N	N	A
8758422	PARAMOUNT BL	290	W	N	N	A
8759362	PARAMOUNT BL	74	W	N	Y	A
8776563	LAS POSAS ST	210	N	N	Y	A
8780916	PASSONS BL	155	E	N	Y	A
8781306	MINES AV	50	S	N	Y	A
8783943	PASSONS BL	14	E	N	Y	A
8784328	BASCOM ST	51	N	N	Y	A
8784360	TROJAN	74	S	N	Y	C
8784534	DELAND AV	5	E	N	Y	A
8784538	ROSEMEAD BL	3	E	N	Y	A
8784724	KILGARRY AV	179	W	N	Y	A
8784792	SLAUSON AV	470	N	N	N	A
8792482	CANDACE AV	54	N	N	Y	A
8811955	ESPERANZA AV	104	W	N	Y	A
8813407	CROSSWAY DR	15		N	Y	A
8813489	WASHINGTON BL	700	N	N	N	A
8813576	PASSONS BL	87	E	N	Y	A
8813640	PASSONS BL	30	W	N	Y	A
8817201	CHANEY AV	159	W	N	Y	A
8817538	WASHINGTON BL	500	S	N	N	C
8817540	AERO DR	100	S	N	Y	C
8817548	ROSEMEAD BL	19	E	N	Y	A

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
8713724	-	N				
8713728	-	N				
8713747	-	N				
8713751	-	N				
8741877	-	N				
8741881	-	N				
8741922	-	N				
8741930	-	N				
8741934	-	N				
8741938	-	N				
8744892	-	N				
8744896	-	N				
8758422	-	N				
8759362	-	N				
8776563	-	N				
8780916	-	N				
8781306	-	N				
8783943	-	N				
8784328	-	N				
8784360	-	N				
8784534	-	N				
8784538	-	N				
8784724	-	N				
8784792	-	N				
8792482	-	N				
8811955	-	N				
8813407	-	N				
8813489	-	N				
8813576	-	N				
8813640	-	N				
8817201	-	N				
8817538	-	N				
8817540	-	N				
8817548	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
8713724						N
8713728						N
8713747						Y
8713751						N
8741877						Y
8741881						Y
8741922						N
8741930						Y
8741934						N
8741938						Y
8744892						N
8744896						N
8758422						N
8759362						Y
8776563						Y
8780916						Y
8781306						N
8783943						N
8784328						Y
8784360						Y
8784534						N
8784538						N
8784724						N
8784792						N
8792482						N
8811955						Y
8813407						Y
8813489						N
8813576						N
8813640						N
8817201						N
8817538						Y
8817540						N
8817548						N

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
8713724	4	0	1	2	A	-
8713728	4	0	1	2	A	-
8713747	3	0	2	3	A	-
8713751	4	0	1	2	-	-
8741877	2	0	3	1	A	-
8741881	4	0	1	2	A	-
8741922	4	0	1	2	A	-
8741930	4	0	1	2	A	-
8741934	4	0	1	2	A	-
8741938	3	0	1	2	A	-
8744892	4	0	1	2	A	-
8744896	3	0	1	2	D	-
8758422	4	0	1	2	A	-
8759362	4	0	1	1	A	-
8776563	4	0	1	3	A	-
8780916	4	0	1	3	A	-
8781306	4	0	2	2	A	-
8783943	1	1	0	2	A	-
8784328	4	0	1	3	A	-
8784360	3	0	1	1	A	-
8784534	4	0	1	2	A	-
8784538	3	0	1	2	D	-
8784724	3	0	2	4	A	-
8784792	2	0	1	1	A	-
8792482	3	0	1	2	A	-
8811955	4	0	2	2	A	-
8813407	4	0	1	3	A	-
8813489	4	0	1	2	A	-
8813576	4	0	1	2	A	-
8813640	3	0	2	2	A	-
8817201	4	0	3	3	A	-
8817538	4	0	1	2	A	-
8817540	4	0	1	2	A	-
8817548	4	0	1	2	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
8713724	3	22350		N	-	C	A
8713728	21	22106		N	C	C	A
8713747	3	22350		N	E	I	A
8713751	0	0		N	C	C	A
8741877	8	22107		N	F	J	A
8741881	7	21658	A	N	B	C	A
8741922	4	21703		N	C	C	A
8741930	9	21801	A	N	D	C	A
8741934	11	21954	A	N	G	B	E
8741938	9	21801	A	N	D	C	A
8744892	3	22350		N	C	C	A
8744896	0	0		N	A	G	A
8758422	9	21801		N	D	C	A
8759362	8	22107		N	A	I	A
8776563	3	22350		N	C	C	A
8780916	8	22107		N	B	C	A
8781306	3	22350		N	C	C	A
8783943	1	23153	F	F	G	B	B
8784328	8	22107		N	C	E	A
8784360	3	22350		N	A	I	A
8784534	12	22450	A	F	G	B	B
8784538	0	0		N	G	B	B
8784724	4	21703		N	C	-	A
8784792	3	22350		N	E	I	A
8792482	8	22107		F	C	E	A
8811955	8	22107		N	D	C	A
8813407	4	21703		N	C	C	A
8813489	8	22107		M	B	C	A
8813576	8	22107		N	B	C	A
8813640	4	21703		N	C	C	A
8817201	1	23152	A	F	C	C	A
8817538	9	21801	A	N	D	C	A
8817540	7	21658	A	N	C	C	A
8817548	11	21453	D	N	G	B	B

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
8713724	A	H	-	A	A	0
8713728	A	H	-	A	A	0
8713747	A	H	-	A	D	0
8713751	A	H	-	A	D	0
8741877	A	-	-	C	D	0
8741881	A	H	-	A	D	0
8741922	A	-	-	C	D	0
8741930	A	H	-	A	D	0
8741934	A	H	-	C	D	0
8741938	A	H	-	A	A	0
8744892	A	H	-	A	D	0
8744896	A	H	-	A	D	0
8758422	A	H	-	A	D	0
8759362	B	H	-	C	D	0
8776563	A	H	-	B	D	0
8780916	A	H	-	A	D	0
8781306	A	H	-	A	A	0
8783943	A	H	-	C	D	0
8784328	A	H	-	A	D	0
8784360	B	H	-	A	D	0
8784534	A	H	-	A	A	0
8784538	A	H	-	A	A	0
8784724	A	-	-	C	D	0
8784792	A	-	-	C	D	0
8792482	A	-	-	C	D	0
8811955	A	H	-	C	D	0
8813407	A	H	-	A	A	0
8813489	A	-	-	C	D	0
8813576	B	H	-	C	D	0
8813640	A	H	-	A	A	0
8817201	B	-	-	C	D	0
8817538	B	H	-	A	D	0
8817540	B	H	-	C	D	0
8817548	A	H	-	C	A	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
8713724					Y	
8713728					Y	
8713747					Y	
8713751					Y	
8741877					Y	
8741881				Y	Y	
8741922					Y	
8741930					Y	
8741934	Y				Y	Y
8741938					Y	
8744892					Y	
8744896		Y			Y	
8758422					Y	
8759362					Y	
8776563					Y	
8780916					Y	
8781306					Y	
8783943	Y				Y	Y
8784328					Y	
8784360					Y	
8784534	Y				Y	
8784538	Y				Y	
8784724					Y	
8784792					Y	
8792482					Y	
8811955					Y	
8813407					Y	
8813489					Y	
8813576					Y	
8813640					Y	
8817201					Y	Y
8817538					Y	
8817540					Y	
8817548	Y				Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
8713724	A	1	0	0	1	0
8713728	A	1	0	0	1	0
8713747	A	1	0	1	1	0
8713751	-	-	0	0	1	0
8741877	D	22	1	2	0	0
8741881	F	27	0	0	1	0
8741922	A	1	0	0	1	0
8741930	A	1	0	0	1	0
8741934	N	60	0	0	1	0
8741938	A	1	0	1	0	0
8744892	A	7	0	0	1	0
8744896	-	-	0	1	0	0
8758422	A	1	0	0	1	0
8759362	A	1	0	0	1	0
8776563	A	1	0	0	1	0
8780916	A	8	0	0	1	0
8781306	A	1	0	0	2	0
8783943	A	1	0	0	0	1
8784328	A	7	0	0	1	0
8784360	D	22	0	1	0	0
8784534	-		0	0	1	0
8784538	-	-	0	1	0	0
8784724	A	1	0	2	0	0
8784792	A	1	1	0	0	0
8792482	-		0	1	0	0
8811955	A	1	0	0	2	0
8813407	-		0	0	1	0
8813489	A	1	0	0	1	0
8813576	A	1	0	0	1	0
8813640	A	1	0	1	1	0
8817201	D	22	0	0	3	0
8817538	A	1	0	0	1	0
8817540	A	1	0	0	1	0
8817548	N	60	0	0	1	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
8713724	0	0	0	0	0	-
8713728	0	0	0	0	0	-
8713747	0	0	0	0	0	-
8713751	0	0	0	0	0	-
8741877	0	0	0	0	0	-
8741881	0	0	0	0	0	-
8741922	0	0	0	0	0	-
8741930	0	0	0	0	0	-
8741934	1	0	0	0	0	-
8741938	0	0	0	0	0	-
8744892	0	0	0	0	0	-
8744896	0	0	1	0	0	-
8758422	0	0	0	0	0	-
8759362	0	0	0	0	0	-
8776563	0	0	0	0	0	-
8780916	0	0	0	0	0	-
8781306	0	0	0	0	0	-
8783943	0	0	0	0	0	-
8784328	0	0	0	0	0	-
8784360	0	0	0	0	0	-
8784534	1	0	0	0	0	-
8784538	1	0	0	0	0	-
8784724	0	0	0	0	0	-
8784792	0	0	0	0	0	-
8792482	0	0	0	0	0	-
8811955	0	0	0	0	0	-
8813407	0	0	0	0	0	-
8813489	0	0	0	0	0	-
8813576	0	0	0	0	0	-
8813640	0	0	0	0	0	-
8817201	0	0	0	0	0	-
8817538	0	0	0	0	0	-
8817540	0	0	0	0	0	-
8817548	1	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
8713724	-	33.9695816	-118.1007004	LOS ANGELES	PICO RIVERA	-118.1007156	33.96960449	6
8713728	-	33.9584198	-118.1062927	LOS ANGELES	PICO RIVERA	-118.106369	33.95843887	6
8713747	-	33.98220062	-118.089798	LOS ANGELES	PICO RIVERA	-118.0905304	33.97960663	11
8713751	-	0	0	LOS ANGELES	PICO RIVERA	-118.0858383	34.01301956	6
8741877	-	33.99599838	-118.0849991	LOS ANGELES	PICO RIVERA	-118.0854263	33.99673843	165
8741881	-	33.98120117	-118.0938034	LOS ANGELES	PICO RIVERA	-118.0945358	33.98178864	6
8741922	-	33.9720192	-118.09478	LOS ANGELES	PICO RIVERA	-118.0947723	33.97195816	6
8741930	-	33.98273087	-118.0960388	LOS ANGELES	PICO RIVERA	-118.0963364	33.98276901	6
8741934	-	33.98878098	-118.1018524	LOS ANGELES	PICO RIVERA	-118.1020584	33.98834991	6
8741938	-	33.95793152	-118.106163	LOS ANGELES	PICO RIVERA	-118.1084061	33.95983124	11
8744892	-	33.9720993	-118.094902	LOS ANGELES	PICO RIVERA	-118.0947571	33.97199249	6
8744896	-	34.00014877	-118.0790787	LOS ANGELES	PICO RIVERA	-118.0791855	34.00000763	11
8758422	-	34.00460052	-118.0910034	LOS ANGELES	PICO RIVERA	-118.0895386	34.00373077	6
8759362	-	34.00299835	-118.0889969	LOS ANGELES	PICO RIVERA	-118.0889053	34.00346375	6
8776563	-	34.01567078	-118.0795898	LOS ANGELES	PICO RIVERA	-118.079895	34.01408005	6
8780916	-	33.58399963	-118.5240021	LOS ANGELES	PICO RIVERA	-118.0897598	33.97909927	6
8781306	-	33.99969864	-118.0843964	LOS ANGELES	PICO RIVERA	-118.09021	33.99202347	6
8783943	-	33.99599838	-118.0981979	LOS ANGELES	PICO RIVERA	-118.09832	33.96603775	165
8784328	-	33.97200012	-118.9459991	LOS ANGELES	PICO RIVERA	-118.0947342	33.97205353	6
8784360	-	33.97499847	-119.1110001	LOS ANGELES	PICO RIVERA	-118.1118927	33.97569275	11
8784534	-	33.99990082	-118.0802994	LOS ANGELES	PICO RIVERA	-118.0803375	33.99986267	6
8784538	-	33.99200058	-118.0887985	LOS ANGELES	PICO RIVERA	-118.0893021	33.9926796	11
8784724	-	33.98040009	-118.0920715	LOS ANGELES	PICO RIVERA	-118.0920715	33.98023987	11
8784792	-	33.96940994	-118.0962677	LOS ANGELES	PICO RIVERA	-118.0961075	33.96935272	165
8792482	-	33.98672867	-118.1035309	LOS ANGELES	PICO RIVERA	-118.1036377	33.98669052	11
8811955	-	33.99480057	-118.0710983	LOS ANGELES	PICO RIVERA	-118.0709381	33.99458694	6
8813407	-	33.98490143	-118.100502	LOS ANGELES	PICO RIVERA	-118.1003265	33.98488998	6
8813489	-	33.98498917	-118.0958328	LOS ANGELES	PICO RIVERA	-118.0959091	33.98483276	6
8813576	-	33.96847153	-118.0959015	LOS ANGELES	PICO RIVERA	-118.096962	33.96846008	6
8813640	-	0	0	LOS ANGELES	PICO RIVERA	-118.07798	33.99868011	11
8817201	-	33.9575386	-118.1049881	LOS ANGELES	PICO RIVERA	-118.1049347	33.95742798	6
8817538	-	33.98194885	-118.0981216	LOS ANGELES	PICO RIVERA	-118.0980072	33.98204422	6
8817540	-	33.96762848	-118.1066971	LOS ANGELES	PICO RIVERA	-118.1066208	33.96773911	6
8817548	-	33.9919014	-118.0898972	LOS ANGELES	PICO RIVERA	-118.0900345	33.99207687	6

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
8851980	2019	2019-05-17	1900	2019-04-04	1300	13	430275
8851988	2019	2019-05-22	1900	2019-03-26	2102	21	517839
8851992	2019	2019-05-09	1900	2019-03-24	556	5	499039
8852697	2019	2019-05-07	1900	2019-03-12	1652	16	532522
8852705	2019	2019-05-07	1900	2019-03-25	2130	21	499039
8852709	2019	2019-05-07	1900	2019-03-31	1639	16	529571
8864316	2019	2019-05-31	1900	2019-04-01	1300	13	455303
8868802	2019	2019-06-11	1900	2019-05-03	1240	12	455303
8869258	2019	2019-06-05	1900	2019-05-04	1650	16	499039
8869262	2019	2019-06-05	1900	2019-05-02	1533	15	523026
8872970	2019	2019-06-13	1900	2019-05-16	1030	10	448685
8875632	2019	2019-09-23	1900	2019-05-29	1718	17	530167
8881496	2019	2019-06-26	1900	2019-06-05	2307	23	496487
8891808	2019	2019-11-01	1900	2019-10-04	1450	14	430275
8894500	2019	2019-07-18	1900	2019-06-09	14	0	499039
8895857	2019	2019-07-18	1900	2019-03-11	2331	23	S17839
8895861	2019	2019-07-18	1900	2019-03-11	1520	15	529571
8897214	2019	2019-07-19	1900	2019-06-20	755	7	455303
8897218	2019	2019-07-19	1900	2019-06-17	1948	19	525145
8897222	2019	2019-07-19	1900	2019-06-19	1225	12	430275
8897226	2019	2019-07-19	1900	2019-06-12	1505	15	455303
8898851	2019	2019-07-25	1900	2019-06-16	1235	12	430275
8905346	2019	2019-09-19	1900	2019-08-02	2250	22	499039
8906877	2019	2019-08-30	1900	2019-07-10	900	9	455303
8910856	2020	2020-03-23	1900	2020-01-13	1552	15	529571
8939308	2019	2021-05-28	1900	2019-08-12	2227	22	529571
8946331	2019	2019-10-02	1900	2019-06-29	2115	21	499039
8917088	2019	2019-08-19	1900	2019-07-18	1320	13	430275
8917184	2019	2019-09-03	1900	2019-07-11	1523	15	515181
8930790	2019	2019-09-10	1900	2019-08-04	1125	11	455303
8930993	2019	2019-09-16	1900	2019-08-06	1850	18	499039
8931137	2019	2019-09-11	1900	2019-07-29	617	6	525145
8937234	2019	2019-09-19	1900	2019-08-26	605	6	499039
8937242	2019	2019-09-19	1900	2019-08-24	1621	16	529571

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
8851980	1512	4	5	5	1954	0
8851988	1518	2	5	5	1954	0
8851992	1512	7	5	5	1954	0
8852697	1511	2	5	5	1954	0
8852705	1515	1	5	5	1954	0
8852709	1519	7	5	5	1954	0
8864316	1510	1	5	5	1954	0
8868802	1515	5	5	5	1954	0
8869258	1510	6	5	5	1954	0
8869262	DOWNE	4	5	5	1954	0
8872970	1513	4	5	5	1954	0
8875632	1513	3	5	5	1954	0
8881496	1513	3	5	5	1954	0
8891808	1519	5	5	5	1954	0
8894500	1513	7	5	5	1954	0
8895857	1513	1	5	5	1954	0
8895861	1519	1	5	5	1954	0
8897214	1513	4	5	5	1954	0
8897218	1516	1	5	5	1954	0
8897222	1517	3	5	5	1954	0
8897226	1513	3	5	5	1954	0
8898851	1513	7	5	5	1954	0
8905346	1516	5	5	5	1954	0
8906877		3	5	5	1954	0
8910856	1510	1	5	5	1954	0
8939308	1513	1	5	5	1954	0
8946331	1517	6	5	5	1954	0
8917088	1517	4	5	5	1954	0
8917184	1518	4	5	5	1954	0
8930790	1512	7	5	5	1954	0
8930993	1518	2	5	5	1954	0
8931137	1516	1	5	5	1954	0
8937234	1516	1	5	5	1954	0
8937242	1517	6	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
8851980	0	0		0	151T1	STEPHENS ST
8851988	0	0		0	151T3	ROSEMEAD BL
8851992	0	0		0	151T3	DURFEE AV
8852697	0	0		0	151T2	BEVERLY BL
8852705	0	0		0	151T3	WASHINGTON BL
8852709	0	0		0	151T2	TELEGRAPH RD
8864316	0	0		0	151T1	PARAMOUNT BL
8868802	0	0		0	151T1	ROSEMEAD BL
8869258	0	0		0	151T2	WHITTIER BL
8869262	0	0		0	152B	PASSONS BL
8872970	0	0		0	151T1	ROSEMEAD BL
8875632	0	0		0	151T2	ROSEMEAD BL
8881496	0	0		0	151T3	PARAMOUNT BL
8891808	0	0		0	151T1	TELEGRAPH RD
8894500	0	0		0	151T3	PARAMOUNT BL
8895857	0	0		0	151T3	PARAMOUNT BL
8895861	0	0		0	151T2	SLAUSON AV
8897214	0	0		0	151T1	WASHINGTON BL
8897218	0	0		0	151T2	ROSEMEAD BL
8897222	0	0		0	151T1	ROSEMEAD BL
8897226	0	0		0	151T1	WHITTIER BL
8898851	0	0		0	151T1	ROSEMEAD BL
8905346	0	0		0	151T3	PARAMOUNT BL
8906877	0	0		0	151T1	ROSEMEAD BL
8910856	0	0		0	151T2	BEVERLY BL
8939308	0	0		0	151K3	ROSEMEAD BL
8946331	0	0		0	151T3	WASHINGTON BL
8917088	0	0		0	151T1	SLAUSON AV
8917184	0	0		0	151T2	ROSEMEAD BL
8930790	0	0		0	151T1	WHITTIER BL
8930993	0	0		0	151T4	SLAUSON AV
8931137	0	0		0	151T11	PARAMOUNT BL
8937234	0	0		0	151T1	PARAMOUNT BL
8937242	0	0		0	151T2	WASHINGTON BL

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
8851980	DURFEE BL	30	E	N	Y	B
8851988	MAXINE ST	178	N	N	Y	A
8851992	OLYMPIC BL	76	S	N	Y	A
8852697	DURFEE AV	110	W	N	Y	A
8852705	ROSEMEAD BL	33	W	N	Y	A
8852709	TRUE AV	673	E	N	N	A
8864316	BEVERLY BL	172	S	N	Y	A
8868802	THE MARKET PLACE	2	N	N	Y	A
8869258	IVY ST	220	W	N	Y	-
8869262	WASHINGTON BL	13	N	N	Y	A
8872970	WHITTIER BL	158	S	N	Y	B
8875632	CARRON DR	236	N	N	Y	A
8881496	DUNLAP CROSSING RD	70	N	N	Y	A
8891808	CHANEY AV	54	W	N	Y	A
8894500	ADVENT AV	358	N	N	N	A
8895857	ROSEHEDGE DR	203	S	N	Y	C
8895861	PASSONS BL	453	W	N	N	A
8897214	PARAMOUNT BL	178	E	N	Y	B
8897218	TELEGRAPH RD	30	N	N	Y	A
8897222	DANBRIDGE ST	500	S	N	N	A
8897226	PARAMOUNT BL	390	W	N	N	A
8898851	DUNLAP CROSSING RD	111	N	N	Y	A
8905346	TELEGRAPH RD	49	E	N	Y	A
8906877	GALLATIN RD	21	S	N	Y	A
8910856	PARAMOUNT BL	288	E	N	N	A
8939308	WHITTIER BL	261	S	N	N	A
8946331	HASTY AV	37	E	N	Y	A
8917088	PASSONS BL	240	E	N	Y	A
8917184	BURKE ST	420	S	N	N	A
8930790	TOBIAS AV	20	W	N	Y	A
8930993	REEVE RD	37	W	N	Y	A
8931137	SLAUSON AV	316	S	N	N	A
8937234	TROJAN ST	192	S	N	Y	A
8937242	PASSONS BL	12	W	N	Y	A

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
8851980	-	N				
8851988	-	N				
8851992	-	N				
8852697	-	N				
8852705	-	N				
8852709	-	N				
8864316	-	N				
8868802	-	N				
8869258	-	N				
8869262	-	N				
8872970	C	N				
8875632	-	N				
8881496	-	N				
8891808	-	N				
8894500	-	N				
8895857	-	N				
8895861	-	N				
8897214	-	N				
8897218	-	N				
8897222	-	N				
8897226	-	N				
8898851	-	N				
8905346	-	N				
8906877	-	N				
8910856	-	N				
8939308	-	N				
8946331	-	N				
8917088	-	N				
8917184	-	N				
8930790	-	N				
8930993	-	N				
8931137	-	N				
8937234	-	N				
8937242	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
8851980						
8851988						Y
8851992						N
8852697						N
8852705						N
8852709						N
8864316						Y
8868802						N
8869258						Y
8869262						Y
8872970						Y
8875632						N
8881496						Y
8891808						Y
8894500						N
8895857						Y
8895861						N
8897214						N
8897218						N
8897222						N
8897226						Y
8898851						Y
8905346						N
8906877						Y
8910856						Y
8939308						Y
8946331						N
8917088						Y
8917184						N
8930790						Y
8930993						N
8931137						N
8937234						N
8937242						N

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
8851980	4	0	1	2	A	-
8851988	3	0	1	2	A	-
8851992	4	0	2	2	A	-
8852697	4	0	2	4	A	-
8852705	4	0	3	2	A	-
8852709	2	0	5	3	A	-
8864316	2	0	1	4	A	-
8868802	3	0	1	2	A	-
8869258	4	0	2	2	A	-
8869262	4	0	2	2	A	-
8872970	3	0	1	1	A	-
8875632	4	0	1	3	A	-
8881496	3	0	1	1	A	-
8891808	4	0	1	3	A	-
8894500	2	0	2	1	A	-
8895857	3	0	3	1	A	-
8895861	4	0	2	2	A	-
8897214	3	0	1	2	A	-
8897218	2	0	2	2	A	-
8897222	3	0	1	2	A	-
8897226	3	0	1	2	A	-
8898851	4	0	2	3	A	-
8905346	4	0	1	2	A	-
8906877	3	0	1	3	A	-
8910856	4	0	1	2	A	-
8939308	1	1	0	2	A	-
8946331	2	0	1	3	A	-
8917088	3	0	1	2	A	-
8917184	4	0	1	2	A	-
8930790	4	0	2	3	A	-
8930993	4	0	2	2	A	-
8931137	4	0	1	2	-	-
8937234	4	0	2	2	A	-
8937242	4	0	1	2	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
8851980	3	22350		N	C	C	A
8851988	8	22107		N	B	E	A
8851992	8	22107		N	C	C	A
8852697	3	22350		M	C	-	A
8852705	4	21703		M	C	C	A
8852709	8	22107		N	A	C	A
8864316	8	22107		N	C	C	A
8868802	9	21801		N	G	B	B
8869258	8	22107		N	B	C	A
8869262	3	22350		N	C	D	A
8872970	3	22350	A	N	D	I	A
8875632	8	22107		M	B	D	A
8881496	3	22350		N	E	I	A
8891808	8	22107		N	C	E	A
8894500	3	22350		N	E	I	A
8895857	3	22350	A	N	B	I	A
8895861	8	22107		N	D	C	A
8897214	5	21650	1	N	D	G	A
8897218	3	22350		N	B	C	A
8897222	11	21954	A	N	G	B	D
8897226	6	21755		N	D	C	A
8898851	3	22350		N	-	C	A
8905346	9	21804	A	N	D	C	A
8906877	12	21453	A	N	D	C	A
8910856	8	22107		N	B	E	A
8939308	0	21954		N	A	B	D
8946331	9	21801	A	N	D	C	A
8917088	8	22107		N	D	C	A
8917184	3	22350		N	C	C	A
8930790	3	22350		N	C	C	A
8930993	8	22107		N	B	C	A
8931137	0	0		N	C	E	A
8937234	4	21703		N	C	C	A
8937242	3	22350		N	C	C	A

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
8851980	A	H	-	A	A	0
8851988	A	H	-	C	D	0
8851992	A	-	-	A	D	0
8852697	A	-	-	A	D	0
8852705	A	-	-	C	D	0
8852709	A	H	-	A	D	0
8864316	A	H	-	A	A	0
8868802	A	H	-	A	A	0
8869258	-	-	-	A	D	0
8869262	A	H	-	A	A	0
8872970	B	H	-	A	D	0
8875632	A	G	-	A	A	0
8881496	A	H	-	C	D	0
8891808	A	H	-	A	D	0
8894500	A	-	-	C	D	0
8895857	B	H	-	C	D	0
8895861	A	H	-	A	D	0
8897214	A	H	-	A	D	0
8897218	A	H	-	B	A	0
8897222	A	H	-	A	D	0
8897226	A	H	-	A	A	0
8898851	A	H	-	A	D	0
8905346	A	H	-	C	D	0
8906877	A	H	-	A	A	0
8910856	A	H	-	A	D	0
8939308	A	H	-	C	A	0
8946331	A	H	-	C	D	0
8917088	A	H	-	A	D	0
8917184	A	H	-	A	D	0
8930790	A	H	-	A	A	0
8930993	A	H	-	A	D	0
8931137	A	H	-	A	D	0
8937234	A	H	-	A	D	0
8937242	A	H	-	A	-	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
8851980					Y	
8851988					Y	
8851992					Y	
8852697					Y	
8852705					Y	
8852709					Y	Y
8864316					Y	Y
8868802	Y				Y	
8869258					Y	
8869262					Y	
8872970					Y	
8875632					Y	
8881496					Y	
8891808					Y	
8894500					Y	
8895857					Y	
8895861					Y	
8897214		Y			Y	
8897218					Y	
8897222	Y				Y	
8897226					Y	
8898851					Y	
8905346					Y	
8906877					Y	
8910856					Y	
8939308	Y				Y	
8946331					Y	
8917088					Y	
8917184					Y	
8930790					Y	
8930993					Y	
8931137					Y	
8937234					Y	
8937242					Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
8851980	A	1	0	0	1	0
8851988	A	1	0	1	0	0
8851992	A	1	0	0	2	0
8852697	A	1	0	0	2	0
8852705	A	7	0	0	3	0
8852709	A	1	3	2	0	0
8864316	A	7	1	0	0	0
8868802	D	22	0	1	0	0
8869258	A	8	0	0	2	0
8869262	A	1	0	0	2	0
8872970	D	22	0	1	0	0
8875632	A	7	0	0	1	0
8881496	D	22	0	1	0	0
8891808	A	1	0	0	1	0
8894500	D	22	1	1	0	0
8895857	A	1	0	1	2	0
8895861	A	1	0	0	2	0
8897214	L	4	0	1	0	0
8897218	-		1	0	1	0
8897222	N	60	0	1	0	0
8897226	A	1	0	1	0	0
8898851	A	1	0	0	2	0
8905346	A	1	0	0	1	0
8906877	D	22	0	1	0	0
8910856	A	1	0	0	1	0
8939308	N	60	0	0	0	1
8946331	A	1	1	0	0	0
8917088	D	22	0	1	0	0
8917184	A	1	0	0	1	0
8930790	A	1	0	0	2	0
8930993	A	1	0	0	2	0
8931137	-	-	0	0	1	0
8937234	A	8	0	0	2	0
8937242	A	1	0	0	1	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
8851980	0	0	0	0	0	-
8851988	0	0	0	0	0	-
8851992	0	0	0	0	0	-
8852697	0	0	0	0	0	-
8852705	0	0	0	0	0	-
8852709	0	0	0	0	0	-
8864316	0	0	0	0	0	-
8868802	1	0	0	0	0	-
8869258	0	0	0	0	0	-
8869262	0	0	0	0	0	-
8872970	0	0	0	0	0	-
8875632	0	0	0	0	0	-
8881496	0	0	0	0	0	-
8891808	0	0	0	0	0	-
8894500	0	0	0	0	0	-
8895857	0	0	0	0	0	-
8895861	0	0	0	0	0	-
8897214	0	0	1	0	0	-
8897218	0	0	0	0	0	-
8897222	1	0	0	0	0	-
8897226	0	0	0	0	0	-
8898851	0	0	0	0	0	-
8905346	0	0	0	0	0	-
8906877	0	0	0	0	0	-
8910856	0	0	0	0	0	-
8939308	0	0	0	0	0	-
8946331	0	0	0	0	0	-
8917088	0	0	0	0	0	-
8917184	0	0	0	0	0	-
8930790	0	0	0	0	0	-
8930993	0	0	0	0	0	-
8931137	0	0	0	0	0	-
8937234	0	0	0	0	0	-
8937242	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
8851980	-	34.00220108	-118.0781021	LOS ANGELES	PICO RIVERA	-118.0784225	34.00215912	6
8851988	-	33.96619034	-118.1073914	LOS ANGELES	PICO RIVERA	-118.1075974	33.96589661	11
8851992	-	34.00428009	-118.0780106	LOS ANGELES	PICO RIVERA	-118.0778275	34.00434875	6
8852697	-	34.00918961	-118.0767975	LOS ANGELES	PICO RIVERA	-118.0766907	34.00921631	6
8852705	-	33.98334122	-118.0973587	LOS ANGELES	PICO RIVERA	-118.0972519	33.98326874	6
8852709	-	33.95077896	-118.0942688	LOS ANGELES	PICO RIVERA	-118.0946884	33.95088577	165
8864316	-	34.0115509	-118.0860519	LOS ANGELES	PICO RIVERA	-118.085968	34.01166153	165
8868802	-	33.98443985	-118.0961075	LOS ANGELES	PICO RIVERA	-118.0961075	33.98434067	11
8869258	-	34.00600052	-118.0960007	LOS ANGELES	PICO RIVERA	-118.0961838	34.00667191	6
8869262	-	33.58399963	-118.5230026	LOS ANGELES	PICO RIVERA	-118.0900955	33.97940445	6
8872970	-	34.03900146	-118.5155029	LOS ANGELES	PICO RIVERA	-118.0840454	34.00088882	11
8875632	-	33.98529816	-118.0956116	LOS ANGELES	PICO RIVERA	-118.095192	33.98575592	6
8881496	-	33.99713898	-118.0919037	LOS ANGELES	PICO RIVERA	-118.0922394	33.99744797	11
8891808	-	33.95729828	-118.1044006	LOS ANGELES	PICO RIVERA	-118.1046677	33.95724487	6
8894500	-	33.98936081	-118.1020889	LOS ANGELES	PICO RIVERA	-118.1019592	33.98927689	165
8895857	-	33.99797058	-118.0917969	LOS ANGELES	PICO RIVERA	-118.0921097	33.99764633	11
8895861	-	33.96900177	-118.098877	LOS ANGELES	PICO RIVERA	-118.0986328	33.96896362	6
8897214	-	33.98736954	-118.1044464	LOS ANGELES	PICO RIVERA	-118.1047363	33.98728561	11
8897218	-	0	0	LOS ANGELES	PICO RIVERA	-118.1101151	33.96111679	165
8897222	-	33.97880173	-118.0999985	LOS ANGELES	PICO RIVERA	-118.1002197	33.97901917	11
8897226	-	34.0038681	-118.0899887	LOS ANGELES	PICO RIVERA	-118.0896149	34.00387573	11
8898851	-	33.99259949	-118.0886993	LOS ANGELES	PICO RIVERA	-118.0890274	33.99288177	6
8905346	-	33.96720123	-118.1155396	LOS ANGELES	PICO RIVERA	-118.1156616	33.96716309	6
8906877	-	34.01705933	-118.0789719	LOS ANGELES	PICO RIVERA	-118.0789795	34.01693344	11
8910856	-	34.01160049	-118.0838928	LOS ANGELES	PICO RIVERA	-118.085022	34.01185226	6
8939308	-	34.00040817	-118.8415298	LOS ANGELES	PICO RIVERA	-118.0840759	34.00061035	165
8946331	-	33.97785187	-118.0874481	LOS ANGELES	PICO RIVERA	-118.0874557	33.97771454	165
8917088	-	33.96989822	-118.0932999	LOS ANGELES	PICO RIVERA	-118.096489	33.96831512	11
8917184	-	33.96884155	-118.1058426	LOS ANGELES	PICO RIVERA	-118.1059875	33.96899796	6
8930790	-	33.99819183	-118.0764618	LOS ANGELES	PICO RIVERA	-118.0763397	33.99815369	6
8930993	-	33.96915817	-118.098938	LOS ANGELES	PICO RIVERA	-118.0990448	33.96908569	6
8931137	-	0	0	LOS ANGELES	PICO RIVERA	-118.1132278	33.9725647	6
8937234	-	33.97539139	-118.1120682	LOS ANGELES	PICO RIVERA	-118.11203	33.97539139	6
8937242	-	33.97945023	-118.0904312	LOS ANGELES	PICO RIVERA	-118.0901642	33.97939682	6

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
8938660	2019	2019-10-04	1900	2019-08-30	1410	14	430275
8940884	2019	2019-10-03	1900	2019-08-15	954	9	430275
8940896	2019	2019-10-02	1900	2019-08-14	1405	14	430275
8940904	2019	2019-10-01	1900	2019-07-22	1745	17	526351
8949386	2019	2019-10-11	1900	2019-09-13	1315	13	430275
8949445	2019	2019-11-05	1900	2019-10-06	1828	18	529571
8954243	2019	2019-10-10	1900	2019-08-28	1204	12	507891
9015919	2019	2020-01-10	1900	2019-11-30	2118	21	499039
8954318	2019	2019-10-09	1900	2019-08-21	1705	17	515181
9019102	2019	2020-02-04	1900	2019-12-24	1730	17	499039
8973255	2019	2019-11-14	1900	2019-10-11	1130	11	455303
8973940	2019	2019-11-19	1900	2019-10-16	750	7	455303
8978665	2019	2019-11-25	1900	2019-09-25	2310	23	499039
8978669	2019	2019-11-25	1900	2019-09-16	800	8	540705
8979510	2019	2019-12-18	1900	2019-10-20	400	4	499039
8979866	2019	2019-11-25	1900	2019-10-17	1430	14	448685
8979870	2019	2019-11-25	1900	2019-10-28	745	7	430275
9006415	2019	2020-01-09	1900	2019-10-28	1900	19	529141
9015887	2019	2020-01-09	1900	2019-11-06	1215	12	455303
9015899	2019	2020-01-10	1900	2019-11-12	1825	18	430275
9015907	2019	2020-01-10	1900	2019-11-18	2020	20	529141
9015911	2019	2020-01-10	1900	2019-11-28	1036	10	530167
9015915	2019	2020-01-10	1900	2019-11-27	2318	23	531724
8911418	2020	2020-08-12	1900	2020-06-14	2142	21	542530
9018799	2020	2020-03-12	1900	2020-01-04	255	2	531724
9018909	2019	2020-02-05	1900	2019-12-28	1310	13	525145
9019044	2019	2020-01-24	1900	2019-10-04	1750	17	509018
9019086	2019	2020-02-04	1900	2019-12-31	1745	17	499039
8911945	2020	2021-01-21	1900	2020-10-27	2105	21	499039
9022368	2019	2020-02-27	1900	2019-12-03	1840	18	602946
9024088	2019	2020-02-14	1900	2019-12-03	745	7	430275
9040610	2020	2020-02-26	1900	2020-01-24	1840	18	499039
9040614	2020	2020-02-26	1900	2020-01-25	1810	18	499039
9040622	2020	2020-02-26	1900	2020-01-24	1511	15	430275

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
8938660	1511	5	5	5	1954	0
8940884	1516	4	5	5	1954	0
8940896	15116	3	5	5	1954	0
8940904	1517	1	5	5	1954	0
8949386	1513	5	5	5	1954	0
8949445	1516	7	5	5	1954	0
8954243	1513	3	5	5	1954	0
9015919	1512	6	5	5	1954	0
8954318	1518	3	5	5	1954	0
9019102	1517	2	5	5	1954	0
8973255	1510	5	5	5	1954	0
8973940	1511	3	5	5	1954	0
8978665	1512	3	5	5	1954	0
8978669	1512	1	5	5	1954	0
8979510	1512	7	5	5	1954	0
8979866	1519	4	5	5	1954	0
8979870	1516	1	5	5	1954	0
9006415	1513	1	5	5	1954	0
9015887	1511	3	5	5	1954	0
9015899	1516	2	5	5	1954	0
9015907	1514	1	5	5	1954	0
9015911	1513	4	5	5	1954	0
9015915	1512	3	5	5	1954	0
8911418	1513	7	5	5	1954	0
9018799	1511	6	5	5	1954	0
9018909	1515	6	5	5	1954	0
9019044	1513	5	5	5	1954	0
9019086	1514	2	5	5	1954	0
8911945	1513	2	5	5	1954	0
9022368	1514	2	5	5	1954	0
9024088	1512	2	5	5	1954	0
9040610	1516	5	5	5	1954	0
9040614	1512	6	5	5	1954	0
9040622	1513	5	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
8938660	0	0		0	151T1	BEVERLY BL
8940884	0	0		0	151T1	SLAUSON AV
8940896	0	0		0	151T1	ROSEMEAD BL
8940904	0	0		0	151T2	SLAUSON AV
8949386	0	0		0	151T1	PARAMOUNT BL
8949445	0	0		0	151T2	SLAUSON AV
8954243	0	0		0	151K1	PARAMOUNT BL
9015919	0	0		0	151T3	WHITTIER BL
8954318	0	0		0	151T2	TELEGRAPH RD
9019102	0	0		0	151T2	WASHINGTON BL
8973255	0	0		0	151T1	WHITTIER BL
8973940	0	0		0	151T1	BEVERLY BL
8978665	0	0		0	151T3	BEVERLY RD
8978669	0	0		0	151T1	WASHINGTON BL
8979510	0	0		0	151T3	WHITTIER BL
8979866	0	0		0	151T1	TELEGRAPH RD
8979870	0	0		0	151T1	SLAUSON AV
9006415	0	0		0	151T3	WHITTIER BL
9015887	0	0		0	151T4	BEVERLY BL
9015899	0	0		0	151T2	PARAMOUNT BL
9015907	0	0		0	151T2	WHITTIER BL
9015911	0	0		0	151T1	WASHINGTON BL
9015915	0	0		0	151T3	WHITTIER BL
8911418	0	0		0	151T2	WASHINGTON BL
9018799	0	0		0	151T3	BEVERLY BL
9018909	0	0		0	151T1	WASHINGTON BL
9019044	0	0		0	151T2	PARAMOUNT BL
9019086	0	0		0	151T2	WHITTIER BL
8911945	0	0		0	151T3	PARAMOUNT BL
9022368	0	0		0	151T2	WHITTIER BL
9024088	0	0		0	151T1	ROSEMEAD BL
9040610	0	0		0	151T2	WASHINGTON BL
9040614	0	0		0	151T2	WHITTIER BL
9040622	0	0		0	151T1	ROSEMEAD BL

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
8938660	DELAND AV	35	W	N	Y	A
8940884	CROSSWAY DR	378	E	N	N	A
8940896	REX RD	75	S	N	Y	A
8940904	PASSONS BL	250	E	N	Y	A
8949386	WASHINGTON BL	90	N	N	Y	A
8949445	PARAMOUNT BL	48	E	N	Y	A
8954243	MARIS AV	3	S	N	Y	A
9015919	GREGG RD	436	W	N	N	A
8954318	ARRINGTON AV	285	E	N	N	A
9019102	PASSONS BL	304	W	N	N	A
8973255	PARAMOUNT BL	152	W	N	Y	A
8973940	MANNING RD	155	E	N	Y	A
8978665	CANAL WY	300	W	N	N	A
8978669	PASSONS BL	36	W	N	Y	B
8979510	TOBIAS AV	523	E	N	N	A
8979866	TRUE AV	5	E	N	Y	A
8979870	PARAMOUNT BL	120	W	N	Y	A
9006415	PARAMOUNT BL	395	W	N	N	A
9015887	DURFEE AV	527	E	N	N	A
9015899	MERCURY LN	240	S	N	Y	A
9015907	ROSEMEAD BL	60	E	N	Y	A
9015911	PARAMOUNT BL	30	W	N	Y	C
9015915	GREGG RD	128	W	N	Y	C
8911418	CANDACE AV	125	W	N	Y	A
9018799	LAYMAN AV	1	W	N	Y	A
9018909	ROSEMEAD BL	40	E	N	Y	A
9019044	MINES AV	62	S	N	Y	A
9019086	LINDSEY AV	45	W	N	Y	A
8911945	SILVERETTE DR	157	S	N	Y	A
9022368	LINDSEY AV	335	W	N	N	C
9024088	OLYMPIC BL	85	S	N	Y	B
9040610	PARAMOUNT BL	45	W	N	Y	A
9040614	GREGG RD	522	E	N	N	A
9040622	BEXLEY DR	61	N	N	Y	B

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
8938660	-	N				
8940884	-	N				
8940896	-	N				
8940904	-	N				
8949386	-	N				
8949445	-	N				
8954243	-	N				
9015919	-	N				
8954318	-	N				
9019102	-	N				
8973255	-	N				
8973940	-	N				
8978665	-	N				
8978669	-	N				
8979510	-	N				
8979866	-	N				
8979870	-	N				
9006415	-	N				
9015887	-	N				
9015899	-	N				
9015907	-	N				
9015911	-	N				
9015915	-	N				
8911418	-	N				
9018799	-	N				
9018909	-	N				
9019044	-	N				
9019086	-	N				
8911945	-	N				
9022368	-	N				
9024088	-	N				
9040610	-	N				
9040614	-	N				
9040622	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
8938660						N
8940884						Y
8940896						Y
8940904						Y
8949386						Y
8949445						N
8954243						Y
9015919						N
8954318						N
9019102						N
8973255						Y
8973940						Y
8978665						N
8978669						N
8979510						N
8979866						N
8979870						Y
9006415						N
9015887						Y
9015899						Y
9015907						N
9015911						N
9015915						Y
8911418						N
9018799						Y
9018909						N
9019044						N
9019086						N
8911945						Y
9022368						N
9024088						Y
9040610						N
9040614						N
9040622						Y

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
8938660	4	0	1	3	A	-
8940884	3	0	1	2	A	-
8940896	3	0	1	1	C	-
8940904	4	0	1	3	A	-
8949386	4	0	1	2	A	-
8949445	3	0	1	2	A	-
8954243	4	0	1	2	A	-
9015919	2	0	1	1	A	-
8954318	4	0	1	2	A	-
9019102	2	0	1	2	A	-
8973255	3	0	1	1	A	-
8973940	3	0	1	3	A	-
8978665	3	0	2	2	A	-
8978669	3	0	1	2	A	-
8979510	3	0	1	2	A	-
8979866	4	0	1	2	A	-
8979870	3	0	1	2	A	-
9006415	3	0	1	2	A	-
9015887	3	0	1	1	A	-
9015899	4	0	2	4	A	-
9015907	3	0	1	2	A	-
9015911	3	0	1	2	A	-
9015915	3	0	1	1	A	-
8911418	1	1	0	2	A	-
9018799	3	0	2	4	A	-
9018909	4	0	1	3	A	-
9019044	4	0	1	2	A	-
9019086	3	0	1	2	A	-
8911945	1	2	1	2	A	-
9022368	4	0	1	2	A	-
9024088	4	0	1	2	A	-
9040610	4	0	1	2	D	-
9040614	2	0	1	4	A	-
9040622	3	0	1	3	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
8938660	3	22350		N	C	C	A
8940884	8	22107		N	E	C	A
8940896	18	0		N	E	I	A
8940904	8	22107		N	B	C	A
8949386	9	21804	A	N	D	C	A
8949445	1	23152	A	N	A	C	A
8954243	3	22350	A	N	C	C	A
9015919	3	22350		N	E	I	A
8954318	9	21804	A	N	D	C	A
9019102	4	21703		N	C	C	A
8973255	9	21801	A	N	D	I	A
8973940	3	22350		N	C	C	A
8978665	21	22106		N	B	C	A
8978669	3	22350		N	C	C	A
8979510	8	22107		M	E	I	A
8979866	9	21800	A	N	D	G	A
8979870	3	22350		N	C	C	A
9006415	5	21650		N	D	G	A
9015887	8	22107		N	A	I	A
9015899	3	22350		N	C	C	A
9015907	8	22107		N	C	G	A
9015911	11	21956	A	N	G	B	E
9015915	3	22350	A	N	E	I	A
8911418	11	21950	B	F	G	B	D
9018799	3	22350		N	C	C	A
9018909	3	22350		N	C	C	A
9019044	0	21703	A	N	C	C	A
9019086	4	21703		N	C	C	A
8911945	3	22350		N	D	C	A
9022368	10	21950		N	G	B	D
9024088	7	21658	A	N	B	C	A
9040610	0	0		N	B	C	A
9040614	3	22350		N	C	C	A
9040622	21	22106		N	B	C	A

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
8938660	A	H	-	A	A	0
8940884	A	H	-	A	D	0
8940896	A	H	-	A	D	0
8940904	A	D	-	A	A	0
8949386	A	H	-	A	D	0
8949445	A	H	-	C	A	0
8954243	A	H	-	A	D	0
9015919	A	-	-	C	D	0
8954318	A	H	-	A	D	0
9019102	A	H	-	C	D	0
8973255	A	H	-	A	A	0
8973940	A	H	-	A	D	0
8978665	A	H	-	C	D	0
8978669	A	H	-	A	A	0
8979510	A	H	-	A	D	0
8979866	A	H	-	A	A	0
8979870	A	H	-	A	A	0
9006415	A	H	-	C	D	0
9015887	A	H	-	A	D	0
9015899	A	H	-	C	D	0
9015907	A	H	-	C	D	0
9015911	B	H	-	A	D	0
9015915	B	G	-	C	D	0
8911418	A	H	-	C	D	0
9018799	A	H	-	C	D	0
9018909	A	H	-	A	A	0
9019044	A	H	-	B	A	0
9019086	A	H	-	C	D	0
8911945	A	H	-	C	D	0
9022368	B	H	-	C	D	0
9024088	A	H	-	A	A	0
9040610	A	H	-	C	D	0
9040614	A	H	-	C	D	0
9040622	A	H	-	A	D	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
8938660					Y	
8940884				Y	Y	
8940896					Y	
8940904			Y		Y	
8949386					Y	
8949445			Y		Y	Y
8954243					Y	
9015919					Y	
8954318					Y	
9019102					Y	
8973255					Y	
8973940					Y	
8978665					Y	
8978669					Y	
8979510				Y	Y	
8979866		Y			Y	
8979870					Y	
9006415		Y			Y	
9015887					Y	
9015899					Y	
9015907		Y			Y	
9015911	Y				Y	
9015915					Y	
8911418	Y				Y	
9018799					Y	
9018909					Y	
9019044			Y		Y	
9019086					Y	
8911945					Y	
9022368	Y				Y	
9024088			Y		Y	
9040610					Y	
9040614					Y	
9040622					Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
8938660	A	1	0	0	1	0
8940884	D	22	0	1	0	0
8940896	-	-	0	1	0	0
8940904	C	2	0	0	1	0
8949386	D	22	0	0	1	0
8949445	C	2	0	1	0	0
8954243	A	1	0	0	1	0
9015919	A	1	1	0	0	0
8954318	A	1	0	0	1	0
9019102	A	1	1	0	0	0
8973255	D	22	0	1	0	0
8973940	A	7	0	1	0	0
8978665	A	1	0	1	1	0
8978669	A	1	0	1	0	0
8979510	G	26	0	1	0	0
8979866	-		0	0	1	0
8979870	A	1	0	1	0	0
9006415	L	4	0	1	0	0
9015887	A	1	0	1	0	0
9015899	-	99	0	0	2	0
9015907	A	1	0	1	0	0
9015911	N	60	0	1	0	0
9015915	A	1	0	1	0	0
8911418	N	60	0	0	0	1
9018799	D	22	0	2	0	0
9018909	A	1	0	0	1	0
9019044	C	2	0	0	1	0
9019086	A	8	0	1	0	0
8911945	A	1	1	0	0	0
9022368	A	1	0	0	1	0
9024088	A	1	0	0	1	0
9040610	-	-	0	0	1	0
9040614	A	1	1	0	0	0
9040622	A	8	0	1	0	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
8938660	0	0	0	0	0	-
8940884	0	0	0	0	0	-
8940896	0	0	0	0	0	-
8940904	0	0	0	0	1	-
8949386	0	0	0	0	0	-
8949445	0	0	0	0	0	-
8954243	0	0	0	0	0	-
9015919	0	0	0	0	0	-
8954318	0	0	0	0	0	-
9019102	0	0	0	0	0	-
8973255	0	0	0	0	0	-
8973940	0	0	0	0	0	-
8978665	0	0	0	0	0	-
8978669	0	0	0	0	0	-
8979510	0	0	0	0	0	-
8979866	0	0	1	0	0	-
8979870	0	0	0	0	0	-
9006415	0	0	1	0	0	-
9015887	0	0	0	0	0	-
9015899	0	0	0	0	0	-
9015907	0	0	1	0	0	-
9015911	1	0	0	0	0	-
9015915	0	0	0	0	0	-
8911418	0	0	0	0	0	-
9018799	0	0	0	0	0	-
9018909	0	0	0	0	0	-
9019044	0	0	0	0	1	-
9019086	0	0	0	0	0	-
8911945	0	0	0	0	0	-
9022368	1	0	0	0	0	-
9024088	0	0	0	0	1	-
9040610	0	0	0	0	0	-
9040614	0	0	0	0	0	-
9040622	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
8938660	-	34.00960159	-118.0779037	LOS ANGELES	PICO RIVERA	-118.0774307	34.0092659	6
8940884	-	33.97309875	-118.108902	LOS ANGELES	PICO RIVERA	-118.1076965	33.97182465	11
8940896	-	33.97740173	-118.1010971	LOS ANGELES	PICO RIVERA	-118.1015854	33.97722626	11
8940904	-	33.96842957	-118.0958862	LOS ANGELES	PICO RIVERA	-118.0964584	33.9683075	6
8949386	-	33.97930145	-118.1051025	LOS ANGELES	PICO RIVERA	-118.1050949	33.98756409	6
8949445	-	33.97354126	-118.1129303	LOS ANGELES	PICO RIVERA	-118.112854	33.97336578	11
8954243	-	33.59334946	-118.0550919	LOS ANGELES	PICO RIVERA	-118.0974045	33.99270248	6
9015919	-	33.99694061	-118.0742264	LOS ANGELES	PICO RIVERA	-118.0751801	33.99751282	165
8954318	-	33.95943832	-118.1076813	LOS ANGELES	PICO RIVERA	-118.1077423	33.95936584	6
9019102	-	33.97990036	-118.0911636	LOS ANGELES	PICO RIVERA	-118.0909576	33.97984695	165
8973255	-	34.00374985	-118.0891495	LOS ANGELES	PICO RIVERA	-118.0891342	34.00356293	11
8973940	-	34.00714874	-118.0763321	LOS ANGELES	PICO RIVERA	-118.0704346	34.0072403	11
8978665	-	34.00548172	-118.0756836	LOS ANGELES	PICO RIVERA	-118.0756836	34.00548172	11
8978669	-	0	0	LOS ANGELES	PICO RIVERA	-118.0902252	33.97943497	11
8979510	-	0	0	LOS ANGELES	PICO RIVERA	-118.0747528	33.99747086	11
8979866	-	33.5705986	-118.054718	LOS ANGELES	PICO RIVERA	-118.0966339	33.95173264	6
8979870	-	33.97269821	-118.1143036	LOS ANGELES	PICO RIVERA	-118.1133652	33.97352982	11
9006415	-	0	0	LOS ANGELES	PICO RIVERA	-118.0895996	34.00387955	11
9015887	-	34.00516129	-118.0448303	LOS ANGELES	PICO RIVERA	-118.0747528	34.008564	11
9015899	-	33.98519897	-118.1067963	LOS ANGELES	PICO RIVERA	-118.1073608	33.98465729	6
9015907	-	34.00109863	-118.0836029	LOS ANGELES	PICO RIVERA	-118.0838089	34.00123596	11
9015911	-	0	0	LOS ANGELES	PICO RIVERA	-118.1053085	33.98759842	11
9015915	-	33.99729919	-118.0743179	LOS ANGELES	PICO RIVERA	-118.0743179	33.99707413	11
8911418	-	33.98672867	-118.1036377	LOS ANGELES	PICO RIVERA	-118.1038361	33.98679733	165
9018799	-	34.00997162	-118.078949	LOS ANGELES	PICO RIVERA	-118.0789566	34.00971985	11
9018909	-	0	0	LOS ANGELES	PICO RIVERA	-118.0970459	33.98316193	6
9019044	-	33.99493027	-118.0950165	LOS ANGELES	PICO RIVERA	-118.0949707	33.99504089	6
9019086	-	34.00020981	-118.0814819	LOS ANGELES	PICO RIVERA	-118.0813828	34.00014877	11
8911945	-	33.99021149	-118.0996323	LOS ANGELES	PICO RIVERA	-118.0995102	33.99019623	165
9022368	-	33.99980164	-118.0826035	LOS ANGELES	PICO RIVERA	-118.082222	34.00053024	6
9024088	-	34.00569916	-118.0821991	LOS ANGELES	PICO RIVERA	-118.0826111	34.0055809	6
9040610	-	33.99591064	-118.0726395	LOS ANGELES	PICO RIVERA	-118.1053467	33.98762512	6
9040614	-	33.99591064	-118.0726395	LOS ANGELES	PICO RIVERA	-118.0727005	33.9959259	165
9040622	-	33.99509811	-118.0852966	LOS ANGELES	PICO RIVERA	-118.0862656	33.99536896	11

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
9040626	2020	2020-02-26	1900	2020-01-21	1450	14	455303
9042552	2020	2020-02-19	1900	2020-01-21	1707	17	499039
9054886	2020	2020-02-28	1900	2020-01-18	1930	19	1518928
9055617	2020	2020-06-05	1900	2020-02-11	945	9	455303
9061679	2020	2020-05-20	1900	2020-02-20	1250	12	430275
9062989	2020	2020-07-07	1900	2020-03-09	1025	10	525145
9063093	2020	2020-06-30	1900	2020-03-17	2200	22	499039
9067324	2020	2020-07-31	1900	2020-02-25	806	8	455303
9067328	2020	2020-03-19	1900	2020-02-24	1105	11	455303
9067823	2020	2020-05-19	1900	2020-02-25	805	8	455303
9067827	2020	2020-05-19	1900	2020-02-17	753	7	525145
9074591	2020	2020-07-20	1900	2020-04-20	2110	21	651288
9078898	2020	2020-10-13	1900	2020-03-07	1945	19	530376
9086564	2020	2020-06-24	1900	2020-03-06	335	3	499039
9099101	2020	2020-08-05	1900	2020-04-18	1010	10	455303
9100682	2020	2020-10-30	1900	2020-05-01	1410	14	455303
9104603	2020	2020-11-10	1900	2020-05-18	1550	15	609650
9104604	2020	2020-11-10	1900	2020-05-04	2250	22	499039
9126361	2020	2020-09-14	1900	2020-06-23	1755	17	448685
9126488	2020	2020-09-12	1900	2020-06-01	1310	13	430275
9126496	2020	2020-09-15	1900	2020-06-15	2349	23	499039
9126500	2020	2020-09-15	1900	2020-06-11	1250	12	455303
9134299	2020	2020-10-05	1900	2020-07-22	155	1	499039
9140450	2020	2020-10-15	1900	2020-08-01	203	2	499039
9140532	2020	2020-09-29	1900	2020-07-19	1600	16	430275
9142932	2020	2020-09-03	1900	2020-06-19	1952	19	627713
9147066	2020	2020-10-15	1900	2020-08-08	2000	20	656739
9147078	2020	2020-10-19	1900	2020-08-07	2109	21	499039
9152700	2020	2020-10-21	1900	2020-08-31	1135	11	455303
9152721	2020	2020-10-21	1900	2020-08-17	1240	12	455303
9152861	2020	2020-10-24	1900	2020-08-20	1912	19	499039
9152865	2020	2020-10-23	1900	2020-08-20	2110	21	499039
9153568	2020	2020-10-14	1900	2020-08-19	1330	13	430275
9153569	2020	2020-10-14	1900	2020-08-08	154	1	499039

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
9040626	1516	2	5	5	1954	0
9042552	1514	2	5	5	1954	0
9054886	2	6	5	5	1954	0
9055617	1518	2	5	5	1954	0
9061679	1512	4	5	5	1954	0
9062989	1517	1	5	5	1954	0
9063093	1514	2	5	5	1954	0
9067324	1516	2	5	5	1954	0
9067328	1516	1	5	5	1954	0
9067823	1515	2	5	5	1954	0
9067827	1510	1	5	5	1954	0
9074591	1517	1	5	5	1954	0
9078898	1520	6	5	5	1954	0
9086564	1516	5	5	5	1954	0
9099101	1518	6	5	5	1954	0
9100682	1514	5	5	5	1954	0
9104603	1518	1	5	5	1954	0
9104604	1518	1	5	5	1954	0
9126361	1515	2	5	5	1954	0
9126488	1512	1	5	5	1954	0
9126496	1510	1	5	5	1954	0
9126500	1517	4	5	5	1954	0
9134299	1513	3	5	5	1954	0
9140450	1515	6	5	5	1954	0
9140532	1516	7	5	5	1954	0
9142932	1517	5	5	5	1954	0
9147066	151F	6	5	5	1954	0
9147078	1518	5	5	5	1954	0
9152700	1516	1	5	5	1954	0
9152721	1520	1	5	5	1954	0
9152861	1512	4	5	5	1954	0
9152865	1516	4	5	5	1954	0
9153568	1516	3	5	5	1954	0
9153569	1518	6	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
9040626	0	0		0	151T1	PARAMOUNT BL
9042552	0	0		0	151T2	WHITTIER BL
9054886	0	0		0	1	BEVERLY RD
9055617	0	0		0	151T1	TELEGRAPH RD
9061679	0	0		0	151T1	MANNING RD
9062989	0	0		0	151T1	SLAUSON AV
9063093	0	0		0	151T3	WHITTIER BL
9067324	0	0		0	151T1	SLAUSON AV
9067328	0	0		0	151T1	PARAMOUNT BL
9067823	0	0		0	151T1	WASHINGTON BL
9067827	0	0		0	151T1	BEVERLY BL
9074591	0	0		0	151K2	WASHINGTON BL
9078898	0	0		0	151T2	WASHINGTON BL
9086564	0	0		0	151T3	PARAMOUNT BL
9099101	0	0		0	151T1	ROSEMEAD BL
9100682	0	0		0	151T1	ROSEMEAD BL
9104603	0	0		0	151T2	SERAPIS AV
9104604	0	0		0	151T3	PASSONS BL
9126361	0	0		0	151T2	ROSEMEAD BL
9126488	0	0		0	151T1	WHITTIER BL
9126496	0	0		0	151T3	WHITTIER BL
9126500	0	0		0	151T1	ROSEMEAD BL
9134299	0	0		0	151T3	ROSEMEAD BL
9140450	0	0		0	151T3	ROSEMEAD BL
9140532	0	0		0	151T1	WASHINGTON BL
9142932	0	0		0	151T2	WASHINGTON BL
9147066	0	0		0		SLAUSON AV
9147078	0	0		0	151T3	TELEGRAPH RD
9152700	0	0		0	N151T1	PARAMOUNT BL
9152721	0	0		0	151T1	WASHINTON BL
9152861	0	0		0	151T2	BEVERLY BL
9152865	0	0		0	151T3	SLAUSON AV
9153568	0	0		0	151T1	ROSEMEAD BL
9153569	0	0		0	151T3	ROSEMEAD BL

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
9040626	REX RD	3	N	N	Y	A
9042552	LINDSEY AV	54	W	N	Y	A
9054886	PARAMOUNT BL	10	E	N	Y	A
9055617	SERAPIS AV	276	E	N	N	A
9061679	BEVERLY BL	5	S	N	Y	A
9062989	ROSEMEAD BL	130	E	N	Y	A
9063093	GREGG RD	226	E	N	Y	A
9067324	INDUSTRY AV	27	E	N	Y	A
9067328	MERCURY LN	28	S	N	Y	A
9067823	ROSEMEAD BL	166	E	N	Y	A
9067827	ROSEMEAD BL	315	W	N	N	A
9074591	ROSEMEAD BL	29	W	N	Y	A
9078898	ROSEMEAD BL	320	W	N	N	A
9086564	REX RD	453	N	N	N	A
9099101	SHADE LN	174	S	N	Y	B
9100682	HAVENWOOD DR	44	S	N	Y	A
9104603	CLAYMORE ST	308	S	N	N	A
9104604	MYRON ST	173	N	N	Y	A
9126361	MINES AV	95		N	Y	A
9126488	ESPERANZA AV	214	W	N	Y	A
9126496	PARAMOUNT BL	399	W	N	N	A
9126500	TERRAZAS WY	47	N	N	Y	A
9134299	BRADHURST ST	65	S	N	Y	A
9140450	CARRON DR	74	S	N	Y	A
9140532	ROSEMEAD BL	955	W	N	N	A
9142932	CORD AV	80	N	N	Y	A
9147066	SERAPIS AV	30	E	N	Y	A
9147078	KLINDALE AV	192	W	N	Y	A
9152700	TROJAN	193	N	N	Y	A
9152721	TOWN CENTER DR	316	W	N	N	A
9152861	SANDOVAL AV	240	E	N	Y	A
9152865	CROSSWAY DR	170	E	N	Y	A
9153568	REX RD	60	S	N	Y	A
9153569	TELEGRAPH RD	182	N	N	Y	A

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
9040626	-	N				
9042552	-	N				
9054886	-	N				
9055617	-	N				
9061679	-	N				
9062989	-	N				
9063093	-	N				
9067324	-	N				
9067328	-	N				
9067823	-	N				
9067827	-	N				
9074591	-	N				
9078898	-	N				
9086564	-	N				
9099101	-	N				
9100682	-	N				
9104603	-	N				
9104604	-	N				
9126361	-	N				
9126488	-	N				
9126496	-	N				
9126500	-	N				
9134299	-	N				
9140450	-	N				
9140532	-	N				
9142932	-	N				
9147066	-	N				
9147078	-	N				
9152700	-	N				
9152721	-	N				
9152861	-	N				
9152865	-	N				
9153568	-	N				
9153569	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
9040626						N
9042552						N
9054886						N
9055617						N
9061679						Y
9062989						Y
9063093						N
9067324						Y
9067328						Y
9067823						N
9067827						N
9074591						N
9078898						N
9086564						N
9099101						Y
9100682						Y
9104603						N
9104604						N
9126361						Y
9126488						N
9126496						N
9126500						Y
9134299						N
9140450						N
9140532						N
9142932						Y
9147066						N
9147078						N
9152700						Y
9152721						N
9152861						N
9152865						N
9153568						Y
9153569						N

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
9040626	3	0	1	2	A	-
9042552	4	0	1	2	A	-
9054886	4	0	1	2	A	-
9055617	3	0	1	2	A	-
9061679	3	0	1	1	A	-
9062989	4	0	2	2	A	-
9063093	4	0	2	2	A	-
9067324	3	0	1	2	A	-
9067328	4	0	1	2	A	-
9067823	3	0	1	2	A	-
9067827	4	0	1	2	A	-
9074591	4	0	1	2	A	-
9078898	3	0	1	2	A	-
9086564	4	0	1	2	A	-
9099101	3	0	1	4	A	-
9100682	3	0	1	3	A	-
9104603	3	0	1	2	A	-
9104604	2	0	1	2	A	-
9126361	3	0	1	1	A	-
9126488	4	0	2	2	A	-
9126496	3	0	1	3	A	-
9126500	3	0	1	1	A	-
9134299	4	0	1	3	A	-
9140450	3	0	2	2	A	-
9140532	3	0	1	2	A	-
9142932	3	0	1	2	A	-
9147066	4	0	1	2	A	-
9147078	2	0	1	2	A	-
9152700	3	0	1	2	A	-
9152721	4	0	1	3	A	-
9152861	3	0	1	2	A	-
9152865	3	0	1	2	A	-
9153568	3	0	2	2	A	-
9153569	3	0	2	2	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
9040626	3	22350		N	C	C	A
9042552	4	21703		N	C	C	A
9054886	8	22107		F	H	G	A
9055617	3	22350		N	C	C	A
9061679	3	22350		N	E	I	A
9062989	3	22350	A	N	C	C	A
9063093	8	22107		N	B	C	A
9067324	9	21801	A	N	D	C	A
9067328	3	22350		N	C	C	A
9067823	8	22107		N	D	G	A
9067827	9	21801		N	D	C	A
9074591	3	22350		N	C	C	A
9078898	11	21950	B	N	D	B	D
9086564	3	22350		M	B	C	A
9099101	21	22106		N	D	C	A
9100682	3	22350		N	C	C	A
9104603	11	21954	A	N	A	B	D
9104604	8	22107		F	C	G	A
9126361	8	22107		N	E	I	A
9126488	3	22350		N	C	C	A
9126496	3	22350		N	C	A	A
9126500	8	22107		N	A	I	A
9134299	1	23152	A	N	C	E	A
9140450	1	23152	A	N	A	C	A
9140532	3	22350		M	C	C	A
9142932	4	21703		N	C	-	A
9147066	3	22350	A	N	C	C	A
9147078	3	22350		N	C	E	A
9152700	3	22350		N	B	C	A
9152721	3	22350		N	C	C	A
9152861	4	21703		N	C	-	A
9152865	0	23109		F	B	C	A
9153568	7	21658	A	N	B	C	A
9153569	3	22350		N	C	E	A

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
9040626	A	H	-	A	A	0
9042552	A	H	-	B	D	0
9054886	A	H	-	A	A	0
9055617	A	H	-	A	A	0
9061679	A	H	-	A	A	0
9062989	A	H	-	A	A	0
9063093	A	H	-	C	D	0
9067324	A	H	-	A	D	0
9067328	A	H	-	A	A	0
9067823	A	H	-	A	D	0
9067827	A	H	-	A	D	0
9074591	A	H	-	C	A	0
9078898	A	-	-	B	D	0
9086564	A	H	-	C	D	0
9099101	A	C	-	A	D	0
9100682	A	H	-	A	A	0
9104603	A	H	-	A	D	0
9104604	A	H	-	C	D	0
9126361	A	H	-	A	D	0
9126488	A	H	-	A	D	0
9126496	-	H	-	C	D	0
9126500	A	H	-	A	A	0
9134299	A	-	-	C	D	0
9140450	A	H	-	C	D	0
9140532	A	H	-	A	D	0
9142932	-	H	-	A	D	0
9147066	A	H	-	B	A	0
9147078	A	H	-	C	D	0
9152700	A	H	-	A	D	0
9152721	A	H	-	A	A	0
9152861	A	H	-	A	D	0
9152865	A	H	-	C	D	0
9153568	A	H	-	A	A	0
9153569	A	H	-	C	D	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
9040626					Y	
9042552					Y	
9054886		Y			Y	
9055617					Y	
9061679					Y	
9062989					Y	
9063093					Y	
9067324					Y	
9067328					Y	
9067823		Y			Y	
9067827					Y	
9074591					Y	
9078898	Y				Y	
9086564					Y	
9099101					Y	
9100682					Y	
9104603	Y				Y	
9104604		Y			Y	
9126361					Y	
9126488					Y	
9126496					Y	
9126500				Y	Y	
9134299					Y	
9140450					Y	Y
9140532			Y		Y	
9142932					Y	
9147066					Y	
9147078					Y	Y
9152700					Y	
9152721					Y	
9152861				Y	Y	
9152865					Y	
9153568					Y	
9153569					Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
9040626	A	8	0	1	0	0
9042552	D	22	0	0	1	0
9054886	A	1	0	0	1	0
9055617	A	1	0	1	0	0
9061679	A	1	0	1	0	0
9062989	-		0	0	2	0
9063093	D	22	0	0	2	0
9067324	-		0	1	0	0
9067328	D	22	0	0	1	0
9067823	L	4	0	1	0	0
9067827	-		0	0	1	0
9074591	A	1	0	0	1	0
9078898	N	60	0	1	0	0
9086564	A	1	0	0	1	0
9099101	A	1	0	1	0	0
9100682	D	22	0	1	0	0
9104603	N	60	0	1	0	0
9104604	A	7	1	0	0	0
9126361	A	1	0	1	0	0
9126488	D	22	0	0	2	0
9126496	A	1	0	1	0	0
9126500	F	27	0	1	0	0
9134299	A	1	0	0	1	0
9140450	A	1	0	2	0	0
9140532	-	99	0	1	0	0
9142932	A	1	0	1	0	0
9147066	A	1	0	0	1	0
9147078	A	1	1	0	0	0
9152700	A	1	0	1	0	0
9152721	-		0	0	1	0
9152861	F	21	0	1	0	0
9152865	D	22	0	1	0	0
9153568	A	1	0	1	1	0
9153569	A	1	0	2	0	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
9040626	0	0	0	0	0	-
9042552	0	0	0	0	0	-
9054886	0	0	1	0	0	-
9055617	0	0	0	0	0	-
9061679	0	0	0	0	0	-
9062989	0	0	0	0	0	-
9063093	0	0	0	0	0	-
9067324	0	0	0	0	0	-
9067328	0	0	0	0	0	-
9067823	0	0	1	0	0	-
9067827	0	0	0	0	0	-
9074591	0	0	0	0	0	-
9078898	1	0	0	0	0	-
9086564	0	0	0	0	0	-
9099101	0	0	0	0	0	-
9100682	0	0	0	0	0	-
9104603	1	0	0	0	0	-
9104604	0	0	1	0	0	-
9126361	0	0	0	0	0	-
9126488	0	0	0	0	0	-
9126496	0	0	0	0	0	-
9126500	0	0	0	0	0	-
9134299	0	0	0	0	0	-
9140450	0	0	0	0	0	-
9140532	0	0	0	0	1	-
9142932	0	0	0	0	0	-
9147066	0	0	0	0	0	-
9147078	0	0	0	0	0	-
9152700	0	0	0	0	0	-
9152721	0	0	0	0	0	-
9152861	0	0	0	0	0	-
9152865	0	0	0	0	0	-
9153568	0	0	0	0	0	-
9153569	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
9040626	-	33.98178101	-118.109169	LOS ANGELES	PICO RIVERA	-118.1092072	33.98161697	11
9042552	-	34.00019073	-118.0814438	LOS ANGELES	PICO RIVERA	-118.0814056	34.00016022	6
9054886	-	34.00875854	-118.0860367	LOS ANGELES	PICO RIVERA	-118.0863266	34.00891876	6
9055617	-	33.95798111	-118.1056595	LOS ANGELES	PICO RIVERA	-118.1057434	33.95800018	11
9061679	-	34.00519943	-118.0715027	LOS ANGELES	PICO RIVERA	-118.0709152	34.00737762	11
9062989	-	0	0	LOS ANGELES	PICO RIVERA	-118.1046906	33.97081757	6
9063093	-	33.99649048	-118.0735474	LOS ANGELES	PICO RIVERA	-118.0734711	33.99640274	6
9067324	-	33.97404099	-118.1147232	LOS ANGELES	PICO RIVERA	-118.1146393	33.97392273	11
9067328	-	33.98503876	-118.1069489	LOS ANGELES	PICO RIVERA	-118.1069946	33.9851532	6
9067823	-	33.98300171	-118.0964508	LOS ANGELES	PICO RIVERA	-118.0967026	33.98297119	11
9067827	-	0	0	LOS ANGELES	PICO RIVERA	-118.0819778	34.01088333	6
9074591	-	33.98320007	-118.0972977	LOS ANGELES	PICO RIVERA	-118.0972366	33.98326492	6
9078898	-	33.98389816	-118.0984726	LOS ANGELES	PICO RIVERA	-118.0980453	33.9836998	11
9086564	-	33.98292923	-118.1086426	LOS ANGELES	PICO RIVERA	-118.1086578	33.9827652	6
9099101	-	33.96657181	-118.1070786	LOS ANGELES	PICO RIVERA	-118.1072235	33.96661377	11
9100682	-	33.59725952	-118.0515671	LOS ANGELES	PICO RIVERA	-118.0856781	33.99584198	11
9104603	-	33.96038818	-118.1057129	LOS ANGELES	PICO RIVERA	-118.1062698	33.95868683	11
9104604	-	33.96654892	-118.0982132	LOS ANGELES	PICO RIVERA	-118.0981674	33.96649551	165
9126361	-	33.59495926	-118.0543518	LOS ANGELES	PICO RIVERA	-118.0900803	33.99211121	11
9126488	-	0	0	LOS ANGELES	PICO RIVERA	-118.0712128	33.99478531	6
9126496	-	34.00405884	-118.089859	LOS ANGELES	PICO RIVERA	-118.0895844	34.00387955	11
9126500	-	33.98178864	-118.097847	LOS ANGELES	PICO RIVERA	-118.0980148	33.98203278	11
9134299	-	33.9934082	-118.0883484	LOS ANGELES	PICO RIVERA	-118.088356	33.99319077	6
9140450	-	33.9849205	-118.0956421	LOS ANGELES	PICO RIVERA	-118.0957413	33.98504257	11
9140532	-	0	0	LOS ANGELES	PICO RIVERA	-118.0997162	33.98472214	11
9142932	-	33.9786911	-118.0886993	LOS ANGELES	PICO RIVERA	-118.0885086	33.97874069	11
9147066	-	33.96966171	-118.1004105	LOS ANGELES	PICO RIVERA	-118.1008835	33.96965408	6
9147078	-	33.95323181	-118.0987091	LOS ANGELES	PICO RIVERA	-118.0986862	33.95308685	165
9152700	-	33.97595978	-118.1160889	LOS ANGELES	PICO RIVERA	-118.111496	33.97633743	11
9152721	-	0	0	LOS ANGELES	PICO RIVERA	-118.101181	33.98534393	6
9152861	-	34.00782013	-118.0724869	LOS ANGELES	PICO RIVERA	-118.0724945	34.00789642	11
9152865	-	33.97201157	-118.1083603	LOS ANGELES	PICO RIVERA	-118.1083374	33.97202682	11
9153568	-	33.97740173	-118.1013031	LOS ANGELES	PICO RIVERA	-118.1015549	33.97726059	11
9153569	-	33.9615593	-118.1097412	LOS ANGELES	PICO RIVERA	-118.1099167	33.96150208	11

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
9153570	2020	2020-10-14	1900	2020-08-09	2207	22	621336
9153571	2020	2020-10-14	1900	2020-08-12	1330	13	430275
9153573	2020	2020-10-14	1900	2020-08-09	1656	16	627713
9160511	2020	2021-01-14	1900	2020-10-03	50	0	499039
9160512	2020	2021-01-14	1900	2020-10-11	2211	22	499039
9167068	2020	2020-11-07	1900	2020-09-01	1010	10	455303
9167268	2020	2020-11-20	1900	2020-09-08	1631	16	499039
9180380	2020	2021-01-16	1900	2020-10-07	1330	13	540304
9194426	2020	2021-01-27	1900	2020-11-19	1908	19	627713
9194989	2020	2021-01-15	1900	2020-11-06	550	5	496487
9195039	2020	2021-01-15	1900	2020-11-12	1814	18	627713
9202722	2020	2021-01-26	1900	2020-11-20	1042	10	499039
9206345	2021	2021-03-19	1900	2021-01-24	1620	16	523026
9214568	2020	2021-02-23	1900	2020-12-09	1512	15	627713
9214779	2020	2021-02-05	1900	2020-12-26	2355	23	499039
9219419	2021	2021-03-09	1900	2021-01-24	700	7	455303
9227146	2020	2021-03-15	1900	2020-12-21	1050	10	529141
9229923	2021	2021-03-19	1900	2021-01-08	1931	19	646149
9229924	2021	2021-03-19	1900	2021-01-23	735	7	430275
9231959	2021	2021-05-03	1900	2021-03-28	325	3	531724
9239731	2021	2021-03-25	1900	2021-02-15	1917	19	523026
9241253	2021	2021-04-02	1900	2021-02-16	608	6	461716
9251456	2021	2021-04-17	1900	2021-03-04	1827	18	646149
9251458	2021	2021-04-17	1900	2021-03-14	1407	14	448685
9251459	2021	2021-04-17	1900	2021-03-09	2336	23	499039
9255334	2021	2021-05-11	1900	2021-04-19	1258	12	430275
9255335	2021	2021-05-11	1900	2021-04-14	830	8	40275
9257311	2021	2021-05-07	1900	2021-03-26	1410	14	430275
9257340	2021	2021-04-29	1900	2021-03-02	1825	18	627713
9257341	2021	2021-04-28	1900	2021-02-13	2350	23	461716
9257408	2021	2021-04-29	1900	2021-04-05	1730	17	448685
9265465	2021	2021-06-01	1900	2021-04-09	1300	13	455303
9265583	2021	2021-05-24	1900	2021-04-08	1723	17	621336
9281260	2021	2021-08-28	1900	2021-07-15	550	5	430275

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
9153570	1516	7	5	5	1954	0
9153571	1513	3	5	5	1954	0
9153573	1513	7	5	5	1954	0
9160511	1516	6	5	5	1954	0
9160512	1514	7	5	5	1954	0
9167068	1513	2	5	5	1954	0
9167268	1513	2	5	5	1954	0
9180380	1513	3	5	5	1954	0
9194426	1516	4	5	5	1954	0
9194989	1516	5	5	5	1954	0
9195039	1511	4	5	5	1954	0
9202722	1510	5	5	5	1954	0
9206345	1518	7	5	5	1954	0
9214568	1513	3	5	5	1954	0
9214779	1516	6	5	5	1954	0
9219419	1516	7	5	5	1954	0
9227146	1512	1	5	5	1954	0
9229923	1511	5	5	5	1954	0
9229924	1515	6	5	5	1954	0
9231959	1518	7	5	5	1954	0
9239731	1516	1	5	5	1954	0
9241253	1515	2	5	5	1954	0
9251456	1514	4	5	5	1954	0
9251458	1518	7	5	5	1954	0
9251459	1513	2	5	5	1954	0
9255334	1510	1	5	5	1954	0
9255335	1517	3	5	5	1954	0
9257311	1510	5	5	5	1954	0
9257340	1513	2	5	5	1954	0
9257341	1510	6	5	5	1954	0
9257408	1517	1	5	5	1954	0
9265465		5	5	5	1954	0
9265583	1519	4	5	5	1954	0
9281260	1510	4	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
9153570	0	0		0	152H	PARAMOUNT BL
9153571	0	0		0	151T1	WHITTIER BL
9153573	0	0		0	151T2	WHITTIER BL
9160511	0	0		0	151T3	SLAUSON AV
9160512	0	0		0	151T3	ROSEMEAD BL
9167068	0	0		0	151T1	PARAMOUNT BL
9167268	0	0		0	151T2	WASHINGTON BL
9180380	0	0		0	151T1	PARMOUNT BL
9194426	0	0		0	151T2	REX RD
9194989	0	0		0	151T3	PARAMOUNT BL
9195039	0	0		0	151T2	BEVERLY BL
9202722	0	0		0	151T1	ROSEMEAD BL
9206345	0	0		0	151T2	TELEGRAPH RD
9214568	0	0		0	151T2	WHITTIER BL
9214779	0	0		0	151T3	ROSEMEAD BL
9219419	0	0		0	151T1	ROSEMEAD BL
9227146	0	0		0	121T1	PASSONS BL
9229923	0	0		0	151T2	BEVERLY BL
9229924	0	0		0	151T1	LINDSEY AV
9231959	0	0		0	151B	TELEGRAPH RD
9239731	0	0		0	151T2	SLAUSON AV
9241253	0	0		0	151T3	WHITTIER AV
9251456	0	0		0	151T2	WHITTIER BL
9251458	0	0		0	151T1	ROSEMEAD BL
9251459	0	0		0	151T3	PARAMOUNT BL
9255334	0	0		0	151T1	WHITTIER BL
9255335	0	0		0	151T1	SLAUSON AV
9257311	0	0		0	151T1	WHITTIER BL
9257340	0	0		0	151T2	BEVERLY BL
9257341	0	0		0	151T3	ROSEMEAD BL
9257408	0	0		0	151T2	SLAUSON AV
9265465	0	0		0	151T1	TELEGRAPH RD
9265583	0	0		0	151T2	ROSEMEAD BL
9281260	0	0		0	151T1	GALLATIN RD

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
9153570	DUNLAP CROSSING RD	36	N	N	Y	-
9153571	PARAMOUNT BL	386	W	N	N	A
9153573	PARAMOUNT BL	180	W	N	Y	A
9160511	INDUSTRY AV	690	W	N	N	A
9160512	HAVENWOOD DR	489	S	N	N	A
9167068	MINES AV	13	N	N	Y	A
9167268	PHAETON AV	117	E	N	Y	A
9180380	TROJAN ST	20	E	N	Y	A
9194426	ROSEMEAD BL	105	W	N	Y	A
9194989	MAXINE ST	3	W	N	Y	A
9195039	PARAMOUNT BL	425	W	N	N	A
9202722	ISORA ST	144	S	N	Y	A
9206345	SERAPIS AV	487	W	N	N	A
9214568	PARAMOUNT BL	95	W	N	Y	A
9214779	WASHINGTON BL	330	S	N	N	A
9219419	REX RD	146	S	N	Y	B
9227146	WHITTIER BL	80	N	N	Y	A
9229923	SAN GABRIEL RIVER PKWY	160	E	N	Y	A
9229924	WASHINGTON BL	14	N	N	Y	C
9231959	CHANEY AV	95	E	N	Y	A
9239731	PARAMOUNT BL	1032	W	N	N	A
9241253	MILLUX AV	111	E	N	Y	A
9251456	GREGG RD	536	E	N	N	A
9251458	MAXINE ST	20	N	N	Y	A
9251459	ROSEHEDGE DR	139	S	N	Y	A
9255334	ROSEMEAD BL	156	W	N	Y	A
9255335	SERAPIS AV	22	E	N	Y	B
9257311	PARAMOUNT BL	115	W	N	Y	A
9257340	TOBIAS AV	400	W	N	N	A
9257341	LAS POSAS ST	117	N	N	Y	A
9257408	PASSONS BL	1500	E	N	N	A
9265465	CHANEY ST	55	W	N	Y	A
9265583	MINES AV	332	N	N	N	A
9281260	ROSEMEAD BL	144	W	N	Y	A

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
9153570	-	N				
9153571	-	N				
9153573	-	N				
9160511	-	N				
9160512	-	N				
9167068	-	N				
9167268	-	N				
9180380	-	N				
9194426	-	N				
9194989	-	N				
9195039	-	N				
9202722	-	N				
9206345	-	N				
9214568	-	N				
9214779	-	N				
9219419	-	N				
9227146	-	N				
9229923	-	N				
9229924	-	N				
9231959	-	N				
9239731	-	N				
9241253	-	N				
9251456	-	N				
9251458	-	N				
9251459	-	N				
9255334	-	N				
9255335	-	N				
9257311	B	N				
9257340	-	N				
9257341	-	N				
9257408	-	N				
9265465	-	N				
9265583	-	N				
9281260	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
9153570						N
9153571						N
9153573						N
9160511						N
9160512						N
9167068						N
9167268						N
9180380						Y
9194426						Y
9194989						N
9195039						Y
9202722						N
9206345						Y
9214568						N
9214779						N
9219419						Y
9227146						N
9229923						Y
9229924						Y
9231959						N
9239731						Y
9241253						Y
9251456						Y
9251458						Y
9251459						N
9255334						N
9255335						N
9257311						N
9257340						Y
9257341						Y
9257408						N
9265465						Y
9265583						Y
9281260						Y

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
9153570	3	0	1	1	A	-
9153571	3	0	1	2	A	-
9153573	3	0	2	2	A	-
9160511	4	0	1	1	A	-
9160512	4	0	1	1	A	-
9167068	3	0	1	2	A	-
9167268	2	0	1	1	A	-
9180380	3	0	1	2	A	-
9194426	4	0	1	1	A	-
9194989	2	0	1	2	A	-
9195039	4	0	2	2	A	-
9202722	2	0	1	2	A	-
9206345	3	0	2	2	A	-
9214568	4	0	1	2	A	-
9214779	4	0	2	2	A	-
9219419	3	0	1	1	A	-
9227146	3	0	1	2	A	-
9229923	3	0	1	3	A	-
9229924	4	0	1	1	C	-
9231959	3	0	1	2	A	-
9239731	2	0	1	1	D	-
9241253	3	0	1	2	A	-
9251456	4	0	1	4	A	-
9251458	3	0	1	2	A	-
9251459	4	0	2	1	A	-
9255334	4	0	1	2	A	-
9255335	4	0	1	3	A	-
9257311	4	0	1	1	C	-
9257340	2	0	1	1	A	-
9257341	2	0	1	3	A	-
9257408	3	0	2	2	A	-
9265465	4	0	1	2	A	-
9265583	3	0	1	2	A	-
9281260	4	0	1	2	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
9153570	3	22350		N	E	I	A
9153571	9	21804	A	N	D	G	A
9153573	3	22350		N	C	-	A
9160511	8	22107		N	E	I	A
9160512	8	22107		N	E	I	A
9167068	5	21650	1	N	A	G	A
9167268	1	23152	A	N	E	I	A
9180380	8	22107		N	D	C	A
9194426	8	22107		N	E	I	A
9194989	5	21650	1	N	G	-	A
9195039	4	21703		N	C	C	A
9202722	3	22350		M	C	C	A
9206345	3	22350		F	C	C	A
9214568	3	22350	A	N	C	C	A
9214779	8	22107		N	B	C	A
9219419	3	22350		N	F	I	A
9227146	9	21804		N	B	C	A
9229923	1	23152	A	N	-	C	A
9229924	18	0		N	E	I	A
9231959	1	23152	A	N	B	E	A
9239731	0	0		N	A	I	A
9241253	3	22350		N	C	E	A
9251456	3	22350		N	C	D	A
9251458	8	22107	A	N	B	-	A
9251459	3	22350		N	E	I	A
9255334	3	22350		M	G	B	F
9255335	3	22350		N	-	C	A
9257311	18	0		N	E	I	A
9257340	3	22350	A	N	A	I	A
9257341	3	22350		N	C	E	A
9257408	3	22350	A	N	C	C	A
9265465	3	22350		M	C	C	A
9265583	3	22350		N	C	C	A
9281260	3	22350		N	C	E	A

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
9153570	A	-	-	C	D	0
9153571	A	H	-	A	D	0
9153573	A	-	-	A	D	0
9160511	A	H	-	C	D	0
9160512	A	H	-	C	D	0
9167068	A	H	-	A	A	0
9167268	A	H	-	A	D	0
9180380	A	H	-	A	D	0
9194426	A	-	-	C	D	0
9194989	A	H	-	A	D	0
9195039	A	-	-	B	D	0
9202722	A	H	-	A	D	0
9206345	A	H	-	A	D	0
9214568	A	H	-	A	A	0
9214779	A	H	-	C	D	0
9219419	B	H	-	A	D	0
9227146	A	H	-	A	D	0
9229923	A	H	-	C	A	0
9229924	B	H	-	A	D	0
9231959	A	H	-	C	D	0
9239731	A	H	-	C	D	0
9241253	A	H	-	A	D	0
9251456	A	H	-	C	D	0
9251458	-	H	-	A	A	0
9251459	B	H	-	C	D	0
9255334	A	H	-	A	D	0
9255335	A	H	-	A	-	0
9257311	A	H	-	-	D	0
9257340	A	H	-	B	A	0
9257341	A	H	-	C	D	0
9257408	A	H	-	A	D	0
9265465	A	H	-	A	D	0
9265583	A	H	-	A	A	0
9281260	A	H	-	B	D	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
9153570			Y		Y	
9153571		Y			Y	
9153573					Y	
9160511					Y	
9160512					Y	
9167068		Y			Y	
9167268					Y	Y
9180380					Y	
9194426				Y	Y	Y
9194989		Y			Y	
9195039					Y	
9202722					Y	
9206345					Y	Y
9214568					Y	
9214779					Y	
9219419					Y	
9227146					Y	
9229923					Y	Y
9229924					Y	
9231959					Y	
9239731					Y	
9241253				Y	Y	
9251456					Y	
9251458					Y	
9251459					Y	
9255334	Y				Y	
9255335					Y	
9257311					Y	
9257340					Y	
9257341					Y	
9257408					Y	
9265465					Y	
9265583					Y	
9281260					Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
9153570	C	2	0	1	0	0
9153571	A	1	0	1	0	0
9153573	A	1	0	2	0	0
9160511	A	7	0	0	1	0
9160512	A	1	0	0	1	0
9167068	L	4	0	1	0	0
9167268	A	1	1	0	0	0
9180380	D	22	0	1	0	0
9194426	F	21	0	0	1	0
9194989	L	4	1	0	0	0
9195039	A	1	0	0	2	0
9202722	A	1	1	0	0	0
9206345	A	1	0	2	0	0
9214568	A	1	0	0	1	0
9214779	A	1	0	0	2	0
9219419	D	22	0	1	0	0
9227146	A	1	0	1	0	0
9229923	A	1	0	1	0	0
9229924	-	-	0	0	1	0
9231959	D	22	0	1	0	0
9239731	-	-	1	0	0	0
9241253	A	7	0	1	0	0
9251456	A	1	0	0	1	0
9251458	A	1	0	1	0	0
9251459	A	1	0	0	2	0
9255334	A	7	0	0	1	0
9255335	-	99	0	0	1	0
9257311	-	-	0	0	1	0
9257340	A	1	1	0	0	0
9257341	A	1	1	0	0	0
9257408	A	1	0	2	0	0
9265465	D	22	0	0	1	0
9265583	A	1	0	1	0	0
9281260	-		0	0	1	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
9153570	0	0	0	0	1	-
9153571	0	0	1	0	0	-
9153573	0	0	0	0	0	-
9160511	0	0	0	0	0	-
9160512	0	0	0	0	0	-
9167068	0	0	1	0	0	-
9167268	0	0	0	0	0	-
9180380	0	0	0	0	0	-
9194426	0	0	0	0	0	-
9194989	0	0	1	0	0	-
9195039	0	0	0	0	0	-
9202722	0	0	0	0	0	-
9206345	0	0	0	0	0	-
9214568	0	0	0	0	0	-
9214779	0	0	0	0	0	-
9219419	0	0	0	0	0	-
9227146	0	0	0	0	0	-
9229923	0	0	0	0	0	-
9229924	0	0	0	0	0	-
9231959	0	0	0	0	0	-
9239731	0	0	0	0	0	-
9241253	0	0	0	0	0	-
9251456	0	0	0	0	0	-
9251458	0	0	0	0	0	-
9251459	0	0	0	0	0	-
9255334	1	0	0	0	0	-
9255335	0	0	0	0	0	-
9257311	0	0	0	0	0	-
9257340	0	0	0	0	0	-
9257341	0	0	0	0	0	-
9257408	0	0	0	0	0	-
9265465	0	0	0	0	0	-
9265583	0	0	0	0	0	-
9281260	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
9153570	-	33.99729919	-118.0922012	LOS ANGELES	PICO RIVERA	-118.0922928	33.99736404	11
9153571	-	34.0033989	-118.088501	LOS ANGELES	PICO RIVERA	-118.0896301	34.00387573	11
9153573	-	34.003479	-118.0893173	LOS ANGELES	PICO RIVERA	-118.0892181	34.00359726	11
9160511	-	33.97468948	-118.1169662	LOS ANGELES	PICO RIVERA	-118.1168594	33.97459412	6
9160512	-	33.99472046	-118.0865326	LOS ANGELES	PICO RIVERA	-118.0864105	33.99479294	6
9167068	-	33.99256897	-118.0946274	LOS ANGELES	PICO RIVERA	-118.0948105	33.9951973	11
9167268	-	33.98612976	-118.1024094	LOS ANGELES	PICO RIVERA	-118.1023636	33.98599625	165
9180380	-	33.97587967	-118.1180115	LOS ANGELES	PICO RIVERA	-118.1117172	33.97589874	11
9194426	-	33.9776001	-118.1017609	LOS ANGELES	PICO RIVERA	-118.101738	33.97756195	6
9194989	-	33.5809288	-118.0649567	LOS ANGELES	PICO RIVERA	-118.1140442	33.96918106	165
9195039	-	34.01250839	-118.0873413	LOS ANGELES	PICO RIVERA	-118.0872269	34.01253128	6
9202722	-	34.0156517	-118.0794678	LOS ANGELES	PICO RIVERA	-118.0793839	34.01573563	165
9206345	-	33.95941925	-118.1077194	LOS ANGELES	PICO RIVERA	-118.1076889	33.9593277	11
9214568	-	34.00344086	-118.0887833	LOS ANGELES	PICO RIVERA	-118.0889664	34.00349045	6
9214779	-	33.98236084	-118.0978088	LOS ANGELES	PICO RIVERA	-118.0977173	33.98244476	6
9219419	-	0	0	LOS ANGELES	PICO RIVERA	-118.1017075	33.97706223	11
9227146	-	33.99900055	-118.0775986	LOS ANGELES	PICO RIVERA	-118.0777588	33.99882889	11
9229923	-	34.0026207	-118.0413132	LOS ANGELES	PICO RIVERA	-118.0704193	34.00723648	11
9229924	-	33.98120117	-118.0929031	LOS ANGELES	PICO RIVERA	-118.0929337	33.98096085	6
9231959	-	33.95705032	-118.1043701	LOS ANGELES	PICO RIVERA	-118.1042938	33.95698166	11
9239731	-	33.97436905	-118.1163025	LOS ANGELES	PICO RIVERA	-118.116188	33.97438049	165
9241253	-	33.99794006	-118.0759735	LOS ANGELES	PICO RIVERA	-118.074913	33.99738693	11
9251456	-	33.59449005	-118.0421829	LOS ANGELES	PICO RIVERA	-118.07267	33.99590302	6
9251458	-	33.96561813	-118.1075974	LOS ANGELES	PICO RIVERA	-118.1078033	33.96549988	11
9251459	-	33.99777985	-118.0920334	LOS ANGELES	PICO RIVERA	-118.0920181	33.99780655	6
9255334	-	34.00189972	-118.0845032	LOS ANGELES	PICO RIVERA	-118.0844421	34.00151062	6
9255335	-	33.96989822	-118.1006012	LOS ANGELES	PICO RIVERA	-118.100914	33.96966171	6
9257311	-	34.00370026	-118.0891037	LOS ANGELES	PICO RIVERA	-118.0890274	34.00351334	6
9257340	-	34.00699997	-118.0734329	LOS ANGELES	PICO RIVERA	-118.07267	34.00795364	165
9257341	-	34.0138588	-118.0797195	LOS ANGELES	PICO RIVERA	-118.0799637	34.01383209	165
9257408	-	33.58055878	-118.0565109	LOS ANGELES	PICO RIVERA	-118.0925827	33.96715164	11
9265465	-	33.95740128	-118.1046982	LOS ANGELES	PICO RIVERA	-118.1046677	33.95724487	6
9265583	-	33.99282074	-118.0890808	LOS ANGELES	PICO RIVERA	-118.0892563	33.99271011	11
9281260	-	34.01660156	-118.0799026	LOS ANGELES	PICO RIVERA	-118.0794144	34.01687622	6

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
9281882	2021	2021-07-06	1900	2021-05-07	2144	21	621336
9282021	2021	2021-07-14	1900	2021-06-06	1335	13	430275
9282023	2021	2021-07-14	1900	2021-06-01	920	9	430275
9286688	2021	2021-07-28	1900	2021-06-27	15	0	499039
9286694	2021	2021-08-13	1900	2021-06-09	1450	14	430275
9286939	2021	2021-08-06	1900	2021-06-14	1445	14	430275
9303065	2021	2021-10-16	1900	2021-07-17	1410	14	430275
9303067	2021	2021-10-27	1900	2021-07-06	1956	19	523026
9303879	2021	2021-09-09	1900	2021-06-12	445	4	621336
9309704	2021	2021-10-07	1900	2021-06-16	1630	16	536467
9310619	2021	2021-09-10	1900	2021-07-22	1545	15	448685
9314451	2021	2021-09-15	1900	2021-07-30	2056	20	646149
9320035	2021	2021-11-04	1900	2021-06-29	2300	23	515235
9320050	2021	2021-11-04	1900	2021-10-04	1315	13	430275
9322124	2021	2021-10-09	1900	2021-08-17	900	9	525145
9322125	2021	2021-10-09	1900	2021-08-15	2300	23	499039
9324960	2021	2021-10-04	1900	2021-08-21	1238	12	430275
9338382	2021	2021-09-29	1900	2021-08-09	1533	15	529571
9344455	2021	2021-10-14	1900	2021-09-01	534	5	531724
9344898	2021	2021-10-19	1900	2021-08-21	2238	22	621336
9348299	2021	2021-11-02	1900	2021-10-02	720	7	430275
9348336	2021	2021-11-15	1900	2021-10-05	1921	19	448685
9349374	2021	2021-10-27	1900	2021-09-27	1205	12	455303
9349965	2021	2021-11-10	1900	2021-09-26	1015	10	455303
9349985	2021	2021-11-10	1900	2021-09-13	845	8	455303
9351177	2021	2021-11-17	1900	2021-10-12	1649	16	524070
9354576	2021	2021-10-27	1900	2021-05-29	200	2	621336
9363602	2021	2021-12-17	1900	2021-10-23	520	5	621336
9364034	2021	2021-12-29	1900	2021-11-01	1935	19	529571
9370000	2021	2022-01-04	1900	2021-11-27	2115	21	655558
9377327	2021	2021-12-23	1900	2021-10-19	820	8	430275
9377345	2021	2021-12-27	1900	2021-11-03	1355	13	430275
9377347	2021	2021-12-27	1900	2021-11-11	2330	23	531724
9377455	2021	2022-01-04	1900	2021-11-03	1415	14	455303

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
9281882	1516	5	5	5	1954	0
9282021	1517	7	5	5	1954	0
9282023	1510	2	5	5	1954	0
9286688	1513	7	5	5	1954	0
9286694	1518	3	5	5	1954	0
9286939	1520	1	5	5	1954	0
9303065	1517	6	5	5	1954	0
9303067	1510	2	5	5	1954	0
9303879	1512	6	5	5	1954	0
9309704	1513	3	5	5	1954	0
9310619	1515	4	5	5	1954	0
9314451	1516	5	5	5	1954	0
9320035	1510	2	5	5	1954	0
9320050	1512	1	5	5	1954	0
9322124	1516	2	5	5	1954	0
9322125	1513	7	5	5	1954	0
9324960	1510	6	5	5	1954	0
9338382	1511	1	5	5	1954	0
9344455	1513	3	5	5	1954	0
9344898	1510	6	5	5	1954	0
9348299	1516	6	5	5	1954	0
9348336	1515	2	5	5	1954	0
9349374	1516	1	5	5	1954	0
9349965	1511	7	5	5	1954	0
9349985	1518	1	5	5	1954	0
9351177	1513	2	5	5	1954	0
9354576	1511	6	5	5	1954	0
9363602	1518	6	5	5	1954	0
9364034	1517	1	5	5	1954	0
9370000	1516	6	5	5	1954	0
9377327	1510	2	5	5	1954	0
9377345	1519	3	5	5	1954	0
9377347	1512	4	5	5	1954	0
9377455	1520	3	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
9281882	0	0		0	151T3	PARAMOUN BL
9282021	0	0		0	151T1	WASHINGTON BL
9282023	0	0		0	151T1	ROSEMEAD BL
9286688	0	0		0	151T3	WHITTIER BL
9286694	0	0		0	151T1	SLAUSON AV
9286939	0	0		0	151T1	ROSEMEAD BL
9303065	0	0		0	151T1	SLAUSON AV
9303067	0	0		0	151T2	WHITTIER BL
9303879	0	0		0	151T3	BEVERLY RD
9309704	0	0		0	151T2	PARAMOUNT BL
9310619	0	0		0	151T2	WASHINGTON BL
9314451	0	0		0	151A	PARAMOUNT BL
9320035	0	0		0	143T2E	WHITTIER BL
9320050	0	0		0	151T1	WHITTIER BL
9322124	0	0		0	151T1	PARAMOUNT BL
9322125	0	0		0	151T3	PARAMOUNT BL
9324960	0	0		0	151T1	PARAMOUNT BL
9338382	0	0		0	151T2	BEVERLY BL
9344455	0	0		0	151T3	PICO RIVERA
9344898	0	0		0	151T3	PARAMOUNT BL
9348299	0	0		0	151T1	SLAUSON AV
9348336	0	0		0	151T2	SLAUSON AV
9349374	0	0		0	151T1	PARAMOUNT BL
9349965	0	0		0	151T1	DURFEE AV
9349985	0	0		0	151T1	SLAUSON AV
9351177	0	0		0	152D	WHITTER BL
9354576	0	0		0	151T3	BEVERLY BL
9363602	0	0		0	151T3	ROSEMEAD BL
9364034	0	0		0	151T2	SLAUSON AV
9370000	0	0		0	152F	ROSEMEAD BL
9377327	0	0		0	151T1	WHITTIER BL
9377345	0	0		0	151T1	PASSONS BL
9377347	0	0		0	151T3	ROSEMEAD BL
9377455	0	0		0	151T1	PARAMOUNT BL

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
9281882	SLAUSON AV	139	S	N	Y	A
9282021	PASSONS BL	200	E	N	Y	A
9282023	BEVERLY RD	97	N	N	Y	A
9286688	MYRTLE ST	104	E	N	Y	A
9286694	REEVE RD	1	E	N	Y	A
9286939	TERRAZAS WY	30	S	N	Y	A
9303065	PASSONS BL	428	E	N	N	A
9303067	COLUMBIA AV	22	W	N	Y	A
9303879	CANAL WY	49	E	N	Y	A
9309704	MINES AV	868	N	N	N	A
9310619	LEMORAN AV	12	W	N	Y	A
9314451	MAXINE ST	229	S	N	Y	A
9320035	ORANGE AV	10	E	N	Y	A
9320050	ESPERANZA AV	102	W	N	Y	B
9322124	SLAUSON AV	110	S	N	Y	A
9322125	WASHINGTON BL	82	N	N	Y	A
9324960	BEVERLY RD	11	N	N	Y	B
9338382	SAN GABRIEL RIVER PKWY	23	W	N	Y	A
9344455	ROSEMEAD BL	427	W	N	N	A
9344898	CALICO AV	65	N	N	Y	A
9348299	INDUSTRY AV	952	W	N	N	A
9348336	PARAMOUNT BL	200	E	N	Y	A
9349374	WASHINGTON BL	432	S	N	N	A
9349965	BEVERLY RD	158	S	N	Y	B
9349985	SERAPIS AV	13	W	N	Y	A
9351177	PARAMOUNT BL	391	W	N	N	A
9354576	LINDSEY AV	16	E	N	Y	A
9363602	TERRADEL ST	209	N	N	Y	C
9364034	PASSONS BL	1160	E	N	N	A
9370000	MAXINE ST	106	N	N	Y	A
9377327	IVY ST	110	W	N	Y	A
9377345	TELEGRAPH RD	175	N	N	Y	A
9377347	OLYMPIC BL	16	N	N	Y	A
9377455	WASHINGTON BL	100	S	N	Y	A

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
9281882	-	N				
9282021	-	N				
9282023	-	N				
9286688	-	N				
9286694	-	N				
9286939	-	N				
9303065	-	N				
9303067	F	N				
9303879	-	N				
9309704	-	N				
9310619	-	N				
9314451	-	N				
9320035	-	N				
9320050	-	N				
9322124	-	N				
9322125	-	N				
9324960	-	N				
9338382	-	N				
9344455	-	N				
9344898	-	N				
9348299	-	N				
9348336	-	N				
9349374	-	N				
9349965	-	N				
9349985	-	N				
9351177	-	N				
9354576	-	N				
9363602	-	N				
9364034	-	N				
9370000	-	N				
9377327	-	N				
9377345	-	N				
9377347	-	N				
9377455	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
9281882						N
9282021						Y
9282023						N
9286688						N
9286694						Y
9286939						N
9303065						Y
9303067						N
9303879						Y
9309704						Y
9310619						Y
9314451						Y
9320035						Y
9320050						Y
9322124						N
9322125						N
9324960						Y
9338382						N
9344455						Y
9344898						Y
9348299						Y
9348336						N
9349374						Y
9349965						Y
9349985						
9351177						Y
9354576						N
9363602						Y
9364034						Y
9370000						Y
9377327						Y
9377345						Y
9377347						Y
9377455						N

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
9281882	3	0	1	1	A	-
9282021	4	0	1	2	A	-
9282023	4	0	1	2	A	-
9286688	3	0	1	2	A	-
9286694	3	0	2	3	A	-
9286939	4	0	1	1	C	-
9303065	3	0	1	2	A	-
9303067	3	0	2	3	A	-
9303879	1	1	0	2	A	-
9309704	3	0	1	1	A	-
9310619	2	0	3	2	A	-
9314451	3	0	1	4	A	-
9320035	1	1	0	2	A	-
9320050	1	1	0	2	A	-
9322124	4	0	1	3	D	-
9322125	4	0	2	2	A	-
9324960	4	0	1	3	A	-
9338382	3	0	3	3	A	-
9344455	3	0	1	2	A	-
9344898	3	0	1	4	A	-
9348299	3	0	1	1	A	-
9348336	2	0	1	2	A	-
9349374	4	0	1	4	A	-
9349965	3	0	1	2	A	-
9349985	4	0	1	2	D	-
9351177	3	0	1	2	A	-
9354576	3	0	1	2	A	-
9363602	3	0	1	7	A	-
9364034	2	0	1	2	A	-
9370000	2	0	1	2	A	-
9377327	3	0	1	2	A	-
9377345	4	0	1	2	A	-
9377347	4	0	2	2	D	-
9377455	4	0	1	2	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
9281882	3	22350		N	C	C	A
9282021	7	21658	A	N	B	C	A
9282023	7	21658	A	N	B	C	A
9286688	9	21804		F	B	C	A
9286694	9	21801	A	N	D	C	A
9286939	18	0		N	E	I	A
9303065	8	22107		N	D	C	A
9303067	8	22107		N	C	C	A
9303879	11	21950	B	N	G	B	E
9309704	3	22350		F	E	J	A
9310619	0	21650	B	N	A	D	A
9314451	3	22350		N	D	D	A
9320035	3	22350		N	G	B	D
9320050	9	21801	A	N	D	C	A
9322124	0	0		N	C	C	A
9322125	3	22350		N	C	-	A
9324960	3	22350		N	C	C	A
9338382	12	21453	A	N	A	C	A
9344455	8	22107		F	D	C	A
9344898	3	22350		N	D	E	A
9348299	8	22107		N	E	I	A
9348336	8	22107		F	A	G	A
9349374	3	22350		N	C	C	A
9349965	8	22107		N	C	E	A
9349985	0	0		N	D	C	A
9351177	9	21801	A	N	D	C	A
9354576	3	22350		N	G	B	E
9363602	3	22350		N	C	C	A
9364034	9	21801		N	C	C	A
9370000	3	22350		N	H	D	A
9377327	7	21658	A	N	C	C	A
9377345	9	21804	A	M	D	C	A
9377347	0	0		N	B	C	A
9377455	3	22350		N	C	C	A

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
9281882	A	H	-	C	-	0
9282021	A	H	-	A	D	0
9282023	A	-	-	A	D	0
9286688	A	H	-	C	D	0
9286694	A	H	-	A	-	0
9286939	A	H	-	A	D	0
9303065	A	H	-	A	D	0
9303067	A	H	-	B	A	0
9303879	A	H	-	C	D	0
9309704	A	H	-	A	A	0
9310619	A	H	-	A	D	0
9314451	A	H	-	C	D	0
9320035	A	H	-	C	D	0
9320050	A	H	-	A	D	0
9322124	A	G	-	A	D	0
9322125	A	H	-	C	D	0
9324960	A	H	-	A	A	0
9338382	A	H	-	A	A	0
9344455	A	H	-	B	D	0
9344898	A	H	-	C	D	0
9348299	A	H	-	A	D	0
9348336	A	H	-	C	D	0
9349374	A	H	-	A	A	0
9349965	A	H	-	A	D	0
9349985	A	H	-	A	A	0
9351177	A	H	-	A	A	0
9354576	A	H	-	C	D	0
9363602	B	H	-	C	D	0
9364034	A	H	-	C	D	0
9370000	A	H	-	C	D	0
9377327	A	H	-	A	D	0
9377345	A	H	-	A	D	0
9377347	A	H	-	C	A	0
9377455	A	H	-	A	A	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
9281882					Y	
9282021					Y	
9282023					Y	
9286688					Y	
9286694					Y	
9286939					Y	
9303065					Y	
9303067					Y	
9303879	Y				Y	
9309704					Y	
9310619				Y	Y	
9314451					Y	Y
9320035	Y				Y	Y
9320050			Y		Y	
9322124					Y	
9322125					Y	
9324960					Y	
9338382					Y	
9344455			Y		Y	
9344898					Y	
9348299					Y	
9348336		Y			Y	
9349374					Y	
9349965					Y	
9349985					Y	
9351177					Y	
9354576	Y				Y	Y
9363602					Y	
9364034			Y		Y	
9370000				Y	Y	
9377327			Y		Y	
9377345					Y	
9377347					Y	
9377455					Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
9281882	A	1	0	1	0	0
9282021	A	1	0	0	1	0
9282023	A	7	0	0	1	0
9286688	A	1	0	1	0	0
9286694	A	8	0	1	1	0
9286939	-	-	0	0	1	0
9303065	A	7	0	1	0	0
9303067	A	1	0	1	1	0
9303879	N	60	0	0	0	1
9309704	A	1	0	1	0	0
9310619	G		1	1	1	0
9314451	-		0	1	0	0
9320035	A	7	0	0	0	1
9320050	A	1	0	0	0	0
9322124	-	-	0	0	1	0
9322125	A	1	0	0	2	0
9324960	A	1	0	0	1	0
9338382	A	1	0	3	0	0
9344455	D	22	0	1	0	0
9344898	A	1	0	1	0	0
9348299	D	22	0	1	0	0
9348336	D	22	1	0	0	0
9349374	A	1	0	0	1	0
9349965	D	22	0	1	0	0
9349985	-	-	0	0	1	0
9351177	A	1	0	1	0	0
9354576	A	1	0	1	0	0
9363602	A	1	0	1	0	0
9364034	A	1	1	0	0	0
9370000	A	1	1	0	0	0
9377327	C	2	0	1	0	0
9377345	A	1	0	0	1	0
9377347	-	-	0	0	2	0
9377455	D	22	0	0	1	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
9281882	0	0	0	0	0	-
9282021	0	0	0	0	0	-
9282023	0	0	0	0	0	-
9286688	0	0	0	0	0	-
9286694	0	0	0	0	0	-
9286939	0	0	0	0	0	-
9303065	0	0	0	0	0	-
9303067	0	0	0	0	0	-
9303879	0	0	0	0	0	-
9309704	0	0	0	0	0	-
9310619	0	0	0	0	0	-
9314451	0	0	0	0	0	-
9320035	0	0	0	0	0	-
9320050	0	0	0	1	0	-
9322124	0	0	0	0	0	-
9322125	0	0	0	0	0	-
9324960	0	0	0	0	0	-
9338382	0	0	0	0	0	-
9344455	0	0	0	0	1	-
9344898	0	0	0	0	0	-
9348299	0	0	0	0	0	-
9348336	0	0	1	0	0	-
9349374	0	0	0	0	0	-
9349965	0	0	0	0	0	-
9349985	0	0	0	0	0	-
9351177	0	0	0	0	0	-
9354576	1	0	0	0	0	-
9363602	0	0	0	0	0	-
9364034	0	0	0	0	1	-
9370000	0	0	0	0	0	-
9377327	0	0	0	0	1	-
9377345	0	0	0	0	0	-
9377347	0	0	0	0	0	-
9377455	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
9281882	-	33.97299957	-118.1130981	LOS ANGELES	PICO RIVERA	-118.1130981	33.97299957	11
9282021	-	33.97850037	-118.0894012	LOS ANGELES	PICO RIVERA	-118.0896301	33.97903061	6
9282023	-	34.00770187	-118.0821991	LOS ANGELES	PICO RIVERA	-118.0815887	34.00814056	6
9286688	-	34.00585175	-118.094368	LOS ANGELES	PICO RIVERA	-118.0943451	34.00588226	11
9286694	-	33.96849823	-118.0970993	LOS ANGELES	PICO RIVERA	-118.0989304	33.96904755	11
9286939	-	33.98310089	-118.0970001	LOS ANGELES	PICO RIVERA	-118.0981445	33.98184967	6
9303065	-	33.96849823	-118.0970993	LOS ANGELES	PICO RIVERA	-118.0959015	33.96814346	11
9303067	-	0	0	LOS ANGELES	PICO RIVERA	-118.0864182	34.0025177	11
9303879	-	34.00191116	-118.0428085	LOS ANGELES	PICO RIVERA	-118.0744324	34.00535202	165
9309704	-	33.99689865	-118.0930634	LOS ANGELES	PICO RIVERA	-118.0928345	33.99686432	11
9310619	-	33.9799881	-118.0910721	LOS ANGELES	PICO RIVERA	-118.0911255	33.97993851	165
9314451	-	33.58073044	-118.0652237	LOS ANGELES	PICO RIVERA	-118.1144028	33.96863937	11
9320035	-	34.00566864	-118.0939102	LOS ANGELES	PICO RIVERA	-118.0937729	34.00563812	165
9320050	-	33.99459839	-118.0709991	LOS ANGELES	PICO RIVERA	-118.0709305	33.99458313	165
9322124	-	0	0	LOS ANGELES	PICO RIVERA	-118.1130981	33.97311783	6
9322125	-	33.98794174	-118.1049805	LOS ANGELES	PICO RIVERA	-118.1050949	33.98758698	6
9324960	-	33.98749924	-118.1051025	LOS ANGELES	PICO RIVERA	-118.0863571	34.00896072	6
9338382	-	34.00735092	-118.0708771	LOS ANGELES	PICO RIVERA	-118.0709839	34.00741196	11
9344455	-	33.98397827	-118.0983276	LOS ANGELES	PICO RIVERA	-118.0983276	33.98397827	11
9344898	-	34.00362015	-118.050972	LOS ANGELES	PICO RIVERA	-118.0862122	34.00992584	11
9348299	-	33.97539902	-118.1186981	LOS ANGELES	PICO RIVERA	-118.1176682	33.97483444	11
9348336	-	33.9799881	-118.0910721	LOS ANGELES	PICO RIVERA	-118.1123734	33.97323608	165
9349374	-	33.98643875	-118.1058807	LOS ANGELES	PICO RIVERA	-118.1059723	33.98653793	6
9349965	-	34.00500107	-118.0777435	LOS ANGELES	PICO RIVERA	-118.0776062	34.00504684	11
9349985	-	33.96966934	-118.1009903	LOS ANGELES	PICO RIVERA	-118.1010208	33.96969223	6
9351177	-	34.00233078	-118.0539627	LOS ANGELES	PICO RIVERA	-118.0896149	34.00387573	11
9354576	-	34.00983047	-118.0779266	LOS ANGELES	PICO RIVERA	-118.0780792	34.00947571	11
9363602	-	33.57509995	-118.0628967	LOS ANGELES	PICO RIVERA	-118.1084442	33.96428299	11
9364034	-	33.9675293	-118.0934601	LOS ANGELES	PICO RIVERA	-118.0936356	33.96747208	165
9370000	-	33.57574081	-118.0627594	LOS ANGELES	PICO RIVERA	-118.1076889	33.96571732	165
9377327	-	34.0060997	-118.0951996	LOS ANGELES	PICO RIVERA	-118.0958633	34.00653458	11
9377345	-	33.9557991	-118.1025009	LOS ANGELES	PICO RIVERA	-118.1024094	33.95629883	6
9377347	-	34.00593185	-118.082428	LOS ANGELES	PICO RIVERA	-118.0825043	34.0058403	6
9377455	-	33.98723984	-118.1054001	LOS ANGELES	PICO RIVERA	-118.1054001	33.98731613	6

CASE_ID	ACCIDENT_Y	PROC_DATE	JURIS	COLLISION_	COLLISION1	Hour	OFFICER_ID
9380696	2021	2022-02-08	1900	2021-12-17	1745	17	529571
9380697	2021	2022-02-22	1900	2021-12-15	1120	11	430275
9381196	2021	2022-02-02	1900	2021-12-20	1500	15	520085
9381782	2021	2022-01-24	1900	2021-12-12	1848	18	537978
9381947	2021	2022-02-14	1900	2021-12-20	1635	16	520085
9391880	2021	2022-02-03	1900	2021-12-28	358	3	540460
9415092	2021	2022-03-07	1900	2021-07-17	45	0	540460

CASE_ID	REPORTING_	DAY_OF_WEE	CHP_SHIFT	POPULATION	CNTY_CITY_	SPECIAL_CO
9380696	1511	5	5	5	1954	0
9380697	1516	3	5	5	1954	0
9381196	1514	1	5	5	1954	0
9381782	1510	7	5	5	1954	0
9381947	1514	1	5	5	1954	0
9391880	1519	2	5	5	1954	0
9415092	1517	6	5	5	1954	0

CASE_ID	BEAT_TYPE	CHP_BEAT_T	CITY_DIVIS	CHP_BEAT_C	BEAT_NUMBE	PRIMARY_RD
9380696	0	0		0	151T2	BEVERLY BL
9380697	0	0		0	151T1	PARAMOUNT BL
9381196	0	0		0	151T2	ROSEMEAD BL
9381782	0	0		0	151T2	WHITTIER BL
9381947	0	0		0	151T2	BEVERLY BL
9391880	0	0		0	151T3	SLAUSON AV
9415092	0	0		0	151T3	WASHINGTON BL

CASE_ID	SECONDARY_	DISTANCE	DIRECTION	INTERSECTI	TJKM_Inter	WEATHER_1
9380696	SAN GABRIEL RIVER PKWY	213	E	N	Y	A
9380697	WASHINGTON BL	54	S	N	Y	A
9381196	HAVENWOOD DR	171	N	N	Y	A
9381782	COLUMBIA AV	61	E	N	Y	A
9381947	TOBIAS AV	18		N	Y	A
9391880	EDISON LIGHT POLE	220	E	N	Y	A
9415092	MILLUX AV	131	W	N	Y	A

CASE_ID	WEATHER_2	STATE_HWY_	CALTRANS_C	CALTRANS_D	STATE_ROUT	ROUTE_SUFF
9380696	-	N				
9380697	-	N				
9381196	-	N				
9381782	-	N				
9381947	-	N				
9391880	-	N				
9415092	-	N				

CASE_ID	POSTMILE_P	POSTMILE	LOCATION_T	RAMP_INTER	SIDE_OF_HW	TOW_AWAY
9380696						N
9380697						Y
9381196						N
9381782						N
9381947						N
9391880						Y
9415092						Y

CASE_ID	COLLISIO_1	NUMBER_KIL	NUMBER_INJ	PARTY_COUN	PRIMARY_CO	PCF_CODE_O
9380696	4	0	1	2	A	-
9380697	4	0	2	2	A	-
9381196	4	0	2	3	A	-
9381782	4	0	5	2	A	-
9381947	4	0	1	2	A	-
9391880	1	1	1	2	A	-
9415092	2	0	1	2	A	-

CASE_ID	PCF_VIOL_C	PCF_VIOLAT	PCF_VIOL_S	HIT_AND_RU	TYPE_OF_CO	MVIW	PED_ACTION
9380696	3	22350		N	C	C	A
9380697	8	22100	A	N	D	C	A
9381196	3	22350		N	C	C	A
9381782	3	22350	A	M	C	C	A
9381947	3	22350		N	C	C	A
9391880	5	21651	A	N	A	D	A
9415092	3	22350		N	C	C	A

CASE_ID	ROAD_SURFA	ROAD_COND_	ROAD_COND1	LIGHTING	CONTROL_DE	CHP_ROAD_T
9380696	A	H	-	C	A	0
9380697	A	H	-	A	D	0
9381196	A	H	-	A	D	0
9381782	A	-	-	C	D	0
9381947	A	H	-	A	D	0
9391880	B	H	-	C	D	0
9415092	A	H	-	C	D	0

CASE_ID	PEDESTRIAN	BICYCLE_AC	MOTORCYCLE	TRUCK_ACCI	NOT_PRIVAT	ALCOHOL_IN
9380696					Y	
9380697					Y	
9381196					Y	
9381782					Y	
9381947					Y	
9391880					Y	
9415092					Y	

CASE_ID	STWD_VEHTY	CHP_VEHTYP	COUNT_SEVE	COUNT_VISI	COUNT_COMP	COUNT_PED_
9380696	A	1	0	0	1	0
9380697	A	7	0	0	2	0
9381196	A	7	0	0	2	0
9381782	A	1	0	0	5	0
9381947	A	1	0	0	1	0
9391880	D	22	0	0	1	0
9415092	D	22	1	0	0	0

CASE_ID	COUNT_PED1	COUNT_BICY	COUNT_BI_1	COUNT_MC_K	COUNT_MC_I	PRIMARY_RA
9380696	0	0	0	0	0	-
9380697	0	0	0	0	0	-
9381196	0	0	0	0	0	-
9381782	0	0	0	0	0	-
9381947	0	0	0	0	0	-
9391880	0	0	0	0	0	-
9415092	0	0	0	0	0	-

CASE_ID	SECONDARY1	LATITUDE	LONGITUDE	COUNTY	CITY	POINT_X	POINT_Y	EPDO
9380696	-	34.0071907	-118.0701904	LOS ANGELES	PICO RIVERA	-118.0702515	34.00718689	6
9380697	-	33	-118	LOS ANGELES	PICO RIVERA	-118.1053238	33.98742294	6
9381196	-	0	0	LOS ANGELES	PICO RIVERA	-118.08535	33.99636459	6
9381782	-	34.00244904	-118.0861969	LOS ANGELES	PICO RIVERA	-118.086174	34.00241089	6
9381947	-	0	0	LOS ANGELES	PICO RIVERA	-118.0714417	34.00756073	6
9391880	-	33.96702957	-118.0919876	LOS ANGELES	PICO RIVERA	-118.0919876	33.96702957	165
9415092	-	0	0	LOS ANGELES	PICO RIVERA	-118.088295	33.97830582	165

APPENDIX D:
LRSM Excerpt

Local Roadway Safety

A Manual for California's Local Road Owners

Version 1.6
April 2022

Created by Caltrans in conjunction with FHWA and SafeTREC
for the express benefit of California Local Agencies.

Caltrans

U. S. Department of Transportation
Federal Highway Administration

Safe Transportation Research & Education Center
SafeTREC

Document History

Version 1.0: 4/20/2012

The California Department of Transportation - Division of Local Assistance developed the first version of the Local Roadway Safety Manual (Version 1.0) in 2012 to support the Cycle 5 HSIP call-for-projects.

Version 1.1: 4/26/2013

Based on feedback and lessons learned from Cycle 5, Caltrans updated Appendix B: "Table of Countermeasures and Crash Reduction Factors" to better clarify text in "Where to use", "Why it works", and "General Qualities" for several of the countermeasures included in the original manual.

No other changes were made to the Local Roadway Safety Manual as part of Version 1.1

Version 1.2: 03/10/2015

Based on feedback and lessons learned from Cycle 6, Caltrans made minor updates to the text of the document as needed for achieving consistency with overall Caltrans local HSIP guidance documents. The following sections were updated: 1.2, 4.2, 5.1, 6.2, and Appendix B, E, F & G.

Version 1.3: 04/29/2016

Caltrans made updates to the text of the document as needed in the following sections: 4.2, 5.1 and Appendix B.

Version 1.4: 06/08/2018

3/30/18 - Caltrans made updates to the crash costs in Appendix D, some of the website links in Appendix G, and some other texts of the document.
6/8/18 - Countermeasure S22 ("Modify signal phasing to implement a Leading Pedestrian Interval (LPI)") is added.

Version 1.5: April 2020

Caltrans added a few more countermeasures (e.g. Pedestrian Scramble, Install Separated Bike Lanes, Reduced Left-Turn Conflict Intersections, and Curve Shoulder widening), renumbered the countermeasures and updated the crash costs in Appendix D.

Version 1.6: April 2022

For Cycle 11 Call-for-projects, Countermeasure S04 (Provide Advanced Dilemma Zone Detection for high-speed approaches) was deleted and Countermeasure NS05mr (Convert intersection to mini-roundabout) added. The HSIP Funding Eligibility was changed to 90% except for S03, of which the HSIP Funding Eligibility stays at 50%. The crash costs in Appendix D were updated.

Future Updates:

In the future, Caltrans anticipates that additional changes will be needed to keep the Local Roadway Safety Manual consistent with future Calls-for-Projects' Guidelines and Application Instructions. In addition, new local HSIP programs, improvements to California data on local roadways, data analysis tools, and the latest safety research and methodologies may give rise to the need to make more significant changes to this manual.

Table of Contents

Foreword

Why was this manual developed?

The California Department of Transportation - Division of Local Assistance's goal in developing this manual is to maximize the safety benefits for local roadways by encouraging all local agencies to proactively identify and analyze their safety issues and to position themselves to compete effectively in Caltrans' statewide, data-driven call-for-projects.

This goal is complicated by California's wide variety of local agencies, roadway types, and project types, including: rural vs. urban, low-volume vs. high-volume, and intersection vs. roadway segment vs. network-wide. This variety makes it difficult to administer a single program and provide one set of guidelines that meets the needs of all California's local roadway owners and users. Many of California's local agencies are also challenged by the lack of a basic safety analysis framework and analysis tools specifically designed for local roadway managers with widely varying responsibilities and safety training. Currently, there is a vast range of safety documents, program guidance, and analysis tools with a wide variety of complexity and applications. Without clear and simple safety guidance for locals, many agencies take a 'reactive' approach to safety, even when research has shown 'proactive' safety analysis of roadways is more effective in making system-wide safety improvements.

The Federal Highway Administration (FHWA) Office of Safety provides national leadership in identifying, developing, and delivering safety programs and products to local governments to improve highway safety on local and rural roads.[1] In 2010, FHWA published a set of three manuals designed specifically for rural road owners; Roadway Departure Safety, Intersection Safety, and Road Safety Information Analysis.[2] These manuals present a simple, data driven safety analysis framework for rural agencies across the nation. These manuals, in conjunction with Caltrans' ongoing short-term research and development contract with the Safe Transportation Research and Education Center (SafeTREC) at the University of California, Berkeley, provided a unique opportunity for Caltrans to pursue development of this document as a mirror of FHWA's new Manuals for Local Rural Road Owners. Much of the wording, formatting and references from these FHWA manuals have been directly incorporated into this manual for California's local road owners. Individual references to the FHWA manuals have not been included; instead these documents are intended to be referenced on a wholesale basis.

With FHWA's and SafeTREC's support and expertise, Caltrans was able to expedite the completion of this manual and can now offer California's local agencies a new tool intended to provide focused roadway safety information in one manual.

1. Introduction and Purpose

The information in this document is geared towards local road managers and other practitioners with responsibility for operating and maintaining local roads, regardless of safety-specific highway training. The primary goal of this document is to provide an easy-to-use and comprehensive framework of the steps and analysis tools needed to identify locations with roadway safety issues and the appropriate countermeasures. For novice practitioners, the concepts and framework will be new, while experienced safety practitioners may find this manual to be mostly review. In both cases, the manual will provide the practitioners with a good understanding of how to complete a proactive safety analysis and ensure they have the best opportunity to secure HSIP safety funding during Caltrans calls-for-projects.

It's expected that novice and experienced practitioners will utilize this manual to help position their local agency to better compete in future Caltrans' calls-for-projects for safety programs. Inexperienced local roadway practitioners are also a target audience for this manual to gain exposure to the basic concepts that make up a proactive safety analysis of a local agency's roadway network.

The intent of this manual is to focus on key safety activities that every local agency should conduct on an annual basis (or as established by the agency) with the objective of reducing the number and severity of crashes within their jurisdiction. This manual defines this overall process as a "proactive safety analysis" approach to roadway safety. The Highway Safety Manual (HSM), documents a very similar process and refers to it as the "Roadway Safety Management Process." While the process in this document is similar and suggests the same primary elements, the HSM goes into significantly more detail, focuses more on scientific and mathematical equations behind the process, and intends to provide a comprehensive understanding of the overall processes to be applied by individual agencies across the nation. In contrast, this manual attempts to streamline the discussion; and make accommodations for the more novice safety practitioners, provide an adequate understanding of the process to complete an initial safety analysis of their roadway network, and instruct them on how to prepare applications that will compete well in Caltrans' statewide calls-for-projects. In general, this manual is intended to follow the research and methodologies presented in the HSM; however, to support Caltrans' statewide calls-for-projects process, it is important to note this manual deviates from the HSM in areas related to countermeasure selection and benefit / cost calculations. The logic behind these deviations is explained at the specific topic sections.

This manual is not intended to cover many of the day-to-day basics of traffic engineering including: maintain standard signage per the Manual on Uniform Traffic Control Devices; maintain sight distance (cut vegetation, remove parking); maintain a recovery zone; work with local traffic law enforcement; monitor collisions; address complaints; and manage litigation. These activities are understood to be critical elements of a local agency's traffic engineering responsibilities, but are not within the intended scope of this document.

1.1 California Local Roadway Safety Challenges and Opportunities

California's local roads are managed by more than 600 local agencies, including: cities, counties, and tribal governments. These local roads vary from flat multi-lane urban arterials to rural gravel roads in mountainous areas. California local agencies invest extensive resources on roadway safety every year, yet many roadways operate with outdated or insufficient safety features. A portion of these roadways even lack basic signing, pavement markings, alignment, and traffic control devices. Limited funding often prevents agencies from constructing safety projects, which can be expected. At the same time, the lack of safety data, design challenges, and lack of adequate training also hinder local agencies' accurate evaluation of their roadway network safety issues, which is more preventable.

Many small California local agencies are challenged by a lack of crash data. Without data, they have no way to identify High Crash Concentration Locations (HCCLs) or high risk roadway features, which can leave them "flying blind" with respect to the safety of their overall roadway network. Without data and analysis results, local officials may overreact when a tragic crash occurs, resulting in resources being spent in areas that will not maximize the overall application of safety funds. In conjunction with the collision mapping and analysis tools developed by UC Berkeley's SafeTREC, this document helps ensure all California local agencies have direct access to data on fatal and injury crashes within their jurisdictions and the analysis tools to effectively assess and prioritize future safety projects.

1.2 Safe System Approach

The Infrastructure Investment and Jobs Act (IIJA), aka Bipartisan Infrastructure Law (BIL), was signed into law on November 15, 2021. Under IIJA, the Highway Safety Improvement Program (HSIP), codified as Section 148 of Title 23, United States Code (23 U.S.C §148), is a core federal-aid program to States for the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. The IIJA emphasizes the "safe system approach":

Safe system approach means a roadway design that emphasizes minimizing the risk of injury or fatality to road users; and that (i) takes into consideration the possibility and likelihood of human error; (ii) accommodates human injury tolerance by taking into consideration likely accident types, resulting impact forces, and the ability of the human body to withstand impact forces; and (iii) takes into consideration vulnerable road users. (23 U.S.C. 148(a)(9)).

FHWA recognizes that the funding available through HSIP alone will not achieve the goal of zero fatalities on the Nation's roads. The Safe System approach addresses the safety of all road users, including those who walk, bike, drive, ride transit, and travel by other modes. It involves a paradigm shift to improve safety culture, increase collaboration across all safety stakeholders, and refocus transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives. FHWA encourages States to prioritize safety in all Federal-aid investments and in all appropriate projects, using not only HSIP funding but also other Federal-aid funding.

The IIJA emphasizes the importance of vulnerable road user (non-motorized road user) safety in the HSIP by adding a definition for vulnerable road users, creating a vulnerable road user special rule, and requiring States to develop and update a vulnerable road user safety assessment. All of these provisions address the increasing number of fatalities involving vulnerable road users on U.S. roads. It is imperative that States consider the needs of all road users as part of the HSIP. Investment in highway safety improvement projects that promote and improve safety for all road users, particularly vulnerable road users, aligns with the IIJA and will help Build a Better America. States and other funding recipients should prioritize projects that maximize the existing right-of-way for accommodation of non-motorized modes and transit options that increase safety, equity, accessibility, and connectivity. Projects that separate users in time and space, match vehicle speeds to the built environment, and increase visibility (e.g., lighting) advance implementation of a Safe System approach and improve safety for vulnerable road users.

1.3 The State's Role in Local Roadway Safety

The California Department of Transportation (Caltrans)—Division of Local Assistance is responsible for administering California's HSIP safety funding intended for local roadway safety improvements. This funding primarily comes to the state through two federal programs: Highway Safety Improvement Program (HSIP)—a federal-aid program focused on reducing fatalities and serious injuries on all public roads; and the Active Transportation Program (ATP)—a federal aid and state funded program focused on improving safety and the overall use of non-motorized, active transportation modes of travel. Under SAFETEA-LU, High Risk Rural Roads Program (HR3) was established to focus on addressing rural road safety needs but in MAP-21 and FAST, it is now a 'special rule' under HSIP that if triggered, directs that a certain amount of HSIP funds will need to be allocated for those rural roads that meet the definition.

Caltrans' administration of these programs encompasses many responsibilities, including: establishing program guidance; reviewing applications for improvements on local roadways; ranking applications/projects on a statewide basis; selecting projects for funding based on the greatest potential for reducing fatalities and injuries; programming the selected projects in the Federal Statewide Transportation Improvement Program (FSTIP); and assisting with programming and delivery issues throughout the delivery of the local agency projects. <u>One goal for developing this document is to improve Caltrans' overall data-driven approach to statewide project selection of safety projects and to maximize the long-term safety improvements across California.</u> To show the relationship between Caltrans' project selection process and this manual, a diagram showing the HSIP Call-for-Projects Process is provided in Appendix A.

Many State Departments are also actively engaged in California's Strategic Highway Safety Plan (SHSP). Caltrans developed the SHSP in a cooperative process with local, State, federal, and private sector safety stakeholders. The SHSP is a data-driven, comprehensive plan that established statewide goals, objectives, integrated the five E's of traffic safety— engineering, enforcement, education, emergency response, and emerging technologies. This manual directly supports many of the emphasis areas of the California SHSP. Local agencies are encouraged to participate in ongoing SHSP update efforts and can find more information on the SHSP at the following website: https://dot.ca.gov/programs/safety-programs/shsp.

Local Roadway Safety Plan (LRSP) and Systemic Safety Analysis Report Program (SSARP)

The state-funded Systemic Safety Analysis Report Program (SSARP) was established in 2016. The intent of the SSARP was to assist local agencies in performing a collision analysis, identifying safety issues on their roadway networks, and developing a list of systemic low-cost countermeasures that can be used to prepare future HSIP and other safety program applications. Late 2019, the program was evolved to Local Roadway Safety Plan (LRSP) so that the focus is not just engineering solutions but also include safety improvements in other areas such as enforcement, Education and emergency response.

The state funding for the LRSP/SSARP program is made available by exchanging the local Highway Safety Improvement Program (HSIP) federal funds for State Highway Account (SHA) funds.

For more information, please visit the LRSP/SSARP webpage at https://dot.ca.gov/programs/local-assistance/fed-and-state-programs/highway-safety-improvement-program/local-roadway-safety-plans.

1.4 The Local Roadway Crash Problem

Approximately 3,000 people die in California traffic crashes every year, representing nearly 10% of all traffic fatalities in the United States. Fifty-seven percent of these fatalities occur on local roadways, while only forty-three percent occur on the California State Highway System. A comparison of rural and urban roadways shows that local rural roadways have fatality rates 2 to 3 times higher than urban roadways per vehicle miles traveled. Based on these statistics, the total annual cost of local roadway fatal crashes to California is over $6 billion, while only $100 million is available annually in HSIP safety funds.

These statistics demonstrate the large and complex safety issues facing California. Through the development of this document, Caltrans is striving to help local agencies proactively identify high risk roadway features, roadway network locations/corridors with the highest safety needs, and encourage them to select effective low-cost improvements, whenever appropriate.

1.5 Reactive vs. Proactive Safety Issue Identification

Safety issues are identified on local roadways through a wide range of approaches. Although no single approach works best for all local agencies, some are far more effective at improving long-term roadway safety. Many agencies, often larger ones, have staff whose full-time job is dedicated to roadway safety; allowing them to focus on safety initiatives, be trained in the latest safety research, and have access to safety analysis data, tools and procedures. These agencies often utilize a 'proactive' approach to analyze their roadway network and identify safety issues.

At the same time many agencies, often the smaller ones, lack the financial ability to dedicate large portions of their staff resources to analyze safety issues and their staff has limited access to roadway safety training, safety expertise, and the latest safety analysis tools and procedures. Unfortunately, this can often result in identifying their safety issues in 'reaction' to tragic events.

The following is a basic outline of the differences in proactive vs. reactive identification approaches used by local agencies:

Reactive Approach

For this document, an agency is considered to be utilizing a reactive approach to roadway safety if they primarily identify safety improvements in reaction to:

- Recent crashes triggering safety investigations
- Specific crash concentrations triggering safety investigations
- Stakeholder identification of locations with safety issues and requests for improvements
- New funding becoming available

Crash concentrations and crash trends may be missed if local agencies rely exclusively on these identifiers for their roadway safety effort. They may also miss many opportunities to effectively utilize low-cost, systemic type improvements. This document encourages local agencies to adopt a more proactive approach to their roadway safety.

Proactive Approach

An agency is considered to be using a proactive approach to roadway safety if they go beyond the elements of a reactive approach and identify safety improvements by analyzing the safety of their entire roadway network, in one of the following ways:

- One-time, network-wide safety analysis of their roadways driven by new source of funding.
- Routine safety analyses of the roadway network (Preferred Approach!)

Agencies with a proactive approach utilize both systemic and spot location improvements (as defined in section 1.5 below). Applying improvements systemically across an entire corridor or network allows an agency to proactively address locations that have not had crash concentrations in the past, but have similar features as those currently experiencing high levels of crashes. In addition, even though a spot location improvement may be based on 'past' crashes, agencies making improvements based on countermeasures with proven crash reduction factors at their highest crash locations often have the best chance of proactively reducing future crashes.

This document encourages safety practitioners to pursue a proactive approach and routinely analyze the safety of their roadway networks to yield the best overall safety results.

1.6 Implementation Approaches

When an agency proactively identifies their safety issues throughout their roadway network, it is likely they will find high crash concentrations at intersections, roadway segments, and corridors. The safety practitioner should consider which implementation approach to utilize. Typical approaches include:

- Systemic Approach
- Spot Location Approach
- Comprehensive Approach incorporating human behavior issues

Each of these approaches has benefits and drawbacks. As Local agency practitioners identify their safety issues and analyze the data for crash patterns, they should be open to implementing a combination of these approaches, as documented in Sections 2 and 3 of this manual.

Systemic Approach

The Systemic Approach is primarily based on application of proven safety countermeasures at multiple crash locations, corridors, or geographic areas. Implementation of the Systemic Approach is generally based on 'system-wide' crash data with the estimates of the impacts being made in terms of benefits measured in traffic crash reduction and deployment cost. Identified locations experiencing high levels of crashes and locations with similar geometric features can be treated systemically with low-cost, proven safety countermeasures. *Note: The term "Systemic" used throughout in this manual is often exchanged with the term "Systematic" in many national safety documents and research studies. In general, safety practitioners will find these terms interchangeable. This manual uses "Systemic" to match the new HSM and the FHWA CMF Clearinghouse.*

Benefits of the Systemic Approach may include:

- <u>Widespread effect.</u> The Systemic Approach addresses safety issues at a large number of locations or on an entire local roadway network. It can also generate projects that combine HCCLs and locations with the potential for crashes and still have high Benefit to Cost (B/C) ratios. An example of this type of project could be upgrading pavement delineation and warning signs along a rural corridor: crashes may not have occurred on every curve or segment along the corridor, but all of the corridor's pavement delineation and warning signs can be upgraded at one time. For urban applications, an example could be protecting the left-turn phase of signalized intersections with existing left-turn pockets: severe crashes may not have occurred at each of the left-turn movements, but with minor changes to the signal hardware and signing, all or many of a city's unprotected left-turn phases can be protected with one safety project.

- Crash type prevention. By focusing on a predominant crash type, an agency can address locations that have not experienced significant numbers of these types of crashes, but have similar characteristics or conditions as existing HCCLs. The resulting B/C ratios for these types of projects will be less than if only HCCLs are included; but by using low-cost countermeasures and including as many high crash locations as possible, the resulting B/C ratios should still be high enough to allow agencies to proactively address locations that have not experienced high numbers of these types of crashes. For urban areas, projects improving pedestrian crossings can be good examples of the Systemic Approach. By applying the countermeasures systemically, the agency can often justify these projects based on relatively high B/C ratios, even though some of the improvement locations have not experienced enough crashes to yield moderate-to-high B/C ratios on their own.
- Cost-effectiveness. Implementing low-cost solutions across an entire system or corridor can be a more cost-effective approach to addressing system-wide safety issues. Even though this approach does not address all (or total) safety issues for a given location, the deployment of low-cost countermeasures often result in the highest overall safety benefit for an agency with limited safety funding. An example of this would be an agency choosing to install rumble stripes along an entire corridor for equal or less money than realigning a small portion the roadway to fix a single curve.
- Reduced data needs. The Systemic Approach can be used without a detailed crash history for specific locations, thereby reducing data needs. For example, consider a long rural corridor, which includes a section that passes through an Indian Reservation: Even if there is no documented crash data for the portion of the corridor that passes through the reservation, the entire limits can be treated with the same low-cost improvements. As long as there are sufficient past crashes documented for the entire corridor, the project will still have a reasonably high B/C ratio.

Drawbacks of the Systemic Approach may include:

- Justifying improvements can be difficult. Because this approach does not always address locations with a history of crashes and active stakeholders, it can be difficult to justify the improvements. The Systemic Approach will rarely include a recommendation for a large-scale safety improvement at a single location. Since large-scale projects usually garner attention from decision makers, the media, elected officials, and the general public, safety practitioners often need to make additional efforts to explain the Systemic Approach and its benefits to those groups. Safety practitioners can utilize the high B/C ratios of these systemic projects to convey their benefits compared to high-profile, single location projects with lower B/C ratios.

Spot Location Approach

The Spot Location Approach is typically based on an analysis of crash history to identify locations that have significantly higher crashes and treat them accordingly. It is important to practitioners to understand that for many locations, safety issues can be complicated and sometimes the most appropriate fixes are not quick, easy or cheap.

Benefits of the Spot Location Approach may include:

- <u>Focus on demonstrated needs.</u> The Spot Location Approach focuses directly on locations with a history of crashes and specifically addresses those crashes. Intersection improvements are some of the most common spot location projects. Intersections tend to have higher concentrations of crashes resulting from opposing traffic movements. These high crash concentrations often require stand-alone improvements to adequately resolve the safety issues.
- <u>Justifying improvements can be easy.</u> Because this approach addresses locations with a history of crashes, it is usually easy to justify improvements. For urban areas, reconfiguring/ reconstructing an entire intersection can be a good example of an effective Spot Location Approach. Large urban intersections can have extremely high crash concentrations, making major changes to the intersection the only way to significantly reduce future crashes. With these types of scenarios, even the highest cost countermeasures can be cost effective.
- <u>If low-cost countermeasures are used, this approach can prove very cost effective.</u> The Spot Location Approach does not always have to include moderate or high cost improvements. It is often appropriate for local agencies to make low-cost improvements at one location at a time. Ongoing maintenance and development projects offer great opportunities for these low-cost improvements to be constructed with no additional expense to local agencies.

Drawbacks of the Spot Location Approach may include:

- <u>Assumption that the past equals the future.</u> This approach assumes locations with a history of crashes will continue to experience the same number and type of crashes in the future. When agencies do not account for the random nature of roadway crashes (i.e., Regression to the Mean), moderate to high cost projects can be erroneously justified. Practitioners can mitigate this by using 5 years of crash data when analyzing their roadways. In addition, significant changes to land use or roadway characteristics in or around proposed projects can either increase or decrease the expected number of future crashes.
- <u>Minimal overall benefit to the roadway network.</u> Some local agencies use this approach with medium and high cost improvements at locations which do not represent their worst high crash concentration locations. The result can be projects with low B/C ratios and overall safety benefits that are not as high as if they utilized a Systemic Approach. This drawback can be minimized by safety practitioners who analyze their entire roadway network, propose spot location fixes only at their highest crash locations, and utilize lower cost countermeasures wherever appropriate.

The Spot Location Approach to traffic safety is ideally implemented along with the Systemic Approach to provide the best combination of safety treatments. For instance, the Spot Location Approach can be applied at locations where low-cost countermeasures are not expected to be effective in significantly reducing future crashes or at those locations that have had low-cost countermeasures previously installed systemically but, after an assessment, continue to show a higher-than-average crash rate.

Comprehensive Approach

The Comprehensive Approach introduces the concept of the “5 E’s of Safety”: Education, Enforcement, Engineering, Emergency Response and Emerging Technologies. This approach recognizes that not all locations can be addressed solely by infrastructure improvements. Incorporating the “5 E’s of Safety” is often required to achieve marked improvement in roadway safety. For instance, some roadway segments will be identified for which targeted enforcement is an appropriate countermeasure. Some of the most common violations are speeding, failure-to-yield, red light running, aggressive driving, failure to wear safety belts, distracted driving, and driving while impaired. When locations are identified as having these types of violations, coordination with the appropriate law enforcement agencies is needed to deploy visible targeted enforcement to reduce the potential for future driving violations and related crashes. To improve safety, education and outreach efforts can also be used to supplement enforcement efforts. Enforcement and/or education can also be effectively utilized as short-term ways to address high crash locations, until the recommended infrastructure project can be implemented.

1.7 Our “Safety Challenge” for Local Agencies

<u>Caltrans, FHWA and Safe Transportation Research and Education Center (SafeTREC) “challenge” local agencies to initially commit one or more days to understanding and applying the concepts and tools outlined in this manual.</u> Experienced safety practitioners working in agencies currently using a proactive approach can quickly review the topics in the manual and consider/test some of the new tools (e.g., TIMS) identified within it. In contrast, novice safety practitioners may need several days to better understand the underlying concepts in this manual to be able to complete the basic elements of a proactive safety analysis of their roadway network. In these situations, the room for knowledge growth, internal process improvements, and expected safety benefits will be even greater, which should more than offset the additional time invested.

By utilizing this simple framework for identifying, analyzing and implementing a proactive approach for improving safety on their roadways, practitioners will have a better understanding of their agencies’ unique safety issues, the proven low-cost countermeasures that can reduce crashes, and the existing and future funding to implement the projects. This small investment of time will help local agencies achieve significant reductions in future fatalities, injuries and overall crashes. We believe these local agencies may also gain the added unexpected benefit of improved job satisfaction of those involved, as there are few more rewarding tasks than knowing that your efforts will result in future roadway users arriving safely at their destination instead of becoming statistics.

1.8 Summary of information in this Document

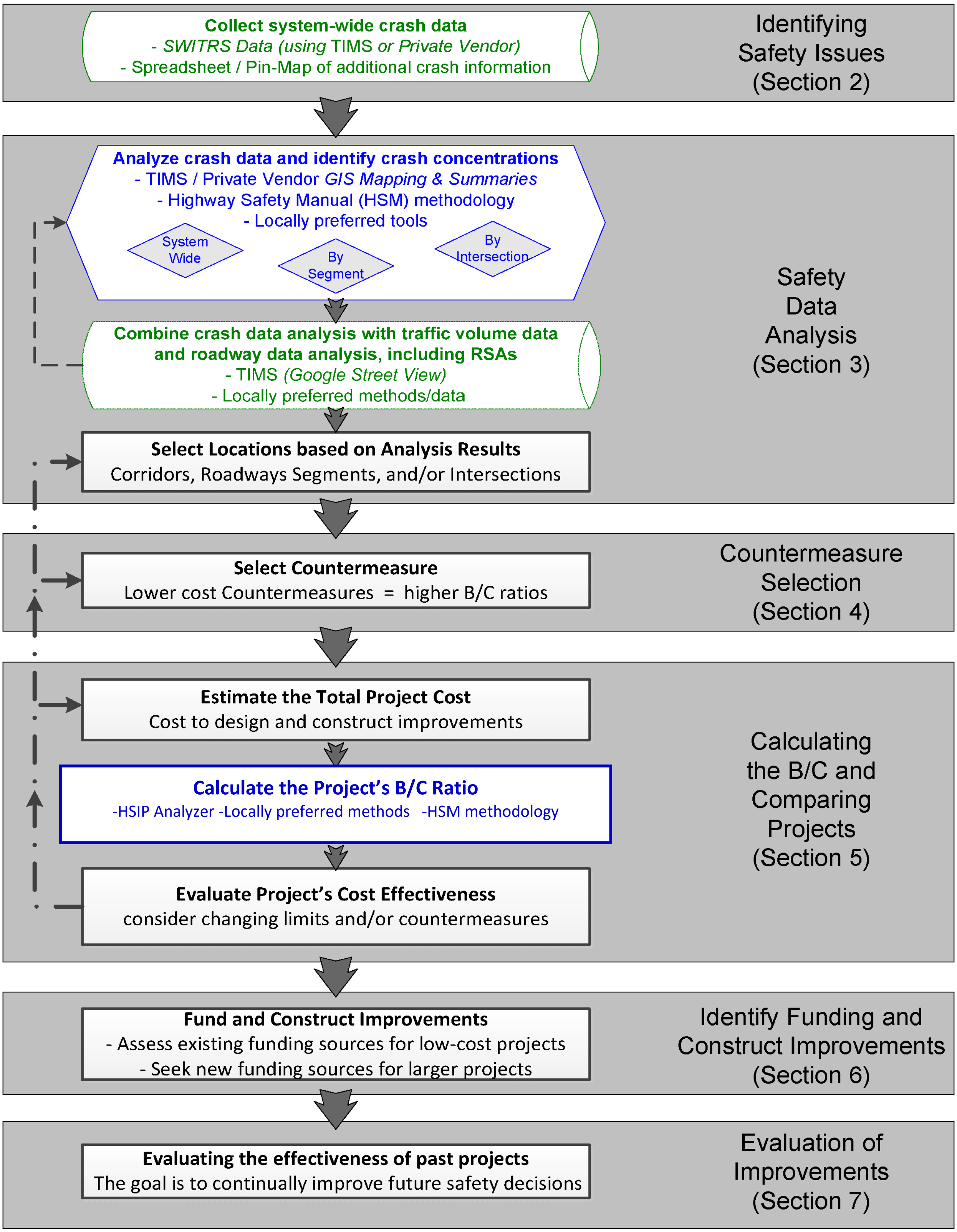
This document provides information on effectively identifying California's local roadway safety issues and the countermeasures that address them, ultimately leading to the effective implementation of safety projects that improve safety on local roadways. The document is not intended to be a comprehensive guide for roadway design and improvement or the only guide local agencies utilize for their safety analysis of their roadways.

Caltrans also expects this document will directly support its efforts in selecting local agency safety projects. The expectation is that as local agencies throughout the state utilize the proactive safety analysis approach outlined in this document, their applications for HSIP, and ATP projects will include lower cost improvements at locations with the highest safety needs. This will improve Caltrans' data-driven approach to statewide project selection of safety projects and maximize the safety benefits across California.

The proactive safety analysis framework incorporated in this document is summarized in Figure 1.

Figure 1

Local Roadway Safety: Proactive Safety Analysis Approach



The above flowchart illustrates how each of the individual sections of this document work together to make up a proactive safety analysis approach. These sections are briefly outlined below:

Section 2 of this manual provides an overview of the types of data to collect for the identification of roadway safety issues. It discusses sources of crash data and how they can be used.

Section 3 summarizes the types of analyses that can be conducted to determine what roadway countermeasures should be implemented. This section is the link between the data (Section 2) and the selection of appropriate countermeasures (Section 4). It provides definitions and examples of the qualitative and quantitative factors that should be considered when evaluating roadway safety issues.

Section 4 provides a description of selected countermeasures that have been shown to improve safety on local roads. It includes a basic set of strategies to implement at locations experiencing a history of crashes and their corresponding crash modification factors (CMF). The interrelationship between CMFs and Crash Reduction Factors (CRFs) are defined and used interchangeably throughout this document.

Section 5 defines a methodology for calculating a B/C ratio for a potential safety project. It includes sources for estimating projected costs and benefits and the specific values/formulas Caltrans uses for its statewide evaluations of HSIP projects. This section also discusses the potential value in reevaluating projects' overall cost effectiveness at this point in the safety analysis, including: refining the project's costs and/or changing the mix of countermeasures and locations.

Section 6 identifies existing and new funding opportunities for safety projects that local agencies should be considering. This section also briefly discusses some unique project development issues and strategies for safety projects as they proceed through design and construction.

Section 7 presents the process to complete an evaluation of installed treatments. After the countermeasures are installed, assessing their effectiveness will provide valuable information and can help determine which countermeasures should continue to be installed on other roadways to make them safer as well as those that should be limited or discontinued.

Appendix A presents a flowchart of the HSIP call-for-projects process. This flowchart demonstrates how this document interacts with these Caltrans calls-for-projects.

Appendix B contains Detailed Tables of countermeasures discussed in Section 4. This table includes detailed information about each countermeasure, including: where to use, why it works, general qualities (time, cost and effectiveness), crash type(s) addressed, crash reduction factor, and specific values for use in Caltrans HSIP calls-for-projects.

Appendix C includes a summary of "recommended actions" involved in a proactive safety analysis.

Appendix D contains the formulas used to calculate the B/C ratio of safety projects.

Appendix E presents TIMS tutorials that are available to assist local agencies in completing Caltrans call-for-projects application requirements and attachments. The tutorials include examples for Spot Location projects and systemic projects.

Appendix F presents a list of the abbreviations used in this document.

Appendix G presents a list of references.

2. Identifying Safety Issues

This document encourages local agency safety practitioners to proactively analyze their roadway networks with the intention of yielding the best overall safety benefits. When utilizing a proactive safety analysis approach, practitioners need to consider a wide range of data sources to get an overall picture of the safety needs.

There are a number of information sources that can be accessed to get a clearer picture of the roadway safety issues on the roadway network. These can be formal or informal sources, including:

Formal sources:

- State and local crash databases
- SafeTREC's TIMS website (or locally preferred mapping software)
- Law enforcement crash reports and citations
- Field assessments

Informal sources:

- Observational information from road maintenance crews, law enforcement, and first responders
- Citizen notification of safety concerns

Examining crash history will help practitioners identify locations with an existing roadway safety problem, and also identify locations that are susceptible to future roadway crashes. In addition to location identification, this data can provide information regarding crash causation that ultimately provides insight into identifying potentially effective countermeasures.

Emphasis on data-driven decisions is indicative of reliability and efficiency. The more reliable the data, the more likely the decisions regarding safety improvements will be effective. However, detailed, reliable crash data are not available in all areas. Under this circumstance, the practitioner should use the best available information and engineering judgment to make the best decisions. In an effort to mitigate these situations, UC Berkeley SafeTREC has developed the TIMS website, which includes GIS mapping tools to access fatal and injury crashes statewide. This site is now available to all California local agencies. See Section 2.2 for more details on TIMS.

It is generally accepted that at least 3 years, or preferably 5 years, of crash data be used for an analysis; additional years of crash data can provide better information. For low volume roadways and/or when only severe crashes are analyzed, more years of crash data may be necessary for an effective evaluation. Due to the randomness of crashes in a given year, a multi-year average of safety data will smooth outlier years of relatively high or low roadway crash rates. This concept is commonly referred to as "regression to the mean" and is critical in helping safety practitioners avoid making wrong inferences as they analyze their roadway network data. An example of this is an agency making a high-cost improvement at a location in response to one or two tragic crashes. The Highway Safety Manual (HSM) includes more details on regression to the mean and methods to reduce the random nature of crashes.

There are some circumstances where additional years of crash data may not always be advantageous. First, it's important for practitioners to recognize that as more years of crash data are used, they need to consider changes in traffic patterns, physical infrastructure, land use, and demographics that may affect their projection of future crashes. Second, if practitioners only focus on many years of past crash data, they could miss emerging safety issues and crash trends. For these reasons, if practitioners sense one or more factors affecting crashes have changed or may be changing, they should consider looking at the crash data for the specific area on a yearly or 3-year moving average to expose any changes and crash trends that are occurring.

2.1 State and Local Crash Databases

California has a central repository for storing crash data called SWITRS, which stands for Statewide Integrated Traffic Records System. SWITRS is a comprehensive data source for doing roadway safety analysis that includes almost all public roads in the database except tribal roads which are currently not included. SWITRS information is available to California's local agencies, although many agencies have had difficulty identifying, extracting and utilizing their crash records from SWITRS. All California local agencies, especially those that currently have difficulty accessing and mapping crash data, are encouraged to utilize the SafeTREC TIMS website to access and map SWITRS data.

This document focuses on the SafeTREC TIMS website as a tool to access and map SWITRS data because TIMS is free to local agencies and the general public. At the same time, this document also acknowledges that TIMS currently does not offer some of the features currently available in some of the commercially available crash analysis software packages. For this reason, local agencies are encouraged to try TIMS, but they should not feel obligated to make a switch if they prefer using their vendor supplied crash analysis software. See section 2.2 for more details on TIMS.

Many agencies utilize one of several crash analysis software packages (e.g., Crossroads) to manage and access their crash records. Their use can be costly, but allows local road practitioners to identify locations with multiple roadway crashes, conduct an analysis that can produce predominant crash types, and identify associated roadway features that may have contributed. One drawback to agencies managing and updating their own individual databases is that the statewide database may become outdated and may not include the updated crash details like geo-coded locations. Agencies that manage and update their own individual databases are encouraged to share all updates, including any geo-coding information, with the SWITRS data managers at the California Highway Patrol. This will allow updated geo-coding and other crash features to be available on a statewide basis.

Recommended Action: Obtain at least 5 years of network-wide crash data to identify local roads that have a history of roadway crashes. This data will be used to identify predominant roadway crash locations, crash types and other common characteristics.

As practitioners gather formal and informal information relating to the safety of their roadway network, they are encouraged to develop one or more separate spreadsheets and/or pin-maps to help track and manage this data. (These spreadsheets/pin-maps should capture much of the data gathered in each of Sections 2.1 through 2.8). A spreadsheet and/or pin-map can serve as a database to help an agency identify locations and crash characteristics representing their greatest safety issues and guide them in identifying appropriate countermeasures.

The following spreadsheet is offered as an example, but each agency's spreadsheet should be reformatted to include data to meet their needs. Agencies should consider printing their spreadsheets on 'legal' or '11 x 17' paper for easy review of their data.

	General Information		Crash Information			Evaluation / Action		
Location & Date	Source/Type of information	Safety Issue/Problem	Nature of Crashes	Time of Day	Weather/Traffic Conditions	Staff Evaluation	Recommend Action	Resolution
1) Intersection "X"								
1) Feb 7, 2010	Input from law enforcement	Clearance Intervals need adjustment	V1-WB V2-SB Side-swipe	21:30	Dry, Night, Free-flowing	R. Jones 2/26/10	Increase all-red interval	Completed 2/26/10
1) Mar 9, 2010	Citizen Complaint	Ped Crossing unsafe due to RT turns	N/A	N/A	N/A	R. Jones 3/12/10	No RT on Red (Need study)	
2) Intersection "Y"								
2)								
3) Roadway Segment (PM 5.3 to PM 7.8)								
PM 6.4 to 6.8 Sep 29, 2011	Maintenance data	Extensive skid marks. Speed of Travel?	General WB: ROR	N/A	Dry Free-flowing	J. Smith 10/1/11	High Friction Overlay	Preparing HSIP App.
PM 7.1 Jan 5, 2011	Input from law enforcement	Stop Sign missing	N/A	N/A	N/A	J. Smith 1/5/11	Informed Maintenance	New sign 1/5/11

An example of a pin-map, which could be modified to capture much of the data gathered in Section 2, is shown in the following section as part of the TIMS output.

2.2 Transportation Injury Mapping System (TIMS)

The Safe Transportation Research and Education Center (SafeTREC) at the University of California, Berkeley, has developed a powerful website with tools for California's local agencies to gather data for their safety analyses. Their Transportation Injury Mapping System (TIMS) website provides safety practitioners with California crash data (SWITRS, i.e. Statewide Integrated Traffic Records System) and collision mapping and analysis tools. California local agencies are encouraged to utilize TIMS at: https://tims.berkeley.edu/

<u>Site Features:</u>

- Applications to query map and download geo-referenced SWITRS data.
- Summary tables based on data included in SWITRS individual crash reports. These summary tables can be generated based on specified data fields or spatial limits.
- Virtual field review by connecting the crash location to Google maps and Google Street View, allowing the examination of the existing roadway infrastructure and dimensions.
- A 'Help Tab' that provides step-by-step instructions.

Please note that SafeTREC is not able to incorporate all SWITRS crashes into TIMS due to poor crash location descriptions in the crash reports. Currently, TIMS includes the majority of California fatal and injury crashes but does not include Property Damage Only collisions.

<u>Recommended Action:</u> Consider augmenting your local agency's data collection approach with information available using the suite of TIMS tools. The TIMS tools (and/or purchased software applications) can help the safety practitioner complete or assist with each of the actions in Sections 2.1 through 2.8. This website includes several tutorials specifically designed to support the individual sections of this document. Local practitioners may find the TIMS output files as a great starting point to build their tracking spreadsheet discussed in the recommendation of Section 2.1.

2.3 Law Enforcement Crash Reports

Both State and local law enforcement officials can be an important source of roadway crash data. The actual law enforcement crash reports can be valuable in identifying the location and contributing circumstances to roadway crashes (e.g., did the highway hardware and features operate as intended: end treatment worked, no barrier in the passenger compartment, pavement not slippery when wet, signs visible, signal timing, etc.). The following variables can and should be extracted and compiled from the crash reports:

- Location
- Date and time
- Crash type
- Crash severity
- Weather conditions
- Lighting conditions
- Sequence of events and most harmful events
- Contributing circumstances
- Driver Variables: age of driver, DUIs, use of seat belt, etc.

Similar to the crash database, the information in the crash reports can be used to assist in the identification of potential infrastructure and non-infrastructure safety treatments and the deployment approach.

Recommended Action: Develop a working relationship with law enforcement officials responsible for enforcement and crash investigations. This could foster a partnership where sharing crash reports and safety information on problem roadway segments becomes an everyday occurrence. Practitioners with limited access to crash data are encouraged to use TIMS to assess the local crash report data.

2.4 Observational Information

Law enforcement officers, local agency maintenance crews, and Emergency Medical Services personnel can serve as valuable resources to identify problem areas. Since they travel extensively on local roads, they can continuously monitor roads for actual or potential problems (e.g., poor delineation, fixed objects near the roadway, missing signs, signs of vehicles leaving the road). Law enforcement observations of driver behavior and roadway elements can provide valuable information to the local road agency. Additionally, law enforcement officers are sometimes aware of problem areas based on citations written, even if crashes related to the violations have not yet occurred. Road maintenance crews may keep logs of their work, including sign and guardrail replacements, debris removal, and edge drop-off repairs. These logs can provide supplemental information about crashes and HCCLs that may not have been reported to law enforcement. Finally, Emergency Medical Service Crash Reports can provide an entirely different perspectives and set of observations relating to crash occurrences.

Information obtained from road maintenance crews, law enforcement officers, and Emergency Medical Services personnel can help support all three methods of implementation approaches: Spot Location treatments, systemic deployments, and the Comprehensive Approach. Often, traffic violations such as speeding and impaired driving lend themselves to education and enforcement solutions to address these behaviors and supplement the intended infrastructure countermeasures.

Recommended Action: Add information received from law enforcement, road maintenance crew, and Emergency Medical Service observations to the agency's tracking spreadsheet and/or pin-maps. Develop a system for maintenance crews to report and record observed roadway safety issues and a mechanism to address them.

2.5 Public Notifications

Occasionally, when unsafe situations are observed, local citizens may notify the local government by email, letter, telephone, or at a public meeting. Information identifying safety issues on local roads may also come from community or regional newspapers, newsletters, correspondence, and from local homeowner and neighborhood associations. These sources can serve as indicators that a safety issue may exist and may warrant further review and analysis to determine the extent of the issues. Citizen reports can be tracked along with official crash data; however, safety practitioners should not regard these reports as factual, unless proven by other methods. Local safety databases should only contain objective and verifiable data.

Recommended Action: Review and summarize information received from these sources, identifying segments or corridors with multiple notifications and record the locations, dates, and nature of the problem that are cited. Add information received from public notifications to tracking spreadsheets and/or pin-maps once confirmed.

2.6 Roadway Data and Devices

It is also valuable to obtain information about the existing roadway infrastructure. Currently, many local agencies have few of their roadway characteristics in a database. For these agencies, the establishment of a roadway database could be a long-term goal. The following roadway characteristics are often used to assist practitioners in safety analyses of roadway segments:

- Roadway surface (dirt, aggregate, asphalt, concrete)
- Roadway geometry (horizontal, vertical, flat)
- Lane information (number, width)
- Shoulder information (width, type)
- Median (type, width)
- Traffic control devices present (signs, pavement marking, signals, rumble stripes etc.)

- Roadside safety hardware (e.g., guardrail, crash cushions, drainage structures)

The TIMS site, described in Section 2.2, can provide safety practitioners with much of this roadway data virtually by using Google Maps and Google Street View. By utilizing TIMS (and/or private for-profit vendors), safety practitioners can save hours and even days of driving during the initial steps in the safety analysis of their network. Once agencies start to define individual safety projects for funding and future construction, actual field reviews are needed to ensure a complete understanding of the project location and context.

As local practitioners gather information about their existing roadway infrastructure, they need to determine whether it complies with the minimum standards for signs, breakaway supports, signals, pavement markings, protective barriers, etc. Practitioners should use the most current *California - Manual on Uniform Traffic Control Devices* (CA-MUTCD), which provides the minimum standard requirements for traffic control devices on all public streets, highways, bikeways, and private roads open to public travel.[6] In addition to ensuring compliance with the MUTCD, geometric standards for sight distance, curve radius, and intersection skew angle and roadway standards for lane width, shoulder width, clear recovery zone, and super-elevation should also be evaluated.

Roadway information can be combined with crash data to help local practitioners identify appropriate locations and treatments to improve safety. For example, if a local rural segment is experiencing a high number of horizontal curve-related crashes, analysis of the inventory of roadway elements could reveal that the roadway does not have sufficient signage installed in advance of many of those curves to give motorists warning of the pending change in roadway geometry.

Recommended Action: Identify and track roadway characteristics for the intersections, roadway segments, and corridors, including compliance with the minimum standards. At a minimum, this should be done for locations being considered for safety improvements, but ideally agencies would establish an extensive database of roadway data to help them proactively identify high risk roadway features.

2.7 Exposure Data

The number of crashes can sometimes provide misleading information about the most appropriate locations for treatment. Introducing exposure data helps to create a more effective comparison of locations. Exposure data provides a common metric to the crash data so roadway segments and intersections can be compared more appropriately, helping local agencies prioritize their potential safety improvements.

The most common type of exposure data used on roadway segments is traffic volume. Ideally, volume would be broken down by pedestrians, bicycles, cars, motorcycles, and large trucks. A count of the number of vehicles and non-motorized users can provide information for comparison. For example, if two roadway segments have the same number of crashes but different traffic volumes, the segment with fewer vehicles (i.e., less exposure) will have a higher crash rate, meaning that vehicles were more likely to experience a crash along that roadway segment. In situations where traffic volume is not available, segment length or population can serve as an effective exposure element for comparison.

Recommended Action: Consider the availability of exposure data and track it along with the other crash data to help prioritize potential locations for safety improvements.

2.8 Field Assessments and Road Safety Audits

Local road practitioners should always consider conducting field assessments in conjunction with their collection of crash data to help identify problem locations. An assessment can be as informal as driving, walking or virtually viewing the road network looking for evidence of roadway crashes. Ideally, informal field assessments are to be performed by multidisciplinary teams that include a traffic safety expert, law enforcement personnel, and others. The team can visit several sites and document evidence of crashes or deficiencies on the roadway or roadside, including: damaged trees or fences, skid marks, ruts on the shoulder, car parts on the shoulder, and/or pavement drop-offs. This information, along with observations of actual driver-behavior, can be used to develop recommendations for improvement.

Field reviews can also be more formalized such as in conducting a Road Safety Audit (RSA). A RSA is a formal safety performance examination of an existing or future road by an independent, multidisciplinary team. The team examines and reports on existing or potential road safety issues and identifies opportunities for safety improvements for all road users. Agencies considering RSAs for the first time are encouraged to consider requesting support from FHWA. For more information on FHWA's free RSA support, go to their website at: http://safety.fhwa.dot.gov/rsa/.

Informal field assessments and more formal RSAs provide an opportunity for local safety practitioners to gather and summarize all of the information sources discussed in Section 2. They can also be used to identify potential project delivery obstacles. The field assessments/RSAs should identify major environmental, right-of-way, infrastructure, and operational issues that need to be considered when applying countermeasures.

Recommended Action: Consider completing formal or informal field assessments and RSAs at certain locations to help ensure all relevant information is collected and available for the safety practitioners to complete their safety analysis and identify the most appropriate countermeasures. It's recommended that local agencies develop simple straightforward criteria on when one of these will be undertaken. The information gathered during the assessments should be added to the agency's tracking spreadsheet, as discussed in section 2.

3. Safety Data Analysis

Proactive safety analysis will assist in making informed decisions on the type, deployment levels, and locations for safety countermeasures. This builds on the previous discussions on information sources that identify safety issues. 'Safety Data Analysis' is one of the most critical steps in an agency's overall proactive safety analysis approach. Ideally, agencies regularly analyze the safety data for their entire roadway networks to identify and prioritize the locations with the most severe safety issues. This step is often skipped by agencies reacting to a recent tragic crash and the corresponding public outcry, which may leave their most critical safety locations undetected.

As agencies analyze their safety data, they will need to select the implementation approach that most effectively address the safety issues identified; Systemic Approach, Spot Location Approach, Comprehensive Approach, or a combination of these approaches. For example, if a high number of crashes are occurring at a particular curve or along a short segment of roadway, a spot treatment may be appropriate. However, systemic treatment of multiple locations experiencing similar crash types may be necessary and most beneficial for reducing overall fatalities and injuries. These implementation approaches were described in Section 1.5. With all of the approaches, safety practitioners should be looking for patterns in the crash data and not just the total number of crashes. These patterns include: types of crashes, severity of crashes, mode of travel, pavement conditions, time of day, etc. Identifying and analyzing the patterns in the crash data will help ensure the most appropriate countermeasure is selected and the safety problems are effectively addressed.

3.1 Quantitative Analysis

Crash data analysis is used to determine the extent of the roadway safety issues, the priority for application of scarce resources, and the selection of appropriate countermeasures. The two main quantitative analysis methods for roadway crashes are crash frequency and crash rate.

Crash Frequency

Crash frequency is defined as the number of crashes occurring within a determined study area. A practitioner can determine crash volumes using methods discussed in Section 2, including: State crash database (SWITRS), TIMS, local agency crash databases, law enforcement crash reports, pin-maps, etc. The practitioner should analyze the data to identify locations and crash characteristics with the highest frequency. There are numerous methods to assist practitioners in this process. Each agency will have their own preferred methods for initially selecting their top priority locations. The following are a few examples of the methods used to determine Crash Frequency:

- Summarize the crashes by attributes such as type, severity and location to identify patterns in the crash data and the most significant problem locations.
  - Top 10 (or 20) lists of intersections and roadway segments. It is common to weight more severe crashes higher in this process.

- Spatially display the sites on a pin-map or a GIS software package.
    - For small or rural agencies with lower volume roadways, network-wide pin-maps may be all that is needed to identify the highest priority locations.
- Develop collision diagrams showing the direction of movement of vehicles, types of crashes, and pedestrians involved in the crashes.

As stated earlier, this manual acknowledges many local agency safety practitioners may have their preferred methods for completing these analyses. For those agencies that do not and for those willing to try something new, Caltrans recommends using the TIMS website along with the processes outlined in this document to complete these analyses.

Once the crash frequency information is collected and displayed, the practitioner can complete a methodical analysis by geographic area, route, or a cluster analysis to determine which locations have experienced a high or moderate level of crashes. The resulting crash information can be further analyzed for recurring patterns or events. As agencies consider their locations with high levels of crashes, they should understand the overall random nature of crashes and the concept of "regression to the mean", as discussed in Section 2. Otherwise, if the natural variations in crash occurrence are not accounted for, a site might be selected for study when the number of crashes is randomly high, or overlooked when the number of crashes is randomly low.

Crash Rate

Crash rate analysis can be a useful tool to determine how a specific roadway or segment compares with similar roadway types on the network. A simple count of the number of crashes can be inadequate when comparing multiple roadways of varying lengths and/or traffic volume. Local agencies are also encouraged to compare their crashes with those occurring in similar areas around the state; doing so will help in determining just how severe the number and types of crashes are in the local area. When working with limited budgets, Crash Rates are often used to prioritize locations for safety improvements that will achieve the greatest safety benefits with limited resources. Where traffic volume data is unavailable, other information can be used to provide exposure information. One often-used factor is the length of the roadway segment on each route studied. Comparing the number of roadway crashes per mile or per intersection can help an agency identify potential opportunities to improve safety. The FHWA Roadway Departure Safety and Intersection Safety manuals include the following formulas for calculating crash rates on roadway segments and intersections:

The crash rate for crashes on a roadway is calculated as:

R = (C x 100,000,000) / (V x 365 x N x L)

Where:

R = Crash rate for the road segment expressed as crashes per 100 million vehicle-miles of travel,
C = Total number of crashes in the study period
V = Traffic volumes using Average Annual Daily Traffic (AADT) volumes
N = Number of years of data
L = Length of the roadway segment in miles

The crash rate for crashes at an intersection is calculated as:

R = (1,000,000 x C) / (365 x N x V)

Where:

R = Crash rate for the intersection expressed as crashes per million entering vehicles (MEV)
C= Total number of intersection-related crashes in the study period
N = Number of years of data
V = Traffic volumes entering the intersection daily

Similar to Crash Frequency, there are numerous methods for local safety practitioners to utilize Crash Rate in their safety data analysis and each will have their own preferred methods for initially selecting their top priority locations. The following are a few examples:

- Top 10 (or 20) lists of roadway segments with the highest crashes in relationship to roadway length, traffic volumes, and/or population density.
- Top 10 (or 20) lists of intersections, sorted by crash rate.
- Top 10 (or 20) lists of the highest volume intersections, sorted by crash frequency or rate.

Even though crash frequency and crash rate are helpful for local agency safety practitioners to effectively rank their most critical locations for improvements, the lack of reliable statewide traffic volumes for all roadway types precludes Caltrans from using the crash rate methodology in their statewide project scoring and ranking processes for the HSIP (discussed in more detail in Section 5).

Recommended Action: Complete a quantitative analysis of the roadway data using both Crash Frequency and Crash Rate methodologies. Safety practitioners should look for patterns in the crash data, including: types of crashes, severity of crashes, mode of travel, pavement conditions, roadway characteristics, time of day, intersection control, etc.

3.2 Qualitative Analysis

Qualitative analysis considers the physical characteristics of the roadway network, through the examination of maps, photographs, and field assessments. Certain roadway infrastructure characteristics relate to design standard and compliance issues and should continually be identified and upgraded on a network-wide basis (e.g., signing and pavement delineation characteristics relating to CA-MUTCD compliance as discussed in more detail below). Other roadway characteristics are more important as they relate to locations with high crash frequencies and rates (e.g., well defined pedestrian paths crossing the roadway or a high number of utility poles/fixed objects adjacent to the edge of travel way). All of these characteristics should to be accounted for in an agency's proactive safety analysis.

Ensuring Compliance with CA-MUTCD and Design Standards

It is important for local agencies to continually evaluate their roadways for compliance with the minimum safety standards. The CA-MUTCD provides the minimum standard requirements for traffic control devices on all public streets, highways, bikeways, and private roads open to public travel. In addition to ensuring compliance with the CA-MUTCD, geometric standards should be evaluated as they relate to sight distance, curve radius, and intersection skew angle and roadway standards for lane width, shoulder width, clear recovery zone, and super-elevation. Many local agencies have their own specific roadway design standards, while others rely on Caltrans' Highway Design Manual[7], FHWA's "Green Book" policy manual[8] and PEDSAFE guide[9], and AASHTO's Roadside Design Guide[10]. If the traffic control devices or roadway geometry are not in compliance, appropriate devices/countermeasures should be installed. Non-compliance is an important consideration that can affect road safety and may have liability implications for a jurisdiction. Using CA-MUTCD compliant devices results in uniformity among California roadways and serves to meet road user expectations.

Field Assessments

While the qualitative analysis of compliance issues should continually occur on a network-wide basis, a qualitative analysis should also occur for each of the locations and corridors identified as a result of a 'Quantitative Analysis'. The consideration of roadway infrastructure characteristics in conjunction with crash frequency or crash rate gives a more complete picture of overall safety and should be used in an agency's identification and prioritization process for locations needing safety improvements. The qualitative assessment of HCCLs can be completed through the examination of maps and photographs, but the importance of in-field assessments by multi-disciplinary teams should not be underestimated. In some cases, field reviews of all potential project locations may not be practical, so safety practitioners are encouraged to utilize internet-mapping tools to view maps and photographs and virtually visit these sites from their offices.

Actual field visits or RSAs can be done at the highest priority locations before or during the countermeasure selection process. In many cases, field assessments are often the only way for practitioners to identify potential countermeasure implementation and project delivery obstacles. Without in-field assessments, right-of-way, infrastructure, and operational constraints can be overlooked, including: sensitive environmental resources (widening may not be feasible next to wetlands), roadway users (rumble strips may not be feasible on roadways with high bicycle volumes and narrow shoulders), or nearby roadway stakeholders (flashing beacons may be problematic for adjacent residents.) Assessments can provide critical information for local practitioners as they prioritize their crash locations and select countermeasures with the greatest potential for cost effective deployment.

Recommended Action: Incorporate qualitative analysis elements into agency's proactive analysis approach. Consider completing field assessments and RSAs to identify locations with roadway infrastructure characteristics that relate to both compliance issues and high crash frequencies/rates. As part of field assessments, common roadway and crash characteristics should be identified for the potential systemic deployment of countermeasures. Rather than reviewing all crash sites individually, agencies may find the use of Internet mapping tools offers significant time savings. For agencies without a preferred virtual field review method, the SafeTREC TIMS website automatically links the SWITRS crash locations to Google Maps and Google Street View.

Caltrans recommends all agencies complete both quantitative and qualitative analyses before starting their applications for HSIP program funding. The findings from these analyses should be documented in spreadsheets and/or pin-maps similar to the ones discussed in Section 2.

4. Countermeasure Selection

Once locations and crash problems are identified as illustrated in Sections 2 and 3, the safety practitioners will need to select the set of proposed safety improvements to reduce the likelihood of future crashes. Individual elements of standard safety improvements are referred to as countermeasures and most countermeasures have corresponding Crash Modification Factors (CMFs).

When applied correctly, CMFs can help agencies identify the expected safety impacts of installing various countermeasures to reduce crashes. CMFs are multiplicative factors used to estimate the expected number of crashes after implementing a given countermeasure at a specific site (the lower the CMF, the greater the expected reduction in crashes). Crash Reduction Factors (CRFs) are directly connected to the CMFs and are another indication of the effectiveness of a particular treatment, measured by the percentage of crashes the countermeasure is expected to reduce. The CRF for a countermeasure is defined mathematically as (1 – CMF) (the higher the CRF, the greater the expected reduction in crashes). <u>*NOTE: Given that CRF values can be more intuitive when analyzing roadways for potential "reductions" in crashes; this document shows CRF values in the countermeasure tables. The terms CMFs and CRFs are used interchangeably throughout the text of this section and in other sections of this document.*</u>

In an effort to stretch the limited highway safety funding, local transportation agencies are encouraged to identify and implement the optimal combination of countermeasures to achieve the greatest benefits. Combined with crash cost data and project cost information, CRFs can help safety practitioners compare the B/C ratio of multiple countermeasures and then choose the most appropriate application for their proposed safety improvement projects.

As agencies consider the overall scope/cost of their projects, they also need to consider the number of locations to which each countermeasure may be applied in order to maximize the B/C ratio and the overall effectiveness of their limited safety funding. For HCCLs with varying causes, the Spot Location Approach may be the most appropriate. In contrast, the Systemic Approach should be considered where a high proportion of similar crash types tend to occur at locations that share common geometric or operational elements. In these situations, installing the same low-cost safety countermeasure at multiple locations can increase the cost effectiveness of the safety improvement, allowing an increased number of treatments to be applied.

It is important to note that there are many safety issues and corresponding countermeasures that are more "maintenance" in nature (e.g., visibility issues relating to the need for brush clearing and roadway departure issues relating to the need to replace shoulder backing). As these issues are identified when investigating crash locations, it's expected that the local safety practitioners would take the necessary steps to remedy the situation in the short-term. For this reason, most of the common maintenance-type safety countermeasures are not included in this document.

4.1 Selecting Countermeasures and Crash Modification Factors / Crash Reduction Factors

Selecting an appropriate countermeasure and corresponding CMF is similar to choosing the right tool for a job. In some cases, a countermeasure and CMF may not be perfect, but will still work well enough to get the job done by providing a reasonable estimation of the countermeasure's effect. In other cases, using an improper countermeasure or CMF may do more harm than good. Applying a CMF that does not fit a specific situation may give a false sense of the countermeasure's safety effectiveness and may result in an increased safety problem.

The Federal Highway Administration (FHWA) is leading a concerted effort to develop information on CMFs and makes it available to State and local agencies to assist with highway safety planning. The CMF Clearinghouse, a free online database introduced in 2009 and accessible at http://www.cmfclearinghouse.org/, details the varying quality and reliability of CMFs available to transportation professionals.

FHWA has identified three main considerations to assure appropriate selection of CMFs for a given countermeasure: the **availability** of relevant CMFs, the **applicability** of available CMFs, and the **quality** of applicable CMFs. The following sections detail these considerations and describe how Caltrans recommended CRF and service life values meet these criteria.

Availability: The availability of a CMF that applies to a specific situation depends on whether research has been conducted to determine the safety effects of a particular countermeasure or combination of countermeasures, and whether researchers have documented it. The CMF Clearinghouse contains more than 2,900 CMFs and receives quarterly updates to include the latest research.

At this point, Caltrans has established a small subset of 82 countermeasures and a single CRF for each of these countermeasures that must be used when submitting applications for Caltrans statewide calls-for-projects. This methodology allows for a statewide data-driven process that facilitates a fair and accurate comparison of project applications. (The reason for limiting the number of countermeasures is further explained below under “applicability”).

Applicability: In general, once a local safety practitioner determines that one or more CMFs exist for a specific countermeasure, the next step is to determine which CMF is the most applicable. Applicability depends on how closely the CMF represents the situation to which it will be applied. Safety practitioners should evaluate the potentially applicable CMFs, eliminating any that are not appropriate for the situation. Practitioners should only choose the most appropriate CMFs for their specific project based on factors including but not limited to: urban areas vs. rural areas; low vs. high traffic volumes; 2-lane vs. 6-lane roadways; individual vs. combination treatments; signalized vs. non-signalized intersections; and minor crashes vs. fatal crashes. If practitioners choose to use a CMF outside the range of applicability, the safety effect will likely be over or underestimated.

The mix of countermeasures and CRFs included in this document is intended to meet Caltrans' goal for a data-driven award process for local agencies to follow that allows for a fair and accurate comparison of project applications. Where possible and appropriate, the CRF value intended for use in statewide calls-for-projects is based on research studies that specifically established the CRF to be used for 'all' project areas, roadway types, and traffic volumes. Where not all applicability factors have already been established by prior research, Caltrans worked closely with FHWA to approximate CRFs for countermeasures often utilized by local agencies.

Quality: Often a search of the CMF Clearing House results in multiple CMFs for the same countermeasure. A practitioner needs to examine the quality of each CMF. The quality of a CMF can vary greatly depending on several factors associated with the process of developing the CMF. The primary factors that determine the quality of a CMF are the study design, sample size, standard error, potential bias, and data source. The CMF Clearinghouse provides a star rating for each based on a scale of 1 to 5, where 5 indicates the highest quality. The most reliable CMFs in the HSM are indicated with a bold font.

Wherever possible, the CRFs included in this document are based on research that has a CMF Clearinghouse star rating of 3 or more. For countermeasures that do not have corresponding research of a star rating of 3 or more but were deemed important to provide flexibility to local practitioners, Caltrans worked closely with FHWA to establish CRFs based on the best available research.

4.2 List of Countermeasures

The list of countermeasures discussed in this section is not an all-inclusive list, and only includes those available in the Caltrans' HSIP Cycle 11 Call-for-projects. Only thoroughly researched countermeasures with a readiness to be applied by local agencies on a statewide basis are utilized. In addition, the California Local HSIP program places further restrictions on the eligibility of some countermeasures to meet the most critical needs on California local roadways. Practitioners are encouraged to utilize the FHWA CMF Clearinghouse for a more comprehensive list as they establish their local agency specific set of proposed improvements and prioritize their projects.

The countermeasures listed in the following three tables have been sorted into 3 categories: Signalized Intersection, Non-Signalized Intersection, and Roadway Segment. 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 also used in the HSIP Analyzer. When selecting countermeasures and CMFs 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.

Only Crash Types, CRFs, Expected Lives, and HSIP Funding Eligibility of the countermeasures for use in Caltrans local HSIP program are provided in this section. 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 reimbursement ratio for HSIP Cycle 11 Call-for-projects.
    - Eighty-one (81) 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".

The list of countermeasures presented in this section is intended to be a quick-reference summary. Appendix B of this manual provides more details on each of these countermeasures including Where to use, Why it works, General Qualities (Time, Cost and Effectiveness), and information from FHWA CMF Clearinghouse (Crash Types Addressed and range of Crash Reduction Factor).

Recommended Action: At this point, agencies should use all information and results obtained by completing the actions in Sections 2, 3 and 4 to select the appropriate countermeasures for their HCCLs and systemic improvements. As novice safety practitioners select countermeasures, they must realize that a reasonable level of traffic 'engineering judgment' is required and that this manual should not be used as a simple cheat-sheet for preparing and submitting applications for funding.

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	90%	Medium
NS02	Control	Convert to all-way STOP control (from 2-way or Yield control)	All	50%	10	90%	High
NS03	Control	Install signals	All	30%	20	90%	Low
NS04	Control	Convert intersection to roundabout (from all way stop)	All	Varies	20	90%	Low
NS05	Control	Convert intersection to roundabout (from stop or yield control on minor road)	All	Varies	20	90%	Low
NS05mr*	Control	Convert intersection to mini-roundabout	All	30%	20	90%	Medium
NS06	Operation/ Warning	Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	All	15%	10	90%	Very High
NS07	Operation/ Warning	Upgrade intersection pavement markings (NS.I.)	All	25%	10	90%	Very High
NS08	Operation/ Warning	Install Flashing Beacons at Stop-Controlled Intersections	All	15%	10	90%	High
NS09	Operation/ Warning	Install flashing beacons as advance warning (NS.I.)	All	30%	10	90%	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	90%	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.)	P & B	45%	20	90%	Medium
NS20PB	Ped and Bike	Install pedestrian crossing at uncontrolled locations (new signs and markings only)	P & B	25%	10	90%	High
NS21PB	Ped and Bike	Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)	P & B	35%	20	90%	Medium
NS22PB	Ped and Bike	Install Rectangular Rapid Flashing Beacon (RRFB)	P & B	35%	20	90%	Medium
NS23PB	Ped and Bike	Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))	P & B	55%	20	90%	Low

*CM NS05mr is a new countermeasure added for HSIP Cycle 11 Call-for-projects.

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	90%	Medium
S02	Signal Mod.	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number	All	15%	10	90%	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~~	~~90%~~	~~High~~
S05	Signal Mod.	Install emergency vehicle pre-emption systems	Emergency Vehicle	70%	10	90%	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	90%	High
S08	Signal Mod.	Convert signal to mast arm (from pedestal-mounted)	All	30%	20	90%	Medium
S09	Operation/ Warning	Install raised pavement markers and striping (Through Intersection)	All	10%	10	90%	Very High
S10	Operation/ Warning	Install flashing beacons as advance warning (S.I.)	All	30%	10	90%	Medium
S11	Operation/ Warning	Improve pavement friction (High Friction Surface Treatments)	All	55%	10	90%	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	90%	Low
S17PB	Ped and Bike	Install pedestrian countdown signal heads	P & B	25%	20	90%	Very High
S18PB	Ped and Bike	Install pedestrian crossing (S.I.)	P & B	25%	20	90%	High
S19PB	Ped and Bike	Pedestrian Scramble	P & B	40%	20	90%	High
S20PB	Ped and Bike	Install advance stop bar before crosswalk (Bicycle Box)	P & B	15%	10	90%	Very High
S21PB	Ped and Bike	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	P & B	60%	10	90%	Very High

*CM S04 has been deleted in HSIP Cycle 11 Call-for-projects.

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	90%	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	90%	Medium
R04	Remove/ Shield Obstacles	Install Guardrail	All	25%	20	90%	High
R05	Remove/ Shield Obstacles	Install impact attenuators	All	25%	10	90%	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	All	30%	20	90%	Medium
R14	Geometric Mod.	Road Diet (Reduce travel lanes and add a two way left-turn and bike lanes)	All	35%	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	90%	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	90%	Very High
R23	Operation/ Warning	Install chevron signs on horizontal curves	All	40%	10	90%	Very High
R24	Operation/ Warning	Install curve advance warning signs	All	25%	10	90%	Very High
R25	Operation/ Warning	Install curve advance warning signs (flashing beacon)	All	30%	10	90%	High
R26	Operation/ Warning	Install dynamic/variable speed warning signs	All	30%	10	90%	High
R27	Operation/ Warning	Install delineators, reflectors and/or object markers	All	15%	10	90%	Very High
R28	Operation/ Warning	Install edge-lines and centerlines	All	25%	10	90%	Very High
R29	Operation/ Warning	Install no-passing line	All	45%	10	90%	Very High
R30	Operation/ Warning	Install centerline rumble strips/stripes	All	20%	10	90%	High
R31	Operation/ Warning	Install edgeline rumble strips/stripes	All	15%	10	90%	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 and 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	90%	Medium
R38	Animal	Install animal fencing	Animal	80%	20	90%	Medium

5. Calculating the B/C Ratio and Comparing Projects

Practitioners need to consider the expected B/C ratio of their proposed projects. This is an important step in a proactive safety analysis process because it provides two key pieces of information: First, it defines the cost effectiveness of the proposed projects; and second, it gives the safety practitioner a means to help prioritize their safety projects both inside the agency's traffic safety section and against other proposed operational and maintenance projects competing for funding.

5.1 Estimate the Benefit of Implementing Proposed Improvements

Sections 2 through 4 provide the practitioner all the information needed to calculate the expected 'Benefit' of the proposed safety projects. The resulting expected benefit value is derived by applying the proposed countermeasures and corresponding CMFs to the expected crashes. It is of critical importance for the practitioner to understand that misapplication of a CMF will lead to misinformed decisions. Four main factors need to be considered when applying countermeasures and CMFs to calculate the expected benefit value: (1) how to estimate the number of expected crashes without treatment, (2) how to apply CMFs by type and severity, (3) how to apply multiple CMFs if multiple treatments are to be included in the same project, and (4) how to apply a benefit value by crash severity. The following text explains how these factors affect the expected benefit value in more detail.

Estimating expected crashes without treatment: Before applying CMFs, local safety practitioners first need to select countermeasures and CMFs. The CMF is applied to the expected safety performance (expected crashes) without any treatment in order to estimate the expected crashes with the treatment. The reduction in expected crashes multiplied by the expected costs per each crash gives the practitioner the expected benefit.

As mentioned earlier in this manual, the random nature of roadway crashes suggests that over time the number of crashes at any particular locations will change. This concept is known as "regression to the mean" and it gives rise to the concern that a site might be selected for study when the crashes are at a randomly high fluctuation, or overlooked from study when the site is at a randomly low fluctuation. The HSM presents several methods for estimating the expected safety performance of a roadway or intersection including the Empirical Bayes method, which combines observed information from the site of interest with information from similar sites to estimate the expected crashes without treatment. Another common way to minimize the impact of regression to the mean is to increase the number of years of crash data being analyzed.

For statewide calls-for-projects, Caltrans strives to ensure that all projects are fairly ranked based on a consistent statewide approach. Given this, Caltrans has avoided using methodology requiring agencies to mathematically adjust their crash data (e.g., Empirical Bayes) and instead has opted to use 5 years of "observed crashes" in estimating "expected crashes."

Applying CMFs by type and severity: Section 4.1 of this manual discusses the application of CMFs and the need for them to represent the situation to which they will be applied. It also stresses the need for practitioners to choose the most appropriate CMFs for their specific project. In many circumstances, estimating the change in crashes by type and severity is useful; however, local safety practitioners only can use this approach when CMFs exist for the specific crash types and severities in question. If practitioners choose to use a CMF outside the range of applicability, the safety effect may be over- or underestimated. (For example: past research relating to installing a channelized left turn lane, has estimated CMFs as high as 68% for Right-Angle crashes of all severities and as low as 11% for Rear-End crashes with severities of only fatal and injury).

Applying multiple CMFs: In real-world scenarios, transportation agencies commonly install more than one countermeasure per project as part of their safety improvement program. This leads to the question, "What is the safety effect of the combined countermeasures?" The calculation methods that Transportation agencies use include: applying the CMF for the single countermeasure expected to achieve the greatest reduction, applying CMFs separately by crash type and summing them to get a project-level effect, and applying CMFs based on a review of crash patterns, etc. Regardless of the specific method employed, “engineering judgment” is required when combining multiple CMFs and it is important for local agencies to apply their method consistently throughout their analysis to ensure a fair comparison of projects.

One common practice is to assume that CMFs are multiplicative when they are applied to the same set of crash data. In other words, each successive countermeasure will achieve an additional benefit when implemented in combination with other countermeasures. The multiplicative method is a common, generally accepted method and is presented in the HSM and in the CMF Clearinghouse. This method is also used in the HSIP calls-for-projects.

To allow agencies maximum flexibility in combining countermeasures and locations into a single project while ensuring all projects can be consistently ranked on a statewide basis, Caltrans only allows up to three (3) individual countermeasures can be utilized in the B/C ratio for a project location site. The CMFs are multiplicative if there are multiple countermeasures, i.e. each successive countermeasure will achieve an additional benefit based on the remainder of the crashes after the effect of the prior countermeasures, not the original number of the crashes.

More information on these requirements and procedures are provided in the documents (Application Form Instructions, etc.) for each call-for-projects.

Applying benefit value by crash severity: The last step in estimating the overall benefit of a proposed improvement project is to multiply the expected reduction in crashes by a generally accepted value for the “cost” of crashes. In other words, the expected “benefit” value for a project is actually the expected “reduction in costs” value from reducing future crashes. There are many sources for the costs of crashes (e.g., HSM, FHWA & National Safety Council) and some of the sources vary widely depending on how they account for the economic value of a life and when the numbers were last updated.

When calculating the "benefit" to be used in calculating an improvement's B/C ratio, it is important for the practitioner to consider whether a total benefit value for the "life" of the improvement is needed or if the benefit value should be annualized (i.e., benefit per year). Whichever method is used to calculate the overall cost of the improvements must also be used for calculating the benefit.

Caltrans has currently chosen to use published Cost-of-Crash values from the first edition of the HSM and increase the values by 4% annually. These values may be updated in the future, when updated cost-of-crash values are published by FHWA or another national source. The specific values for each of the crash severities and the formulas uses to calculate the total benefit are shown in Appendix D.

Recommended Action: Prepare Total Benefit estimates for the proposed projects being evaluated in the proactive safety analysis.

5.2 Estimate the Cost of Implementing Proposed Improvements

After calculating the expected benefit of the proposed safety projects, the next step for the practitioner is to develop an estimate of the Total Project Costs. These costs need to include both the construction costs and the project development and administration costs. The most common approach to estimating construction costs is through an "Engineer's Cost Estimate." A Template for Detailed Engineer's Estimate and Cost Breakdown by Countermeasures is included in the HSIP funding application website. When calculating the administration costs for a project, the complexity of the improvements must be accounted for: Low-cost countermeasures, typically used in the Systemic Approach, often have minimal environmental and right-of-way impacts and require minimal design effort. In contrast, many medium to high cost improvements tend to have greater impacts to the environment and right-of-way and require significant design efforts. It's crucial to account for these differences to accurately determine the true B/C ratio of the projects and prioritize them correctly.

When an agency is initially evaluating several potential locations and countermeasures as part of their proactive safety analysis or in preparing for Caltrans call-for-projects, they should consider first using rough 'ballpark' cost estimates using previous projects that had similar scope, if possible. Ballpark cost estimates can allow the practitioner to quickly establish B/C ratios for all of their potential projects and identify the projects with high cost effectiveness and with a reasonable chance of receiving HSIP funding in a Caltrans call-for-projects.

Recommended Action: Prepare 'Total Project Cost' estimates for the proposed projects being evaluated in the proactive safety analysis.

5.3 Calculate the B/C Ratio

In general, the B/C ratio is calculated by taking a project's overall benefit (as calculated in Section 5.1) and dividing it by the project's overall cost (as calculated in Section 5.2). There are, however, several methods and input-factors available for calculating a project's B/C ratio and practitioners may want to consider other methods as defined in the HSM.

Based on Caltrans' need for a fair, data-driven, statewide project selection process for HSIP call-for-projects, Caltrans requires the B/C ratio for all applications to be completed using the same process. Applicants must utilize the HSIP Analyzer to calculate the B/C ratio of the project. Additional details and formulas included in the calculation are included in this document as Appendix D.

Recommended Action: Calculate the B/C ratio for each of the proposed projects being evaluated in the proactive safety analysis.

5.4 Compare B/C Ratios and Consider the Need to Reevaluate Project Elements

By implementing a comprehensive proactive safety analysis approach, agencies will likely identify more potential safety projects than they can fund and deliver. It will be important for an agency to prioritize their projects internally before funding is sought. It is not uncommon for projects to have a B/C ratio as low as 0.1 or as high as 100. Once the relative cost effectiveness of an agency's potential projects has been established, the projects with low to mid-ranged B/C ratios should be reassessed. Projects with very low initial B/C ratios may be dropped while projects with low to mid ranged B/C ratios may be redefined by changing the limits of the proposed improvements to focus on higher crash locations or incorporating lower-cost countermeasures. This reiterative process is illustrated in Figure 1 in Section 1 of this document.

At the conclusion of this step, the local agency should have several potential safety projects ready to move into the project development and construction phases. Ideally, there will be a variety of low cost safety projects and potentially a few higher cost roadway reconstruction projects. How each local agency prioritizes their list of safety improvements will vary, but projects with the highest B/C ratios should generally have a high overall priority. It should be understood that available funding will play a key role in local agency prioritization (e.g., higher-cost projects may have to wait for funding to become available while low-cost improvements with lower B/C ratios can be constructed with in-house maintenance crews), but in the goal of maximizing overall safety benefits, the role of politics and public influence should be minimized.

Recommended Action: Compare, reevaluate, and prioritize the potential safety projects. Consider changing the project limits to maximize the number of fatal and injury crashes addressed within the limits. Consider lower cost countermeasures in areas where high and medium cost countermeasures resulted in low B/C ratios.

6. Identifying Funding and Construct Improvements

Funding strategies for implementing safety projects need to vary as widely as local agency's roadway types, project costs, and proposed improvements. At this point in the proactive safety analysis process, local agencies should have several potential safety projects ready to move into the project development and construction phases. There are likely a wide range of 'approaches' to fund each of these projects. This section of the document discusses some of the most common approaches.

6.1 Existing Funding for Low-cost Countermeasures

For projects utilizing low-cost countermeasures, the total project cost may be low enough that the agency can construct the project using its existing roadway funding by utilizing the ongoing activities of their roadway maintenance staff and equipment. Other low-cost projects (e.g., overlays, sealcoats, drainage, signing, and striping projects) may be more important to incorporate into larger maintenance projects. It is common for agencies to have 1-, 5-, and 10-year plans for making these standard maintenance improvements. With upfront planning and coordination between agency staff, the low-cost safety projects identified through the proactive safety analysis can be incorporated with minimal costs to an agency's maintenance program. Maximizing the cost effectiveness of the program may even allow the transportation managers to justify increasing the funding for their overall roadway maintenance program.

In addition to their maintenance program, transportation managers should also strategically seek out planned capital improvement and development projects that can incorporate low and medium cost countermeasures identified in their safety analysis. Local agencies may also find opportunities to partner with private enterprises and insurance companies to fund special safety projects that further both organizations' strategic goals.

Recommended Action: Survey planned maintenance, developer and capital projects to determine whether they overlap any of the proposed safety projects. Where projects overlap, leverage the existing funding sources to include safety countermeasures.

6.2 HSIP and Other Funding Sources

In addition to the HSIP Program, the Division of Local Assistance's web site includes several other Caltrans administered funding programs:
https://dot.ca.gov/programs/local-assistance

Recommended Action: Consider all potential funding opportunities to incorporate the identified safety countermeasures.

6.3 Project Development and Construction Considerations

In general, roadway safety projects don't garner the same level of attention from decision makers, media, elected officials, and the general public, that large operational and development-driven projects do. As a result, local safety practitioners and project sponsors often find their projects have difficulty in competing for the agencies' limited project delivery resources. Establishing and implementing a comprehensive safety analysis process can assist safety practitioners in delivering their safety programs in many ways, including:

- Credibility and awareness to individual projects and delivery schedules.
- Increased stakeholders tracking and delivery of a project when low-cost improvements are incorporated into ongoing maintenance and capital projects.
- An increased focus on low-cost countermeasures typically corresponds to projects with less environmental, right-of-way and other impacts; resulting in projects that have streamlined project delivery processes and short construction schedules.

Recommended Action: Safety practitioners should follow their safety projects all the way through the project delivery and construction process. In addition, they should establish a safety program delivery plan that brings awareness and support to the expedited delivery of safety projects. Where possible, safety practitioners should involve the media and even consider having their own program intended to "toot their own safety-horn."

7. Evaluation of Improvements

Evaluation of the effectiveness of roadway treatments following installation should be used to guide future decisions regarding roadway countermeasures. Field reviews should also be conducted shortly after the project is completed to insure the project is operating as intended.

A record of crash history and countermeasure installation forms the foundation for assessing how well the implemented strategies have performed. An important database to maintain is a current list of installed countermeasures with documented “when/where/why” information. Periodic assessments will provide the necessary information to make informed decisions on whether each countermeasure contributed to an increase in safety, whether the countermeasure could or should be installed at other locations, and which factors may have contributed to each countermeasure’s success.

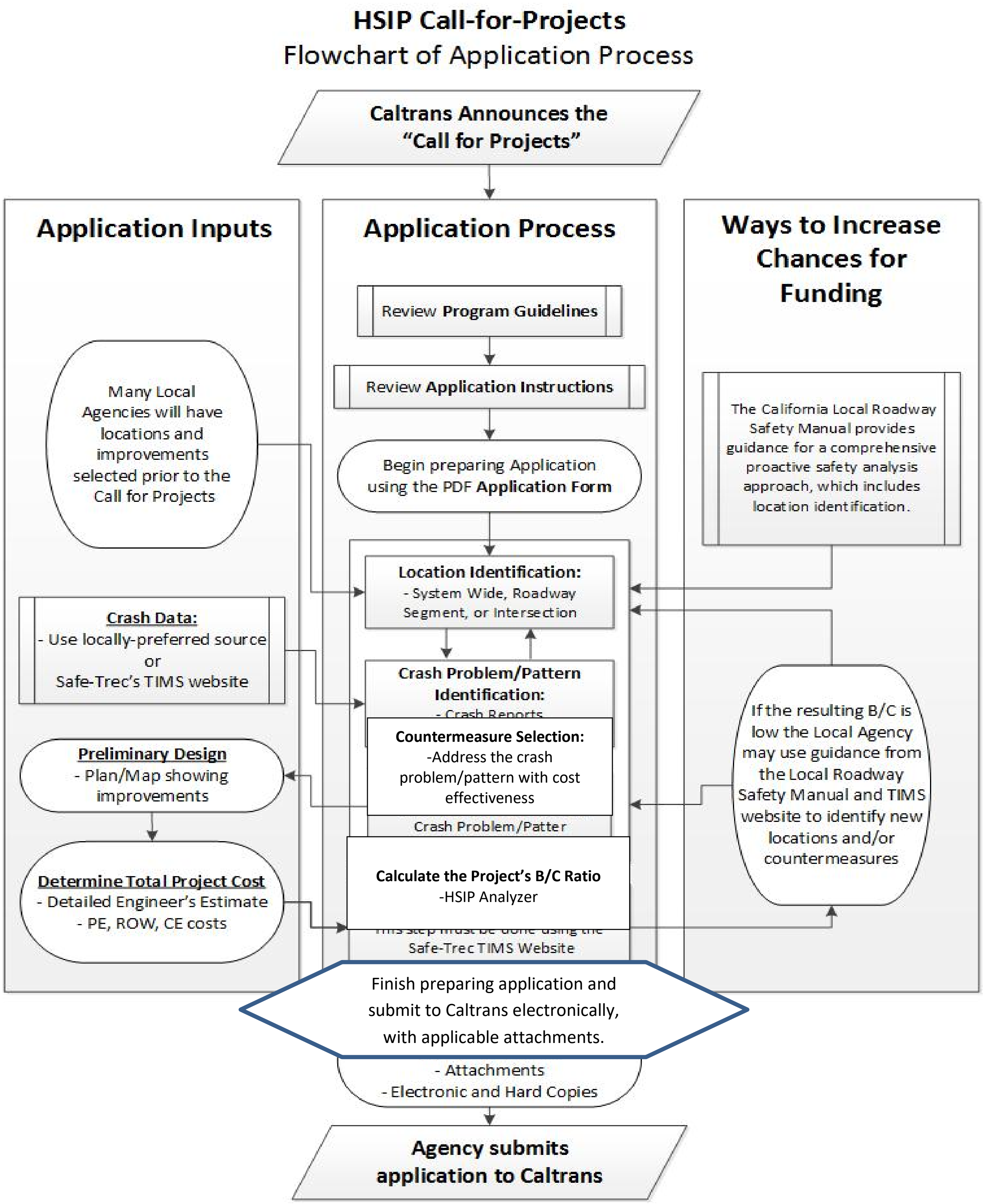
In order to perform the assessment, it is necessary to collect the required information for a certain period after strategies have been deployed at the locations. The time period varies, but whenever possible, 3 to 5 years is recommended to reduce the effects of the random nature of roadway crashes (i.e., Regression to the Mean). The information required may consist of public input and complaints, police reports, observations from maintenance crews, and local and State crash data.

It is important to keep the list of safety installations up-to-date since it will serve as a record of countermeasure deployment history (see table below for an example). By using this type of system, assessment dates can be scheduled to review the crashes and other pertinent information on segments where roadway countermeasures have been installed. Making “after” assessments will inform the practitioner on the effectiveness of past improvements and can provide data to help justify the value of continuing and expanding the local agency’s safety program in the future.

Location	Type of Countermeasure Installed	Date Installed	Crashes Before (Duration and Severity)	Crashes After (Duration and Severity)	Comments

<u>Recommended Action:</u> Develop a spreadsheet or database to track future safety project installations and record 3 or more years of “before” and “after” crash information at those locations. Once safety countermeasures are constructed, schedule and track assessment dates to ensure they happen.

Appendix A: HSIP Call-for-Projects Process



Appendix B: Detailed Tables of Countermeasures

The intent of the information contained in this appendix is to provide local agency safety practitioners with a list of effective countermeasures that are appropriate remedies to many common safety issues. The tables in Section 4.2 present a quick summary of the specific values that the Caltrans Division of Local Assistance uses to assess and select projects for its calls- for-projects. In addition to the same information as in Section 4.2, this appendix also includes notes for Caltrans HSIP calls-for-projects and "General information" regarding where the countermeasure should be used, why it works, the general qualities that can be used to suggest the potential complexity of installation, and information from FHWA CMF Clearinghouse on the type of crashes where the countermeasure is best used and a range of their expected overall effectiveness.

The countermeasures have been sorted into 3 categories: Signalized Intersection, Non-Signalized Intersection, and Roadway Segment. Pedestrian and bicycle related countermeasures have been included in each of these categories.

Caltrans gives careful consideration to the fair application of its calls-for-projects process. Starting in 2012, the award of safety funding has been solely based on a determined benefit-to-cost ratio for each project. The fixed set of countermeasures and CRFs included in these tables are intended to allow for all projects to be evaluated consistently and fairly throughout the project selection process. However, at this time, there are no CRFs/CMFs available for several safety improvements, such as: "dynamic/variable speed regulatory signs", "non-motorized signs and markings (regulatory and warning)", "Square-up (reduce curve radius) turn lanes" and non-infrastructure elements. These safety improvement items can be included in project applications, but they will not be included into the B/C ratio calculations, unless the safety improvements meet the intent of other separate countermeasures included in the attached lists. Caltrans is interested in adding these countermeasures (and many others) to these tables once CRFs/CMFs have been established. Caltrans will continue to periodically update this list of allowable countermeasures and CRFs as new safety research data becomes available. With this in mind, Caltrans is interested in feedback and suggestions from local agency safety practitioners on the overall countermeasure list as well as specific details of individual countermeasures, including locally developed safety effectiveness information.

Caltrans used the following references to assist its team in developing the information shown in the following tables. Safety Practitioners are encouraged to utilize these references for a more expansive list of countermeasures and CRFs / CMFs.

The Crash Modification Factors Clearinghouse
https://www.cmfclearinghouse.org/

NCHRP Report 500 Series: Volumes 4, 5, 6, 7, 10, 12, 13, and others
https://www.trb.org/Main/Blurbs/152868.aspx

Highway Safety Manual (HSM)
http://www.highwaysafetymanual.org

Pedestrian and Bicycle - Tools to Diagnose and Solve the Problem
https://safety.fhwa.dot.gov/ped_bike/tools_solve/

FHWA Local and Rural Road / Training, Tools, Guidance and Countermeasures for Locals
https://safety.fhwa.dot.gov/local_rural/training/

For each countermeasure (CM):

(Title) CM No., CM Name

- CM No. is
  - S01 through S21PB for Intersection Countermeasures – Signalized,
  - NS01 through NS23PB for Intersection Countermeasures – Unsignalized, or
  - R01 through R38 for Roadway Countermeasures.

For HSIP Calls-for-projects:

- **Funding Eligibility -** 90% or 50%.
- **Crash Types Addressed -** “All”, “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.
- **Notes -** Specific requirements are provided for utilizing the countermeasure on applications for Caltrans statewide calls-for-projects.
-

General Information:

- **Where to use** – Roadway segments and intersections with specific common characteristics can be addressed with similar countermeasures that are most effective.
- **Why it works** – A discussion of the benefit of a countermeasure is important to determine its appropriateness in addressing certain roadway crash types at areas with specific issues as determined by the data and roadway features.
- **General Qualities (Time, Cost and Effectiveness)** – This category is more subjective and can vary substantially. ‘Time’ refers to the approximate relative time it can take to implement the countermeasure. Costs can vary considerably due to local conditions, so ‘cost’ represents the relative cost of applying a countermeasure. A relative overall ‘effectiveness’ is also provided for some countermeasures. All of this subjective information may not be applicable to the unique circumstances for the agency and should not be utilized without verification by the safety practitioner.

- **FHWA CMF Clearinghouse**

- **Crash Types Addressed** – In order to effectively reduce the number and severity of roadway crashes, it is necessary to match countermeasures to the crash types they are intended to address. Depending on the type of problem, one or more of a range of countermeasures could be the most effective way to reduce the number and severity of future crashes.
- **Crash Reduction Factor** – The crash reduction factor (CRF) is an indication of the effectiveness of a particular treatment, measured by the percentage of crashes it is expected to reduce. Note: As mentioned earlier in this section, the effectiveness of a countermeasure can also be expressed as a Crash Modification Factor (CMF), which is defined mathematically as 1 – CRF. However, this document uses CRFs as they can be more insightful when analyzing roadways for potential "reductions" in crashes. There is a range of CRF values that exist for each of the countermeasures (or similar countermeasures). The range of CRFs is provided to give local safety practitioners a clear understanding that they may need to go to the FHWA CMF Clearinghouse to find the most appropriate countermeasure and CRF for their specific projects and local prioritization.

B.1 Intersection Countermeasures – Signalized

S01, Add intersection lighting (Signalized Intersection => S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	"night" crashes	40%	20 years
Notes:	This CM only applies to "night" crashes (all types) occurring within limits of the proposed roadway lighting 'engineered' area.		

General information				
Where to use:				
Signalized intersections that have a disproportionate number of night-time crashes and do not currently provide lighting at the intersection or at its approaches. Crash data should be studied to ensure that safety at the intersection could be improved by providing lighting (this strategy would be supported by a significant number of crashes that occur at night).				
Why it works:				
Providing lighting at the intersection itself, or both at the intersection and on its approaches, improves the safety of an intersection during nighttime conditions by (1) making drivers more aware of the surroundings at an intersection, which improves drivers' perception-reaction times, (2) enhancing drivers' available sight distances, and (3) improving the visibility of non-motorists. Intersection lighting is of particular benefit to non-motorized users. Lighting not only helps them navigate the intersection, but also helps drivers see them better.				
General Qualities (Time, Cost and Effectiveness):				
A lighting project can usually be completed relatively quickly, but generally requires at least 1 year to implement because the lighting system must be designed and the provision of electrical power must be arranged. The provision of lighting involves both a fixed cost for lighting installation and an ongoing maintenance and power cost which results in a moderate to high cost. Some locations can result in high B/C ratios, but due to higher costs, these projects often result in medium to low B/C ratios.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Night, All	CRF:	20-74%

S02, Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the upgraded signals. This CM does not apply to improvements like "battery backup systems", which do not provide better intersection/signal visibility or help drivers negotiate the intersection (unless applying past crashes that occurred when the signal lost power). If new signal mast arms are part of the proposed project, CM "S2" should not be used and the signal improvements would be included under CM "S7".		

General information				
Where to use:				
Signalized intersections with a high frequency of right-angle and rear-end crashes occurring because drivers are unable to see traffic signals sufficiently in advance to safely negotiate the intersection being approached. Signal intersection improvements include new LED lighting, signal back plates, retro-reflective tape outlining the back plates, or visors to increase signal visibility, larger signal heads, relocation of the signal heads, or additional signal heads.				
Why it works:				
Providing better visibility of intersection signals aids the drivers' advance perception of the upcoming intersection. Visibility and clarity of the signal should be improved without creating additional confusion for drivers.				
General Qualities (Time, Cost and Effectiveness):				
Installation costs and time should be minimal as these type strategies are classified as low cost and implementation does not typically require the approval process normally associated with more complex projects. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in low to moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Rear-End, Angle	CRF:	0-46%

S03, Improve signal timing (coordination, phases, red, yellow, or operation)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
50%	All	15%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new signal timing. For projects coordination signals along a corridor, the crashes related to side-street movements should not be applied. This CM does not apply to projects that only 'study' the signal network and do not make physical timing changes, including corridor operational studies and improvements to Traffic Operation Centers (TOCs). In Caltrans calls for projects, this CM has a HSIP reimbursement ratio of 50%, considering that it will improve the signal operation rather than merely the safety.		

General information				
Where to use:				
Locations that have a crash history at multiple signalized intersections. Signalization improvements may include adding phases, lengthening clearance intervals, eliminating or restricting higher-risk movements, and coordinating signals at multiple locations. Understanding the corridor or roadway's crash history can provide insight into the most appropriate strategy for improving safety.				
Why it works:				
Certain timing, phasing, and control strategies can produce multiple safety benefits. Sometimes capacity improvements come along with the safety improvements and other times adverse effects on delay or capacity occur. Corridor improvements often have the highest benefit but may take longer to implement. Projects focused on capacity improvements (without a separate focus on signal timing safety needs) may not result in a reduction in future crashes.				
General Qualities (Time, Cost and Effectiveness):				
In general, these low-cost improvements to multiple signalized intersections can be implemented in a short time. Typically these low cost improvements are funded through local funding by local maintenance crews. However, some projects requiring new interconnect infrastructure can have moderate to high costs making them more appropriate to seek state or federal funding. The expected effectiveness of this CM must be assessed for each individual project.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	0 - 41%

~~S04, Provide Advanced Dilemma-Zone Detection for high speed approaches~~

~~For HSIP Cycle 11 Call-for-projects~~			
~~Funding Eligibility~~	~~Crash Types Addressed~~	~~CRF~~	~~Expected Life~~
~~90%~~	~~All~~	~~40%~~	~~10 years~~
~~Notes:~~	~~This CM only applies to crashes occurring on the approaches / influence area of the new detection and signal timing.~~		

~~General information~~				
~~**Where to use:**~~				
~~More rural/remote areas that have a high frequency of right-angle and rear-end crashes. The Advanced Dilemma-Zone Detection system enhances safety at signalized intersections by modifying traffic control signal timing to reduce the number of drivers that may have difficulty deciding whether to stop or proceed during a yellow phase. This may reduce rear-end crashes associated with unsafe stopping and angle crashes due to illegally continuing into the intersection during the red phase.~~				
~~**Why it works:**~~				
~~Clearance times provide safe, orderly transitions in ROW assignment between conflicting streams of traffic. An Advanced Dilemma-Zone Detection system has several benefits relative to traditional multiple detector systems, which have upstream detection for vehicles in the dilemma zone but do not take the speed or size of individual vehicles into account. These benefits include: Reducing the frequency of red-light violations; Reducing the frequency of crashes associated with the traffic signal phase change (for example, rear-end and angle crashes); Reducing delay and stop frequency on the major road and a reduction in overall intersection delay.~~				
~~**General Qualities (Time, Cost and Effectiveness):**~~				
~~Installation costs should be low and the time to implement short. Additional modifications to the traffic signal controller may also necessary. In general, This CM can be very effective and can be considered on a systematic approach. Video detection equipment is now available for this purpose, making installation and maintenance more efficient.~~				
~~**FHWA CMF Clearinghouse:**~~	~~Crash Types Addressed:~~	~~All~~	~~CRF:~~	~~39%~~

S05, Install emergency vehicle pre-emption systems

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Emergency Vehicle - only	70%	10 years
Notes:	This CM only applies to "E.V." crashes occurring on the approaches / influence area of the new pre-emption system.		

General information				
Where to use:				
Corridors that have a history of crashes involving emergency response vehicles. The target of this strategy is signalized intersections where normal traffic operations impede emergency vehicles and where traffic conditions create a potential for conflicts between emergency and nonemergency vehicles. These conflicts could lead to almost any type of crash, due to the potential for erratic maneuvers of vehicles moving out of the paths of emergency vehicles				
Why it works:				
Providing emergency vehicle preemption capability at a signal or along a corridor can be a highly effective strategy in two ways; any type of crash could occur as emergency vehicles try to navigate through intersections and as other vehicles try to maneuver out of the path of the emergency vehicles. In addition, a signal preemption system can decrease emergency vehicle response times therefore decreasing the time in receiving emergency medical attention, which is critical in the outcome of any crash. When data is not available for past crashes with emergency vehicles, an agency may consider combining the E.V. pre-emption improvements into a comprehensive project that also makes significant signal hardware and/or signal timing improvements.				
General Qualities (Time, Cost and Effectiveness):				
Costs for installation of a signal preemption system will vary from medium to high, based upon the number of signalized intersections at which preemption will be installed and the number of emergency vehicles to be outfitted with the technology. The number of detectors, a requirement for new signal controllers, and the intricacy of the preemption system could increase costs. This CM is considered systemic as it is usually implemented on a corridor-basis.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Emergency Vehicle - only	CRF:	70%

S06, Install left-turn lane and add turn phase (signal has no left-turn lane or phase before)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	55%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new left turn lanes. This CM does NOT apply to converting a single-left into double-left turn.		

General information				
Where to use:				
Intersections that do not currently have a left turn lane or a related left-turn phase that are experiencing a large number of crashes. Many intersection safety problems can be traced to difficulties in accommodating left-turning vehicles, in particular where there is currently no accommodation for left turning traffic. A key strategy for minimizing collisions related to left-turning vehicles (angle, rear-end, sideswipe) is to provide exclusive left-turn lanes and the appropriate signal phasing, particularly on high-volume and high-speed major-road approaches. Agencies need to document their consideration of the MUTCD, Section 4D.19 guidelines; the section on implementing protected left-turn phases.				
Why it works:				
Left-turn lanes allow separation of left-turn and through-traffic streams, thus reducing the potential for rear-end collisions. Left-turn phasing also provides a safer opportunity for drivers to make a left-turn. The combination of left-turn storage and a left turn signal has the potential to reduce many collisions between left-turning vehicles and through vehicles and/or non-motorized road users.				
General Qualities (Time, Cost and Effectiveness):				
Implementation time may vary from months to years. At some locations, left-turn lanes can be quickly installed simply by restriping the roadway. At other locations, widening of the roadway, acquisition of additional right-of-way, and extensive environmental processes may be needed. Such projects require a substantial time for development and construction. Costs are highly variable and range from very low to high. Installing a protected left turn lane and phase where none exists results in a high Crash Reduction Factor and is often highly effective.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	17 - 58 %

S07, Provide protected left turn phase (left turn lane already exists)

For HSIP Cycle 11 Call-for-projects				
Funding Eligibility		Crash Types Addressed	CRF	Expected Life
90%		All	30%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new left turn phases. This CM does NOT apply to converting a single-left into double-left turn (unless the single left is unprotected and the proposed double left will be protected).			

General information				
Where to use:				
Signalized intersections (with existing left turns pockets) that currently have a permissive left-turn or no left-turn protection that have a high frequency of angle crashes involving left turning, opposing through vehicles, and non-motorized road users. A properly timed protected left-turn phase can also help reduce rear-end and sideswipe crashes between left-turning vehicles and the through vehicles as well as vehicles behind them. Protected left-turn phases are warranted based on such factors as turning volumes, delay, visibility, opposing vehicle speed, distance to travel through the intersection, presence of non-motorized road users, and safety experience of the intersections. Agencies need to document their consideration of the MUTCD, Section 4D.19 guidelines; the section on implementing protected left-turn phases.				
Why it works:				
Left turns are widely recognized as the highest-risk movements at signalized intersections. Providing Protected left-turn phases (i.e., the provision for a specific phase for a turning movement) for signalized intersections with existing left turn pockets significantly improve the safety for left-turn maneuvers by removing the need for the drivers to navigate through gaps in oncoming/opposing through vehicles. Where left turn pockets are not protected, the pedestrian and bicyclist crossing phase often conflicts with these left turn maneuvers. Drivers focused on navigating the gaps of oncoming cars may not anticipate and/or perceive the non-motorized road users.				
General Qualities (Time, Cost and Effectiveness):				
If the existing traffic signal only requires a minor modification to allow for a protected left-turn phase, then the cost would also be low. The time to implement this countermeasure is short because there is no actual construction that has to take place. In-house signal maintainers can perform this operation once the proper signal phasing is determined so the cost is low. In addition, the countermeasure is tried and proven to be effective. Has the potential of being applied on a systemic/systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Rear-End, Sideswipe, Broadside	CRF:	16 - 99%

S08, Convert signal to mast arm (from pedestal-mounted)

For HSIP Cycle 11 Call-for-projects				
Funding Eligibility		Crash Types Addressed	CRF	Expected Life
90%		All	30%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the converted signal heads that are relocated from median and/or outside shoulder pedestals to signal heads on master arms over the travel-lanes. Projects using CM "S7" should not also apply "S2" in the B/C calc.			

General information				
Where to use:				
Intersections currently controlled by pedestal mounted traffic signals (in medians and/or on outside shoulder) that have a high frequency of right-angle and rear-end crashes occurring because drivers are unable to see traffic signals in advance to safely negotiate the intersection. Intersections that have pedestal-mounted signals may have poor visibility and can result in vehicles not being able to stop in time for a signal change. Care should be taken to place the new signal heads (with back plates) as close to directly over the center of the travel lanes as possible.				
Why it works:				
Providing better visibility of intersection signs and signals aids the drivers' advance perception of the upcoming intersection. Visibility and clarity of the signal should be improved without creating additional confusion or distraction for drivers.				
General Qualities (Time, Cost and Effectiveness):				
Dependent on the scope of the project. Costs are generally moderate for this type of project. There is usually no right-of-way costs, minimal roadway reconstruction costs, and a shorter project development timeline. At the same time, new mast arms can be expensive. Some locations can result in high B/C ratios, but due to moderate costs, some locations may result in medium to low B/C ratios.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Rear-End, Angle	CRF:	12 - 74%

S09, Install raised pavement markers and striping (Through Intersection)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	10%	10 years
Notes:	This CM only applies to crashes occurring in the intersection and influence areas of the new pavement markers and/or markings.		

General information

Where to use:

Intersections where the lane designations are not clearly visible to approaching motorists and/or intersections noted as being complex and experiencing crashes that could be attributed to a driver's unsuccessful attempt to navigate the intersection. Driver confusion can exist in regard to choosing the proper turn path or where through-lanes do not line up. This is especially relevant at intersections where the overall pavement area of the intersection is large, and multiple turning lanes are involved or other unfamiliar elements are presented to the driver.

Why it works:

Adding clear pavement markings can guide motorists through complex intersections. When drivers approach and traverse through complex intersections, drivers may be required to perform unusual or unexpected maneuvers. Providing more effective guidance through an intersection will minimize the likelihood of a vehicle leaving its appropriate lane and encroaching upon an adjacent lane.

General Qualities (Time, Cost and Effectiveness):

Costs of implementing this strategy will vary based on the scope and number of applications. Applying raised pavement markers is relatively low cost but can be variable and determined largely by the material used for pavement markings (paint, thermoplastic, epoxy, RPMs etc.). When using this type delineators, an issue of concern is the cost-to-service-life of the material. (Note: When HSIP safety funding is used for these installations in high-wear-locations, the local agency is expected to maintain the improvement for a minimum of 10 years.) When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Wet, Night, All	CRF:	10 - 33%

S10, Install flashing beacons as advance warning (S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new flashing beacons.		

General information

Where to use:

At signalized intersections with crashes that are a result of drivers being unaware of the intersection or are unable to see the traffic control device in time to comply.

Why it works:

Increased driver awareness of an approaching signalized intersection and an increase in the driver's time to react. Driver awareness of both downstream intersections and traffic control devices is critical to intersection safety. Crashes often occur when the driver is unable to perceive an intersection, signal head or the back of a stopped queue in time to react. Advance flashing beacons can be used to supplement and call driver attention to intersection control signs. Most advance warning flashing beacons can be powered by solar, thus reducing the issues relating to power source.

General Qualities (Time, Cost and Effectiveness):

Before choosing this CM, the agency needs to confirm the ability to provide power to the site (solar may be an option). Flashing beacons can be constructed with minimal design, environmental and right-of-way issues and have relatively low costs. This combined with a relatively high CRF, can result in high B/Cs for locations with a history of crashes and lead to a high effectiveness.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Rear End, Angle	CRF:	36 - 62%

S11, Improve pavement friction (High Friction Surface Treatments)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	55%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the improved friction overlay. This CM is not intended to apply to standard chip-seal or open-graded maintenance projects for long segments of corridors or structure repaving projects intended to fix failed pavement.		

General information				
Where to use:				
Nationally, this countermeasure is referred to as "High Friction Surface Treatments" or HFST. Signalized Intersections noted as having crashes on wet pavements or under dry conditions when the pavement friction available is significantly less than needed for the actual roadway approach speeds. This treatment is intended to target locations where skidding and failure to stop is determined to be a problem in wet or dry conditions and the target vehicle is unable to stop due to insufficient skid resistance.				
Why it works:				
Improving the skid resistance at locations with high frequencies of wet-road crashes and/or failure to stop crashes can result in reductions of 50 percent for wet-road crashes and 20 percent for total crashes. Applying HFST can double friction numbers, e.g. low 40s to high 80s. This CM represents a special focus area for both FHWA and Caltrans, which means there are extra resources available for agencies interested in more details on High Friction Surface Treatment projects.				
General Qualities (Time, Cost and Effectiveness):				
This strategy can be relatively inexpensive and implemented in a short timeframe. The installation would be done by either agency personnel or contractors and can be done by hand or machine. In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Wet, Night, ALL	CRF:	10 - 62 %

S12, Install raised median on approaches (S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new raised median. All new raised medians funded with HSIP funding should not include the removal of the existing roadway structural section and should be doweled into the existing roadway surface. This requirement is being implemented to maximize the safety-effectiveness of the limited HSIP funding and to minimize project impacts. Landscaping, if included in the project, is considered non-participating.		

General information				
Where to use:				
Intersections noted as having turning movement crashes near the intersection as a result of insufficient access control. Application of this CM should be based on current crash data and a clearly defined need to restrict or accommodate the movement.				
Why it works:				
Raised medians next to left-turn lanes at intersections offer a cost-effective means for reducing crashes and improving operations at higher volume intersections. The raised medians prohibit left turns into and out of driveways that may be located too close to the functional area of the intersection.				
General Qualities (Time, Cost and Effectiveness):				
Raised medians at intersections may be most effective in retrofit situations where high volumes of turning vehicles have degraded operations and safety, and where more extensive CMs would be too expensive because of limited right-of-way and the constraints of the built environment. The result is This CM can be very effective and can be considered on a systematic approach. Raised medians can often be installed directly over the existing pavement. When agencies opt to install landscaping in conjunction with new raised medians, the portion of the cost for landscaping and other non-safety related items that exceeds 10% of the project total cost is not federally participated and must be funded by the applicant.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle	CRF:	21 -55 %

S13PB, Install pedestrian median fencing on approaches

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring on the approaches/influence area of the new pedestrian median fencing.		

General information				
Where to use:				
Signalized Intersections with high pedestrian-generators nearby (e.g. transit stops) may experience a high volumes of pedestrians J-walking across the travel lanes at mid-block locations instead of walking to the intersection and waiting to cross during the walk-phase. When this safety issue cannot be mitigated with signal timing and shoulder/sidewalk treatments, then installing a continuous pedestrian barrier in the median may be a viable solution.				
Why it works:				
Adding pedestrian median fencing has the opportunity to enhance pedestrian safety at locations noted as being problematic involving pedestrians running/darting across the roadway outside the intersection crossings. Pedestrian median fencing can significantly reduce this safety issue by creating a positive barrier, forcing pedestrians to the designated pedestrian crossing.				
General Qualities (Time, Cost and Effectiveness):				
Costs associated with this strategy will vary widely depending on the type and placement of the median fencing. Impacts to transit and other land uses may need to be considered and controversy can delay the implementation. In general, this CM can be effective as a spot-location approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	25- 40%

S14, Create directional median openings to allow (and restrict) left-turns and U-turns (S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	20 years
Notes:	This CM only applies to crashes occurring in the intersection / influence area of the new directional openings.		

General information				
Where to use:				
Crashes related to turning maneuvers include angle, rear-end, pedestrian, and sideswipe (involving opposing left turns) type crashes. If any of these crash types are an issue at an intersection, restriction or elimination of the turning maneuver may be the best way to improve the safety of the intersection.				
Why it works:				
Restricting turning movement into and out of an intersection can help reduce conflicts between through and turning traffic. The number of access points, coupled with the speed differential between vehicles traveling along the roadway, contributes to crashes. Affecting turning movements by either allowing them or restricting them, based on the application, can ensure safe movement of traffic.				
General Qualities (Time, Cost and Effectiveness):				
Turn prohibitions that are implemented by closing a median opening can be implemented quickly. The cost of this strategy will depend on the treatment. Impacts to businesses and other land uses must be considered and controversy can delay the implementation. In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	51%

S15, Reduced Left-Turn Conflict Intersections (S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	20 years
Notes:	This CM only applies to crashes occurring in the intersection / influence area of the new Reduced Left-Turn Conflict.		

General information

Where to use and Why it works:

Reduced left-turn conflict intersections are geometric designs that alter how left-turn movements occur in order to simplify decisions and minimize the potential for related crashes. Two highly effective designs that rely on U-turns to complete certain left-turn movements are known as the restricted crossing U-turn (RCUT) and the median U-turn (MUT).

Restricted Crossing U-turn (RCUT):

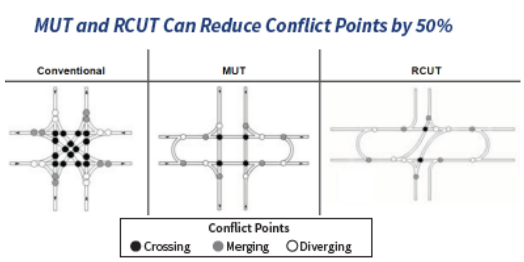
The RCUT intersection modifies the direct left-turn and through movements from cross-street approaches. Minor road traffic makes a right turn followed by a U-turn at a designated location (either signalized or unsignalized) to continue in the desired direction.

The RCUT is suitable for a variety of circumstances, including along rural, high-speed, four-lane, divided highways or signalized routes. It also can be used as an alternative to signalization or constructing an interchange. RCUTs work well when consistently used along a corridor, but also can be used effectively at individual intersections.

Median U-turn (MUT)

The MUT intersection modifies direct left turns from the major approaches. Vehicles proceed through the main intersection, make a U-turn a short distance downstream, followed by a right turn at the main intersection. The U-turns can also be used for modifying the cross-street left turns.

The MUT is an excellent choice for heavily traveled intersections with moderate left-turn volumes. When implemented at multiple intersections along a corridor, the efficient two-phase signal operation of the MUT can reduce delay, improve travel times, and create more crossing opportunities for pedestrians and bicyclists.



General Qualities (Time, Cost and Effectiveness):

Implementing this strategy may take from months to years, depending on whether additional R/W is required. Such projects require a substantial time for development and construction. Costs are highly variable and range from very low to high. The expected effectiveness of this CM must be assessed for each individual location.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle/Left-turn/Rear-End/All	CRF:	34.8-100%

S16, Convert intersection to roundabout (from signal)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	Varies	20 years
Notes:	This CM only applies to crashes occurring in influence area of the new roundabout. This CM is not intended for mini-roundabouts. The benefit of this CM is calculated using Caltrans procedure. The CRF is dependent on the ADT, project location (Rural/Urban) and the roundabout type (1 lane or 2 lanes). The benefit comes from both the reduction in the number and the severity of the crashes.		

General information				
Where to use:				
Signalized intersections that have a significant crash problem and the only alternative is to change the nature of the intersection itself. Roundabouts can also be very effective at intersections with complex geometry and intersections with frequent left-turn movements.				
Why it works:				
The types of conflicts that occur at roundabouts are different from those occurring at conventional intersections; namely, conflicts from crossing and left-turn movements are not present in a roundabout. The geometry of a roundabout forces drivers to reduce speeds as they proceed through the intersection. This helps keep the range of vehicle speed narrow, which helps reduce the severity of crashes when they do occur. Pedestrians only have to cross one direction of traffic at a time at roundabouts, thus reducing their potential for conflicts.				
General Qualities (Time, Cost and Effectiveness):				
Provision of a roundabout requires substantial project development. The need to acquire right-of-way is likely and will vary from site to site and depends upon the geometric design. These activities may require up to 4 years or longer to implement. Costs are variable, but construction of a roundabout to replace an existing signalized intersection are relatively high. The result is this CM may have reduced relative-effectiveness compared to other CMs.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	35 - 67%

S17PB, Install pedestrian countdown signal heads

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	25%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection/crossing with the new countdown heads.		

General information				
Where to use:				
Signals that have signalized pedestrian crossing with walk/don't walk indicators and where there have been pedestrian vs. vehicle crashes.				
Why it works:				
A pedestrian countdown signal contains a timer display and counts down the number of seconds left to finish crossing the street. Countdown signals can reassure pedestrians who are in the crosswalk when the flashing "DON'T WALK" interval appears that they still have time to finish crossing. Countdown signals begin counting down either when the "WALK" or when the flashing "DON'T WALK" interval appears and stop at the beginning of the steady "DON'T WALK" interval. These signals also have been shown to encourage more pedestrians to use the pushbutton rather than jaywalk.				
General Qualities (Time, Cost and Effectiveness):				
Costs and time of installation will vary based on the number of intersections included in this strategy and if it requires new signal controllers capable of accommodating the enhancement. When considered at a single location, these low cost improvements are usually funded through local funding by local crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	25%

S18PB, Install pedestrian crossing (S.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	25%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection/crossing with the new crossing. This CM is not intended to be used for high-cost aesthetic enhancements to intersection crosswalks (i.e. stamped concrete or stamped asphalt).		

General information				
Where to use:				
Signalized Intersections with no marked crossing and pedestrian signal heads, where pedestrians are known to be crossing intersections that involve significant turning movements. They are especially important at intersections with (1) multiphase traffic signals, such as left-turn arrows and split phases, (2) school crossings, and (3) double-right or double-left turns. At signalized intersections, pedestrian crossings are often safer when the left turns have protected phases that do not overlap the pedestrian walk phase.				
Why it works:				
Adding pedestrian crossings has the opportunity to enhance pedestrian safety at locations noted as being problematic. Nearly one-third of all pedestrian-related crashes occur at or within 50 feet of an intersection. Of these, 30 percent may involve a turning vehicle. Another 22 percent of pedestrian crashes involve a pedestrian either running across the intersection or darting out in front of a vehicle whose view was blocked just prior to the impact. Finally, 16 percent of these intersection-related crashes occur because of a driver violation (e.g., failure to yield right-of-way). When agencies opt to install aesthetic enhancement to intersection crosswalks like stamped concrete/asphalt, the project design and construction costs can significantly increase. For HSIP applications, these costs must be accounted for in the B/C calculation, but these costs (over standard crosswalk markings) must be tracked separately and are not federally reimbursable and will increase the agency's local-funding share for the project costs.				
General Qualities (Time, Cost and Effectiveness):				
Costs associated with this strategy will vary widely, depending if curb ramps and sidewalk modifications are required with the crossing. When considered at a single location, these low cost improvements may be funded through local funding by local crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate to high cost projects that are appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	25%

S19PB, Pedestrian Scramble

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	40%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection with the new pedestrian crossing.		

General information				
Where to use:				
Pedestrian Scramble is a form of pedestrian "WALK" phase at a signalized intersection in which all vehicular traffic is required to stop, allowing pedestrians/bicyclists to safely cross through the intersection in any direction, including diagonally. Pedestrian Scramble may be considered at signalized intersections with very high pedestrian/bicycle volumes, e.g. in an urban business district.				
Why it works:				
Pedestrian Scramble has been shown to reduce injury risk and increase bicycle ridership due to its perceived safety and comfort.				
General Qualities (Time, Cost and Effectiveness):				
Not involving any additional R/W, Pedestrian Scramble should not require a long development process and should be implemented reasonably soon. A systemic approach may be used in implementing this CM, resulting in cost efficiency with low to moderate cost.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	-10% to 51%

S20PB, Install advance stop bar before crosswalk (Bicycle Box)

For HSIP Cycle 11 Call-for-projects				
Funding Eligibility		Crash Types Addressed	CRF	Expected Life
90%		Pedestrian and Bicycle	15%	10 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection-crossing with the new advanced stop bars.			

General information				
Where to use:				
Signalized Intersections with a marked crossing, where significant bicycle and/or pedestrians volumes are known to occur.				
Why it works:				
Adding advance stop bar before the striped crosswalk has the opportunity to enhance both pedestrian and bicycle safety. Stopping cars well before the crosswalk provides a buffer between the vehicles and the crossing pedestrians. It also allows for a dedicated space for cyclists, making them more visible to drivers (This dedicated space is often referred to as a bike-box.)				
General Qualities (Time, Cost and Effectiveness):				
Costs and time of installation will vary based on the number of intersections included in this strategy and if it requires new signal controllers capable of accommodating the enhancement. When considered at a single location, these low cost improvements are usually funded through local funding by local crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	35%

S21PB, Modify signal phasing to implement a Leading Pedestrian Interval (LPI)

For HSIP Cycle 11 Call-for-projects				
Funding Eligibility		Crash Types Addressed	CRF	Expected Life
90%		Pedestrian and Bicycle	60%	10 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersections with signalized pedestrian crossing with the newly implemented Leading Pedestrian Interval (LPI).			

General information				
Where to use:				
Intersections with signalized pedestrian crossing that have high turning vehicles volumes and have had pedestrian vs. vehicle crashes.				
Why it works:				
A leading pedestrian interval (LPI) gives pedestrians the opportunity to enter an intersection 3-7 seconds before vehicles are given a green indication. With this head start, pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn left. LPIs provide (1) increased visibility of crossing pedestrians; (2) reduced conflicts between pedestrians and vehicles; (3) Increased likelihood of motorists yielding to pedestrians; and (4) enhanced safety for pedestrians who may be slower to start into the intersection.				
General Qualities (Time, Cost and Effectiveness):				
Costs for implementing LPIs are very low, since only minor signal timing alteration is required. This makes it an easy and inexpensive countermeasure that can be incorporated into pedestrian safety action plans or policies and can become routine agency practice. When considered at a single location, the LPI is usually local-funded. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	59%

B.2 Intersection Countermeasures – Non-signalized

NS01, Add intersection lighting (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Night	40%	20 years
Notes:	This CM only applies to "night" crashes (all types) occurring within limits of the proposed roadway lighting 'engineered' area.		

General information

Where to use:

Non-signalized intersections that have a disproportionate number of night-time crashes and do not currently provide lighting at the intersection or at its approaches. Crash data should be studied to ensure that safety at the intersection could be improved by providing lighting (this strategy would be supported by a significant number of crashes that occur at night).

Why it works:

Providing lighting at the intersection itself, or both at the intersection and on its approaches, improves the safety of an intersection during nighttime conditions by (1) making drivers more aware of the surroundings at an intersection, which improves drivers' perception-reaction times, (2) enhancing drivers' available sight distances, and (3) improving the visibility of non-motorists. Intersection lighting is of particular benefit to non-motorized users as lighting not only helps them navigate the intersection, but also helps drivers see them better.

General Qualities (Time, Cost and Effectiveness):

A lighting project can usually be completed relatively quickly, but generally requires at least 1 year to implement because the lighting system must be designed and the provision of electrical power must be arranged. The provision of lighting involves both a fixed cost for lighting installation and an ongoing maintenance and power cost. For rural intersections, studies have shown the installation of streetlights reduced nighttime crashes at unlit intersections and can be more effective in reducing nighttime crashes than either rumble strips or overhead flashing beacons. Some locations can result in high B/C ratios, but due to higher costs, these projects often result in medium to low B/C ratios.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Night, All	CRF:	25- 50%

NS02, Convert to all-way STOP control (from 2-way or Yield control)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	10 years
Notes:	This CM only applies to crashes occurring in the intersection and/or influence area of the new control. CA-MUTCD warrant must be met.		

General information

Where to use:

Unsignalized intersection locations that have a crash history and have no controls on the major roadway approaches. However, all-way stop control is suitable only at intersections with moderate and relatively balanced volume levels on the intersection approaches. Under other conditions, the use of all-way stop control may create unnecessary delays and aggressive driver behavior. MUTCD warrants should always be followed.

Why it works:

All-way stop control can reduce right-angle and turning collisions at unsignalized intersections by providing more orderly movement at an intersection, reducing through and turning speeds, and minimizing the safety effect of any sight distance restrictions that may be present. Advance public notification of the change is critical in assuring compliance and reducing crashes.

General Qualities (Time, Cost and Effectiveness):

The costs involved in converting to all-way stop control are relatively low. All-way stop control can normally be implemented at multiple intersections with just a change in signing on intersection approaches, and typically are very quick to implement. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Left-turn, Angle	CRF:	6 - 80%

NS03, Install signals

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	20 years
Notes:	This CM only applies to crashes occurring in the intersection and/or influence area of the new signals. **All new signals must meet MUTCD "safety" warrants: 4, 5 or 7.** Given the over-arching operational changes that occur when an intersection is signalized, no other intersection CMs can be applied to the intersection crashes in conjunction with this CM.		

General information				
Where to use:				
Traffic signals can be used to prevent the most severe type crashes (right-angle, left-turn). Consideration to signalize an unsignalized intersection should only be given after (1) less restrictive forms of traffic control have been utilized as the installation of a traffic signal often leads to an increased frequency of crashes (rear-end) on major roadways and introduces congestion and (2) signal warrants have been met. Refer to the CA MUTCD, Section 4C.01, Studies and Factors for Justifying Traffic Control Signals.				
Why it works:				
Traffic signals have the potential to reduce the most severe type crashes but will likely cause an increase in rear-end collisions. A reduction in overall injury severity is likely the largest benefit of traffic signal installation.				
General Qualities (Time, Cost and Effectiveness):				
Typical traffic signal costs fall in the medium to high category and are affected by application, type of signal and right-of-away considerations. Projects of this magnitude should only be considered after alternate and lesser means of correction have been evaluated. Some locations can result in high B/C ratios, but due to higher costs, these projects often result in medium to low B/C ratios.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	0 - 74%

NS04, Convert intersection to roundabout (from all way stop)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	Varies	20 years
Notes:	This CM only applies to crashes occurring in the intersection and/or influence area of the new control. The benefit of this CM is calculated using Caltrans procedure. The CRF is dependent on the ADT, project location (Rural/Urban) and the roundabout type (1 lane or 2 lanes). The benefit comes from both the reduction in the number and the severity of the crashes.		

General information				
Where to use:				
Intersections that have a high frequency of right-angle and left-turn type crashes. Whether such intersections have existing crash patterns or not, a roundabout provides an alternative to signalization. The primary target locations for roundabouts should be moderate-volume unsignalized intersections. Roundabouts may not be a viable alternative in many suburban and urban settings where right-of-way is limited.				
Why it works:				
Roundabouts provide an important alternative to signalized and all-way stop-controlled intersections. Modern roundabouts differ from traditional traffic circles in that they operate in such a manner that traffic entering the roundabout must yield the right-of-way to traffic already in it. Roundabouts can serve moderate traffic volumes with less delay than all-way stop-controlled intersections and provide fewer conflict points. Crashes at roundabouts tend to be less severe because of the speed constraints and elimination of left-turn and right-angle movements.				
General Qualities (Time, Cost and Effectiveness):				
Construction of roundabouts are usually relatively costly and major projects, requiring the environmental process, right-of-way acquisition, and implementation under an agency's long-term capital improvement program. (For this reason, roundabouts may not be appropriate for California's Federal Safety Programs that have relatively short delivery requirements.) Even with roundabouts higher costs, they still can have a relatively high effectiveness.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Left-turn, Angle	CRF:	12 - 78 %

NS05, Convert intersection to roundabout (from 2-way stop or Yield control)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	Varies	20 years
Notes:	This CM only applies to crashes occurring in the intersection and/or influence area of the new control. The benefit of this CM is calculated using Caltrans procedure. The CRF is dependent on the ADT, project location (Rural/Urban) and the roundabout type (1 lane or 2 lanes). The benefit comes from both the reduction in the number and the severity of the crashes.		

General information

Where to use:

Intersections that have a high frequency of right-angle and left-turn type crashes. Whether such intersections have existing crash patterns or not, a roundabout provides an alternative to signalization. The primary target locations for roundabouts should be moderate-volume unsignalized intersections. Roundabouts may not be a viable alternative in many suburban and urban settings where right-of-way is limited.

Why it works:

Roundabouts provide an important alternative to signalized and all-way stop-controlled intersections. Modern roundabouts differ from traditional traffic circles in that they operate in such a manner that traffic entering the roundabout must yield the right-of-way to traffic already in it. Roundabouts can serve moderate traffic volumes with less delay than all-way stop-controlled intersections and provide fewer conflict points. Crashes at roundabouts tend to be less severe because of the speed constraints and elimination of left-turn and right-angle movements.

General Qualities (Time, Cost and Effectiveness):

Construction of roundabouts are usually relatively costly and major projects, requiring the environmental process, right-of-way acquisition, and implementation under an agency's long-term capital improvement program. (For this reason, roundabouts may not be appropriate for California's Federal Safety Programs that have relatively short delivery requirements.) Even with roundabouts higher costs, they still can have a relatively high effectiveness.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Left-turn, Angle	CRF:	12 - 78 %

NS05mr, Convert intersection to mini-roundabout

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	20 years
Notes:	This CM only applies to crashes occurring in the intersection and/or influence area of the new control.		

General information

Where to use:

Mini-roundabouts are characterized by a small diameter (45-90 ft) and traversable islands (central island and splitter islands). Mini-roundabouts offer most of the benefits of regular roundabouts with the added benefit of a smaller footprint. They are best suited to environments where speeds are already low and environmental constraints would preclude the use of a larger roundabout. Mini-roundabouts are most effective in lower speed environments in which all approaching roadways have posted speed of 30 mph or less and an 85th-percentile speed of less than 35 mph near the proposed yield and/or entrance line. For any location with an 85th-percentile speed above 35 mph, the mini-roundabout can be included as part of a broader system of traffic calming measures to achieve an appropriate speed environment.

Why it works:

Mini-roundabouts may be an optimal solution for a safety or operational issue at an existing intersection where there is insufficient right-of-way for a standard roundabout installation. The benefits of mini-roundabouts are the Compact size, operational efficiency, traffic safety improvement and traffic Calming.

General Qualities (Time, Cost and Effectiveness):

Construction costs for mini-roundabouts vary widely depending upon the extent of sidewalk modifications or other geometric improvements and the types of materials used. In most cases, mini-roundabouts have been installed with little or no pavement widening and with only minor changes to curbs and sidewalks. Construction costs can be minimum for an installation consisting entirely of pavement markings and signage or moderate for mini-roundabouts that include raised islands and pedestrian improvements.

FHWA CMF Clearinghouse:	Crash Types Addressed:	NA	CRF:	NA

NS06, Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years
Notes:	This CM only applies to crashes occurring in the influence area of the new signs. The influence area must be determined on a location by location basis.		

General information				
Where to use:				
The target for this strategy should be approaches to unsignalized intersections with patterns of rear-end, right-angle, or turning collisions related to lack of driver awareness of the presence of the intersection.				
Why it works:				
The visibility of intersections and, thus, the ability of approaching drivers to perceive them can be enhanced by installing larger regulatory and warning signs at or prior to intersections. A key to success in applying this strategy is to select a combination of regulatory and warning sign techniques appropriate for the conditions on a particular unsignalized intersection approach.				
General Qualities (Time, Cost and Effectiveness):				
Signing improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of signs. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	11 - 55%

NS07, Upgrade intersection pavement markings (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new pavement markings. This CM is not intended to be used for general maintenance activities (i.e. the replacement of existing pavement markings in-kind) and must include upgraded safety features over the existing pavement markings and striping.		

General information				
Where to use:				
Unsignalized intersections that are not clearly visible to approaching motorists, particularly approaching motorists on the major road. The strategy is particularly appropriate for intersections with patterns of rear-end, right-angle, or turning crashes related to lack of driver awareness of the presence of the intersection. Also at minor road approaches where conditions allow the stop bar to be seen by an approaching driver at a significant distance from the intersection. Typical improvements include "Stop Ahead" markings and the addition of Centerlines and Stop Bars.				
Why it works:				
The visibility of intersections and, thus, the ability of approaching drivers to perceive them can be enhanced by installing appropriate pavement delineation in advance of and at intersections will provide approaching motorists with additional information at these locations. Providing visible stop bars on minor road approaches to unsignalized intersections can help direct the attention of drivers to the presence of the intersection. Drivers should be more aware that the intersection is coming up, and therefore make safer decisions as they approach the intersection.				
General Qualities (Time, Cost and Effectiveness):				
Pavement marking improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of markings. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding. Note: When federal safety funding is used for these installations in high-wear-locations, the local agency is expected to maintain the improvement for a minimum of 10 years.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	13 - 60%

NS08, Install Flashing Beacons at Stop-Controlled Intersections

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years
Notes:	This CM only applies to crashes occurring on the stop-controlled approaches / influence area of the new beacons.		

General information				
Where to use:				
Flashing beacons can reinforce driver awareness of the Non-Signalized intersection control and can help mitigate patterns of right-angle crashes related to stop sign violations. Post-mounted advanced flashing beacons or overhead flashing beacons can be used at stop-controlled intersections to supplement and call driver attention to stop signs.				
Why it works:				
Flashing beacons provide a visible signal to the presence of an intersection and can be very effective in rural areas where there may be long stretches between intersections as well as locations where night-time visibility of intersections is an issue.				
General Qualities (Time, Cost and Effectiveness):				
Flashing beacons can be constructed with minimal design, environmental and right-of-way issues and have relatively low costs. Before choosing this CM, the agency needs to confirm the ability to provide power to the site (solar may be an option). In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle, Rear-End	CRF:	5-34%

NS09, Install flashing beacons as advance warning (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new beacons placed in advance of the intersection.		

General information				
Where to use:				
Non-Signalized Intersections with patterns of crashes that could be related to lack of a driver's awareness of approaching intersection or controls at a downstream intersection.				
Why it works:				
Advance flashing beacons can be used to supplement and call driver attention to intersection control signs. Flashing beacons are intended to reinforce driver awareness of the stop or yield signs and to help mitigate patterns of crashes related to intersection regulatory sign violations. Most advance warning flashing beacons can be powered by solar, thus reducing the issues relating to power source.				
General Qualities (Time, Cost and Effectiveness):				
Use of flashing beacons requires minimal development process, allowing flashing beacons to be installed within a short time period. Before choosing this CM, the agency needs to confirm the ability to provide power to the site (solar may be an option). In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle, Rear-End	CRF:	36 - 62%

NS10, Install transverse rumble strips on approaches

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	20%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new rumble strips.		

General information
Where to use:
Transverse rumble strips are installed in the travel lane for the purposes of providing an auditory and tactile sensation for each motorist approaching the intersection. They can be used at any stop or yield approach intersection, often in combination with advance signing to warn of the intersection ahead. Due to the noise generated by vehicles driving over the rumble strips, care must be taken to minimize disruption to nearby residences and businesses.
Why it works:
When motorists are traveling along the roadway, they are sometimes unaware they are approaching an intersection. This is especially true on rural roads, as there may be fewer clues indicating an intersection ahead. Transverse rumble strips warn motorists that something unexpected is ahead that they need to pay attention to.
General Qualities (Time, Cost and Effectiveness):
Use of transverse rumble strips requires minimal development process, allowing transverse rumble strips to be installed within a short time period. In general, This CM can be very effective and can be considered on a systematic approach, although care should be taken to not over-use this CM. Note: When federal safety funding is used for these installations in high-wear-locations, the local agency is expected to maintain the improvement for a minimum of 10 years.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	0 - 35%

NS11, Improve sight distance to intersection (Clear Sight Triangles)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	20%	10 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the significantly improved new sight distance. Minor/incidental improvements to sight distance would not likely result in the CRF shown below.		

General information
Where to use:
Unsignalized intersections with restricted sight distance and patterns of crashes related to lack of sight distance where sight distance can be improved by clearing roadside obstructions without major reconstruction of the roadway.
Why it works:
Adequate sight distance for drivers at stop or yield-controlled approaches to intersections has long been recognized as among the most important factors contributing to overall safety at unsignalized intersections. By removing sight distance restrictions (e.g., vegetation, parked vehicles, signs, buildings) from the sight triangles at stop or yield-controlled intersection approaches, drivers will be able see approaching vehicles on the main line, without obstruction and therefore make better decisions about entering the intersection safely.
General Qualities (Time, Cost and Effectiveness):
Projects involving clearing sight obstructions on the highway right-of-way can typically be accomplished quickly, assuming the objects are readily moveable. Clearing sight obstructions on private property requires more time for discussions with the property owner. Costs will generally be low, assuming that in most cases the objects to be removed are within the right-of-way. In general, this CMs can be very effective and can be implemented by agencies' maintenance staff and/or implemented on a systematic approach. Usually only high-cost removals would be good candidates for Caltrans Federal Safety Funding. Note: When federal safety funding is used to remove vegetation that has the potential to grow back, the local agency is expected to maintain the improvement for a minimum of 10 years.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	11 - 56%

NS12, Improve pavement friction (High Friction Surface Treatments)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	55%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the improved friction overlay. This CM is not intended to apply to standard chip-seal or open-graded maintenance projects for long segments of corridors or structure repaving projects intended to fix failed pavement.		

General information				
Where to use:				
Nationally, this countermeasure is referred to as "High Friction Surface Treatments" or HFST. Non-signalized Intersections noted as having crashes on wet pavements or under dry conditions when the pavement friction available is significantly less than needed for the actual roadway approach speeds. This treatment is intended to target locations where skidding and failure to stop is determined to be a problem in wet or dry conditions and the target vehicle is unable to stop due to insufficient skid resistance.				
Why it works:				
Improving the skid resistance at locations with high frequencies of wet-road crashes and/or failure to stop crashes can result in reductions of 50 percent for wet-road crashes and 20 percent for total crashes. Applying HFST can double friction numbers, e.g. low 40s to high 80s. This CM represents a special focus area for both FHWA and Caltrans, which means there are extra resources available for agencies interested in more details on High Friction Surface Treatment projects.				
General Qualities (Time, Cost and Effectiveness):				
This strategy can be relatively inexpensive and implemented in a short timeframe. The installation would be done by either agency personnel or contractors and can be done by hand or machine. In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Wet, Night, ALL	CRF:	10 - 62 %

NS13, Install splitter-islands on the minor road approaches

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	40%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of **the new splitter island on the minor road approaches.**		

General information				
Where to use:				
Minor road approaches to unsignalized intersections where the presence of the intersection or the stop sign is not readily visible to approaching motorists. The strategy is particularly appropriate for intersections where the speeds on the minor road are high. In creation of a splitter island allows for an additional stop sign to be placed in the median for the minor approach.				
Why it works:				
The installation of splitter islands allows for the addition of a stop sign in the median to make the intersection more conspicuous. Additionally, the splitter island on the minor-road provides for a positive separation between turning vehicles on the through road and vehicles stopped on the minor road approach.				
General Qualities (Time, Cost and Effectiveness):				
Splitter islands at non-signalized intersections can usually be installed with minimal roadway reconstruction and relatively quickly. In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle, Rear-End	CRF:	35 - 100 %

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

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new raised median. All new raised medians funded with federal HSIP funding should not include the removal of the existing roadway structural section and should be doweled into the existing roadway surface. This requirement is being implemented to maximize the safety-effectiveness of the limited HSIP funding and to minimize project impacts. Landscaping, if included in the project, is considered non-participating.		

General information				
Where to use:				
Where related or nearby turning movements affect the safety and operation of an intersection. Effective access management is key to improving safety at, and adjacent to, intersections. The number of intersection access points coupled with the speed differential between vehicles traveling along the roadway often contributes to crashes. Any access points within 250 feet upstream and downstream of an intersection are generally undesirable.				
Why it works:				
Raised medians with left-turn lanes at intersections offer a cost-effective means for reducing crashes and improving operations at higher volume intersections. The raised medians also prohibit left turns into and out of driveways that may be located too close to the functional area of the intersection.				
General Qualities (Time, Cost and Effectiveness):				
Raised medians at intersections may be most effective in retrofit situations where high volumes of turning vehicles have degraded operations and safety, and where more extensive approaches would be too expensive because of limited right-of-way and the constraints of the built environment. Because raised medians limit property access to right turns only, the need for providing alternative access ways should be considered. In general, This CM can be very effective and can be considered on a systematic approach. When agencies opt to install landscaping in conjunction with new raised medians, the portion of the cost for landscaping and other non-safety related items that exceeds 10% of the project total cost is not federally participated and must be funded by the applicant.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	20 - 39 %

NS15, Create directional median openings to allow (and restrict) left-turns and u-turns (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	20 years
Notes:	This CM only applies to crashes occurring in the intersection / influence area of the new directional openings.		

General information				
Where to use:				
Crashes related to turning maneuvers include angle, rear-end, pedestrian, and sideswipe (involving opposing left turns) type crashes. If any of these crash types are an issue at an intersection, restriction or elimination of the turning maneuver may be the best way to improve the safety of the intersection. Because raised medians limit property access to right turns only, they should be used in conjunction with efforts to provide alternative access ways and promote driveway spacing objectives.				
Why it works:				
Agencies are increasingly using access management techniques on urban and suburban arterials to manage the number of conflicts experienced at an intersection. A key element of access management is to restrict certain movements, create directional median openings, or close median openings that are deemed too close to an intersection.				
General Qualities (Time, Cost and Effectiveness):				
Turn prohibitions that are implemented by closing a median opening can usually be implemented quickly. Costs are highly variable but in many cases could be considered low. In some cases this strategy may involve acquiring access or constructing replacement access; those actions will significantly increase the cost of the project. Impacts to businesses and other land uses must be considered and controversy can delay the implementation. In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	51%

NS16, Reduced Left-Turn Conflict Intersections (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	20 years
Notes:	This CM only applies to crashes occurring in the intersection / influence area of the new Reduced Left-Turn Conflict.		

General information

Where to use and Why it works:

Reduced left-turn conflict intersections are geometric designs that alter how left-turn movements occur in order to simplify decisions and minimize the potential for related crashes. Two highly effective designs that rely on U-turns to complete certain left-turn movements are known as the restricted crossing U-turn (RCUT) and the median U-turn (MUT).

Restricted Crossing U-turn (RCUT):

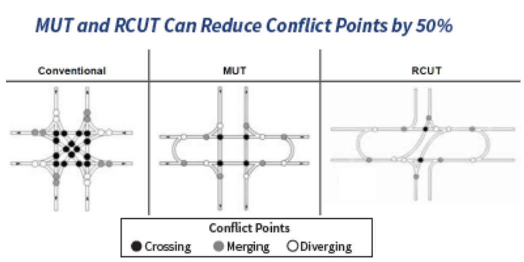
The RCUT intersection modifies the direct left-turn and through movements from cross-street approaches. Minor road traffic makes a right turn followed by a U-turn at a designated location (either signalized or unsignalized) to continue in the desired direction.

The RCUT is suitable for a variety of circumstances, including along rural, high-speed, four-lane, divided highways or signalized routes. It also can be used as an alternative to signalization or constructing an interchange. RCUTs work well when consistently used along a corridor, but also can be used effectively at individual intersections.

Median U-turn (MUT)

The MUT intersection modifies direct left turns from the major approaches. Vehicles proceed through the main intersection, make a U-turn a short distance downstream, followed by a right turn at the main intersection. The U-turns can also be used for modifying the cross-street left turns.

The MUT is an excellent choice for heavily traveled intersections with moderate left-turn volumes. When implemented at multiple intersections along a corridor, the efficient two-phase signal operation of the MUT can reduce delay, improve travel times, and create more crossing opportunities for pedestrians and bicyclists.



General Qualities (Time, Cost and Effectiveness):

Implementing this strategy may take from months to years, depending on whether additional R/W is required. Such projects require a substantial time for development and construction. Costs are highly variable and range from very low to high. The expected effectiveness of this CM must be assessed for each individual location.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Angle/Left-turn/Rear-End/All	CRF:	34.8-100%

NS17, Install right-turn lane (NS.I.)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	20%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new right-turn lanes. This CM is not eligible for use at existing all-way stop intersections.		

General information				
Where to use:				
Many collisions at unsignalized intersections are related to right-turn maneuvers. A key strategy for minimizing such collisions is to provide exclusive right-turn lanes, particularly on high-volume and high-speed major-road approaches. When considering new right-turn lanes, potential impacts to non-motorized users should be considered and mitigated as appropriate. When considering new right-turn lanes, potential impacts to non-motorized users should be considered and mitigated as appropriate.				
Why it works:				
The strategy is targeted to reduce the frequency of rear-end collisions resulting from conflicts between vehicles turning right and following vehicles and vehicles turning right and through vehicles coming from the left on the cross street. Right-turn lanes also remove slow vehicles that are decelerating to turn right from the through-traffic stream, thus reducing the potential for rear-end collisions. Right-turn lanes can increase the length of the intersection crossing and create an additional potential conflict point for non-motorized users.				
General Qualities (Time, Cost and Effectiveness):				
Implementing this strategy may take from months to years. At some locations, right-turn lanes can be quickly and simply installed by restriping the roadway. At other locations, widening of the roadway, acquisition of additional right-of-way, and extensive environmental processes may be needed. Such projects require a substantial time for development and construction. Costs are highly variable and range from very low to high. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	14 - 26 %

NS18, Install left-turn lane (where no left-turn lane exists)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	35%	20 years
Notes:	This CM only applies to crashes occurring on the approaches / influence area of the new left-turn lanes. This CM does NOT apply to converting a single-left into double-left turn. This CM is not eligible for use at existing all-way stop intersections.		

General information				
Where to use:				
Many collisions at unsignalized intersections are related to left-turn maneuvers. A key strategy for minimizing such collisions is to provide exclusive left-turn lanes, particularly on high-volume and high-speed major-road approaches. When considering new left-turn lanes, potential impacts to non-motorized users should be considered and mitigated as appropriate.				
Why it works:				
Adding left-turn lanes remove vehicles waiting to turn left from the through-traffic stream, thus reducing the potential for rear-end collisions. Because they provide a sheltered location for drivers to wait for a gap in opposing traffic, left-turn lanes may encourage drivers to be more selective in choosing a gap to complete the left-turn maneuver. This strategy may reduce the potential for collisions between left-turn and opposing through vehicles.				
General Qualities (Time, Cost and Effectiveness):				
Implementing this strategy may take from months to years. At some locations, left-turn lanes can be quickly and simply installed by restriping the roadway. At other locations, widening of the roadway, acquisition of additional right-of-way, and extensive environmental processes may be needed. Such projects require a substantial time for development and construction. Costs are highly variable and range from very low to high. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	9 -55 %

NS19PB, Install raised medians (refuge islands)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	45%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the crossing with the new islands. All new raised medians funded with federal HSIP funding should not include the removal of the existing roadway structural section and should be doweled into the existing roadway surface. This requirement is being implemented to maximize the safety-effectiveness of the limited HSIP funding and to minimize project impacts. Landscaping, if included in the project, is considered non-participating.		

General information

Where to use:

Intersections that have a long pedestrian crossing distance, a higher number of pedestrians, or a crash history. Raised medians decrease the level of exposure for pedestrians and allow pedestrians to concentrate on (or cross) only one direction of traffic at a time.

Why it works:

Raised pedestrian refuge islands, or medians at crossing locations along roadways, are another strategy to reduce exposure between pedestrians and motor vehicles. Refuge islands and medians that are raised (i.e., not just painted) provide pedestrians more secure places of refuge during the street crossing. They can stop partway across the street and wait for an adequate gap in traffic before completing their crossing.

General Qualities (Time, Cost and Effectiveness):

Median and pedestrian refuge areas are a low-cost countermeasure to implement. This cost can be applied to retrofit improvements or if it is a new construction project, implementing this countermeasure is even more cost-effective. In general, This CM can be very effective and can be considered on a systematic approach. When agencies opt to install landscaping in conjunction with new raised medians, the portion of the cost for landscaping and other non-safety related items that exceeds 10% of the project total cost is not federally participated and must be funded by the applicant.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian and Bicycle	CRF:	30 - 56 %

NS20PB, Install pedestrian crossing at uncontrolled locations (signs and markings only)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	25%	10 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection/crossing with the new crossing. This CM is not intended to be used for high-cost aesthetic enhancements to intersection crosswalks (i.e. stamped concrete or stamped asphalt).		

General information

Where to use:

Non-signalized intersections without a marked crossing, where pedestrians are known to be crossing intersections that involve significant vehicular traffic. They are especially important at school crossings and intersections with right and/or left turns pockets. See Zegeer study (Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations) for additional guidance regarding when to install a marked crosswalk.

Why it works:

Adding pedestrian crossings has the opportunity to enhance pedestrian safety at locations noted as being problematic. Pavement markings delineate a portion of the roadway that is designated for pedestrian crossing. These markings will often be different for controlled verses uncontrolled locations. The use of "ladder", "zebra" or other enhanced markings at uncontrolled crossings can increase both pedestrian and driver awareness to the increased exposure at the crossing. Incorporating advanced "stop" or “yield" markings provides an extra safety buffer and can be effective in reducing the 'multiple-threat' danger to pedestrians. Nearly one-third of all pedestrian-related crashes occur at or within 50 feet of an intersection. Of these, 30 percent may involve a turning vehicle. There are several types of pedestrian crosswalks, including: continental, ladder, zebra, and standard. When agencies opt to install aesthetic enhancement to intersection crosswalks like stamped concrete/asphalt, the project design and construction costs can significantly increase. For HSIP applications, these costs must be accounted for in the B/C calculation, but these costs (over standard crosswalk markings) must be tracked separately and are not federally reimbursable and will increase the agency's local-funding share for the project costs.

General Qualities (Time, Cost and Effectiveness):

Costs associated with this strategy will vary widely, depending upon if curb ramps and sidewalk modifications are required with the crossing. When considered at a single location, these low cost improvements are usually funded through local funding by local crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian and Bicycle	CRF:	25 %

NS21PB, Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)

For HSIP Cycle 11 Call-for-projects				
Funding Eligibility		Crash Types Addressed	CRF	Expected Life
90%		Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the new crossing (influence area) with enhanced safety features. This CM is not intended to be used for high-cost aesthetic enhancements to intersection crosswalks (i.e. stamped concrete or stamped asphalt).			

General information				
Where to use:				
Non-signalized intersections where pedestrians are known to be crossing intersections that involve significant vehicular traffic. They are especially important at school crossings and intersections with turn pockets. Based on the Zegeer study (Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations) at many locations, a marked crosswalk alone may not be sufficient to adequately protect non-motorized users. In these cases, **flashing beacons, curb extensions, advanced "stop" or "yield" markings, and other safety features** should be added to complement the standard crossing elements.				
Why it works:				
Adding pedestrian crossings that include enhances safety features has the opportunity to enhance pedestrian safety at locations noted as being especially problematic. The enhanced safety elements help delineate a portion of the roadway that is designated for pedestrian crossing. Incorporating advanced "yield" markings provide an extra safety buffer and can be effective in reducing the 'multiple-threat' danger to pedestrians. Nearly one-third of all pedestrian-related crashes occur at or within 50 feet of an intersection. When agencies opt to install aesthetic enhancement to intersection crosswalks like stamped concrete/asphalt, the project design and construction costs can significantly increase. For HSIP applications, these costs must be accounted for in the B/C calculation, but these costs (over standard crosswalk markings) must be tracked separately and are not federally reimbursable and will increase the agency's local-funding share for the project costs.				
General Qualities (Time, Cost and Effectiveness):				
Costs associated with this strategy will vary widely, depending upon the types of enhanced features that will be combined with the standard crossing improvements. The need for new curb ramps and sidewalk modifications will also be a factor. This CM may be effectively and efficiently implemented using a systematic approach with more than one location and can have relatively high B/C ratios based on past non-motorized crash history.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian and Bicycle	CRF:	37%

NS22PB, Install Rectangular Rapid Flashing Beacon (RRFB)

For HSIP Cycle 11 Call-for-projects				
Funding Eligibility		Crash Types Addressed	CRF	Expected Life
90%		Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the influence area (expected to be a maximum of within 250') of the crossing which includes the RRFB.			

General information				
Where to use:				
Rectangular Rapid Flashing Beacon (RRFB) includes pedestrian-activated flashing lights and additional signage that enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings. It uses an irregular flash pattern that is similar to emergency flashers on police vehicles. RRFBs are installed at unsignalized intersections and mid-block pedestrian crossings.				
Why it works:				
RRFBs can enhance safety by increasing driver awareness of potential pedestrian conflicts and reducing crashes between vehicles and pedestrians at unsignalized intersections and mid-block pedestrian crossings. The addition of RRFB may also increase the safety effectiveness of other treatments, such as crossing warning signs and markings.				
General Qualities (Time, Cost and Effectiveness):				
RRFBs are a lower cost alternative to traffic signals and hybrid signals. This CM can often be effectively and efficiently implemented using a systematic approach with numerous locations.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	7 – 47.4%

NS23PB, Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	55%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the intersection/crossing with the new signal. 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		

General information
Where to use:
Intersections noted as having a history of pedestrian vs. vehicle crashes and in areas where the likelihood of the pedestrian presence is high. Corridors should also be assessed to determine if there are adequate safe opportunities for non-motorists to cross and if a pedestrian signal, or a Pedestrian Hybrid Beacon (PHB) (also called High-Intensity Activated crossWalK beacon (HAWK)) are needed to provide an active warning to motorists when a pedestrian is in the crosswalk.
Why it works:
Adding a pedestrian signal has the opportunity to greatly enhance pedestrian safety at locations noted as being problematic. Nearly one-third of all pedestrian-related crashes occur at or within 50 feet of an intersection. In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing pedestrians and cyclists on appropriate/legal travel paths and signs and markings warning motorists of non-motorized uses of the roadway that should be expected.
General Qualities (Time, Cost and Effectiveness):
The cost of improvements are generally high, but can vary dependent on the type of signal and overall scope of the project. In most cases the project duration can be short. The expected effectiveness of this CM must be assessed for each individual location.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian and Bicycle	CRF:	15 - 69%

B.3 Roadway Countermeasures

R01, Add Segment Lighting

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Night	35%	20 years
Notes:	This CM only applies to "night" crashes (all types) occurring within limits of the proposed roadway lighting 'engineered' area.		

General information				
Where to use:				
Where to use: Noted substantial patterns of nighttime crashes. In particular, patterns of rear-end, right-angle, turning or roadway departure collisions on the roadways may indicate that night-time drivers can be unaware of the roadway characteristics.				
Why it works:				
Providing roadway lighting improves the safety during nighttime conditions by (1) making drivers more aware of the surroundings, which improves drivers' perception-reaction times, (2) enhancing drivers' available sight distances to perceive roadway characteristic in advance of the change, and (3) improving non-motorist's visibility and navigation.				
General Qualities (Time, Cost and Effectiveness):				
It expected that projects of this type may be constructed in a year or two and are relatively costly. There are several types of costs associated with providing lighting, including the cost of providing a permanent source of power to the location, the cost for the luminaire supports (i.e., poles), and the cost for routinely replacing the bulbs and maintenance of the luminaire supports. Some locations can result in high B/C ratios, but due to higher costs, these projects often result in medium to low B/C ratios.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Night, All	CRF:	18 - 69 %

R02, Remove or relocate fixed objects outside of Clear Recovery Zone

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	35%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new clear recovery zone (per Caltrans' HDM).		

General information				
Where to use:				
Known locations or roadway segments prone to collisions with fixed objects such as utility poles, drainage structures, trees, and other fixed objects, such as the outside of a curve, end of lane drops, and in traffic islands. A clear recovery zone should be developed on every roadway, as space is available. In situations where public right-of-way is limited, steps should be taken to request assistance from property owners, as appropriate.				
Why it works:				
While this strategy does not prevent the vehicle leaving the roadway, it does provide a mechanism to reduce the severity of a resulting crash. A clear zone is an unobstructed, traversable roadside area that allows a driver to stop safely or regain control of a vehicle that has left the roadway. Removing or moving fixed objects, flattening slopes, or providing recovery areas reduces the likelihood of a crash.				
General Qualities (Time, Cost and Effectiveness):				
Projects involving removing fixed objects from highway right-of-way can typically be accomplished quickly, assuming the objects are readily moveable. Clearing objects on private property requires more time for discussions with the property owner. Costs will generally be low, assuming that in most cases the objects to be removed are within the right-of-way. This CMs can be very effective and can be implemented by agencies' maintenance staff and/or implemented on a systematic approach. High-cost removals or removals implemented using a systematic approach would be good candidates for Caltrans Federal Safety Funding.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Fixed Object	CRF:	17 - 100 %

R03, Install Median Barrier

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	Note: For Caltrans' statewide Calls-for-Projects, this CM only applies to crashes occurring within the limits of the new barrier.		

General information

Where to use:

Areas where crash history indicates drivers are unintentionally crossing the median and the cross-overs are resulting in high severity crashes. The installation of median barriers can increase the number of PDO and non-severe injuries. The net result in safety from this countermeasure is connected more to reducing the severity of crashes not the number of crashes. It is recommended to review the warrants as outlined in Chapter 7 of the Caltrans Traffic Manual when considering whether to install median barriers.

Why it works:

This strategy is designed to prevent head-on collisions by providing a barrier between opposing lanes of traffic. The variety of median barriers available makes it easier to choose a site-specific solution. The main advantage is the reduction of the severity of the crashes. The key to success would be in selecting an appropriate barrier based on the site, previous crash history, maintenance needs, and median width.

General Qualities (Time, Cost and Effectiveness):

This strategy would in many cases be possible to implement within a short period after site selection. Costs will vary depending on the type of median barrier selected and whether the strategy is implemented as a stand-alone project or incorporated as part of a reconstruction or resurfacing effort. Maintenance costs and worker exposure will also vary depending on the type of barrier selected. The expected effectiveness of this CM must be assessed for each individual location.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Head-on	CRF:	0 - 94 %

R04, Install Guardrail

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new guardrail. This CM is not intended to be used for general maintenance activities (i.e. the replacement of existing damaged rail). For projects proposing to upgrade existing guardrail to current standards, this CM and corresponding CRF should only be applied to locations where past crash data or engineering judgment applied to the existing rail conditions suggests the upgraded guardrail may result in fewer or less severe crashes (justifying the use of the 25% CRF for this CM).		

General information

Where to use:

Guardrail is installed to reduce the severity of lane departure crashes. However, guardrail can reduce crash severity only for those conditions where striking the guardrail is less severe than going down an embankment or striking a fixed object. Guardrail should only be installed where it is clear that crash severity will be reduced, or there is a history of run-off-the-road crashes at a given location that have resulted in severe crashes. New and upgraded guardrail and end-treatments must meet current safety standards; see Method for Assessing Safety Hardware (MASH) for more information. Caltrans (or other national accepted guidance) slope/height criteria need to be considered and documented.

Why it works:

Guardrail redirects a vehicle away from embankment slopes or fixed objects and dissipates the energy of an errant vehicle.

General Qualities (Time, Cost and Effectiveness):

Strategies range from relatively inexpensive too costly. Costly projects may include those that upgrade existing guardrail applications to more semi-rigid and rigid barrier systems over extended distances. In general, this CMs can be effective and can be implemented by agencies' maintenance staff and/or implemented on a systematic approach.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Fixed Object, Run-off Road	CRF:	11 - 78 %

R05, Install impact attenuators

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the new attenuators. This CM is not intended to be used for general maintenance activities (i.e. the replacement of existing damaged attenuators). For projects proposing to upgrade existing attenuators to current standards, this CM and corresponding CRF should only be applied to locations where past crash data or engineering judgment applied to the existing attenuator conditions suggests the upgraded attenuators may result in fewer or less severe crashes (justifying the use of the 25% CRF for this CM).		

General information				
Where to use:				
Impact attenuators are typically used to shield rigid roadside objects such as concrete barrier ends, steel guardrail ends and bridge pillars from oncoming automobiles. Attenuators should only be installed where it is impractical for the objects to be removed. New and upgraded barrier end-treatments must meet current safety standards; see MASH for more information.				
Why it works:				
Attenuators bring an errant vehicle to a more-controlled stop or redirect the vehicle away from a rigid object. Attenuators are effective at absorbing impact energy and increasing occupant safety. They also tend to draw attention to the fixed object, which helps drivers steer clear of the fixed objects.				
General Qualities (Time, Cost and Effectiveness):				
Costs depending on the scope of the project, type(s) used, and associated ongoing maintenance costs. Time to install is fairly quick once site is identified.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Fixed Object, Run-off Road	CRF:	5 - 50 %

R06, Flatten side slopes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new side slopes. Minor/incidental flattening of side slopes would not likely result in the CRF shown below and may not be appropriate for use in Caltrans B/C calculations.		

General information				
Where to use:				
Roadways experiencing frequent lane departure crashes that result in roll-over type crashes as a result of the roadway slope being so severe as to not accommodate a reasonable degree of driver correction. When there is a need to reduce the severity of lane departure crashes without installing a barrier system that could result in increased numbers of crashes.				
Why it works:				
Flattened slopes provide a greater area for a driver to regain control of a vehicle. Steep slopes, ditches or unprotected hazardous drops-offs adjacent to a travel lane offer little opportunities to correct an inappropriate action by a driver and can result in sever crashes.				
General Qualities (Time, Cost and Effectiveness):				
Roadside modifications range from relatively inexpensive to very costly. Strategies that include creating safer side slopes where none exists can be moderately expensive based on the scope of the project and the associated clearing, grading, etc. The potential for high environmental and right-of-way impacts is high which can take several years to clear. In other cases This CM can be effective and can be implemented by agencies' maintenance staff and/or implemented on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Fixed Object, Run-off Road	CRF:	5 - 62 %

R07, Flatten side slopes and remove guardrail

For HSIP Cycle 11 Call-for-projects				
Funding Eligibility		Crash Types Addressed	CRF	Expected Life
90%		All	40%	20 years
Notes:	This CM only applies to crashes occurring within the limits of both the removed guardrail and the new side slopes.			

General information					
Where to use:					
Locations where high number of crashes originate as a lane departure and result in collision with guardrail or a fixed object located on the side slope shielded by guardrail. The guardrail may or may not meet current standards. Even though guardrails are generally installed to reduce the severity of departure crashes, they still can result in severe crashes in some locations.					
Why it works:					
Flattened side slopes and an unobstructed clear zone provide a greater area for a driver to regain control of a vehicle. The existing guardrail may help protect the steep slopes, fixed objects, or unprotected hazardous drops-offs adjacent to a travel lane, but removing all of these obstacles generally improves safety.					
General Qualities (Time, Cost and Effectiveness):					
Roadside modifications range from relatively inexpensive to very costly. Strategies that include creating safer side slopes where none exists can be moderately expensive based on the scope of the project and the associated clearing, grading, etc. The potential for high environmental and right-of-way impacts is high which can take several years to clear.					
FHWA CMF Clearinghouse:	Crash Types Addressed:	Roll Over, Fixed Object	CRF:	42%	

R08, Install raised median

For HSIP Cycle 11 Call-for-projects				
Funding Eligibility		Crash Types Addressed	CRF	Expected Life
90%		All	25%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new raised median. All new raised medians funded with federal HSIP funding should not include the removal of the existing roadway structural section and should be doweled into the existing roadway surface. This requirement is being implemented to maximize the safety-effectiveness of the limited HSIP funding and to minimize project impacts. Landscaping, if included in the project, is considered non-participating.			

General information				
Where to use:				
Areas experiencing head-on collisions that may be affected by both the number of vehicles that cross the centerline and by the speed of oncoming vehicles. Installing a raised median is a more restrictive approach in that it represents a more rigid barrier between opposing traffic. Application of raised medians on roadways with higher speeds is not advised - instead a median barrier should be considered. Including landscaping in new raised medians can be counterproductive to the HSIP safety goals and should only be done in ways that do not increase drivers' exposure to fixed objects and that will maintain driver's sight distance needs throughout the life of the proposed landscaping. **Agencies need to consider and document impacts of additional turning movements at nearby intersections.**				
Why it works:				
Adding raised medians is a particularly effective strategy as it adds to or reallocates the existing cross section to incorporate a buffer between the opposing travel lanes and reinforces the limits of the travel lane. Raised median may also be used to limit unsafe turning movements along a roadway.				
General Qualities (Time, Cost and Effectiveness):				
In some cases this strategy may be a retrofit into the existing roadway by utilizing a portion of the existing paved shoulder. These raised medians can be installed directly over the existing pavement. Cost and time to implement could significantly increase if the paved area is not sufficient to include a median. The surface treatment of the raised median also significantly affects their cost-effectiveness: standard concrete or other hardscape surfaces are usually more cost effective than landscaped medians. When agencies opt to install landscaping in conjunction with new raised medians, the project design and construction costs can significantly increase due to excavation, backfill/top-soil, water-connection, irrigation, planting, maintenance needed for the landscaping. When agencies opt to install landscaping in conjunction with new raised medians, the portion of the cost for landscaping and other non-safety related items that exceeds 10% of the project total cost is not federally participated and must be funded by the applicant.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Head-on	CRF:	20 - 75 %

R09, Install median (flush)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new flush median. The new median must be a minimum of 4 feet wide (or "wider" if a narrow median exists before the proposed project).		

General information

Where to use:

Areas experiencing head-on collisions that may be affected by both the number of vehicles that cross the centerline and by the speed of oncoming vehicles. Roadways with oversized lanes offer an opportunity to restripe the roadway to reduce the lanes to standard widths and use the extra width for the median.

Why it works:

Adding medians is a particularly effective strategy as it adds to or reallocates the existing cross section to incorporate a narrow buffer median between opposing flows, thereby providing a greater opportunity to correct an errant maneuver and further reinforce the limits of the travel lane. Application widths can vary based on the available cross section and intended application. Additional safety can be provided by combining this CM with rumble strips.

General Qualities (Time, Cost and Effectiveness):

In some cases this strategy may be retrofitted into the existing roadway by utilizing a portion of the existing paved shoulder and can ultimately be as simple as restriping the roadway. Costs and time to implement could significantly increase if the paved area is not sufficient to include a median.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	15 - 78 %

R10PB, Install pedestrian median fencing

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring on the approaches/influence area of the new pedestrian median fencing.		

General information

Where to use:

Roadway segments with high pedestrian-generators and pedestrian-destinations nearby (e.g. transit stops) may experience a high volume of pedestrians J-walking across the travel lanes at mid-block locations instead of walking to the nearest intersection or designated mid-block crossing. When this safety issue cannot be mitigated with shoulder, sidewalk and/or crossing treatments, then installing a continuous pedestrian barrier in the median may be a viable solution.

Why it works:

Adding pedestrian median fencing has the opportunity to enhance pedestrian safety at locations noted as being problematic involving pedestrians running/darting across the roadway outside designated pedestrian crossings. Pedestrian median fencing can significantly reduce this safety issue by creating a positive barrier, forcing pedestrians to the designated pedestrian crossing.

General Qualities (Time, Cost and Effectiveness):

Costs associated with this strategy will vary widely depending on the type and placement of the median fencing. Impacts to transit and other land uses may need to be considered and controversy can delay the implementation. In general, this CM can be effective as a spot-location approach.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	25 - 40%

R11, Install acceleration/ deceleration lanes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new accel/decel lanes on high speed roadways. Significant improvements to the merge length for lane-drop locations is also an acceptable use of this CM.		

General information				
Where to use:				
Areas proven to have crashes that are the result of drivers not being able to turn onto a high speed roadway to accelerate until the desired roadway speed is reached and areas that do not provide the opportunity to safety decelerate to negotiate a turning movement. This CM can also be used to improve the safety of merging vehicles at a lane-drop location.				
Why it works:				
A lane that does not provide enough deceleration length and storage space for turning traffic may cause the turn queue to back up into the adjacent through lane. This can contribute to rear-end and sideswipe crashes. An acceleration lane is an auxiliary or speed-change lane that allows vehicles to accelerate to highway speeds (high speed roadways) before entering the through-traffic lanes of a highway. Additionally, if acceleration by entering traffic takes place directly on the traveled way, it may disrupt the flow of through-traffic and cause rear-end and sideswipe collisions.				
General Qualities (Time, Cost and Effectiveness):				
Costs are highly variable. Where sufficient median or shoulder space exists it may be possible to provide acceleration/deceleration lanes at a moderate cost. Where the roadway must be widened and additional right-of-way must be acquired, higher costs and a lengthy time-to-construct are likely. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Sideswipe, Rear-End	CRF:	10 - 75 %

R12, Widen lane (initially less than 10 ft)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years
Notes:	Note: For Caltrans' statewide Calls-for-Projects, this CM only applies to crashes occurring within the limits of the widened lanes. Widening must a minimum of 1 foot.		

General information				
Where to use:				
Horizontal curves or tangents and low speed or high speed roadways identified as having lane departure crashes, sideswipe or head-on crashes that can be attributed to an existing pavement width less than 10 feet.				
Why it works:				
Increasing pavement width can affect almost all crash types. A common practice is to widen the traveled way on horizontal curves to make operating conditions on curves comparable to those on tangents. Speed is a primary consideration when evaluating potential adverse impacts of lane width on safety. On high-speed, rural two-lane highways, an increased risk of cross-centerline head-on or cross-centerline sideswipe crashes is a concern because drivers may have more difficulty staying within the travel lane.				
General Qualities (Time, Cost and Effectiveness):				
Costs will depend on the amount of reconstruction necessary and on whether additional right-of-way is required. In general, this is one of the higher-cost strategies recommended, but it can also be very beneficial. Since this is a relatively expensive treatment, one of the keys to creating a cost effective project with at least a medium B/C ratio is targeting higher-hazard roadways.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	5 - 70 %

R13, Add two-way left-turn lane

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new lane, where an existing median did not already exist.		

General information

Where to use:

Roadways having a high frequency of drivers being rear-ended while attempting to make a left turn across oncoming traffic. Also can be effective for drivers crossing the centerline of an undivided multilane roadway inadvertently.

Why it works:

Two-way left-turn lanes provide a buffer between opposing directions of travel and separate left turning traffic from through traffic. They can also help to allow vehicles to begin to accelerate before entering the through-traffic lanes. They reduce the disruption of flow of through-traffic and reducing rear-end and sideswipe collisions. For some roadways the option of converting a four-lane undivided arterials to two-vehicle-lane roadways with a center left-turn lane and bike lanes should be considered (see "Road Diet" CM.)

General Qualities (Time, Cost and Effectiveness):

In some cases this strategy may be retrofitted into the existing roadway by utilizing a portion of the existing paved shoulder and can ultimately be as simple as restriping the roadway. Costs and time to implement could significantly increase if the paved area is not sufficient to include a median, requiring new right-of-way, and having significant environmental impacts. The expected effectiveness of this CM must be assessed for each individual location as the B/C ratios will vary from low to high.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	8 - 50 %

R14, Road Diet (Reduce travel lanes and add a two way left-turn and bike lanes)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	35%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new lane striping. "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. if any pavement is planned to be removed for the purpose of adding landscaping, planter-boxes, or other non-roadway user features, the cost should be non-participating.		

General information

Where to use:

Areas noted as having a higher frequency of head-on, left-turn, and rear-end crashes with traffic volumes that can be handled by only 2 free flowing lanes. Using this strategy in locations with traffic volumes that are too high could result in diversion of traffic to routes less safe than the original four-lane design. It may also result in congestion levels that contribute to other crashes.

Why it works:

The application of this strategy usually reduces the roadway segment speeds and serious head-on crashes. In many cases the extra pavement width can be used for the installation of bike lanes. In addition to increasing bicycle safety, these bike lanes can improve the safety of on-street parking.

General Qualities (Time, Cost and Effectiveness):

Implementation would require more time than in other low-cost treatments to complete environmental analyses, traffic studies and public input. Projects that only require new lane markings and minor signalization modifications will have relatively low cost and can be very effective and can be considered on a systematic approach. These striping and signal modification costs should be considered part of this CM and not an additional CM. (If additional signal hardware improvements are being made, over what is needed for the road diet, then the Improve Signal Hardware CM may also be used.) Often road diet projects need a seal-coat placed on the roadway to fully remove the old striping. These seal coats are considered part of the proper installation of this CM. In contrast, structural-overlays should not be considered part of this CM and are not considered eligible for funding in the California Local HSIP.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	26 - 43 %

R15, Widen shoulder

For HSIP Cycle 11 Call-for-projects				
Funding Eligibility		Crash Types Addressed	CRF	Expected Life
90%		All	30%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new paved shoulder. A minimum of 2 feet width must be added and the new/resulting shoulders must be a minimum of 4 feet wide. This CM is not eligible unless it is done as the last step of an "incremental approach", for which the agency documents that: 1) they have already pursued and installed lower cost and lower impact CMs (i.e. signing/striping upgrades to MUTCD standards/recommendations, rumble strips, etc.), 2) they have already monitored the crash occurrences after these improvements were installed, and 3) the 'after' crash rate is still unacceptably high. This 'incremental approach' (or a special exception from the HSIP program manager) must be documented in the Narrative Questions in the application and a summary of the 'before' and 'after' crash analysis must be attached to the application.			

General information

Where to use:

Roadways that have a frequent incidence of vehicles leaving the travel lane resulting in an unsuccessful attempt to reenter the roadway. The probability of a safe recovery is increased if an errant vehicle is provided with an increased paved area in which to initiate such a recovery.

Why it works:

Based on the best available research, adding shoulder or widening an existing shoulder provides a greater area to regain control of a vehicle, as well as lateral clearance to roadside objects such as guardrail, signs and poles. They may also provide space for disabled vehicles to stop or drive slowly, provide increased sight distance for through vehicles and for vehicles entering the roadway, and in some cases reduce passing conflicts between motor vehicles and bicyclists and pedestrians. The likely safety benefits for adding or widening an existing shoulder generally increase as the widening width increases - practitioners should refer to NCHRP Report 500 Series, the CMF Clearinghouse or other references for more details.

General Qualities (Time, Cost and Effectiveness):

Shoulder widening costs would depend on whether new right-of-way is required and whether extensive roadside modification is needed. Since shoulder widening can be a relatively expensive treatment, one of the keys to creating a cost effective project with at least a medium B/C ratio is targeting higher-hazard roadways.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Fixed Object, Run-off Road, Sideswipe	CRF:	15 - 75 %

R16, Curve Shoulder widening (Outside Only)

For HSIP Cycle 11 Call-for-projects				
Funding Eligibility		Crash Types Addressed	CRF	Expected Life
90%		All	45%	20 years
Notes:	This CM only applies to crashes occurring within the limits (or influence area) of the new shoulder widening at curves. A minimum of 2-4 feet width must be added to the outside of horizontal curves and the new traversable shoulder must be a minimum of 4 feet wide.			

General information

Where to use:

Roadway curves noted as having frequent lane departure crashes due to inadequate or no shoulders, resulting in an unsuccessful attempt to reenter the roadway.

Why it works:

Adding shoulders (outside only) creates a recovery area in which a driver can regain control of a vehicle, as well as lateral clearance to roadside objects.

General Qualities (Time, Cost and Effectiveness):

To minimize the R/W needs and the cost, only outside shoulder at curves is to be widened. This CM can be implemented in a relatively short timeframe.

FHWA CMF Clearinghouse:	NA

R17, Improve horizontal alignment (flatten curves)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	50%	20 years

Notes:	This CM only applies to crashes occurring within the limits (or influence area) of the improved alignment. **<u>This CM is not eligible unless</u>** it is done as the last step of an "incremental approach", including: the agency documents that: 1) they have already pursued and installed lower cost and lower impact CMs (i.e. signing/striping upgrades to MUTCD standards/recommendations, rumble strips, etc.), 2) they have already monitored the crash occurrences after these improvements were installed, and 3) the 'after' crash rate is still unacceptably high. This 'incremental approach' (or a special exception from the HSIP program manager) must be documented in the Narrative Questions in the application and a summary of the agency's 'before' and 'after' crash analysis must be attached to the application.

General information

Where to use:

Roadways with horizontal curves that have experienced lane departure crashes as a result of a roadway segment having compound curves or a severe radius. This strategy should generally be considered only when less expensive strategies involving clearing of specific sight obstructions or modifying traffic control devices have been tried and have failed to ameliorate the crash patterns.

Why it works:

Increasing the radius of a horizontal curve can be very effective in improving the safety performance of the curve. Curve modification reduces the likelihood of a vehicle leaving its lane, crossing the roadway centerline, or leaving the roadway at a horizontal curve; and minimizes the adverse consequences of leaving the roadway. Horizontal alignment improvement projects are expected to include standard/improved superelevation elements, which should be considered part of this CM and not an additional CM.

General Qualities (Time, Cost and Effectiveness):

This strategy is a long-term, higher-cost alternative for improving the safety of a horizontal curve because it usually involves total reconstruction of the roadway. It may also require acquisition of additional right-of-way and an environmental review. This strategy, albeit costly, has shown that increasing the radius of curvature can significantly reduce total curve-related crashes by up to 80 percent. The expected effectiveness of this CM must be assessed for each individual location.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	24 - 90%

R18, Flatten crest vertical curve

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	20 years

Notes:	This CM only applies to crashes occurring within the limits (or influence area) of the improved alignment. This CM is not eligible unless it is done as the last step of an "incremental approach", including: the agency documents that: 1) they have already pursued and installed lower cost and lower impact CMs (i.e. signing/striping upgrades to MUTCD standards/recommendations, rumble strips, etc.), 2) they have already monitored the crash occurrences after these improvements were installed, and 3) the 'after' crash rate is still unacceptably high. This 'incremental approach' (or a special exception from the HSIP program manager) must be documented in the Narrative Questions in the application and a summary of the agency's 'before' and 'after' crash analysis must be attached to the application.

General information

Where to use:

The target for this strategy is usually unsignalized intersections with restricted sight distance due to vertical geometry and with patterns of crashes related to that lack of sight distance that cannot be ameliorated by less expensive methods. This strategy should generally be considered only when less expensive strategies involving clearing of specific sight obstructions or modifying traffic control devices have been tried and have failed to ameliorate the crash patterns.

Why it works:

Adequate sight distance for drivers at stopped approaches to intersections has long been recognized as among the most important factors contributing to overall intersection safety. Vertical alignment improvement projects are expected to include standard/improved superelevation elements, which should be considered part of this CM and not an additional CM.

General Qualities (Time, Cost and Effectiveness):

Projects involving changing the horizontal and/or vertical alignment to provide more sight distance are quite extensive and usually take several years to accomplish. If additional right-of-way is required or environmental impacts are expected, these projects will require a substantial period of time. Since this is usually an expensive treatment, one of the keys to creating a cost effective project with at least a medium B/C ratio is targeting higher-hazard locations.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	20 - 51 %

R19, Improve curve superelevation

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	45%	20 years

Notes:	This CM only applies to crashes occurring within the limits (or influence area) of the improved superelevation. This CM does not apply to sections of roadways where the horizontal or vertical alignments are changing via another CM.

General information

Where to use:

Roadways noted as having frequent lane departure crashes and inadequate or no superelevation. Safety can be enhanced when the superelevation is improved or restored along curves where the actual superelevation is less than the optimal.

Why it works:

Superelevation works with friction between the tires and pavement to counteract the forces on the vehicle associated with cornering. Many curves may have inadequate superelevation because of vehicles traveling at higher speeds than were originally designed for, because of loss of effective superelevation after resurfacing, or because of changes in design policy after the curve was originally constructed.

General Qualities (Time, Cost and Effectiveness):

This strategy can be a higher-cost alternative for improving the safety of a curve because it involves reconstruction to some degree. Other projects may be able to be constructed by simple overlays and minimal reconstruction of roadways features. When simple overlay fixes are pursued, a systematic installation approach may be appropriate. The expected effectiveness of this CM must be assessed for each individual location.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Run-off Road, All	CRF:	40 - 50 %

R20, Convert from two-way to one-way traffic

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	35%	20 years
Notes:	This CM only applies to crashes occurring within the limits of the new one-way sections.		

General information

Where to use:

One-way streets can offer improved signal timing and accommodate odd-spaced signals. One-way streets can simplify crossings for pedestrians, who must look for traffic in only one direction. While studies have shown that conversion of two-way streets to one-way generally reduces pedestrian crashes and the number of conflict points, one-way streets tend to have higher speeds which creates new problems. Care must be taken not to create conditions that cause driver confusion and erratic maneuvers.

Why it works:

Studies have shown a 10 to 50-percent reduction in total crashes after conversion of a two-way street to one-way operation. While studies have shown that con-version of two-way streets to one-way generally reduces pedestrian crashes, one-way streets tend to have higher speeds which creates new problems. At the same time, this strategy (1) increases capacity significantly and (2) can have safety-related drawbacks including pedestrian confusion and minor sideswipe crashes.

General Qualities (Time, Cost and Effectiveness):

The costs will vary depending on length of treatment and if the conversion requires modification to signals. Conversion costs can be high to build "crossovers" where the one-way streets convert back to two-way streets and to rebuild traffic signals. It's also likely that these types of modifications will require public involvement and could significantly add to the time it takes to complete the project. The expected effectiveness of this CM must be assessed for each individual location.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	26 - 43 %

R21, Improve pavement friction (High Friction Surface Treatments)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	55%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the improved friction overlay. This CM is not intended to apply to standard chip-seal or open-graded **maintenance** projects for long segments of corridors or structure repaving projects intended to fix failed pavement.		

General information

Where to use:

Nationally, this countermeasure is referred to as "High Friction Surface Treatments" or HFST. Areas as noted having crashes on wet pavements or under dry conditions when the pavement friction available is significantly less than actual roadway speeds; including but not limited to curves, loop ramps, intersections, and areas with short stopping or weaving distances. This treatment is intended to target locations where skidding is determined to be a problem, in wet or dry conditions and the target vehicle is one that runs (skids) off the road or is unable to stop due to insufficient skid resistance.

Why it works:

Improving the skid resistance at locations with high frequencies of wet-road crashes and/or failure to stop crashes can result in a reduction of 50 percent for wet-road crashes and 20 percent for total crashes. Applying HFST can double friction numbers, e.g. low 40s to high 80s. This CM represents a special focus area for both FHWA and Caltrans, which means there are extra resources available for agencies interested in more details on High Friction Surface Treatment projects.

General Qualities (Time, Cost and Effectiveness):

This strategy can be relatively inexpensive and implemented in a short timeframe. The installation would be done by either agency personnel or contractors and can be done by hand or machine. In general, This CM can be very effective and can be considered on a systematic approach.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Wet, Rear-End, All	CRF:	17 - 68 %

R22, Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years

Notes:	This CM only applies to crashes occurring within the influence area of the new/upgraded signs. This CM is not intended for maintenance upgrades of street-name, parking, guide, or any other signs without a primary focus on roadway safety. **<u>This CM is not eligible unless</u>** it is done as part of a larger sign audit project, including the study of: 1) the existing signs' locations, sizes and information per MUTCD standards, 2) missing signs per MUTCD standards, and 3) sign retroreflectivity. The overall sign audit scope (or a special exception from the HSIP program manager) must be documented in the Narrative Questions in the application. Based on the scope of the project/audit, it may be appropriate to combine other CMs in the B/C calculation.

General information

Where to use:

The target for this strategy should be on roadway segments with patterns of head on, nighttime, non-intersection, run-off road, and sideswipe crashes related to lack of driver awareness of the presence of a specific roadway feature or regulatory requirement. Ideally this type of safety CM would be combined with other sign evaluations and upgrades (install chevrons, warning signs, delineators, markers, beacons, and relocation of existing signs per MUTCD standards.)

Why it works:

This strategy primarily addresses crashes caused by lack of driver awareness (or compliance) roadway signing. It is intended to get the drivers attention and give them a visual warning by using fluorescent yellow sheeting (or other retroreflective material).

General Qualities (Time, Cost and Effectiveness):

Signing improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of signs. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding. When considering any type of federally funded sign upgrade project, California local agencies are encouraged to consider "Roadway Safety Signing Audit (RSSA) and Upgrade Projects". Including RSSAs in the development phase of sign projects are expected to identify non-standard (per MUTCD) sign features and missing signs that may otherwise go unnoticed. More information on RSSA is available on the Local Assistance HSIP webpage.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Head on, Run-off road, Sideswipe, Night	CRF:	18 - 35%

R23, Install chevron signs on horizontal curves

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	40%	10 years
Notes:	This CM only applies to crashes occurring within the influence area of the new signs. (i.e. only through the curve).		

General information				
Where to use:				
Roadways that have an unacceptable level of crashes on relatively sharp curves during periods of light and darkness. Ideally this type of safety CM would be combined with other sign evaluations and upgrades (install warning signs, delineators, markers, beacons, and relocation of existing signs per MUTCD standards.)				
Why it works:				
Post-mounted chevrons are intended to warn drivers of an approaching curve and provide tracking information and guidance to the drivers. While they are intended to act as a warning, it should also be remembered that the posts, placed along the roadside, represent a possible object with which an errant vehicle can crash into. Design of posts to minimize damage and injury is an important part of the considerations to be made when selecting these treatments.				
General Qualities (Time, Cost and Effectiveness):				
Signing improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of signs. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding. When considering any type of federally funded sign upgrade project, California local agencies are encouraged to consider "Roadway Safety Signing Audit (RSSA) and Upgrade Projects". Including RSSAs in the development phase of sign projects are expected to identify non-standard (per MUTCD) sign features and missing signs that may otherwise go unnoticed. More information on RSSA is available on the Local Assistance HSIP webpage.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Run-off Road, All	CRF:	6 - 64 %

R24, Install curve advance warning signs

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	10 years
Notes:	This CM only applies to crashes occurring within the influence area of the new signs. (i.e. only through the curve)		

General information				
Where to use:				
Roadways that have an unacceptable level of crashes on relatively sharp curves during periods of light and darkness. This countermeasure may also include horizontal alignment and/or advisory speed warning signs. Ideally this type of safety CM would be combined with other sign evaluations and upgrades (install warning signs, chevrons, delineators, markers, beacons, and relocation of existing signs per MUTCD standards.)				
Why it works:				
This strategy primarily addresses problem curves, and serves as an advance warning of an unexpected or sharp curve. It provides advance information and gives drivers a visual warning that their added attention is needed.				
General Qualities (Time, Cost and Effectiveness):				
Signing improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of signs. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding. When considering any type of federally funded sign upgrade project, California local agencies are encouraged to consider "Roadway Safety Signing Audit (RSSA) and Upgrade Projects". Including RSSAs in the development phase of sign projects are expected to identify non-standard (per MUTCD) sign features and missing signs that may otherwise go unnoticed. More information on RSSA is available on the Local Assistance HSIP webpage.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Run-off Road, All	CRF:	20 - 30 %

R25, Install curve advance warning signs (flashing beacon)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	10 years
Notes:	This CM only applies to crashes occurring within the influence area of the new signs. (i.e. only through the curve)		

General information				
Where to use:				
Roadways that have an unacceptable level of crashes on relatively sharp curves. Flashing beacons in conjunction with warning signs should only be used on horizontal curves that have an established severe crash history to help maintain their effectiveness.				
Why it works:				
This strategy primarily addresses problem curves, and serves as an enhanced advance warning of an unexpected or sharp curve. It provides advance information and gives drivers a visual warning that their added attention is needed. Flashing beacons are an added indication that a curve may be particularly challenging.				
General Qualities (Time, Cost and Effectiveness):				
Use of flashing beacons requires minimal development process, allowing flashing beacons to be installed within a short time period. Before choosing this CM, the agency needs to confirm the ability to provide power to the site (solar may be an option). In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	30 %

R26, Install dynamic/variable speed warning signs

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	30%	10 years
Notes:	This CM only applies to crashes occurring within the influence area of the new signs. (i.e. through the curve) {**This CM does not apply to dynamic regulatory speed warning signs.** There are currently no nationally accepted CRFs for dynamic regulatory signs (also known as Radar Speed Feedback Signs). CRFs are being developed and Caltrans hopes to include these CMs and CRFs in future calls for projects.}		

General information				
Where to use:				
Curvilinear roadways that have an unacceptable level of crashes due to excessive speeds on relatively sharp curves.				
Why it works:				
This strategy primarily addresses crashes caused by motorists traveling too fast around sharp curves. It is intended to get the drivers attention and give them a visual warning that they may be traveling over the recommended speed for the approaching curve. Care should be taken to limit the placement of these signs to help maintain their effectiveness.				
General Qualities (Time, Cost and Effectiveness):				
Use of dynamic speed warning signs requires minimal development process, allowing them to be installed within a short time period. Before choosing this CM, the agency needs to confirm the ability to provide power to the site (solar may be an option). In general, This CM can be very effective and can be considered on a systematic approach.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	0 - 41 %

R27, Install delineators, reflectors and/or object markers

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years
Notes:	This CM only applies to crashes occurring within the limits / influence area of the new features. {**<u>This is not a striping-related CM</u>**}		

General information

Where to use:

Roadways that have an unacceptable level of crashes on curves (relatively flat to sharp) during periods of light and darkness. Any road with a history of fixed object crashes is a candidate for this treatment, as are roadways with similar fixed objects along the roadside that have yet to experience crashes. If a fixed object cannot be relocated or made break-away, placing an object marker can provide additional information to motorists. Ideally this type of safety CM would be combined with other sign evaluations and upgrades (install warning signs, chevrons, beacons, and relocation of existing signs per MUTCD standards.)

Why it works:

Delineators, reflectors and/or object markers are intended to warn drivers of an approaching curve or fixed object that cannot easily be removed. They are intended to provide tracking information and guidance to the drivers. They are generally less costly than Chevron Signs as they don't require posts to place along the roadside, avoiding an additional object with which an errant vehicle can crash into.

General Qualities (Time, Cost and Effectiveness):

These improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number of locations. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in low to moderate cost projects that are more appropriate to seek state or federal funding. When considering any type of federally funded sign upgrade project, California local agencies are encouraged to consider "Roadway Safety Signing Audit (RSSA) and Upgrade Projects". Including RSSAs in the development phase of sign projects are expected to identify non-standard (per MUTCD) sign features and missing signs that may otherwise go unnoticed. More information on RSSA is available on the Local Assistance HSIP webpage.

FHWA CMF Clearinghouse:	Crash Types Addressed:	All	CRF:	0 - 30 %

R28, Install edge-lines and centerlines

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	25%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the new centerlines and/or edge-lines. This CM is not intended to be used for general maintenance activities (i.e. the replacement of existing striping and RPMs in-kind) and must include upgraded safety features over the existing striping. For two lane roadways allowing passing, a striping audit must be done to ensure the passing limits meeting the MUTCD standards. Both the centerline and edge-lines are expected to be upgraded, unless prior approval is granted by Caltrans staff in writing and attached to application.		

General information
Where to use:
Any road with a history of run-off-road right, head-on, opposite-direction-sideswipe, or run-off-road-left crashes is a candidate for this treatment - install where the existing lane delineation is not sufficient to assist the motorist in understanding the existing limits of the roadway. Depending on the width of the roadway, various combinations of edge line and/or center line pavement markings may be the most appropriate. Incorporating raised/reflective pavement markers (RPMs) into centerlines (and edge-lines) should be considered as it has been shown to improve safety.
Why it works:
Installing edge-lines and centerlines where none exists or making significant upgrades to existing lines (paint to thermoplastic, adding audible disks/bumps in the thermoplastic stripes, or adding RPMs) are intended/designed to help drivers who might leave the roadway because of their inability to see the edge of the roadway along the horizontal edge of the pavement or cross-over the centerline of the roadway into oncoming traffic. New pavement marking products tend to be more durable, are all-weather, more visible, and have a higher retroreflectivity than traditional pavement markings.
General Qualities (Time, Cost and Effectiveness):
These improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number and length of locations. This CM can be effectively and efficiently implemented using a systematic approach with numerous and long locations, resulting in low to moderate cost projects that are more appropriate to seek state or federal funding. When considering any type of federally funded striping upgrade project, California local agencies are encouraged to consider "Roadway Safety Striping Audit and Upgrade Projects". Including wide-scale striping audits in the development phase of striping projects are expected to identify non-standard (per MUTCD) striping/marking features, no-passing zone limits needing adjustment, and missing striping/markings that may otherwise go unnoticed. More information on this concepts is available on the Local Assistance HSIP webpage under an RSSA example document. Note: When federal safety funding is used for these installations in high-wear-locations, the local agency is expected to maintain the improvement for a minimum of 10 years.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Head-on, Run-off Road, All	CRF:	0 - 44 %

R29, Install no-passing line

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	45%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the new or extended no-passing zones.		

General information

Where to use:

Roadways that have a high percentage of head-on crashes suggesting that many head-on crashes may relate to failed passing maneuvers. No-passing lines should be installed where drivers "passing sight distance" is not available due to horizontal or vertical obstructions. General restriping projects can be good opportunities to reevaluate and incorporate new no-passing zones limits. The incorporation 'No Passing Zone' pennants should also be considered when reevaluating the limits of no-passing zones. Installing no-passing limits in areas that are not warranted may reduce the overall safety of the corridor as drivers may become frustrated and attempt passing maneuvers at other locations without the necessary sight distance.

Why it works:

When the centerline markings do not differentiate between passing and no-passing areas, drivers may have difficulty determining where passing maneuvers can be completed safely. Providing clear and engineered passing and no-passing areas can encourage drivers to wait patiently for safe passing areas and avoid aggressively looking for passing opportunities.

General Qualities (Time, Cost and Effectiveness):

These improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number and length of locations. When considered at a single location, these low cost improvements are usually funded through local funding by local maintenance crews. However, This CM can be effectively and efficiently implemented using a systematic approach with numerous and long locations, resulting in low to moderate cost projects that are more appropriate to seek state or federal funding.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Head-on, Side-swipe	CRF:	40 - 53%

R30, Install centerline rumble strips/stripes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	20%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the new rumble strips/stripes.		

General information

Where to use:

Center Line rumble strips/stripes can be used on virtually any roadway – especially those with a history of head-on crashes. It is recommended that rumble strips/stripes be applied systematically along an entire route instead of only at spot locations. For all rumble strips/stripes, pavement condition should be sufficient to accept milled rumble strips. Care should be taken when considering installing rumble strips in locations with residential land uses or in areas with high bicycle volumes.

Why it works:

Rumble strips provide an auditory indication and tactile rumble when driven on, alerting drivers that they are drifting out of their travel lane, giving them time to recover before they depart the roadway or cross the center line. Additionally, rumble stripes (pavement marking in the rumble itself) provide an enhanced marking, especially in wet dark conditions.

General Qualities (Time, Cost and Effectiveness):

These improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number and length of locations. This CM can be effectively and efficiently implemented using a systematic approach with numerous and long locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Head-on, Side-swipe, All	CRF:	15 - 68%

R31, Install edgeline rumble strips/stripes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	All	15%	10 years
Notes:	This CM only applies to crashes occurring within the limits of the new rumble strips/stripes.		

General information
Where to use:
Shoulder and edge line milled rumble strips/stripes should be used on roads with a history of roadway departure crashes. It is recommended that rumble strips/stripes be applied systematically along an entire route instead of only at spot locations. For all rumble strips/stripes, pavement condition should be sufficient to accept milled rumble strips. Special requirements may apply and care should be taken when considering installing rumble strips in locations with residential land uses or in areas with high bicycle volumes.
Why it works:
Rumble strips provide an auditory indication and tactile rumble when driven on, alerting drivers that they are drifting out of their travel lane, giving them time to recover before they depart the roadway or cross the center line. Additionally, rumble stripes (pavement marking in the rumble itself) provide an enhanced marking, especially in wet dark conditions.
General Qualities (Time, Cost and Effectiveness):
These improvements do not require a long development process and can typically be implemented quickly. Costs for implementing this strategy are nominal and depend on the number and length of locations. This CM can be effectively and efficiently implemented using a systematic approach with numerous and long locations, resulting in moderate cost projects that are more appropriate to seek state or federal funding.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Run-off Road	CRF:	10 - 41%

R32PB, Install bike lanes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring within the limits of the Class II (not Class III) bike lanes. When an off-street bike-path is proposed that is not adjacent to the roadway, the applicant must document the engineering judgment used to determine which "Ped & Bike" crashes to apply.		

General information
Where to use:
Roadway segments noted as having crashes between bicycles and vehicles or crashes that may be preventable with a buffer/shoulder. Most studies suggest that bicycle lanes may provide protection against bicycle/motor vehicle collisions. Striped bike lanes can be incorporated into a roadway when is desirable to delineate which available road space is for exclusive or preferential use by bicyclists.
Why it works:
Most studies present evidence that bicycle lanes provide protection against bicycle/motor vehicle collisions. Bicycle lanes provide marked areas for bicyclist to travel along the roadway and provide for more predictable movements for both bicyclist and motorist. Evidence also shows that riding with the flow of vehicular traffic reduces bicyclists' chances of collision with a motor vehicle. Locations with bicycle lanes have lower rates of wrong-way riding. In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing cyclists on appropriate/legal travel paths and signs and markings warning motorists of non-motorized uses of the roadway that should be expected.
General Qualities (Time, Cost and Effectiveness):
Adding striped bicycle lanes can range from the simply restriping the roadway and minor signing to projects that require roadway widening, right-of-way, and environmental impacts. It is most cost efficient to create bike lanes during street reconstruction, street resurfacing, or at the time of original construction. The expected effectiveness of this CM must be assessed for each individual location. For simple installation scenarios, This CM can be very effective and can be considered on a systematic approach.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	0 - 53 %

R33PB, Install Separated Bike Lanes

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	45%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring within the limits of the separated bike lanes. When an off-street bike-path is proposed that is not adjacent to the roadway, the applicant must document the engineering judgment used to determine which "Ped & Bike" crashes to apply.		

General information

Where to use:

Separated bikeways are most appropriate on streets with high volumes of bike traffic and/or high bike-vehicle collisions, presumably in an urban or suburban area. Separation types range from simple, painted buffers and flexible delineators, to more substantial separation measures including raised curbs, grade separation, bollards, planters, and parking lanes. These options range in feasibility due to roadway characteristics, available space, and cost. In some cases, it may be possible to provide additional space in areas where pedestrian and bicyclists may interact, such as the parking buffer, or loading zones, or extra bike lane width for cyclists to pass one another.

Why it works:

Separated bike lanes provide increased safety and comfort for bicyclists beyond conventional bicycle lanes. By separating bicyclists from motor traffic, "protected" or physically separated bike lanes can offer a higher level of comfort and are attractive to a wider spectrum of the public. Intersections and approaches must be carefully designed to promote safety and facilitate left-turns for bicyclists from the primary corridor to cross street.
In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing cyclists on appropriate/legal travel paths and signs and markings warning motorists of non-motorized uses of the roadway that should be expected.

General Qualities (Time, Cost and Effectiveness):

The cost of Installing separated bike lanes can be low to medium or high, depending on whether roadway widening, right-of-way and environmental impacts are involved. It is most cost efficient to create bike lanes during street reconstruction, street resurfacing, or at the time of original construction. The expected effectiveness of this CM must be assessed for each individual location.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	3.7 - 100 %

R34PB, Install sidewalk/pathway (to avoid walking along roadway)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	80%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring within the limits of the new walkway. This CM is not intended to be used where an existing sidewalk is being replaced with a wider one, unless prior Caltrans approval is included in the application. When an off-street multi-use path is proposed that is not adjacent to the roadway, the applicant must document the engineering judgment used to determine which "Ped & Bike" crashes to apply.		

General information

Where to use:

Areas noted as not having adequate or no sidewalks and a history of walking along roadway pedestrian crashes. In rural areas asphalt curbs and/or separated walkways may be appropriate.

Why it works:

Sidewalks and walkways provide people with space to travel within the public right-of-way that is separated from roadway vehicles. The presence of sidewalks on both sides of the street has been found to be related to significant reductions in the "walking along roadway" pedestrian crash risk compared to locations where no sidewalks or walkways exist. Reductions of 50 to 90 percent of these types of pedestrian crashes. In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing pedestrians and cyclists on appropriate/legal travel paths and signs and markings warning motorists of non-motorized uses of the roadway that should be expected.

General Qualities (Time, Cost and Effectiveness):

Costs for sidewalks will vary, depending upon factors such as width, materials, and existing of curb, gutter and drainage. Asphalt curbs and walkways are less expensive, but require more maintenance. The expected effectiveness of this CM must be assessed for each individual location. These projects can be very effective in areas of high-pedestrian volumes with a past history of crashes involving pedestrians.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	65 - 89 %

R35PB, Install/upgrade pedestrian crossing (with enhanced safety features)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years

Notes:	This CM only applies to "Ped & Bike" crashes occurring in the influence area (expected to be a maximum of within 250') of the new crossing which includes new enhanced safety features. Note: This CM is not intended to be combined with the "Install raised pedestrian crossing" when calculating the improvement's B/C ratio. This CM is not intended to be used for high-cost aesthetic enhancements (i.e. stamped concrete or stamped asphalt).

General information
Where to use:
Roadway segments with no controlled crossing for a significant distance in high-use midblock crossing areas and/or multilane roads locations. Based on the Zegeer study (Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations) at many locations, a marked crosswalk alone may not be sufficient to adequately protect non-motorized users. In these cases, flashing beacons, curb extensions, medians and pedestrian crossing islands and/or other safety features should be added to complement the standard crossing elements. For multi-lane roadways, advance "yield" markings can be effective in reducing the 'multiple-threat' danger to pedestrians.
Why it works:
Adding pedestrian crossings has the opportunity to greatly enhance pedestrian safety at locations noted as being problematic. The enhanced safety elements, which may include curb extensions, medians and pedestrian crossing islands, beacons, and lighting, combined with pavement markings delineating a portion of the roadway that is designated for pedestrian crossing. Care must be taken to warn drivers of the potential for pedestrians crossing the roadway and enhanced improvements added to the crossing increase the likelihood of pedestrians crossing in a safe manner. In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing pedestrians and cyclists on appropriate/legal travel paths and signs. When agencies opt to install aesthetic enhancement to crossing like stamped concrete/asphalt, the project design and construction costs can significantly increase. For HSIP applications, these costs must be accounted for in the B/C calculation, but these costs (over standard crosswalk markings) must be tracked separately and are not federally reimbursable and will increase the agency's local-funding share for the project costs.
General Qualities (Time, Cost and Effectiveness):
Costs associated with this strategy will vary widely, depending on the extent of the curb extensions, raised medians, flashing beacons, and other pedestrian safety elements that are needed with the crossing. When considered at a single location, these improvements can sometimes be low cost and funded through local funding by local crews. This CM can often be effectively and efficiently implemented using a systematic approach with numerous locations, resulting in moderate to high cost projects that are appropriate to seek state or federal funding.

FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	8 - 56%

R36PB, Install raised pedestrian crossing

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the area with the new raised crossing. Note: This CM is not intended to be combined with the "Install pedestrian crossing (with enhanced safety features)" when calculating the improvement's B/C ratio.		

General information				
Where to use:				
On lower-speed roadways, where pedestrians are known to be crossing roadways that involve significant vehicular traffic. Based on the Zegeer study (Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations) at many locations, a marked crosswalk alone, may not be sufficient to adequately protect non-motorized users. In these cases, raised crossings can be added to complement the standard crossing elements. Special requirements may apply and extra care should be taken when considering installing raised crossings to ensure unintended safety issues are not created, such as: emergency vehicle access or truck route issues.				
Why it works:				
Adding a raised pedestrian crossing has the opportunity to enhance pedestrian safety at locations noted as being especially problematic. The raised crossing encourages motorists to reduce their speed and provides improved delineation for the portion of the roadway that is designated for pedestrian crossing. In combination with this CM, better guidance signs and markings for non-motorized and motorized roadway users should be considered, including: sign and markings directing pedestrians and cyclists on appropriate/legal travel paths.				
General Qualities (Time, Cost and Effectiveness):				
Costs associated with this strategy will vary widely, depending upon the elements of the raised crossing and the need for new curb ramps and sidewalk modifications. This CM may be effectively and efficiently implemented using a systematic approach with more than one location and can have medium to high B/C ratios based on past non-motorized crash history.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	30 - 46%

R37PB, Install Rectangular Rapid Flashing Beacon (RRFB)

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Pedestrian and Bicycle	35%	20 years
Notes:	This CM only applies to "Ped & Bike" crashes occurring in the influence area (expected to be a maximum of within 250') of the crossing which includes the RRFB.		

General information				
Where to use:				
Rectangular Rapid Flashing Beacon (RRFB) includes pedestrian-activated flashing lights and additional signage that enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings. It uses an irregular flash pattern that is similar to emergency flashers on police vehicles. RRFBs are installed at unsignalized intersections and mid-block pedestrian crossings.				
Why it works:				
RRFBs can enhance safety by increasing driver awareness of potential pedestrian conflicts and reducing crashes between vehicles and pedestrians at unsignalized intersections and mid-block pedestrian crossings. The addition of RRFB may also increase the safety effectiveness of other treatments, such as crossing warning signs and markings.				
General Qualities (Time, Cost and Effectiveness):				
RRFBs are a lower cost alternative to traffic signals and hybrid signals. This CM can often be effectively and efficiently implemented using a systematic approach with numerous locations.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Pedestrian, Bicycle	CRF:	7 – 47.4%

R38, Install Animal Fencing

For HSIP Cycle 11 Call-for-projects			
Funding Eligibility	Crash Types Addressed	CRF	Expected Life
90%	Animal	80%	20 years
Notes:	This CM only applies to "animal" crashes occurring within the limits of the new fencing.		

General information				
Where to use:				
At locations with high percent of vehicular/animal crashes (reactive) or where there is a known high percent of animals crossing due to migratory patterns (proactive).				
Why it works:				
Animal fencing helps to channelize the identified animals to a natural or man-made crossing, eliminating the conflict between vehicles and animals on the same place. Animal fencing is typically installed at a bridge location with its "run of need" dependent on the surrounding terrain.				
General Qualities (Time, Cost and Effectiveness):				
Time to install fencing can be moderate to lengthy depending on the environmental commitments and agreed upon solution to mitigating project impacts. Costs will be fairly low and depend on the "run of need" length. There will be minimal reoccurring maintenance costs on keeping the fence intact. The expected effectiveness of this CM must be assessed for each individual location.				
FHWA CMF Clearinghouse:	Crash Types Addressed:	Animal	CRF:	70 - 90 %

Appendix C: Summary of "Recommended Actions"

The information contained here represent a brief summary of each section of this manual as well as the Summary of "Recommended Actions" from Sections 2 through 7. This is intended to be a quick-reference for local agency practitioners working on a "proactive safety analysis" of their roadway network.

Introduction and Purpose

As safety practitioners consider implementing a 'proactive safety analysis approach' they should consider the overall context of the safety issues facing California local agencies and Caltrans primary goals for preparing this Safety manual for California's local roadway owners. Figure 1 provides a flowchart of the process and Appendices E and F provide examples and lessons learned from recent statewide calls-for-projects.

Identifying Safety Issues

This section provides an overview of the types of data to collect for the identification of roadway safety issues. It discusses sources of crash data and how they can be used. As practitioners gather information they are encouraged to develop one or more separate spreadsheets and/or pin-maps to help track and manage this data. The following spreadsheet is offered as an example, but each agency's spreadsheet should include data and be formatted as necessary to meet their needs.

	General Information		Crash Information			Evaluation / Action		
Location & Date	Source/Type of information	Safety Issue/Problem	Nature of Crashes	Time of Day	Weather/Traffic Conditions	Staff Evaluation	Recommend Action	Resolution
1) Intersection "X"								
2) Roadway Segment (PM 5.3 to PM 7.8)								

State and Local Crash Databases

Recommended Action: Obtain at least 3 years of network-wide crash data to identify local roads that have a history of roadway crashes. This will be used to identify predominant roadway crash locations, crash types and other common characteristics.

Transportation Injury Mapping System (TIMS)

Recommended Action: Consider augmenting your local agency's data collection approach with information available using the suite of TIMS tools. The TIMS tools (and/or tools from private for-profit vendors) can help the safety practitioner access and manage their crash data.

Law Enforcement Crash Reports

Recommended Action: Develop a working relationship with law enforcement officials responsible for enforcement and crash investigations. This could foster a partnership where sharing crash reports and safety information on problem roadway segments becomes an everyday occurrence. Practitioners with limited access to crash data are encouraged to use TIMS to assess the local crash report data.

Observational Information

Recommended Action: Gather information received from law enforcement and road maintenance crew observations. Develop a system for maintenance crews to report and record observed roadway safety issues and a mechanism to address them.

Public Notifications

Recommended Action: Review and summarize information received from these sources, identifying segments or corridors with multiple notifications and record the locations, dates, and nature of the problem that are cited.

Roadway Data and Devices

Recommended Action: Identify and track roadway characteristics for the intersections, roadway segments, and corridors, including compliance with the minimum standards. At a minimum, this should be done for locations being considered for safety improvements, but ideally agencies would establish an extensive database of roadway data to help them proactively identify high risk roadway features.

Exposure Data

Recommended Action: Consider the availability of exposure data and track it along with the other crash data to help prioritize potential locations for safety improvements.

Field Assessments and Road Safety Audits

Recommended Action: Consider completing formal or informal field assessments and RSAs at certain locations to help ensure all relevant information is collected and available for the safety practitioners to complete their safety analysis and identification of the most appropriate countermeasures. Develop simple straightforward criteria on when one of these will be undertaken.

Safety Data Analysis

This section summarizes the types of analyses that can be conducted to determine what roadway countermeasures should be implemented. This section is the link between the data (Section 2) and the selection of appropriate countermeasures (Section 4). It provides definitions and examples of the qualitative and quantitative factors that should be considered when evaluating roadway safety issues.

Quantitative Analysis

Recommended Action: Complete a quantitative analysis of their roadway data using both Crash Frequency and Crash Rate methodologies, including:

Crash Frequency

Top 10 (or 20) lists of intersections and roadway segments.

For lower volume roadways, network wide pin-maps may be more effective.

Develop collision diagrams showing the direction of movement of vehicles and pedestrians.

Crash Rate

Top 10 (or 20) lists of roadway segments in relationship to length, volumes, and/or density.

Top 10 (or 20) lists of intersections, sorted by crash rate.

Top 10 (or 20) lists of the highest volume intersections, sorted by crash frequency or rate.

Qualitative Analysis
Recommended Action: Consider completing field assessments and RSAs to identify roadway infrastructure characteristics relating to both locations with compliance issues and locations with high crash frequencies/rates. As part the field assessments, common roadway and crash characteristics should be identified for the potential systemic deployment of countermeasures.

Caltrans recommends all agencies complete both quantitative and qualitative analyses before starting their applications for HSIP program funding. The findings from these analyses should be documented in spreadsheets and/or pin-maps similar to the ones discussed in Section 2.

Countermeasures

This Section provides a description of selected countermeasures that have been shown in this manual. It includes a basic set of strategies to implement at locations experiencing a history of crashes and their corresponding crash modification factors (CMF). NOTE: Crash Reduction Factors (CRFs) are directly connected to the CMFs and are another indication of the effectiveness of a particular treatment. The CRF for a countermeasure is defined mathematically as 1 – CMF. The terms CMFs and CRFs are used interchangeably throughout this document.

Selecting Countermeasures and Crash Modification Factors / Crash Reduction Factors
Countermeasure Details and Characteristics
Recommended Action: Agencies should use all information and results obtained through completing the actions in Sections 2, 3 and 4 to select the appropriate countermeasures for their HCCLs and systemic improvements. As novice safety practitioners select countermeasures, they must realize that a reasonable level of traffic 'engineering judgment' is required and that this manual and should not be used as a simple cheat-sheet for preparing and submitting applications for funding.

Calculating the B/C ratio and Comparing Projects

This section defines a methodology for calculating a benefit to cost (B/C) ratio for a potential safety project. It includes sources for estimating projected costs and benefits and the specific values/formulas Caltrans uses for its statewide evaluations of HSIP projects. This section also discusses the potential value in reevaluating projects' overall cost effectiveness.

Estimating the Benefit of Implementing Proposed Improvements
Recommended Action: Prepare 'Total Benefit' estimates for the proposed projects being evaluated in the proactive safety analysis.
Estimating the Cost of Implementing Proposed Improvements
Recommended Action: Prepare 'Total Project Cost' estimates for the proposed projects being evaluated in the proactive safety analysis.

Calculating the B/C Ratio
Recommended Action: Calculate the B/C ratio for each of the proposed projects being evaluated in the proactive safety analysis.
Compare B/C Ratios and Consider the Need to Reevaluate Project Elements
Recommended Action: Compare, reevaluate, and prioritize the potential safety projects. Consider changing the project limits or utilizing lower cost countermeasures for projects with low initial B/C ratios.

Identifying Funding and Construct Improvements

This section identifies existing and new funding opportunities for safety projects that local agencies should be considering. This section also briefly discusses some unique project development issues and strategies for safety projects as they proceed through design and construction.

Existing Funding for Low-cost Countermeasures
Recommended Action: Survey planned maintenance, developer and capital projects to determine whether they overlap any of the proposed safety projects. Where projects overlap, leverage the existing funding sources to include safety countermeasures.

Other Funding Sources
Recommended Action: Consider all potential funding opportunities to incorporate the identified safety countermeasures including the HSIP and ATP Programs.

Project Development and Construction Considerations
Recommended Action: Safety practitioners should follow their safety projects all the way through the project delivery and construction process. In addition, they should establish a safety program delivery plan that brings awareness and support to the expedited delivery of safety projects. Where possible, safety practitioners should involve the media and even consider having their own program intended to "toot their own safety-horn."

Evaluation Improvements

This section presents the process to complete an evaluation of installed treatments. After the countermeasures are installed, assessing their effectiveness will provide valuable information and can help determine which countermeasures should continue to be installed on other roadways to make them safer as well.
Recommended Action: Develop a spreadsheet to track future safety project installations and record 3+ years of "before" and "after" crash information at those locations. Once safety countermeasures are constructed, schedule and track assessment dates to ensure they happen.

Appendix D: Benefit Cost Ratio (BCR) Calculations

This appendix includes the Benefit Cost methodology used in the Caltrans calls-for-projects in the HSIP programs. The HSM, Part B - Chapter 7, includes more details on conducting Economic Appraisal for roadway safety projects. Local agencies will be required to utilize the HSIP Analyzer to calculate the Benefit Cost Ratio (BCR) as part of their application for HSIP funding. Starting in Cycle 7 call for projects, the fatality and severe injury costs have been combined for calculating the benefit. Because fatality figures are small and are a matter of randomness, this change is being made to reduce the possibility of selecting an improvement project on the basis of randomness.

1) $Benefit\ (Annual) = \sum_{s=0}^{3} \frac{CRF \times N \times CC_{ave}}{Y}$

- CRF : Crash reduction factor in each countermeasure.
- S : Severity (0: PDO, 1: Minor Injury, 2: Injury, 3: Severe Injury/Fatal). See the below table.
- N : Number of Crashes, in severity levels, related to selected countermeasure.
- Y : Crash data time period (Year).
- CC_{ave} : Crash costs in severity levels.

Severity (S)	Crash Severity *	Location Type	Crash Cost ***
3	**Fatality and Severe Injury Combined (KA)	Signalized Intersection	$1,787,000
3		Non Signalized Intersection	$2,843,000
3		Roadway	$2,461,000
2	Evident Injury – Other Visible (B)		$159,900
1	Possible Injury–Complaint of Pain (C)		$90,900
0	Property Damage Only (O)		$14,900

* The letters in parenthesis (K, A, B, C and O) refer to the KABCO scale; it is commonly used by law enforcement agencies in their crash reporting efforts and is further documented in the HSM.

** Figures were calculated based on an average Fatality (K) / Severe Injury (A) ratio for each area type, a crash cost for a Fatality (K) of $8,112,200, and a crash cost of a Severe/Disabling Injury (A) of $437,100. These costs are used in the HSIP Analyzer.

*** Based on Table 7-1, Highway Safety Manual (HSM), First Edition, 2010. Adjusted to 2022 Dollars.

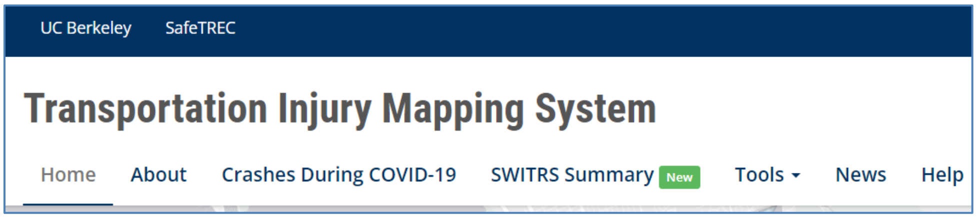
2) *Benefit (Life) = Benefit (annual) x Years of service life*

3) BCR (each countermeasure): $Benefit\ \ Cost\ Ratio_{(CM)} = \frac{Benefit\ (Life)_{(CM)}}{Total\ \Pr oject\ Cost_{(CM)}}$

4) BCR (project): $BCR\ (Project) = \frac{\sum_{CM=1}^{n} Benefit\ (Life)_{(CM)}}{Total\ \ Pr\,oject\ Cost}$

Appendix E: Examples of Crash Data Collection and Analysis Techniques using TIMS

As demonstrated throughout the manual, SafeTREC's TIMS website http://tims.berkeley.edu/ can be used to assist local agencies in completing a proactive safety analysis of their roadway network. *(Note: This manual focuses on TIMS as a tool to access and map SWITRS data because TIMS is free to local agencies and the general public. Local agencies are encouraged to try TIMS, but they should not feel obligated to make a switch if they prefer using their vendor-supplied crash analysis software to complete their data collection and analysis process).*



SWITRS Query & Map:

The SWITRS Query & Map application is a tool for accessing and mapping fatal and injury collision data from the California Statewide Integrated Traffic Records System (SWITRS).

SWITRS GIS Map:

The SWITRS GIS Map offers an interactive map-centric approach to viewing and querying SWITRS collision data, with the capability of multiple tasks including Rank by Intersection, Collision Diagram, etc.

Collision Diagram Tool:

The Collision Diagram tool allows users to generate an interactive collision diagram. The Collision Diagram is accessible through SWITRS GIS Map after a set of collisions is selected.

ATP Maps & Summary Data:

The ATP Maps & Summary Data tool utilizes interactive collision maps to find pedestrian and bicycle collisions hot spot and generate data summaries within specified project and/or community limits. Though it is designed to support the California Active Transportation Program (ATP), this tool may be useful in developing an HSIP project targeting pedestrian and bicycle safety issues.

Appendix F: List of Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ATP	Active Transportation Program
B/C; BCR	Benefit Cost Ratio
Caltrans	California Department of Transportation (Division of Local Assistance)
CA-MUTCD	California - Manual on Uniform Traffic Control Devices
CM	Countermeasure
CMF	Crash Modification Factor
CRF	Crash Reduction Factor
"5 E's of Safety"	Education, Enforcement, Engineering, Emergency Response and Emerging Technologies
EMS	Emergency Medical Services
FHWA	Federal Highway Administration
HCCL	High Crash Concentration Location
HR3	High Risk Rural Roads Program
HSIP	Highway Safety Improvement Program
HSM	Highway Safety Manual
RSA	Roadway Safety Audit
SafeTREC	Safe Transportation Research and Education Center (SafeTREC) at the University of California, Berkeley
SHSP	Strategic Highway Safety Plan
SWITRS	Statewide Integrated Traffic Records System
TIMS	Transportation Injury Mapping System (a product of SafeTREC)

Appendix G: References

1. FHWA, Office of Safety website: Local and Rural Road Safety Program
   - https://safety.fhwa.dot.gov/local_rural/

2. Highway Safety Manual (HSM). Product of the American Association of State Highway and Transportation Officials.
   - http://www.highwaysafetymanual.org/Pages/default.aspx

3. National Highway Traffic Safety Administration (NHTSA): National Center for Statistics and Analysis (NCSA) Motor Vehicle Traffic Crash Data Resource
   - https://crashstats.nhtsa.dot.gov/

4. California - Manual on Uniform Traffic Control Devices (CA-MUTCD)
   - https://dot.ca.gov/programs/safety-programs/camutcd

5. Caltrans' website on the Highway Design Manual
   - https://dot.ca.gov/programs/design/manual-highway-design-manual-hdm

6. FHWA, Research and Development website for Bikesafe and Pedsafe
   - https://safety.fhwa.dot.gov/ped_bike/tools_solve/

7. AASHTO - A Policy on Geometric Design of Highways and Streets ("Green Book")

   AASHTO - the Roadside Design Guide
   - https://store.transportation.org/

8. FHWA – Public Roads Magazine:
   - https://highways.dot.gov/public-roads/home

APPENDIX E:
Countermeasure Toolbox

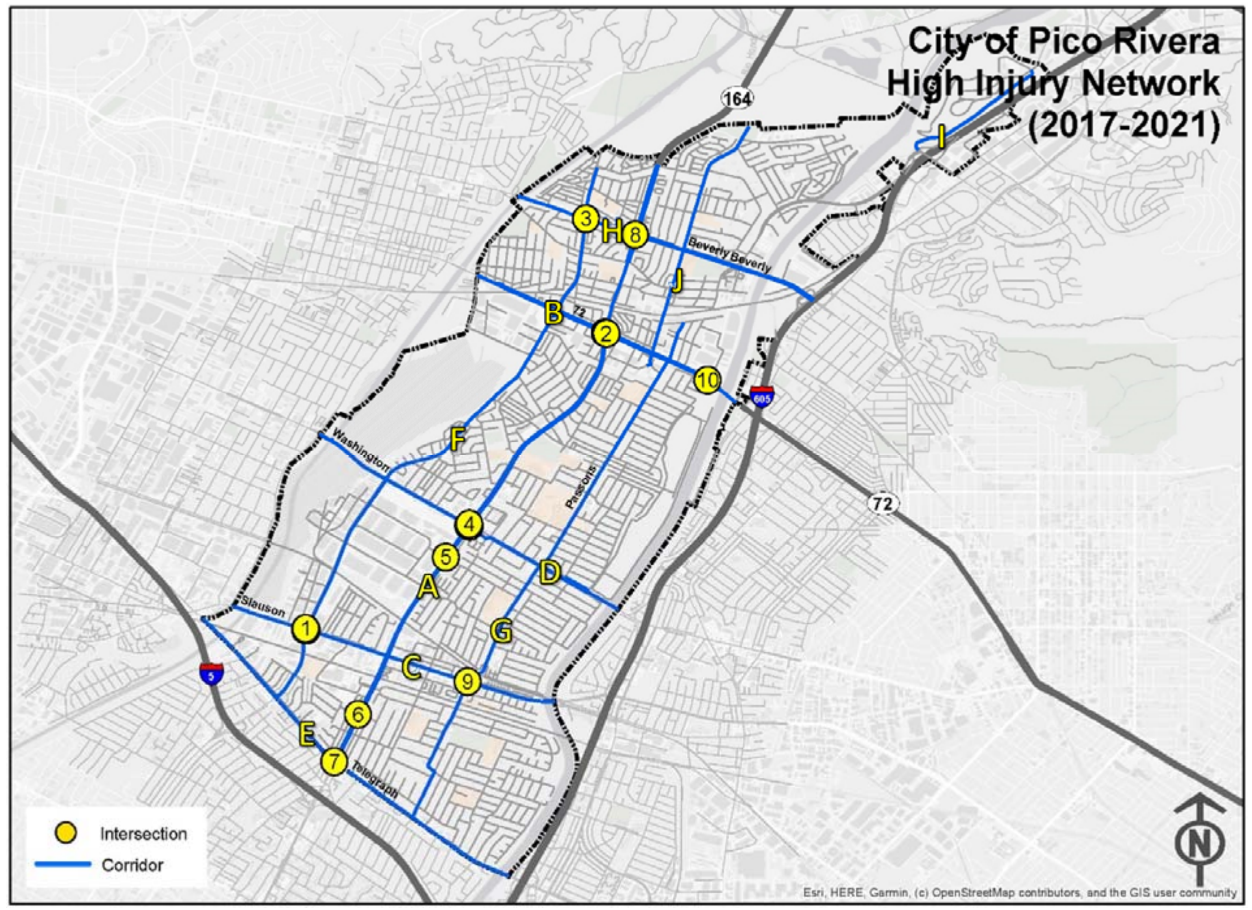
High-risk Intersections

ID	Intersection	Control	Consolidated CMs (HSIP-Eligible - Refer to LRSM* 2020)						Additional CM (non-HSIP)**
			CM1	CM2	CM3	CM4	CM5	CM6	
1	Slauson Ave and Paramount Blvd	Signalized	S02	S03	S09	S10	S20PB		Pavement Resurface, Restrict U-Turns
2	Rosemead Blvd and Whittier Blvd	Signalized	S02	S03	S09	S20PB			
3	Beverly Blvd and Paramount Blvd	Signalized	S02	S03	S09				Keep Right Median sign missing on south leg
4	Rosemead Blvd and Washington Blvd	Signalized	S02	S03	S09	S12			Convert to RT only on SB approach to reduce collisions due to SB merging lane
5	Rosemead Blvd and Danbridge St	Stop Controlled	NS22PB	NS03					
6	Rosemead Blvd and Maxine St	Stop Controlled	NS11	NS03	NS01				Restrict On-Street Parking
7	Rosemead Blvd and Telegraph Rd	Signalized	S02	S03	S09	S11			
8	Beverly Blvd and Rosemead Blvd	Signalized	S02	S03					
9	Slauson Ave and Passons Blvd	Signalized	S02	S03	S09				
10	Gregg Rd and Whittier Blvd	Signalized	S02	S03	S09				

ID	EA - 1 Improve Intersection Safety			EA - 2 Address Rear-end collisions			EA - 3 Address Broadside collisions			EA - 4 Reduce Unsafe speed violations			EA - 5 Address Nighttime collisions			EA - 6 Reduce Improper Turning violations		
	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3
1	S02	S03	S09	S11	S02	S10	S02	S03	S09	S02	S03		S02	S09		S09		
2	S02	S03	S09	S11	S02		S02	S03	S09	S02	S03		S02	S09		S09		
3	S02	S03	S09	S11	S02		S02	S03	S09	S02	S03		S02	S09		S09		
4	S02	S03	S09	S11	S02		S02	S03	S09	S02	S03		S02	S09		S09	S12	
5	NS06	NS22PB	NS03				NS03	NS06					NS06	NS08		NS13		
6	NS06	NS11	NS03				NS03	NS06		NS10			NS06	NS08	NS01	NS13		
7	S02	S03	S09	S11	S02		S02	S03	S09	S02	S03		S02	S09				
8	S02	S03		S11	S02		S02	S03		S02	S03		S02					
9	S02	S03	S09	S11	S02		S02	S03	S09	S02	S03		S02	S09		S09	S12	
10	S02	S03	S09	S11	S02		S02	S03	S09	S02	S03		S02	S09		S09	S12	

Code	Countermeasure Name
HSIP/Non-HSIP Code	
S01	Add intersection lighting
S02	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, and number
S03	Improve signal timing (coordination, phases, red, yellow, or operation)
S05	Install emergency vehicle pre-emption systems
S06	Install left-turn lane and add turn phase (signal has no left-turn lane or phase before)
S07	Provide protected left turn phase (left turn lane already exists)
S08	Convert signal to mast arm (from pedestal-mounted)
S09	Install raised pavement markers and striping (Through Intersection)
S10	Install flashing beacons as advance warning (S.I.)
S11	Improve pavement friction (High Friction Surface Treatments)
S12	Install raised median on approaches (S.I.)
S13PB	Install pedestrian median fencing on approaches
S14	Create directional median openings to allow (and restrict) left-turns and U-turns (S.I.)
S15	Reduced Left-Turn Conflict Intersections (S.I.)
S16	Convert intersection to roundabout (from signal)
S17PB	Install pedestrian countdown signal heads
S18PB	Install pedestrian crossing (S.I.)
S19PB	Pedestrian Scramble
S20PB	Install advance stop bar before crosswalk (Bicycle Box)
S21PB	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)

Code	Countermeasure Name
NS01	Add intersection lighting (NS.I.)
NS02	Convert to all-way STOP control (from 2-way or Yield control)
NS03	Install Signals
NS04	Convert intersection to roundabout (from all way stop)
NS05	Convert intersection to roundabout (from 2-way stop or Yield control)
NS05m	Convert intersection to mini-roundabout
NS06	Install/upgrade larger or additional stop signs or other intersection warning/regulatorysigns
NS07	Upgrade intersection pavement markings (NS.I.)
NS08	Install Flashing Beacons at Stop-Controlled Intersections
NS09	Install flashing beacons as advance warning (NS.I.)
NS10	Install transverse rumble strips on approaches
NS11	Improve sight distance to intersection (Clear Sight Triangles)
NS12	Improve pavement friction (High Friction Surface Treatments)
NS13	Install splitter-islands on the minor road approaches
NS14	Install raised median on approaches (NS.I.)
NS15	Create directional median openings to allow (and restrict) left-turns and u-turns (NS.I.)
NS16	Reduced Left-Turn Conflict Intersections (NS.I.)
NS17	Install right-turn lane (NS.I.)
NS18	Install left-turn lane (where no left-turn lane exists)
NS19PB	Install raised medians (refuge islands)
NS20PB	Install pedestrian crossing at uncontrolled locations (signs and markings only)
NS21PB	Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features)
NS22PB	Install Rectangular Rapid Flashing Beacon (RRFB)
NS23PB	Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))



High-risk Roadway Segments

ID	Roadway Segment	Consolidated CMs (HSIP-Eligible - Refer to LRSM* 2020)						Additional CM (non-HSIP)**	EA - 1 Improve Intersection Safety			EA - 2 Address Rear-end collisions			EA - 3 Address Broadside collisions			EA - 4 Reduce Unsafe speed violations			EA - 5 Address Nighttime collisions			EA - 6 Reduce Improper Turning violations		
		CM1	CM2	CM3	CM4	CM5	CM6		CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3	CM1	CM2	CM3
A	Rosemead Blvd: From/To City Limits	R22	R26	R27	R02							R22	R21					R22	R26		R22	R27		R22	R27	
B	Whittier Blvd/ SR 72: From/To City Limits	R22	R26	R27	R01			No RTOR, Add protected bike lane				R22	R21					R22	R26		R22	R27		R22	R27	
C	Slauson Ave: From/To City Limits	R22	R27	R01	R30			Pavement Resurface				R22						R22			R22	R27		R22	R27	
D	Washington Blvd: From/To City Limits	R22	R27	R01				Pavement Resurface and restriping				R22						R22			R22	R27		R22	R27	
E	Telegraph Rd: From/To City Limits	R26	R30										R21						R26							
F	Paramount Blvd: Gallatin Rd to Telegraph Road	R22	R26	R27								R22	R21					R22	R26		R22	R27		R22	R27	
G	Passons Blvd: Stephens St to City Limit	R22	R27	R36PB	R30	R10PB		High Visibility Crosswalk, Pavement Resurface and restriping				R22	R21					R22			R22	R27		R22	R27	
H	Beverly Blvd: From/To City Limits	R22	R27	R02				Traffic Calming, Speed Feedback Sign				R22	R21					R22			R22	R27		R22	R27	
I	Rooks Rd: Sports Arena Dr to San Gabriel River Pkwy	R22	R26	R27	R01	R23						R22						R22	R26		R22	R27	R01			
J	Durfee Ave: Kruse Road to Jackson St	R22	R27	R30				Pavement Resurface and restriping				R22						R22			R22	R27		R22	R27	

Code	Countermeasure Name
R01	Add Segment Lighting
R02	Remove or relocate fixed objects outside of Clear Recovery Zone
R03	Install Median Barrier
R04	Install Guardrail
R05	Install impact attenuators
R06	Flatten side slopes
R07	Flatten side slopes and remove guardrail
R08	Install raised median
R09	Install median (flush)
R10PB	Install pedestrian median fencing
R11	Install acceleration/ deceleration lanes
R12	Widen lane (initially less than 10 ft)
R13	Add two-way left-turn lane (without reducing travel lanes)
R14	Road Diet (Reduce travel lanes from 4 to 3 and add a two way left-turn and bike lanes)
R15	Widen shoulder
R16	Curve Shoulder widening (Outside Only)
R17	Improve horizontal alignment (flatten curves)
R18	Flatten crest vertical curve
R19	Improve curve superelevation
R20	Convert from two-way to one-way traffic
R21	Improve pavement friction (High Friction Surface Treatments)
R22	Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)
R23	Install chevron signs on horizontal curves
R24	Install curve advance warning signs
R25	Install curve advance warning signs (flashing beacon)
R26	Install dynamic/variable speed warning signs
R27	Install delineators, reflectors and/or object markers
R28	Install edge-lines and centerlines
R29	Install no-passing line
R30	Install centerline rumble strips/stripes
R31	Install edgeline rumble strips/stripes
R32PB	Install bike lanes
R33PB	Install Separated Bike Lanes
R34PB	Install sidewalk/pathway (to avoid walking along roadway)
R35PB	Install/upgrade pedestrian crossing (with enhanced safety features)
R36PB	Install raised pedestrian crossing
R37PB	Install Rectangular Rapid Flashing Beacon (RRFB)
R38	Install Animal Fencing

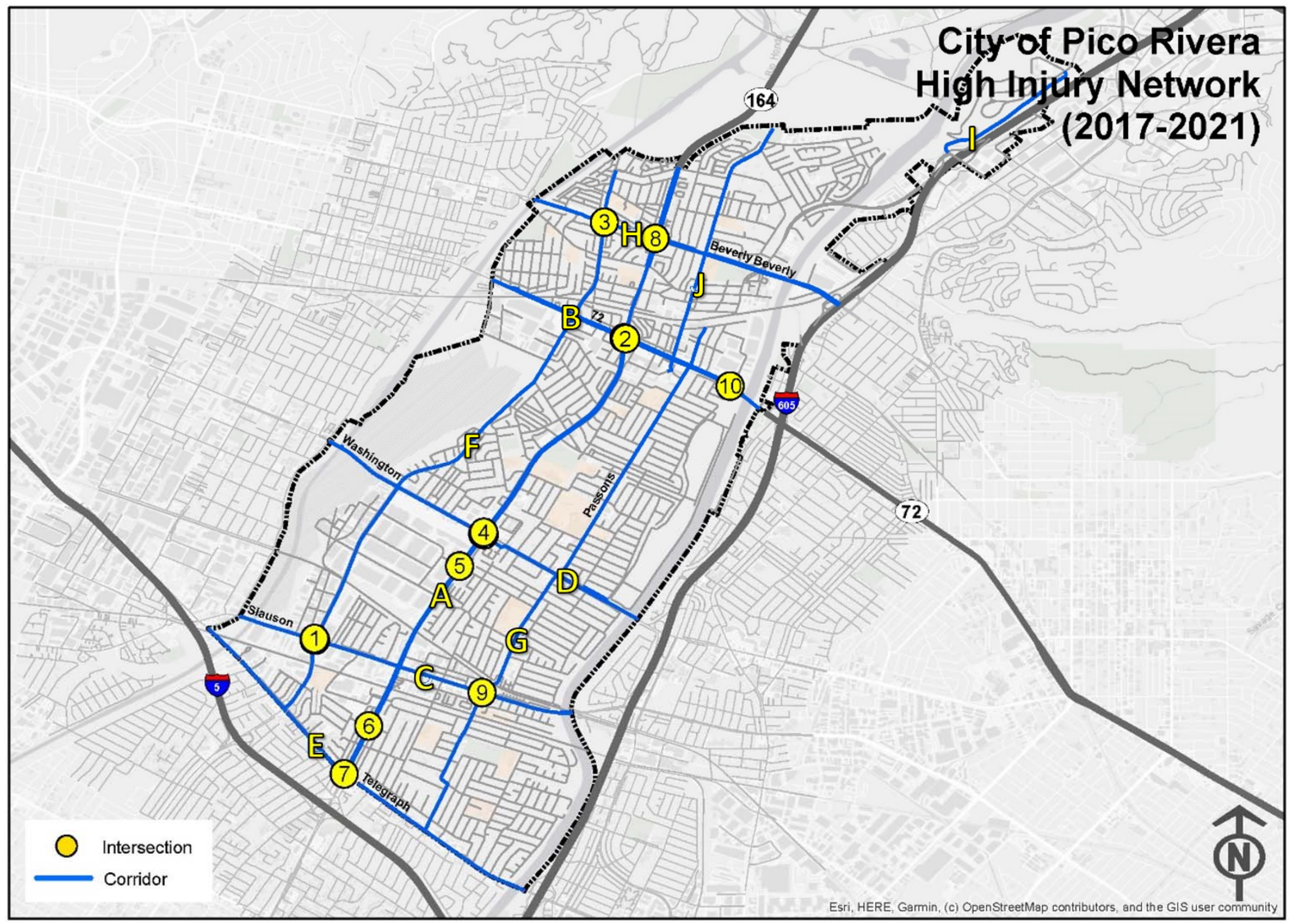


Table 5. Non-Engineering Countermeasures

	Strategy	Performance Measure	Organizations to be involved
Education	Conduct public information and education campaign for intersection safety laws, unsafe speeds, distracted driving, and driving under the influence.	Number of education campaigns	City/ School District/ Sheriff Department
	Conduct pedestrian safety campaigns and outreach to raise their awareness of pedestrian safety needs through media outlets and social media.	Number of education campaigns	City/ School District/ Sheriff Department
	Conduct bicycle safety campaigns and outreach to raise their awareness of bicycle safety needs through media outlets and social media.	Number of education campaigns	City/ School District/ Sheriff Department
Enforcement	Targeted enforcement at high-risk locations.	Number of tickets issued.	Sheriff Department
	Increase the number of personnel who have completed Advanced Roadside impaired Driving Enforcement (ARIDE) training	Number of personnel who have completed Advanced Roadside impaired Driving Enforcement (ARIDE) training	Sheriff Department
Emergency Medical Services (EMS)	S05, Install emergency vehicle pre-emption systems	EMS vehicle response time.	Local Emergency Services Agency
	Increase the number of EMS/fire controll personnel taking Traffic Incident Managmenet Training	number of EMS/fire controll personnel taking Traffic Incident Managmenet Traising	Local Emergency Services Agency

HSIP Eligible Countermeasures

City of Pico Rivera LRSP

Countermeasures for Intersections

Sr. No.	Code	Countermeasure Name	CM Description	CRF	Federal Funding	Systemic Approach Opportunity
			Signalized			
HSIP/Non-HSIP Code						
1	S01	Add intersection lighting	Provision of lighting at intersection.	40%	90%	Medium
2	S02	Improve signal hardware: lenses, back-plates with retroreflective borders, mounting, size, an	Includes New LED lighting, signal back plates, retro-reflective tape outlining the back plates, or visors to increase signal visibility, larger signal heads, relocation of the signal heads, or additional signal heads.	15%	90%	Very High
3	S03	Improve signal timing (coordination, phases, red, yellow, or operation)	Includes adding phases, lengthening clearance intervals, eliminating or restricting higher-risk movements, and coordinating signals at multiple locations.	15%	50%	Very High
5	S05	Install emergency vehicle pre-emption systems	Corridors that have a history of crashes involving emergency response vehicles. The target of this strategy is signalized intersections where normal traffic operations impede emergency vehicles and where traffic conditions create a potential for conflicts between emergency and nonemergency vehicles. These conflicts could lead to almost any type of crash, due to the potential for erratic maneuvers of vehicles moving out of the paths of emergency vehicles	70%	90%	High
6	S06	Install left-turn lane and add turn phase (signal has no left-turn lane or phase before)	Intersections that do not currently have a left turn lane or a related left-turn phase that are experiencing a large number of crashes. Many intersection safety problems can be traced to difficulties in accommodating left-turning vehicles, in particular where there is currently no accommodation for left turning traffic. A key strategy for minimizing collisions related to left-turning vehicles (angle, rear-end, sideswipe) is to provide exclusive left-turn lanes and the appropriate signal phasing, particularly on high-volume and high-speed major-road approaches.	55%	90%	Low
7	S07	Provide protected left turn phase (left turn lane already exists)	Left turns are widely recognized as the highest-risk movements at signalized intersections. Providing Protected left-turn phases for signalized intersections with existing left turn pockets significantly improve the safety for left-turn maneuvers by removing the need for the drivers to navigate through gaps in oncoming/opposing through vehicles	30%	90%	High
8	S08	Convert signal to mast arm (from pedestal-mounted)	Providing better visibility of intersection signs and signals aids the drivers' advance perception of the upcoming intersection. Visibility and clarity of the signal should be improved without creating additional confusion or distraction for drivers.	30%	90%	Medium
9	S09	Install raised pavement markers and striping (Through Intersection)	Adding clear pavement markings can guide motorists through complex intersections. When drivers approach and traverse through complex intersections, drivers may be required to perform unusual or unexpected maneuvers	10%	90%	Very High
10	S10	Install flashing beacons as advance warning (S.I.)	Increased driver awareness of an approaching signalized intersection and an increase in the driver's time to react.	30%	90%	Medium
11	S11	Improve pavement friction (High Friction Surface Treatments)	Improving the skid resistance at locations with high frequencies of wet road crashes and/or failure to stop crashes	55%	90%	Medium
12	S12	Install raised median on approaches (S.I.)	Raised medians next to left turn lanes at intersections offer a cost effective means for reducing crashes and improving operations at higher volume intersections	25%	90%	Medium
13	S13PB	Install pedestrian median fencing on approaches	Signalized Intersections with high pedestrian-generators nearby (e.g. transit stops) may experience a high volumes of pedestrians J-walking across the travel lanes at mid-block locations instead of walking to the intersection and waiting to cross during the walk-phase.	30%	90%	Low
14	S14	Create directional median openings to allow (and restrict) left-turns and U-turns (S.I.)	Crashes related to turning maneuvers include angle, rear-end, pedestrian, and sideswipe (involving opposing left turns) type crashes. If any of these crash types are an issue at an intersection, restriction or elimination of the turning maneuver may be the best way to improve the safety of the intersection	50%	90%	Medium
15	S15	Reduced Left-Turn Conflict Intersections (S.I.)	Reduced left-turn conflict intersections are geometric designs that alter how left-turn movements occur in order to simplify decisions and minimize the potential for related crashes. Two highly effective designs that rely on U-turns to complete certain left-turn movements are known as the restricted crossing U-turn (RCUT) and the median U-turn (MUT).	50%	90%	Medium
16	S16	Convert intersection to roundabout (from signal)	Signalized intersections that have a significant crash problem and the only alternative is to change the nature of the intersection itself. Roundabouts can also be very effective at intersections with complex geometry and intersections with frequent left-turn movements.	Varies	90%	Low
17	S17PB	Install pedestrian countdown signal heads	Signals that have signalized pedestrian crossing with walk/don't walk indicators and where there have been pedestrian vs. vehicle crashes.	25%	90%	Very High
18	S18PB	Install pedestrian crossing (S.I.)	Signalized Intersections with no marked crossing and pedestrian signal heads, where pedestrians are known to be crossing intersections that involve significant turning movements. They are especially important at intersections with (1) multiphase traffic signals, such as left-turn arrows and split phases, (2) school crossings, and (3) double-right or double-left turns. At signalized intersections, pedestrian crossings are often safer when the left turns have protected phases that do not overlap the pedestrian walk phase.	25%	90%	High

19	S19PB	Pedestrian Scramble	Pedestrian Scramble is a form of pedestrian "WALK" phase at a signalized intersection in which all vehicular traffic is required to stop, allowing pedestrians/bicyclists to safely cross through the intersection in any direction, including diagonally. Pedestrian Scramble may be considered at signalized intersections with very high pedestrian/bicycle volumes, e.g. in an urban business district.	40%	90%	High
20	S20PB	Install advance stop bar before crosswalk (Bicycle Box)	Signalized Intersections with a marked crossing, where significant bicycle and/or pedestrians volumes are known to occur.	15%	90%	Very High
21	S21PB	Modify signal phasing to implement a Leading Pedestrian Interval (LPI)	Addition of LPI gives pedestrians the opportunity to enter an intersection 3-7 seconds before vehicles are given a green indication; only minor signal timing alteration is required.	60%	90%	Very High

Unsignalized

Sr. No.	Code	Countermeasure Name	CM Description	CRF	Federal Funding	Systemic Approach Opportunity
1	NS01	Add intersection lighting (NS.I.)	Provision of lighting at intersection.	40%	90%	Medium
2	NS02	Convert to all-way STOP control (from 2-way or Yield control)	Unsignalized intersection locations that have a crash history and have no controls on the major roadway approaches. However, all-way stop control is suitable only at intersections with moderate,and relatively balanced volume levels on the intersection approaches. Under other conditions, the use of all-way stop control may create unnecessary delays and aggressive driver behavior.	50%	90%	High
3	NS03	Install Signals	Installation of traffic signals	25%	90%	Low
4	NS04	Convert intersection to roundabout (from all way stop)	Intersections that have a high frequency of right-angle and left-turn type crashes. Whether such intersections have existing crash patterns or not, a roundabout provides an alternative to signalization. The primary target locations for roundabouts should be moderate-volume unsignalized intersections.	Varies	90%	Low
5	NS05	Convert intersection to roundabout (from 2-way stop or Yield control)	Intersections that have a high frequency of right-angle and left-turn type crashes. Whether such intersections have existing crash patterns or not, a roundabout provides an alternative to signalization. The primary target locations for roundabouts should be moderate-volume unsignalized intersections.	Varies	90%	Low
6	NS05mr	Convert intersection to mini-roundabout	Mini-roundabouts are characterized by a small diameter (45-90 ft) and traversable islands (central island and splitter islands).	30%	90%	High
7	NS06	Install/upgrade larger or additional stop signs or other intersection warning/regulatorysigns	Additional regulatory and warning signs at or prior to intersections will help enhance the ability of approaching drivers to percieve them	15%	90%	Very High
8	NS07	Upgrade intersection pavement markings (NS.I.)	Typical improvements include "Stop Ahead" markings and the addition of centerlines and stop bars	25%	90%	Very High
9	NS08	Install Flashing Beacons at Stop-Controlled Intersections	Flashing beacons can reinforce driver awareness of the Non-Signalized intersection control and can help mitigate patterns of right-angle crashes related to stop sign violations. Post-mounted advanced flashing beacons or overhead flashing beacons can be used at stop-controlled intersections to supplement and call driver attention to stop signs.	15%	90%	High
10	NS09	Install flashing beacons as advance warning (NS.I.)	Installation of advance flashing beacoms to call drivers attention to intersection control signs	30%	90%	High
11	NS10	Install transverse rumble strips on approaches	Transverse rumble strips are installed in the travel lane for the purposes of providing an auditory and tactile sensation for each motorist approaching the intersection.	20%	90%	High
12	NS11	Improve sight distance to intersection (Clear Sight Triangles)	Unsignalized intersections with restricted sight distance and patterns of crashes related to lack of sight distance where sight distance can be improved by clearing roadside obstructions without major reconstruction of the roadway.	20%	90%	High
13	NS12	Improve pavement friction (High Friction Surface Treatments)	Non-signalized Intersections noted as having crashes on wet pavements or under dry conditions when the pavement friction available is significantly less than needed for the actual roadway approach speeds. This treatment is intended to target locations where skidding and failure to stop is determined to be a problem in wet or dry conditions and the target vehicle is unable to stop due to insufficient skid resistance.	55%	90%	Medium
14	NS13	Install splitter-islands on the minor road approaches	The installation of a splitter island allows for the addition of a stop sign in the median to make the intersection more conspicuous.	40%	90%	Medium
15	NS14	Install raised median on approaches (NS.I.)	Effective access management is key to improving safety at, and adjacent to, intersections. The number of intersection access points coupled with the speed differential between vehicles traveling along the roadway often contributes to crashes. Any access points within 250 feet upstream and downstream of an intersection are generally undesirable.	25%	90%	Medium
16	NS15	Create directional median openings to allow (and restrict) left-turns and u-turns (NS.I.)	Crashes related to turning maneuvers include angle, rear-end, pedestrian, and sideswipe (involving opposing left turns) type crashes. If any of these crash types are an issue at an intersection, restriction or elimination of the turning maneuver may be the best way to improve the safety of the intersection.	50%	90%	Medium
17	NS16	Reduced Left-Turn Conflict Intersections (NS.I.)	Reduced left-turn conflict intersections are geometric designs that alter how left-turn movements occur in order to simplify decisions and minimize the potential for related crashes.	50%	90%	Medium
18	NS17	Install right-turn lane (NS.I.)	Many collisions at unsignalized intersections are related to right-turn maneuvers. A key strategy for minimizing such collisions is to provide exclusive right-turn lanes, particularly on high-volume and high-speed major-road approaches. When considering new right-turn lanes, potential impacts to non-motorized users should be considered and mitigated as appropriate.	20%	90%	Low
19	NS18	Install left-turn lane (where no left-turn lane exists)	Many collisions at unsignalized intersections are related to left-turn maneuvers. A key strategy for minimizing such collisions is to provide exclusive left-turn lanes, particularly on high-volume and high-speed major-road approaches. When considering new left-turn lanes, potential impacts to non-motorized users should be considered and mitigated as appropriate.	35%	90%	Low

20	NS19PB	Install raised medians (refuge islands)	Intersections that have a long pedestrian crossing distance, a higher number of pedestrians, or a crash history. Raised medians decrease the level of exposure for pedestrians and allow pedestrians to concentrate on (or cross) only one direction of traffic at a time.	45%	90%	Medium
21	NS20PB	Install pedestrian crossing at uncontrolled locations (signs and markings only)	Non-signalized intersections without a marked crossing, where pedestrians are known to be crossing intersections that involve significant vehicular traffic. They are especially important at school crossings and intersections with right and/or left turns pockets. See Zegeer study (Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations) for additional guidance regarding when to install a marked crosswalk.	25%	90%	High
22	NS21PB	Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features	Non-signalized intersections where pedestrians are known to be crossing intersections that involve significant vehicular traffic. They are especially important at school crossings and intersections with turn pockets.flashing beacons, curb extensions, advanced "stop" or "yield" markings, and other safety features should be added to complement the standard crossing elements.	35%	90%	Medium
23	NS22PB	Install Rectangular Rapid Flashing Beacon (RRFB)	Rectangular Rapid Flashing Beacon (RRFB) includes pedestrian-activated flashing lights and additional signage that enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings. It uses an irregular flash pattern that is similar to emergency flashers on police vehicles. RRFBs are installed at unsignalized intersections and mid-block pedestrian crossings.	35%	90%	Medium
24	NS23PB	Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))	Intersections noted as having a history of pedestrian vs. vehicle crashes and in areas where the likelihood of the pedestrian presence is high. Corridors should also be assessed to determine if there are adequate safe opportunities for non-motorists to cross and if a pedestrian signal, or a Pedestrian Hybrid Beacon (PHB) (also called High-Intensity Activated crossWalK beacon (HAWK)) are needed to provide an active warning to motorists when a pedestrian is in the crosswalk.	55%	90%	Low

Countermeasures for Roadway Segments

Sr. No.	Code	Countermeasure Name	CM Description	CRF	Federal Funding	Systemic Approach Opportunity
1	R01	Add Segment Lighting	Provision of lighting along roadways.	35%	90%	Medium
2	R02	Remove or relocate fixed objects outside of Clear Recovery Zone	Known locations or roadway segments prone to collisions with fixed objects such as utility poles, drainage structures, trees, and other fixed objects, such as the outside of a curve, end of lane drops, and in traffic islands. A clear recovery zone should be developed on every roadway, as space is available. In situations where public right-of-way is limited, steps should be taken to request assistance from property owners, as appropriate.	35%	90%	High
3	R03	Install Median Barrier	Areas where crash history indicates drivers are unintentionally crossing the median and the cross-overs are resulting in high severity crashes. The installation of median barriers can increase the number of PDO and non-severe injuries. The net result in safety from this countermeasure is connected more to reducing the severity of crashes not the number of crashes.	25%	90%	Medium
4	R04	Install Guardrail	Guardrail is installed to reduce the severity of lane departure crashes. However, guardrail can reduce crash severity only for those conditions where striking the guardrail is less severe than going down an embankment or striking a fixed object. Guardrail should only be installed where it is clear that crash severity will be reduced, or there is a history of run-off-the-road crashes at a given location that have resulted in severe crashes.	25%	90%	High
5	R05	Install impact attenuators	Impact attenuators are typically used to shield rigid roadside objects such as concrete barrier ends, steel guardrail ends and bridge pillars from oncoming automobiles. Attenuators should only be installed where it is impractical for the objects to be removed.	25%	90%	High
6	R06	Flatten side slopes	Roadways experiencing frequent lane departure crashes that result in roll-over type crashes as a result of the roadway slope being so severe as to not accommodate a reasonable degree of driver correction. When there is a need to reduce the severity of lane departure crashes without installing a barrier system that could result in increased numbers of crashes.	30%	90%	Medium
7	R07	Flatten side slopes and remove guardrail	Locations where high number of crashes originate as a lane departure and result in collision with guardrail or a fixed object located on the side slope shielded by guardrail. The guardrail may or may not meet current standards. Even though guardrails are generally installed to reduce the severity of departure crashes, they still can result in severe crashes in some locations.	40%	90%	Medium
8	R08	Install raised median	Areas experiencing head-on collisions that may be affected by both the number of vehicles that cross the centerline and by the speed of oncoming vehicles. Installing a raised median is a more restrictive approach in that it represents a more rigid barrier between opposing traffic.	25%	90%	Medium
9	R09	Install median (flush)	Areas experiencing head-on collisions that may be affected by both the number of vehicles that cross the centerline and by the speed of oncoming vehicles. Roadways with oversized lanes offer an opportunity to restripe the roadway to reduce the lanes to standard widths and use the extra width for the median.	15%	90%	Medium
10	R10PB	Install pedestrian median fencing	Roadway segments with high pedestrian-generators and pedestrian-destinations nearby (e.g. transit stops) may experience a high volume of pedestrians J-walking across the travel lanes at mid-block locations instead of walking to the nearest intersection or designated mid-block crossing. When this safety issue cannot be mitigated with shoulder, sidewalk and/or crossing treatments, then installing a continuous pedestrian barrier in the median may be a viable solution.	35%	90%	Low
11	R11	Install acceleration/ deceleration lanes	Areas proven to have crashes that are the result of drivers not being able to turn onto a high speed roadway to accelerate until the desired roadway speed is reached and areas that do not provide the opportunity to safety decelerate to negotiate a turning movement.	25%	90%	Low

12	R12	Widen lane (initially less than 10 ft)	Horizontal curves or tangents and low speed or high speed roadways identified as having lane departure crashes, sideswipe or head-on crashes that can be attributed to an existing pavement width less than 10 feet.	25%	90%	Medium
13	R13	Add two-way left-turn lane (without reducing travel lanes)	Roadways having a high frequency of drivers being rear-ended while attempting to make a left turn across oncoming traffic. Also can be effective for drivers crossing the centerline of an undivided multilane roadway inadvertently.	30%	90%	Medium
14	R14	Road Diet (Reduce travel lanes from 4 to 3 and add a two way left-turn and bike lanes)	Areas noted as having a higher frequency of head-on, left-turn, and rear-end crashes with traffic volumes that can be handled by only 2 free flowing lanes. Using this strategy in locations with traffic volumes that are too high could result in diversion of traffic to routes less safe than the original four-lane design.	30%	90%	Medium
15	R15	Widen shoulder	Roadways that have a frequent incidence of vehicles leaving the travel lane resulting in an unsuccessful attempt to reenter the roadway. The probability of a safe recovery is increased if an errant vehicle is provided with an increased paved area in which to initiate such a recovery.	30%	90%	Medium
16	R16	Curve Shoulder widening (Outside Only)	Roadway curves noted as having frequent lane departure crashes due to inadequate or no shoulders, resulting in an unsuccessful attempt to reenter the roadway.	45%	90%	Medium
17	R17	Improve horizontal alignment (flatten curves)	Roadways with horizontal curves that have experienced lane departure crashes as a result of a roadway segment having compound curves or a severe radius. This strategy should generally be considered only when less expensive strategies involving clearing of specific sight obstructions or modifying traffic control devices have been tried and have failed to ameliorate the crash patterns.	50%	90%	Low
18	R18	Flatten crest vertical curve	The target for this strategy is usually unsignalized intersections with restricted sight distance due to vertical geometry and with patterns of crashes related to that lack of sight distance that cannot be ameliorated by less expensive methods. This strategy should generally be considered only when less expensive strategies involving clearing of specific sight obstructions or modifying traffic control devices have been tried and have failed to ameliorate the crash patterns.	25%	90%	Low
19	R19	Improve curve superelevation	Roadways noted as having frequent lane departure crashes and inadequate or no superelevation. Safety can be enhanced when the superelevation is improved or restored along curves where the actual superelevation is less than the optimal.	45%	90%	Medium
20	R20	Convert from two-way to one-way traffic	One-way streets can offer improved signal timing and accommodate odd-spaced signals. One-way streets can simplify crossings for pedestrians, who must look for traffic in only one direction. While studies have shown that conversion of two-way streets to one-way generally reduces pedestrian crashes and the number of conflict points, one-way streets tend to have higher speeds which creates new problems.	35%	90%	Medium
21	R21	Improve pavement friction (High Friction Surface Treatments)	Improving the skid resistance at locations with high frequencies of wet road crashes and/or failure to stop crashes	55%	90%	High
22	R22	Install/Upgrade signs with new fluorescent sheeting (regulatory or warning)	Additional or new signage can address crashes caused by lack of driver awareness or complaince of roadway signing.	15%	90%	Very High
23	R23	Install chevron signs on horizontal curves	Roadways that have an unacceptable level of crashes on relatively sharp curves during periods of light and darkness.		90%	
24	R24	Install curve advance warning signs	Addition of advance curve warning signs; may also include horizontal alignment and/or advisory speed warning signs	25%	90%	Very High
25	R25	Install curve advance warning signs (flashing beacon)	Roadways that have an unacceptable level of crashes on relatively sharp curves. Flashing beacons in conjunction with warning signs should only be used on horizontal curves that have an established severe crash history to help maintain their effectiveness.	40%	90%	Very High
26	R26	Install dynamic/variable speed warning signs	Includes the addition of dynamic speed warning signs (also known as Radar Speed Feedback Signs)	30%	90%	High
27	R27	Install delineators, reflectors and/or object markers	Installation of delineators, reflectors and/or object markers are intended to warn drivers of an approaching curve or fixed object that cannot easily be removed.	15%	90%	Very High
28	R28	Install edge-lines and centerlines	Any road with a history of run-off-road right, head-on, opposite-direction-sideswipe, or run-off-road-left crashes is a candidate for this treatment -install where the existing lane delineation is not sufficient to assist the motorist in understanding the existing limits of the roadway. Depending on the width of the roadway, various combinations of edge line and/or center line pavement markings may be the most appropriate.	25%	90%	Very High
29	R29	Install no-passing line	Roadways that have a high percentage of head-on crashes suggesting that many head-on crashes may relate to failed passing maneuvers. No-passing lines should be installed where drivers "passing sight distance" is not available due to horizontal or vertical obstructions.	45%	90%	Very High
30	R30	Install centerline rumble strips/stripes	Center Line rumble strips/stripes can be used on virtually any roadway – especially those with a history of head-on crashes.	20%	90%	High
31	R31	Install edgeline rumble strips/stripes	Shoulder and edge line milled rumble strips/stripes should be used on roads with a history of roadway departure crashes.	15%	90%	High
32	R32PB	Install bike lanes	Roadway segments noted as having crashes between bicycles and vehicles or crashes that may be preventable with a buffer/shoulder.	35%	90%	High
33	R33PB	Install Separated Bike Lanes	Separated bikeways are most appropriate on streets with high volumes of bike traffic and/or high bike-vehicle collisions, presumably in an urban or suburban area. Separation types range from simple, painted buffers and flexible delineators, to more substantial separation measures including raised curbs, grade separation, bollards, planters, and parking lanes.	45%	90%	High
34	R34PB	Install sidewalk/pathway (to avoid walking along roadway)	Areas noted as not having adequate or no sidewalks and a history of walking along roadway pedestrian crashes. In rural areas asphalt curbs and/or separated walkways may be appropriate.	80%	90%	Medium
35	R35PB	Install/upgrade pedestrian crossing (with enhanced safety features)	Roadway segments with no controlled crossing for a significant distance in high-use midblock crossing areas and/or multilane roads locations. flashing beacons, curb extensions, medians and pedestrian crossing islands and/or other safety features should be added to complement the standard crossing elements.	35%	90%	Medium
36	R36PB	Install raised pedestrian crossing	On lower-speed roadways, where pedestrians are known to be crossing roadways that involve significant vehicular traffic.	35%	90%	Medium

37	R37PB	Install Rectangular Rapid Flashing Beacon (RRFB)	Rectangular Rapid Flashing Beacon (RRFB) includes pedestrian-activated flashing lights and additional signage that enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings. It uses an irregular flash pattern that is similar to emergency flashers on police vehicles. RRFBs are installed at unsignalized intersections and mid-block pedestrian crossings	35%	90%	Medium
38	R38	Install Animal Fencing	At locations with high percent of vehicular/animal crashes (reactive) or where there is a known high percent of animals crossing due to migratory patterns (proactive).	80%	90%	Medium

APPENDIX F:
B/C Ratio Calculation
(HSIP Analyzers)

APPENDIX G:
HSIP Cycle 11 Applications