



City of Moreno Valley

LOCAL ROAD SAFETY PLAN

Final Report
August 2022

Prepared By

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Acknowledgments

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Introduction

The City of Moreno Valley (City) is committed to prioritizing safety and eliminating traffic-related deaths and serious injuries on City streets. The Moreno Valley Local Road Safety Plan (LRSP) identifies collision trends and hot spot locations throughout the City and pairs them with engineering and programmatic countermeasures. This LRSP also identifies a five-year implementation approach and suggested funding sources.

This section provides an introduction to the Safe Systems approach, this LRSP's vision and guiding principles, and the City's safety partners.

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Caltrans Local Road Safety Plan Background

A Local Road Safety Plan is a means for providing the City an opportunity to address unique roadway safety needs while contributing to the success of the California Strategic Highway Safety Plan and statewide safety goals. The process of preparing an LRSP creates a framework to systemically identify and analyze safety problems and recommend improvements in coordination with local agency partners and stakeholders.

Beginning in Fall 2022, agencies must have a finalized LRSP to be eligible to apply for Highway Safety Improvement Program (HSIP) Cycle 11 funds. For more information on Caltrans' LRSP approach, please refer to their [website](#).

State and Federal Context

The FHWA Proven Safety Countermeasures initiative, Caltrans Strategic Highway Safety Plan, and Caltrans Local Roadway Safety Manual provide the policy context for which this LRSP was developed under.

FHWA Proven Safety Countermeasures

FHWA published a list of 28 [Proven Safety Countermeasures](#) initiative (PSCi) and strategies that are effective in reducing collisions with fatalities and serious injuries on roadways. The countermeasures are categorized under speed management, roadway departure, intersections, pedestrian/bicycling and cross-cutting. FHWA also offers a [web tool](#) where countermeasures can be filtered by focus area, crash type, problem identified and area type. This PSCi was referenced in the development of the Countermeasure Toolbox (Chapter 6).

Caltrans Strategic Highway Safety Plan (SHSP)

The 2020-2024 SHSP has been developed by Caltrans in collaboration with data findings and feedback from regional outreach with the purpose of reducing roadway fatalities and serious injuries. The four guiding

principles include integrating equity, implementing proven safety countermeasures, accelerating advanced technology, and implementing a Safe System approach. As part of the data-driven approach, the [SHSP Crash Data Dashboard](#) was developed to provide SHSP implementers access to crash data.

Caltrans Local Roadway Safety Manual (LRSM)

Caltrans developed the LRSM to assist local agencies in identifying safety issues and position themselves for statewide competitive funding sources such as Highway Safety Improvement Program. The [LRSM](#) provides a framework for analyzing safety data, identifying collision trends and hot spot locations, and establishing relevant countermeasures to address them. The LRSM also provides guidance on how to establish a cost-benefit ratio, identify potential funding sources, and assign performance metrics for safety projects.

Figure 1-1: Safe System Approach

(Source: Fehr & Peers for FHWA)

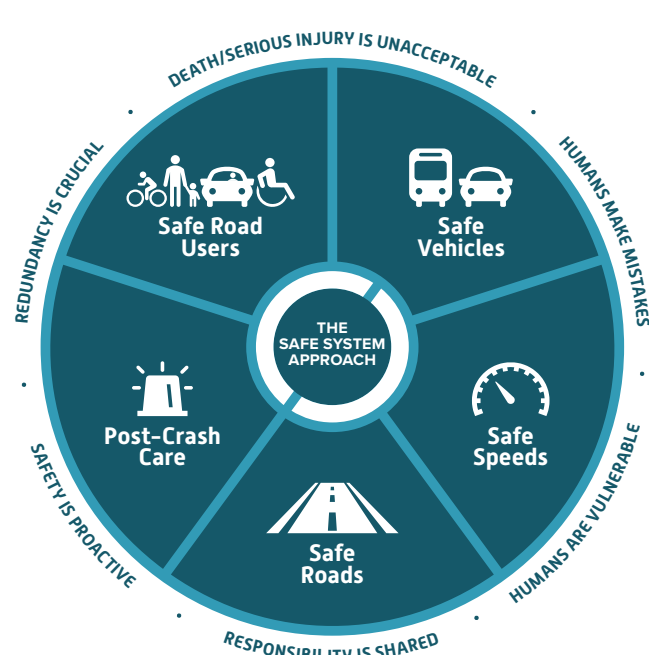


Figure 1-2: The Importance of Addressing Speed in a Safe System

(Source: ITE Safe System Framework)



FHWA’s and Caltrans’ Safe System Approach

Crashes can irreversibly change the course of human lives, touching victims, their families and loved ones, and society as a whole. Through collective action on the part of all roadway system stakeholders— from vehicle manufacturers to everyday people —we can move to a Safe System approach that anticipates human mistakes, with the goal of reducing fatal and serious injuries for all road users.

The Safe System approach is built on five core elements and aims to eliminate fatal & serious injuries for all road users.

- The **Safe Roads Element** includes the physical design of roadways, including the separation of users in time and space, and whether designs are accommodating to human mistakes and injury tolerance levels.
- The **Safe Speeds Element** fine-tunes the idea of Safe Roads into infrastructure and policy changes that specifically target speed as a major factor in collisions and collision severity.
- The **Safe Road Users Element** addresses safety

from the behavioral perspective and focuses on education, engagement, and enforcement.

- The **Post-Crash Care Element** focuses on addressing collision response, including emergency medical care response time, crash reporting and investigation, traffic incident management, and the justice system.
- The **Safe Vehicles Element** calls for vehicles to be designed and regulated to minimize the occurrence and severity of collisions using safety measures that incorporate the latest technology.

The Institute of Transportation Engineers (ITE) and the Road to Zero Coalition’s Safe Systems Explanation and Framework articulate that a Safe System seeks to anticipate human mistakes by:

- Separating users in a physical space (e.g., sidewalks, dedicated bicycle facilities)
- Separating users in time (e.g., pedestrian scramble, dedicated turn phases)
- Alerting users to potential hazards
- Accommodating human injury tolerance through interventions that reduce speed or impact force

For more information on FHWA's Safe System Approach, please refer to their website. Caltrans has also adopted the Safe System Approach.

City of Moreno Valley LRSP Vision & Goals

Vision Statement

The City of Moreno Valley is committed to advancing transportation safety for all who share our streets by eliminating fatal and severe injury collisions on City roadways.

Guiding Principles

- Invest in programs and infrastructure that address the City's most frequent and severe collision profiles.
- Encourage safe roadway behavior through geometrically safe designs and contextually appropriate posted speeds.
- Support the mobility of all road users by reducing the number of pedestrian- and bicycle-involved collisions.
- Discourage motorists from driving under the influence through educational programs and decrease the severity of DUI collisions through roadway infrastructure improvements

Safety Partners

The City of Moreno Valley Public Works Department will collaborate with its safety partners to ensure efficient, effective implementation of this LRSP.

- Moreno Valley Traffic Safety Commission
- Riverside County Transportation Commission
- Western Riverside Council of Governments
- Caltrans
- Moreno Valley Unified School District
- Val Verde Unified School District
- Moreno Valley College
- Moreno Valley Police Department
- Riverside County Sheriff's Department
- Moreno Valley Fire Department
- Mayor or City Council Offices
- Other City Departments (e.g. Parks & Community Services; Community Development; Media Division)
- Community groups
- Businesses

2

Existing Safety Efforts

The City of Moreno Valley is continually making investments in roadway safety through project and program implementation, grant application submittals, and adoption of planning documents that identify transportation safety priorities and future projects.

2

Transportation safety-related goals, policies, projects, and recommendations included in City planning documents are summarized here by the Safe System elements. Planning documents reviewed include:

- [Moreno Valley General Plan Circulation Element](#) (2021)
- Moreno Valley Pedestrian Safety Study (2020), included as Appendix B
- [Moreno Valley Bicycle Master Plan](#) (2014)
- [City of Moreno Valley Americans with Disabilities Act Transition Plan](#) (2020)
- [Riverside Transit Agency First and Last Mile Mobility Plan](#) (2017)
- [City of Moreno Valley Standard Plans](#) (2022)

Safe Roads

Ongoing Projects

The City of Moreno Valley maintains an interactive [Capital Improvements Featured Projects webmap](#) where

current and recently completed projects are mapped and documented. The current capital improvements as of Summer 2022 are listed below.

Pedestrian infrastructure upgrades throughout the City, including installing American with Disabilities Act (ADA)-compliant access ramps in various locations, upgrading existing non-ADA compliant facilities to ADA standards (e.g., restrooms), installing parking lot ramps, and installing sidewalks throughout City parks. *Estimated completion date: Ongoing.*

Traffic Signal Equipment Upgrades to upgrade audible pedestrian signal equipment in various locations. *Estimated completion date: Ongoing.*

Heacock Street Pedestrian and Bicycle Enhancements Project will install sidewalks, pavement, and striping along Heacock St. at Gregory Lane. *Estimated completion date: May 2022*

Juan Bautista de Anza Multi-Use Trail Project will upgrade non-ADA compliant pedestrian ramps, install sidewalks, and add a concrete pathway between Iris and El Potrero Park. *Estimated completion date: November 2021-June 2022.*

Recent Grant-Funded Projects in Moreno Valley

The following projects are funded

through grants in the current fiscal year. More information is available on the [City's website](#):

- Dracaea Avenue Neighborhood Greenway Corridor Study (Caltarns Sustainable Communities Grant)
- Guardrail updates at 20 locations to comply with current standards (Highway Safety Improvement Program).
- Design and construction for the Juan Bautista de Anza trail (Federal grant programs).
- Installation of high-friction surface treatments on Lasselle Street between the southern City limit and College Drive

Citywide Plans, Policies, and Guidelines

Moreno Valley General Plan Circulation Element (2021)

acknowledges safety as an important factor to consider in transportation planning for the City. The report recommends a “Complete Streets” approach to provide safe, comfortable facilities for all users. The following policies are in alignment with the “Safe Roads” Element:

- Policy C.2-2 calls for implementing a layered network approach by prioritizing conflicting modes, such as trucks and bicyclists,

on alternative parallel routes to provide safe facilities for each mode.

- Policy C.2-3 calls for eliminating “traffic-related fatalities and severe injury collisions by developing a transportation system that prioritizes human life on the roadway network”.
- Policy C.2-G calls for promoting safety by researching best practices for Autonomous Vehicles (AV).
- Policy C.4-A recommends preparing and maintain a Pedestrian Access Plan that addresses safer routes to school, for seniors, and for people with disabilities.

Moreno Valley Bicycle Master Plan (2014) guides the development of existing and future bicycle facilities and presents a complete set of network recommendations including:

- 18.35 miles of Class I facilities,
- 88.67 miles of Class II facilities,
- 14.96 miles of Class III facilities, and
- 12.45 miles of Class IV facilities.

The Bicycle Master Plan also features an implementation plan with recommendations for project

prioritization, cost estimates, and funding opportunities.

City of Moreno Valley Americans with Disabilities Act Transition Plan (2020) serves as a reference for bringing public facilities into compliance with ADA regulations.

Riverside Transit Agency First & Last Mile Mobility Plan (2017) provides recommended pedestrian, bicycle, and transit access improvements for critical Moreno Valley/Perris transit routes.

Moreno Valley Pedestrian Safety Study (2020) identifies pedestrian collision trends, hot spot locations, a safety countermeasure toolbox, and priority projects that would be competitive for grant funding. The plan also reviews the City’s uncontrolled crosswalks on arterial roadways, provides lighting safety guidelines, and identifies bus stop locations with opportunities for pedestrian improvements. The plan is included as Appendix B.

Safe Speeds

Ongoing Projects

The City of Moreno Valley Neighborhood Traffic Management Program implements traffic calming projects on local streets and some arterial streets. The Public Works

Department maintains a [Frequently Asked Questions webpage](#) about speed- and traffic calming-related concerns.

Citywide Plans, Policies, and Guidelines

City of Moreno Valley Speed Surveys (Ongoing) are conducted every five to seven years in compliance with the California Vehicle Code.

The following policy in the **General Plan** addresses the “Safe Speeds” element of Safe System approach:

- Policy C.2-11 calls for incorporating “traffic calming design on local and collector streets to promote safer streets”.

The Pedestrian Safety Study identifies opportunities to make speed adjustments in pedestrian zones based on pedestrian volumes and increase physical separation between automobiles and pedestrians on streets with high speed limits.

Safe Road Users

Ongoing Programs

The City currently operates various education, engagement, and encouragement programs in alignment with the Safe Road Users Element:

- [Traffic Safety Commission](#)

responds to public concerns regarding traffic and pedestrian safety. The commission works closely with the City's Transportation Engineering Division, Western Riverside Council of Governments (WRCOG), the Riverside County Transportation Commission (RCTC), and the California Department of Transportation (Caltrans).

- The City has an ongoing annual signal priority program to identify and prioritize the need for signals at non-signalized intersections.
- [Suggested Routes to School](#), operated by the Moreno Valley Public Works Department, provides maps with the preferred routes to each elementary school based on roadway safety factors, with special notes and consideration for parents. More information on the program is available on the City's [website](#).
- The City of Moreno Valley Police Department conducts [public safety campaigns](#) on speed awareness, DUI enforcement, school zone enforcement, and seatbelt enforcement in Moreno Valley.
- Educational classes are operated by the Traffic Safety Commission and Police Traffic Team to teach

traffic safety best practices to students, such as the use of bicycle helmets, pedestrian safety practices, and the consequences of drinking and driving. The Riverside County Sheriff's Department conducts a pedestrian safety education campaign in schools and annually provides educational materials to residents at the Fourth of July parade.

Citywide Plans, Policies, and Guidelines

The [Pedestrian Safety Study](#) identifies opportunities for pursuing educational campaigns, partnering with non-traditional partners and leveraging pedestrian safety branding within the transit providers' professional driver training program.

Post-Crash Care

Ongoing Programs

The Moreno Valley Sheriff's Station features a [Traffic Collision Reconstruction Team](#), which investigates the causes of traffic collisions that result in severe injuries or fatalities. Investigation of these severe collisions is an important piece of data gathering for improving road safety in Moreno Valley.

Citywide Plans, Policies,

and Guidelines

[City of Moreno Valley Standard Plans](#) currently feature design guidelines for emergency vehicle median turn-arounds to allow for more rapid response to incidents.

Safe Vehicles

Ongoing Programs

The City of Moreno Valley has a [Vehicle/Equipment Program](#) to maintain the City's fleet by providing services for vehicle replacement and after-hour emergency response repairs.

Citywide Plans, Policies, and Guidelines

[Moreno Valley General Plan Circulation Element \(2021\)](#) includes Policy C.2-G, which calls for promoting safety by researching best practices for Autonomous Vehicles (AV). The Plan also recommends Intelligent Transportation System (ITS) to facilitate a connected, integrated transportation system to improve safety for all users.

3

Safety Analysis & Results

This section summarizes the results of a broad collision analysis for the City of Moreno Valley, which informed the recommended emphasis areas and countermeasures identified for the City.

3

This analysis considers reported injury collisions on local roadways between 2016 and 2020, acquired from the Transportation Injury Mapping System (TIMS). To better understand systemic collision patterns in the City of Moreno Valley, several contextual factors were analyzed in conjunction with collision characteristics. Key contextual factors include:

- Roadway classification
- Posted and observed speeds
- Signalized & unsignalized intersections and midblock locations
- Land use context, including proximity to industrial areas, schools, parks, and bus stops
- Presence of bicycle facilities and sidewalks
- Areas in the top 25th percentile in CalEnviroScreen 4.0

Appendix A of this report includes more details on the systemic analysis.

Injury Collisions by Year

Between 2016 and 2020, 2,420 collisions occurred on local roadways in the City of Moreno Valley.

The total number of collisions per year has been on a decline since 2017.

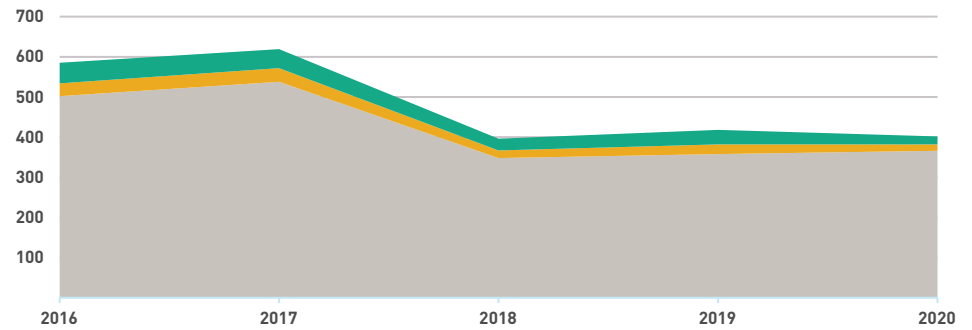
KSI Collisions by Year

Over the 5-year period, there were 143 collisions where victims were killed or severely injured (KSI). 50 of these collisions were fatal.

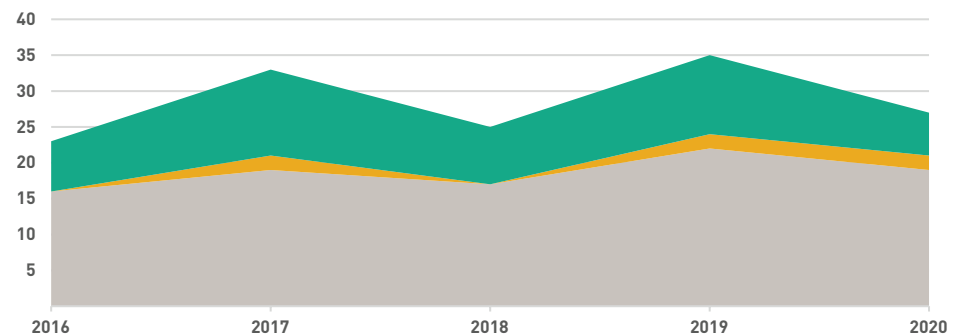
KSI collisions increased about 17% from 2016 to 2020.

Key Takeaways

All Injury Collisions



KSI Collisions



Pedestrian Collisions



Bicycle Collisions



Vehicle Collisions



Killed or Severely Injured in a Collision

Severe injuries resulting from a traffic collision can result in a number of catastrophic impacts, including permanent disability, lost productivity and wages, and ongoing healthcare costs. These injuries can include:

- Broken or fractured bone
- Dislocated or distorted limbs
- Severe lacerations
- Severe burns
- Skull, spinal, chest or abdominal injuries
- Unconsciousness at or when taken from the collision scene

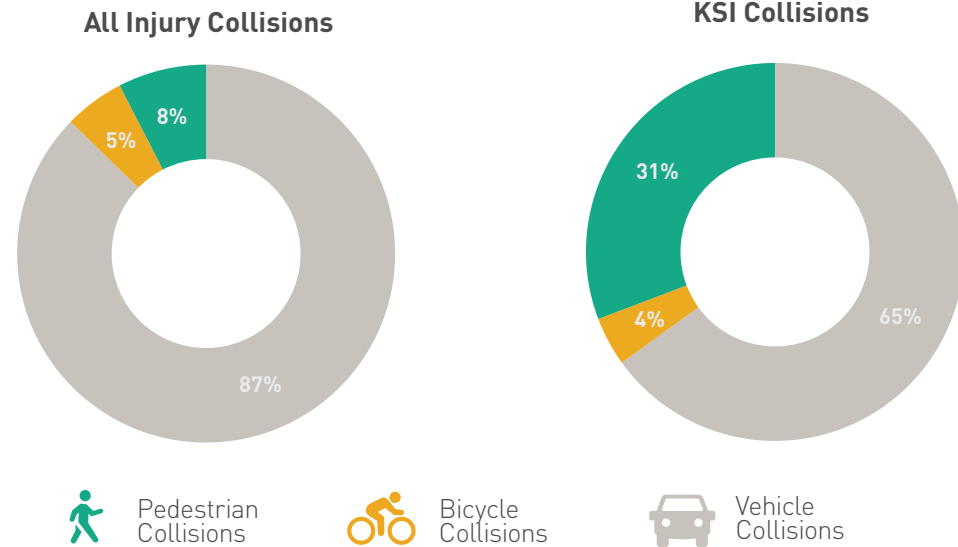
Throughout this plan, the acronym KSI is used to denote collisions where someone was killed or severely injured.

Injury Collisions by Mode

Pedestrians and bicyclists made up a disproportionate share of KSI collisions compared to all collisions.

The share of pedestrians and cyclists in KSI collisions is nearly 3x their share in all injury collisions.

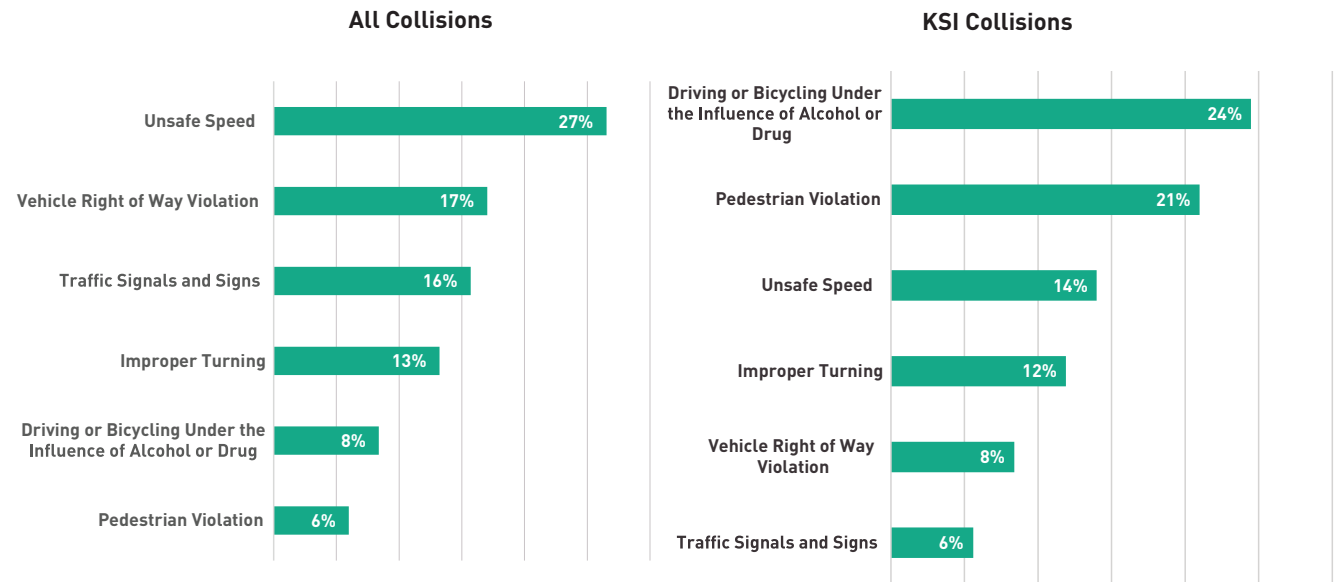
The share of pedestrians in KSI collisions is almost 4x their share in all injury collisions.



Primary Collision Factor (PCF)

Unsafe speed and right of way violations accounted for the most injury collisions among all primary collision factors.

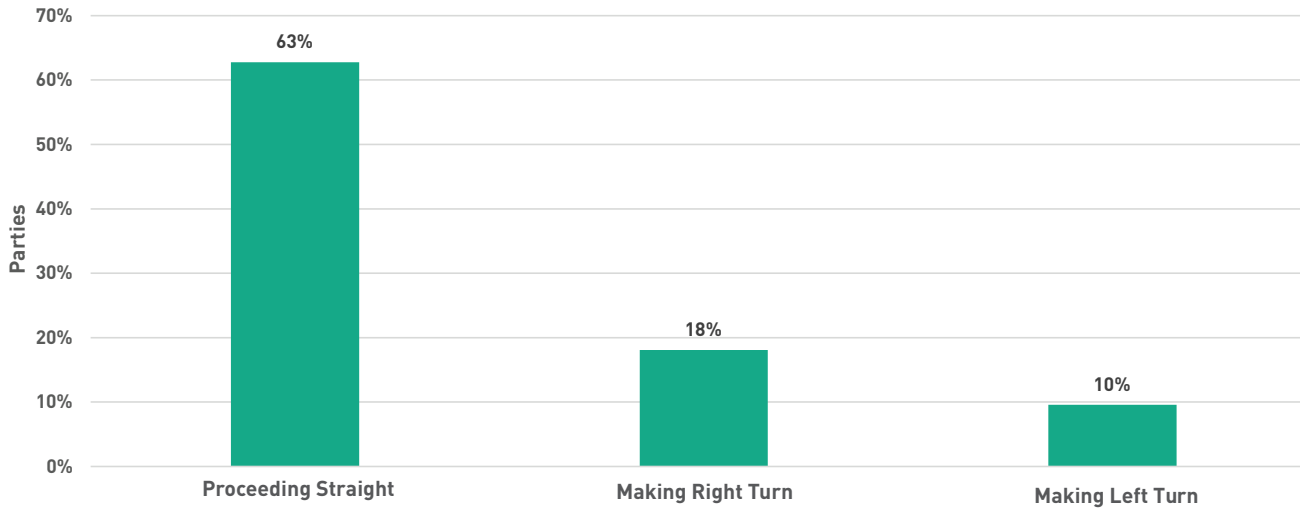
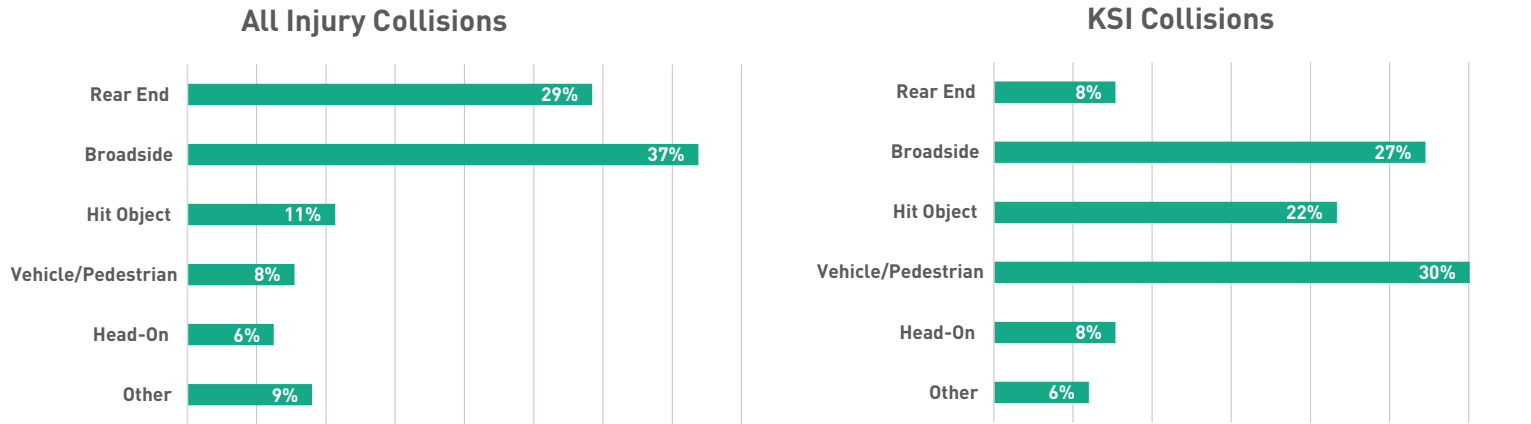
Driving under the influence of alcohol or drugs (DUI collisions) and pedestrian violations accounted for the most KSI collisions among all primary collision factors.



Collision Types

Broadside and rear end collisions accounted for the most injury collisions among all collision types.

The share of Vehicle/Pedestrian KSI collisions were more than 3x their share in all injury collisions and were the most common collision type among KSI collisions. Broadside and hit object collisions accounted for the second- and third-most KSI collisions.



Driver Movement Before Pedestrian Collisions (All)

Almost two-thirds of pedestrian collisions involve a driver proceeding straight, or hitting the pedestrian head-on.

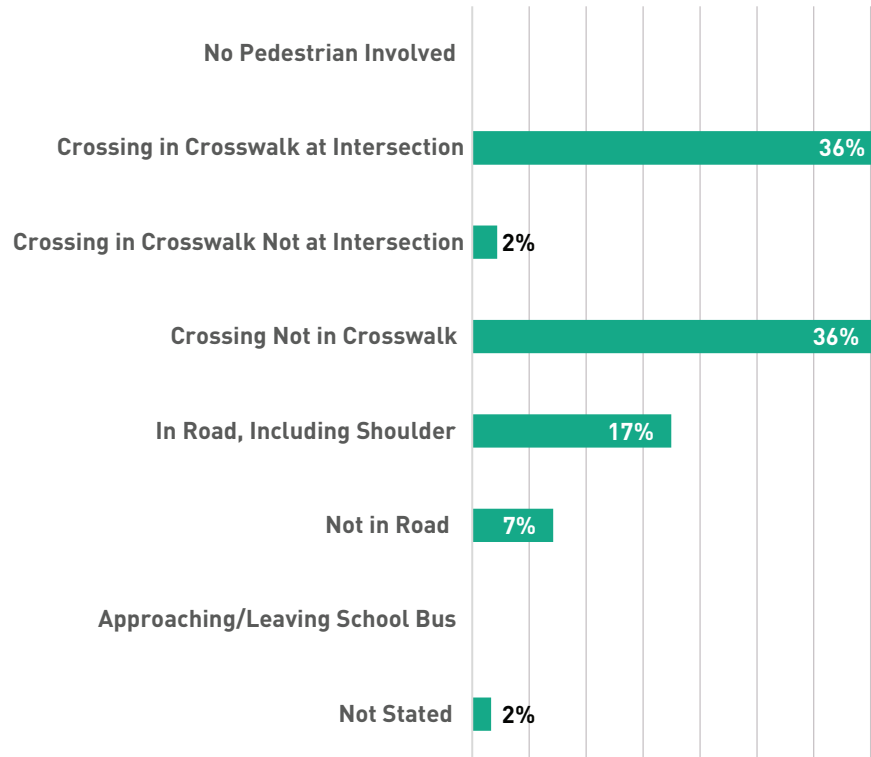
Head-on pedestrian collisions tend to be more severe due to higher speeds when proceeding straight as opposed to making a turn.

Pedestrian Action

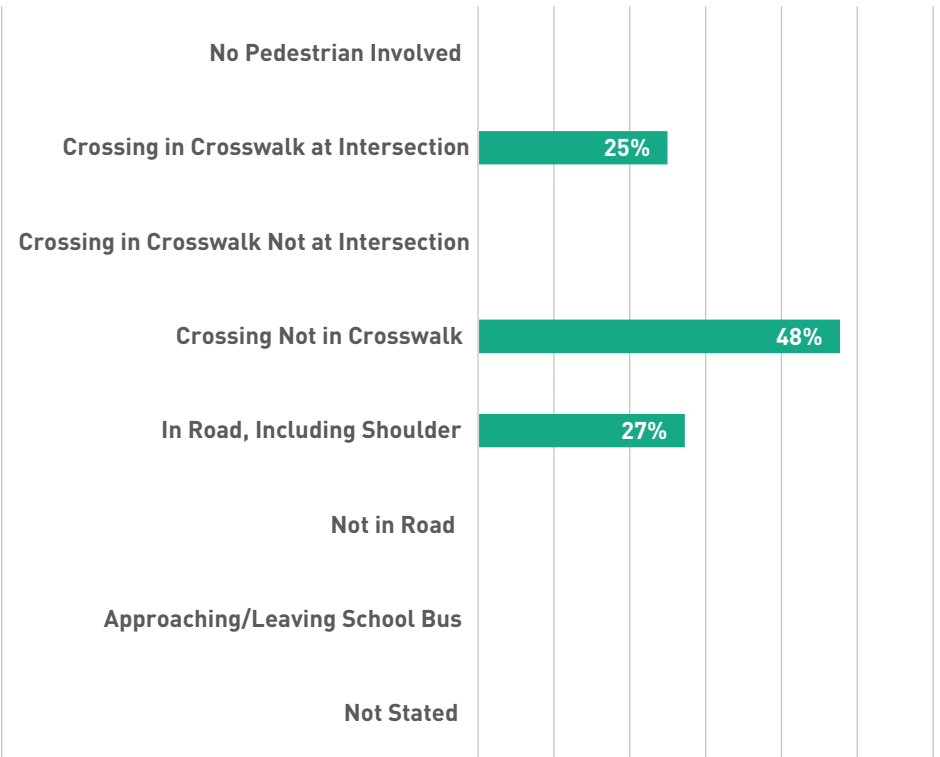
Over a third of pedestrian collisions and 25% of pedestrian KSI collisions involved a pedestrian crossing in a crosswalk at an intersection.

Pedestrians crossing not in crosswalk accounted for the highest share of pedestrian injury and KSI collisions.

All Injury Collisions



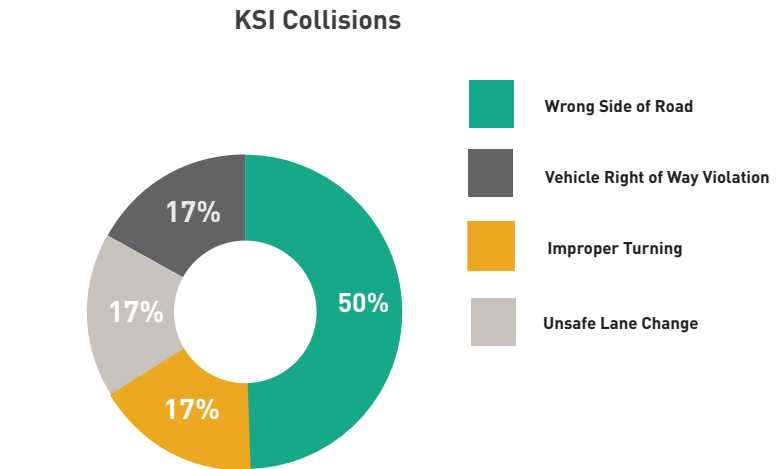
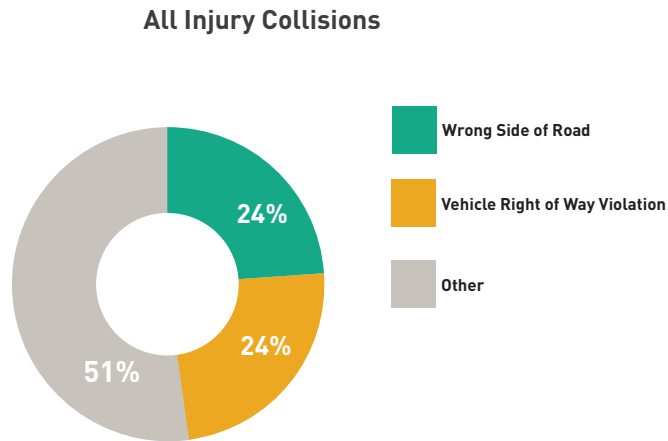
KSI Collisions



Primary Collision Factor (PCF) for Bicycle Collisions

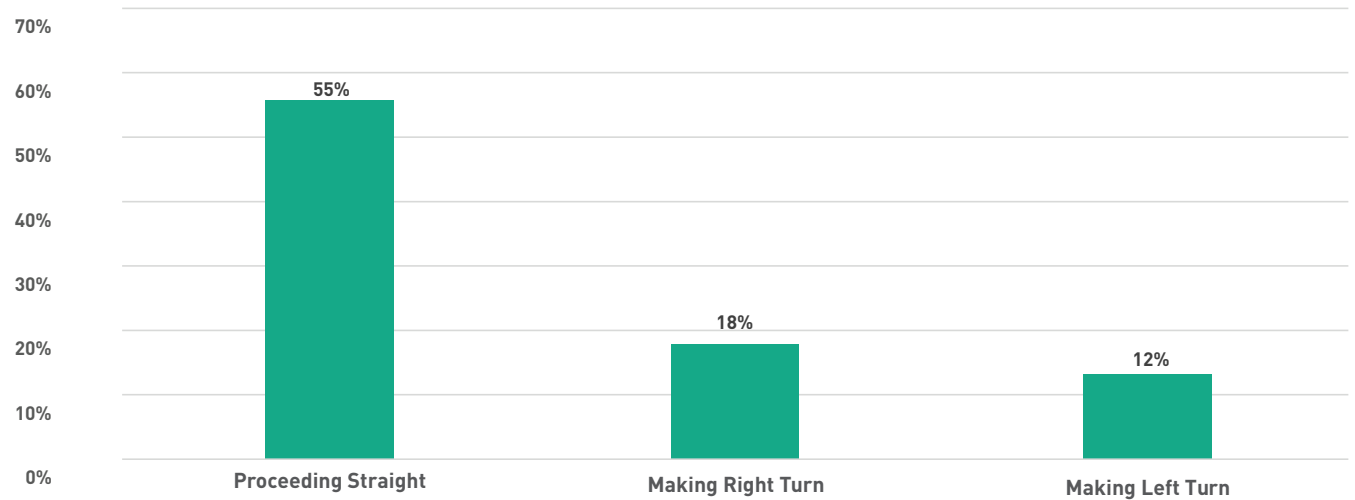
Wrong Side of Road riding and Vehicle Right of Way Violations accounted for roughly half of bicycle collisions. 50% of bicycle KSI collisions involved a bicyclist riding on the wrong side of the road.

Some cyclists may choose to ride on the sidewalk if there is no on-street bicycle facility, or if it feels to uncomfortable. Cyclists may also choose to ride contraflow to traffic to increase their own visibility of oncoming cars. However, these behaviors may not be anticipated by drivers, limiting their awareness and potentially resulting in a crash.



Driver Movement Before Bicycle Collisions (All)

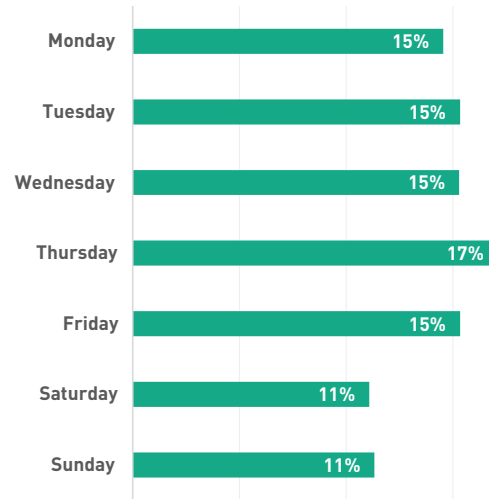
30% of bicycle collisions involved a turning driver.



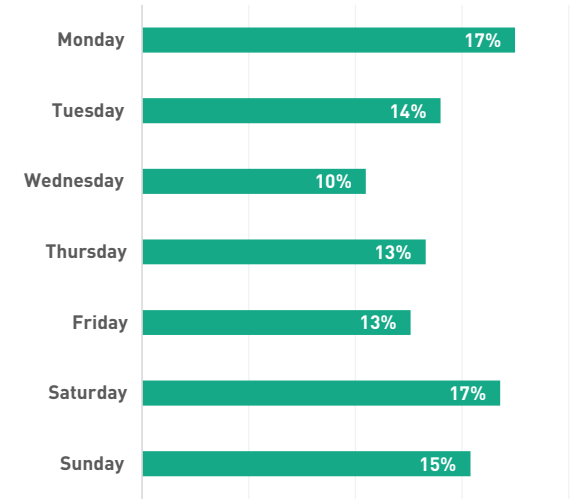
Day of Week

Weekend KSI collisions made up a disproportionate share of KSI collisions compared to all collisions.

All Injury Collisions



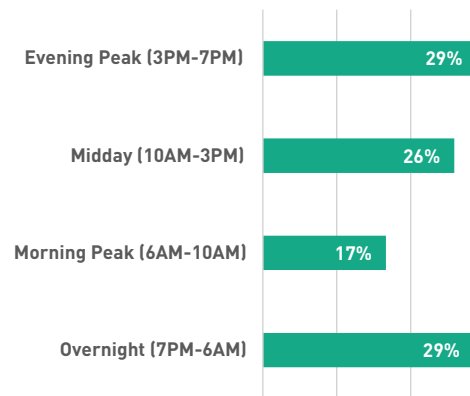
KSI Collisions



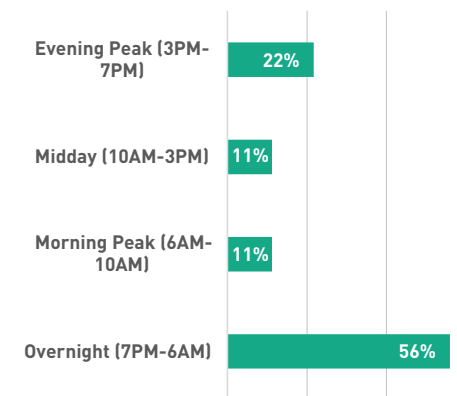
Time of Day

The share of collisions occurring overnight was almost two times higher among KSI collisions than all injury collisions.

All Injury Collisions



KSI Collisions



Contextual Data

Contextual Factors	Data Source
Intersection Control	Pedestrian Safety Study
General Plan Classification	General Plan Update
Posted Speeds	Pedestrian Safety Study – Assuming 25 MPH on all local roads
Observed Speeds	Wejo Data
Average Daily Traffic	StreetLight data
Bicycle Facilities	General Plan Update
Marked Crosswalks	Pedestrian Safety Study
Sidewalk Gaps	Pedestrian Safety Study
RTA Transit Stops	Pedestrian Safety Study
Street lights	Pedestrian Safety Study

Data Considerations

TIMS reports injury collisions from the Statewide Integrated Traffic Records System (SWITRS). Collision databases have been found to have certain reporting biases, including:

- Collisions involving people walking, on bicycles, or on motorcycles are less likely to be reported than collisions with people driving
- Younger victims are less likely to report collisions
- Alcohol-involved collisions may be under-reported

Race, income, immigration status, and English proficiency may also impact reporting, but there is limited research on these factors.

Key Takeaways from Contextual Data Analysis

Collision data was paired with geographic roadway characteristics including roadway classification, posted speed and observed speeds, intersection control, bicycle and pedestrian facilities, and sensitive land uses. This pairing allowed for identification of the combinations of factors that contributed to a high number of all injury collisions, and combinations that led to a high number of fatal and severe collisions. Below are some significant takeaways. More details on the analysis can be found in Appendix A.

- Divided Arterials and Divided Major Arterials make up just 7% of the total roadway centerline miles in the City, but almost 40% of the total injury collisions
- Streets with posted speeds 40 miles per hour (MPH) and above make up less than 30% of the total roadway miles, but over 90% of the total injury collisions
- 60% of injury collisions occur at signalized intersections
- 37% of all collisions and 42% of KSI collisions involving victims 19 and under occurred within 1000 feet of a school, compared to 29% of all injury collisions and 31% of all KSI collisions.

4

Emphasis Areas and Strategies

After identifying collision trends and systemic issues, the project team and City staff collaborated to identify a set of emphasis areas and associated countermeasures.

Emphasis Area Typologies

This LRSP includes two emphasis area typologies to comprehensively evaluate roadway safety in the City of Moreno Valley:

Collision Profile Emphasis Areas

Directly stem from the collision and contextual analysis and represent combinations of collision and contextual factors that are seen throughout the City of Moreno Valley. Collision profiles allow for a proactive approach to improving safety, helping to identify higher-risk locations and suggested countermeasures before fatal and severe injury collisions occur.

Hotspot Emphasis Areas

These are based on a traditional location-based analysis to identify corridors or intersections where a high number of collisions occur, regardless of collision type or characteristics. Hot spots were selected based on the frequency and severity of crashes, and to demonstrate how countermeasures can be applied in a diversity of roadway types.

The countermeasures developed for each hot spot location present a data-driven menu of options for the City to further explore at each location. The proposed countermeasures do not commit the City to employ them, but provide a number of options to further analyze for implementation.

Emphasis Areas

Each emphasis area includes a set of recommended countermeasures aimed at reducing the number and severity of collisions. It is recommended that the City track progress against the goal of collision and severity reduction for each emphasis area, with particular focus on post-implementation evaluation. More information on evaluation strategies can be found in Chapter 6.

Collision Profiles:

1. Broadside Collisions on Divided Major Arterials – Unsignalized or Midblock
2. Overnight Collisions on 45mph+ Streets – Signalized Intersections
3. Hit Object, DUI Collisions – Unsignalized or Midblock
4. Unsafe Speed Collisions in Industrial Areas – Signalized Intersections
5. Broadside Motorcycle Collisions
6. Wrong Side of Road Bicycle Collisions
7. Pedestrian Collisions on Minor Arterials – Unsignalized and Midblock
8. Pedestrian Crossing not in Crosswalk Collisions – Signalized Intersections
9. Pedestrian In Road, Including Shoulder Collisions
– Near Schools, Parks, and Bus Stops
10. Overnight Pedestrian and Bicycle Collisions – Signalized Intersections

Hot Spots:

11. Iris between Heacock and Nason
12. Perris – All Signals
13. Frederick & Sunnymead
14. Lasselle between Cremello and Oleander
15. Kitching between Alessandro and Cactus

I. Broadside Collisions on Divided Major Arterials at Unsignalized Intersections or Midblock Driveways

Key Stats

- 12% result in a KSI collision, above the overall average of 6%
- 66% involve a motorist making a left turn

Top 20 Locations where these types of collisions occur:

- Iris: Kaiser Hospital to Oliver
- Alessandro: Grant to Elsworth
- Gilman Springs: Laurene to Big Nash
- Alessandro: Alessandro Plz to Heacock
- Alessandro Blvd & Gilman Springs Rd
- Championship Dr & Moreno Beach Dr
- Alessandro Blvd & Via Vargas Dr/Brandt Dr
- Iris Ave & Rancho Del Lago
- Southgate St & Towngate Blvd
- Day: Box Springs/Ironwood to 60 WB Off-Ramp
- Iris Ave & Pelican Ln
- Auburn Ln & Moreno Beach Dr
- Alessandro: Via Vargas to Indian
- Alessandro Blvd & Chagall Ct
- Alessandro Blvd & Courage St
- Alessandro Blvd & Gaye St
- Alessandro Blvd & Ramsdell Dr
- Edgemont St & Eucalyptus Ave
- Edgewater Ln & Iris Ave
- Alessandro: Covey Quail to Perris

Suggested Engineering Countermeasures

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Included in BCR
Restrict turning movements by installing median. Install relevant signage (e.g., Right turn only at driveways)	NS15	50%	\$685,000.00	Reduce the number of conflict points	✓
Install transverse rumble strips on approaches with regulatory/warning signage of upcoming conflict point	NS10	20%	\$20,000.00	Elevate awareness of conflict zone	✓
Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	NS06	15%	\$800.00	Elevate awareness of conflict zone	✓

PLANNING-LEVEL BCR†: 10.3

* Intersection treatment unit costs are per location. Corridor treatments are per mile.

† Planning-level BCR based on suggested countermeasure application at top 20 locations. The HSIP Analyzer could vary significantly based on soft cost assumptions and location-specific considerations.

2. Overnight Collisions on 45mph+ Streets at Signalized Intersections

Key Stats

- 10% result in a KSI collision, above the overall average of 6%
- Red-light running and unsafe speeds are the top two primary collision factors

Top 20 Locations where these types of collisions occur:

- Iris: Heacock St & John F Kennedy Dr
- Old Lake Dr & Pigeon Pass Rd
- Cactus Ave & Heacock St
- Frederick St & Sunnymead Blvd
- Ironwood Ave & Perris Blvd
- Heacock St & Ironwood Ave
- Cottonwood Ave & Graham St
- Heacock St & Iris Ave
- Avenida De Plata/Cremello Way & Lasselle St
- Box Springs Rd & Morton Rd
- Camino Flores & Iris Ave
- Gentian Ave & Perris Blvd
- Indian St & Iris Ave
- Cottonwood Ave & Lasselle St
- Krameria Ave & Perris Blvd
- Lasselle St & Margaret Ave
- Pigeon Pass Rd & Swan St
- Pigeon Pass Rd & Western Ridge Rd
- Iris Ave & Perris Blvd
- Alessandro Blvd & Heacock St

Suggested Engineering Countermeasures

The City of Moreno Valley is planning to submit a Caltrans HSIP grant application for the countermeasures below at select locations. The concept plans for the grant application are included in Appendix C.

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Included in BCR
Install retroreflective backplates	S02	15%	\$6,000	Increase visibility of the intersection	✓
Signal rest in red (Improve signal timing)	S03	15%	\$2,500	Require vehicles to slow down to a stop at signalized intersections	✓
Add supplemental intersection lighting so all departures/ approaches have a light	S01	40%	\$45,000	Increase visibility of the intersection	✓
Install flashing beacons as advance warning (S.I.)	S10	30%	\$24,800	Elevate awareness of the upcoming signal	✓
Road diet	R14	35%	\$319,000	Reduce auto speeds on corridors where capacity exceeds demand	

PLANNING-LEVEL BCR[†]: 22.3

* Intersection treatment unit costs are per location. Corridor treatments are per mile.

† Planning-level BCR based on suggested countermeasure application at top 20 locations. The HSIP Analyzer could vary significantly based on soft cost assumptions and location-specific considerations.

3. Hit Object, DUI Collisions at Unsignalized Intersections or Midblock

Key Stats

- 22% result in a KSI collision, above the overall average of 6%
- 75% are occurring overnight (7:00pm to 6:00am)

Top 20 Locations where these types of collisions occur:

- Dracaea Ave & Old 215 Frontage Rd
- Ely Dr & John F Kennedy Dr
- La Barca Rd & Lasselle St
- Camino Quintana & Lasselle St
- Boccaccio Ct & Wordsworth Rd
- Plumtree Ct & Thornberry Cir
- Indian: Superior to Mariposa
- Ironwood: Sinclair to Highland
- Alessandro Blvd & Pepper St
- Atwood Ave & Perris Blvd
- Blueberry Rd & John F Kennedy Dr
- Ironwood Ave & Vista De Cerros Dr
- Lake Vista Rd & Sunnymead Ranch Pkwy
- Loraine Ter & Sunnymead Blvd
- Pigeon Pass Rd & Sunnymead Ranch Pkwy
- Cactus Ave & Madrid Ave
- Alessandro Blvd & Theodore St
- Cottonwood Ave & Oliver St
- Arbor Park Ln & Redwood Ln
- Cape Cod St & Philo St

Suggested Engineering Countermeasures

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Included in BCR
Install delineators, reflectors and/or object markers	R27	15%	\$1,000.00	Increase visibility of objects along the roadway	✓
Install edge-lines and centerlines	R28	25%	\$22,300.00	Clearly delineate the path of travel	✓
Install transverse rumble strips on approaches with regulatory/warning signage of upcoming conflict point	NS10	20%	\$20,000.00	Elevate awareness of upcoming non-signalized intersections	✓

PLANNING-LEVEL BCR[†]: 12.3

* Intersection treatment unit costs are per location. Corridor treatments are per mile.

† Planning-level BCR based on suggested countermeasure application at top 20 locations. The HSIP Analyzer could vary significantly based on soft cost assumptions and location-specific considerations.

4. Unsafe Speed Collisions in Industrial Areas – Signalized Intersections

Key Stats

- 7% result in a KSI collision, above the overall average of 6%
- 88% are rear-end collisions

Top 20 Locations where these types of collisions occur:

- Alessandro Blvd & Frederick St
- Alessandro Blvd & Graham St
- Avenida De Plata/Cremello Way & Lasselle St
- Alessandro Blvd & Old 215 Frontage Rd
- Heacock St & Iris Ave
- Indian St & San Michele Rd
- Heacock St & Hemlock Ave
- Cactus Ave & Elsworth St
- Globe St/Grove View Rd & Perris Blvd
- Alessandro Blvd & Heacock St
- Cactus Ave & Graham St/Riverside Dr
- Heacock St & Ironwood Ave
- Cactus Ave & Heacock St
- Heacock St & SR-60 EB Ramps
- Auto Mall Dr & Moreno Beach Dr
- Perris Blvd & Rivard Rd
- Alessandro Blvd & Alessandro Plaza
- Perris Blvd & San Michele Rd
- Indian St & Sunnymead Blvd
- Cactus Ave & Old 215 Frontage Rd

Suggested Engineering Countermeasures

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Included in BCR
Improve pavement friction (High Friction Surface Treatments)	S11	55%	\$6,000.00	Improve pavement friction to decrease the required stopping distance in the intersection	✓
Improve signal timing (All red time, signal rest in red, shortened cycle length)	S03	15%	\$2,500.00	Introduce an all red time to allow intersections to clear. Utilize signals rest in red during overnight hours to require vehicles to come to a stop at intersections. Shorten cycle lengths to disincentivize red-light running.	✓
Install transverse rumble strips on approaches with regulatory/warning signage of upcoming conflict point	NS10	20%	\$20,000.00	Elevate awareness of upcoming intersections	✓
Road diet	R14	35%	\$319,000	Reduce auto speeds on corridors where capacity exceeds demand	

PLANNING-LEVEL BCR†: 11.5

* Intersection treatment unit costs are per location. Corridor treatments are per mile.

† Planning-level BCR based on suggested countermeasure application at top 20 locations. The HSIP Analyzer could vary significantly based on soft cost assumptions and location-specific considerations.

5. Broadside Motorcycle Collisions

Key Stats

- 35% result in a KSI collision, above the overall average of 6%
- The top two primary collision factors are failure to yield to oncoming traffic when making a left turn/crossing the road and failing to signal.

Top 20 Locations where these types of collisions occur:

- Delphinium Ave & Heacock St
- Bitsy St & Iris Ave
- Graham St & Old Valley Dr
- Lake Vista Rd & Sunnymead Ranch Pkwy
- Perris Blvd & Slate Creek Dr
- Chambray Dr & Glendon Dr
- Cactus Ave & Perham Dr
- Pigeon Pass: Chambray to Hemlock
- Cactus: Commerce Center to Elsworth
- Alessandro: Grant to Elsworth
- Atwood: Indian to Perris
- Dracaea: Ninebark to Twinflower
- Iris: Perris to Wedow
- Iris Ave & Los Cabos Dr
- Old Lake Dr & Pigeon Pass Rd
- Alessandro Blvd & Moreno Beach Dr
- Alessandro Blvd & Old 215 Frontage Rd
- Heacock St & John F Kennedy Dr
- Sunnymead: Pigeon Pass to Olivewood Plaza
- Centerpoint Dr & Frederick St

Suggested Engineering Countermeasures

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Included in BCR
Improve pavement friction (High Friction Surface Treatments)	S11	55%	\$6,000.00	Improve pavement friction to decrease the required stopping distance in the intersection	✓
Improve signal timing (All red, signal rest in red, shortened cycle length)	S03	15%	\$2,500.00	Introduce an all red time to allow intersections to clear. Utilize signals rest in red during overnight hours to require vehicles to come to a stop at intersections. Shorten cycle lengths to dis-incentivize red-light running.	✓
Install transverse rumble strips on approaches with regulatory/warning signage of upcoming conflict point	NS10	20%	\$20,000.00	Elevate awareness of upcoming intersections	✓
Restrict turning movements by installing median. Install relevant signage (e.g., Right turn only at driveways)	NS15	50%	\$685,000.00	Reduce the number of conflict points	

PLANNING-LEVEL BCR[†]: 24.2

* Intersection treatment unit costs are per location. Corridor treatments are per mile.

† Planning-level BCR based on suggested countermeasure application at top 20 locations. The HSIP Analyzer could vary significantly based on soft cost assumptions and location-specific considerations.

6. Wrong Side of Road Bicycle Collisions

Key Stats

- 86% are occurring at the intersection, as opposed to midblock
- 33% are occurring on divided major arterials, compared to 20% of all injury collisions occurring on these roadways

Top Locations where these types of collisions occur:

- Adrienne Ave & Courage St
- Heacock St & Hemlock Ave
- Heacock St & Webster Ave
- Cactus Ave & Joshua Tree Ave
- Casa Encantador Rd & Kitching St
- Iris Ave & Turnberry St
- Ironwood Ave & Riparian Way
- Avenida Espaldar & Lasselle St
- Delphinium Ave & Unity Ct
- Iris Ave & Patata Way/La Fortuna Ln
- Iris: Kaiser Hospital to Oliver
- Bloomfield Rd & Nason St
- Iris Ave & Lasselle St
- Hemlock Ave & Perris Blvd
- Alessandro Blvd & Day St
- Iris Ave & Oliver St
- Alessandro: Brandt to Indian
- Perris: Covey to Manzanita

Suggested Engineering Countermeasures

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Included in BCR
Install/upgrade larger or additional stop signs or other intersection warning/regulatory signs	S18PB	15%	\$9,600.00	Elevate awareness of conflict zone	✓
Install/upgrade pedestrian crossing at uncontrolled locations (high-visibility crosswalk striping)	S21PB	35%	\$2,500.00	Elevate awareness of conflict zone. Refer to the Pedestrian Safety Study (Appendix B) for the appropriate crosswalk safety countermeasures by roadway feature.	✓
Install Pedestrian Hybrid Beacons at midblock crosswalks	NS23PB	55%	\$250,000	Separate users in time. Refer to the Pedestrian Safety Study (Appendix B) for the appropriate crosswalk safety countermeasures by roadway feature.	
Install separated bike lanes	R33PB	45%	\$227,600	Provide a safe, comfortable on-road bike facility that encourages bikers to transition off the sidewalk and onto the in-road facility to increase their visibility to other road users.	

PLANNING-LEVEL BCR[†]: 14.9

* Intersection treatment unit costs are per location. Corridor treatments are per mile.

† Planning-level BCR based on suggested countermeasure application at listed locations. The HSIP Analyzer could vary significantly based on soft cost assumptions and location-specific considerations.

7. Pedestrian Collisions on Minor Arterials at Unsignalized Intersections and Midblock

Key Stats

- 43% result in a KSI collision, above the overall average of 24% for pedestrian injury collisions
- The primary collision factor is pedestrians crossing outside a crosswalk or legal crossing

Top 20 Locations where these types of collisions occur:

- Indian: Dorner to Bay
- Cactus Ave & Joshua Tree Ave
- Cactus Ave & Madison Way
- Graham St & Old Valley Dr
- Indian St & Oneida St
- Ironwood Ave & Medley Dr
- Ironwood Ave & Tuscola St
- Ironwood Ave & Zantar Ln
- John F Kennedy Dr & Sevilla Ct
- Jonestown Dr & Kitching St
- Brodiaea Ave & Kitching St
- Cottonwood: Elsworth to Pan Am
- Alona St & Eucalyptus Ave
- Broadleaf Ln & Sunnymead Blvd
- Camino Juanito & Krameria Ave
- Cottonwood Ave & Nagai Dr
- Cottonwood Ave & Pan Am Blvd
- Indian St & Jenkins Dr
- Ironwood Ave & Kristen Ct
- Elder Ave & Kitching St

Suggested Engineering Countermeasures

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Included in BCR
Install transverse rumble strips on approaches with regulatory/warning signage of upcoming conflict point	NS21PB	20%	\$20,000.00	Elevate awareness of upcoming intersections	✓
Install/upgrade pedestrian crossing at uncontrolled locations (curb extension & high-vis striping)	NS23PB	35%	\$40,000.00	Elevate awareness of conflict zone. Refer to the Pedestrian Safety Study (Appendix B) for the appropriate crosswalk safety countermeasures by roadway feature.	✓
Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))	NS01	55%	\$250,000.00		✓
Install Rectangular Rapid Flashing Beacon (RRFB)	R34PB	35%	\$44,500.00		✓
Road diet	R14	35%	\$319,000	Reduce the crossing distance for pedestrians. Reduce auto speeds on corridors where capacity exceeds demand to reduce severity of collisions.	

PLANNING-LEVEL BCR[†]: 15.3

* Intersection treatment unit costs are per location. Corridor treatments are per mile.

† Planning-level BCR based on suggested countermeasure application at top 20 locations. The HSIP Analyzer could vary significantly based on soft cost assumptions and location-specific considerations.

8. Pedestrian Crossing not in Crosswalk Collisions at Signalized Intersections

Key Stats

- 43% result in a KSI collision, above the overall average of 24% for pedestrian injury collisions
- The primary collision factor is pedestrians crossing outside a crosswalk or legal crossing

Top Locations where these types of collisions occur:

- Elsworth St & Eucalyptus Ave
- Hemlock Ave & SR-60 WB Off-Ramp
- Arbor Park Ln & Eucalyptus Ave
- Alessandro Blvd & Day St
- Cactus Ave & Heacock St
- Dracaea Ave & Perris Blvd
- Perris Blvd & Sunnymead Blvd
- Iris Ave & Perris Blvd
- John F Kennedy Dr & Perris Blvd
- Alessandro Blvd & Perris Blvd
- Brodiaea Ave & Perris Blvd

Suggested Engineering Countermeasures

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Included in BCR
Install pedestrian crossings	S18PB	25%	\$9,600.00	Provide crosswalks across all intersection legs to provide a direct path of travel for pedestrians.	✓
Install Leading Pedestrian Interval with sign R9-5 "Bikes use Ped Signal" and upgraded pavement markings	S21PB	60%	\$2,900.00	Separate users in time and space by giving pedestrians a head start at the intersection	✓

PLANNING-LEVEL BCR†: 40.2

* Intersection treatment unit costs are per location. Corridor treatments are per mile.

† Planning-level BCR based on suggested countermeasure application at listed locations. The HSIP Analyzer could vary significantly based on soft cost assumptions and location-specific considerations.

9. Pedestrian In Road, Including Shoulder Collisions – Near Schools, Parks, and Bus Stops

Key Stats

- 33% result in a KSI collision, above the overall average of 24% for pedestrian injury collisions
- 83% occur within 250' of an intersection
- The primary collision factor is pedestrians crossing outside a crosswalk or legal crossing

Top Locations where these types of collisions occur:

- Indian: Dorner to Bay
- Fawn St & Heacock St
- Indian St & Oneida St
- Jonestown Dr & Kitching St
- Cottonwood: Elsworth to Pan Am
- Old Lake Dr & Pigeon Pass Rd
- Honors Way & Letterman St
- Cottonwood Ave & Nagai Dr
- Bay Ave & Pecan Pl
- Delphinium Ave & Spinnaker Ln
- Kiowa Ct & Kiowa Dr
- Alessandro: Alessandro Plz to Heacock
- Heacock St & Sunnymead Ranch Pkwy
- Crodova Way & Venetian Dr
- Elder Ave & Perris Blvd
- John F Kennedy Dr & Lasselle St
- Iris Ave & Via Del Lago
- Dracaea: Indian to Moreno

Suggested Engineering Countermeasures

Refer to the Pedestrian Safety Study (Appendix B) for bus stop safety guidelines and to determine appropriate crosswalk safety countermeasures by roadway feature.

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Included in BCR
Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))	NS23PB	55%	\$250,000.00	Elevate awareness of conflict zone. Refer to the Pedestrian Safety Study (Appendix B) for the appropriate crosswalk safety countermeasures by roadway feature.	✓
Install/upgrade pedestrian crossing at uncontrolled locations (curb extension & high-vis striping)	NS21PB	35%	\$40,000.00		✓
Add supplemental intersection lighting so all departures/ approaches have a light	S01	40%	\$45,000	Increase visibility of the intersection	✓
Install sidewalk/pathway (to avoid walking along roadway)	R34PB	80%	\$1,270,000.00	Separate users in space by providing a dedicated space for pedestrians	✓

PLANNING-LEVEL BCR[†]: 2.9

* Intersection treatment unit costs are per location. Corridor treatments are per mile.

† Planning-level BCR based on suggested countermeasure application at listed locations. The HSIP Analyzer could vary significantly based on soft cost assumptions and location-specific considerations.

10. Overnight Pedestrian and Bicycle Collisions at Signalized Intersections

Key Stats

- 64% are occurring on Divided Arterials and Divided Major Arterials
- The primary collision factor is “Pedestrian Violation” either due to pedestrians crossing outside of the crosswalk/legal crossing or pedestrians suddenly leaving the curb.

Top 20 Locations where these types of collisions occur:

- Dracaea Ave & Perris Blvd
- Hemlock Ave & Perris Blvd
- Alessandro Blvd & Day St
- Alessandro Blvd & Indian St
- Camino Flores & Iris Ave
- Elsworth St & Eucalyptus Ave
- Old Lake Dr & Pigeon Pass Rd
- Krameria Ave & Perris Blvd
- Gentian Ave & Perris Blvd
- Day St & Canyon Springs Pkwy
- Heacock St & John F Kennedy Dr
- Hemlock Ave & Pigeon Pass Rd
- Eucalyptus Ave & Frederick St
- Filaree Ave & Perris Blvd
- Iris Ave & Perris Blvd
- Alessandro Blvd & Perris Blvd
- Brodiaea Ave & Perris Blvd
- Iris Ave & Lasselle St
- Delphinium Ave & Perris Blvd
- Alessandro Blvd & Frederick St

Suggested Engineering Countermeasures

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Included in BCR
Improve signal timing (All red, signal rest in red, shortened cycle length)	S03	15%	\$2,500.00	Introduce an all red time to allow intersections to clear. Utilize signals rest in red during overnight hours to require vehicles to come to a stop at intersections. Shorten cycle lengths to dis-incentivize red-light running.	✓
Install retroreflective backplates	S02	15%	\$6,000.00	Increase visibility of the intersection	✓
Install advance stop bar (or bike box) before crosswalk	S20PB	15%	\$250.00	Separate users in space.	✓
Add supplemental intersection lighting so all departures/ approaches have a light	S01	40%	\$45,000	Increase visibility of the intersection	
Install Green-backed bike lane conflict zone markings	--	--	\$7100	Elevate awareness of the conflict zone	

PLANNING-LEVEL BCR[†]: 13.4

* Intersection treatment unit costs are per location. Corridor treatments are per mile.

† Planning-level BCR based on suggested countermeasure application at top 20 locations. The HSIP Analyzer could vary significantly based on soft cost assumptions and location-specific considerations.

II. Iris between Heacock and Nason

Focus Areas

- Broadside and rear-end collisions at signals due to red-light running and unsafe speeds
- Broadside and rear-end collisions at unsignalized locations, including driveways
- Hit object collisions
- Pedestrian collisions, including a midblock fatal collision near Rainbow Ridge Elementary, a fatality near the Perris/Iris intersection, and a fatality at Camino Flores.

Suggested Engineering Countermeasures

The City of Moreno Valley is planning to submit a Caltrans HSIP grant application for the near-term countermeasures included below. The concept plan for the grant application is included in Appendix C.

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Timeline
Install retroreflective backplates	S02	15%	\$6,000.00	Increase visibility of signalized intersections	Near-term
Install advanced stop bars and high-visibility crosswalk striping	S20PB	15%	\$4,000.00	Increase the visibility of signalized crosswalks and provide a buffer between cars and crossing pedestrians.	Near-term
Install Leading Pedestrian Interval with sign R9-5 "Bikes use Ped Signal"	S21PB	60%	\$2,900.00	Separate users in time and space by giving pedestrians a head start at the intersection	Near-term
Install W2-2/W2-1 intersection warning signs	NS06	15%	\$800	Elevate awareness of the upcoming conflict zone	Near-term
Install delineators, reflectors and/or object markers	R27	15%	\$1,000.00	Increase visibility of objects along the roadway	Near-term
Install edge-lines and centerlines	R28	25%	\$5,000.00	Clearly delineate the path of travel	Near-term
Install Pedestrian Signal (including Pedestrian Hybrid Beacon (HAWK))	NS23PB	55%	\$250,000.00	Respond to fatal pedestrian collision near Emma Lane on Iris. Refer to the Pedestrian Safety Study (Appendix B) for the appropriate crosswalk safety countermeasures by roadway feature.	Medium-term (3-5 years)
Road diet	R14	35%	\$319,000	The average daily traffic on Iris varies between 10,000-20,000, signifying that it could be a potential candidate for a road diet. A road diet would reduce the crossing distance for pedestrians, reduce auto speeds on the corridor where existing capacity exceeds demand. Refer to the Pedestrian Safety Study (Appendix B) for the proposed lane configuration.	Medium-term (3-5 years)

BCR FOR NEAR-TERM COUNTERMEASURES: 33.3

* Intersection treatment unit costs are per location. Corridor treatments are per mile.



Intersections with Frequent and Severe Collisions

- Lower Frequency and Severity of Collisions
- Highest Frequency and Severity of Collisions

Figure 4-1
IRIS AVENUE: HEACOCK STREET TO NASON STREET

12. Perris – All Signals

Focus Areas

- Broadside collisions due to red-light running
- Rear-end collisions due to unsafe speed collisions
- Pedestrian collisions where the pedestrian is trying to cross the street (in a crosswalk or not)

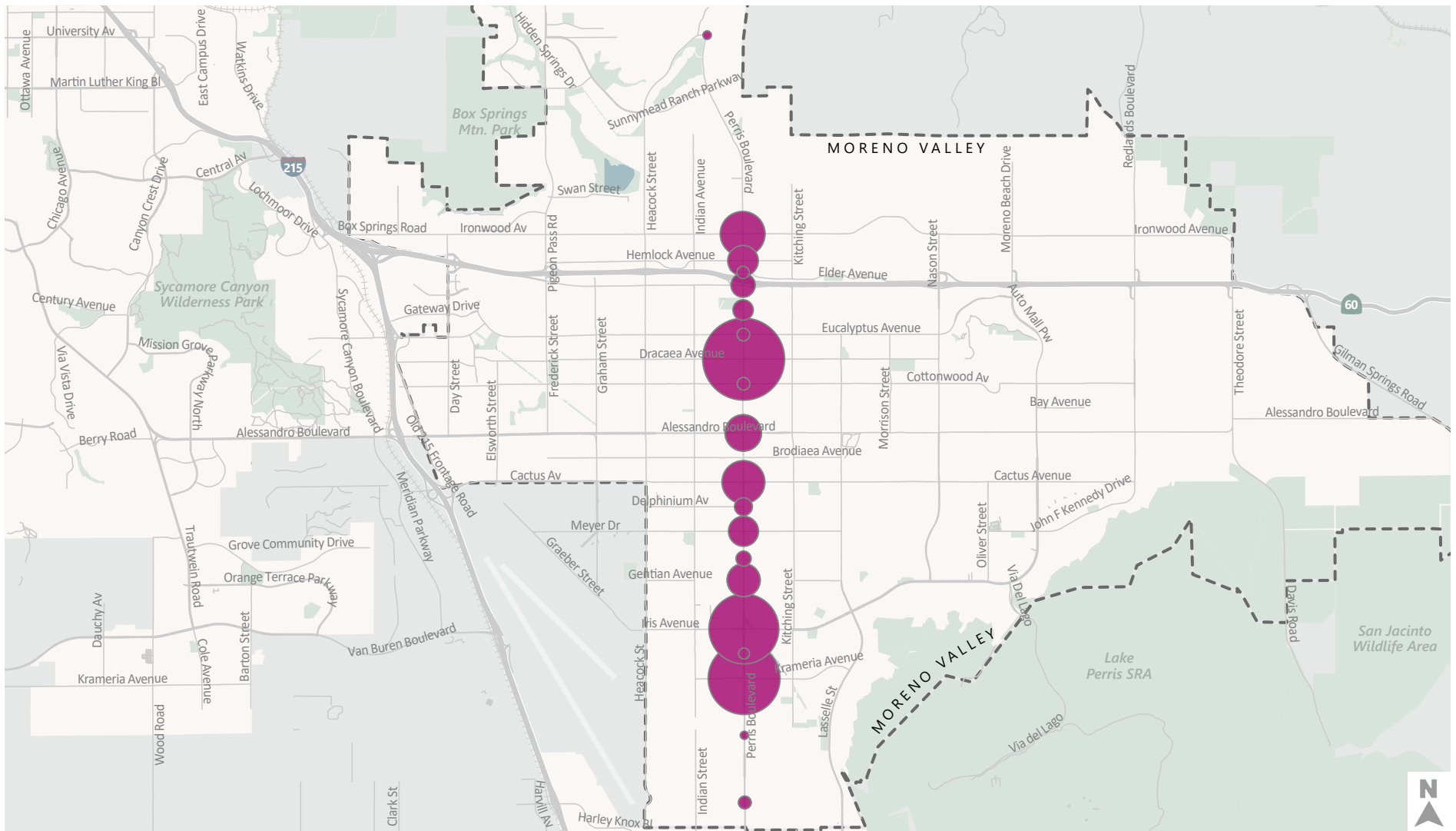
Suggested Engineering Countermeasures

The City of Moreno Valley is planning to submit a Caltrans HSIP grant application for the near-term countermeasures included below at select locations. The concept plans for the grant application are included in Appendix C.

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Timeline
Install retroreflective backplates	S02	15%	\$6,000.00	Increase visibility of signalized intersections	Near-term
Install advanced stop bars and high-visibility crosswalk striping	S20PB	15%	\$4,000.00	Increase the visibility of signalized crosswalks and provide a buffer between cars and crossing pedestrians.	Near-term
Install Leading Pedestrian Interval with sign R9-5 “Bikes use Ped Signal” near pedestrian generators and along bike routes	S21PB	60%	\$2,900.00	Separate users in time and space by giving pedestrians a head start at the intersection	Near-term
Install flashing beacons as advance warning (S.I.)	S10	30%	\$24,800	Elevate awareness of the upcoming signal	Medium-term (3-5 years)
Implement signal coordination throughout the day and signals rest in red overnight (Improve signal timing)	S03	15%	\$2,500.00	Manage speeds through signal coordination throughout the day and signals to rest in red overnight	Medium-term (3-5 years)
Install signals	NS03	30%	\$400,000	Install signals along segments where there are long distances between existing signals to allow for signal coordination on longer block lengths.	Medium-term (3-5 years)
Road diet north of Ironwood	R14	35%	\$319,000	The average daily traffic on Perris above Ironwood ranges from 10,000-20,000, signifying that it could be a potential candidate for a road diet. A road diet would reduce the crossing distance for pedestrians, reduce auto speeds on the corridor where existing capacity exceeds demand.	Medium-term (3-5 years)

BCR FOR NEAR-TERM COUNTERMEASURES: 24.7

* Intersection treatment unit costs are per location. Corridor treatments are per mile.



Intersections with Frequent and Severe Collisions

- Lower Frequency and Severity of Collisions
- Highest Frequency and Severity of Collisions

Figure 4-2
PERRIS BOULEVARD: SIGNALIZED INTERSECTIONS

13. Frederick & Sunnymead

Focus Areas

- Enhance signal control visibility and improve safety for pedestrians accessing commercial destinations off of Frederick Street on foot.
- Address rear-end and broadside collisions, traffic signal violations, and unsafe speeding

Suggested Engineering Countermeasures

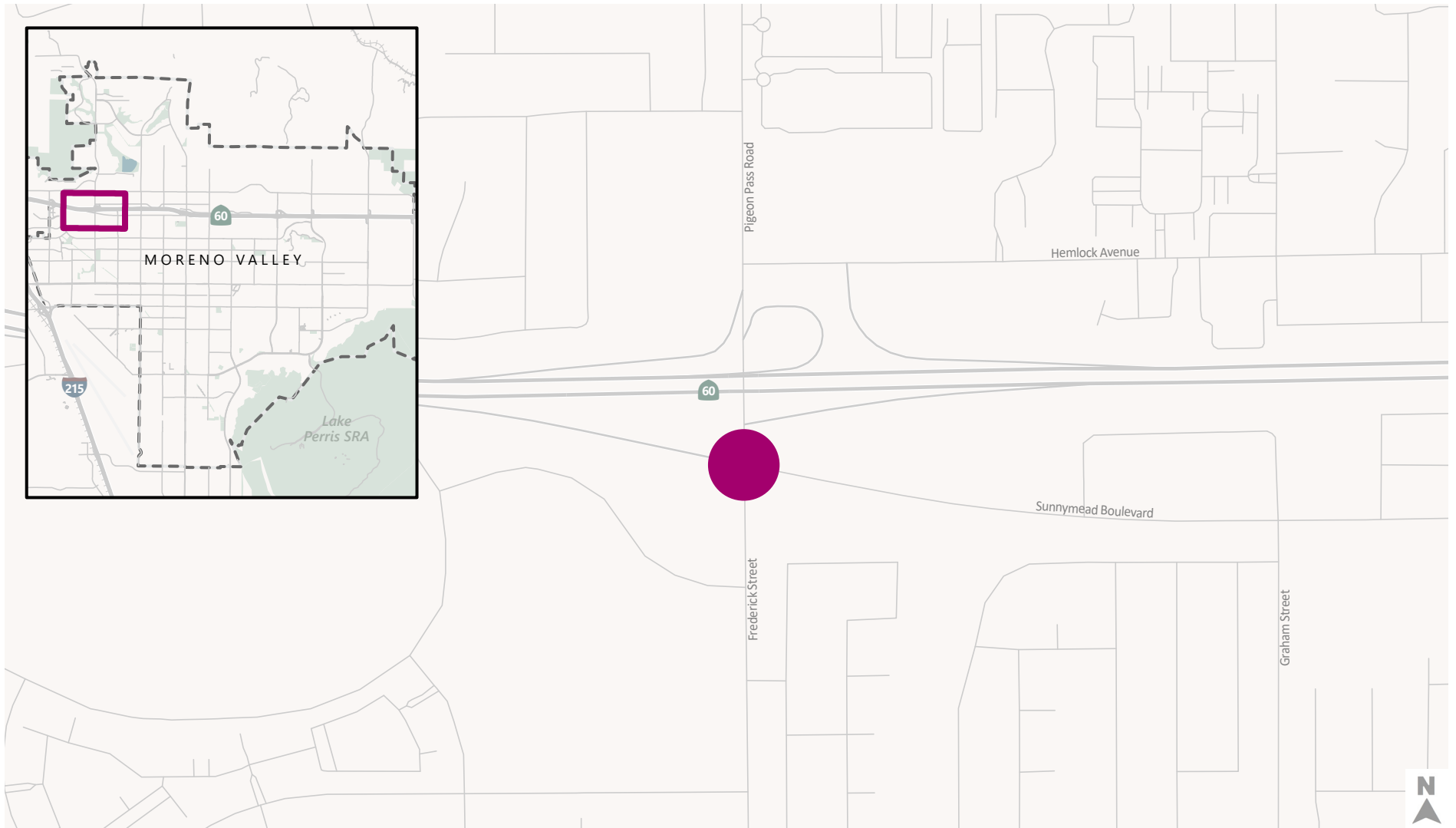
The City of Moreno Valley is planning to submit a Caltrans HSIP grant application for the near-term countermeasures included below. The concept plan for the grant application is included in Appendix C. Medium-term improvements are discussed in more detailed in the Pedestrian Safety Study (Appendix B).

Note the SR-60 Off-Ramp and signal are owned by Caltrans. Improvements will require coordination and processing an encroachment permit.

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Timeline
Install retroreflective backplates	S02	15%	\$6,000.00	Increase visibility of signalized intersections	Near-term
Install advanced stop bars and high-visibility crosswalk striping on the east leg	S20PB	15%	\$4,000.00	Increase the visibility of signalized crosswalks and provide a buffer between cars and crossing pedestrians.	Near-term
Install Leading Pedestrian Interval with sign R9-5 "Bikes use Ped Signal"	S21PB	60%	\$2,900.00	Separate users in time and space by giving pedestrians a head start at the intersection	Near-term
Install a curb extension on the southwest corner and flex posts along the bike lane	--	--	\$46,000.00	Minimize autos weaving in and out of the bike lane when accessing the curb-adjacent lane in the southbound direction. Install vertical barriers along the bike lane for the 225-foot stretch south of the intersection.	Near-term
Implement signal coordination throughout the day and signals rest in red overnight (Improve signal timing)	S03	15%	\$2,500.00	Ensure the signal immediately to the north serving the SR-60 EB On-Ramp is coordinated with the Frederick/Sunnymead intersection to minimize driver confusion.	Medium-term (3-5 years)
Install sidewalk on the northwest corner (to avoid walking along roadway)	R34PB	80%	\$200,000	Improve connections under the freeway	Medium-term (3-5 years)
Install pedestrian crossing on the north side of the intersection	S18PB	25%	\$30,000	Provide a direct path of travel for pedestrians	Medium-term (3-5 years)
Install Pedestrian Signal on Sunnymead near the Travel Inn with a pedestrian refuge island	NS23PB	55%	\$250,000.00	Provide a new crossing location	Medium-term (3-5 years)

BCR FOR NEAR-TERM COUNTERMEASURES: 21.1

* Intersection treatment unit costs are per location. Corridor treatments are per mile.



Intersections with Frequent and Severe Collisions

- Lower Frequency and Severity of Collisions
- Highest Frequency and Severity of Collisions

Figure 4-3
 FREDERICK STREET & SUNNYMEAD BOULEVARD

14. Lasselle between Cremello and Oleander

Focus Areas

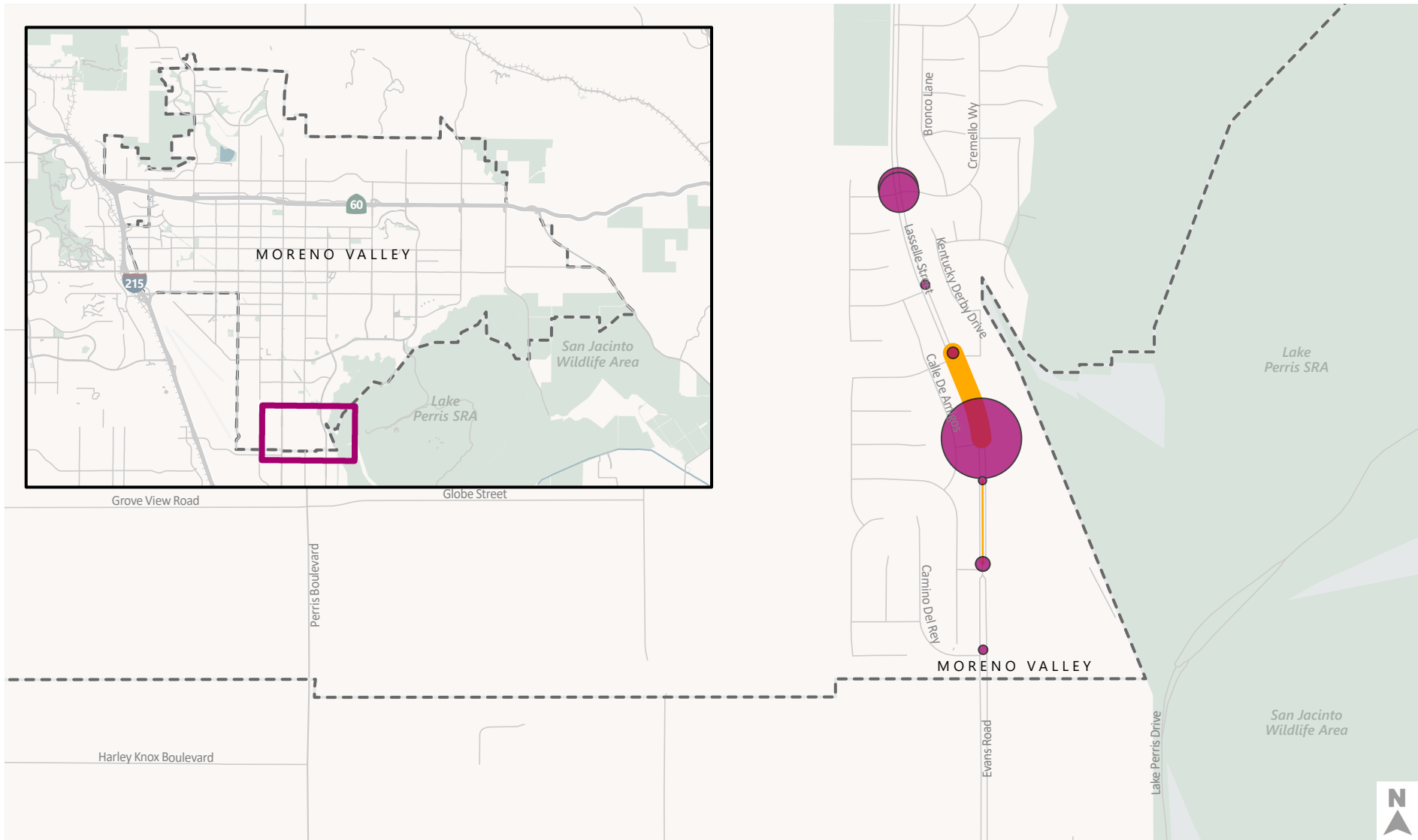
- Manage speeds and address rear-end, sideswipe, and hit object collisions to improve safety for residents and students of Rancho Verde High School.

Suggested Engineering Countermeasures

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Timeline
Road diet with separated bike lane	R14	35%	\$415,000	The average daily traffic on this segment of Lasselle ranges from 10,000-30,000. Further exploration would need to be done to determine the feasibility of a road diet. A road diet would reduce the crossing distance for pedestrians, and reduce auto speeds on the corridor where existing capacity exceeds demand. At a minimum, upgrade existing bike lanes to separated bike lanes to provide a comfortable all ages and abilities facility between Rancho Verde High School, El Portrero Park, and surrounding neighborhoods	Near-term
Install transverse rumble strips at curves with regulatory/warning signage	NS10	20%	\$20,000	Slow speeds at curves along this segment	Near-term
Install flashing beacons as advance warning of signalized intersections	S10	30%	\$24,800	Elevate awareness of the upcoming conflict zone	Near-term
Improve signal timing (All red, signal rest in red, shortened cycle length)	S03	15%	\$2,500	Introduce an all red time to allow intersections to clear. Utilize signals rest in red during overnight hours to require vehicles to come to a stop at intersections. Shorten cycle lengths to dis-incentivize red-light running.	Near-term

BCR FOR NEAR-TERM COUNTERMEASURES: 10.3

* Intersection treatment unit costs are per location. Corridor treatments are per mile.



Intersections with Frequent and Severe Collisions

- Lower Frequency and Severity of Collisions
- Highest Frequency and Severity of Collisions

Collision Hotspot Extent

- Lower Frequency and Severity Collisions
- Highest Frequency and Severity Collisions

Figure 4-4
 LASELLE STREET: CREMELLO WAY TO CAMINO DEL REY

15. Kitching between Alessandro and Cactus

Focus Areas

- Improve safety for residents and students of Hendrick Ranch Elementary School and the Journey School.
- Address broadside collisions due to red-light running and rear-end collisions due to unsafe speeds
- Manage speeds midblock

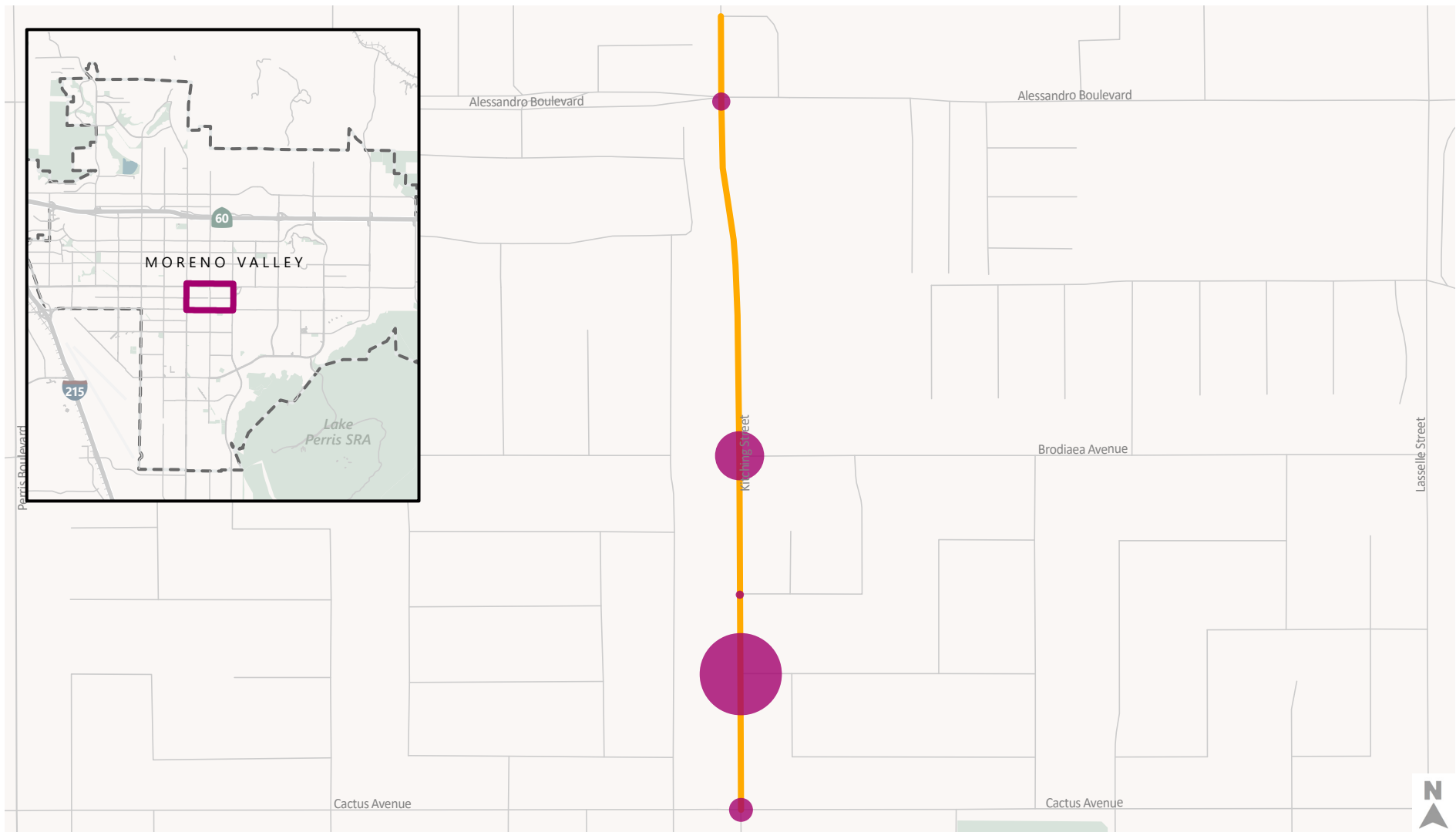
Suggested Engineering Countermeasures

The City of Moreno Valley is planning to submit a Caltrans HSIP grant application for the near-term countermeasures included below. The concept plan for the grant application is included in Appendix C.

Suggested Countermeasures	LRSM ID	CRF	Unit Cost*	Goal	Timeline
Road diet with a separated bike lane	R14	35%	\$200,000	The average daily traffic on this segment of Kitching ranges from 10,000-20,000, signifying that it could be a potential candidate for a road diet. A road diet would reduce the crossing distance for pedestrians, and reduce auto speeds on the corridor where existing capacity exceeds demand. At a minimum, install separated bike lanes from Cactus to Black Walnut to provide a comfortable all ages and abilities facility between the existing bike lanes south of Cactus, Hendrick Ranch Elementary School, the Journey School, the existing pedestrian bridge at Brodiaea, and surrounding neighborhoods.	Near-term
Install retroreflective backplates	S02	15%	\$6,000.00	Increase visibility of signalized intersections	Near-term
Install advanced stop bars and high-visibility crosswalk striping	S20PB	15%	\$4,000.00	Increase the visibility of signalized crosswalks and provide a buffer between cars and crossing pedestrians.	Near-term
Install Leading Pedestrian Interval with sign R9-5 "Bikes use Ped Signal"	S21PB	60%	\$2,900.00	Separate users in time and space by giving pedestrians and bikes a head start at the intersection	Near-term
Install flashing stop signs at Brodiaea	NS08	15%	\$6,000.00	Elevate awareness of the all-way stop control	Near-term

HSIP ANALYZER BCR FOR NEAR-TERM COUNTERMEASURES: 18.6

* Intersection treatment unit costs are per location. Corridor treatments are per mile.



Intersections with Frequent and Severe Collisions

- Lower Frequency and Severity of Collisions
- Highest Frequency and Severity of Collisions

Collision Hotspot Extent

- Lower Frequency and Severity Collisions
- Highest Frequency and Severity Collisions

Figure 4-5
KITCHING STREET: BLACK WALNUT STREET TO CACTUS AVENUE

5

Countermeasure Toolbox

This toolbox presents safety countermeasures covering each element of a Safe System (safe road users, safe vehicles, safe speeds, safe roads, and post-crash care) to address the safety trends identified through the comprehensive collision analysis.

5

WHAT YOU'LL SEE IN THIS TOOLBOX

These countermeasures include those recommended for the Emphasis Areas identified in this plan, as well as additional countermeasures that are applicable to the City of Moreno Valley context. Most of the countermeasures are included in the 2020 Caltrans Local Roadway Safety Manual (LRSM) and can be advantageous for use in Caltrans Highway Safety Improvement Program (HSIP) grant funding applications. The toolbox identifies a Caltrans-approved Crash Reduction Factor (CRF) as outlined in the LRSM. The higher the CRF, the greater the expected reduction in collisions. There are many effective safety countermeasures beyond those listed in the LRSM, and several are included in this toolbox.

Countermeasures are organized into the following categories:

- › Geometric Modifications
- › Lighting
- › Operation/Warning
- › Signal Modifications & ITS
- › Pedestrian and Bicycle
- › Programmatic

The diagram shows a sample countermeasure card for 'Road Diet'. Callouts point to various elements:

- Countermeasure Title:** Road Diet
- LRSM Countermeasure:** LRSM ID R14
- LRSM Countermeasure Code:** R14
- Countermeasure Icon:** Road Diet icon showing a road with arrows indicating lane reduction.
- Crash Reduction Factor:** CRF 35%
- Mode(s) this Countermeasure Affects:** Pedestrian, Bicycle, and Car.
- Countermeasure Description:** A road diet reduces roadway space dedicated to vehicle travel lanes to create room for bicycle facilities, wider sidewalks, or center turn lanes. A Road Diet improves safety by reducing vehicle speeds and creating designated space for all road users. FHWA advises that streets with 20,000 ADT or less may be good candidates for road diets, though road diets have been implemented successfully on roadways with higher traffic volumes in urban settings.
- Countermeasure Details:**

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

COUNTERMEASURE TOOLBOX SUMMARY

TYPE	COUNTERMEASURE	Caltrans LRSM CRF	Safe Roads	Safe Speeds	Safe Road Users	Post-Crash Care	Safe Vehicles
GEOMETRIC MODIFICATIONS	Diverter	-	✓				
	Driveway Consolidation	-	✓				
	Protected Intersection	-	✓				
	Reduce Curb Radius	-	✓				
	Restrict Turning Movements	50%	✓				
	Road Diet	35%	✓				
	Roundabout/Mini Roundabout	30%	✓				
	Transit Island	-	✓				
LIGHTING	Intersection Lighting	40%	✓				
	Segment Lighting	35%	✓				
	LED Lighting	-	✓				
OPERATION/WARNING	Centerline and Edgeline Rumble Strips	20/15%	✓				
	Delineators, Reflectors, Object Markers	15%	✓				
	Edgelines and Centerlines	25%	✓				
	Flashing Beacon as Advanced Warning	30%	✓				
	Flashing Beacons at Stop-Controlled Intersection	15%	✓				
	High Friction Surface Treatments	55%	✓				
	Improved Sight Distance	20%	✓				
	Left-Turn Restriction	-	✓				
	Narrow Lanes	-	✓				
	Right Turn on Red Restriction	-	✓				
	Retroreflective Borders on Signals	15%	✓				
	Raised Pavement Markers	10%	✓				
	“Stop Here on Red” Sign	-	✓				
	Transverse Rumble Strips	20%	✓				
	Upgrade to Larger Warning Signs	15%	✓				
Upgrade Pavement Markings	25%	✓					

	COUNTERMEASURE	Caltrans LRSM CRF	Safe Roads	Safe Speeds	Safe Road Users	Post-Crash Care	Safe Vehicles
PEDESTRIAN & BICYCLE	Advanced Stop Bar	15%	✓				
	Bike Box	15%	✓				
	Curb Extensions	35%	✓				
	Dual Curb Ramps	-	✓				
	Green Conflict Striping	-	✓				
	High-Visibility Crosswalk Striping	25%	✓				
	Install Sidewalk	80%	✓				
	Mixed-Use Path	80%	✓				
	Pedestrian Hybrid Beacons	55%	✓				
	Pedestrian Median Fencing	-	✓				
	Raised Median/Refuge Island	25/45%	✓				
	Raised Pedestrian Crossing	35%	✓				
	Rectangular Rapid Flash Beacon	45%	✓				
	Separated Bikeway	45%	✓				
	Sidewalk Landscape Buffer	-	✓				
	Straighten Crosswalk	-	✓				
Trail Crossing	-	✓					
Upgrade Curb Ramp	-	✓					
Widen Sidewalk	-	✓					
SIGNAL MODIFICATIONS	Accessible Pedestrian Signal	25%	✓				
	Extend Yellow and All-Red Time	15%	✓				
	Leading Pedestrian Intervals	60%	✓				
	New signal	25%	✓				
	Pedestrian Recall	15%	✓				
	Protected Left Turn	30/55%	✓				
	Shorten Cycle Length	15%	✓				
	Signal Rest in Red	15%	✓				
PROGRAMMATIC	Reduce Posted Speeds	-		✓			
	Alternatives to Street Racing	-		✓	✓		
	Education & Public Awareness Campaign - Focus on Safe Speeds and DUIs	-		✓	✓		
	Licensee Education on Alcohol and Drugs (LEAD) Training Program	-			✓		
	Impaired Driving Treatment Program	-			✓		
	High-Visibility DUI Patrols	-			✓		
	Rapid Response Safety Communication Protocol & Multi-Disciplinary Team	-				✓	
	Emerging Technology, including Autonomous and Connected Vehicles	-					✓

Diverter



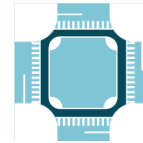
A **diverter** is a roadway treatment that restricts through vehicle movements using physical diversion while allowing bicyclists and pedestrians to proceed through an intersection in all directions.

Driveway Consolidation



Reducing the number of driveways through consolidation limits the exposure of pedestrians to vehicles entering or exiting driveways, reducing conflicts.

Protected Intersection



A **protected intersection** provides separate paths for vehicles, bikes and pedestrians each to cross the intersection. One key design element is the corner refuge island. This island forces drivers to turn a full 90 degrees before intersecting a crosswalk when making a right turn and makes the intersection smaller overall, shrinking the distance pedestrians, as well as bikers, have to traverse.

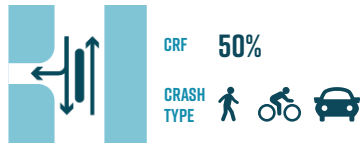
Reduce Curb Radius



Corner radii directly impact vehicle turning speeds and pedestrian crossing distances. **Minimizing the size of a corner radius** is critical to creating compact intersections with safe turning speeds. This may enlarge the area where pedestrians wait to cross, can provide additional pedestrian visibility, and shorten pedestrian crossing distances. These changes can be made using paint and plastic materials.

Restrict Turning Movements

LRSM ID SI4/
NS15

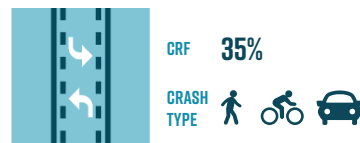


Access control and turn restrictions balances traffic safety and efficiency with reasonable property access. Installing a raised median can restrict turning movements and reduce head-on collisions by number of vehicles that cross the centerline.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

Road Diet

LRSM ID RI4

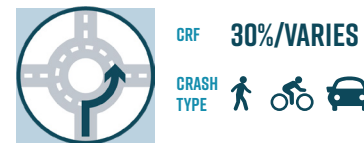


A **road diet** reduces roadway space dedicated to vehicle travel lanes to create room for bicycle facilities, wider sidewalks, or center turn lanes. A Road Diet improves safety by reducing vehicle speeds and creating designated space for all road users. FHWA advises that streets with 20,000 ADT or less may be good candidates for road diets, though road diets have been implemented successfully on roadways with higher traffic volumes in urban settings.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

Roundabout/ Mini Roundabout

LRSM ID NS05MR
/NS04
/NS05



A **roundabout** is a type of circular intersection in which road traffic is permitted to flow in one direction around a central island, and priority is typically given to traffic already in the junction. 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 keeps 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. See CA MUTCD Chapter 3C for details

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

Transit Island



Where there is a protected or buffered bike lane and there is a bus stop, an island between the vehicle lane and the bike lane creates a safe place for pedestrians to wait for the bus. Adding the **transit island** narrows the vehicle lane and has a traffic calming effect on vehicle traffic, encouraging slower speeds which creates less risk for pedestrians.

Intersection Lighting ✓

LRSM ID **SOI**



CRF **40%**



Adding **intersection lighting** 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 nonmotorists. Intersection lighting is of particular benefit to nonmotorized users as lighting not only helps them navigate the intersection, but also helps drivers see them better. Upgrading to LED lighting also has a documented safety benefit.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

Segment Lighting ✓

LRSM ID **ROI**



CRF **35%**



Providing **segment lighting** improves safety during nighttime conditions by making drivers more aware of the surroundings, which improves drivers' perception-reaction times; enhancing drivers' available sight distances to perceive roadway characteristic in advance of the change; and improving nonmotorist's visibility and navigation. Upgrading to LED lighting also has a documented safety benefit. Pedestrian-scale lighting, which can be used in addition to roadway and intersection lighting, is lower in height than standard street lighting and is spaced closer together.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

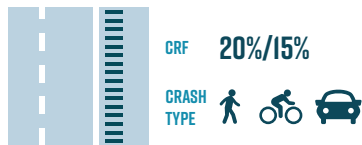
LED Lighting



Upgrading existing street lights to **LED lighting** can increase the visibility of pedestrians in crosswalks, providing for a whiter light, greater color contrast and larger areas of light distribution, when compared to existing high-pressure sodium lighting of the same or higher wattage.

Centerline and Edgeline Rumble Strips

LRSM ID R30/
R31

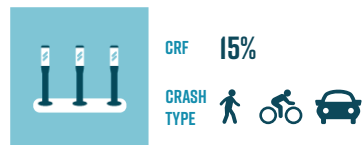


Centerline and edgeline rumble strips create noise and vibration inside the vehicle that alert a driver as they cross the center or edge line. Often this alert is strong enough to get the attention of a distracted or drowsy driver, who can quickly make a corrective steering action to return to the roadway safely.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	HIGH

Delineators, Reflectors, Object Markers

LRSM ID R27

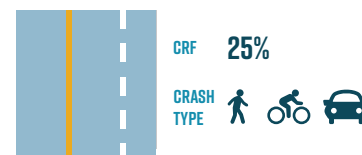


Delineators, reflectors and/or object markers are intended to warn drivers of an approaching curve or fixed object that cannot easily be removed. They are generally less costly than chevron signs as they don't require posts to place along the roadside, avoiding an additional object with which an errant vehicle can crash into.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	VERY HIGH

Edgelines and Centerlines

LRSM ID R28

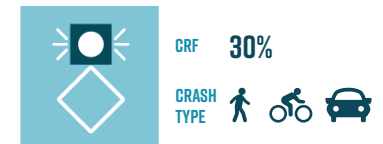


Installing **edge-lines and centerlines** where none exists or making significant upgrades to existing lines (paint to thermoplastic, adding audible disks/bumps in the thermoplastic stripes, or adding RPMs) are intended/designed to help drivers who might leave the roadway because of their inability to 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.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	VERY HIGH

Flashing Beacon as Advance Warning

LRSM ID S10/
NS09



A **flashing beacon as advance warning** is a blinking light with signage to notify motorists of an upcoming intersection or crosswalk. A Flashing Beacon improves safety by providing motorists more time to be aware of and slow down for an intersection or yield to pedestrians crossing a crosswalk.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	HIGH

Flashing Beacons at Stop-Controlled Intersections ✓

LRSM ID 



CRF **15%**
 CRASH TYPE   

Installing a **flashing beacon** or LED-enhanced stop sign can help bring drivers' attention to an intersection. An LED-enhanced sign has LED lights embedded in the sign to outline the sign itself or the words and symbols on the sign. The LEDs may be set to flash or operate in a steady mode. An LED-enhanced sign improves safety by improving the visibility of signs at locations with visibility limitations or with a documented history of drivers failing to see or obey the sign (e.g. at STOP signs).

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	HIGH

High Friction Surface Treatments ✓

LRSM ID 



CRF **55%**
 CRASH TYPE   

A roadway must have an appropriate level of pavement friction to ensure that drivers are able to keep their vehicles safely in the lane. **Pavement friction** is critical for changing vehicle direction and ensuring the vehicle remains in its lane. Traditional friction courses or high friction surface treatments should be considered for curves with numerous wet weather crashes or severe curves with higher operating speeds.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

Improved Sight Distance ✓

LRSM ID 



CRF **20%**
 CRASH TYPE   

Remove objects that may prevent drivers and pedestrians from having a **clear sightline**. May include installing red curb at intersection approaches to remove parked vehicles (also called "daylighting"), trimming or removing landscaping, or removing or relocating large signs.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	HIGH

Left Turn Restriction



Prohibits left turns at locations where a turning vehicle may conflict with pedestrians in the crosswalk or where opposing traffic volume is high. Reduces pedestrian interaction with vehicles when crossing.

Narrow Lanes



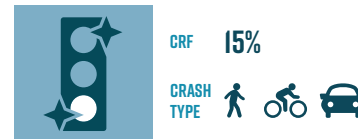
A **reduction in lane width** produces a traffic calming effect by encouraging motorists to travel at slower speeds, lowering the risk of collision with bicyclists, pedestrians, and other motorists.

Right Turn on Red Restriction



Restricts right turns during the pedestrian crossing phase at locations where a turning vehicle may conflict with pedestrians in the crosswalk. This restriction may be displayed with a blank-out sign. This may be implemented in conjunction with a Leading Pedestrian Interval.

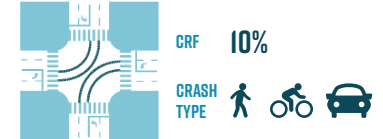
Retroreflective Borders on Signals S02



Retroreflective borders enhance the visibility of traffic signals for aging and color vision impaired drivers enabling them to understand which signal indication is illuminated. Retroreflective borders may also alert drivers to signalized intersections during periods of power outages when the signals would otherwise be dark, and non-reflective signal heads and backplates would not be visible.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	VERY HIGH

Raised Pavement Markers S09



Adding clear **pavement markings** (i.e. “cat track”) can guide motorists through complex intersections. 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 can benefit from this treatment.

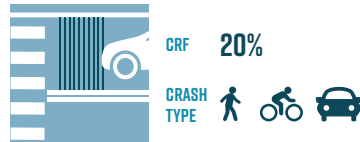
EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	VERY HIGH

“Stop Here on Red” Sign



Add “**Stop Here on Red**” (R 10-6) signs to intersection approaches to increase compliance with advance stop bars. Encouraging advanced stops reduces crosswalk encroachment and improves pedestrian visibility.

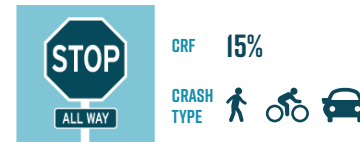
Transverse Rumble Strips LRSM ID



Transverse rumble strips are installed in the travel lane for the purposes of providing an auditory and tactile sensation, to alert drivers of an upcoming intersection. They can be used at any stop or yield approach intersection, often in combination with advance signing to warn of the intersection ahead.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	HIGH

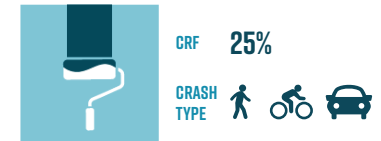
Upgrade to Larger Warning Signs LRSM ID



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.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	VERY HIGH

Upgrade Pavement Markings LRSM ID

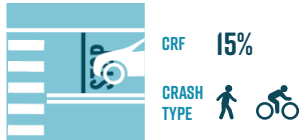


Upgrading intersection pavement marking can include “Stop Ahead” markings and the addition of centerlines and stop bars. These markings can improve safety by increasing the visibility of intersections for drivers.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	VERY HIGH

Advanced Stop Bar ✓

LRSM ID 

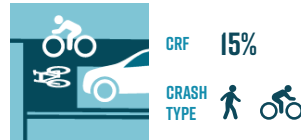


An **advance stop bar** is a horizontal stripe painted ahead of the crosswalk at stop signs and signals to indicate where drivers should stop. An advanced stop bar improves safety by reducing instances of vehicles encroaching on the crosswalk. Creating a wider stop bar or setting the stop bar further back may be appropriate for locations with known crosswalk encroachment issues. See CA MUTCD Section 3B.16 for more information.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	VERY HIGH

Bike Box ✓

LRSM ID 

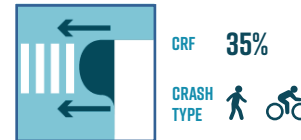


A **bike box** is a designated area at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible way to get ahead of queuing traffic during the red signal phase.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	VERY HIGH

Curb Extensions ✓

LRSM ID 



A **curb extension** widens the sidewalk for a short distance to reduce the crossing distance and to improve pedestrians and drivers' visibility that would otherwise be limited by parked vehicles. Curb extensions also slow vehicles around turns by forcing drivers to make turns at a smaller radius. Paint, surface-mounted flexible guide posts, raised lane separators, delineators posts, and plastic curb barriers are quick build options.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

Dual Curb Ramps



Dual curb ramps improve ADA accessibility at all intersection approaches so that pedestrians with mobility challenges, or those pushing carts or strollers, can safely enter and exit all crosswalks.

Green Conflict Striping



Green conflict striping is green markings painted in a dashed pattern on bike lanes approaching an intersection and/or going through an intersection. Green conflict striping highlights potential conflict points and communicates the expected trajectory of bicyclists through those conflict points.

High-Visibility Crosswalk Striping LRSM ID SI8PB



CRF **25%**
 CRASH TYPE

A **high-visibility crosswalk** has a striped pattern with markings made of high-visibility material, such as thermoplastic tape, instead of paint. A high-visibility crosswalk improves safety with a clearly marked pedestrian crossing so motorists exercise caution and yield to pedestrians. The crash reduction factor noted here only applies to locations currently without a marked crosswalk, but high-visibility crosswalk upgrades can be implemented at existing marked crosswalks. See Section 3B.18 of the CA MUTCD for more detail.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	HIGH

Install Sidewalk LRSM ID R34PB



CRF **80%**
 CRASH TYPE

Adding **sidewalks** provides a separated and continuous facility for people to walk along the roadway. Adding sidewalks also improves safety by minimizing the risk of vehicle and bicycle collisions with pedestrians.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

Mixed-Use Path LRSM ID R34PB



CRF **80%**
 CRASH TYPE

Installing a **mixed-use path** provides a completely separate right of way that is designated for the exclusive use of people riding bicycles and walking with minimal cross-flow traffic.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

Pedestrian Hybrid Beacons

LRSM ID **NS23PB**

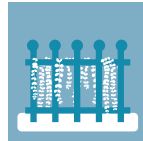


CRF **55%**
CRASH TYPE  

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.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	LOW

Pedestrian Median Fencing






Pedestrian median fencing is a strategy designed to discourage pedestrian crossings where a safe crossing cannot be provided. Median barriers can also 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.

Raised Median/Refuge Island

LRSM ID **NS19PB /SI2 /R08**



CRF **45%/25%**
CRASH TYPE   



A **raised median/refuge island** is a raised curb in the center of the roadway that can restrict certain turning movements and provide a place for pedestrians to wait if they are unable to finish crossing the intersection. A Raised Median can improve safety by reducing the number of potential conflict points with designate zones for vehicles to turn, and a pedestrian refuge island improves safety by reducing the exposure time for pedestrians crossing the intersection.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

Raised Pedestrian Crossing

LRSM ID **R36PB**



CRF **35%**
CRASH TYPE  

A **raised pedestrian crossing** at an intersection or on a segment provides a formalized location for people to cross the street, reducing the risk of people crossing outside crosswalks where drivers are not expecting them. Raising the crossing increases the visibility of the crosswalk and pedestrian to the driver and encourages slower driving.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

Rectangular Rapid Flashing Beacon

LRSM ID

NS22PB
/R37PB



CRF 35%

CRASH TYPE



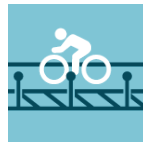
A **rectangular rapid flashing beacon (RRFB)** is a pedestrian-activated flashing light with additional signage to alert motorists of a pedestrian crossing. An RRFB improves safety by increasing motorist yield compliance at uncontrolled locations.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	MEDIUM

Separated Bikeway

LRSM ID

R33PB



CRF 45%

CRASH TYPE



A **separated bikeway** provides dedicated street space with physical separation from vehicle traffic, designated lane markings, pavement legends, and signage. Physical separation may consist of plastic posts, parked vehicles, or a curb. Separated bikeways improve safety by reducing conflicts between bicycles and vehicles and by creating a road-narrowing effect which may reduce vehicle speeds. Raised lane separators, delineator and flexible guide posts, planters, and curb barriers are quick build options.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	HIGH

Sidewalk Landscape Buffer



Separating vehicles from pedestrians using **landscaping** provides more space between the modes and can produce a traffic calming effect by encouraging motorists to drive at slower speeds, lowering the risk of collision.

Straighten Crosswalk



Straightening crosswalks improves sight lines, making pedestrians more visible to oncoming motorists, and may shorten the crossing distance, reducing the length of time required for pedestrians to cross an intersection.

Trail Crossing



Where an off street multi-use trail intersects a roadway, include enhanced crossings, signage, and pedestrian and bike push buttons that facilitate **safe crossing to access the trail**.

Upgrade Curb Ramp



Curb ramps must follow the Americans with Disabilities Act (ADA) design guidelines. Tactile warning devices must be detectable to visually impaired pedestrians.

Widen Sidewalk

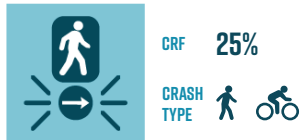


Wide sidewalks can provide a more comfortable space for pedestrians. They are particularly helpful at locations with high volumes of pedestrians, and for providing space to accommodate people in wheelchairs.



Accessible Pedestrian Signal ✓

LRSM ID **S17PB**

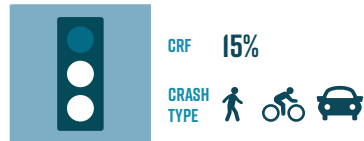


Accessible pedestrian signals, including audible push buttons, improve access for pedestrians who are blind or have low vision. Curb ramps and push buttons must comply with the Americans with Disability Act (ADA) standards for accessibility. Push buttons should be visible and conveniently located for pedestrians waiting at a crosswalk. This countermeasure is often paired with the installation of pedestrian countdown signal heads.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	VERY HIGH

Extend Yellow and All-Red Time ✓

LRSM ID **S03**

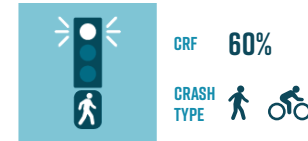


Extending yellow and all red time increases the time allotted for the yellow and red lights during a signal phase. Extending yellow and red time improves safety by allowing drivers and bicyclists to safely cross through a signalized intersection before conflicting traffic movements are permitted to enter the intersection. See CA MUTCD Section 4D.26 for more detail.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	50%
SYSTEMIC OPPORTUNITY	VERY HIGH

Leading Pedestrian Intervals and Pedestrian Recall ✓

LRSM ID **S21PB**

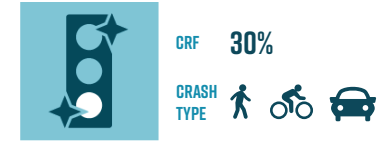


At intersection locations that have a high volume of turning vehicle and have high pedestrian vs. vehicle crashes, a **leading pedestrian interval** gives pedestrians the opportunity to enter an intersection 3-7 seconds before vehicles are given a green indication. With this head start, pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn left or right. **Pedestrian recall** timing automatically provides a pedestrian crossing phase, without having to press the pedestrian call button.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	VERY HIGH

New Signal ✓

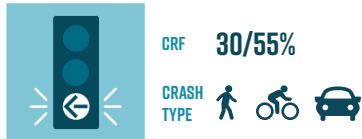
LRSM ID **NS03**



Traffic signals at intersections control the flow of traffic. 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.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	LOW

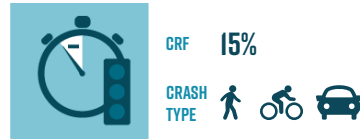
Protected Left Turn ✓ LRSM ID S06/S07



A **protected left turn** can be implemented at signalized intersections (with existing left turns pockets) that currently have a permissive left-turn or no left-turn protection and a high frequency of angle crashes involving left turning movements. Left turns are widely recognized as the highest risk movements at signalized intersections. Providing protected left-turn phases significantly improves the safety for left-turn maneuvers by removing the need for the drivers to navigate through gaps in oncoming through vehicles.

EXPECTED LIFE (YEARS)	20
FEDERAL FUNDING ELIGIBILITY	90%
SYSTEMIC OPPORTUNITY	LOW/HIGH

Shorten Cycle Length ✓ LRSM ID S03



Traffic signal cycle lengths have a significant impact on the quality of the urban realm and consequently, the opportunities for bicyclists, pedestrians, and transit vehicles to operate safely along a corridor. Long signal cycles, compounded over multiple intersections, can make crossing a street or walking even a short distance prohibitive and frustrating. Short cycle lengths of 60–90 seconds are ideal but must be balanced with the time it takes for a pedestrian to cross the street, especially at wide intersections.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	50%
SYSTEMIC OPPORTUNITY	VERY HIGH

Signal Rest in Red ✓ LRSM ID S03



With **rest-in-red**, signals with no volume detected will remain red instead of green, which requires drivers to slow down or stop when approaching the intersection. This can lower intersection departure speeds and reduce the frequency or severity of speed-related collisions. Rest-in-red is intended to be implemented during low-volume conditions, such as nighttime.

EXPECTED LIFE (YEARS)	10
FEDERAL FUNDING ELIGIBILITY	50%
SYSTEMIC OPPORTUNITY	VERY HIGH

Countermeasures that Work Effectiveness Rating

National Highway Traffic Safety Administration, 2017

Programmatic countermeasures listed here that are included in NHTSA's Countermeasures that Work report have an effectiveness rating included in the summary.



Demonstrated to be effective
by several high-quality evaluations with consistent results



Demonstrated to be effective
in certain situations



Likely to be effective
based on balance of evidence from high-quality evaluations or other sources



Effectiveness still undetermined;
different methods of implementing this countermeasure produce different results



Limited or no high-quality evaluation evidence

Reduce Posted Speeds

Utilize California Assembly Bill (AB) 43 methodology to lower speed limits on corridors.

AB 43 features the following five major components, focused on providing local jurisdictions more flexibility in setting speed limits, especially regarding vulnerable road users:

- Engineering & Traffic Survey (E&TS) - option to extend enforceable time period
- Post E&TS - agency can elect to retain current or immediately prior speed limit
- Speed Limit Reduction - reduction of additional 5 mph based on several factors, including designation of local "Safety Corridors"
- Prima Facie Speed Limits - options for 15 and 25 mph in certain zones
- Business Activity Districts - option for 20 or 25 mph

AUTOMATED ENFORCEMENT

Automated enforcement for speeds, though not currently allowed in California, has been shown to be one of the most effective tools for enforcing lower speed limits. Should the City of Moreno Valley be interested in exploring automated speed enforcement opportunities, the City may consider supporting state-level legislation.

Best Practice Resource

California Assembly Bill 43

NACTO "City Limits - Setting Safe Speeds Limits on Urban Streets" guide

Lead Agency

Moreno Valley Public Works
Moreno Valley Police Department

Effectiveness



Speed Limits

Funding Source

California Office of Traffic Safety (OTS) Grants

Alternatives to Street Racing

Cars are an important part of community identity in Moreno Valley, but street takeovers and races are dangerous in the public right-of-way. In addition to roadway design measures to ensure roads are not designed for high speed races, Moreno Valley and partner organizations can host car-related events intended to encourage safer alternatives to street racing. In response to an increase in street racing during COVID, cities across the country have started to host their own racing events and car shows. Providing a safe, controlled environment for the community to engage in Moreno Valley’s car culture can help to mitigate issues resulting from unsafe behavior on City streets. Participant rules should be in place, such as racers must possess a valid drivers license and vehicle insurance, submit to vehicle safety inspections, and refrain from any use of alcohol at the event.

Best Practice Resource ASU Center for Problem-Oriented Policing “Responses to the Problem of Street Racing”

Lead Agency Moreno Valley Public Works
Moreno Valley Police Department
Local Organizations and Businesses

Effectiveness -

Funding Source California Office of Traffic Safety (OTS) Grants
SCAG Go Human Grants

Education & Public Awareness Campaign - Focus on Safe Speeds and DUIs

Coordinate with the City communication staff to use existing social media accounts to establish an ongoing public education campaign on driving at responsible speeds, discouraging drinking and driving, along with encouraging increased awareness of pedestrians and bicyclists. Another application of this countermeasure would be collaborating with local radio stations to disseminate safety messages.

The SCAG Go Human campaign and the OTS Go Safely California campaign both have free resources for local agencies to use in implementing public awareness campaigns. OTS also has three DUI crackdown programs - Report Drunk Drivers, Drive Sober or Get Pulled Over, and Designated Driver VIP - that Moreno Valley can publicize locally.

Jurisdictions partner technology companies to provide alerts to on-vehicle computer systems and phones when drivers pass through designated corridors that have been targeted for speed enforcement and education programs. These programs use geofencing technology and send push alerts urging drivers to travel at reasonable speeds.

Best Practice Resource SCAG Go Human Campaign; OTS Go Safety California Campaign

San Francisco Municipal Transportation Agency’s “Be Nice, Look Twice” pedestrian safety campaign and “Safety - It’s Your Turn” campaign

Lead Agency Moreno Valley Public Works
Moreno Valley Police Department

Effectiveness 
Mass Media Campaign on DUI


Funding Source California Office of Traffic Safety (OTS) Grants
SCAG Go Human Grants

Licensee Education on Alcohol and Drugs (LEAD) Training Program

California Alcoholic Beverage Control has trained more than 350,000 employees who sell alcoholic beverages through its Licensee Education on Alcohol and Drugs (LEAD) training program. The training is now available online, making it easier for people to access. Moreno Valley can work with local stores and bars to ensure all employees who sell alcohol in the City have undergone this training, focusing on preventing the sale of alcohol to minors and obviously intoxicated persons. Targeting DUI offenders at the sale source may help to mitigate collision frequency and severity.

ALCOHOL DELIVERY


During the COVID-19 pandemic, California liquor laws were changed to allow for the delivery of distilled spirits and retailer-packaged alcoholic beverages. As a result, the state has seen a significant increase in businesses offering these delivery services. In Moreno Valley, the availability and promotion of alcohol delivery services could be a potential incentive for those planning on drinking to stay home, avoiding driving under the influence. Moreno Valley can also work with alcohol delivery businesses to encourage participation in LEAD training.

Best Practice Resource	California Alcohol Beverage Control “LEAD Training”
Lead Agency	Moreno Valley Police Department
Effectiveness	 Responsible Beverage Service
Funding Source	California Office of Traffic Safety (OTS) Grants

Impaired Driving Treatment Program

Riverside University Health System, the public health agency for Riverside County, runs the Drinking Driver Program clinic (DDP) as part of its substance abuse programs offered county-wide. Moreno Valley can partner with Riverside University Health to promote and refer DUI offenders to this program.

Programs like this have seen very successful outcomes in California. OTS previously funded the San Mateo County Superior Court Impaired Driving Treatment program, which provided treatment services to more than 150 individuals with driving under the influence (DUI) convictions. The program had an 88% graduation rate and less than 2% of individuals in the program were arrested again for DUI.



Best Practice Resource	NHTSA Countermeasures that Work
Lead Agency	Riverside University Health System Moreno Valley Police Department
Effectiveness	 Alcohol Problem Assessment and Treatment
Funding Source	California Office of Traffic Safety (OTS) Grants

High-Visibility DUI Patrols

Moreno Valley Police Department should continue their use of high-visibility enforcement for DUIs, publicized checkpoints, and deterrence policies, focusing on raising the actual and perceived risk of detection of driving under the influence. Enforcement should be paired with widespread dissemination of multi-lingual educational messaging and promotion of safe rides home programs in advance of major enforcement efforts to mitigate equity concerns about disproportionate impacts of fines/fees on lower income residents.

EQUITY CONSIDERATIONS

Enforcement of traffic laws is a common strategy to increase street safety, but historical enforcement techniques and strategies have raised concerns about racial profiling, police violence, and the impacts of policing on communities of color. According to the US Department of Justice, Black and Hispanic people are more likely than white people to experience use of force when they are stopped by police. To ensure that efforts to improve safety recognize that all people have the right to move about their communities safely, enforcement should be paired with equity-oriented programs such as enacting progressive fine structures, analyzing demographic data in traffic citations, and culturally relevant education and outreach.

Best Practice Resource	-
Lead Agency	Moreno Valley Police Department
Effectiveness	 Publicized Sobriety Checkpoints  High-Visibility Saturation Patrols
Funding Source	California Office of Traffic Safety (OTS) Grants

Rapid Response Safety Communication Protocol & Multi-Disciplinary Team

Moreno Valley Public Works and Police Department staff should continue to work closely to address safety challenges at key collision locations. The City can employ an internal, multi-departmental communication strategy in response to severe and fatal collisions. The protocol should outline a path forward for Public Works staff to be a part of the immediate on-the ground-response to an investigation of severe and fatal collisions, ensuring a multi-disciplinary response team focused both on the behavioral and engineering elements of a collision. This multi-disciplinary team can also support timely data sharing among Moreno Valley departments, ensure data accuracy, and develop near-term interventions.

Best Practice Resource	San Francisco Vision Zero Traffic Fatality Protocol
Lead Agency	Moreno Valley Police Department Moreno Valley Public Works Riverside University Health System
Effectiveness	-
Funding Source	California Office of Traffic Safety (OTS) Grants

Emerging Technology, including Autonomous and Connected Vehicles

Near Miss Data

Near misses have historically been difficult to study in practical safety applications due to an overall lack of reported information. In the absence of sufficient crash data, near miss data is an important indicator for guiding crash prevention. There are several technologies that are closing the gap and providing key safety insights regarding near misses, including:

- Video Data: Video machine learning is an effective means of classifying collisions and collecting near miss data.
- Commercially Available Event Data: With the capability of vehicles to capture and transmit real-time data on driver behavior wirelessly, these data are increasingly becoming an integral part of reporting near misses especially given the introduction of AVs on public roadways.

AV Readiness

Planning Having strategies prepared to meet and address the oncoming challenges posed by AV technology will be crucial in advancing road safety in Moreno Valley. Fully automated vehicles have the potential to modify travel behavior and improve safety outcomes given that AVs are ultimately intended to operate lawfully and eliminate or reduce human error. Some strategies for preparation include educating the public on current and future safety features and limitations, continuing to upgrade signal equipment, and maintaining roadway surfaces, striping and signage.

Best Practice Resource	<p>NHTSA Automated Vehicles for Safety</p> <p>ITE Connected Automated Vehicles/Connected Transportation Interoperability Standards</p> <p>National Transportation Communications for ITS Standards</p>
Lead Agency	<p>Moreno Valley Public Works</p> <p>Caltrans</p>
Effectiveness	-
Funding Source	California Office of Traffic Safety (OTS) Grants

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6

Implementation and Evaluation

This section outlines the strategies necessary to implement and evaluate this local road safety plan, as well as provides an overview of potential funding sources to explore.

6

To successfully implement programs and projects outlined in this LRSP, partnerships, trust, funding, and coordination need to be proactively managed. Successful implementation requires sustained and coordinated support from key stakeholders, elected officials, and city staff. Some strategies include the following:

- **Continue stakeholder engagement:** Continue close coordination with the internal stakeholder group established through this LRSP process, who will ultimately be responsible for implementing the countermeasures identified in this Plan. This multi-disciplinary group will ensure that an integrated approach will be taken to implementation - ensuring that city-led engineering countermeasures are supported by coordinated enforcement, education, and engagement programs led by local and regional partners. It is recommended that this group meet biannually or quarterly to maintain momentum.
- **Provide regular updates to the community:** Having continued communication and transparency with stakeholders and community members can allow for greater trust and support of the LRSP's goals. Strategies could include conducting briefings and presentations at board and agency meetings, collecting and sharing information on a regular basis, and updating a public-facing database (or scorecard) on LRSP goal progress.
- **Identify efficiencies in project delivery:** Look for funding and implementation efficiencies through mechanisms such as project bundling, scope modifications of CIP projects, and integration of safety projects into routine maintenance work.

Evaluation

Evaluation identifies possible opportunities to inform future decision-making and allows the City to understand how it is doing against the goal of reducing the number of fatal and severe injury collisions on City roadways. Annual evaluation is encouraged.

GOAL	METRIC
The City of Moreno Valley is committed to advancing transportation safety for all who share our streets by eliminating fatal and severe injury collisions on City roadways.	Total KSI collisions <hr/> Total KSI pedestrian and bicycle collisions
Invest in programs and infrastructure that address the City's most frequent and severe collision profiles.	Number of engineering countermeasures implemented <hr/> Percent of Public Works projects with a safety component
Encourage safe roadway behavior through geometrically safe designs and contextually appropriate posted speeds.	85th percentile speeds
Support the mobility of all road users by reducing the number of pedestrian- and bicycle-involved collisions.	Total pedestrian and bicycle collisions
Discourage motorists from driving under the influence through educational programs and decrease the severity of DUI collisions through roadway infrastructure improvements.	Total injury collisions with a DUI primary collision factor <hr/> Number of DUI-related education, engagement, and enforcement campaigns or programs implemented

Funding

While the primary purpose of this LRSP is to prepare the City of Moreno Valley to submit successful Highway Safety Improvement Program (HSIP) applications, safety projects can be funded through a wide range of additional sources at the regional, state, and federal levels. HSIP funds are largely awarded based on a benefit/cost analysis using a set of Caltrans-approved countermeasures with documented collision reduction factors and historic collision data. While many safety projects will perform well in the HSIP process, others may be successfully funded through other sources that consider additional factors, such as the Active Transportation Program (ATP). The sources in this chapter may be used to fund a broad scope of projects targeting air quality and sustainability, affordable housing, and transportation. Successful projects often entail creative solutions that address impact areas beyond transportation safety alone.

FUNDING LEVEL	GRANT	NEXT OPPORTUNITY
Local/Regional	SCAG Sustainable Communities Program	2022 - Fall
Local/Regional	SCAG Community Streets Mini-Grant Program	2023 - TBD
Local/Regional	Riverside County Transportation Commission (RCTC) Transportation Development Act (TDA) Article 3 Bicycle and Pedestrian Facilities Program (SB 821)	2023 - February
Local/Regional	RCTC Measure A	TBD
State	Highway Safety Improvement Program (HSIP)	2022 - September
State	California Strategic Growth Council (SGC) Transformative Climate Communities (TCC) Program	TBD
State	SGC Affordable Housing and Sustainable Communities (AHSC) Program	2023 - February
State	Active Transportation Program (ATP)	2023/2024 - TBD
State	SB 1 Local Streets and Roads Program (LSRP)	2022 - Fall (TBD)
State	Caltrans Sustainable Communities Grants	2022 - October
State	California Office Of Traffic Safety (OTS) Grant Programs	2023 - TBD
State	SB 1 Solutions for Congested Corridors Program (SCCP)	2023 - TBD
State	SB 1 Local Partnership Program (LPP)	2023 - TBD
State	SB 1 State Transportation Improvement Program (STIP)	2024 - TBD
State	California Natural Resources Agency Urban Greening Program	2024 - TBD
Federal	RAISE Grants (Formerly BUILD and TIGER)	TBD
Federal	Safe Streets for All Grants	2022 - September

Local and Regional Sources

SCAG SUSTAINABLE COMMUNITIES PROGRAM

Provides direct technical assistance to SCAG member jurisdictions to complete planning and policy efforts that enable implementation of the regional SCS).

Grants are available in four categories: Civic Engagement, Equity & Environmental Justice; Smart Cities & Mobility Innovations; Housing & Sustainable Development; Active Transportation & Safety.

SCAG COMMUNITY STREETS MINI-GRANT PROGRAM

Competitive community grant program that funds safety projects. Awards are made up to \$10,000. Projects aim to build street-level community resiliency and increase the safety of people most harmed by traffic injuries and fatalities. \$277,000 was awarded to 31 projects in 2021.

RIVERSIDE COUNTY TRANSPORTATION COMMISSION (RCTC) TRANSPORTATION DEVELOPMENT ACT (TDA) ARTICLE 3 BICYCLE AND PEDESTRIAN FACILITIES PROGRAM (SB 821)

Each year, 2% of the Local Transportation Fund (LTF) revenue is made available for bicycle and pedestrian facility projects under TDA Article 3, also known as SB 821. Eligible projects include sidewalks, access ramps, bicycle facilities, and bicycle plan development. A Call for Projects is issued biennially in February, and

funds are allocated each June. The next funding opportunity is February 2023.

RCTC MEASURE A

Riverside County's first half-cent sales tax for transportation improvements through 2039.

State Sources

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP)

HSIP 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. California's Local HSIP focuses on infrastructure projects with nationally recognized crash reduction factors (CRFs). This is the primary grant funding source to support roadway projects identified through the LRSP.

CALIFORNIA STRATEGIC GROWTH COUNCIL (SGC) TRANSFORMATIVE CLIMATE COMMUNITIES (TCC) PROGRAM

The Transformative Climate Communities (TCC) Program empowers the communities most impacted by pollution to choose their own goals, strategies, and projects to reduce greenhouse gas emissions and local air pollution.

SGC AFFORDABLE HOUSING AND SUSTAINABLE COMMUNITIES (AHSC) PROGRAM

The Affordable Housing and Sustainable Communities (AHSC) Program makes it easier for Californians to drive less by

making sure housing, jobs, and key destinations are accessible by walking, biking, and transit.

ACTIVE TRANSPORTATION PROGRAM (ATP)

ATP is a statewide competitive grant application process with the goal of encouraging increased use of active modes of transportation. The ATP consolidates existing federal and state transportation programs, including the Transportation Alternatives Program (TAP), Bicycle Transportation Account (BTA), and State Safe Routes to School (SRTS), into a single program with a focus to make California a national leader in active transportation. The ATP administered by the Division of Local Assistance, Office of State Programs.

SB 1 LOCAL STREETS AND ROADS PROGRAM (LSRP)

SB 1 dedicated approximately \$1.5 billion per year in new formula revenues apportioned by the State Controller to cities and counties for basic road maintenance, rehabilitation, and critical safety projects on the local streets and roads system.

CALTRANS SUSTAINABLE COMMUNITIES GRANTS

To encourage local and regional planning that furthers state goals, including, but not limited to, the goals and best practices cited in the Regional Transportation Plan Guidelines adopted by the California Transportation Commission.

CALIFORNIA OFFICE OF TRAFFIC SAFETY (OTS) GRANT PROGRAMS

OTS administers traffic safety grants in the following areas: Alcohol Impaired Driving, Distracted Driving, Drug-Impaired Driving, Emergency Medical Services, Motorcycle Safety, Occupant Protection, Pedestrian and Bicycle Safety, Police Traffic Services, Public Relations, Advertising, and Roadway Safety and Traffic Records.

SB 1 SOLUTIONS FOR CONGESTED CORRIDORS PROGRAM (SCCP)

The Solutions for Congested Corridors Program funds projects designed to reduce congestion in highly traveled and highly congested corridors. This statewide, competitive program makes \$250 million available annually for projects that implement specific transportation performance improvements and are part of a comprehensive corridor plan by providing more transportation choices while preserving the character of local communities and creating opportunities for neighborhood enhancement.

SB1 LOCAL PARTNERSHIP PROGRAM (LPP)

The purpose of this program is to provide local and regional transportation agencies that have passed sales tax measures, developer fees, or other imposed transportation fees with a continuous appropriation of \$200 million annually from the Road Maintenance and Rehabilitation Account to fund road maintenance

and rehabilitation, sound walls, and active transportation projects. There is also a competitive grant portion of this project.

SB1 STATE TRANSPORTATION IMPROVEMENT PROGRAM (STIP)

The State Transportation Improvement Program (STIP) is the biennial five-year plan for future allocations of certain state transportation funds for state highway improvements, intercity rail, and regional highway and transit improvements.

CALIFORNIA NATURAL RESOURCES AGENCY URBAN GREENING PROGRAM

This program supports projects that “use natural systems or systems that mimic natural systems to achieve multiple benefits.” Eligible projects include “non-motorized urban trails that provide safe routes for travel between residences, workplaces, commercial centers, and schools.”

Federal Sources

RAISE GRANTS (FORMERLY BUILD AND TIGER)

The Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Discretionary Grant program provides a unique opportunity for the DOT to invest in road, rail, transit, and port projects that promise to achieve national objectives. This cycle’s program selection criteria encompass safety, environmental sustainability, quality of life, economic competitiveness, state of good repair,

innovation, and partnerships with a broad range of stakeholders. The first round of RAISE grants awarded \$417m to bicycle and pedestrian projects, and \$30m for planning grants (eligible for the first time).

SAFE STREETS FOR ALL GRANTS

The recent federal infrastructure bill established the new Safe Streets for All program to provide \$5b in grant funding to develop and implement Vision Zero safety plans. Current legislation emphasizes funding of planning efforts, but the focus on implementation funding is expected to increase over the next few years.

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Moreno Valley LRSP

Date: August 2022

Subject: **Appendix A | Moreno Valley Local Road Safety Plan Systemic Analysis Methodology**

OC21-0844

Systemic analysis is a proactive safety approach that focuses on evaluating an entire roadway network using a defined set of criteria. It looks at collision history on an aggregate basis to identify high-risk roadway characteristics in addition to looking at high-collision concentration locations. By merging roadway and intersection features with collision data, relationships can be uncovered between contextual factors and the risk of frequent and severe collisions.

Collision data was paired with geographic roadway and other contextual data to develop collision types. Outputs from this analysis were used to populate a set of matrices that allow us to look at crosstabs (collision data in rows and geographic data in columns) for collisions across the entire roadway network. The matrices allowed for identification of the combinations of factors that contributed to a high number of all collisions, and combinations that led to a high number of fatal and severe collisions.

Collision Data Assumptions

This analysis considers injury collisions from 2016-2020 available through the Transportation Injury Mapping System (TIMS) as of February 24, 2022. TIMS reports injury collisions from the Statewide Integrated Traffic Records System (SWITRS). Collision data for Riverside County was acquired and filtered to only include collisions occurring on local roadways within the City. The table below provides more detail on how the collision dataset was filtered.

Table 1: Collision Data Details and Assumptions

Condition	Assumption Details
Analysis years	2016-2020
Collision types	Injury collisions only; Property Damage Only (PDO) collisions were excluded from the dataset.
Geographic extents	City of Moreno Valley collisions only; a 250-foot buffer around the City boundaries was applied.



<i>Incorrectly geocoded collisions</i>	During manual validation of the TIMS dataset it was discovered that some collisions were incorrectly geocoded to appear on SR-60 just north of the Perris Boulevard/Sunnymead Boulevard intersection. The locations of these collisions were manually corrected using the provided cross street, direction, and distance from intersection attributes.
<i>State highway collisions</i>	Collisions occurring on state facilities were excluded from the analysis. The TIMS dataset was filtered using the state highway and ramp attribute fields to exclude collisions recorded as occurring on SR-60 and SR-215. During manual validation of this process, some surface street collisions were identified to be mis-reported as occurring on state facilities. These collisions were included in the analysis. Additionally, collisions occurring on ramps within 250 feet of an intersection were included in the analysis.
<i>Truck classification</i>	Vehicles reported by TIMS as "Pickup or Panel Truck," "Pickup or Panel Truck with Trailer," "Truck or Truck Tractor," or "Truck or Truck Tractor with Trailer" considered to be "trucks" for the purposes of this analysis.
<i>Unmapped collisions</i>	Collisions that were reported by TIMS without a Point X and Point Y geographic spatial reference but tagged as occurring in the City of Moreno Valley jurisdiction were manually geocoded using the provided cross street, direction, and distance from intersection attributes, and included in the analysis.

Contextual Data Assumptions

To better understand systemic collision patterns in Moreno Valley, several contextual factors were analyzed in conjunction with collision characteristics. Key contextual factors are included in **Table 2**.

Additionally, collisions were matched with the characteristics of a roadway in which they occurred, including roadway classification and posted speed limit. The proximity to each contextual factor varied based on its area of influence (e.g. a school has a much larger area of influence than a transit stop). The distances for each factor and any processing modifications are summarized in the following tables.

Table 2: Contextual Factors Details and Assumptions

Contextual Factors	Data Source	Buffer Distance
<i>Average Daily Traffic</i>	Streetlight data purchased for this project. Traffic volumes were categorized into Low, Low-Medium, Medium, Medium-High, and High categories by roadway segment. The breakpoints were (in thousands): 5, 10, 20, and 30.	NA
<i>Bicycle Facilities</i>	Moreno Valley General Plan Update	100 ft
<i>Equity-focused geographies</i>	CalEnviroScreen 4.0. Filtered to include 25 th percentile and below.	250 ft



General Plan Classification	Moreno Valley General Plan Update. Riverside County roadway shapefile with manually inputted Moreno Valley GP classifications. All roadways that weren't classified in the GP were assumed to be local.	NA
Intersection Control	Moreno Valley Pedestrian Safety Study (2020) data layer	250 ft
Marked Crosswalks	Moreno Valley Pedestrian Safety Study (2020) data layer	250 ft
Observed Speeds	Wejo data purchased for this project.	NA
Posted Speeds	Moreno Valley Pedestrian Safety Study (2020) data layer. Roadways that were missing posted speed data were supplemented by a manual Google Maps Streetview check. Roads designated as local in the General Plan Update were assumed to be 25 mph.	NA
RTA Transit Stops	Moreno Valley Pedestrian Safety Study (2020) data layer	100 ft
Sidewalk Gaps	Moreno Valley Pedestrian Safety Study (2020) data layer	100 ft
Streetlights	Moreno Valley Pedestrian Safety Study (2020) data layer	50 ft

Source: Fehr & Peers, 2022.

Table 3: Land Use Contextual Factors Details and Assumptions

Land Use Type	Data Source	Distance
Schools	Moreno Valley Pedestrian Safety Study (2020) data layer	.25 mi
Industrial Land Use	Moreno Valley General Plan Update	.25 mi
Parks	Moreno Valley Pedestrian Safety Study (2020) data layer and Fehr & Peers Basemap. Open spaces were classified as parks if they had public access points.	.25 mi

Source: Fehr & Peers, 2022.

Property Damage Only Collision Data Assumptions

As part of HSIP applications, benefit-cost ratios were calculated for selected emphasis areas. For these calculations, information on Property Damage Only (PDO) collisions from 2016-2020 available through the Statewide Integrated Traffic Records System (SWITRS) was accessed on July 11, 2022. The table below provides more detail on how the collision dataset was filtered.

Table 4: PDO Collision Details and Assumptions

Condition	Assumption Details
Analysis years	2016-2020
Collision types	Property Damage Only (PDO) collisions.
Geographic extents	City of Moreno Valley collisions only; a 250-foot buffer around the City boundaries was applied.



<i>Incorrectly geocoded collisions</i>	During manual validation of the SWITRS dataset it was discovered that some collisions were incorrectly geocoded. All collisions included as part of an emphasis area benefit-cost calculation were verified by cross street, distance, and direction from intersection.
<i>State highway collisions</i>	Collisions occurring on state facilities were excluded from the analysis. The SWITRS dataset was filtered using the state highway and ramp attribute fields to exclude collisions recorded as occurring on SR-60 and SR-215. Collisions occurring on ramps within 250 feet of an intersection were included in the analysis.
<i>Unmapped collisions</i>	Collisions that were reported by SWITRS without a Point X and Point Y geographic spatial reference were manually geocoded using the provided cross street, direction, and distance and included in the analysis.

Source: Fehr & Peers, 2022.



City of Moreno Valley

PEDESTRIAN SAFETY STUDY

Final Report

June 2020

Prepared By

FEHR & PEERS

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Engineer's Seal

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SIGNED FOR APPROVAL

Claude Strayer

6/30/2020

Claude Strayer, PE
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Date

John Kerenyi, PE
City of Moreno Valley

Date

By signing and stamping this Systemic Safety Analysis Report, the engineer is attesting to this report's technical information and engineering data upon which local agency's recommendations, conclusions, and decisions are made.

Statement of Protection of Data from Discovery and Admissions

SECTION 148 OF TITLE 23, UNITED STATES CODE

REPORTS DISCOVERY AND ADMISSION INTO EVIDENCE OF CERTAIN REPORTS, SURVEYS, AND INFORMATION — Notwithstanding any other provisions of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section, 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 the location identified or addressed in the reports, surveys, schedules, lists, or other data.

Acknowledgments

The 2019 City of Moreno Valley Pedestrian Safety Study was funded through a Systemic Safety Analysis Report Program (SSARP) grant provided by the California Department of Transportation (Caltrans). Input was sought from an advisory group consisting of staff from the City of Moreno Valley and partner public agencies. Fehr & Peers assisted the City of Moreno Valley in preparing the plan.

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Glossary

(A)ADT (annual) average daily traffic

ADA Americans with Disabilities Act

AHSC Affordable Housing and Sustainable Communities

APTA American Public Transportation Association

ATP Active Transportation Program

B/C benefit/cost

BTA Bicycle Transportation Account

BUILD Better Utilizing Investments to Leverage Development

CDBG Community Development Block Grant

CRF crash reduction factor

CVC California Vehicle Code

DOT Department of Transportation

DUI driving under the influence

fc foot candles

FHWA Federal Highway Administration

GIS geographic information system

HPS high pressure sodium

HSIP Highway Safety Improvement Program

IES Illuminating Engineering Society

ITE Institute of Transportation Engineers

KSI killed or severely injured

LED light-emitting diode

LOS level of service

LPI leading pedestrian interval

LPP Local Partnership Program

LRSM Local Roadway Safety Manual

LSRP Local Streets and Roads Program

LTF Local Transportation Fund

MUTCD Manual on Uniform Traffic Control Devices

MVUSD Moreno Valley Unified School District

NACTO National Association of City Transportation Officials

NHTSA National Highway Traffic Safety Administration

OTS Office of Traffic Safety

PARET Public Awareness Radar Educational Trailer

PHB Pedestrian Hybrid Beacon

RCTC Riverside County Transportation Commission

RRFB Rectangular Rapid Flashing Beacon

RTA Riverside Transit Agency

SCCP Solution for Congested Corridors Program

SGC Strategic Growth Council

SR2S Safe Routes to School

SSAR(P) Systemic Safety Analysis Report (Program)

STIP State Transportation Improvement Program

TCC Transportation Climate Communities

TCRP Transit Cooperative Research Program

TDA Transit Development Act

TIGER Transportation Investment Generating Economic Recovery

TSC Traffic Safety Commission

TUMF Transportation Uniform Mitigation Fee

WRCOG Western Riverside Council of Governments



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Executive Summary

This study identifies opportunities to improve pedestrian safety through roadway design projects that are relevant to the project location, feasible for implementation, and competitive for grant funding.

This plan lays the groundwork and provides the resources necessary for the preparation of successful Highway Safety Improvement Program (HSIP) grant applications by the City. The Pedestrian Safety Study was funded through a Systemic Safety Analysis Report (SSAR) program grant provided by the California Department of Transportation (Caltrans).

The SSAR program was initiated by Caltrans to help local agencies proactively identify safety improvement projects by completing a system-wide, data-driven analysis of collisions. The SSAR evaluation includes collision

and roadway database development, review of local collision data, safety data analysis, collision profile analysis, safety countermeasures identification, and project cost estimates.

Chapter 1 of this report contains a review of the planning and policy background related to pedestrian safety in Moreno Valley. The team researched Moreno Valley's existing plans, policies, and procedures, and compared these with national best practices, to determine in which areas the City is following best practices and in which areas the City has opportunities to improve its safety work. Topics in this chapter are organized into three categories based on areas where the City is exceeding national best practices (Key Strengths), meeting best practices (Enhancement), and areas where additional best practices could be implemented (Opportunity).

Chapter 2 summarizes the safety data used as part of the analysis for this report. Nine years of the most current pedestrian crash data available (2009-2017) was extracted from the City of Moreno Valley's Crossroads database. Between 2009 and 2017, 11,744 collisions occurred in Moreno Valley, 353 of which involved a pedestrian. The pedestrian collision dataset was the focus of the majority of our analysis. In addition to collision data, several pieces of contextual geographic data were analyzed in conjunction with collisions, including street lights, sidewalks, schools, transit stops, signals, roadway type, and roadway speed.

The collision analysis process – described in Chapter 3 – involved creating a collision database to identify locations with a history of collisions and examining the collision trends at those locations to discern patterns

and contributing factors. In addition to identifying locations with a history of collisions, the systemic nature of crashes was also evaluated, with a focus not only on where crashes have occurred, but collision and contextual factors contributing to disproportionate numbers of collisions or disproportionately severe collisions. From this systemic analysis process, six key crash types were identified, mapped, and paired with potential safety countermeasures.

To address the safety patterns identified in the collision analysis, a safety Countermeasure Toolbox is presented in Chapter 4. The Toolbox includes a set of infrastructure improvement projects that can be used in HSIP funding applications. Each countermeasure is described along with key information from the California Local Roadway Safety Manual, including crash reduction factors and opportunities for systemic implementation. These countermeasures are used in the project lists in Chapter 5 and can be a resource to the City for future planning and safety improvements.

Beyond the requirements of the Systemic Safety Analysis Report Program, Chapter 4 includes a review of additional safety topics specific to the Moreno Valley context:

- A safety review of Moreno Valley's marked uncontrolled crosswalks on arterial roadways, along with relevant

guidance from the Federal Highway Administration's guidelines for uncontrolled crosswalks

- An overview of lighting safety guidelines for pedestrian crossing locations
- A review of bus stop locations with opportunities for pedestrian improvements. As the Riverside Transit Agency continues to enhance service within Moreno Valley, through projects like bus rapid transit, the City of Moreno Valley can build on these investments by improving access to stops. Industry best practice for safe pedestrian access to bus stops is summarized in the chapter.
- A review of safety countermeasures that may be good candidates for implementation using low cost and quick build materials, including photographs of key examples

Chapter 5 includes the recommended priority projects and locations. Through the collision analysis process, four intersections and six roadway segments were identified as priority project locations. These locations represent a variety of roadway contexts seen throughout Moreno Valley, and the projects recommended for each location can also be considered for locations with similar characteristics or similar crash patterns. To aid in the preparation of HSIP grant applications, each project is accompanied by a cost

estimate, the benefit/cost ratio, and planning graphics that illustrate the proposed improvements.

Chapter 6 presents a summary of available funding sources that can be used to finance safety projects in addition to HSIP funding. This list includes regional, state, and federal funding programs, a description of the program purpose, and the date of the next funding opportunity. The summary also includes funding sources for which Moreno Valley has been successful in securing grant funding for transportation projects.

1

Policy Background & Best Practices

**Pedestrian Safety Best Practices Review to Identify
Key Strengths, Areas for Enhancement & Opportunities**

1

Fehr & Peers performed a literature review of key systemic safety plans and safety design guidance to summarize best practices in the emerging field of pedestrian systemic safety analysis. Resources from the Institute of Transportation Engineers (ITE), National Association of City Transportation Officials (NACTO), and Federal Highway Administration (FHWA), among others, were reviewed. Fehr & Peers also identified best practices based on its previous work in this field, such as the City of Los Angeles Vision Zero initiative.

The team researched Moreno Valley's existing plans, policies, and procedures, and compared these with national best practices, to determine in which areas the City is following best practices and in which areas the City has opportunities to improve its safety work. Fehr & Peers discussed its findings with several key city officials to ensure that its analysis is complete and accurate.

This chapter's sections are organized as follows:

- **Key Strengths:** areas where the City is exceeding national best practices.
- **Enhancement:** areas where the City is meeting best practices.
- **Opportunity:** areas where the City could apply more best practices.

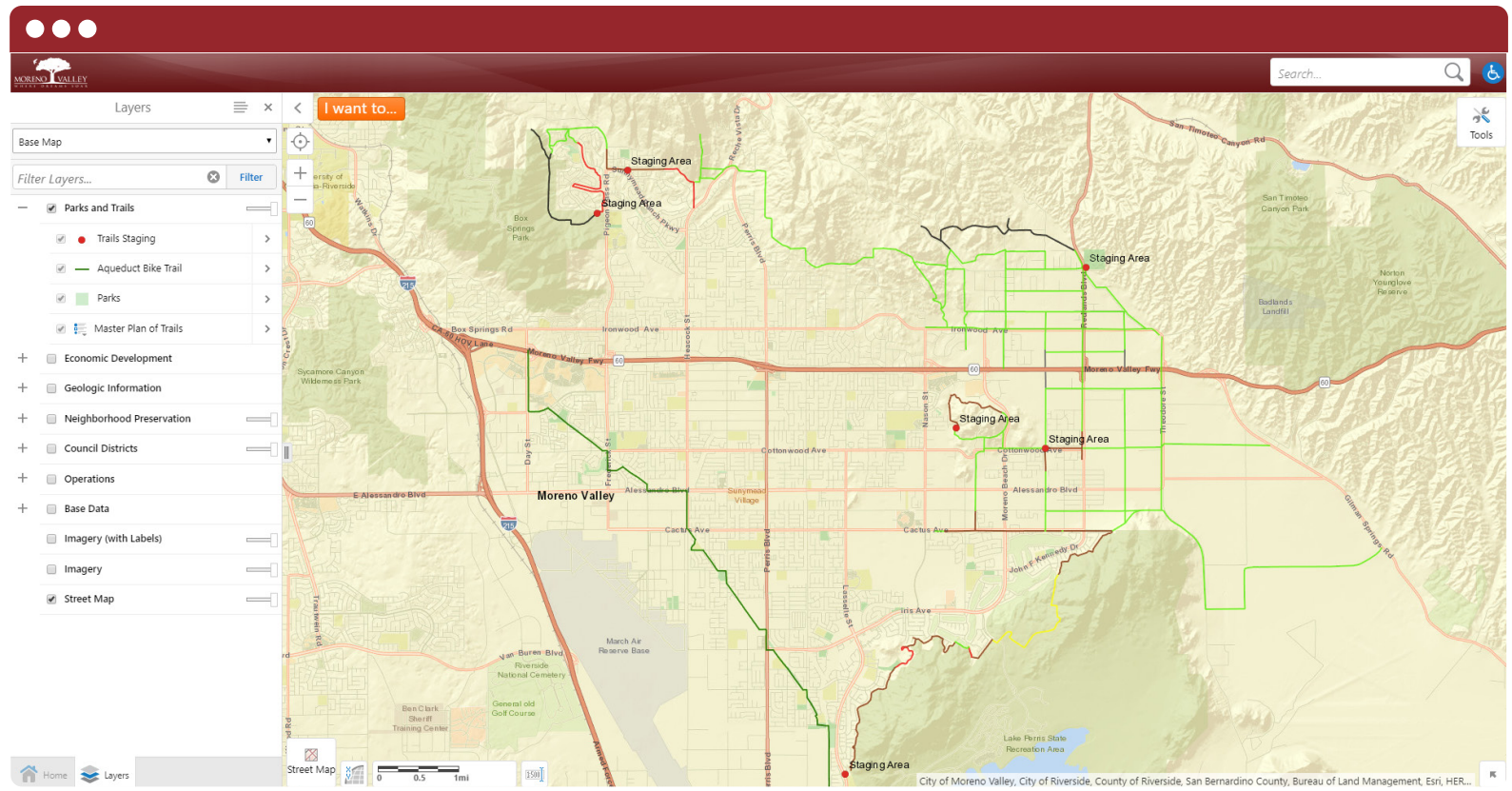
Each section includes recommendations for how Moreno Valley could improve pedestrian safety, which the City may decide to implement based on local priorities.

Key Strengths **Geographic Information System (GIS) Database**

The City has converted many of its Excel-based data relevant to pedestrian safety into GIS-based files, which makes overlaying this data on top of geographic information and identifying spatial relationships between safety factors and locations efficient.

For instance, Moreno Valley has the following GIS-based files, which many cities do not have access to:

- **Sidewalks:** This layer contains information such as edge type, sidewalk material, and nearby schools.
- **Traffic Signals:** This layer contains information such as which organization maintains the signal (i.e. the City of Moreno Valley or Caltrans).
- **Public Street Trees:** This layer contains information such as the height, diameter, year trimmed, and distance from the sidewalk.
- **Street Lights:** This layer contains information such as lamp type, size, and maintenance organization.
- **Trails:** Moreno Valley also has an

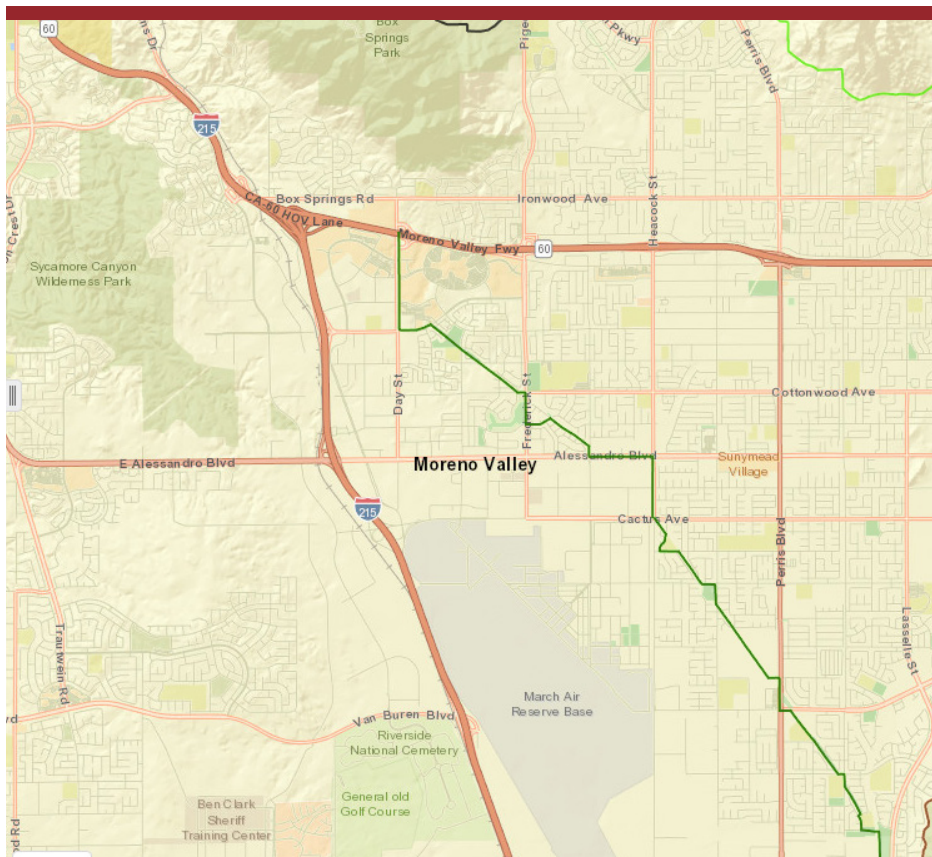


online map¹, shown below, that contains a “Trails Staging” layer and a “Master Plan of Trails” layer.

- **Signs:** The City has a geocoded database called “Simple Signs” of all traffic signs and the speed limits associated with those signs.

As part of this project, the city created an inventory of marked uncontrolled

crosswalks, including crosswalks near schools and other side-street stop-controlled or mid-block locations. The team created a GIS file of this inventory, which was provided to the City for future use. The file was also included in the collision database used to identify pedestrian collision patterns near marked uncontrolled crosswalks.



Opportunity

Geographic Information System (GIS) Database

While Moreno Valley is certainly ahead of the curve in terms of creating and maintaining GIS-based data, there are a few improvements in this area listed below that the City could consider implementing:

- Create a formal process for routinely updating GIS layers, to ensure that they are accurate and up-to-date.

Within the Traffic Signals layer, include maintenance records for each signal.

Public Input on Traffic Safety

There are currently numerous ways for community members to provide feedback to the City, including by phone, personal visits, email, a mobile app, and a web-based public feedback system. When residents submit feedback via the web, they are asked to provide contact information so that the City can reach them, if necessary, and are given a tracking number so that complaints can be tracked electronically by residents.

The public can also voice their concerns to members of City Council or the Traffic Safety Commission (TSC), which focuses on issues such as pedestrian safety.

The City tracks and monitors all public

comments and requests through a Customer Relationship Management system.

The City created a Pedestrian Safety Task Force as part of the Pedestrian Safety Study. The task force is composed of stakeholders already involved in Moreno Valley transportation planning and engineering, such as members of the TSC, the Western Riverside Council of Governments, and Caltrans. However, it also includes multidisciplinary representatives with interests in pedestrian safety, who have not necessarily always been involved in pedestrian safety conversations with the City, such as members of the Moreno Valley Unified School District and Moreno Valley College. This task force has provided feedback on Fehr & Peers' recommended

countermeasures, prioritized project list, and data analysis of crash types and high-risk locations.



Opportunity

Public Involvement and Feedback Process

- Continue to use the TSC as a mechanism for receiving public feedback, as well as applying for grants, identify the speed zones, and implement pedestrian safety projects.
- Continue convening the Pedestrian Safety Task Force after the conclusion of the Pedestrian Safety Study to continue a forum for community engagement on pedestrian safety issues and projects.



Pedestrian Traffic Control Audit

This section describes Moreno Valley's current efforts and potential improvement areas related to pedestrian signals, Leading Pedestrian Intervals (LPIs), pedestrian scrambles, and traffic signal and stop sign warrants.

PEDESTRIAN SIGNALS

Regarding pedestrian signals in Moreno Valley, in accordance with the 2014 California Manual on Uniform Traffic Control Devices (MUTCD), all existing pedestrian signals have been replaced with countdown pedestrian signal heads, and City specifications require that new pedestrian signals be countdown LED indicators. All traffic signal bulbs have been replaced with LED bulbs to increase visibility and improve efficiency.

LEADING PEDESTRIAN INTERVALS (LPIs)

One LPI has been installed in Moreno Valley near a school. A 2000 study by the Insurance Institute for Highway Safety found that LPIs reduce conflicts between turning vehicles and pedestrians by enhancing the visibility of the pedestrian in the crosswalk. LPIs provide pedestrians with a "head start" crossing the street so that they are more visible to turning vehicles. Citywide implementation of LPIs in Moreno Valley would be financially

infeasible because not all the controllers are compatible with them.

PEDESTRIAN SCRAMBLE PHASES

The City has implemented one pedestrian scramble at the intersection of Kitching Street and Krameria Avenue. A pedestrian scramble is a pedestrian-only interval during which all vehicular movement stops, and pedestrians can cross the intersection in any direction, including diagonally. Pedestrian scrambles increase pedestrian safety by removing vehicular traffic during the pedestrian crossing phase.²

PEDESTRIAN-ORIENTED TRAFFIC SIGNAL AND STOP SIGN WARRANTS

Providing all-way stop control (stop signs for every approach) at an intersection improves pedestrian safety by reducing speeds and pedestrian-vehicle conflicts. Best practices include:

- Requiring a crash history of three instead of five collisions based on routine underreporting
- Reducing traffic volume thresholds based on latent demand
- Providing consideration for school children/pedestrians and traffic speeds

Moreno Valley follows the California MUTCD requirements for signal and stop sign warrants. The city has also

established an annual signal priority program, to identify the need for signalization on City intersections. The program offers a ranking system among the intersections that meet the signal warrant criteria. This ranked list is then approved by the City Council. The ranking system is based upon various traffic data, such as traffic and pedestrian volumes, collision history, speeds, delays, and proximity to schools and senior citizens residents, among other relevant site-specific factors.³

Finally, City staff conducts monthly field assessments of traffic control devices, in addition to responding to citizen complaints.



Opportunity

Pedestrian Traffic Control Audit

- Update the traffic signal GIS layer when there is a modification and review annually
- Consider implementing more LPIs and pedestrian scrambles in specific locations.
- Consider developing City-specific stop sign warrants for adoption by City Council and subsequent application, similar to the signal priority program.



Safe-Routes-to-School

Safe-Routes-to-School (SR2S) programs encourage children to safely walk or bicycle to school. They increase physical activity, which reduces childhood obesity, and decrease morning traffic associated with school drop-off. Funding for Safe-Routes-to-School programs and/or projects is available at the state and federal levels.

Moreno Valley has applied for SR2S grants and been awarded grants that funded the installation of pedestrian countdown indications, sidewalks, flashing beacons, and speed feedback signs. For instance, a current project of the Public Works Department is to eliminate missing sidewalk gaps⁴ at five locations in the vicinity of Bear Valley, Cloverdale, Midland, Moreno

and Towngate Elementary Schools, Mountain View Middle School, and Valley View High School. This project receives federal funding under the Active Transportation Program (ATP). The City also provides a general Suggested Routes to School⁵ map that identifies walking routes to local schools, as well as individual more detailed maps for each elementary school. Finally, the City's Transportation Division hires, trains, equips, and supervises all School Crossing Guards. There is a formal process for requesting an adult crossing guard that involves review and approval from the school district and the City's Transportation Division.

In addition, the Riverside County Public Health Department won a grant in 2017 for non-infrastructure type SR2S programs and approached

Moreno Valley about implementing such programs in the City. Since then, Moreno Valley has participated in the 2017 International Walk to School Day that the department organized.

The City has started to work with schools to improve infrastructure and review circulation patterns and pick-up/drop-off locations. The Moreno Valley Police Department conducts regular enforcement near schools. In addition, there is an official SR2S program with 10 participating elementary and middle schools. The program organized a Walk to School Day event, for National Walk to School Day, which caused 8,753 students and their parents to walk or bike to school. The program also hosts monthly "Walking Parties."



Opportunity

Safe-Routes-to-School

- Continue to seek opportunities to partner with other agencies such as Riverside County Public Health to implement SR2S initiatives.
- Provide detailed Suggested Routes to School maps for each middle school.
- Implement design solutions that address unsafe driving behavior in drop-off zones, such as double parking and weaving around cars.

Open Space Preservation and Pedestrian Access

Residents typically rate open space as among a city's key assets and needs, and open spaces are often locations of pedestrian pathways. The City of Moreno Valley has open space requirements for residential and non-residential uses. The municipal code also provides for open space districts and design and landscaping guidelines that apply to open space areas. The 2006 Parks, Recreation, and Open Space Element also provides general policies for preserving the City's natural resources, while the 2010 Parks, Recreation, and Open Space Comprehensive Master Plan⁶ contains specific strategies for how to implement the previously mentioned element.

In addition, the City has an Adopt-a-Park or Trail program⁷ through which any private organization, business, non-profit, civic group, or individual can help maintain any of the City's multi-use trails, parks, playgrounds, or open space areas. Activities include picking up trash and filling holes.

Two segments of the Juan Bautista De Anza regional trail, which serve as pedestrian paths, are currently in the design phase, and the City has recently applied for construction funding for these segments. The City has also set aside developer-fee money for a new skate park and a new amphitheater, both of which can be locations for pedestrian paths. The \$600,000 skate park was constructed in Moreno Valley Community Park on Frederick Street, and the \$4.93 million Civic Center Amphitheater is planned for

Alessandro Boulevard, near Frederick Street.⁸ Construction for the skate park was completed in January 2019, and construction for the amphitheater is expected to begin in Fall 2019.⁹

Moreno Valley also recently received a \$154,927 grant from California's Department of Transportation (DOT) Sustainable Communities Grants programs for the Dracaea Avenue Neighborhood Greenway Corridor Study. This will explore the feasibility of creating a greenway corridor and will examine the practicalities of

establishing multi-use trails, bike paths, and safe routes to school facilities within the approximately five-mile corridor.¹⁰

To ensure open space and pedestrian access needs are addressed alongside new development, developers sometimes must set aside land for their projects to be approved.



Opportunity

Open Space Preservation and Pedestrian Access

- Continue to provide incentives to developers to contribute to the construction of high quality sidewalks and shared-use paths.
- Explore opportunities to implement Safe Routes to Parks¹¹ strategies to enhance pedestrian access to the City's parks.



Collision Reporting and Analysis

The Moreno Valley Police Department routinely and annually reviews all pedestrian-vehicle collisions utilizing the Crossroads software. They also review high-incidence locations. If the City identifies collision trends with applicable engineering solutions, the City may initiate an improvement project. Moreno Valley maps the location of collisions for their records.

As part of the Pedestrian Safety Study, Fehr & Peers assisted the City in creating a collision database and conducting collision and bus stop analyses. For the collision database task, the team worked with the City to compile pedestrian collision data for Moreno Valley for at least the past nine available years from Crossroads. Fehr & Peers then developed a robust database of roadway characteristics to identify factors contributing to the most commonly occurring and severe collisions, and better understand collision patterns. Variables included in the final database contained information on roadway characteristics and the environment surrounding the collision locations, such as:

- Roadway classification, number of lanes, and posted speeds
- Traffic counts and speed surveys
- Traffic control types

- Pedestrian and bicycle facilities
- Street lighting
- Demographic data (population, employment, age, race, gender, etc.)
- Land use data and key pedestrian generators (locations of schools, parks, transit facilities and bus stops, senior centers, etc.)

Examples of crash trends include who is involved, key contributing factors, and other important information like lighting conditions. Hot spots are the top intersections and corridors that account for a disproportionate share of severe and fatal pedestrian collisions. These hot spot locations were mapped for the City. For the crash type work, Fehr & Peers defined up to 5 crash types for the most frequent and severe crash types (for example, collisions occurring at mid-block locations on multi-lane arterials where the primary collision factor is “unsafe speed”). The team also produced one map for each crash type that shows where that type is happening in Moreno Valley. To identify future high-risk locations, Fehr & Peers used systemic modeling and multivariate analysis to identify a set of high-risk locations, as defined in the Systemic Safety Analysis Report Program (SSARP) guidelines, where collisions would be expected to occur, despite a lack of collision history.



Opportunity

Collision Reporting and Analysis

None (continue current practice).

Street Trees

Street trees enhance the pedestrian environment by providing shade and a buffer from vehicles, which can increase pedestrian safety. Street trees may also enhance property values, especially in residential neighborhoods. However, street trees, when improperly selected, planted, or maintained, may cause damage to adjacent sidewalks.

Moreno Valley has street tree requirements that provide planting specifications, guidance on the location of trees, type of tree, and a requirement for a minimum number of residential trees. Additionally, Moreno Valley has adopted Landscape Design Guidelines that provide extensive direction to residential and non-residential properties on the installation of landscaping and supportive systems. Proper installation of these systems can lead to strong barriers between pedestrians and cars, and increased pedestrian safety.

The City's Public Works Department also implements a tree program to maintain the trees within residential

street rights-of-way. Community members can make maintenance requests when they see a residential tree blocking pedestrian travel on sidewalks, obscuring vehicular vision and thus increasing the risk of a collision, or causing damage to public infrastructure, which can again increase the risk of a collision.¹²

Moreno Valley's Environmental and Historical Preservation Board also runs an Urban Forestry Program, the purpose of which is to "advance the development of a healthy and sustainable urban forest within the City of Moreno Valley."¹³ This is another mechanism to ensure shade and road buffers are provided to pedestrians. The board provides educational resources to the public on how they can contribute to Moreno Valley's urban forest.



Opportunity
Street Trees

- Continue to provide as many street trees as possible to provide shade, a more pleasant walking environment, and add buffers from vehicles for pedestrians where they don't currently exist.

Traffic Calming Programs

Traffic Calming Programs and Policies set forth a consensus threshold on

neighborhood requests and approvals, as well as standard treatments and criteria.

Traffic calming programs in the City are generally localized efforts at the community level governed by the Moreno Valley Policy and Procedure for Speed Hump Installation. When residents are concerned over vehicle speeds, public safety, cut-through traffic, or congestion, they may explore traffic calming options in their neighborhood. Through the City's Neighborhood Traffic Management Program, speed humps have been implemented in the City, and there are currently discussions about installing more speed humps. Speed feedback signs, PARET (Public Awareness Radar

Educational Trailer) units, and mid-block crosswalks around schools and bus stops have also been provided to calm traffic. Currently this program only applies to local streets and some arterial streets.



Opportunity
Traffic Calming Programs

- Expand the Neighborhood Traffic Management Program to include Collector Streets in addition to local streets.



Implementation of Americans with Disabilities Act (ADA) Improvements

Compliance with the ADA guidelines is important not only to enhance community accessibility, but also to improve walking conditions for all pedestrians.

Moreno Valley has a Transition Plan, which sets forth the process for bringing public facilities into compliance with ADA regulations. The ADA Transition Plan identifies both public right-of-way and facilities with ADA deficiencies, including sidewalks and curb ramps. Two years ago, the City started updating this plan, which is currently under final review and close to being adopted by City Council. Guy Pegan, the ADA Coordinator for Moreno Valley, is responsible for leading the plan's update and administration, as well as implementing other ADA projects on an as-needed basis. This depends on the number of non-compliance complaints and accommodation requests the public submits.

In addition to the ADA Transition Plan, the City provides several ADA policies and guidelines on its website. Examples include ADA Work Zone Path of Travel Guidelines, an ADA Checklist for Special Events, and Construction Barricade Guidelines for Pedestrian Pathways.



All development plans are reviewed to ensure that ADA requirements will be met. The City also hosts outreach meetings where the public can comment on new plans or projects and make additional compliance requests. Finally, the City Council sets aside money each year to fund ADA improvements.

Besides policies and procedures, Moreno Valley has made several infrastructure improvements to be ADA compliant. This work is informed by a database of non-compliant locations that the City maintains and

updates. The City has an aggressive program to install access ramps and complete ramp improvements. All curb returns now have ramps. Curb ramps in Moreno Valley are primarily diagonal curb ramps due to budgetary constraints. Many agencies are adopting standard plans that include dual (directional) curb ramps to improve accessibility for wheelchair users. Moreno Valley currently installs truncated domes in commercial areas. Additionally, whenever a project results in the removal, replacement, or resurfacing of a facility, the facility is improved to be consistent with

current ADA requirements. Moreno Valley has a policy addressing the installation of audible pedestrian signals.



Opportunity

Implementation of Americans with Disabilities Act (ADA) Improvements

- Consider development of a standard plan for dual (directional) curb ramps to be used at a signalized and all-way stop controlled intersections, where feasible.

Pursuing Funding Opportunities

The City is proactive about applying for grants for pedestrian safety projects. As part of the Pedestrian Safety Study, Fehr & Peers compiled a list of local, regional, state and federal funding opportunities related to pedestrian safety, and determined which grants the City has applied to and won, has applied to and lost, and has never applied to. This provided the City a good understanding of which funding opportunities are worth pursuing. Also, for each of the 10 prioritized projects, Fehr & Peers recommended a funding source (or package of sources) best suited for each project type.



Opportunity

Pursuing Funding Opportunities

- Seek opportunities to team with private organizations and insurance companies to fund special safety improvements that are mutually beneficial to all parties.¹⁴ For example, pedestrian safety improvements around the Amazon logistics center are in the best interest of Amazon and the City. Thus, Amazon might consider partially funding such improvements.
- Seek opportunities to partner with larger regional, state, or federal agencies on pedestrian safety projects. An example of this is Riverside County Public Health's support for SR2S initiatives in Moreno Valley.

Enhancement

Coordination with Health Agencies

Involving non-traditional partners such as Emergency Medical Service (EMS) personnel, public health agencies, and pediatricians, in the planning or design of pedestrian facilities may create opportunities to be more proactive with pedestrian safety, identify pedestrian safety challenges and education venues, and secure funding. Additionally, under-reporting of pedestrian-vehicle collisions could be a problem that may be partially mitigated by involving the medical community in pedestrian safety planning.¹⁵

As mentioned in the previous section, Moreno Valley was approached by Riverside County Public Health about implementing SR2S initiatives in the City.



Opportunity

Coordination with Health Agencies

- Seek opportunities to collaborate with health agencies such as Kaiser Permanente, Hospital Association of Southern California, and Riverside County Office of Aging on initiatives that serve both organization's interests, such as walking promotion and obesity fighting programs.



Enforcement

Enforcement of pedestrian right-of-way laws and speed limits is an important complement to engineering treatments and education programs. Moreno Valley contracts with the Riverside County Sheriff's Department for police services. The Riverside County Sheriff provides extensive traffic enforcement and traffic safety officers.

Officers are trained in pedestrian safety enforcement principles, by participating in training events hosted by the National Highway Traffic Safety Administration (NHTSA) either online or in-person, which are offered on a quarterly basis.

The Sheriff's Department provides enforcement efforts at local schools by citing motorists and pedestrians. Local law enforcement has also received coverage in newspapers for their "sting" operations, in which a law enforcement officer crosses a street

legally, sometimes while dressed in a conspicuous costume. Citations are issued to those who fail to yield to a pedestrian.

These pedestrian stings are funded through a grant provided by California's Office of Traffic Safety (OTS). The Sheriff's Department is proactive about applying for OTS grants for additional pedestrian safety projects. The Department has applied for other OTS grants directly related to pedestrian safety, and indirectly related to pedestrian safety, such as driving while under the influence (DUI), traffic congestion, and distracted driving.

The Sheriff's Department also operates two dedicated radar trailers and one radar sign that display the speeds of passing vehicles. Speed data collected from the radar sign is downloaded and provided to officers so that they can prioritize enforcement geographically and by time of day.



Opportunity Enforcement

- Explore opportunities for automated speed enforcement (pending state legislation) and red-light cameras
- Target enforcement to address unsafe driving behavior in drop-off school zones, such as double parking and weaving around cars.

Pedestrian Safety Program and Walking Audits

Walking audits provide an interactive opportunity to receive feedback from key stakeholders about the study area and discuss potential solutions and their feasibility. They can be led by city staff, advocacy groups, neighborhood groups, or consultants.

Moreno Valley Public Works and Police offer local schools their assistance to improve circulation, pick-up/drop-off, and walkability. The Sheriff's Department conducts a pedestrian safety education campaign in schools and annually provides educational materials to residents at the Fourth of July parade. As previously mentioned, Moreno Valley provides "Suggested Routes to School" for residents and has installed improved pedestrian signals and speed feedback signs. The city also recently completed a sidewalk improvement project on Elsworth Street and Sherman Avenue.

Public works staff is willing to conduct walking audits or site visits when asked by local schools. Moreno Valley also provides materials related to pedestrian safety via their website.



Opportunity

Pedestrian Safety Program and Walking Audits

Proactive Approach to Institutional Challenges

Numerous agencies have jurisdiction over components of the Moreno Valley transportation network, including the Riverside Transit Agency (RTA), Moreno Valley Unified School District (MVUSD), and Caltrans. Institutional coordination associated with multiple agencies is necessary because of non-local control of right-of-way and differing policies regarding pedestrian accommodation. For example, Caltrans policies have historically discouraged proposals for bulbouts, wider sidewalks, and other pedestrian-oriented improvements.

While there is more collaboration between the City and the Moreno Valley Unified School District on pedestrian safety efforts through the SR2S program than in the past, the City has encountered institutional obstacles in coordinating with schools related to missing infrastructure, vehicular circulation, and pedestrian circulation. Other obstacles have arisen attempting to implement bicycle/pedestrian improvements due to strict Caltrans standards.



Opportunity

Proactive Approach to Institutional Challenges

- When working with Caltrans District 8 on pedestrian safety projects, reference Caltrans' internal policies and directives with respect to Context Sensitive Solutions and Routing Accommodation¹⁶. These policies and directives are intended to provide more design flexibility where state highways interface with local streets.

Pedestrian-Oriented Speed Limits and Speed Surveys

As shown in the below still of an interactive graph¹⁶ by ProPublica, pedestrian fatality rates increase exponentially with vehicle speed. Thus, reducing vehicle speeds in pedestrian zones may be one of the most important strategies for enhancing pedestrian safety. In Moreno Valley, speed surveys follow the California Vehicle Code (CVC), and are conducted every five to seven years by City staff. Speed limit signs are typically posted on arterials, collectors, and entrances to residential areas. When setting speed

- Consider hosting regular walking audits with community groups, such as members of the SR2S program.

limits, the City follows the standard 85th percentile rule¹⁷, and within the bounds of that rule, considers other factors such as pedestrian safety and speed limit consistency between connecting streets. The City also uses PARET units and performs selective speed enforcement in different areas of the City. In addition to enforcement strategies, Moreno Valley uses traffic calming strategies to decrease speed. Examples of traffic calming strategies include installing speed humps and implementing road diets.

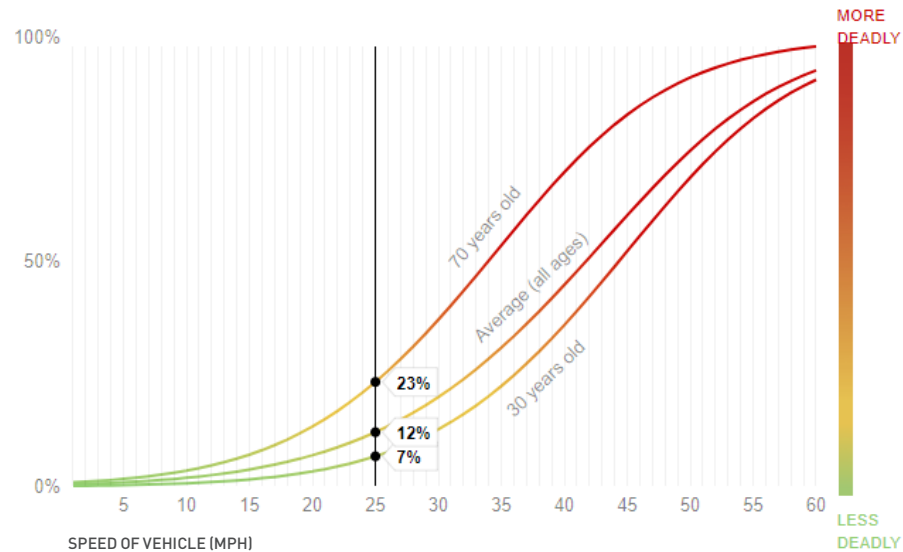


Opportunity

Pedestrian-Oriented Speed Limits and Speed Surveys

- Continue to consider pedestrian volumes when setting speed limits and employing traffic calming strategies in locations where speed surveys suggest traffic speeds are too high for pedestrian areas.
- Determine whether the factors used when making speed adjustments are appropriate following the forthcoming report that will be created by the Zero Traffic Fatalities Task Force that was recently created as a result of [AB 2363](#).¹⁸
- Continue to ensure that design standards/design speeds in pedestrian areas do not contribute to a routine need for traffic calming.

The Chance of Being Killed by a Vehicle, by Speed of Vehicle



- Include school zone speeds on the [Citywide Speed Limits map](#).¹⁹
- Increase physical separation on roads between automobiles and pedestrians as automobile speed limits increase.

Design Policies and Development Standards

Design policies and development standards can improve the pedestrian walking experience, encourage walking, enhance economic vitality, and offer funding opportunities for pedestrian improvements. The City



Opportunity

Design Policies and Development Standards

- Identify areas for lighting improvements (e.g. bus stops, mid-block crossings, and underpasses).²²
- Update City Design standards using [systemic safety principles](#),²³ such as speed control and separation, functional harmony, and predictability and simplicity.

has a Landscape Master Plan that provides guidelines for landscaping and sidewalks, and Municipal Code Section 9.16 is dedicated to the topic of design guidelines. City staff encourages pedestrian friendly development through internal review in the entitlement process.

Crosswalk Installation, Removal, and Enhancement Policy

A formal policy for crosswalk installation, removal, and enhancement provides transparency in decision-making and adopts best practices in pedestrian safety and accommodation. Such policies can provide guidance

for the installation or removal of crosswalks, or enhancements to the marked crosswalks at unsignalized intersections. While decisions regarding crosswalks are made on a case-by-case basis, signalized intersections are generally striped with crosswalks on all four legs.

The City has recently drafted a crosswalk policy based on the City of Boulder's crosswalk policy, among other sample policies from major cities.



Opportunity

Crosswalk Installation, Removal, and Enhancement Policy

- Ensure that locations with pedestrian desire lines have crosswalks. Adoption of the City's draft crosswalk policy will help determine the appropriate crossing treatment at uncontrolled locations without marked crosswalks.

Additional Opportunities

Develop a Pedestrian Plan

The current general plan update includes a complete streets policy that is expected to serve as the basis for much of the City's future pedestrian-related improvement projects. In addition to this Pedestrian Safety Study, the City could provide additional strategies on how to prioritize and implement capital and maintenance pedestrian projects that could address the following:

- Accommodations of pedestrians during construction periods
- Pedestrian connectivity
- Interdepartmental coordination

These recommendations could be included in a Pedestrian Plan, which

would incorporate pedestrian-focused programs and projects.

Pursue Educational and Marketing Campaigns

While Moreno Valley executes many marketing initiatives related to pedestrian safety, such as those organized by the SR2S program or the Sheriff's Department, new outreach strategies could be implemented.

For instance, Moreno Valley could seek opportunities to collaborate with non-traditional partners, such as insurance organizations or major City employers, to create safety education campaigns.²⁰ These new partners could enable the City to reach previously untapped audiences. In addition, Moreno Valley should leverage its "owned media" to disseminate project messaging, which it can do at little to no cost. "Owned media" are the communication mechanisms that the City has at its disposal to provide information to residents, such as mailings, websites, telephone interactions, signage and public space.²¹ In addition to saving money through leveraging owned media, it's also easier to replicate and grow certain marketing messages or strategies across the City's owned media outlets.

Also, it is important to not only market to residents, but to also market

pedestrian safety projects to internal stakeholders within the City of Moreno Valley. This will earn their support and communicate that such projects are a City priority as well as a shared responsibility. The Pedestrian Safety Task Force could be responsible for this type of marketing.

As part of marketing to internal stakeholders, the Pedestrian Safety Task Force could create an internal "brand book" for the SSARP project that contains key statistics, talking points, graphics, and messaging relevant to the project. This would ensure consistent communication throughout the City regarding the project, as well as create and promote a "shared responsibility" mindset surrounding pedestrian safety initiatives.

Finally, the City can work with public transit providers to include pedestrian safety branding within their professional driver training programs. This would ensure that drivers are aware of the City's pedestrian safety goals and doing their best to achieve them while working.

Commit to Equity

Moreno Valley already considers vulnerable populations when it is performing pedestrian safety work. For instance, as mentioned when determining speed limits, the City

might decide to decrease speeds and the Level of Service (LOS) for vehicles, in exchange for safer walking conditions. The City has implemented eight road diets for this reason.

However, to ensure that equitable solutions emerge from the Pedestrian Safety Study and other pedestrian safety projects, the City can make sure that stakeholders are involved in the development of the pedestrian safety plan as well as the planning and design of pedestrian infrastructure reflect the diversity of the community. The City should also consider equity in terms of where pedestrian safety projects are implemented, as well as in enforcement efforts, as described previously.

Community outreach meetings should be convenient for all types of stakeholders. For instance, meetings should be scheduled in specific neighborhoods rather than at centralized locations like City Hall. The times of the meetings should enable working families to attend. Moreno Valley might want to consider partnering with a trusted community group to facilitate meetings.

Restart the Collision Monitoring and Mitigation Annual Program

Moreno Valley previously had a staff team dedicated to performing collision

monitoring and mitigation analysis, including identifying potential hot spots for collisions. However, the 2007 economic recession forced the City to downsize this team, and now collision analysis is performed on a more reactive than proactive basis. To address this, the City is considering contracting out collision analysis on a yearly basis. ●

Endnotes

1. https://moval.geocortex.com/Html5Viewer/index.html?viewer=comv_hv
2. <http://americawalks.org/pedestrian-scrumble-or-barnes-dance/>
3. http://www.moreno-valley.ca.us/city_hall/departments/pub-works/pdf/TrafficFAQ.pdf
4. http://www.moval.org/city_hall/departments/pub-works/cp-spot-safe-route.html
5. http://www.moreno-valley.ca.us/city_hall/departments/pub-works/transportation/traffic-school.shtml
6. http://www.moreno-valley.ca.us/resident_services/park_rec/pdfs/park-mp0910.pdf
7. http://www.moreno-valley.ca.us/resident_services/park_rec/trails.shtml
8. <https://www.pe.com/2018/08/23/construction-nears-for-moreno-valley-skate-park-amphitheater-after-projects-win-city-dollars/>
9. <https://www.pe.com/2018/06/13/new-skate-park-amphitheater-may-follow-renovated-soccer-fields-in-moreno-valley/>
10. <https://mynewsla.com/education/2018/05/17/funds-flow-to-riverside-county-for-transportation-projects/>
11. <https://www.nrpa.org/Safe-Routes-To-Parks/>
12. http://www.moreno-valley.ca.us/city_hall/departments/pub-works/maint-ops.shtml
13. http://www.moval.org/city_council/committees/enviro-hist.shtml
14. <http://www.dot.ca.gov/hq/LocalPrograms/HSIP/2016/CA-LRSM.pdf>
15. Sciortino, S., Vassar, M., Radetsky, M. and M. Knudson, "San Francisco Pedestrian Injury Surveillance: Mapping, Underreporting, and Injury Severity in Police and Hospital Records," Accident Analysis and Prevention, Volume 37, Issue 6, November 2005, Pages 1102-1113
16. http://www.dot.ca.gov/hq/tpp/offices/bike/sites_files/DD-64-R1_Signed.pdf
17. <https://www.propublica.org/article/unsafe-at-many-speeds>
18. <http://www.dot.ca.gov/trafficops/camutcd/docs/california-manual-for-setting-speed-limits.pdf>
19. <https://www.nts.gov/safety/safety-studies/Documents/SS1701.pdf>
20. http://www.moreno-valley.ca.us/city_hall/departments/pub-works/transportation/pdfs/speedzone-map.pdf
21. <http://visionzero-prod.azurewebsites.net/wp-content/uploads/2017/04/VisionZeroActionPlan-2017.pdf>
22. <http://visionzero-prod.azurewebsites.net/wp-content/uploads/2017/04/VisionZeroActionPlan-2017.pdf>
23. <http://visionzero-prod.azurewebsites.net/wp-content/uploads/2017/04/VisionZeroActionPlan-2017.pdf>
24. <http://visionzeronetwork.org/wp-content/uploads/2017/01/VZ-Communications-Strategies-PDF-FINAL.pdf>

Resources

- **LA's Vision Zero Plan Action Plan** <http://visionzero-prod.azurewebsites.net/wp-content/uploads/2017/04/VisionZeroActionPlan-2017.pdf>
- **Vision Zero Equity Strategies for Practitioners** http://visionzeronetwork.org/wp-content/uploads/2017/05/VisionZero_Equity.pdf
- **Communications Strategies for Vision Zero, Lessons from New York City** <http://visionzeronetwork.org/wp-content/uploads/2017/01/VZ-Communications-Strategies-PDF-FINAL.pdf>
- **Moving from Vision to Action, Fundamental Principles, Policies & Practices to Advance Vision Zero in the U.S.** http://visionzeronetwork.org/wp-content/uploads/2017/01/MinimumElements_Final.pdf
- **Vision, Strategies, Action: Guidelines for an Effective Vision Zero Action Plan** http://visionzeronetwork.org/wp-content/uploads/2017/12/VZN_ActionPlan_FINAL.pdf
- **Local Roadway Safety, A Manual for California's Local Road Owners** <http://www.dot.ca.gov/hq/LocalPrograms/HSIP/2016/CA-LRSM.pdf>
- **U.S. DOT Safety Culture and Zero Deaths Vision Home page** <http://safety.fhwa.dot.gov/zerodeaths/>
- **NTSB Reducing Speeding-Related Crashes Involving Passenger Vehicles Safety Study** <http://www.nts.gov/safety/safety-studies/Documents/SS1701.pdf>
- **The Road to Zero: A Vision for Achieving Zero Roadway Deaths by 2050** <http://www.nsc.org/Portals/0/Documents/DistractedDrivingDocuments/Driver-Tech/Road%20to%20Zero/The-Report.pdf?ver=2018-04-17-111652-263>
- **How Pedestrians Will Defeat Autonomous Vehicles** <http://www.scientificamerican.com/article/how-pedestrians-will-defeat-autonomous-vehicles/>
- **Curb Management Strategies for Improving Transit Reliability** <http://nacto.org/wp-content/uploads/2017/11/NACTO-Curb-Appeal-Curbside-Management.pdf>
- **NACTO's web page on curbside management** <http://nacto.org/publication/bau/curbside-management/>

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2

Summary of Safety Data

Overview of Collision and Contextual
Data Included in Safety Analysis

2

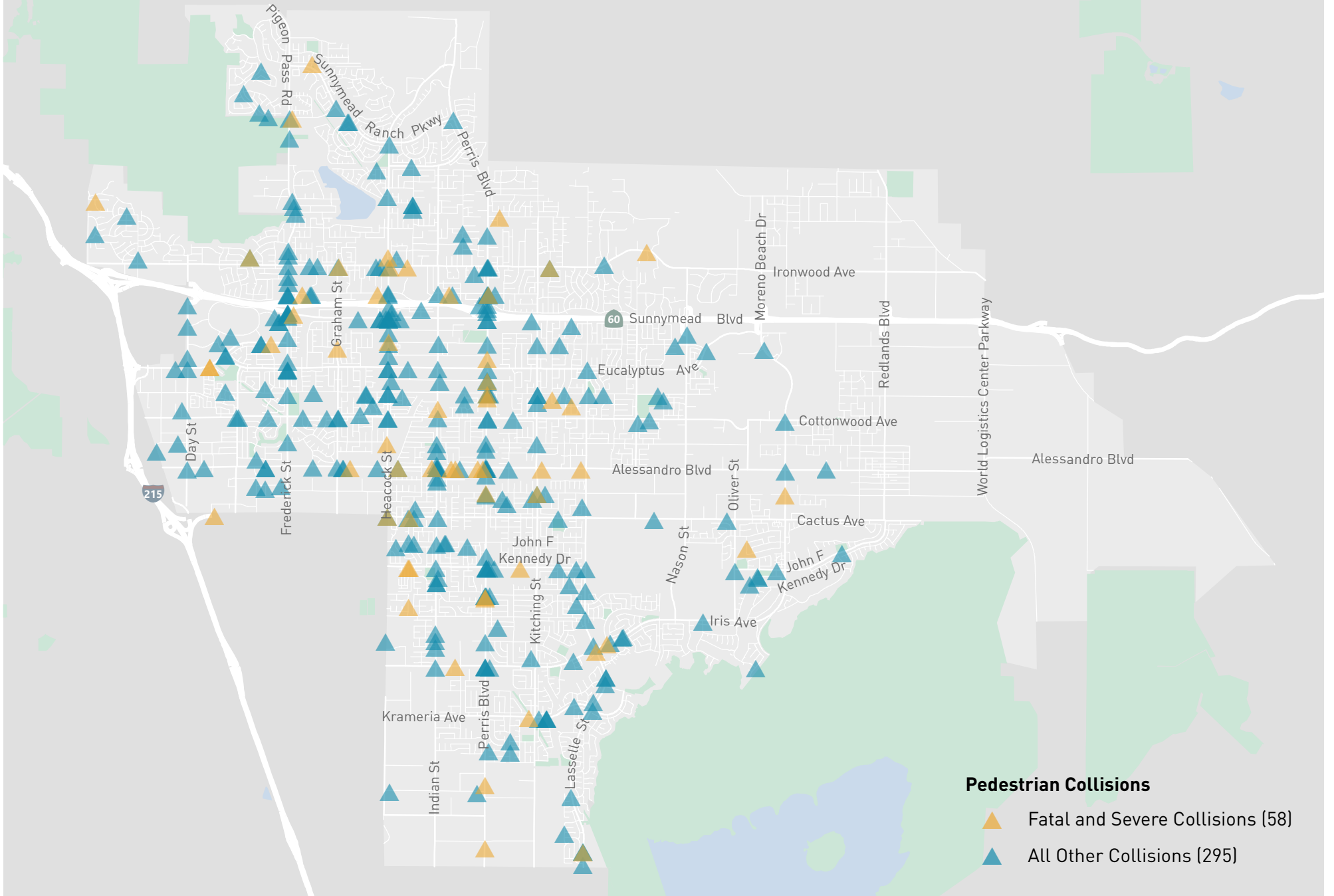
Chapter 2 of Caltrans' Local Roadway Safety Manual (LRSM) states that safety practitioners should "consider a wide range of data sources to get an overall picture of the safety needs" (p. 13). Both crash data and contextual data were collected and analyzed as part of this plan.

Crash Data Overview

For this SSAR, nine years of the most current pedestrian crash data available (2009-2017) was extracted from the City of Moreno Valley's Crossroads database. Crossroads is a commercial provider of a database designed to record collision details. The provided dataset included extensive collision details such as collision location, type, severity, parties involved, contributing factors, etc.

Between 2009 and 2017, 11,744 collisions occurred in Moreno Valley, 353 of which involved a pedestrian. The full collision dataset included collisions of all severity levels, including property damage-only collisions. The pedestrian collision dataset was the focus of the majority of our analysis. The collision analysis included a combination of tabular factors, information about collisions within the collision files, and contextual data, information derived in GIS through proximity and overlay analysis. Collisions are included in this analysis if one of the involved parties involved was a pedestrian. The tabular collision data includes information related to the collision and the parties involved to answer questions about how collisions occurred, where they occurred, when they occurred, who was involved, and who was injured.

All Pedestrian Collisions (2009-2017)



Contextual Data Overview

To understand more about systemic patterns of pedestrian collisions in Moreno Valley, several contextual factors were analyzed along with the characteristics of each collision. Key contextual factors include proximity to street lights, transit stops, schools, signalized intersections, uncontrolled crossings, and CalEnviroScreen

Disadvantaged Communities. Collisions were also matched with characteristics of the roadway on which they occurred including roadway classification and speed limit. The distances used to link a collision to a contextual factor varied based on the factor. For example, a school has a larger area of influence than a streetlight. The distances used for each factor are summarized in the table below.

Contextual Factors	Distance
Street lights	100 ft
Sidewalk	100 ft
Schools	1,000 ft
Disadvantages Communities ¹	Inside or within 100 ft of boundary
Transit Stops	500 ft
Signalized Intersection	Minor Roadway Intersection ² : 50 ft Major Roadway Intersection: 175 ft
Unsignalized Intersection	Minor Roadway Intersection: 50 ft Major Roadway Intersection: 175 ft
Uncontrolled Crossings	100 ft
Roadway Speed	100 ft
Roadway Type	100 ft

¹ Disadvantaged Communities defined by SB 535 and CalEnviroScreen 3.0

² Designations for Major and Minor roadways defined by City staff

In addition to the quantitative and geographic data collected and analyzed as part of this project, outreach to stakeholders was also performed in order to collect “informal data” and understand local safety issues from a qualitative perspective. Stakeholder meetings were held on January 30, 2019 and June 4, 2019. Participants included representatives from Moreno Valley city departments such as Parks & Community Services, Community Development, and Public Works, along with local school districts, emergency responders, the Riverside County Transportation Authority, the Western Riverside Council of Governments, Moreno Valley College, the City of Riverside, and the Moreno Valley Traffic Safety Commission. Stakeholders described locations that might benefit from pedestrian safety improvements and offered feedback on proposed countermeasures. ●

3

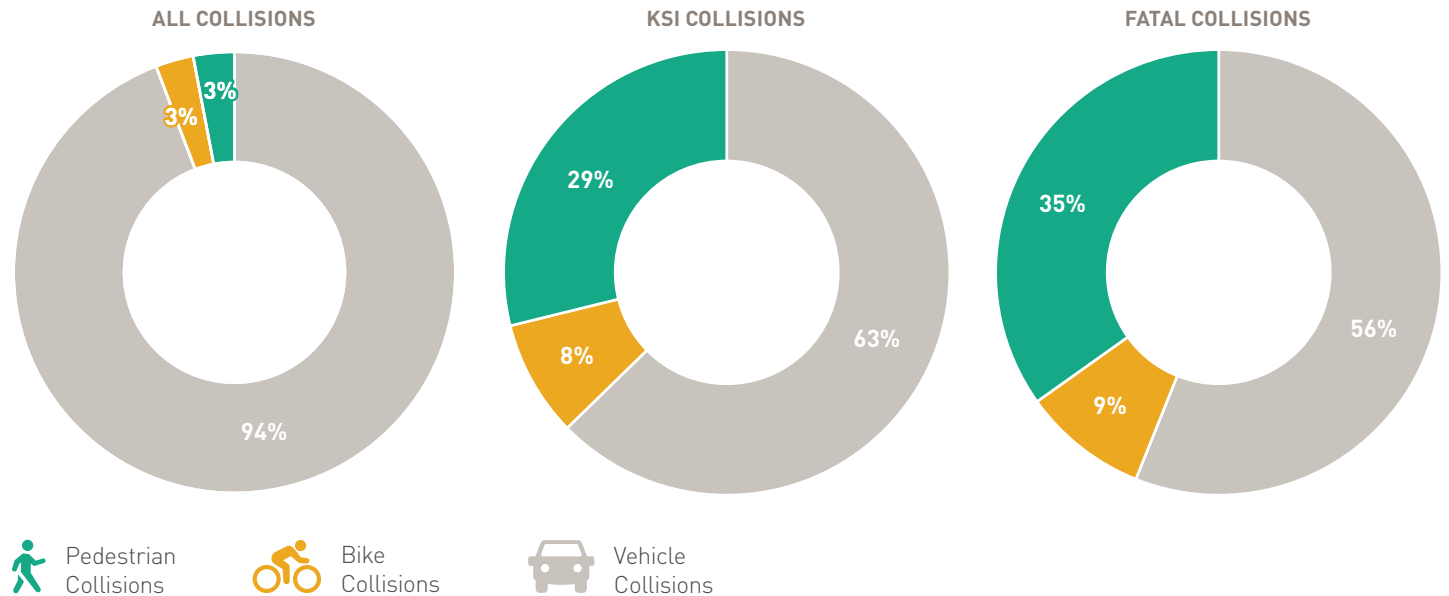
Safety Analysis & Results

Summary of Safety Analysis Results, Including
the Historic Collision Landscape,
Hot Spot Identification, and Development of
Crash Types through Systemic Analysis

3

Collision Landscape Summary

Pedestrians are the most vulnerable roadway users in cities throughout the United States where they often represent a disproportionate share of people killed or severely injured (KSI) in traffic collisions. This is also the case in Moreno Valley, where pedestrians were involved in only 3% of all traffic collisions, yet they comprised 29% of KSI collisions and 35% of all fatalities.



Killed or Severely Injured in a Collision

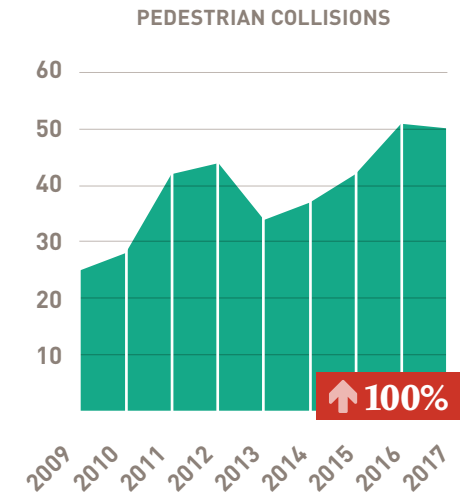
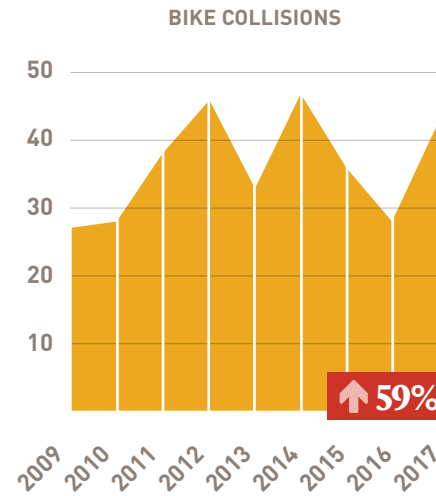
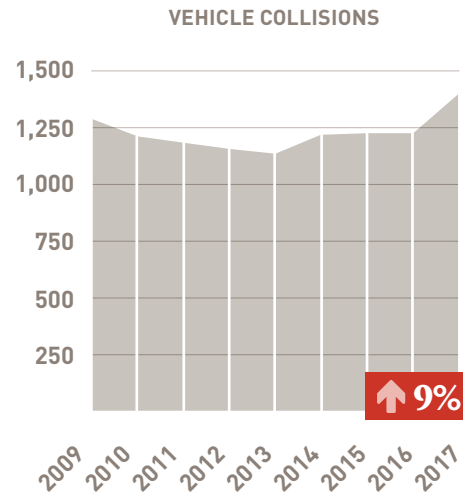
Severe injuries resulting from a traffic crash can result in a number of catastrophic impacts, including permanent disability, lost productivity and wages, and ongoing healthcare costs. These injuries can include:

- Broken or fractured bones
- Dislocated or distorted limbs
- Severe lacerations
- Severe burns
- Skull, spinal, chest or abdominal injuries
- Unconsciousness at or when taken from the collision scene

Throughout this plan, the acronym KSI is used to denote crashes where someone was killed or seriously injured.

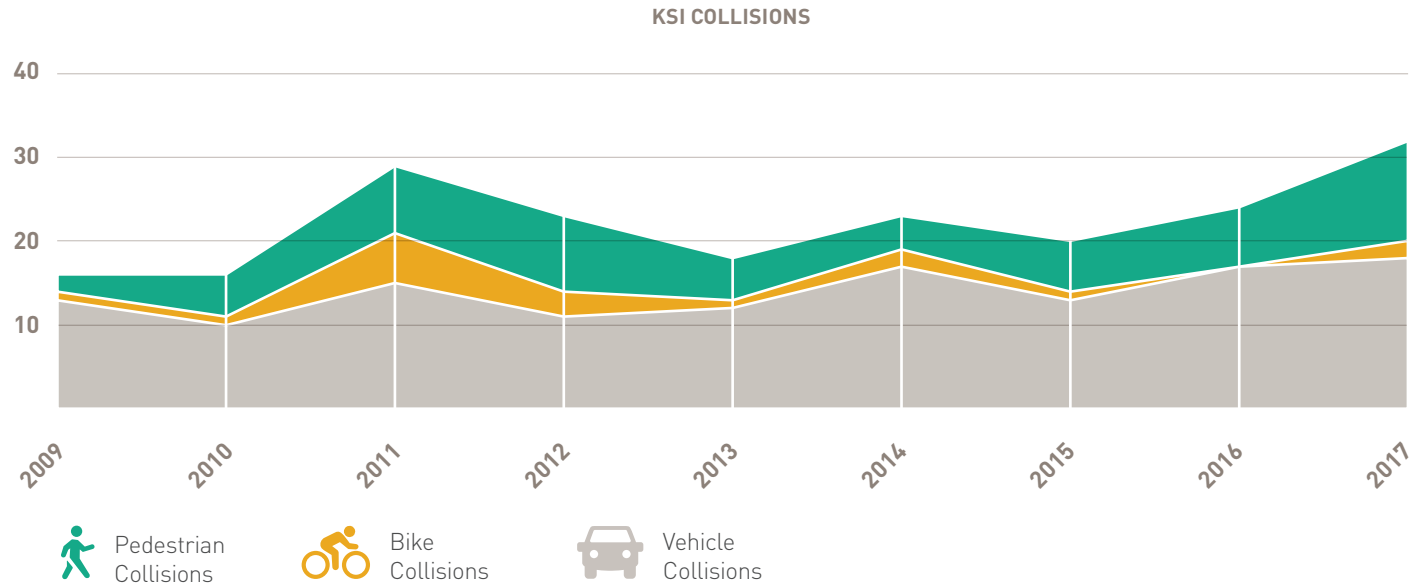
Collisions by Mode

During this time period, the number of annual collisions of all modes increased 11 percent. Over the same time period, collisions involving people bicycling increased 59 percent and collisions involving people walking increased 100 percent.



KSI Collisions by Mode

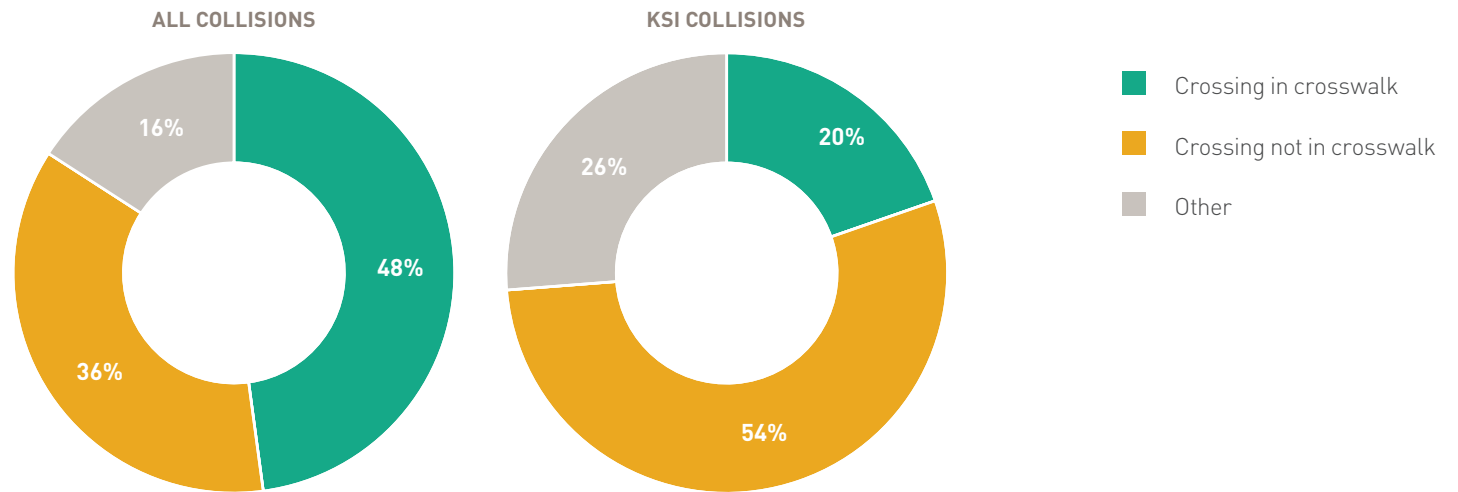
People walking and biking together account for 37 percent of all KSI collisions, but only six percent of total collisions in Moreno Valley. Pedestrian collisions resulting in serious injuries or fatalities have increased by 500 percent during this period of time, representing a serious public safety concern for the City.



Behavior

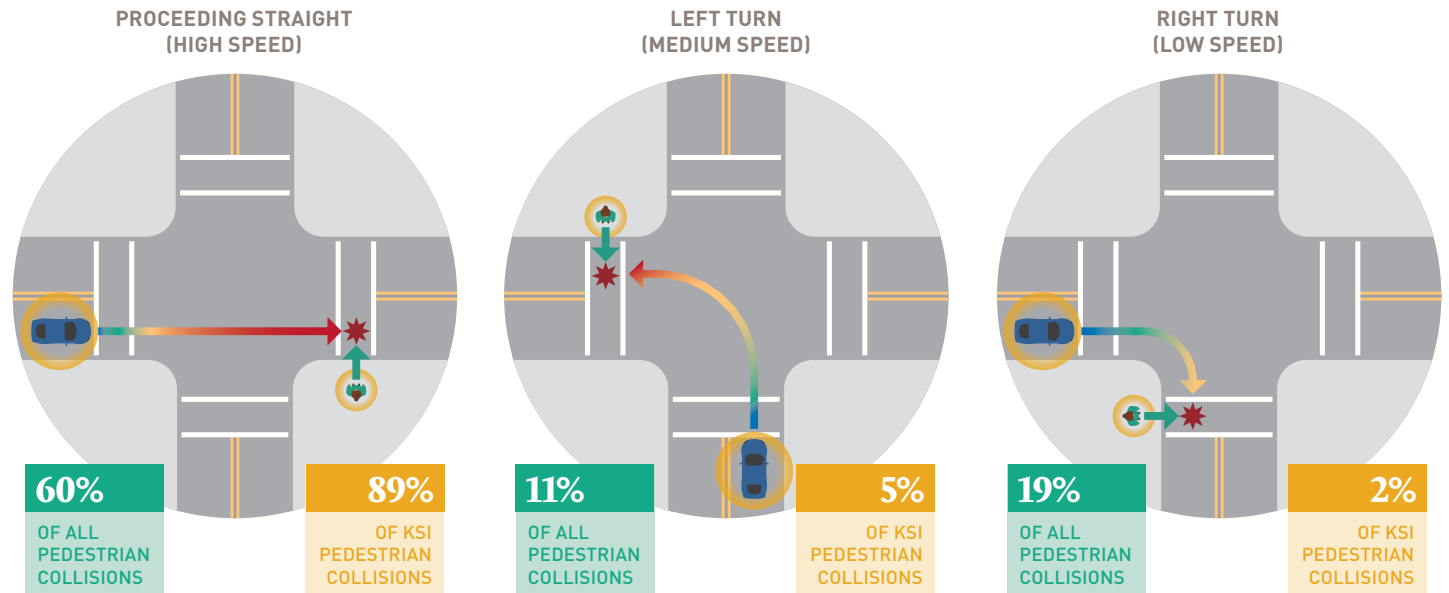
Pedestrian Location

Different locations in the roadway can expose pedestrians to different levels of risk. Of all pedestrian collisions, 48 percent occurred when the pedestrian was crossing in a crosswalk and 36 percent occurred when the pedestrian was outside of a crosswalk. Of the KSI pedestrian collisions, 20 percent occurred when the pedestrian was crossing in a crosswalk and 54 percent occurred when the pedestrian was crossing outside of a crosswalk. The "Other" category includes "In Road, Including Shoulder," "Not in Road," and "Not Stated."



Driver Movement

Another collision factor of note is the driver movement preceding a collision. In most cases, drivers in collisions with pedestrians are proceeding straight when a collision occurs. This is especially true in collisions where a person walking is killed or severely injured, where drivers are proceeding straight 89 percent of the time. The "Other" category includes "Backing," "Entering Traffic," and "Ran Off Road."



Behavior

Driving Under the Influence

When a driver has been drinking, the likelihood of a collision resulting in serious injury or a fatality increases. In Moreno Valley from 2009 to 2017, three percent of pedestrian collisions involved a driver under the influence. That percentage increases to 20 percent for KSI collisions.

DRIVERS IN ALL PEDESTRIAN COLLISIONS

3%
WERE UNDER THE INFLUENCE



DRIVERS IN KSI PEDESTRIAN COLLISIONS

20%
WERE UNDER THE INFLUENCE

Walking Under the Influence

Walking under the influence also increases risk, but the results are not as deadly as driving under the influence. Six percent of all pedestrian collisions and five percent of KSI pedestrian collisions in Moreno Valley involved a pedestrian under the influence.

PEDESTRIANS IN ALL COLLISIONS

6%
WERE UNDER THE INFLUENCE



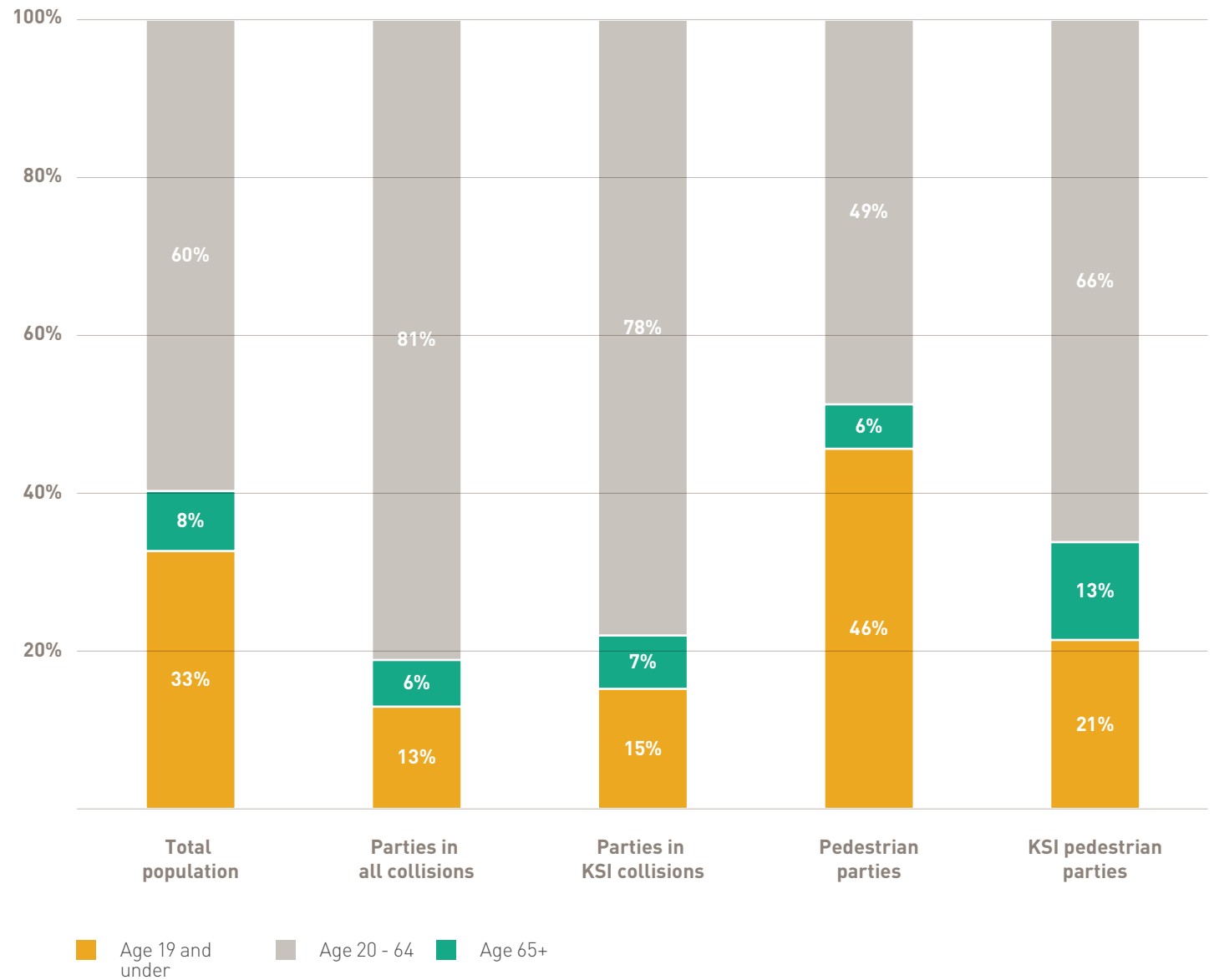
PEDESTRIANS IN KSI COLLISIONS

5%
WERE UNDER THE INFLUENCE

Who

Collision Party Age

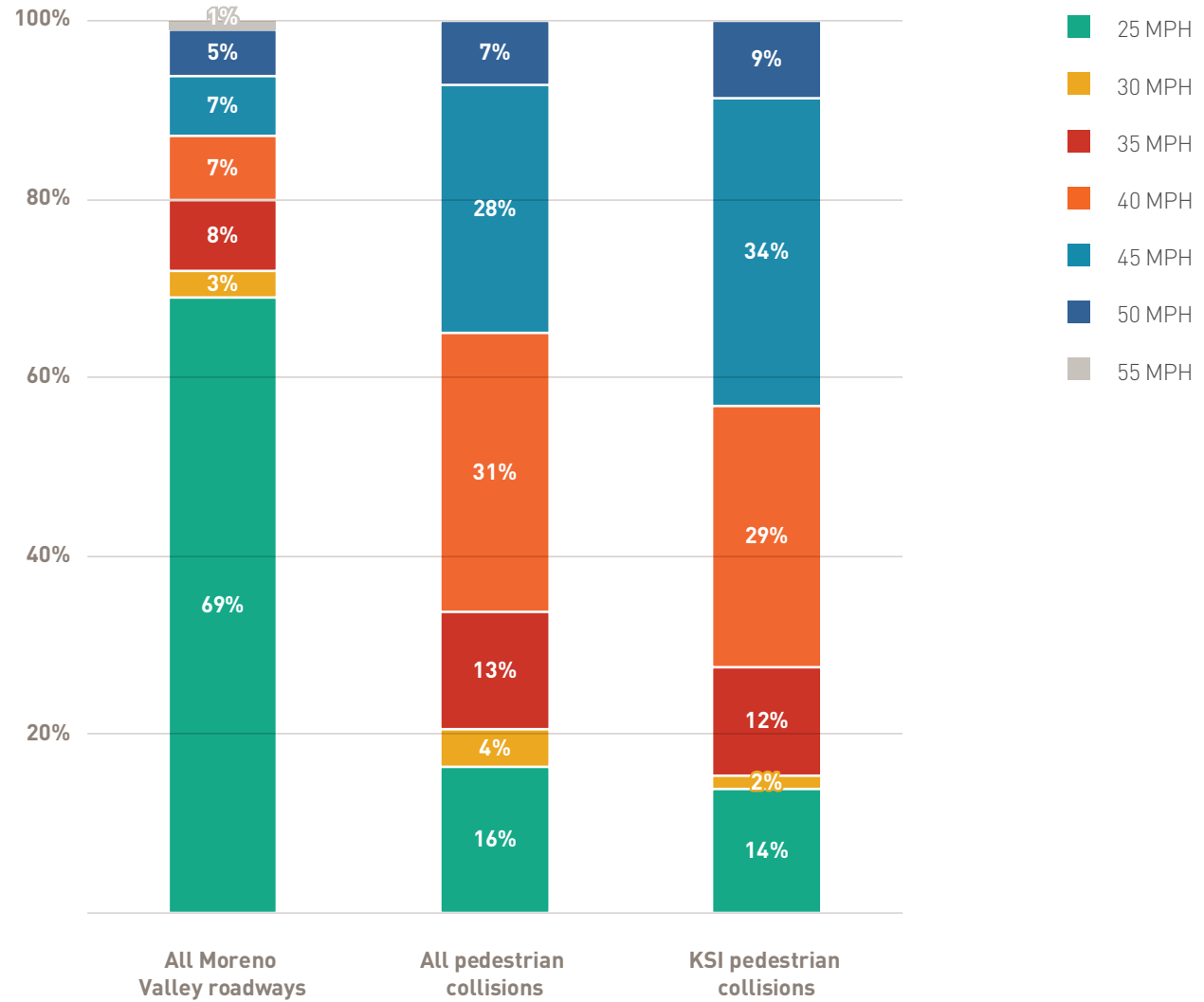
People of different ages have different levels of risk as pedestrians and they have different likelihood of walking. Young adults and senior citizens are more likely to rely on walking for transportation because they are less likely to have access to a vehicle. People under the age of 19 represent 33 percent of the population of Moreno Valley, but 46 percent of pedestrians involved in collisions. People age 65 or older represent eight percent of the population and 13 percent of pedestrians killed or severely injured in collisions. While young people are overrepresented in the collision dataset overall, older people are overrepresented in the most severe pedestrian collisions.



Where

Roadway Speed

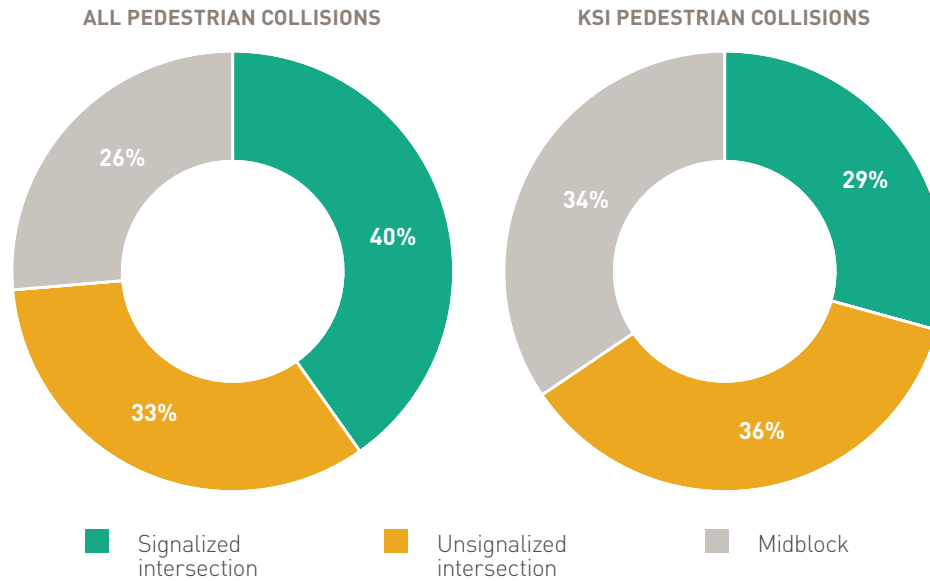
Speed is the primary factor in determining the severity of a collision. A disproportionate number of collisions, particularly KSI collisions, occur on higher speed roadways. Roughly four times the proportion of collisions and KSI collisions occur on roadways with 40 and 45 miles per hour speed limits compared to the proportion of roadways with these speed limits.



Where

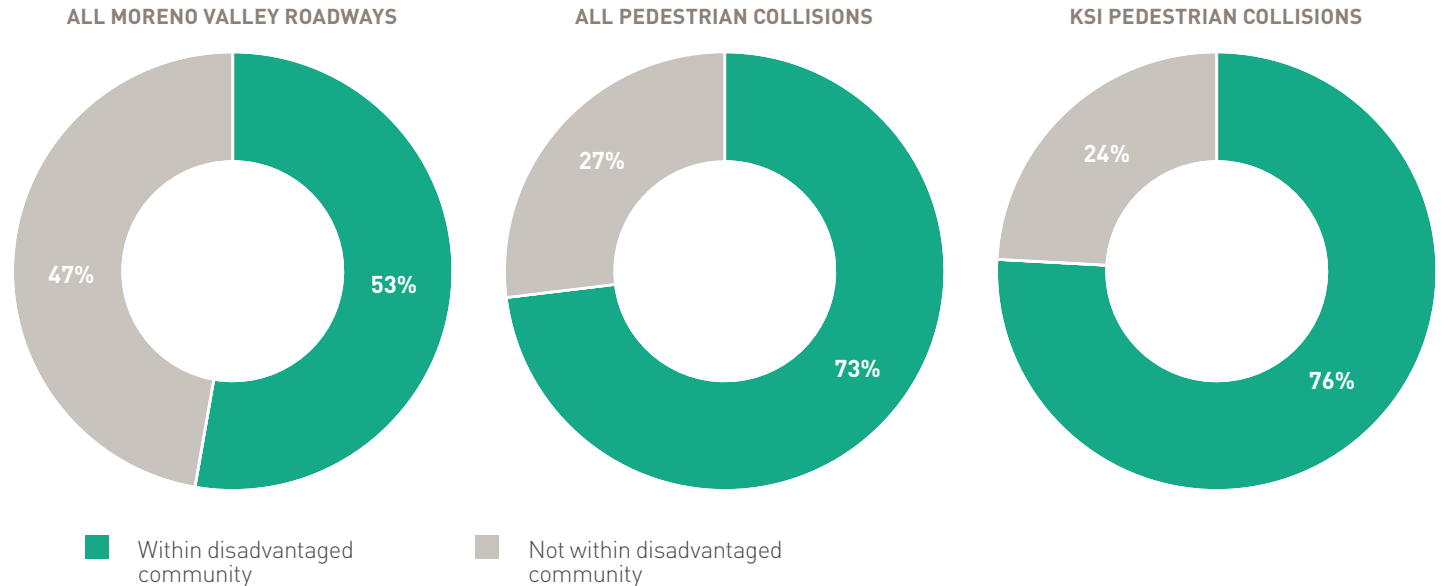
Location Type

Most of the pedestrian collisions and KSI collisions take place at signalized intersections, including 40 percent of pedestrian collisions. Among KSI pedestrian collisions the most common location is an unsignalized intersection, followed by midblock locations, then signalized intersections. As areas where modes mix, directions change, and all users are at a literal crossroads of decision-making, intersections have a high likelihood of being the location of a pedestrian collision.



Disadvantaged Communities

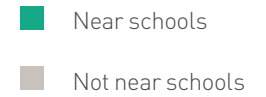
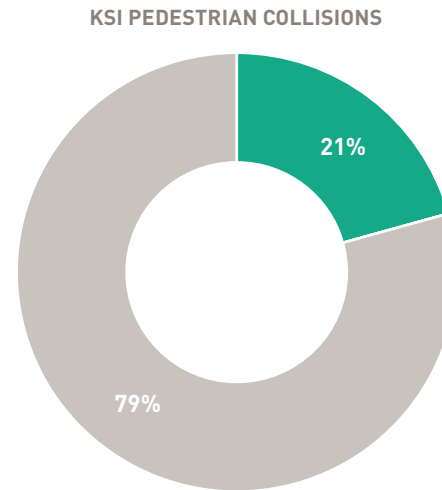
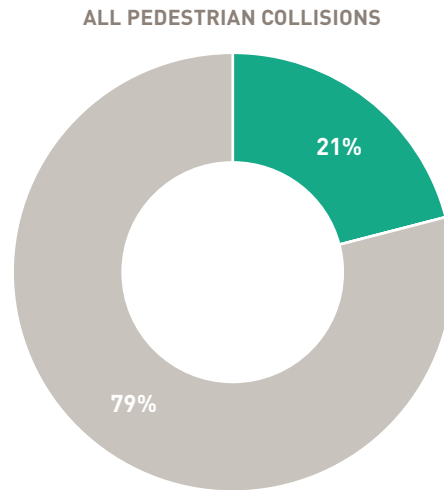
Fifty-three percent of Moreno Valley roadway miles are within Disadvantaged Communities according to CalEnviroScreen designations. However, these communities have a greater risk of pedestrian collisions in Moreno Valley, with 73 percent of all pedestrian collisions and 76 percent of the KSI pedestrian collisions occurring in disadvantaged communities.



Where

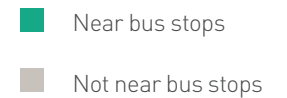
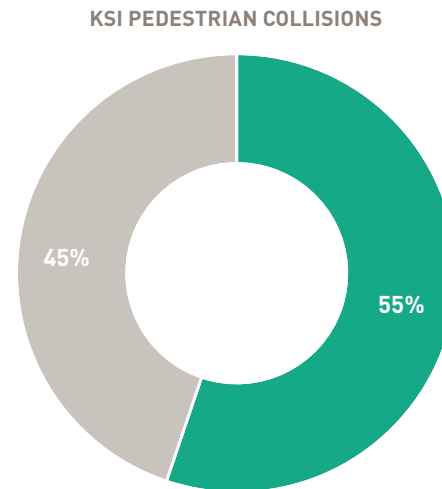
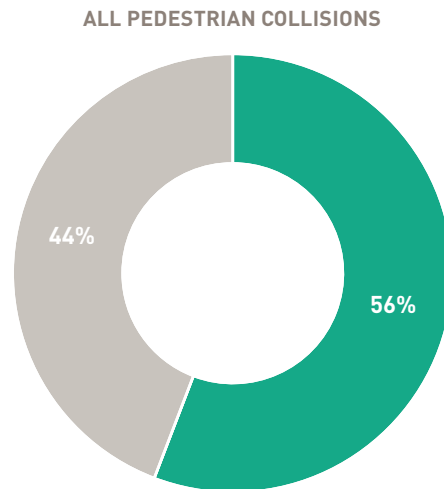
Near School (1,000 ft)

Schools are areas of high pedestrian activity, particularly during arrival and dismissal times. Twenty-one percent of all pedestrian collisions and 21 percent of KSI pedestrian collisions occur within the area of influence of a school.



Near Bus Stops (500 ft)

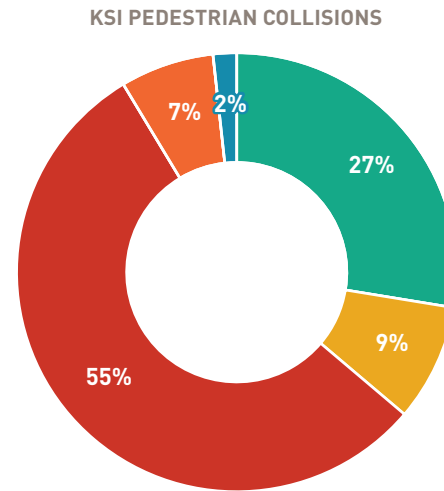
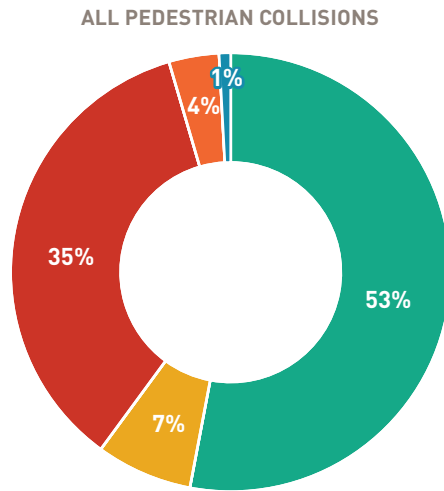
Another area of high pedestrian activity is near bus stops, where people are walking or waiting to catch a bus. There are 334 bus stops in Moreno Valley. Fifty-six percent of all pedestrian collisions and 55 percent of KSI pedestrian collisions occur within the area of influence of a bus stop.



When

Lighting Conditions

The lighting at the time of a collision influences pedestrian visibility to drivers. The most common lighting condition for all pedestrian collisions is daytime, but the most common conditions for KSI pedestrian collisions is night time with streetlights present.

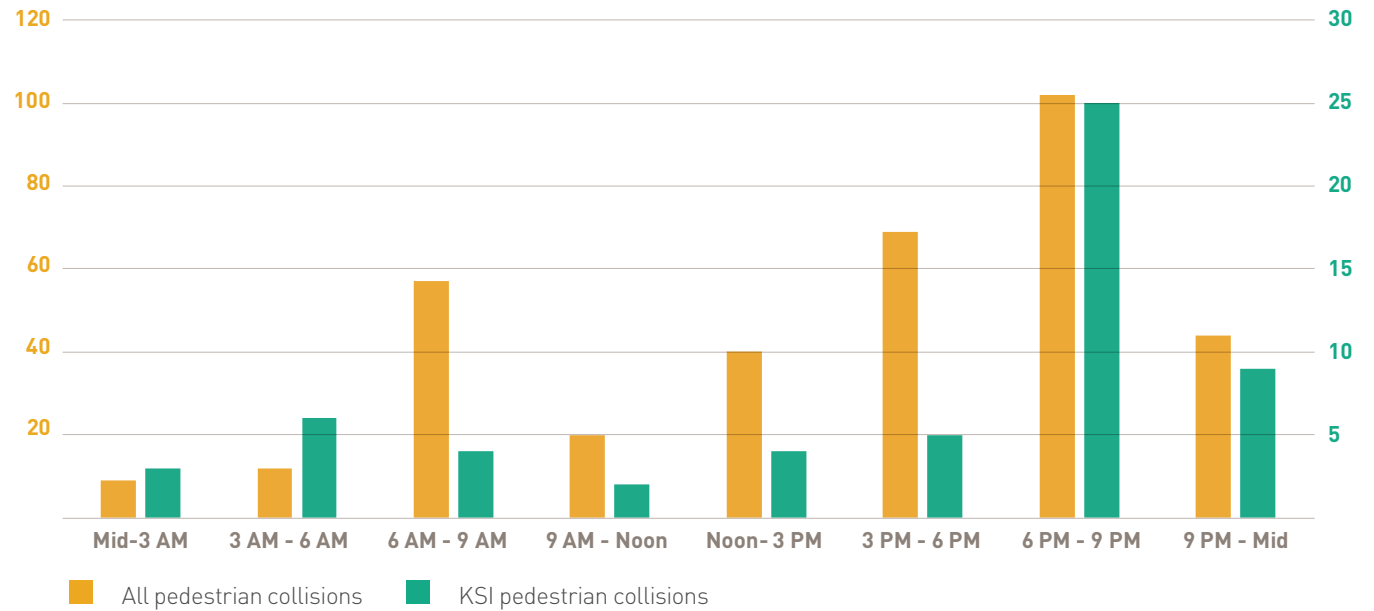


- Daytime
- Dusk/dawn
- Nighttime (street lights)
- Dark (no lights)
- Dark (lights not functioning)

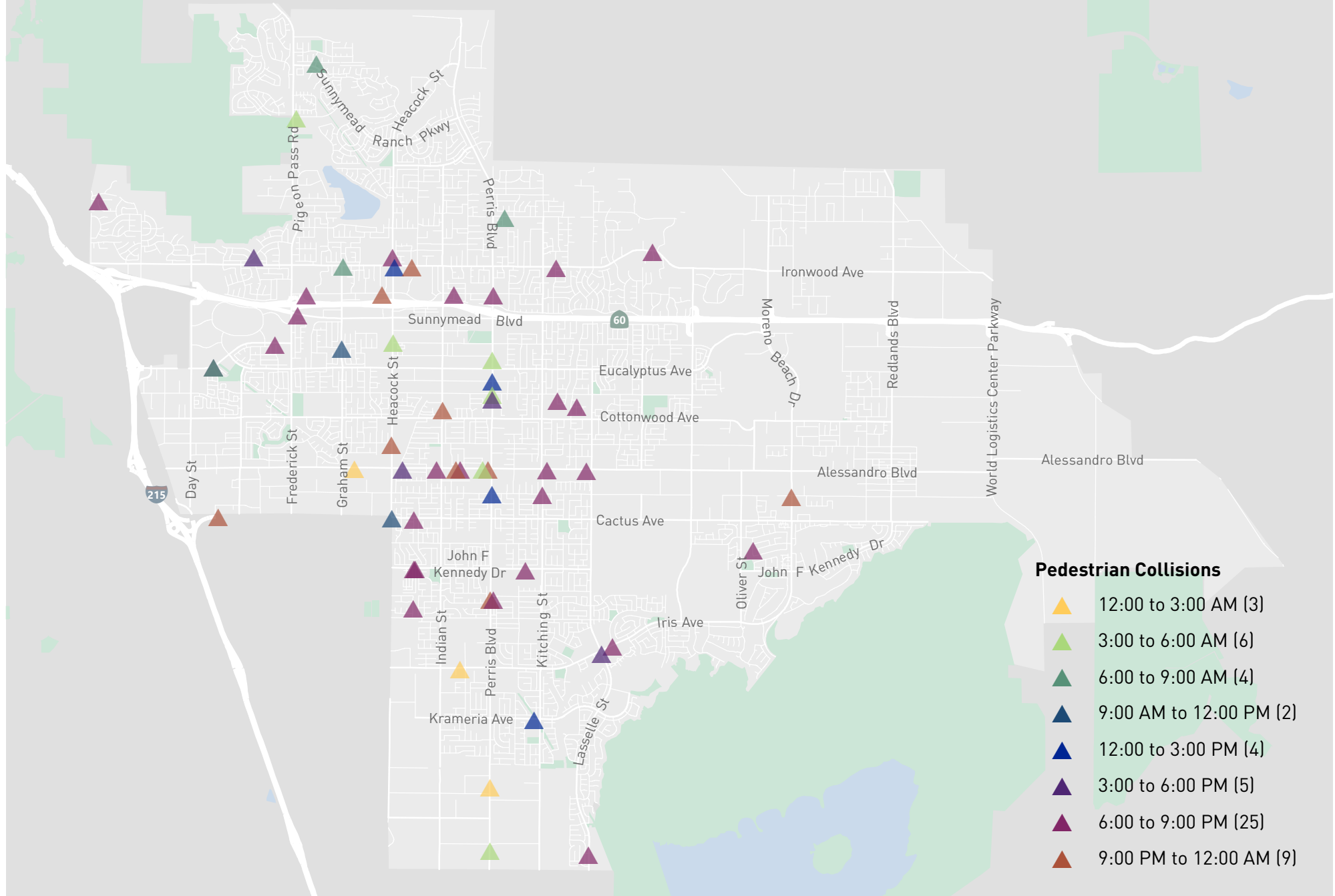
When

Time of Day

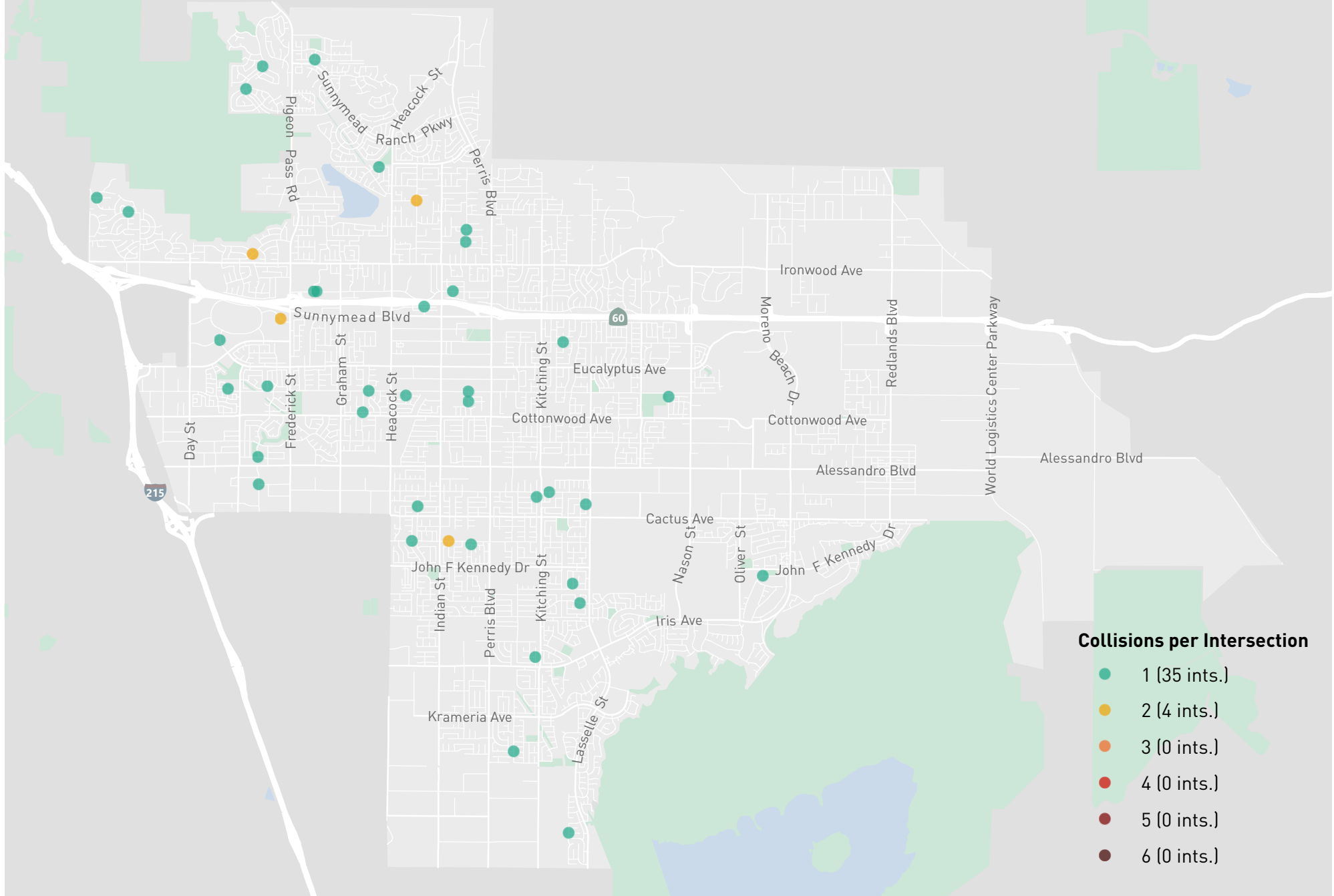
Studying the timing of collisions can provide clues about the traffic and lighting conditions in which they occur, which in turn informs the selection of countermeasures. More collisions take place when more people are likely to be on the road – between 6AM and 9PM. For all pedestrian collisions across Moreno Valley, about 82 percent happen during the daytime. However, KSI collisions tend to increase from 9PM overnight to 6AM, and 6AM to 9AM, with 31 percent of all KSI collisions taking place at nighttime, compared to 18 percent of all pedestrian collisions. A higher rate of fatalities and severe injuries during these hours may be related to traffic speeds, lighting conditions, or the alertness of roadway users.



All Pedestrian Collisions (2009-2017)



Minor Intersections with Pedestrian Collisions (2009-2017)



Systemic Analysis

Analyzing safety risk for pedestrians has conventionally focused on crashes alone. Systemic analysis is a proactive safety approach that focuses on evaluating an entire roadway network, focusing not only on the history of crash data, but also on the contextual characteristics surrounding crashes, and how those characteristics create risk in locations with and without a history of crashes. By merging adjacent road, intersection, and land use features with collision data, we can uncover relationships between contextual factors and the risk of frequent and severe crashes. This systemic process relied on a twofold approach to identify key safety issues and locations to prioritize:

- **Hot Spot Analysis:** Following conventional collision mapping processes, we identified the top intersections and corridors that account for a disproportionate share of severe and fatal pedestrian collisions.

- **Crash Typing:** In developing systemic analysis, it is important to understand the relationship between collision characteristics and the contextual characteristics of the collision location. We developed a systemic matrix that illustrated the number of crashes at the intersection of a collision characteristic (e.g. location of pedestrian) and a contextual characteristic (e.g. posted speed of roadway). Each combination of a collision characteristic and a contextual characteristic represents a crash type. The highest occurring crash types and crash types with the largest share of severe collisions were mapped and considered for further study. This process evaluates risk across the entire roadway system, rather than only managing risk at certain locations.

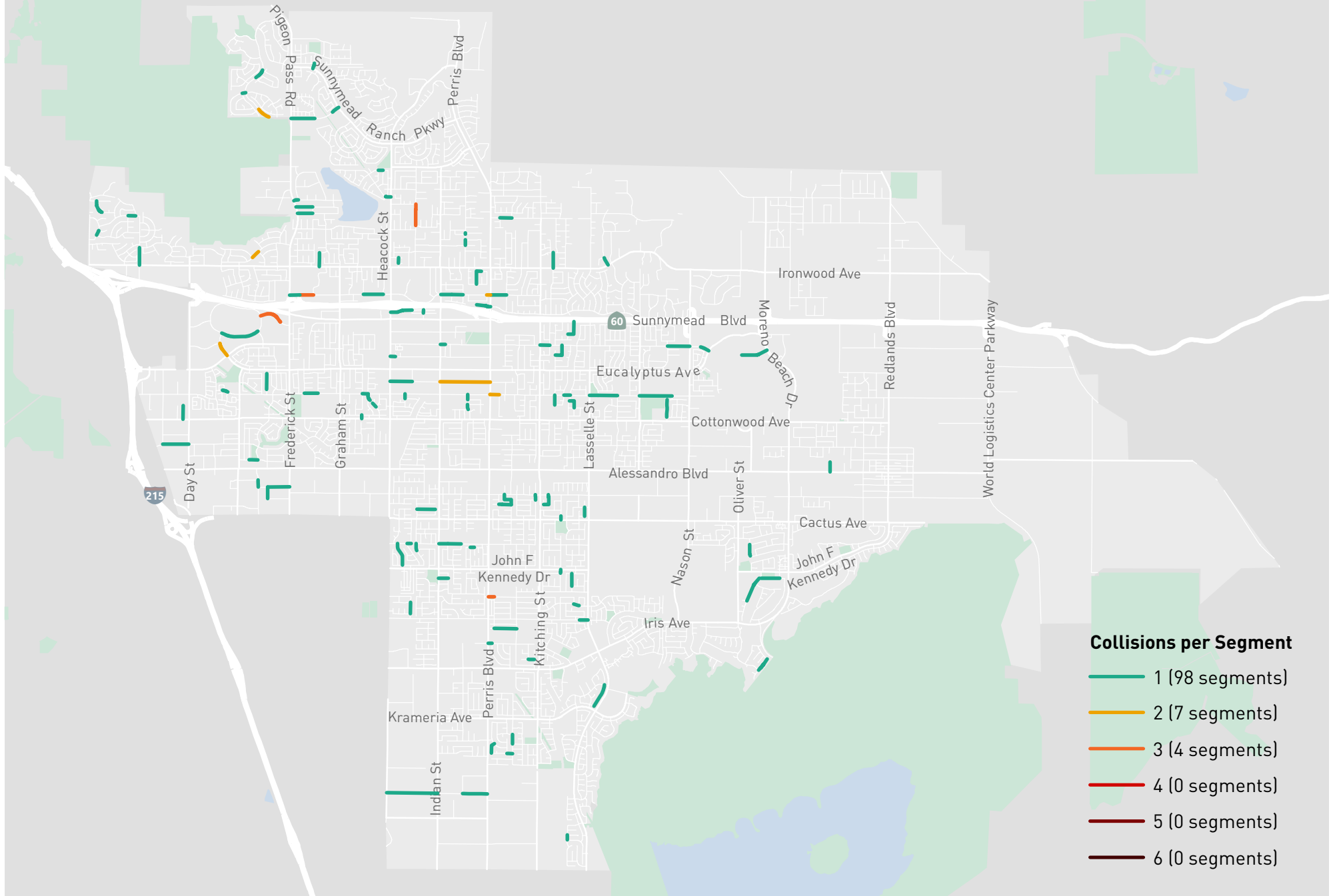
Hot Spot Analysis

Hot spot analysis identifies the intersections and corridors that account for a disproportionate share of severe or total pedestrian collisions. To summarize the collisions by intersection, a set of non-overlapping areas of influence were generated based on a 50-foot radius around minor intersections and a 175-foot radius around major intersections. To summarize the collisions by roadway, collisions were matched to roadways based on the primary road name and a 100-foot search area. Not all collisions are associated with an intersection, but all collisions were associated with a roadway. The figures on the following pages identify intersections and corridors with pedestrian collisions. Top locations are listed on corresponding tables, including: minor facilities with two or more collisions and major facilities with at least two KSI collisions or three total collisions are listed. Full location lists showing all facilities with at least one KSI collision or at least two total collisions are included in Appendix A.

Minor Intersection Collisions

	Intersection	All Collisions	KSI Collisions
1	CLIMBING ROSE DR & SCARLET SAGE WAY	2	1
2	CENTERPOINT DR & TOWNGATE PLAZA	2	0
3	CLOVERFIELD RD & DELPHINIUM AVE	2	0
4	DAVIS ST & SANDY GLADE AVE	2	0

Minor Roadways with Pedestrian Collisions (2009-2017)



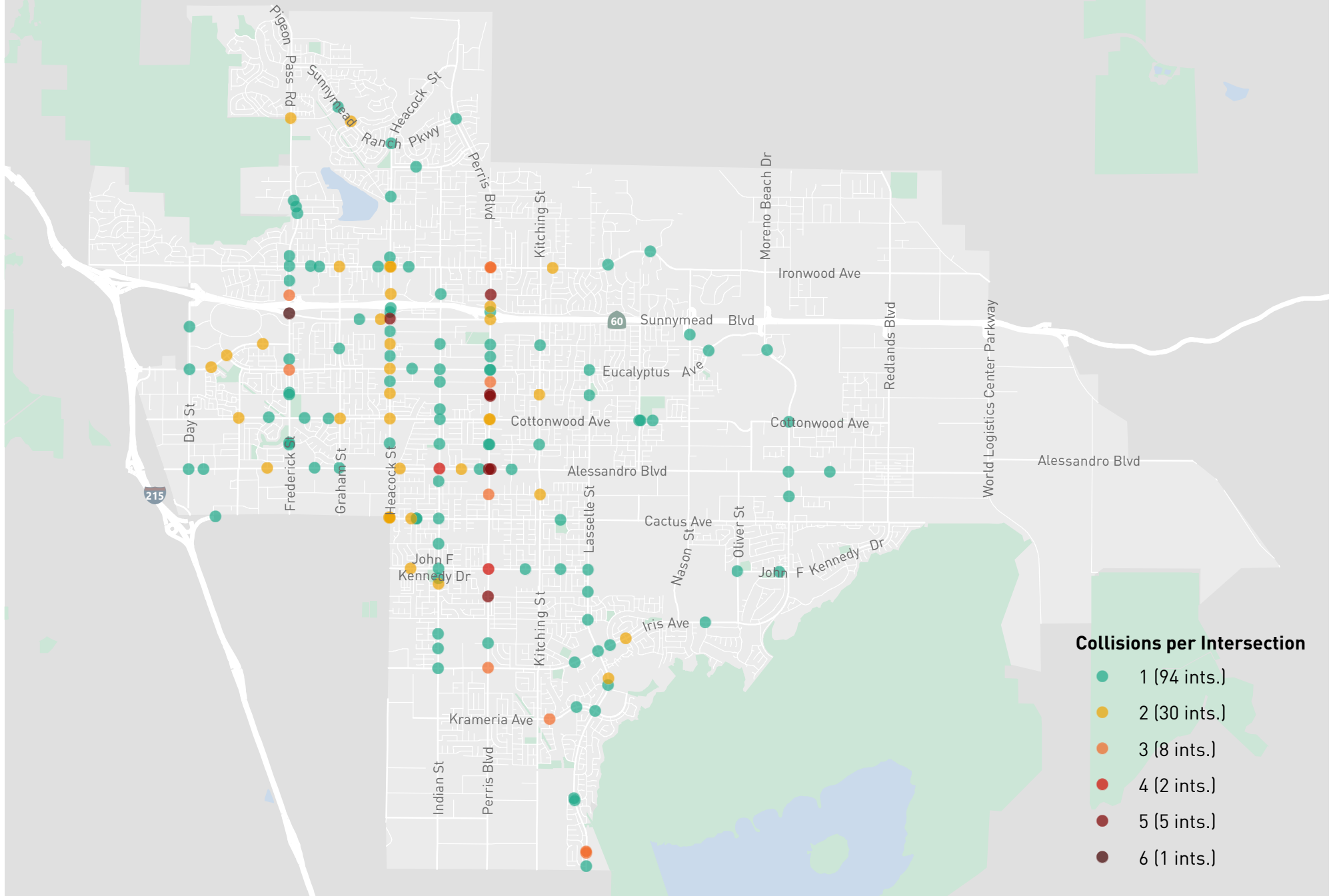
Collisions per Segment

- 1 (98 segments)
- 2 (7 segments)
- 3 (4 segments)
- 4 (0 segments)
- 5 (0 segments)
- 6 (0 segments)

Minor Roadway Collisions

	Intersection	North/West Extent	South/East Extent	All Collisions	KSI Collisions
1	HEMLOCK AVE	SH-60 WB OFF-RAMP	CALLE SOMBRA	3	1
2	CENTERPOINT DR	TOWN CIR	FREDERICK ST	3	0
3	DAVIS ST	SANDY GLADE AVE	MOONRAKER LN	3	0
4	FILAREE AVE	PERRIS BLVD	SHEILA ST	3	0
5	CLIMBING ROSE DR	SCARLET SAGE WAY	YELLOW IRIS WAY	2	1
6	ATWOOD AVE	INDIAN ST	PERRIS BLVD	2	0
7	DRACAEA AVE	DRIVEWAY	PERRIS BLVD	2	0
8	DRACAEA AVE	PERRIS BLVD	BIRCHWOOD DR	2	0
9	HEMLOCK AVE	ONYX PL	PERRIS BLVD	2	0
10	HIDDEN SPRINGS DR	COUNTRY GATE RD	BOX SPRINGS MOUNTAIN RESERVE DRIVEWAY	2	0
11	MEMORIAL WAY	GATEWAY DR	EUCALYPTUS AVE	2	0

Major Intersections with Pedestrian Collisions (2009-2017)



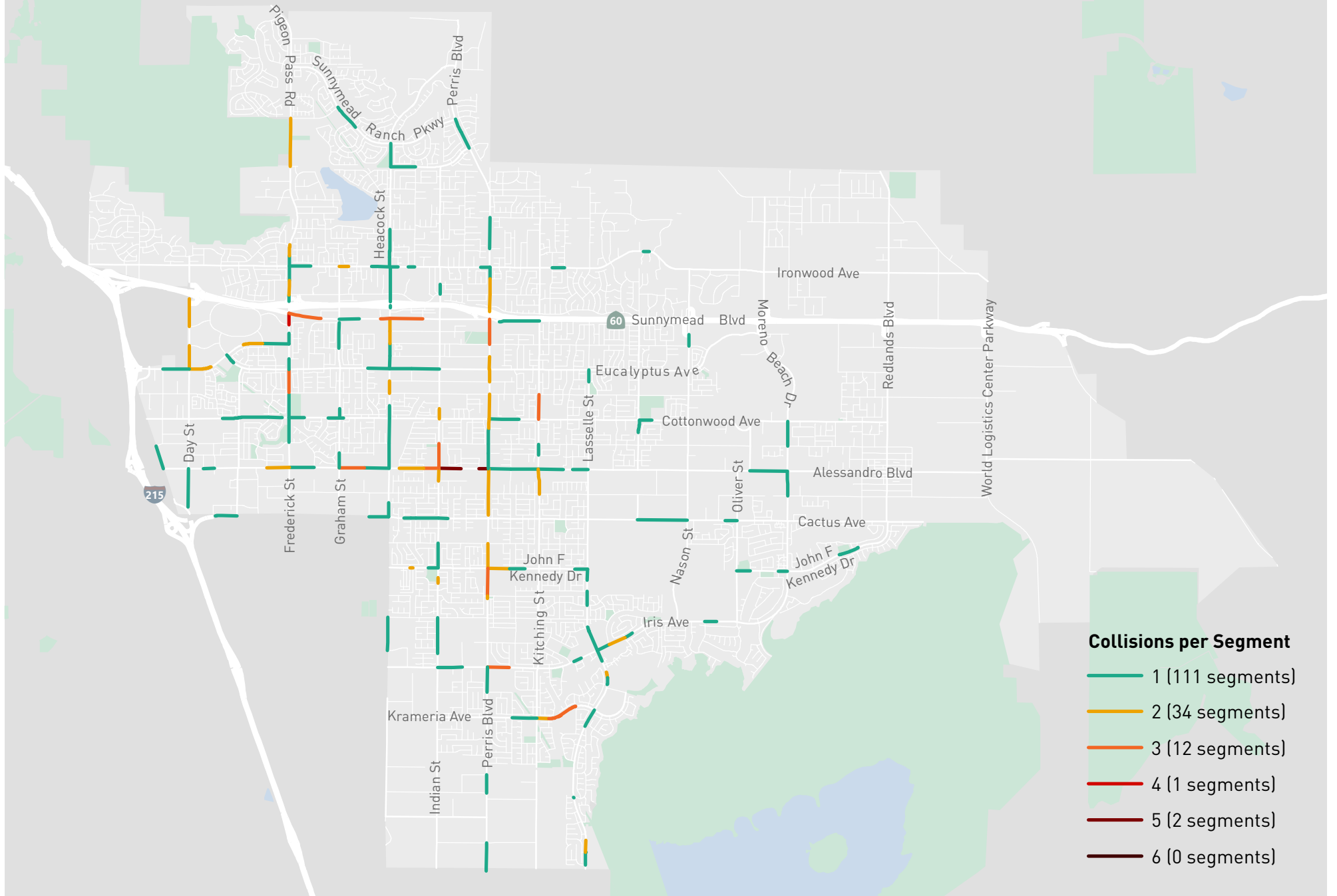
Collisions per Intersection

- 1 (94 ints.)
- 2 (30 ints.)
- 3 (8 ints.)
- 4 (2 ints.)
- 5 (5 ints.)
- 6 (1 ints.)

Major Intersection Collisions

	Intersection	All Collisions	KSI Collisions
1	FREDERICK ST & SUNNYMEAD BLVD/ SH-60 EB OFF-RAMP	6	0
2	FILAREE AVE & PERRIS BLVD	5	2
3	DRACAEA AVE & PERRIS BLVD	5	1
4	HEMLOCK AVE & PERRIS BLVD	5	1
5	ALESSANDRO BLVD & PERRIS BLVD	5	0
6	HEACOCK ST & SUNNYMEAD BLVD	5	0
7	ALESSANDRO BLVD & INDIAN ST	4	0
8	JOHN F KENNEDY DR & PERRIS BLVD	4	0
9	ATWOOD AVE & PERRIS BLVD	3	1
10	BRODIAEA AVE & PERRIS BLVD	3	1
11	LASSELLE ST & VIA DE ANZA	3	1
12	CAMINO JUANITO & KRAMERIA AVE	3	0
13	EUCALYPTUS AVE & FREDERICK ST	3	0
14	HEMLOCK AVE & PIGEON PASS RD	3	0
15	IRIS AVE & PERRIS BLVD	3	0
16	IRONWOOD AVE & PERRIS BLVD	3	0
17	ARBOR PARK LN & EUCALYPTUS AVE	2	2
18	JOHN F KENNEDY DR & PEPPER CT	2	2

Major Roadways with Pedestrian Collisions (2009-2017)



Major Roadway Collisions

	Intersection	North/West Extent	South/East Extent	All Collisions	KSI Collisions
1	ALESSANDRO BLVD	INDIAN ST	COVEY QUAIL LN	5	2
2	ALESSANDRO BLVD	GAYE ST	PERRIS BLVD	5	2
3	FREDERICK ST	SUNNYMEAD BLVD	CENTERPOINT DR	4	0
4	ALESSANDRO BLVD	GRAHAM ST	ALLESANDRO PLAZA	3	1
5	ALESSANDRO BLVD	BRANDT DR	INDIAN ST	3	1
6	SUNNYMEAD BLVD	FREDERICK ST	OLIVE WOOD PLAZA DR	3	1
7	FREDERICK ST	EUCALYPTUS AVE	DRACAEA AVE	3	0
8	INDIAN ST	BAY AVE	ALESSANDRO BLVD	3	0
9	IRIS AVE	PERRIS BLVD	WEDOW DR	3	0
10	KITCHING ST	DRACAEA AVE	COTTONWOOD AVE	3	0
11	KRAMERIA AVE	CAMINO JUANITO	VISTA CONEJO DR	3	0
12	PERRIS BLVD	SUNNYMEAD BLVD	FIR AVE	3	0
13	PERRIS BLVD	JOHN F KENNEDY DR	FILAREE AVE	3	0
14	SUNNYMEAD BLVD	LORAIN TER	HEACOCK ST	3	0
15	SUNNYMEAD BLVD	HEACOCK ST	BACK WAY	3	0
16	EUCALYPTUS AVE	DAY ST	ARBOR PARK LN	2	2
17	JOHN F KENNEDY DR	PEPPER CT	ALLEY	2	2
18	PERRIS BLVD	DRACAEA AVE	COTTONWOOD AVE	2	2
19	PERRIS BLVD	FILAREE AVE	GENTIAN AVE	2	2

Crash Typing

In developing crash types, we developed an analysis approach that paired collision data with geographic roadway and other contextual data. Outputs from this analysis were used to populate a set of matrices that allow us to look at crosstabs (collision data in rows and geographic data in columns) for collisions across the entire roadway network. Using these matrices, we were able to easily identify what combinations of factors contributed to a high number of crashes, and which combinations led to severe crashes. Crash types were considered for selection if two criteria were met: 5+ KSI collisions and 25% or more of all collisions were KSI. A sample systemic matrix is shown here.

CRASH TYPING MATRIX: NUMBER OF PEDESTRIAN COLLISIONS

		CONTEXTUAL FACTORS													
		TOTAL	POSTED SPEED (MPH)					LOCATION			PROXIMITY		PRIMARY ROADWAY TYPE		
			25	30	35	40	45+	AT INTERSECTION		MID-BLOCK	NEAR BUS STOP	NEAR SCHOOL	MINOR	MAJOR	
								SIGNAL	UNSIGNAL-IZED						
COLLISION FACTORS	VIOLATION	Improper Turning	17	4	0	4	5	4	6	7	4	8	3	9	8
		Traffic Signals and Signs	17	1	0	2	6	8	13	4	0	11	2	9	8
		Unsafe Speed	13	5	2	0	4	2	3	6	4	3	3	8	5
	PEDESTRIAN ACTION	Crossing in Crosswalk	134	7	3	15	53	56	94	40	0	95	29	36	98
		Crossing in Crosswalk Not at Intersection	8	2	0	3	1	2	3	5	0	5	2	3	5
		Crossing Not in Crosswalk	123	23	9	18	35	38	26	50	47	61	25	45	78
		In Road, Including Shoulder	63	23	2	7	11	20	8	18	37	22	12	32	31
		Not in Road	21	3	1	3	9	5	8	4	9	11	5	6	15
	LIGHTING CONDITIONS	Daytime	187	38	8	27	54	60	73	68	46	93	47	79	108
		Dark	141	16	6	16	45	58	56	42	43	87	24	34	107
		Dusk/Dawn	25	4	1	3	12	5	13	8	4	17	3	11	14
	PARTY AT FAULT	Driver		21	3	22	54	48	71	53	24	84	29	58	90
		Pedestrian		32	11	22	48	67	60	57	63	96	39	58	122
	DRIVER MOVEMENT	Proceeding Straight	210	40	11	29	62	66	62	74	74	105	42	78	132
		Making Left Turn	39	4	0	6	19	10	19	18	2	25	8	12	24
		Making Right Turn	67	7	3	8	18	31	43	19	5	49	10	19	48
	PED AGE	19 and Under	155	33	6	20	47	49	58	57	40	2	45	65	90
		65+	19	3	1	3	4	8	12	6	1	11	2	5	14

Note: Selected crash types (described in detail on the following page) are shaded in the table cells above.

CRASH TYPE SUMMARY

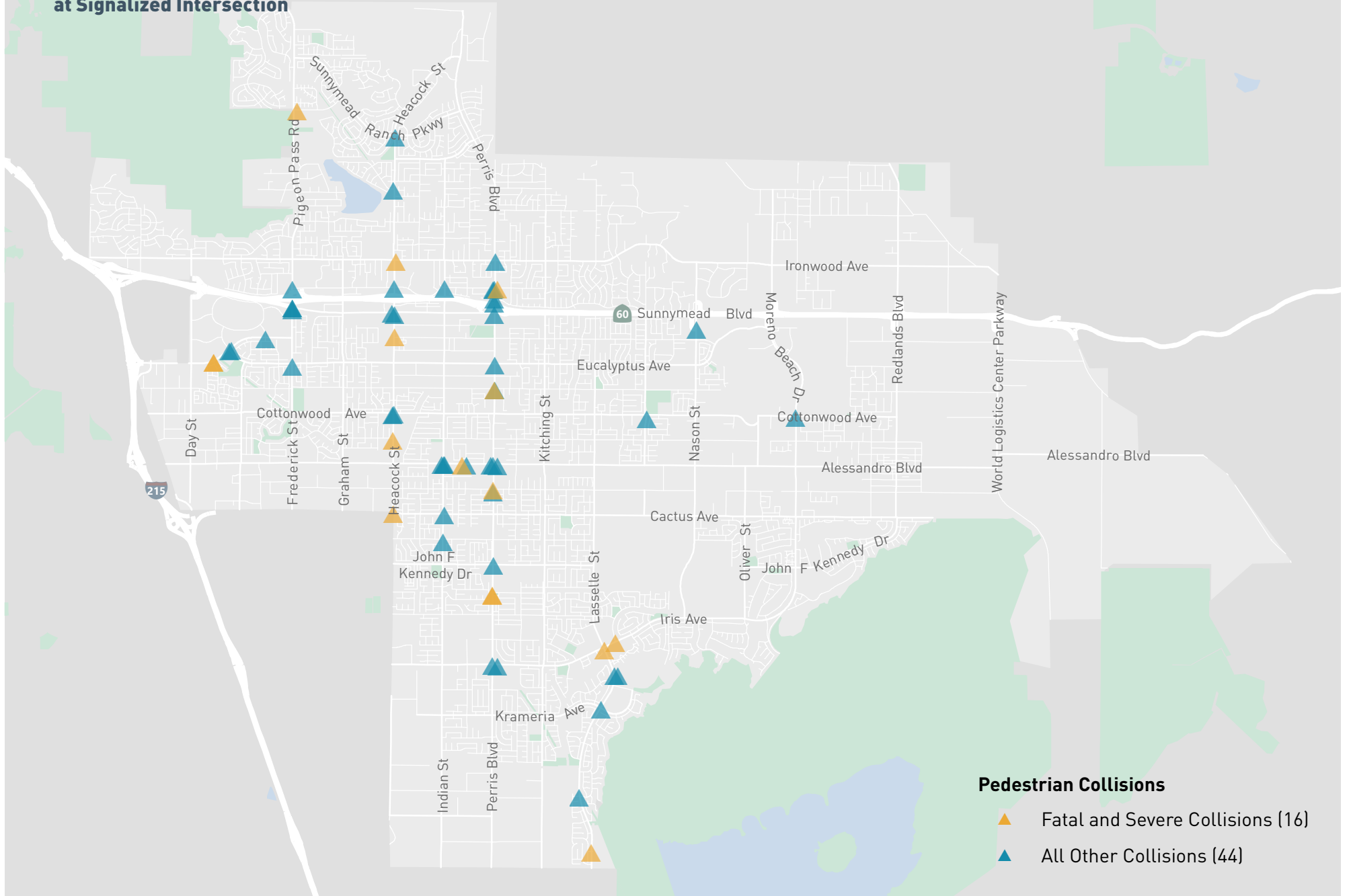
From the systemic matrix, the City developed crash types to highlight six of the most common and most severe patterns among pedestrian collisions in Moreno Valley. The crash types identified in this analysis represent factors that describe a sample of the most frequent and most severe crash types. Crash types #1-5 show an overrepresentation of severity, when compared to the full set of pedestrian collisions. While 16% of all pedestrian collisions in the City result in a fatality or severe injury, between 27% and 37% of the crash types highlighted here result in a fatality or severe injury. While crash type #6 does not show overrepresentation in terms of severity, collisions involving pedestrians age 19 or younger account for a significant portion of pedestrian collisions in Moreno Valley (43%), warranting its inclusion.

Every crash type highlights a crash pattern the City has identified as a priority concern. The collision attributes and contextual factors that define each crash type along with the number of collisions and KSI collisions that match the crash type are summarized here. The following maps show the locations of collisions included in each crash type. Crash types have been paired with safety countermeasure options relevant to each crash and location context. ●

Crash Type	Collision Factors	Contextual Factors	Number of Collisions	Number of KSI Collisions	Share of Collisions that are KSI
1	Party at fault is pedestrian	Collision occurred at signalized intersection	60	16	27%
2	Pedestrian crossing outside of crosswalk when collision occurred	Collision occurred near a bus stop	61	18	30%
3	Lighting conditions are described as dark when the collision occurred	Collision occurred at an unsignalized intersection	42	14	33%
4	Driver was proceeding straight when the collision occurred	Collision occurred on a roadway with a posted speed of 45 mph or greater	66	22	34%
5	The pedestrian involved in the collisions was 65 years old or older		19	7	37%
6	The pedestrian involved in the collisions was 19 years old or younger		155	12	8%

Crash Type I

**Pedestrian at Fault
at Signalized Intersection**



Pedestrian Collisions

- ▲ Fatal and Severe Collisions (16)
- ▲ All Other Collisions (44)

Crash Type 1

Pedestrian at Fault at Signalized Intersection

SAFETY COUNTERMEASURE OPTIONS



Extend Pedestrian Crossing Time

- ↳ Inaccessibility;
Conflicts at Crossing Locations

Increases time for pedestrian walk phases, and can better accommodate vulnerable populations such as children and the elderly.



Straighten Crosswalk

- ↳ Inadequate Pedestrian Visibility

Straightening crosswalks improves sight lines, making pedestrians more visible to oncoming motorists, and may shorten the crossing distance, reducing the length of time required for pedestrians to cross an intersection.



Pedestrian Recall

- ↳ Crossing Outside Crosswalk

Signals can be put in “recall” for key time periods of the day, such as peak business hours or school drop-off/pick-up times. The “WALK” signal is displayed every signal cycle without requiring a pedestrian push button.



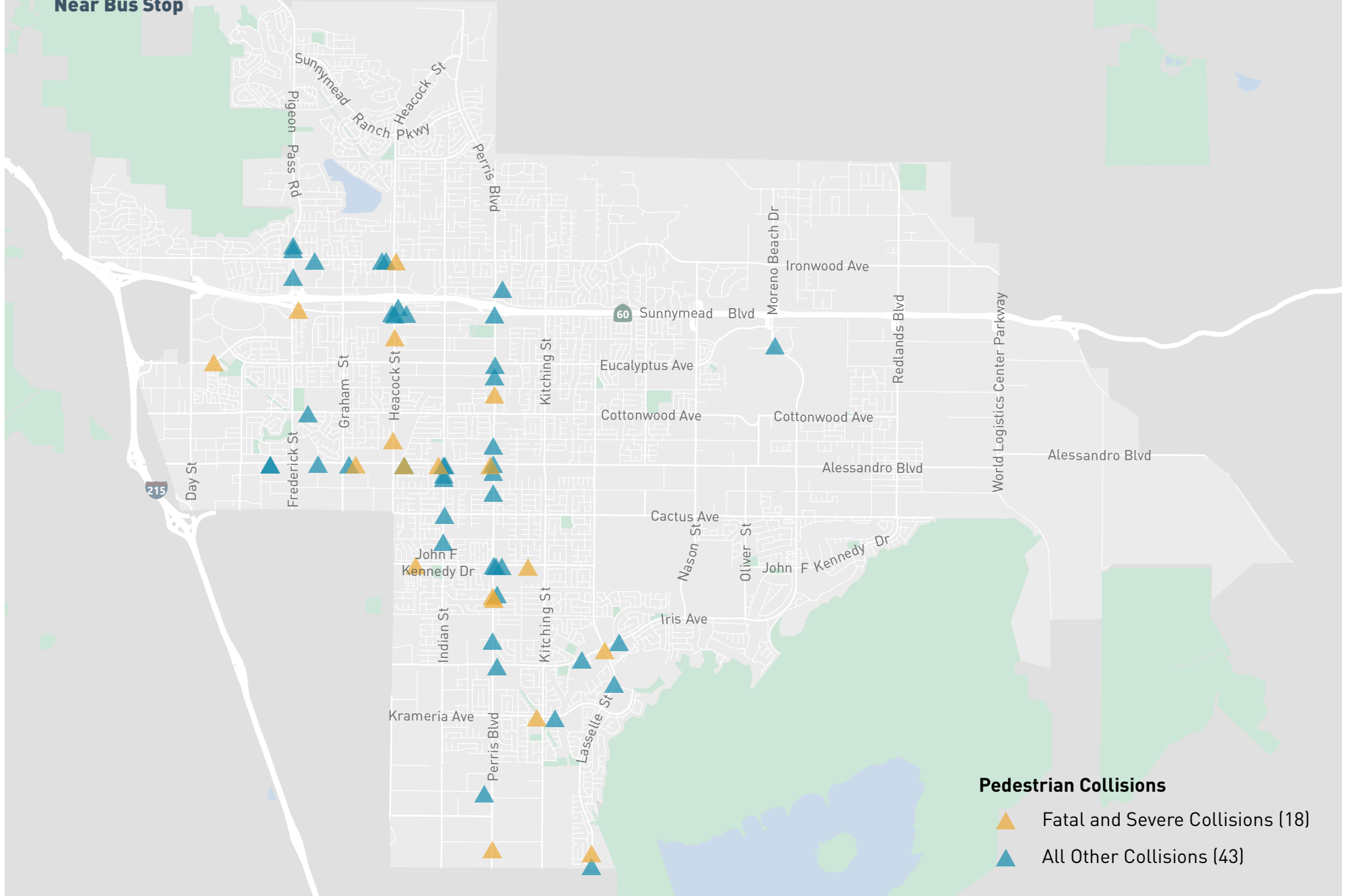
Shorten Cycle Length

- ↳ Crossing Outside Crosswalk

Reducing the cycle length at intersections may reduce the delay experienced by vehicles, bicyclists, and pedestrians. When delay is significant, road users are more inclined to ignore signal indications.

Crash Type 2

**Pedestrian Crossing Outside Crosswalk
Near Bus Stop**



Crash Type 2 Pedestrian Crossing Outside Crosswalk Near Bus Stop

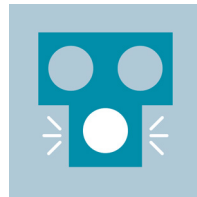
SAFETY COUNTERMEASURE OPTIONS




Bus Stop Near Intersection

 Crossing Outside Crosswalk

Placing bus stops and pedestrian crossings, such as those at intersections, in close proximity allows transit riders to cross the street safely.



Pedestrian Hybrid Beacon

 Inadequate Pedestrian Visibility;
Driver Failure to Yield

Pedestrian-activated beacon used at mid-block crosswalks to notify oncoming motorists to stop with a series of red and yellow lights. Unlike a traffic signal, the PHB rests in dark until a pedestrian activates it via pushbutton or other form of detection.




New Pedestrian Crossing

 Crossing Outside Crosswalk

A pedestrian crossing at an intersection or on a segment provides a formalized location for people to cross the street, reducing the risk of people crossing outside crosswalks where drivers are not expecting them. Crosswalk striping, signs, and other enhanced safety features alert drivers that there may be a pedestrian crossing.



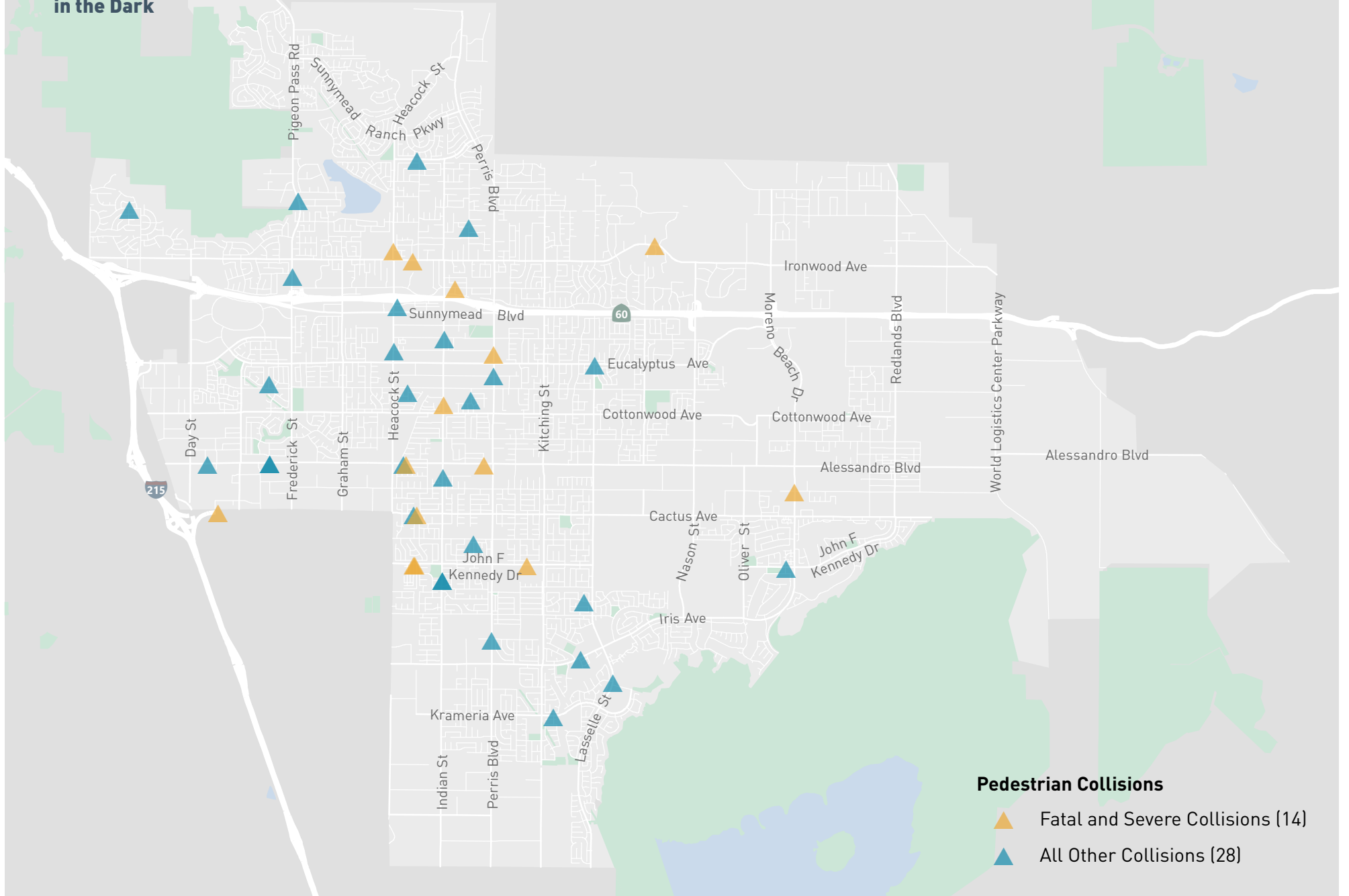
Rectangular Rapid Flash Beacon

 Inadequate Pedestrian Visibility;
Driver Failure to Yield

Pedestrian-activated flashing lights and additional signage enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings.

Crash Type 3

Collision at Unsignalized Intersection
in the Dark



Crash Type 3

Collision at Unsignalized Intersection in the Dark

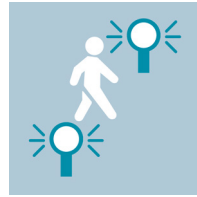
SAFETY COUNTERMEASURE OPTIONS



LED Lighting

- 📍 Dark Conditions;
Inadequate Pedestrian Visibility

Upgrading existing street lights to LED lighting can increase the visibility of pedestrians in crosswalks, providing for a whiter light, greater color contrast and larger areas of light distribution, when compared to existing high-pressure sodium lighting of the same or higher wattage.



Pedestrian Oriented Lighting

- 📍 Dark Conditions;
Inadequate Pedestrian Visibility

Appropriate quality and placement of lighting along the roadway and at intersections can enhance an environment as well as increase comfort and safety, making pedestrians more visible to drivers. Pedestrian-scale lighting, which can be used in addition to roadway and intersection lighting, is lower in height than standard street lighting and is spaced closer together.



New Signal

- 📍 Excessive Vehicle Speed;
Crossing Outside Crosswalk

New traffic signals help organize travel of all modes at an intersection, limiting interactions between vehicles, pedestrians, and bicyclists with conflicting movements. New signals can have a traffic calming effect on long, high-speed straightaways.



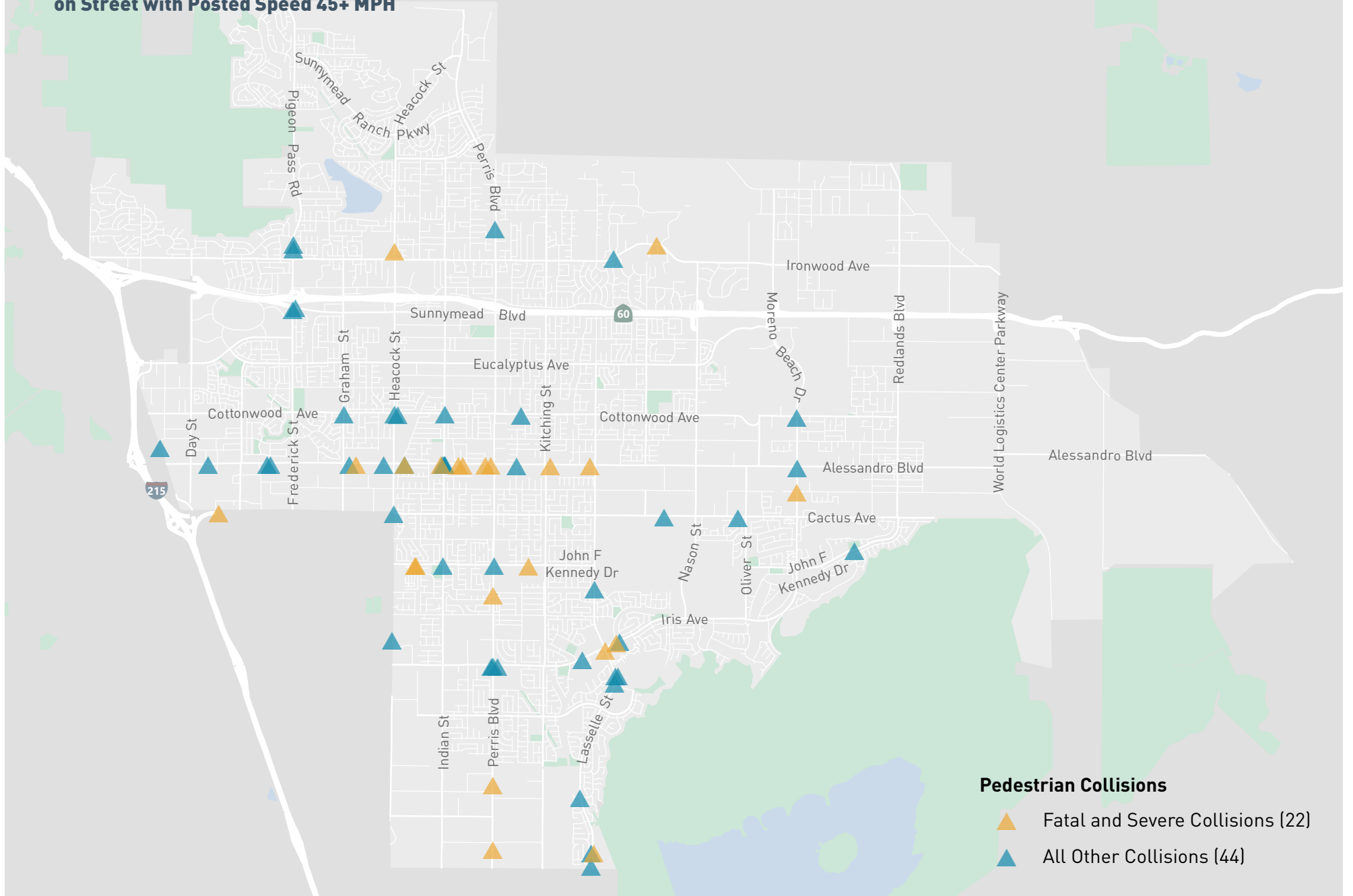
High Visibility Crosswalk

- 📍 Driver Failure to Yield;
Inadequate Pedestrian Visibility

A crosswalk designed to be more visible to approaching drivers, striped with ladder markings using high-visibility material such as thermoplastic tape instead of paint. Advance stop bars or yield markings should be implemented with this countermeasure and installed as appropriate to the context of the crossing.

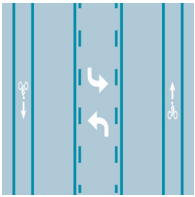
Crash Type 4

Driver Proceeding Straight
on Street with Posted Speed 45+ MPH



Crash Type 4 Driver Proceeding Straight on Street with Posted Speed 45+

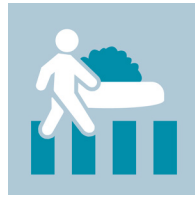
SAFETY COUNTERMEASURE OPTIONS



Road Diet

Excessive Vehicle Speed

Road diets generally reassign space in the roadway from vehicle travel lanes to create room for bicycle facilities, wider sidewalks, or center turn lanes. Road diets optimize street space to benefit all users by improving the safety and comfort of pedestrians and bicyclists, and reducing vehicle speeds and the potential for rear end collisions.



Raised Median

Excessive Vehicle Speed;
Conflicts at Crossing Locations

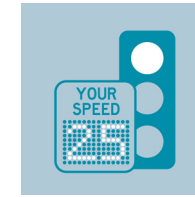
Curbed sections in the center of the roadway that are physically separated from vehicular traffic. Raised medians can also help control access to and from side streets and driveways, reducing conflict points.



Slow Signal Coordination

Excessive Vehicle Speed

A series of traffic signals coordinated to allow for uninterrupted bicycle traffic flow or slower vehicle travel speeds through several intersections along a corridor. Coordinating signals for a slower travel speed gives bicyclists more time to cross safely and encourages drivers to travel at slower speeds.



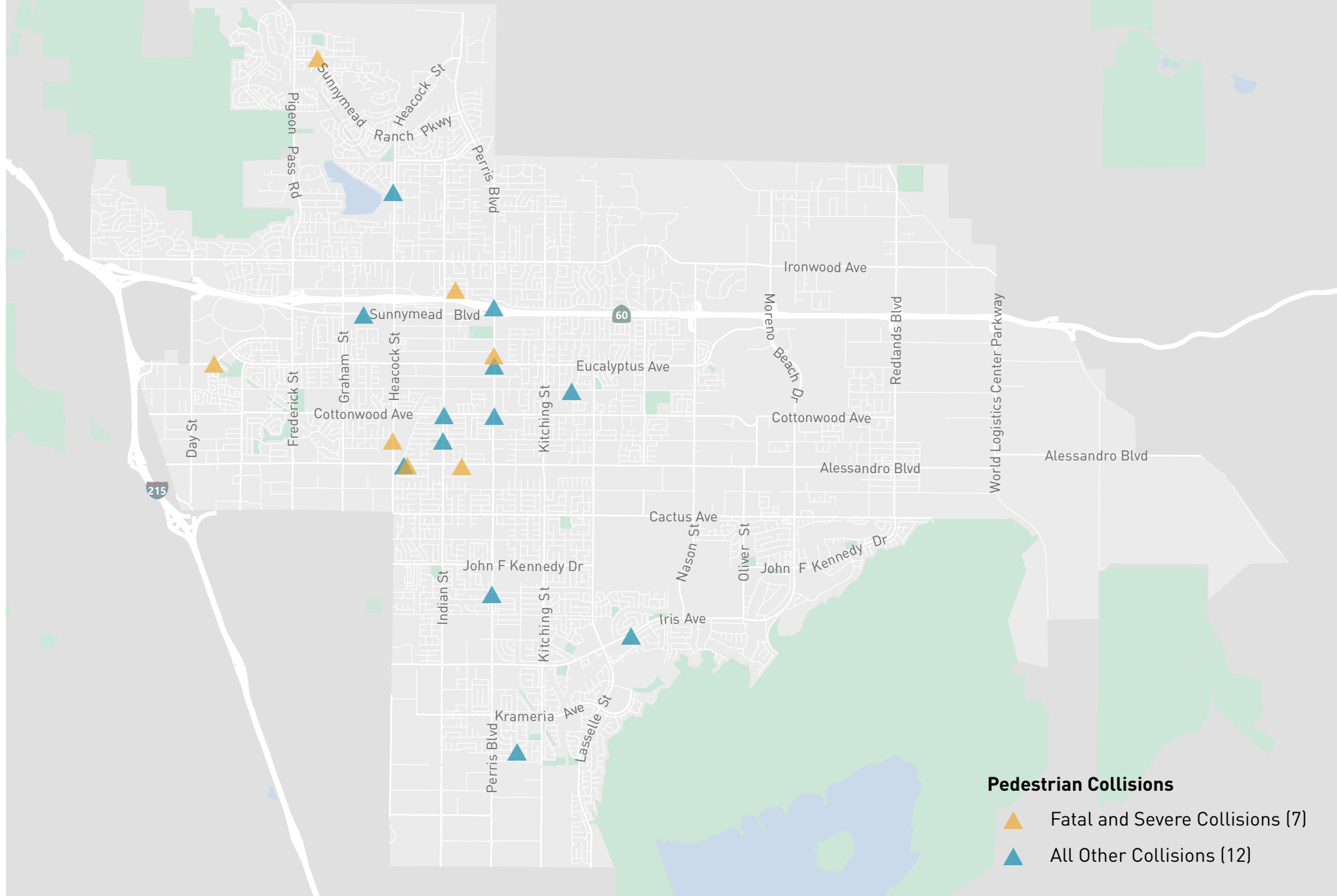
Speed Sensitive Rest in Red Signal

Excessive Vehicle Speed

At certain hours (eg. late night) a signal remains red for all approaches or certain approaches until a vehicle arrives at the intersection. If the vehicle is going faster than the desired speed, the signal will not turn green until after vehicle stops. If the vehicle is going the desired speed the signal will change to green before the vehicle arrives. This signal timing provides operational benefit to drivers traveling at the desired speed limit. Can be paired with variable speed warning signs.

Crash Type 5

Pedestrian Victim Age 65+



Crash Type 5

Pedestrian Victim

Age 65+

SAFETY COUNTERMEASURE OPTIONS



Pedestrian Refuge Island

📍 Inadequate Pedestrian Visibility;
Conflicts at Crossing Locations

Pedestrian refuge islands provide a protected area for pedestrians at the center of the roadway. They reduce the exposure time for pedestrians crossing the intersection and simplify crossings by allowing pedestrians to focus on one direction of traffic at a time.



Accessible Pedestrian Signal

📍 Inaccessibility

Curb ramps and push buttons must comply with the Americans with Disability Act (ADA) standards for accessibility. Push buttons should be visible and conveniently located for pedestrians waiting at a crosswalk. Accessible pedestrian signals, including audible push buttons, improve access for pedestrians who are blind or have low vision.



Extend Pedestrian Crossing Time

📍 Inaccessibility;
Conflicts at Crossing Locations

Increases time for pedestrian walk phases, and can better accommodate vulnerable populations such as children and the elderly.



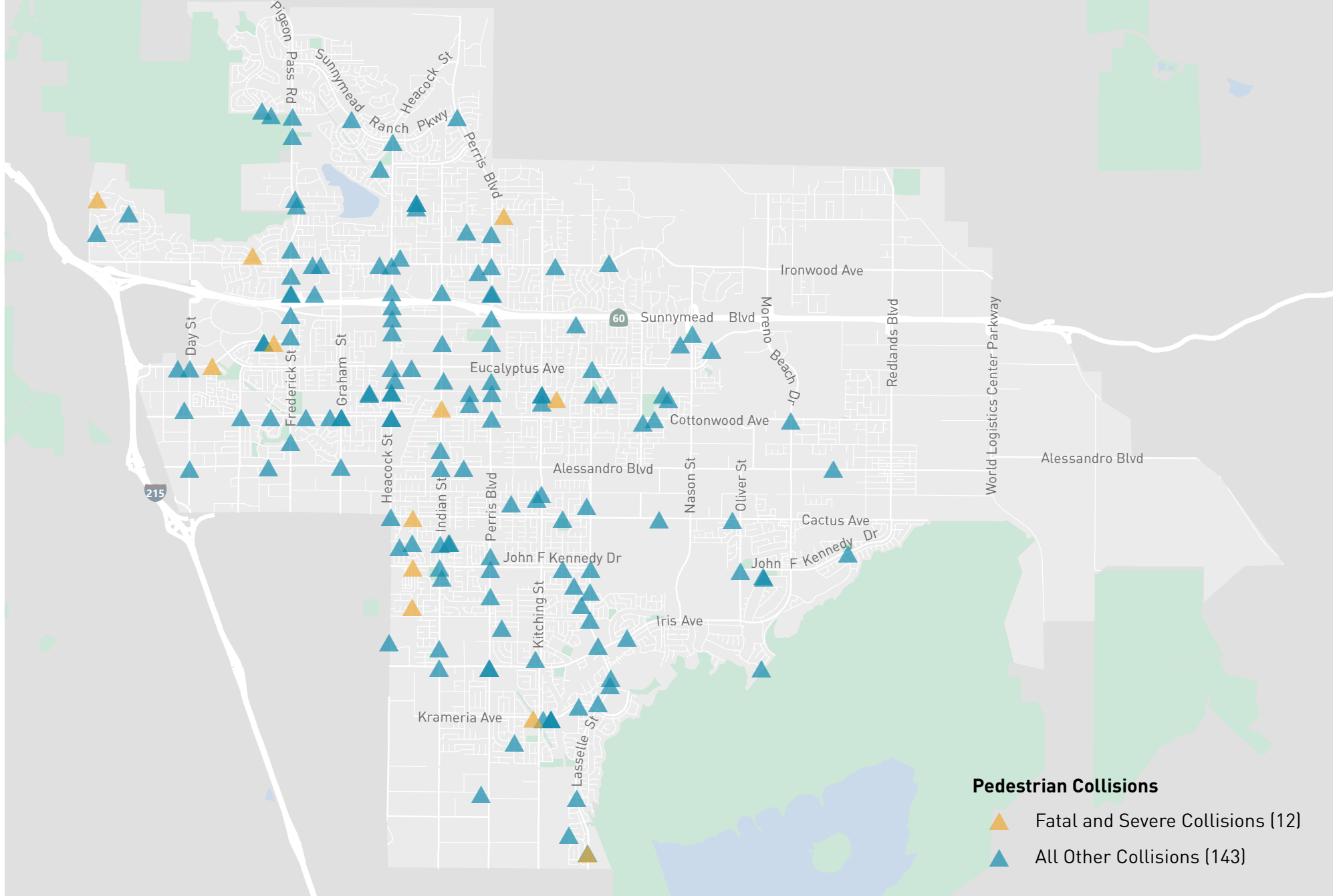
Dual Curb Ramps

📍 Inaccessibility

Dual curb ramps improve ADA accessibility at all intersection approaches so that pedestrians with mobility challenges, or those pushing carts or strollers, can safely enter and exit all crosswalks.

Crash Type 6

Pedestrian Victim Age 19 and Under



Crash Type **6**

Pedestrian Victim

Age 19 and Under

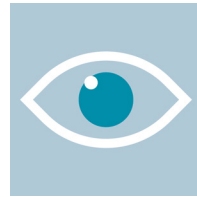
SAFETY COUNTERMEASURE OPTIONS



Raised Pedestrian Crossing

- 📍 Inadequate Pedestrian Visibility;
Driver Failure to Yield

A pedestrian crossing at an intersection or on a segment provides a formalized location for people to cross the street, reducing the risk of people crossing outside crosswalks where drivers are not expecting them. Raising the crossing increases the visibility of the crosswalk and pedestrian to the driver and encourages slower driving.



Remove Sight Obstruction

- 📍 Inadequate Pedestrian Visibility

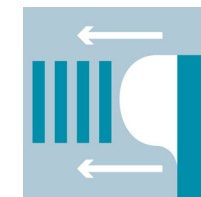
Remove objects that may prevent drivers and pedestrians from having a clear sightline. May include trimming or removing landscaping, prohibiting parking near the intersection, and removing or relocating large signs.



Leading Pedestrian Interval

- 📍 Conflicts at Crossing Locations;
Inadequate Pedestrian Visibility

Traffic signals timed to allow pedestrians a short head start in crossing an intersection to minimize conflicts with turning vehicles and improve pedestrian visibility.



Bulbout/ Curb Extension

- 📍 Excessive Vehicle Turning Speed;
Inadequate Pedestrian Visibility

Widens the sidewalk at intersections or mid-block to shorten the pedestrian crossing distances, improves sight lines, and reduces the speed of turning vehicles. Can be constructed using concrete, landscaping, or paint and plastic materials.

4

Safety Guidance

The Safety Guidance Summarized in this Chapter
Includes a Pedestrian Safety Countermeasure
Toolbox, and Summaries of Bus Stop, Uncontrolled
Marked Crosswalk, and Lighting Guidance, and
Options for Low Cost and Quick Build Materials

4

Countermeasure Toolbox

This toolbox presents 45 pedestrian safety countermeasures applicable in different roadway contexts across Moreno Valley. Many of these countermeasures are recommended for the 10 Priority Location Project Recommendations included in this report. Many of the countermeasures are included in the Caltrans Local Roadway Safety Manual (LRSM) and can be advantageous for use in Caltrans Highway Safety Improvement Program (HSIP) grant funding applications. In the toolbox, these countermeasures include additional information, including a Caltrans-approved Crash Reduction Factor (CRF), the expected life of the project, the federal funding eligibility, the systemic opportunity for countermeasure implementation, and applicable crash type (i.e., all modes, bicycle and pedestrian crashes only, etc.) as outlined in the LRSM. The higher the CRF, the greater the expected reduction in crashes. There are many effective safety countermeasures beyond those listed in the LRSM, and several are included in this toolbox.

A COUNTERMEASURE TOOLBOX
Intersection & Roadway Design



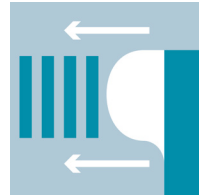
Access Management

📍 Conflicts at Crossing Locations

Using raised medians, striping, and signs to restrict turns into and out of driveways or side streets, can help limit conflicts between vehicles and crossing pedestrians. Using medians to manage access can allow driveways to remain open while mitigating the number of potential conflicts.

S13/NS13
 Create directional median openings to allow (and restrict) left-turns and u-turns

Crash Type	All
CRF	50%
Expected Life (Years)	20
Federal Funding Eligibility	90%
Systemic Approach Opportunity	Medium



Bulbout/ Curb Extension

📍 Excessive Vehicle Turning Speed; Inadequate Pedestrian Visibility

Widens the sidewalk at intersections or mid-block to shorten the pedestrian crossing distances, improves sight lines, and reduces the speed of turning vehicles. Can be constructed using concrete, landscaping, or paint and plastic materials.

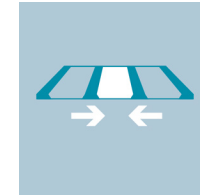
Painted Bulbout/ Curb Extension



Diverter

📍 Conflicts at Crossing Locations

A roadway treatment that restricts through vehicle movements using physical diversion while allowing bicyclists and pedestrians to proceed through an intersection in all directions.

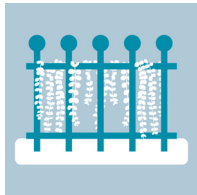


Driveway Consolidation

📍 Conflicts at Crossing Locations

Reducing the number of driveways through consolidation limits the exposure of pedestrians to vehicles entering or exiting driveways, reducing conflicts.

A COUNTERMEASURE TOOLBOX
Intersection & Roadway Design



Median Barrier Fencing

📍 Crossing Outside Crosswalk

Pedestrian median barriers restrict pedestrians from crossing the median at locations where nearby crossings are available and midblock crossings may have poor sight lines or insufficient safety enhancements for the conditions.

S23/R42
 Install pedestrian median fencing on approaches

Crash Type	Ped/Bike
CRF	35%
Expected Life (Years)	20
Federal Funding Eligibility	90%
Systemic Approach Opportunity	Low



Mixed Use Path

📍 Insufficient Separation from Traffic

Provides a completely separate right of way that is designated for the exclusive use of people riding bicycles and walking with minimal cross-flow traffic.

R37
 Install sidewalk/pathway

Crash Type	Ped/Bike
CRF	80%
Expected Life (Years)	20
Federal Funding Eligibility	90%
Systemic Approach Opportunity	Medium



New Sidewalk

📍 Insufficient Separation from Traffic

Providing continuous sidewalks for pedestrians creates a separated facility for people to walk along the roadway, and can help minimize collisions with pedestrians walking in the road.

R37
 Install sidewalk/pathway

Crash Type	Ped/Bike
CRF	80%
Expected Life (Years)	20
Federal Funding Eligibility	90%
Systemic Approach Opportunity	Medium



Pedestrian Refuge Island

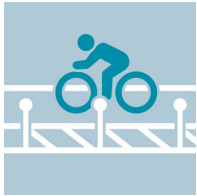
📍 Inadequate Pedestrian Visibility; Conflicts at Crossing Locations

Pedestrian refuge islands provide a protected area for pedestrians at the center of the roadway. They reduce the exposure time for pedestrians crossing the intersection and simplify crossings by allowing pedestrians to focus on one direction of traffic at a time.

NS16
 Install raised medians/refuge islands

Crash Type	Ped/Bike
CRF	45%
Expected Life (Years)	20
Federal Funding Eligibility	90%
Systemic Approach Opportunity	Medium

A COUNTERMEASURE TOOLBOX
Intersection & Roadway Design



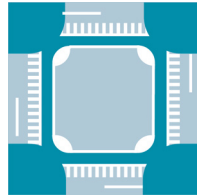
Protected Bike Lane

📌 Excessive Vehicle Speed

Designated bicycle lanes, separated from vehicle traffic by a physical barrier, usually bollards, landscaping, or parked cars. These facilities can increase pedestrian safety, by providing additional space and vertical delineation between vehicles and pedestrians on the sidewalk, in addition to the safety benefit for bicyclists. The vertical barrier can also provide a roadway narrowing effect that may lead to slower vehicle speeds.

R36
 Install bike lanes

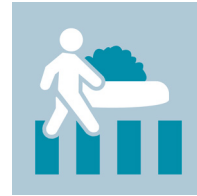
Crash Type	Ped/Bike
CRF	35%
Expected Life (Years)	20
Federal Funding Eligibility	90%
Systemic Approach Opportunity	High



Protected Intersection

📌 Conflicts at Crossing Locations;
 Inadequate Pedestrian Visibility

Provides separate paths for vehicles, bikes and pedestrians each to cross the intersection. One key design element is the corner refuge island. This island forces drivers to turn a full 90 degrees before intersecting a crosswalk when making a right turn and makes the intersection smaller overall, shrinking the distance pedestrians, as well as bikers, have to traverse.



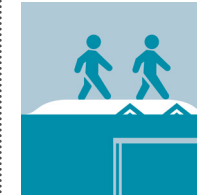
Raised Median

📌 Excessive Vehicle Speed;
 Conflicts at Crossing Locations

Curbed sections in the center of the roadway that are physically separated from vehicular traffic. Raised medians can also help control access to and from side streets and driveways, reducing conflict points.

R9/S12/NS12
 Install raised median

Crash Type	All
CRF	25%
Expected Life (Years)	20
Federal Funding Eligibility	90%
Systemic Approach Opportunity	Medium



Raised Pedestrian Crossing

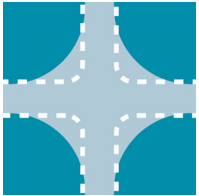
📌 Inadequate Pedestrian Visibility;
 Driver Failure to Yield

A pedestrian crossing at an intersection or on a segment provides a formalized location for people to cross the street, reducing the risk of people crossing outside crosswalks where drivers are not expecting them. Raising the crossing increases the visibility of the crosswalk and pedestrian to the driver and encourages slower driving.

R39
 Install raised pedestrian crossing

Crash Type	Ped/Bike
CRF	35%
Expected Life (Years)	10
Federal Funding Eligibility	90%
Systemic Approach Opportunity	Medium

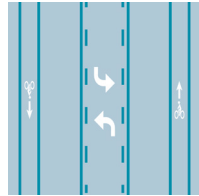
A COUNTERMEASURE TOOLBOX
Intersection & Roadway Design



Reduce Curb Radius

- Excessive Vehicle Turning Speed;
- Conflicts at Crossing Locations;
- Inadequate Pedestrian Visibility

Corner radii directly impact vehicle turning speeds and pedestrian crossing distances. Minimizing the size of a corner radius is critical to creating compact intersections with safe turning speeds. This may enlarge the area where pedestrians wait to cross, can provide additional pedestrian visibility, and shorten pedestrian crossing distances. These changes can be made using paint and plastic materials.



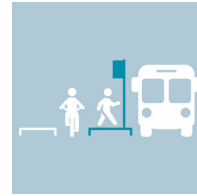
Road Diet

- Excessive Vehicle Speed

Road diets generally reassign space in the roadway from vehicle travel lanes to create room for bicycle facilities, wider sidewalks, or center turn lanes. Road diets optimize street space to benefit all users by improving the safety and comfort of pedestrians and bicyclists, and reducing vehicle speeds and the potential for rear end collisions.

R15
 Road diet (4 to 3 lanes)

Crash Type	All
CRF	30%
Expected Life (Years)	20
Federal Funding Eligibility	90%
Systemic Approach Opportunity	Medium



Transit Island

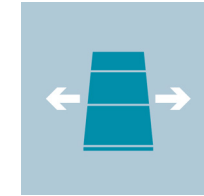
- Excessive Vehicle Speed

Where there is a protected or buffered bike lane and there is a bus stop, an island between the vehicle lane and the bike lane creates a safe place for pedestrians to wait for the bus. Adding the transit island narrows the vehicle lane and has a traffic calming effect on vehicle traffic, encouraging slower speeds which creates less risk for pedestrians.

Transit Island



Source: Adam Coppola Photography



Widen Sidewalk

- Insufficient Separation from Traffic

Wide sidewalks can provide a more comfortable space for pedestrians. They are particularly helpful at locations with high volumes of pedestrians, and for providing space to accommodate people in wheelchairs.

B COUNTERMEASURE TOOLBOX
Signals



Accessible Pedestrian Signal

Inaccessibility

Curb ramps and push buttons must comply with the Americans with Disability Act (ADA) standards for accessibility. Push buttons should be visible and conveniently located for pedestrians waiting at a crosswalk. Accessible pedestrian signals, including audible push buttons, improve access for pedestrians who are blind or have low vision.

S19
Install pedestrian countdown signal heads

Crash Type	Ped/Bike
CRF	25%
Expected Life (Years)	20
Federal Funding Eligibility	100%
Systemic Approach Opportunity	Very High



Extend Pedestrian Crossing Time

Inaccessibility;
Conflicts at Crossing Locations

Increases time for pedestrian walk phases, and can better accommodate vulnerable populations such as children and the elderly.

S3
Improve signal timing

Crash Type	All
CRF	15%
Expected Life (Years)	10
Federal Funding Eligibility	50%
Systemic Approach Opportunity	Very High



Leading Pedestrian Interval

Conflicts at Crossing Locations;
Inadequate Pedestrian Visibility

Traffic signals timed to allow pedestrians a short head start in crossing an intersection to minimize conflicts with turning vehicles and improve pedestrian visibility.

S3
Improve signal timing

Crash Type	All
CRF	15%
Expected Life (Years)	10
Federal Funding Eligibility	50%
Systemic Approach Opportunity	Very High



New Signal

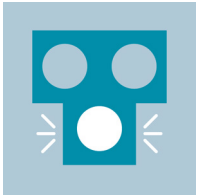
Excessive Vehicle Speed;
Crossing Outside Crosswalk

New traffic signals help organize travel of all modes at an intersection, limiting interactions between vehicles, pedestrians, and bicyclists with conflicting movements. New signals can have a traffic calming effect on long, high-speed straightaways.

NS3
Install signals

Crash Type	All
CRF	25%
Expected Life (Years)	20
Federal Funding Eligibility	100%
Systemic Approach Opportunity	Low

B COUNTERMEASURE TOOLBOX
Signals



Pedestrian Hybrid Beacon

Inadequate Pedestrian Visibility;
 Driver Failure to Yield

Pedestrian-activated beacon used at mid-block crosswalks to notify oncoming motorists to stop with a series of red and yellow lights. Unlike a traffic signal, the PHB rests in dark until a pedestrian activates it via pushbutton or other form of detection.

NS19
 Install pedestrian signal or HAWK

Crash Type	Ped/Bike
CRF	55%
Expected Life (Years)	20
Federal Funding Eligibility	100%
Systemic Approach Opportunity	Low



Pedestrian Recall

Crossing Outside Crosswalk

Signals can be put in “recall” for key time periods of the day, such as peak business hours or school drop-off/pick-up times. The “WALK” signal is displayed every signal cycle without requiring a pedestrian push button.

S3
 Improve signal timing

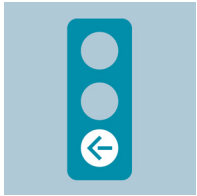
Crash Type	All
CRF	15%
Expected Life (Years)	10
Federal Funding Eligibility	50%
Systemic Approach Opportunity	Very High

Pedestrian Hybrid Beacon



Source: City of Sacramento

B COUNTERMEASURE TOOLBOX
Signals



Protected Left Turn

📍 Conflicts at Crossing Locations

Protected left turns provide an exclusive phase for left-turning vehicles to enter an intersection separate from conflicting vehicle or pedestrian movements.

S6
Provide protected left turn phase

Crash Type	All
CRF	30%
Expected Life (Years)	20
Federal Funding Eligibility	100%
Systemic Approach Opportunity	High



Shorten Cycle Length

📍 Crossing Outside Crosswalk

Reducing the cycle length at intersections may reduce the delay experienced by vehicles, bicyclists, and pedestrians. When delay is significant, road users are more inclined to ignore signal indications.

S3
Improve signal timing

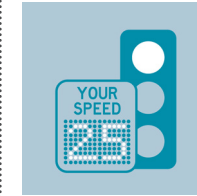
Crash Type	All
CRF	15%
Expected Life (Years)	10
Federal Funding Eligibility	50%
Systemic Approach Opportunity	Very High



Slow Signal Coordination

📍 Excessive Vehicle Speed

A series of traffic signals coordinated to allow for uninterrupted bicycle traffic flow or slower vehicle travel speeds through several intersections along a corridor. Coordinating signals for a slower travel speed gives bicyclists more time to cross safely and encourages drivers to travel at slower speeds.



Speed Sensitive Rest in Red Signal

📍 Excessive Vehicle Speed

At certain hours (eg. late night) a signal remains red for all approaches or certain approaches until a vehicle arrives at the intersection. If the vehicle is going faster than the desired speed, the signal will not turn green until after vehicle stops. If the vehicle is going the desired speed the signal will change to green before the vehicle arrives. This signal timing provides operational benefit to drivers traveling at the desired speed limit. Can be paired with variable speed warning signs.

R30
Install dynamic/variable speed warning signs

Crash Type	All
CRF	30%
Expected Life (Years)	10
Federal Funding Eligibility	100%
Systemic Approach Opportunity	High

C COUNTERMEASURE TOOLBOX
Signing and Striping



Advanced Stop Bar

Driver Failure to Yield

A stop bar placed ahead of the crosswalk at stop signs and signals reduces instances of vehicles encroaching on the crosswalk. Creating a wider stop bar or setting the stop bar further back may be appropriate for locations with known crosswalk encroachment issues.

S21
 Install advance stop bar

Crash Type	Ped/Bike
CRF	15%
Expected Life (Years)	10
Federal Funding Eligibility	100%
Systemic Approach Opportunity	Very High



High Visibility Crosswalk

Driver Failure to Yield;
 Inadequate Pedestrian Visibility

A crosswalk designed to be more visible to approaching drivers, striped with ladder markings using high-visibility material such as thermoplastic tape instead of paint.

High Visibility Crosswalk



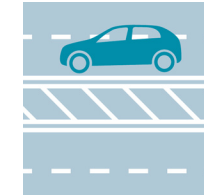
Source: Fehr & Peers



Left Turn Restriction

Conflicts at Crossing Locations

Prohibits left turns at locations where a turning vehicle may conflict with pedestrians in the crosswalk or where opposing traffic volume is high. Reduces pedestrian interaction with vehicles when crossing.



Median (painted)

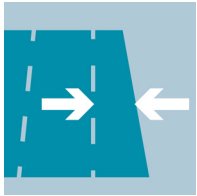
Excessive Vehicle Speed;
 Conflicts at Crossing Locations

Painted sections in the center of the roadway that are separated from vehicular traffic. Striping this area can allow for lane narrowing or lane reduction and can help to organize the street.

R10
 Install median (flush)

Crash Type	All
CRF	15%
Expected Life (Years)	20
Federal Funding Eligibility	90%
Systemic Approach Opportunity	Medium

C COUNTERMEASURE TOOLBOX
Signing and Striping



Narrow Lanes

Excessive Vehicle Speed

A reduction in lane width produces a traffic calming effect by encouraging motorists to travel at slower speeds, lowering the risk of collision with bicyclists, pedestrians, and other motorists.



New Pedestrian Crossing

Crossing Outside Crosswalk

A pedestrian crossing at an intersection or on a segment provides a formalized location for people to cross the street, reducing the risk of people crossing outside crosswalks where drivers are not expecting them. Crosswalk striping, signs, and other enhanced safety features alert drivers that there may be a pedestrian crossing.

S20/NS17
 Install pedestrian crossing

Crash Type	Ped/Bike
CRF	25%
Expected Life (Years)	20/10
Federal Funding Eligibility	100%
Systemic Approach Opportunity	High



Rectangular Rapid Flash Beacon

Inadequate Pedestrian Visibility;
 Driver Failure to Yield

Pedestrian-activated flashing lights and additional signage enhance the visibility of marked crosswalks and alert motorists to pedestrian crossings.

NS18/R38
 Install pedestrian crossing with enhanced safety features

Crash Type	Ped/Bike
CRF	35%/30%
Expected Life (Years)	20/10
Federal Funding Eligibility	100%/90%
Systemic Approach Opportunity	Medium



Right Turn on Red Restriction

Conflicts at Crossing Locations

Restricts right turns during the pedestrian crossing phase at locations where a turning vehicle may conflict with pedestrians in the crosswalk. This restriction may be displayed with a blank-out sign. This may be implemented in conjunction with a Leading Pedestrian Interval.

C COUNTERMEASURE TOOLBOX
Signing and Striping



“Stop Here on Red” Sign

📍 Driver Failure to Yield

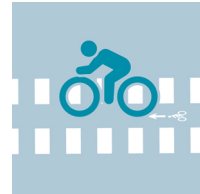
Add “Stop Here on Red” (R 10-6) signs to intersection approaches to increase compliance with advance stop bars. Encouraging advanced stops reduces crosswalk encroachment and improves pedestrian visibility.



Straighten Crosswalk

📍 Inadequate Pedestrian Visibility

Straightening crosswalks improves sight lines, making pedestrians more visible to oncoming motorists, and may shorten the crossing distance, reducing the length of time required for pedestrians to cross an intersection.



Trail Crossing

📍 Driver Failure to Yield;
 Inadequate Pedestrian Visibility;
 Crossing Outside Crosswalk

Where an off street multi-use trail intersects a roadway, include enhanced crossings, signage, and pedestrian and bike push buttons that facilitate safe crossing to access the trail.



Upgrade Striping

📍 Excessive Vehicle Speed

Restripe lanes with reflective striping to improve striping visibility and clarify lane assignment, especially where the number of lanes changes.

Trail Crossing



Source: Adam Coppola Photography

NS6

Upgrade intersection pavement markings

Crash Type	All
CRF	25%
Expected Life (Years)	10
Federal Funding Eligibility	100%
Systemic Approach Opportunity	Very High

D COUNTERMEASURE TOOLBOX
Other Enhancements



Bus Stop Near Intersection

📍 Crossing Outside Crosswalk

Placing bus stops and pedestrian crossings, such as those at intersections, in close proximity allows transit riders to cross the street safely.



Dual Curb Ramps

📍 Inaccessibility

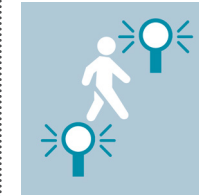
Dual curb ramps improve ADA accessibility at all intersection approaches so that pedestrians with mobility challenges, or those pushing carts or strollers, can safely enter and exit all crosswalks.



LED Lighting

📍 Dark Conditions;
Inadequate Pedestrian Visibility

Upgrading existing street lights to LED lighting can increase the visibility of pedestrians in crosswalks, providing for a whiter light, greater color contrast and larger areas of light distribution, when compared to existing high-pressure sodium lighting of the same or higher wattage.



Pedestrian Oriented Lighting

📍 Dark Conditions;
Inadequate Pedestrian Visibility

Appropriate quality and placement of lighting along the roadway and at intersections can enhance an environment as well as increase comfort and safety, making pedestrians more visible to drivers. Pedestrian-scale lighting, which can be used in addition to roadway and intersection lighting, is lower in height than standard street lighting and is spaced closer together.

Dual Curb Ramps



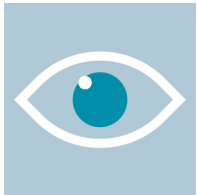
Source: Fehr & Peers

R1 /S1/NS1

Add segment or intersection lighting

Crash Type	Night
CRF	35%/40%
Expected Life (Years)	20
Federal Funding Eligibility	100%
Systemic Approach Opportunity	Medium

D COUNTERMEASURE TOOLBOX
Other Enhancements



Remove Sight Obstruction

Inadequate Pedestrian Visibility

Remove objects that may prevent drivers and pedestrians from having a clear sightline. May include trimming or removing landscaping, prohibiting parking near the intersection, and removing or relocating large signs.

NS10
Improve sight distance to intersection

Crash Type	All
CRF	20%
Expected Life (Years)	10
Federal Funding Eligibility	90%
Systemic Approach Opportunity	High



Sidewalk Landscape Buffer

Insufficient Separation from Traffic

Separating vehicles from pedestrians using landscaping provides more space between the modes and can produce a traffic calming effect by encouraging motorists to drive at slower speeds, lowering the risk of collision.

Sidewalk Landscape Buffer



Upgrade Curb Ramp

Inaccessibility

Curb ramps must follow the Americans with Disabilities Act (ADA) design guidelines. Tactile warning devices must be detectable to visually impaired pedestrians.

Crosswalk Safety Countermeasures

A safety review of Moreno Valley's marked uncontrolled crosswalks on arterial roadways was performed. As part of this plan, these crosswalk locations were collected and mapped, fieldwork was performed (including at night), and locations were evaluated for potential safety grant opportunities based on the latest Federal Highway Administration's guidelines for uncontrolled crosswalks. The following table, which summarizes recommendations from the FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, includes a comprehensive matrix and list of FHWA-approved pedestrian crash countermeasures suggested for application at uncontrolled crossing locations per roadway and traffic features.

CROSSWALK SAFETY COUNTERMEASURES

Application of Pedestrian Crash Countermeasures by Roadway Feature

In this table, nine countermeasures are assigned to specific matrix cells based on safety research, best practices, and established national guidelines (see key on facing page). Each uncontrolled crosswalk identified as part of this Moreno Valley inventory is assigned to the appropriate location in the matrix, based on number of lanes, posted speed, and annual average daily traffic. A description of each crosswalk location follows the table.

Roadway Configuration	POSTED SPEED LIMIT AND AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000-15,000			Vehicle AADT >15,000		
	≤30 mph	35mph	≥40mph	≤30 mph	35mph	≥40mph	≤30 mph	35mph	≥40mph
2 lanes 1 lane in each direction	1 2	1	1	1	1	1	1	1	1
	4 5 6	5 6	5 6	4 5 6	5 6	5 6	4 5 6	5 6	5 6
		7 9	7 9		7 9	7 9	7 9	7 9	9
3 lanes WITH RAISED MEDIAN 1 lane in each direction	1 2 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
	4 5	5	5	4 5	5	5	4 5	5	5
		7 9	7 9	7 9	7 9	7 9	7 9	7 9	9
3 lanes WITHOUT RAISED MEDIAN 1 lane in each direction with a two-way left-turn lane	1 2 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
	4 5 6	5 6	5 6	4 5 6	4 5 6	5 6	4 5 6	5 6	5 6
	7 9	7 9	7 9	7 9	7 9	7 9	7 9	7 9	9
4+ lanes WITH RAISED MEDIAN 2 or more lanes in each direction	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
	5	5	5	5	5	5	5	5	5
	7 8 9	7 8 9	8 9	7 8 9	7 8 9	8 9	7 8 9	8 9	8 9
4+ lanes WITHOUT RAISED MEDIAN 2 or more lanes in each direction	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3	1 3
	5 6	5 6	5 6	5 6	5 6	5 6	5 6	5 6	5 6
	7 8 9	7 8 9	8 9	7 8 9	7 8 9	8 9	7 8 9	8 9	8 9

Source: FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations

Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location

The absence of a number (#) signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location

Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures

CROSSWALK SAFETY COUNTERMEASURES

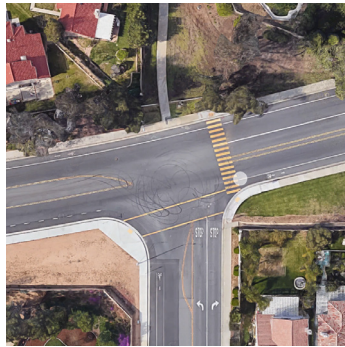
Uncontrolled Marked Crosswalk Locations with Enhancement Opportunities

KEY

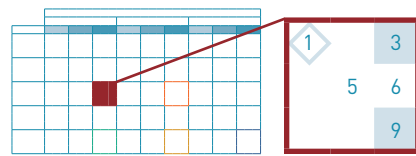
- 1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
- 2 Raised crosswalk
- 3 Advance "Yield Here To (Stop Here For) Pedestrians" sign and yield (stop) line
- 4 In-street pedestrian crossing sign
- 5 Curb extension
- 6 Pedestrian refuge island
- 7 Rectangular rapid-flashing beacon (RRFB)*
- 8 Road diet
- 9 Pedestrian hybrid beacon (PHB)*

*It should be noted that the PHB and RRFB are not both installed at the same crossing location

Manzanita Ave East-West & Indian St North-South



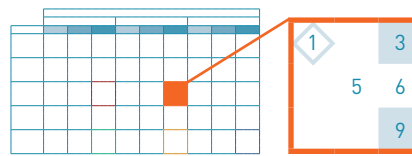
AADT <9,000
SPEED LIMIT ≥40mph
LANES 3 lanes w/o median



John F Kennedy Dr & Pepper Ct



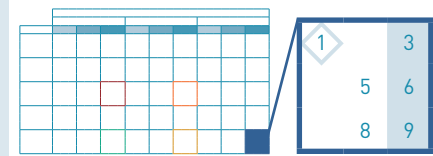
AADT 9,000-15,000
SPEED LIMIT ≥40mph
LANES 3 lanes w/o median



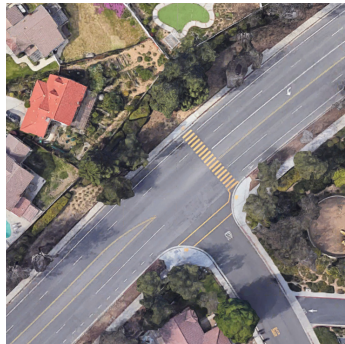
Cactus Ave & Philo St



AADT >15,000
SPEED LIMIT ≥40mph
LANES 4+ lanes w/o median



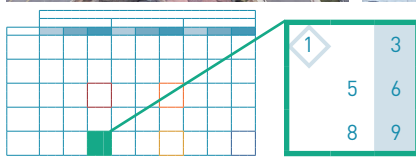
Sunnymead Ranch Pkwy & Old Country Rd



Cottonwood Ave & Jade Way



AADT <9,000
SPEED LIMIT ≥40mph
LANES 4+ lanes w/o median



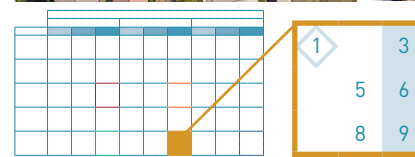
Eucalyptus Ave & Sunnymeads Dr



Eucalyptus Ave & Running Deer Rd



AADT 9,000-15,000
SPEED LIMIT ≥40mph
LANES 4+ lanes w/o median



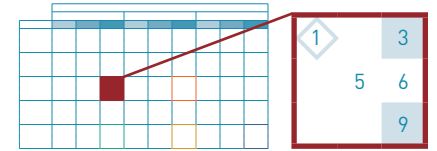
CROSSWALK SAFETY COUNTERMEASURES

Manzanita Avenue East-West & Indian Street North-South



EXISTING CONDITIONS

Located in a residential area, the school crosswalk at Manzanita Avenue & Indian Street is painted yellow with high-visibility markings. Notably, the crosswalk connects pedestrians directly to a paved path that services Sugar Hill Elementary School and other homes. In addition to painted and posted crossing warning signs, two School Crosswalk Warning signs with arrows (SW24-2 CA) frame both sides of the street at the crossing. A two-lane street with approximately 4,000 ADT, Manzanita Avenue has posted speed limits at 40 mph and no raised median. Parking is prohibited and street lighting is provided at the crosswalk. Currently, the crosswalk is approximately 300 feet from a Riverside Transit stop for Route 18, and a Class II bike lane along Manzanita Avenue runs through the crosswalk.



COUNTERMEASURES FOR CONSIDERATION

Based on these existing conditions, FHWA guidelines suggest that the following countermeasures are appropriate enhancements to consider on Manzanita Avenue at this crosswalk:

Should be considered:

- Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- Pedestrian hybrid beacon (PHB)

Additional candidate countermeasures:

- Curb extension
- Pedestrian refuge island

Additional candidate countermeasures, to be implemented with at least one of the options listed above:

- High-visibility crosswalk markings
- Parking restrictions on crosswalk approach
- Adequate nighttime lighting levels
- Crossing warning signs

ALTERNATIVE APPROACH

The City has a funding opportunity to install a Rectangular Rapid Flashing Beacon (RRFB), rather than a PHB at this location. If the City decides to implement an RRFB, a raised median is recommended as a complimentary countermeasure in accordance with FHWA guidance for uncontrolled crosswalks. If a raised median is determined to be infeasible, speed reduction strategies would be needed along Manzanita to support reducing the speed limit to 35 mph.

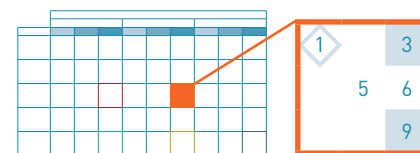
CROSSWALK SAFETY COUNTERMEASURES

John F Kennedy Drive & Pepper Court



EXISTING CONDITIONS

The school crosswalk at John F Kennedy Drive & Pepper Court provides connectivity to Serrano Elementary School and the surrounding residential neighborhood. The crosswalk is painted yellow with high-visibility markings. Crossing guards are present during school start and end times. Two School Crosswalk Warning signs with arrows (SW24-2 CA) frame both sides of the street at the crossing. In addition to painted and posted crossing warning signs, Advance Yield Here To Pedestrians signs (R1-5) and yield lines require approaching vehicles in the travel lane and median to accommodate crossing pedestrians. A three-lane street with approximately 10,800 ADT, John F Kennedy Drive has posted speed limits at 45 mph and no raised median. Speeds lower to 25 mph (SR4-1 (CA) School Speed Limit Assembly C (CA)) when children are present. Parking is prohibited and street lighting is provided at the crosswalk. Currently, the crosswalk is next to a Riverside Transit stop for Route 11, and a Class II bike lane along John F Kennedy Drive runs through the crosswalk.



COUNTERMEASURES FOR CONSIDERATION

Based on these existing conditions, FHWA guidelines suggest that the following countermeasures are appropriate enhancements to consider on John F Kennedy at this crosswalk:

Should be considered:

- Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- Pedestrian hybrid beacon (PHB)

Additional candidate countermeasures:

- Curb extension
- Pedestrian refuge island

Additional candidate countermeasures, to be implemented with at least one of the options listed above:

- High-visibility crosswalk markings
- Parking restrictions on crosswalk approach
- Adequate nighttime lighting levels
- Crossing warning signs

ALTERNATIVE APPROACH

The City has a funding opportunity to install a Rectangular Rapid Flashing Beacon (RRFB), rather than a PHB at this location. If the City decides to implement an RRFB, a raised median and other speed reduction strategies are recommended as complimentary countermeasures in accordance with FHWA guidance for uncontrolled crosswalks. If a raised median is determined to be infeasible, speed reduction strategies would be needed along John F Kennedy Drive to support reducing the speed limit to 35 mph.

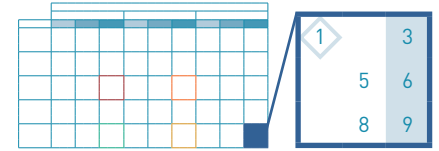
CROSSWALK SAFETY COUNTERMEASURES

Cactus Avenue & Philo Street



EXISTING CONDITIONS

The school crosswalk at Cactus Avenue & Philo Street provides connectivity to Chaparral Hills Elementary School and the surrounding residential neighborhood. The crosswalk is painted yellow with high-visibility markings. Crossing guards are present during school start and end times. A School Crosswalk Warning sign with arrows (SW24-2 CA) is posted at the crossing. In addition to painted and posted crossing warning signs, Advance Yield Here To Pedestrians signs (R1-5) and yield lines require approaching drivers in travel lanes to accommodate crossing pedestrians. A five-lane street with approximately 16,200 ADT, Cactus Avenue has posted speed limits at 40 mph and no raised median. Parking is prohibited and street lighting is provided at the crosswalk. Currently, the crosswalk is several blocks from a Riverside Transit stop for Routes 18 and 19.



COUNTERMEASURES FOR CONSIDERATION

Based on these existing conditions, FHWA guidelines suggest that the following countermeasures are appropriate enhancements to consider on Cactus Avenue at this crosswalk:

Should be considered:

- Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- Pedestrian refuge island
- Pedestrian hybrid beacon (PHB)

Additional candidate countermeasures:

- Curb extension
- Road diet

Additional candidate countermeasures, to be implemented with at least one of the options listed above:

- High-visibility crosswalk markings
- Parking restrictions on crosswalk approach
- Adequate nighttime lighting levels
- Crossing warning signs

ALTERNATIVE APPROACH

The City has a funding opportunity to install a Rectangular Rapid Flashing Beacon (RRFB), rather than a PHB at this location. If the City decides to implement an RRFB, converting the roadway from 4 lanes to 3 lanes with a raised median is recommended in accordance with FHWA guidance, along with speed reduction measures that will allow the speed limit on Cactus Avenue to be reduced to 35 mph.

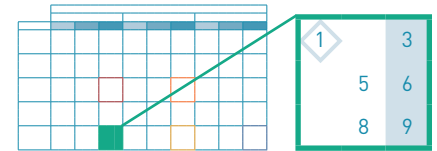
CROSSWALK SAFETY COUNTERMEASURES

Sunnymead Ranch Parkway & Old Country Road



EXISTING CONDITIONS

The school crosswalk at Sunnymead Ranch Parkway & Old Country Road provides connectivity to Sugar Hill Elementary School and the surrounding residential neighborhood. The crosswalk is painted yellow with high-visibility markings. Crossing guards are present during school start and end times. School Crosswalk Warning signs (SW24-1 (CA)) warn approaching vehicles to accommodate pedestrians at the crossing. A four-lane street with approximately 4,900 ADT, Sunnymead Ranch Parkway has posted speed limits at 40 mph and no raised median. Speeds lower to 25 mph according to signage (SR4-1 (CA) School Speed Limit Assembly C (CA)) when children are present. Parking is prohibited and street lighting is provided at the crosswalk. Currently, the crosswalk is about 300 feet from a Riverside Transit stop for Route 18, and a Class II bike lane runs along Sunnymead Ranch Parkway.



COUNTERMEASURES FOR CONSIDERATION

Based on these existing conditions, FHWA guidelines suggest that the following countermeasures are appropriate enhancements to consider on Sunnymead Ranch Parkway at this crosswalk:

Should be considered:

- Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- Pedestrian refuge island
- Pedestrian hybrid beacon (PHB)

Additional candidate countermeasures:

- Curb extension
- Road diet

Additional candidate countermeasures, to be implemented with at least one of the options listed above:

- High-visibility crosswalk markings
- Parking restrictions on crosswalk approach
- Adequate nighttime lighting levels
- Crossing warning signs

ALTERNATIVE APPROACH

The City has a funding opportunity to install a Rectangular Rapid Flashing Beacon (RRFB), rather than a PHB at this location. If the City decides to implement an RRFB, converting the roadway from 4 lanes to 3 lanes with a raised median is recommended in accordance with FHWA guidance. If reducing the number of travel lanes and installing a raised median is not feasible, then implementing speed reduction measures that allow the speed limit on Sunnymead Ranch Parkway to be set at 35 mph would also be in accordance with FHWA guidance.

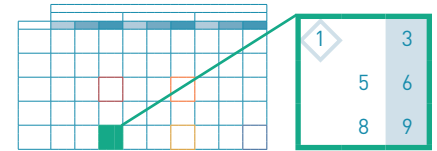
CROSSWALK SAFETY COUNTERMEASURES

Cottonwood Avenue & Jade Way



EXISTING CONDITIONS

The school crosswalk at Cottonwood Avenue & Jade Way provides connectivity to Moreno Elementary School, a Riverside County Fire Department station, nearby Morrison Park and the surrounding residential neighborhood. The crosswalk is painted yellow with high-visibility markings. Crossing guards are present during school start and end times. A School Crosswalk Warning sign with arrows (SW24-2 CA) is posted at the crossing. In addition to painted and posted crossing warning signs, Advance Yield Here To Pedestrians signs (R1-5) and yield lines require approaching drivers to accommodate crossing pedestrians. A four-lane street with approximately 7,100 ADT, Cottonwood Avenue has posted speed limits at 40 mph and no raised median. Speeds lower to 25 mph according to signage (SR4-1 (CA) School Speed Limit Assembly C (CA)) when children are present. Parking is prohibited and street lighting is provided at the crosswalk.



COUNTERMEASURES FOR CONSIDERATION

Based on these existing conditions, FHWA guidelines suggest that the following countermeasures are appropriate enhancements to consider on Cottonwood Avenue at this crosswalk:

Should be considered:

- Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- Pedestrian refuge island
- Pedestrian hybrid beacon (PHB)

Additional candidate countermeasures:

- Curb extension
- Road diet

Additional candidate countermeasures, to be implemented with at least one of the options listed above:

- High-visibility crosswalk markings
- Parking restrictions on crosswalk approach
- Adequate nighttime lighting levels
- Crossing warning signs

ALTERNATIVE APPROACH

The City has a funding opportunity to install a Rectangular Rapid Flashing Beacon (RRFB), rather than a PHB at this location. If the City decides to implement an RRFB, converting the roadway from 4 lanes to 3 lanes with a raised median is recommended in accordance with FHWA guidance. If reducing the number of travel lanes and installing a raised median is not feasible, then implementing speed reduction measures that allow the speed limit on Cottonwood Avenue to be set at 35 mph would also be in accordance with FHWA guidance.

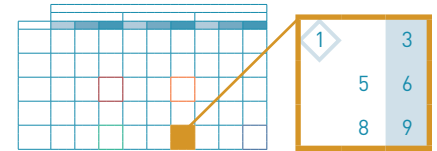
CROSSWALK SAFETY COUNTERMEASURES

Eucalyptus Avenue & Sunnymeadows Drive



EXISTING CONDITIONS

The school crosswalk at Eucalyptus Avenue & Sunnymeadows Drive provides connectivity to Sunnymeadows Elementary School and the surrounding residential neighborhood. The crosswalk is painted yellow with high-visibility markings. Crossing guards are present during school start and end times. Two school crosswalk warning signs with arrows (SW24-2 CA) frame both sides of the street at the crossing. In addition to painted and posted crossing warning signs, Advance Yield Here To Pedestrians signs (R1-5) and yield lines require approaching vehicles to accommodate crossing pedestrians. A four-lane street with approximately 11,000 ADT, Eucalyptus Avenue has posted speed limits at 40 mph and no raised median. Speeds lower to 25 mph according to signage (SR4-1 (CA) School Speed Limit Assembly C (CA)) when children are present. Parking is prohibited and street lighting is provided at the crosswalk. Currently, the crosswalk is several blocks from a Riverside Transit stop for Routes 11 and 18.



COUNTERMEASURES FOR CONSIDERATION

Based on these existing conditions, FHWA guidelines suggest that the following countermeasures are appropriate enhancements to consider on Eucalyptus Avenue at this crosswalk:

Should be considered:

- Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- Pedestrian refuge island
- Pedestrian hybrid beacon (PHB)

Additional candidate countermeasures:

- Curb extension
- Road diet

Additional candidate countermeasures, to be implemented with at least one of the options listed above:

- High-visibility crosswalk markings
- Parking restrictions on crosswalk approach
- Adequate nighttime lighting levels
- Crossing warning signs

ALTERNATIVE APPROACH

The City has a funding opportunity to install a Rectangular Rapid Flashing Beacon (RRFB), rather than a PHB at this location. If the City decides to implement an RRFB, converting the roadway from 4 lanes to 3 lanes with a raised median is recommended in accordance with FHWA guidance. If reducing the number of travel lanes and installing a raised median is not feasible, then implementing speed reduction measures that allow the speed limit on Eucalyptus Avenue to be set at 35 mph would also be in accordance with FHWA guidance.

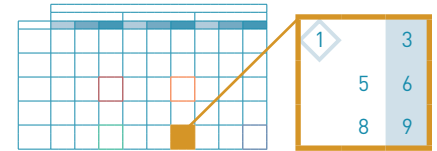
CROSSWALK SAFETY COUNTERMEASURES

Eucalyptus Avenue & Running Deer Road



EXISTING CONDITIONS

The school crosswalk at Eucalyptus Avenue & Running Deer Road provides connectivity to Rainbow Springs Preschool, Sunnymead Middle School, and the surrounding residential neighborhood. Land uses in the area vary, featuring single-family homes, multiple-family residences, medical services, and a church. The crosswalk is painted yellow with high-visibility markings. Crossing guards are present during school start and end times. A School Crosswalk Warning sign with arrows (SW24-2 CA) is posted at the crossing. In addition to painted and posted crossing warning signs, Advance Yield Here To Pedestrians signs (R1-5) and yield lines require approaching drivers to accommodate crossing pedestrians. A four-lane street with approximately 11,000 ADT, Eucalyptus Avenue has posted speed limits at 40 mph and no raised median. Speeds lower to 25 mph according to signage (SR4-1 (CA) School Speed Limit Assembly C (CA)) when children are present. Parking is prohibited and street lighting is provided at the crosswalk. Currently, the crosswalk is several blocks from a Riverside Transit stop for Route 11.



COUNTERMEASURES FOR CONSIDERATION

Based on these existing conditions, FHWA guidelines suggest that the following countermeasures are appropriate enhancements to consider on Eucalyptus Avenue at this crosswalk:

Should be considered:

- Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
- Pedestrian refuge island
- Pedestrian hybrid beacon (PHB)

Additional candidate countermeasures:

- Curb extension
- Road diet

Additional candidate countermeasures, to be implemented with at least one of the options listed above:

- High-visibility crosswalk markings
- Parking restrictions on crosswalk approach
- Adequate nighttime lighting levels
- Crossing warning signs

ALTERNATIVE APPROACH

The City has a funding opportunity to install a Rectangular Rapid Flashing Beacon (RRFB), rather than a PHB at this location. If the City decides to implement an RRFB, converting the roadway from 4 lanes to 3 lanes with a raised median is recommended in accordance with FHWA guidance. If reducing the number of travel lanes and installing a raised median is not feasible, then implementing speed reduction measures that allow the speed limit on Eucalyptus Avenue to be set at 35 mph would also be in accordance with FHWA guidance.

Lighting Safety Guidelines

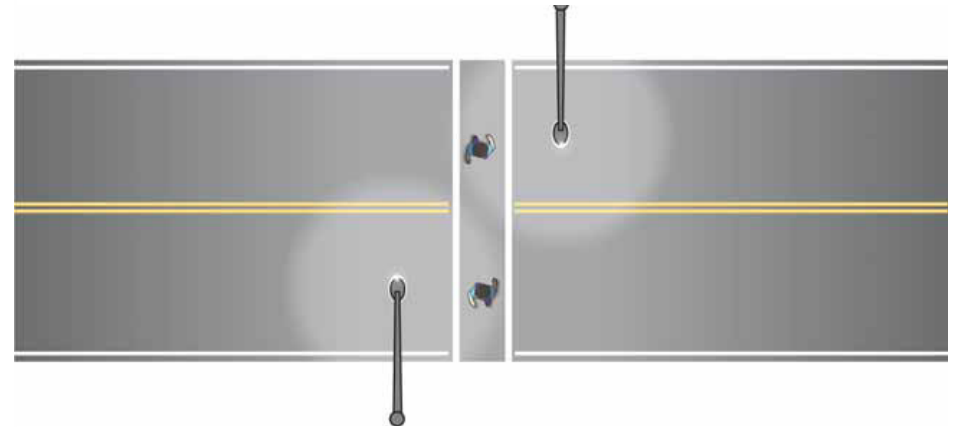
For all locations with uncontrolled marked crosswalks on arterial roadways, and for signalized intersection Priority Locations with more than half of collisions occurring outside of daylight hours, a nighttime safety assessment was performed. This allowed us to evaluate the existing crosswalk illumination levels in relation to required standards and recommended industry guidelines, and recommend measures to improve illumination at these locations.

Caltrans' Traffic Manual, Chapter 9, states a minimum level of maintained horizontal illuminance of 0.15 foot-candles (fc) within the area bounded by the crosswalks. This standard also applies to crosswalks at uncontrolled locations. As Caltrans standards are primarily focused on road surface visibility, we also considered guidance provided by the Illuminating Engineering Society (IES) for mid-block crosswalks, which may be more appropriate for pedestrian safety considerations. IES recommends a minimum vertical illuminance level of 1.85 fc measured at 5 feet from the road surface.

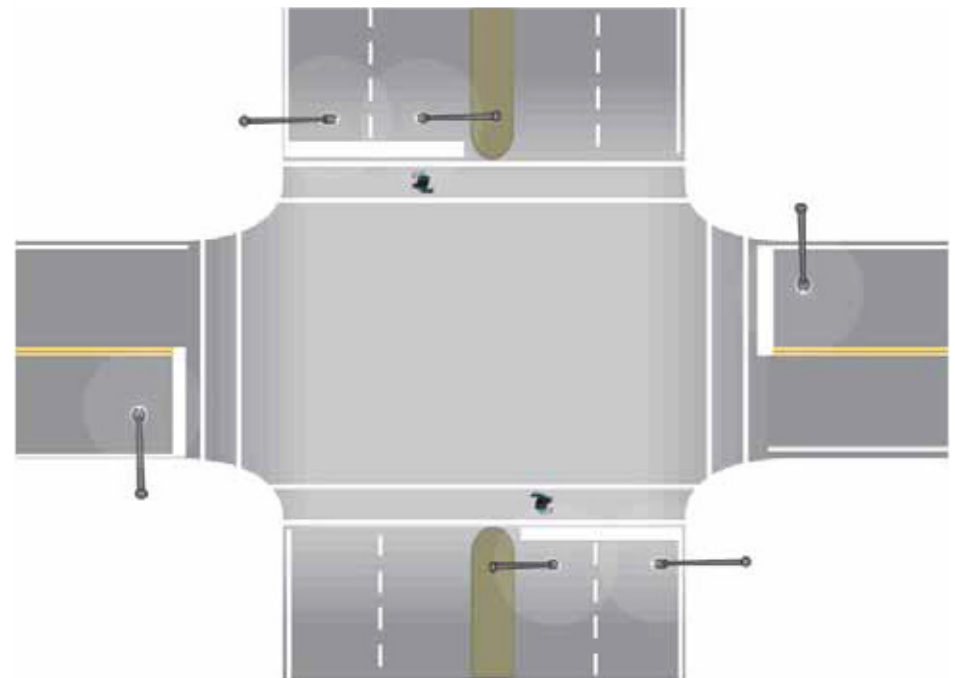
The City has upgraded nearly all roadway lighting to LED lamps and is working on upgrading lighting at signalized intersections to LED lamps. This change will significantly improve motorists' ability to detect crossing pedestrians at night. LED luminaires are able to provide greater color contrast and larger areas of light distribution through the individual optics on each individual LED at lower wattages as compared to HPS lamps.

In addition, we recommend that the City consider supplemental street lighting at uncontrolled crossings with a history of nighttime collisions to ensure that both ends of each crosswalk are adequately lit. Supplemental overhead lighting should be offset ahead of the crosswalk location by about 15 feet on each side of the roadway in order to maintain a positive contrast relative to approaching vehicles. This recommendation is supported by the "Informational Report on Lighting Design for Midblock Crosswalks" (FHWA, 2008) and the "Design and Evaluation of Effective Crosswalk Illumination" (NJDOT, 2009).

Midblock Crossing Lighting



Intersection Crossing Lighting



Source: FHWA Informational Report on Lighting Design for Midblock Crosswalks (top image: figure 12, bottom image: figure 15)

Bus Stop Safety Guidelines

An important component of pedestrian safety is ensuring safe access to transit. Eighty percent of Riverside Transit Agency (RTA) passengers access their bus stops on foot (RTA First & Last Mile Mobility Plan) and in Moreno Valley, more than half of pedestrian collisions occur within 500 feet of a bus stop. The list below highlights locations with bus stops with opportunities for pedestrian access improvements. The table on the right also includes the daily boardings and alightings for each location.

BUS STOP SAFETY GUIDELINES

Bus Stop Locations with Safety Improvement Opportunities

Location	Number of Bus Stops	Total Daily Boardings	Total Alightings	Total Pedestrian Collisions	KSI Pedestrian Collisions
1 ALESSANDRO & INDIAN	3	66	66	8	1
2 FREDRICK & SUNNYMEAD	1	50	6	7	1
3 HEACOCK & SUNNYMEAD	5	99	100	7	0
4 PERRIS & FILAREE	2	32	37	6	2
5 PERRIS & ALESSANDRO SOUTH OF INTERSECTION	1	104	86	6	1
6 PERRIS & DRACAEA	2	35	40	6	2
7 PERRIS & HEMLOCK	2	16	18	6	1
8 PERRIS & ALESSANDRO NORTH AND EAST OF INTERSECTION	3	137	142	6	1
9 PERRIS & ALESSANDRO EAST OF INTERSECTION	2	80	60	5	2
10 PERRIS & JFK	3	84	67	5	0
11 FREDERICK & EUCALYPTUS	2	8	7	4	0
12 IRONWOOD BETWEEN KRISTEN AND HEACOCK	2	6	7	4	1
13 PERRIS & IRIS	2	64	68	4	0
14 CENTER POINT CENTER PLAZA	1	4	59	3	0
15 PIGEON PASS & SONNET/WESTERN RIDGE	2	3	2	3	0
16 GRAHAM & ALESSANDRO	2	28	24	3	0
17 HEACOCK & EUCALYPTUS	2	6	9	3	0
18 IRONWOOD BETWEEN TABOR AND HEACOCK	2	2	2	3	1
19 PERRIS & BRODIAEA	2	9	17	3	1
20 PERRIS & EUCALYPTUS	2	29	27	3	1
21 KRAMERIA & CAMINO JUANITO	1	3	5	3	0
22 LASSELLE & VIA DE ANZA	2	46	36	3	1
23 LASSELLE & CALLE AQUA/COLLEGE DR	2	175	150	3	0

BUS STOP SAFETY GUIDELINES

The following sections summarize pedestrian safety guidelines from key resources focused on safe pedestrian access to transit.

Bus Stop Location

The Federal Highway Administration (FHWA) *Pedestrian Safety Guide and Countermeasure Selection System* recommends locating bus stops at highly visible locations. This guide and the FHWA *Pedestrian Safety Guide for Transit Agencies* recommend sidewalk connections to bus stops from the adjacent intersection, sidewalk, or land use that are direct and convenient. It recommends, that if there is a limited sidewalk network around the bus stop, install a connection between adjacent intersection and bus stop. These guidelines also comment on the frequency of bus stops, recommending that the intervals between bus stops should be convenient to passengers to minimize pedestrians crossing of the street at unmarked mid-block locations.

The FHWA *Pedestrian Safety Guide for Transit Agencies* recommends considering the following elements when locating a bus stop, some of which are elaborated in the subsequent sections:

- Visibility between approaching

bus driver and passengers waiting at the bus stop

- Pedestrian patterns around the bus stop
- Ease of transfer to other bus routes
- Location of traffic signals and crossing opportunities for pedestrians
- Location of sidewalks or other pathways to the bus stop
- Location of driveways

Proximity to Pedestrian Crossings

The National Association of City Transportation Officials (NACTO) provides guidance on safe street design in several of its publications, including the *Urban Street Design Guide* and the *Transit Street Design Guide*. Both NACTO guides, the FHWA *Pedestrian Safety Guide and Countermeasure Selection System*, and the American Public Transportation Association (APTA) report: *Design of On-street Transit Stops and Access for Surrounding Areas* highlight the importance of locating bus stops proximate to pedestrian crossings to create safe environments. When accessing a bus stop, particularly if in a rush to catch the bus, people walking may not always divert their path to use a crosswalk if there is a more expedient path that may not have a crosswalk.

Locating bus stops near convenient crosswalks or vice versa improves safety by allowing the most direct route to a bus stop to be a safe route. The APTA report notes that eliminating a crossing at one side of an intersection or locating a bus stop too far from an intersection can increase the time it takes for a pedestrian to access a bus stop and encourage unsafe jaywalking. The NACTO *Transit Street Design Guide* states that, “prioritizing walking access to transit stops, including direct routes and convenient, low-delay pedestrian crossings, is vital to achieving a safe system.”

Midblock Bus Stops

The FHWA *Pedestrian Safety Guide and Countermeasure Selection System* recommends that where possible, bus stops should be at intersections. However, the NACTO *Transit Street Design Guide* and the FHWA *Pedestrian Safety Guide and Countermeasure Selection System* assert that where there are mid-block bus stops, there should also be “signalized or traffic-calmed pedestrian crossings,” where these facilities cannot be provided, mid-block bus stops should only be used as a last resort. The FHWA *Pedestrian Safety Guide and Countermeasure Selection System* recommends considering a signal at midblock bus stops and if a signal is not warranted, installing a marked mid-block crosswalk with

BUS STOP SAFETY GUIDELINES

other safety enhancements, such as crossing islands, curb extensions, and active warning signals. This guide recommends placing these crosswalks behind the bus stop so pedestrians cross in a location where there is better visibility between pedestrians and approaching drivers.

Far-Side Bus Stops

The NACTO *Urban Street Design Guide*, the FHWA *Pedestrian Safety Guide and Countermeasure Selection System*, and the Transit Cooperative Research Program (TCRP) *Guide for Mitigating Fixed-Routes Bus-and-Pedestrian Collisions* assert that far-side bus stops, where a bus stops after it crosses an intersection rather than before, are safer because the pedestrian crosses behind the bus. Far-side bus stops also improve the visibility between pedestrians and drivers on that side of an intersection with multiple lanes because pedestrians are not hidden in front of a large bus. The FHWA guidelines also note that far-side stops reduce delay for buses and minimize conflicts between buses and right turning motor vehicles.

Enhanced Pedestrian Crossings

The APTA publication highlights the importance of providing “safe and protected pedestrian crossings” at convenient locations for pedestrians.

TCRP produced a report specifically on collisions between buses and people walking: *The Guide for Mitigating Fixed-Routes Bus-and-Pedestrian Collisions*. A subset of the recommendations in this guide and recommendations from the FHWA *Pedestrian Safety Guide and Countermeasure Selection System* and the FHWA *Pedestrian Safety Guide for Transit Agencies* are related to crosswalk design, including recommendations for:

- High visibility crosswalks
- Pedestrian scramble crossings
- Median Islands
- Pedestrian channelization
- Bulbouts
- Reduced curb radii
- Leading pedestrian intervals (LPI)
- Pedestrian countdown signals
- Pedestrian warning signs
- Protected left turn signals
- Narrowed and reduced number of motor vehicle travel lanes

Sidewalk Design

The FHWA *Pedestrian Safety Guide for Transit Agencies* includes recommendations for safe and accessible sidewalk design. The guide recommends the following sidewalk features to enhance pedestrian safety

- Sidewalks of at least five-foot width
- Sidewalks free of obstructions
- A buffer between the sidewalk and the roadway
- Minimal grade changes at driveways
- Small corner radii at driveways
- Consistent lighting

Bus Stop Enhancements

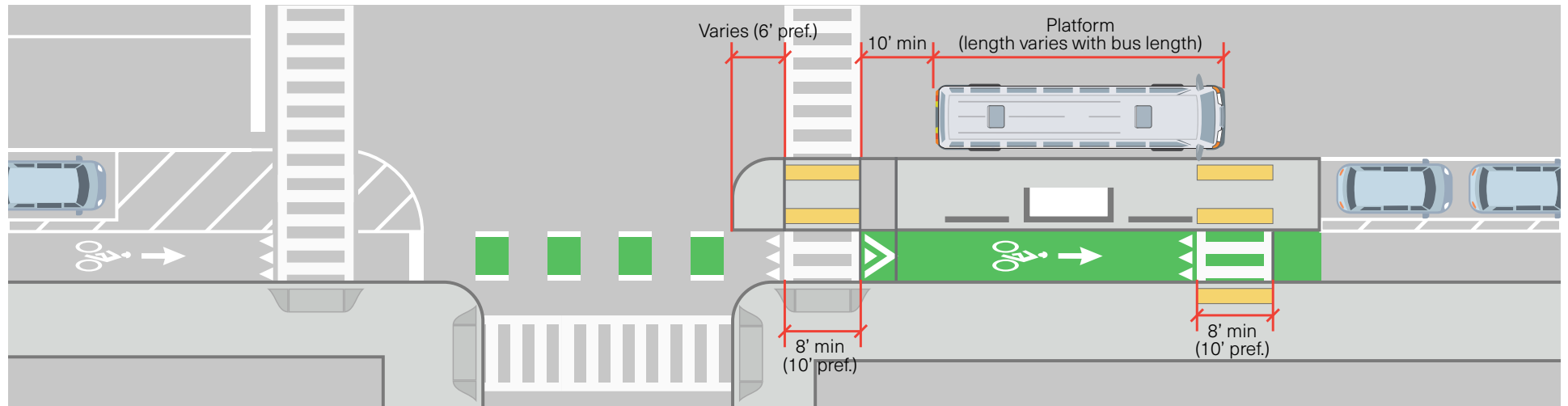
The Guide for Mitigating Fixed-Routes Bus-and-Pedestrian Collisions also recommends treatments to increase safety at bus stops, some of which have the added benefit of also increasing personal security. Many of these recommendations are intended to organize where and how people wait for the bus. Bus stop enhancements include:

- Bus stop lighting
- Bollards
- Barriers
- Striping
- Standee lines
- Bus curb lights

The Guide also recommends monitoring safety at bus stops and modifying or removing stops if there are unsafe situations.

BUS STOP SAFETY GUIDELINES

Bus Stop Island Design



Bus Stop and Bike Lane Interactions

Where bus stops and bike lanes occur at the same location, there is a potential safety risk for cyclists and pedestrians. The literature recommends floating bus boarding islands as the preferred design in these situations. Bus stop islands, depicted in the figure above, keep the bike lane at the curb and create an island between the bike travel lane and the vehicle travel lane for people to board the bus. To make these interactions safe for pedestrians, the design should include pedestrian crossing facilities across the bike lane that include pavement markings and signage indicating that bikes should yield to pedestrians.

Low Cost and Quick Build Materials

Low cost and quick build materials can provide an effective option for the City to implement safety improvements cost-effectively and quickly. Many of the countermeasures highlighted in the toolbox can be built out of materials, such as paint and plastic, allowing for systemic implementation of projects at many different locations throughout the City. Materials can include paint, soft-hit posts, large ceramic raised pavement markers, Botts' dots, mountable rubber speed bumps or curbs, and planters. A sample of these countermeasures are depicted on the following pages.

LOW COST AND QUICK BUILD MATERIALS

Access Management

Adaptive medians are used to restrict driveway and side street turns, reducing the conflict between vehicles and vulnerable road users. They can be built quickly with temporary and low-cost materials, such as plastic bollards and medians.



Source: FHWA Traffic Calming e Primer



Source: QwickKurb

Bulbout/Curb Extension

Using paint and plastic bollards, the curb can be extended and pushed to 90-degrees with a decorative design that creates a safer environment for all road users. The extended curb shortens the crossing for pedestrians while increasing visibility for all road users.



Source: City of Seattle Right of Way Improvements Manual



Source: LA Streetsblog



Source: NACTO Urban Street Design Guide

LOW COST AND QUICK BUILD MATERIALS

Diverter

Temporary road elements, such as plastic bollards or planters and paint, that restrict vehicle access while still providing pedestrian and bicycle entry. Directional signage should be considered to help road users navigate the new installation.



Source: Google maps & Brock Howell's Twitter @BrockRides - 1/7/2019



Source: BikePortland.org Blog Post

Pedestrian Refuge Island

A pedestrian island can be created with high visibility paint and plastic bollards, providing a refuge for pedestrians to safely cross a road in two phases if needed.



Source: City of Seattle Right of Way Improvements Manual

Protected Bike Lane

Utilizing planters or plastic bollards and paint, a protected bike lane can be created. The separation of space benefits people on bicycles, as well as pedestrians on the sidewalk.



Source: City of Seattle Right of Way Improvements Manual



Source: The Urbanist.org



Source: QwickKurb

LOW COST AND QUICK BUILD MATERIALS

Protected Intersection

Designates separate space for vehicles, people on bicycles, and pedestrians at intersections. The corner refuge island is the essential element for a successful protected intersection. Drivers must reduce speed and come to a 90-degree angle with bicycles and pedestrians, increasing visibility and safety.



Source: ProtectedIntersection.com



Source: NACTO Don't Give Up At The Intersection

Reduce Curb Radius

Increasing the corner curb provides greater space for pedestrians. Turning vehicles must slow down and come to a 90-degree angle with the crosswalk. ●



Source: Pedbikeimages.org



Source: NACTO Urban Street Design Guide



Source: Bikeportland.org



Source: NACTO Don't Give Up At The Intersection

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5

Project Recommendations

10 Priority Location Project Recommendations
are Summarized in this Chapter,
Showcasing Key Safety Grant Funding Opportunities

5

Based on the list of locations identified in the Hot Spot and Crash Typing analysis processes, the City chose 10 Priority Locations to focus on for project recommendations.

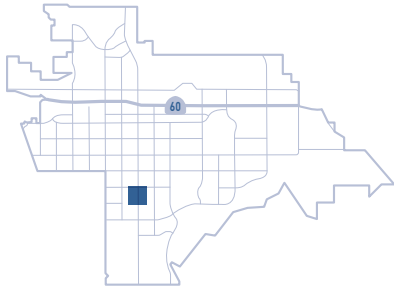
Prioritized Location List

These 10 Priority Locations were chosen to be representative both of locations with the largest grant funding opportunities, based on safety analysis, as well as locations representative of common roadway and land use contexts throughout the City. Projects have been developed so as to balance location-specific recommendations with project elements that can be applied systemically across numerous locations with similar collision history or contextual factors.

The following pages summarize the existing conditions, and project recommendations for each location. While recommendations are targeted for specific issues seen in historic pedestrian collision data, project recommendations are based on a holistic approach to safety and may include recommendations relevant to bicycle and vehicle safety as well.

Project cost estimates, the expected project benefit, and the resulting benefit/cost ratio, developed using the HSIP Cycle 9 HSIP Analyzer, are also shown. Per unit construction costs are based on the most recent available estimates for Southern California, and include contingency (20%) and other soft cost assumptions. While the project summary sheets depict the full set of pedestrian collisions analyzed for this report (2009-2017), the benefit/cost ratio for each project was calculated using collisions of all modes for the most recent 5-year data available (2013-2017), in keeping with HSIP Cycle 9 requirements. The full set of HSIP Analyzer tools, including inputs and results, have been made available to allow for future City use. The City can use these project summaries in future grant funding applications.

- 1 Perris Boulevard & Filaree Avenue**
- 2 Sunnymead Boulevard at Frederick St**
- 3 Hemlock Avenue**
between the SR-60 WB Off-Ramp and Calle Sombra
- 4 Centerpoint Drive**
between Town Circle and Frederick Street
- 5 Heacock Street & Sunnymead Boulevard**
- 6 Perris Boulevard & Alessandro Boulevard**
- 7 Iris Avenue**
between Lasselle Street & Camino Flores
- 8 Perris Boulevard & Filaree Avenue**
- 9 Eucalyptus Avenue and Towngate Boulevard**
from Day Street to Frederick Street
- 10 Perris Boulevard**
from Sunnymead Park to Dracaea Avenue



High speeds and fast turns were observed at this intersection which is proximate to a park, a restaurant and market, a high ridership bus line, and dense neighborhoods - all of which are likely to generate high pedestrian activity. Long distances between crossings along Perris Blvd highlights the importance of making this location a comfortable and easy place to cross.

Existing Conditions

- Fast moving vehicles
- Right and left turning vehicles moving at high speeds
- Wide roadways and long pedestrian crossing distances across Perris
- Several pedestrian activity generators

Collision Summary (2009-2017)

Pedestrian Collisions	Crash Types																						
6	<table border="1"> <thead> <tr> <th style="background-color: #004a87; color: white;">KSI Pedestrian Collisions</th> <th style="background-color: #004a87; color: white;">Crash Types</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; font-size: 2em; font-weight: bold;">2</td> <td> <table border="1"> <tbody> <tr> <td>1</td> <td>Pedestrian at Fault at Signal</td> <td>✓</td> </tr> <tr> <td>2</td> <td>Pedestrian Crossing Outside of Crosswalk Near Bus Stop</td> <td>✓</td> </tr> <tr> <td>3</td> <td>Unsignalized Intersections at Night</td> <td></td> </tr> <tr> <td>4</td> <td>Driver Proceeding Straight on 45+ MPH Streets</td> <td>✓</td> </tr> <tr> <td>5</td> <td>Pedestrian Victim Age 65+</td> <td>✓</td> </tr> <tr> <td>6</td> <td>Pedestrian Victim Age 19 and Under</td> <td>✓</td> </tr> </tbody> </table> </td> </tr> </tbody> </table>	KSI Pedestrian Collisions	Crash Types	2	<table border="1"> <tbody> <tr> <td>1</td> <td>Pedestrian at Fault at Signal</td> <td>✓</td> </tr> <tr> <td>2</td> <td>Pedestrian Crossing Outside of Crosswalk Near Bus Stop</td> <td>✓</td> </tr> <tr> <td>3</td> <td>Unsignalized Intersections at Night</td> <td></td> </tr> <tr> <td>4</td> <td>Driver Proceeding Straight on 45+ MPH Streets</td> <td>✓</td> </tr> <tr> <td>5</td> <td>Pedestrian Victim Age 65+</td> <td>✓</td> </tr> <tr> <td>6</td> <td>Pedestrian Victim Age 19 and Under</td> <td>✓</td> </tr> </tbody> </table>	1	Pedestrian at Fault at Signal	✓	2	Pedestrian Crossing Outside of Crosswalk Near Bus Stop	✓	3	Unsignalized Intersections at Night		4	Driver Proceeding Straight on 45+ MPH Streets	✓	5	Pedestrian Victim Age 65+	✓	6	Pedestrian Victim Age 19 and Under	✓
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6	Pedestrian Victim Age 19 and Under	✓																					

Project Recommendations

The recommended projects at this location seek to improve pedestrian safety through several different strategies:

- **Pedestrian Recall** on all legs during hours of bus operation reduces the risk of pedestrians crossing against the signal to catch a bus.
- Using **Slow Signal Coordination** along Perris Boulevard to time green lights for vehicles traveling at safer speeds, including dynamic message signs that say, "Ideal speed" or "Signal set to X MPH" can help to address speeding issues. At night, implement **Speed Sensitive Rest in Red Signals** that cause vehicles moving at speeds above the speed limit to hit a red light.
- **High Visibility Crosswalks, Advanced Stop Bars, Bulbouts/ Curb Extensions** on Filaree Avenue, and **Leading Pedestrian Intervals** increase driver awareness of pedestrians crossing or waiting to cross the intersection. These elements, in addition to **Dual Curb Ramps**, can make this location a more accessible and convenient place for pedestrians to cross.
- On the south side of the intersection, converting the center two-way left turn lane to a **Raised Median, Reducing Curb Radii** and shortening the northbound left-turn pocket could slow drivers on Perris, as well as those turning onto Filaree.

Costs

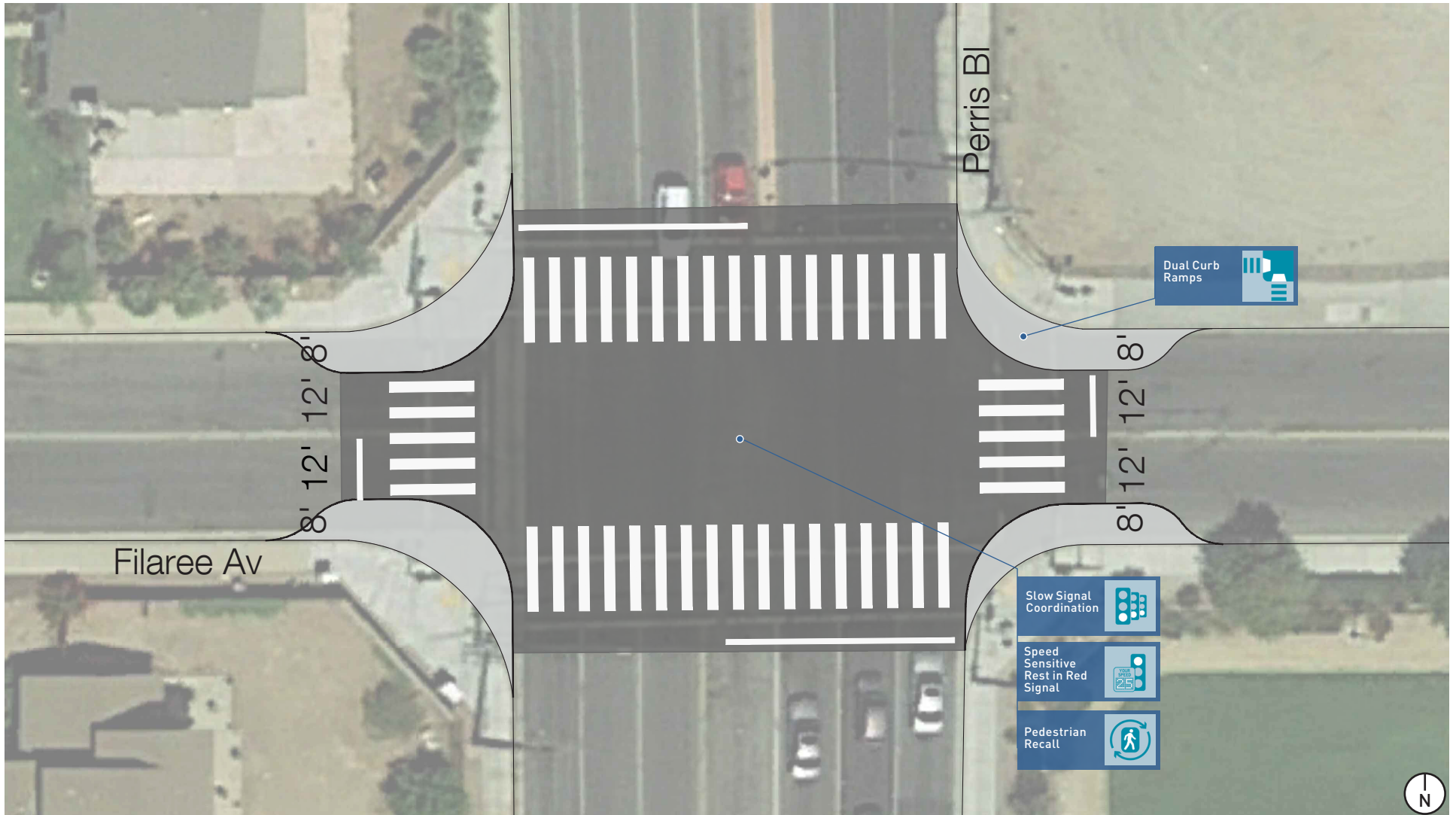
Speed sensitive signal with speed feedback sign	\$22,500
Raised median on south leg	\$22,800
Bulbouts with ramps and push buttons	\$117,005
High visibility crosswalks	\$7,350
All other safety construction items	\$31,831
Contingency and non-construction costs	\$179,554
TOTAL	\$381,040

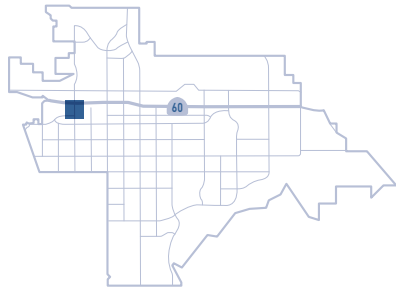
Benefits

\$4,664,632

B/C Ratio

12.2





This key commercial location at the SR-60 off ramps, on a corridor with existing bike lanes, creates an opportunity for a multimodal gateway to the City.

Existing Conditions

- Fast moving vehicles and right-turning vehicles moving at high speeds
- Limited pedestrian crossing options leading to crossings outside of crosswalk, with clear pedestrian desire lines between commercial uses
- Long signal cycles and missing crosswalks create long wait times for pedestrians
- Many vehicles changing lanes, positioning for access to the freeway, the shopping mall, and mixing with bike lanes
- Nearly half a mile between pedestrian crossings to the east on Sunnymead Blvd

Collision Summary (2009-2017)

Pedestrian Collisions	Crash Types
7	1 Pedestrian at Fault at Signal ✓
	2 Pedestrian Crossing Outside of Crosswalk Near Bus Stop ✓
	3 Unsignalized Intersections at Night
	4 Driver Proceeding Straight on 45+ MPH Streets ✓
	5 Pedestrian Victim Age 65+
	6 Pedestrian Victim Age 19 and Under ✓

KSI Pedestrian Collisions
1

Project Recommendations

The recommended projects at this location seek to improve pedestrian safety through several different strategies:

- **New Pedestrian Crossings** with **High Visibility Crosswalks** and **Advance Stop Bars** provide safer crossings, especially to the north side of the freeway. **Straightening the Crosswalk** on the south leg provides a more direct path of travel for pedestrians.
- A **New Sidewalk** on the northwest corner improves connections under the freeway.
- Retiming the signal with a **Leading Pedestrian Interval** and **Shortening the Cycle Length** prioritizes pedestrians and decreases crossing wait times. A **Right Turn on Red Restriction** using blank-out signs during the LPI helps to mitigate right-turn conflicts. On the southwest corner, a **“Stop Here on Red” Sign, Bulbout/ Curb Extension,** and **Removing Sight Obstructions** will help mitigate these right-turn issues resulting from fast speeds off the freeway.
- Narrowing the roadway just south of the intersection and upgrading the buffered bike lane to a **Protected Bike Lane** can provide visual cues for drivers to slow down. This also provides space to **Widen the Sidewalk** and increase the separation between pedestrians and vehicles.
- A new **Pedestrian Hybrid Beacon** on Sunnymead near the Travel Inn, upgraded with a **Pedestrian Refuge Island,** provides a new safe crossing location. Extending the **Raised Median** east can help organize turning movements.
- Future parcel redevelopment offers the opportunity for **Driveway Consolidation,** decreasing conflict points between pedestrians and drivers.

Costs

Pedestrian hybrid beacon and crossing	\$211,705
New pedestrian crossing on north side of Frederick & Sunnymead	\$28,920
New sidewalk on west side of Frederick	\$185,175
Raised median on Sunnymead, east of Travel Inn	\$471,600
All other safety construction items	\$183,402
Contingency and non-construction costs	\$962,053
TOTAL	\$2,042,855

Benefits

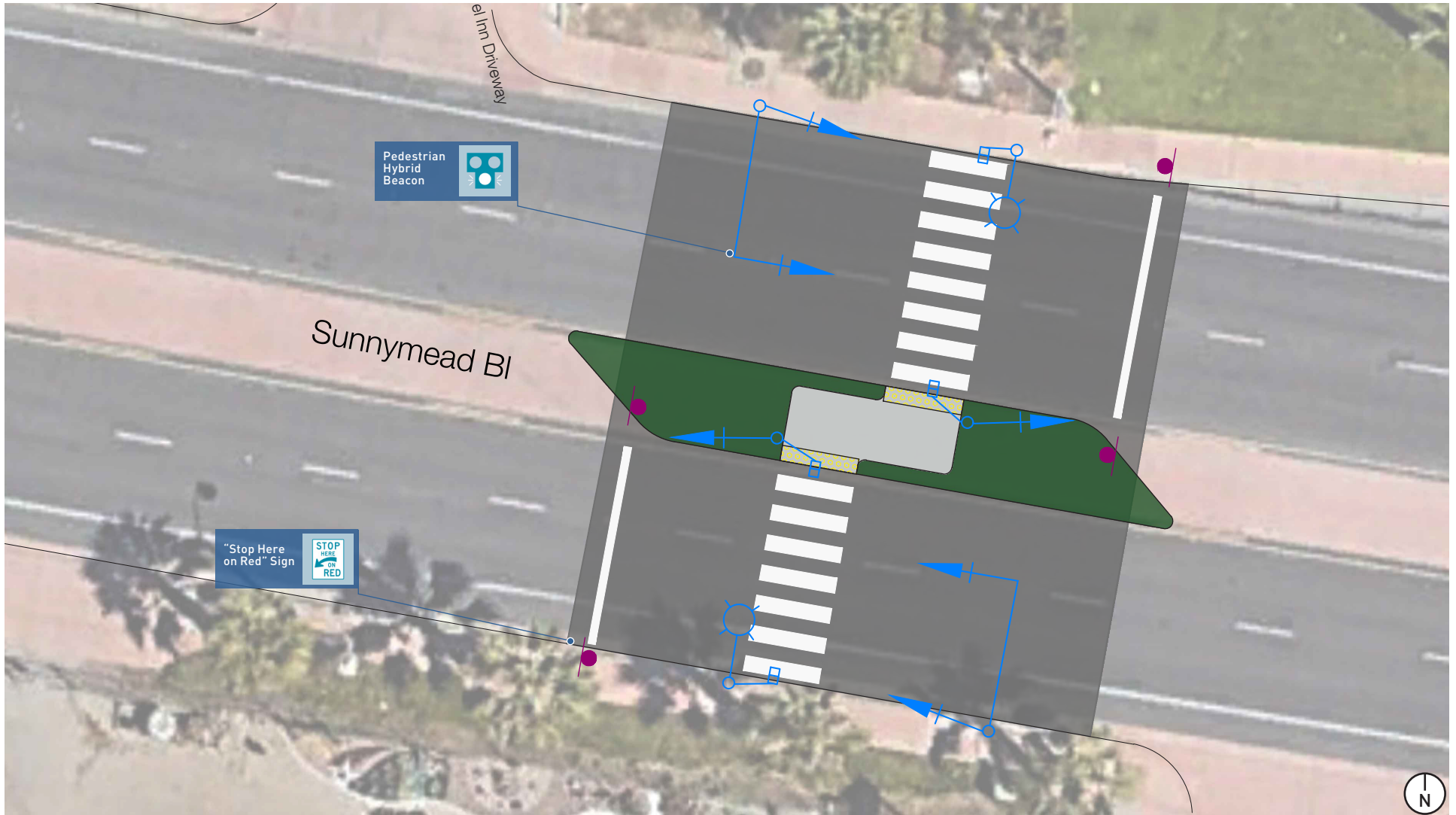
\$10,559,380

B/C Ratio

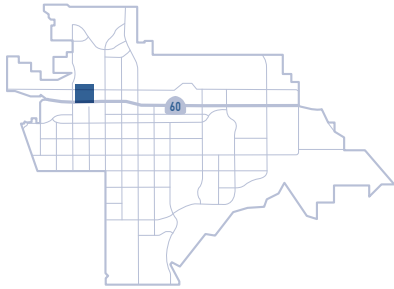
5.2

Note: The cost estimate shown below does not include costs for driveway consolidation as this is assumed to occur in conjunction with parcel redevelopment.





3 Hemlock Avenue between the SR-60 WB Off-Ramp and Calle Sombra



Proximity to a freeway off-ramp creates fast moving vehicles on this segment of Hemlock Avenue. A wide roadway and extra lanes on this segment provide an opportunity to remove and narrow lanes to improve the pedestrian experience.

Existing Conditions

- Transition area between commercial uses and multi-family residential
- Poor pavement conditions, with an opportunity to combine safety projects with repaving
- Limited opportunities to cross Hemlock Avenue, with clear pedestrian desire lines, including school bus stop
- Right turning vehicles moving at high speeds
- Lane adds and drops without clear striping

Collision Summary (2009-2017)

Pedestrian Collisions	Crash Types
3	1 Pedestrian at Fault at Signal
	2 Pedestrian Crossing Outside of Crosswalk Near Bus Stop
	3 Unsignalized Intersections at Night
	4 Driver Proceeding Straight on 45+ MPH Streets
	5 Pedestrian Victim Age 65+
1	6 Pedestrian Victim Age 19 and Under <input checked="" type="checkbox"/>

Project Recommendations

The recommended projects along this **segment of Hemlock** seek to improve pedestrian safety through several different strategies:

- Along this segment of Hemlock Avenue, **Narrow Lanes** and, on parts of the segment with on-street parking, tree-well **Curb Extensions**, which provide a visual cue to drivers to reduce vehicle speed and add a buffer between the sidewalk and the roadway.
- As part of the short **Road Diets** on this corridor, **Upgraded Striping** and, east of the SR-60 off-ramp, extending the **Median (painted)** west until road narrows clarifies lane delineation, adds, and drops.

Recommendations for the intersections at the SR-60 Ramp and Calle Sombra can be seen on the following pages.

Costs

Rectangular rapid flashing beacon (RRFB) and new pedestrian crossing	\$95,910
High visibility crosswalks and new lane striping	\$7,510
Planter bulbouts on Hemlock	\$38,640
All other safety construction items	\$29,753
Contingency and non-construction costs	\$152,998
TOTAL	\$324,811

Benefits

\$2,897,002

B/C Ratio

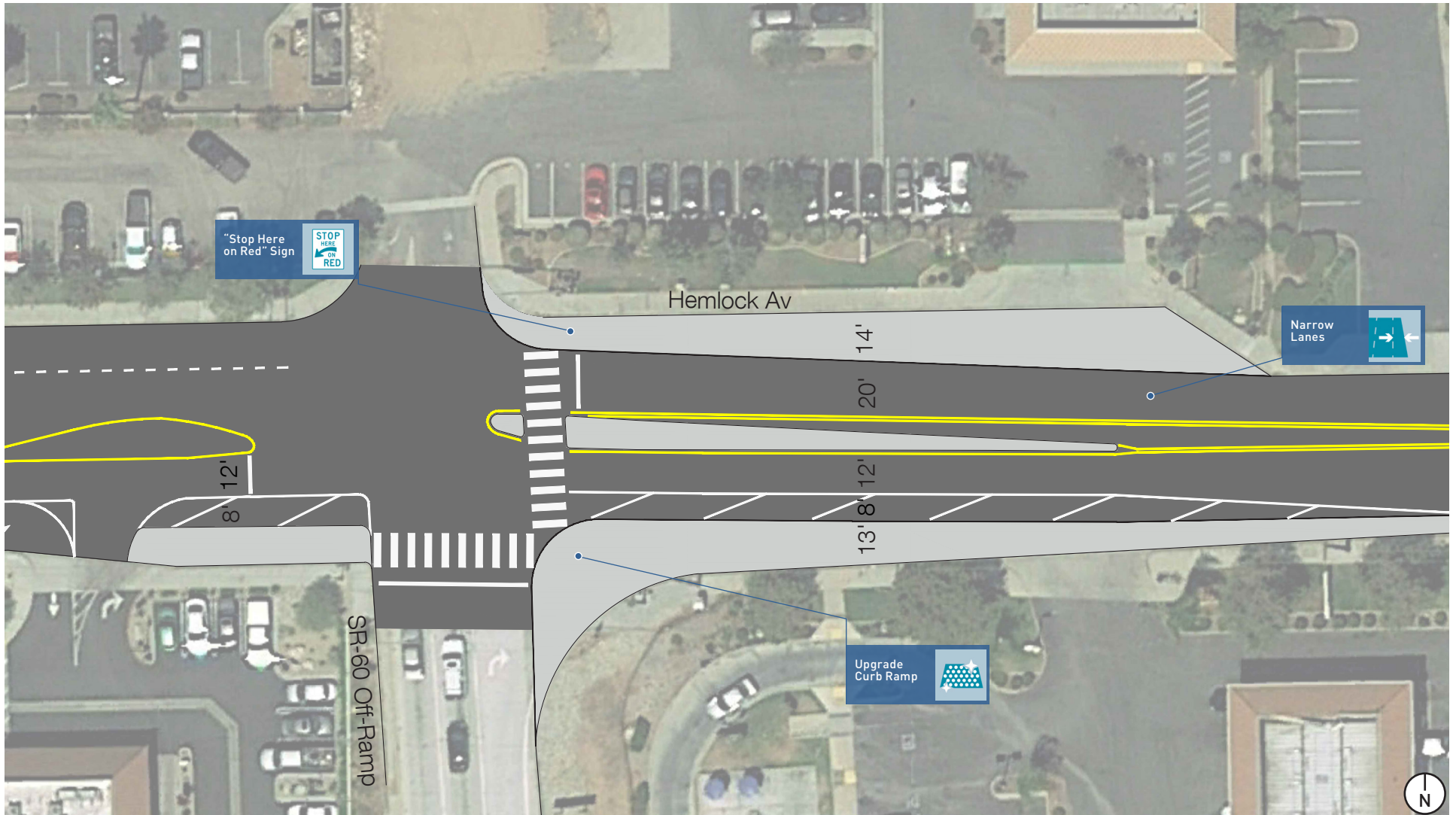
8.9

Note: The cost estimate shown below does not include costs for sidewalk widening as this is assumed to occur in conjunction with parcel redevelopment.

3

Hemlock Avenue between the SR-60 WB Off-Ramp and Calle Sombra

PROJECT RECOMMENDATIONS



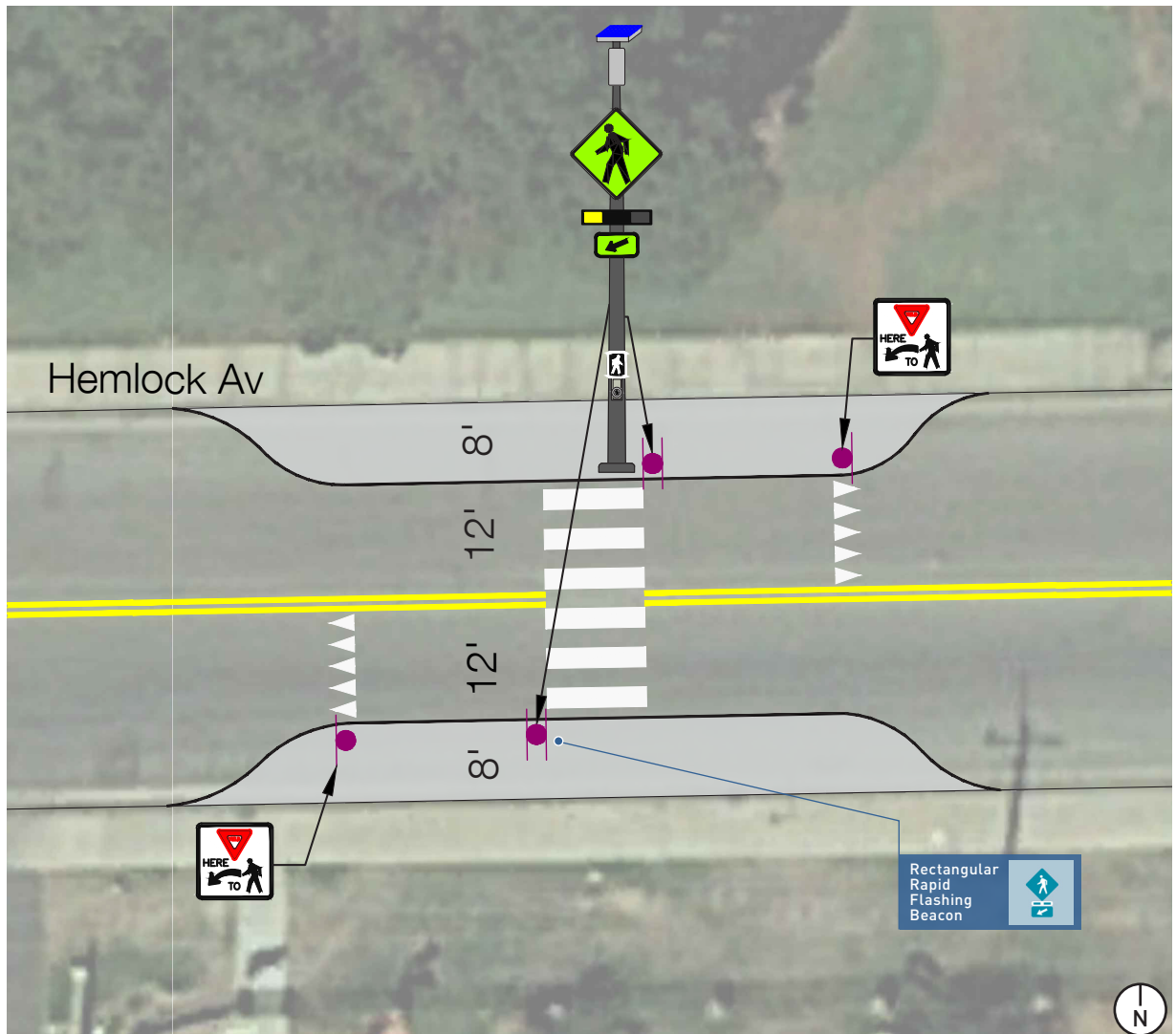
Project Recommendations (cont.)

The recommended projects at the intersection of **Hemlock Avenue & the SR-60 Off-Ramp** (facing page) include:

- A **Reduced Curb Radius** helps slow vehicles making a right turn off the freeway ramp while shortening the pedestrian crossing distance. East of the SR-60 ramp implementing a short **Road Diet** by removing the eastbound curb-side lane and using the space to **Widen the Sidewalk** (13 ft.) and to add a striped buffer (8 ft.) creates a more separation between pedestrians and fast moving vehicles.
- On the westbound and eastbound approaches to the SR-60 off-ramp implement a short **Road Diet** and **Widen the Sidewalk** by extending the curb and removing the curb-side lane, leaving 20 ft. for a single travel lane.
- Upgrading the crosswalks to **High Visibility Crosswalks** and adding **Advanced Stop Bars** draws drivers' attention to the presence of pedestrians in the crosswalk. A **"Stop Here on Red" Sign** at the westbound approach will discourage crosswalk encroachment.
- With the changes to the curb at the intersection, **Straighten Crosswalks** on the east and south legs and move them further toward the center of the intersection.
- With the additional space created at the northeast corner, **Upgrading the Curb Ramp** to a full curb ramp will make it easier for people with mobility devices to navigate.

Recommendations for the segment of **Hemlock Avenue east of Calle Sombra** (this page) include:

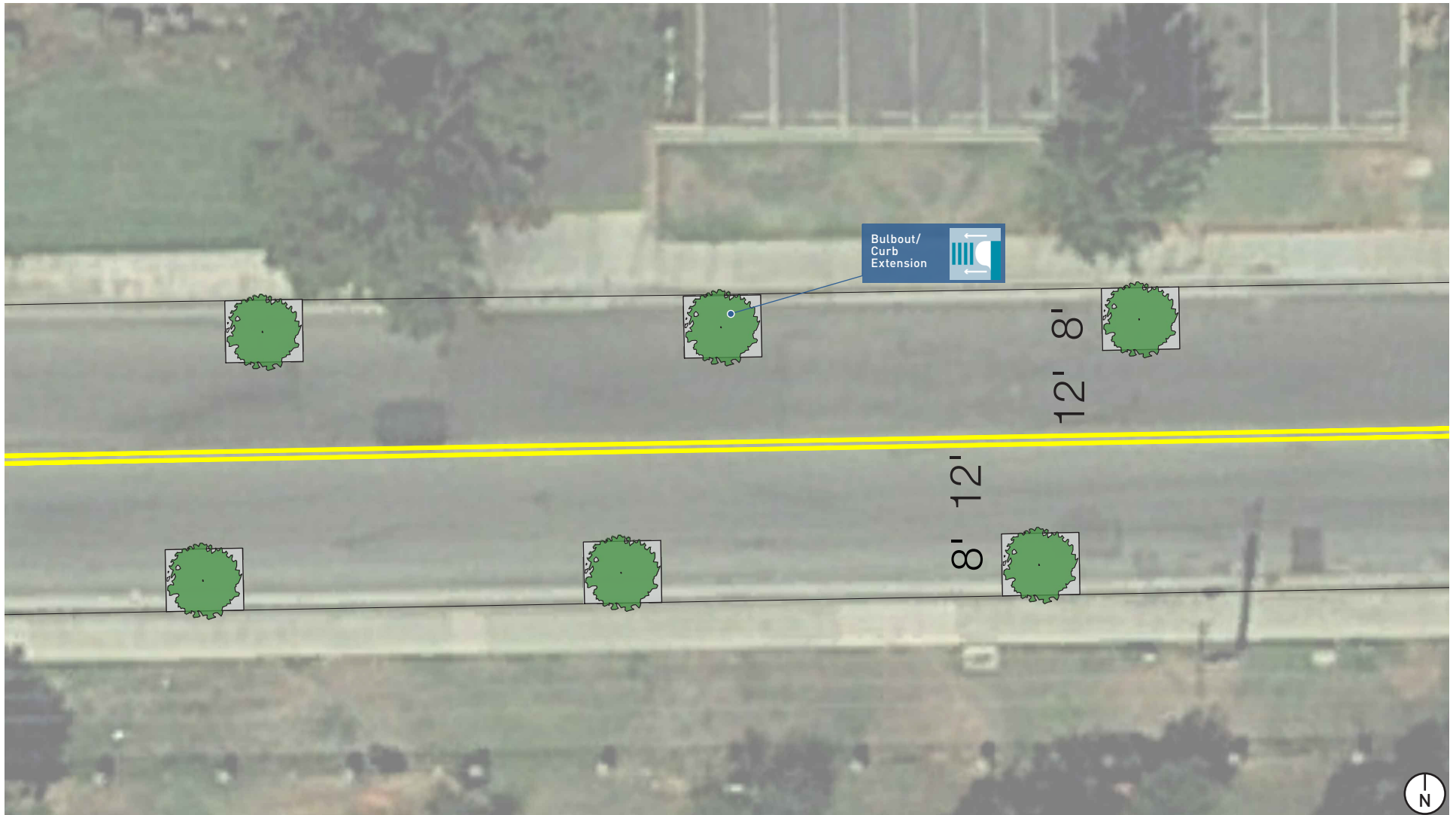
- A **New Pedestrian Crossing** just east of Calle Sombra with a **Rectangular Rapid Flashing Beacon** and **Bulbouts/Curb Extensions** into Hemlock Avenue provides a safe opportunity for pedestrians to cross Hemlock, where there is currently nearly a mile between crossings.

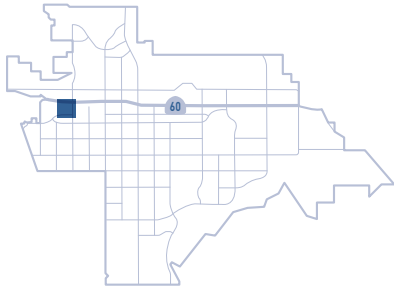


3

Hemlock Avenue between the SR-60 WB Off-Ramp and Calle Sombra

PROJECT RECOMMENDATIONS





This wide roadway, which is contained within a large commercial zone creates the opportunity for lane repurposing that can improve the pedestrian experience, and enhance multi-modal safety for travel along this corridor or between businesses in the shopping center.

Existing Conditions

- High pedestrian activity between commercial uses, especially during lunchtime
- Wide roadways and long pedestrian crossing distances
- Fast moving vehicles
- Missing internal sidewalks
- High volumes of turning vehicles, with fast right-turns

Collision Summary (2009-2017)

Pedestrian Collisions 3	Crash Types
	1 Pedestrian at Fault at Signal
	2 Pedestrian Crossing Outside of Crosswalk Near Bus Stop
	3 Unsignalized Intersections at Night
	4 Driver Proceeding Straight on 45+ MPH Streets
	5 Pedestrian Victim Age 65+
	6 Pedestrian Victim Age 19 and Under
KSI Pedestrian Collisions 0	

Project Recommendations

The recommended projects along this **segment of Centerpoint Drive** seek to improve pedestrian safety through several different strategies:

- A **Road Diet** that includes removing one through lane in each direction and replacing it with a **Protected Bike Lane** encourages vehicles to drive slower.
- Including bollards in the bike lane buffer and green conflict markings through intersections and driveways creates a buffer between pedestrians and the roadway and clarifies lane delineation.
- **New Sidewalk** area at corner of Centerpoint Drive and Town Circle connecting to Carl's Jr. with a **New Raised Pedestrian Crossing** across drive thru lane, creates accessible pedestrian access to the Carl's Jr.

Recommendations for the intersections at Center Point and Frederick Street can be seen on the following pages.

Costs

Protected bike lane	\$468,000
Signal reconstruction for protected left turns and protected bike lane	\$450,000
Widen sidewalk on east side of Frederick	\$121,005
New pedestrian crossing on north leg of Frederick & Centerpoint	\$6,865
All other safety construction items	\$134,392
Contingency and non-construction costs	\$932,615
TOTAL	\$2,112,877

Benefits

\$8,482,961

B/C Ratio

4.0

Note: The cost estimate shown below does not include costs for sidewalk and crossing improvements related to the Carl's Jr. parcel as these improvements are expected to occur with private funds.



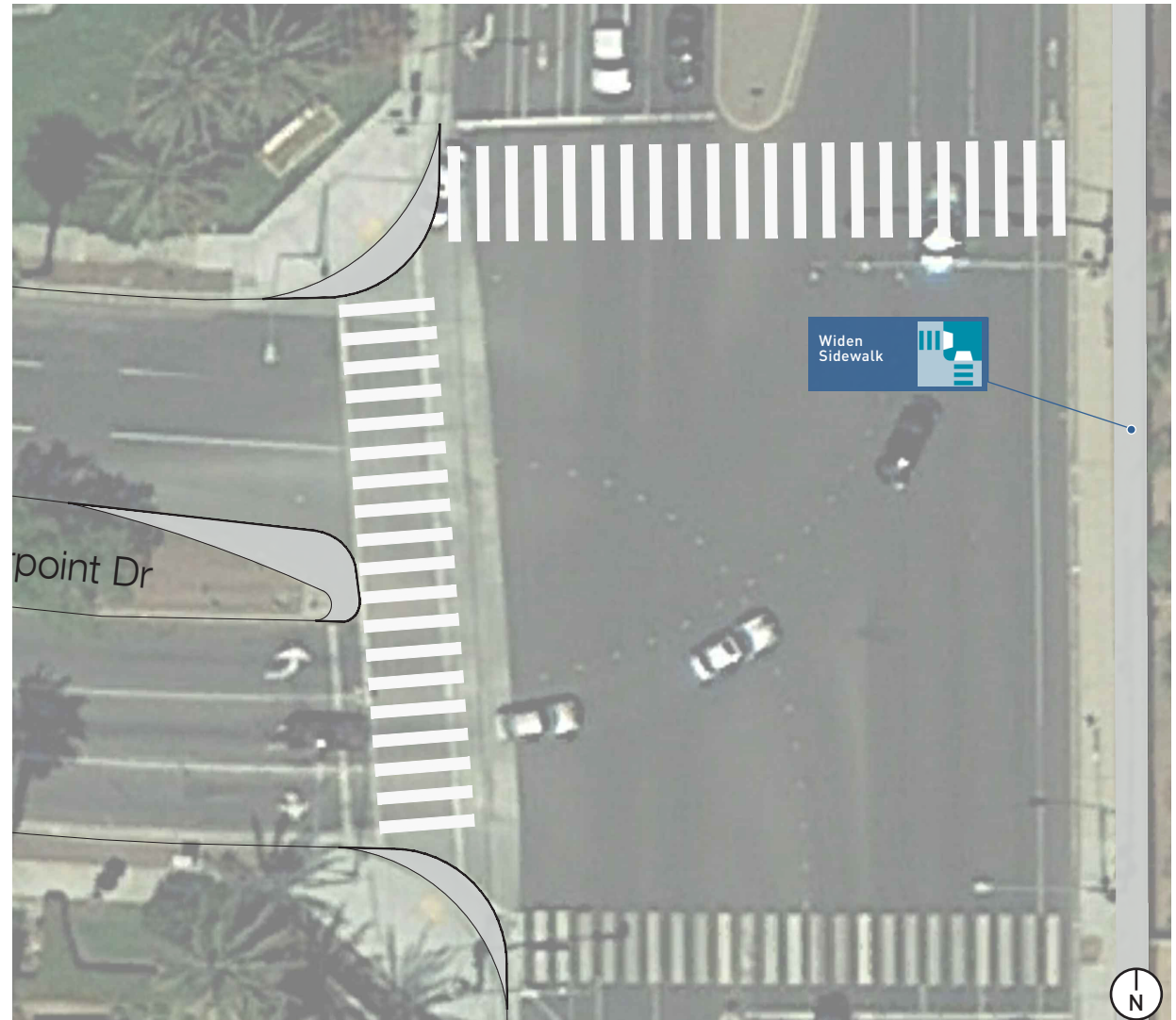
Project Recommendations (cont.)

The recommended projects at the intersection of **Centerpoint Drive & Center Point** (facing page) include:

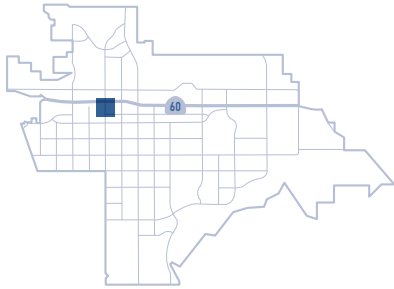
- At Center Point & Centerpoint Drive **Leading Pedestrian Intervals** and **Extending Pedestrian Crossing Times** make crossing easier. **Protected Left Turns** on the minor leg of the intersection, where there are already left turn lanes, minimizes vehicle-pedestrian conflicts.
- Upgraded crosswalks with **High Visibility Crosswalks** and add **Advanced Stop Bars** draw attention to the presence of pedestrians in the intersection.
- A **New Sidewalk** on the east side of northeast leg at Center Point & Centerpoint Drive connects the parking lots to the intersection.

The recommended projects at the intersection of **Centerpoint Drive & Frederick Street** (this page) include:

- A **New Pedestrian Crossing** at Centerpoint Drive & Frederick Street on the north leg of the intersection provides another opportunity to cross Frederick Street and access the shopping center. With this improvement, **Reducing Curb Radii** and squaring-up the **Raised Median** end on the Centerpoint Drive leg of the intersection encourages vehicles to slow as they turn.
- A **Wider Sidewalk** on the east side of Frederick Street gives pedestrians more space to walk further away from fast moving vehicles.



5 Heacock Street & Sunnymead Boulevard



Wide roadways and fast-moving vehicles coming off of the freeway combined with high pedestrian and bicyclist activity points to the need to enhance this intersection for all modes.

Existing Conditions

- Wide roadways and long pedestrian crossing distances
- Right turning vehicles moving at high speeds
- Bust stops are nearly 200 ft. away from the intersection on Sunnymead Avenue

Project Recommendations

The recommended projects at this location seek to improve pedestrian safety through several different strategies:

- Use **Leading Pedestrian Intervals, High Visibility Crosswalks, Straightened Crosswalks, Dual Curb Ramps,** and **Advanced Stop Bars** to bring drivers' attention to the presence of pedestrians in the intersection and make the crossing more accessible and convenient for pedestrians.
- Installing **"Stop Here on Red" Signs** at right turns on the northbound, westbound, and southbound approaches can discourage crosswalk encroachment from right-turning drivers.
- Implementing **Driveway Consolidation** as redevelopment occurs on the southwest and northeast corners of the intersection could reduce pedestrian and vehicle conflicts.
- Moving the **Bus Stop Nearer to the Intersection,** especially along Sunnymead Boulevard, could encourage pedestrians to cross in the crosswalk.
- On the westbound approach, providing mixing zone lane markings can help to better organize the roadway and enhance multi-modal safety at this location with high bicycle activity.

Collision Summary (2009-2017)

 Pedestrian Collisions 5	Crash Types
	1 Pedestrian at Fault at Signal ✓
	2 Pedestrian Crossing Outside of Crosswalk Near Bus Stop ✓
	3 Unsignalized Intersections at Night
	4 Driver Proceeding Straight on 45+ MPH Streets
	5 Pedestrian Victim Age 65+
	6 Pedestrian Victim Age 19 and Under ✓
 KSI Pedestrian Collisions 0	

Costs

High visibility crosswalks with advance stop bars and new signal loop detectors	\$55,869
Move bus stop closer to intersection	\$20,350
Signing and striping upgrades	\$2,629
Upgrade curb ramps	\$28,000
Leading pedestrian interval	\$500
Contingency and non-construction costs	\$85,033
TOTAL	\$192,381

Benefits

\$581,741

B/C Ratio

3.0

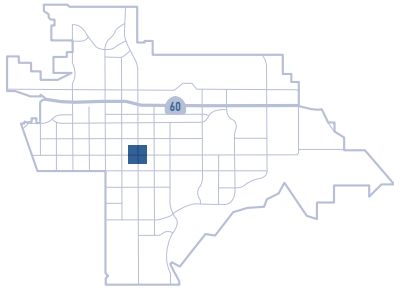
Note: The cost estimate shown below does not include costs for driveway consolidation as this is assumed to occur in conjunction with parcel redevelopment.

Due to low project costs and systemic opportunity, this project should be combined with projects at other similar locations to ensure competitive grant pursuit.



6

Perris Boulevard & Alessandro Boulevard



This intersection brings together the largest north-south and east-west arterials in Moreno Valley, making it a focal point of commercial activity and travel. Wide roadways, key shopping destinations, and high activity bus stops highlight opportunities to enhance pedestrian connections.

Existing Conditions

- Fast moving vehicles
- Wide roadways and long pedestrian crossing distances
- Pedestrians often looking over their shoulder to make sure they are aware of any high-speed right-turning vehicles
- Bus stops located up to 550 feet from the intersection due to driveway placement
- High pedestrian activity, with pedestrians using mobility assistance devices unable to cross in the available time

Collision Summary (2009-2017)

Pedestrian Collisions	Crash Types
6	1 Pedestrian at Fault at Signal ✓
	2 Pedestrian Crossing Outside of Crosswalk Near Bus Stop ✓
	3 Unsignalized Intersections at Night
	4 Driver Proceeding Straight on 45+ MPH Streets ✓
	5 Pedestrian Victim Age 65+
	6 Pedestrian Victim Age 19 and Under

KSI Pedestrian Collisions
1

Project Recommendations

The recommended projects at this location seek to improve pedestrian safety through several different strategies:

- Upgrading to **High Visibility Crosswalks, Advanced Stop Bars, a Straighter Crosswalk** on south leg and **Dual Curb Ramps** at the northwest and southeast corners can bring drivers' attention to the presence of pedestrians in the intersection and create a more accessible and convenient crossing.
- Installing **"Stop Here on Red" Signs** and **Reduce Curb Radii** on all corners can help to minimize right turn encroachment and slow vehicles making right turns.
- Adjust signal timing to provide sufficient crossing time, especially for those who have impaired mobility, by adding a **Leading Pedestrian Interval** and **Extending Pedestrian Crossing Time**.
- Implementing **Right Turn on Red Restrictions** during the LPI when pedestrian button pushed using blank-out signs, can help minimize pedestrian-vehicle conflicts.
- Installing a **New Pedestrian Crossing** at Gaye Street can help to serve the bus stop and shopping center. Controlling the crossing with a **Pedestrian Hybrid Beacon** that uses Programmable LEDs ensures signal is visible at its approach, without creating issues due to the nearby signal. Staggering the crossing and using a **Median Barrier** in the **Pedestrian Refuge Island** can help to channelize pedestrians and make them more visible to drivers on each approach.

Costs

Pedestrian hybrid beacon and new crossing	\$159,280
Pedestrian refuge island	\$72,390
Leading pedestrian interval with right turn on red restriction blankout sign	\$12,700
Reduce curb radii and upgrade ramps	\$39,650
All other safety construction items	\$74,298
Contingency and non-construction costs	\$283,260
TOTAL	\$641,578

Benefits

\$2,353,011

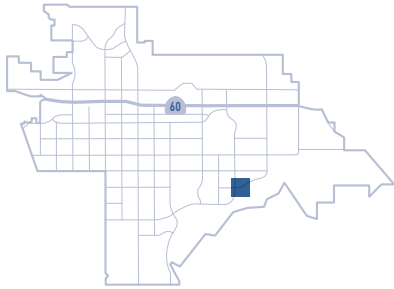
B/C Ratio

3.7



7

Iris Avenue between Lasselle Street & Camino Flores



High speed vehicles along Iris Boulevard can make for uncomfortable walking conditions, and the wide roadway presents promising opportunities to reallocate space for a safer walking environment, while also allowing for improvements to biking and transit conditions.

Existing Conditions

- Posted speed 50 mph
- Bus stops located 200+ feet from pedestrian crossings
- Wide roadways and long pedestrian crossing distances
- More than 1,500 feet between pedestrian crossings in three directions
- Sidewalks adjacent to fast-moving vehicles

Collision Summary (2009-2017)

Pedestrian Collisions 4	Crash Types
	1 Pedestrian at Fault at Signal ✓
	2 Pedestrian Crossing Outside of Crosswalk Near Bus Stop ✓
	3 Unsignalized Intersections at Night
	4 Driver Proceeding Straight on 45+ MPH Streets ✓
	5 Pedestrian Victim Age 65+
	6 Pedestrian Victim Age 19 and Under ✓
KSI Pedestrian Collisions 2	

Project Recommendations

The recommended projects at this location seek to improve pedestrian safety through several different strategies:

- The **Road Diet** and **Protected Intersection** on Iris Avenue reallocates the roadway space to allow for a **Protected Bike Lane** and **Transit Islands**, creating more distance between and physical barriers between pedestrians and vehicles, while creating a street designed for slower vehicle speeds.
- **High Visibility Crosswalks** provide visual cues to drivers that pedestrians may be present in the intersection, and 12" **Advance Stop Bars** set back from the crosswalk help to minimize vehicle encroachment. **Upgraded Dual Curb Ramps** make these crossings more accessible to people with mobility limitations or visual impairments.
- Using **Slow Signal Coordination** along Iris Avenue times green lights for vehicles traveling at safer speeds.
- A new **Mixed Use Path**, enhanced with a formalized **Trail Crossing**, along Camino Flores will provide off-street pedestrian connections between Parque Amistad, the shopping center, and residential areas.

Costs

Road diet, protected bike lanes, and new transit islands	\$1,686,480
Protected intersection with upgraded pedestrian crossings at Lasselle	\$159,476
Upgraded pedestrian crossings and curb ramps at Camino Flores	\$74,075
New mixed use path	\$637,900
All other safety construction items	\$44,090
Contingency and non-construction costs	\$2,055,889
TOTAL	\$4,657,910

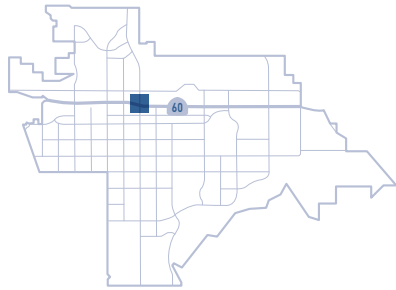
Benefits

\$36,018,792

B/C Ratio

7.7





Perris Boulevard between Hemlock Avenue and Sunnymead Boulevard connects two important commercial areas of the City and passes underneath the SR-60 freeway, creating a significant pedestrian accessibility barrier, with opportunities for safety improvements.

Existing Conditions

- Wide roadways and long pedestrian crossing distances
- Right turning vehicles moving at high speeds
- Signalized intersections without a crossing at each approach, creating limited opportunities to cross Perris Blvd
- Dark and uncomfortable underpass conditions

Collision Summary (2009-2017)

Pedestrian Collisions

10

KSI Pedestrian Collisions

1

Crash Types	
1	Pedestrian at Fault at Signal
2	Pedestrian Crossing Outside of Crosswalk Near Bus Stop
3	Unsignalized Intersections at Night
4	Driver Proceeding Straight on 45+ MPH Streets
5	Pedestrian Victim Age 65+
6	Pedestrian Victim Age 19 and Under

Project Recommendations

The recommended projects along this **segment of Perris Boulevard** seek to improve pedestrian safety through several different strategies:

- At all four signalized intersections along the segment, **Extending Pedestrian Crossing Time** provides sufficient crossing time, especially for those with mobility issues. The **High Visibility Crosswalks, Advanced Stop Bars,** and **Leading Pedestrian Intervals** increase drivers' awareness of pedestrians.
- As the SR-60 off ramp is widened to include a left and right turn lane, a **Reduced Curb Radius** at the northeast corner slows vehicles making a right turn onto Perris Boulevard.
- Working with Caltrans to improve lighting at the SR-60 underpass with **LED Lighting** will match the City's effort and can improve visibility around the dim underpass.
- A **"Stop Here on Red" Sign** for the southbound right turn at Perris Boulevard & Sunnymead Boulevard discourages crosswalk encroachment.
- At Perris Boulevard & Sunnymead Boulevard **Right Turn on Red Restrictions** implemented using blank-out signs during LPI when that pedestrian button is pushed reduces pedestrian-vehicle conflicts.

Recommendations for the intersections at the Elder Avenue and Hemlock Avenue can be seen on the following pages.

Costs

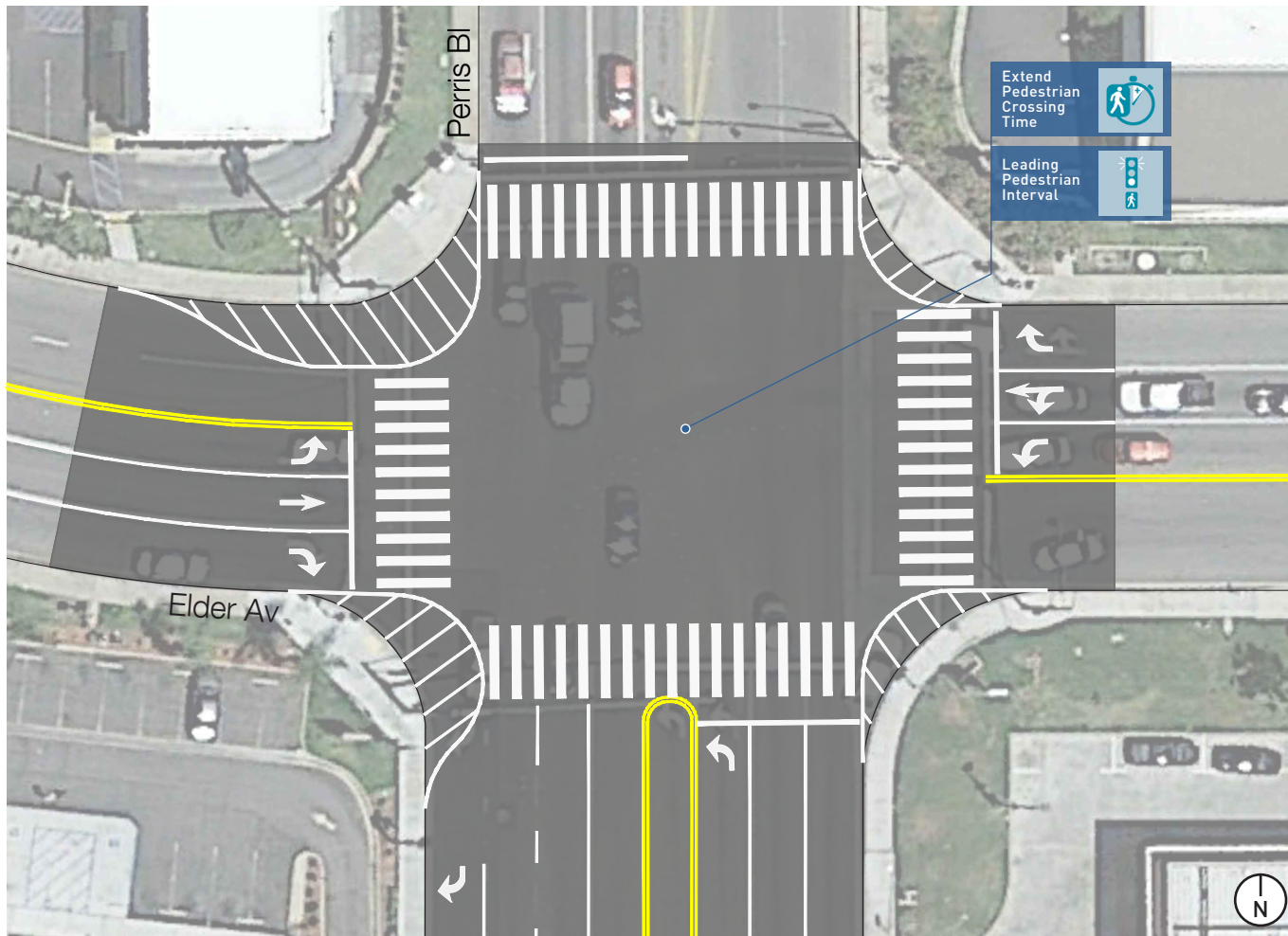
New and upgraded pedestrian crossings, including stop bars, bulbouts, ramps	\$310,271
Leading pedestrian interval and extend pedestrian crossing time	\$4,000
Right-turn on red restriction blankout signs at Sunnymead	\$10,800
LED lighting in freeway undercrossing	\$160,000
All other safety construction items	\$30,910
Contingency and non-construction costs	\$459,232
TOTAL	\$975,213

Benefits

\$4,740,742

B/C Ratio

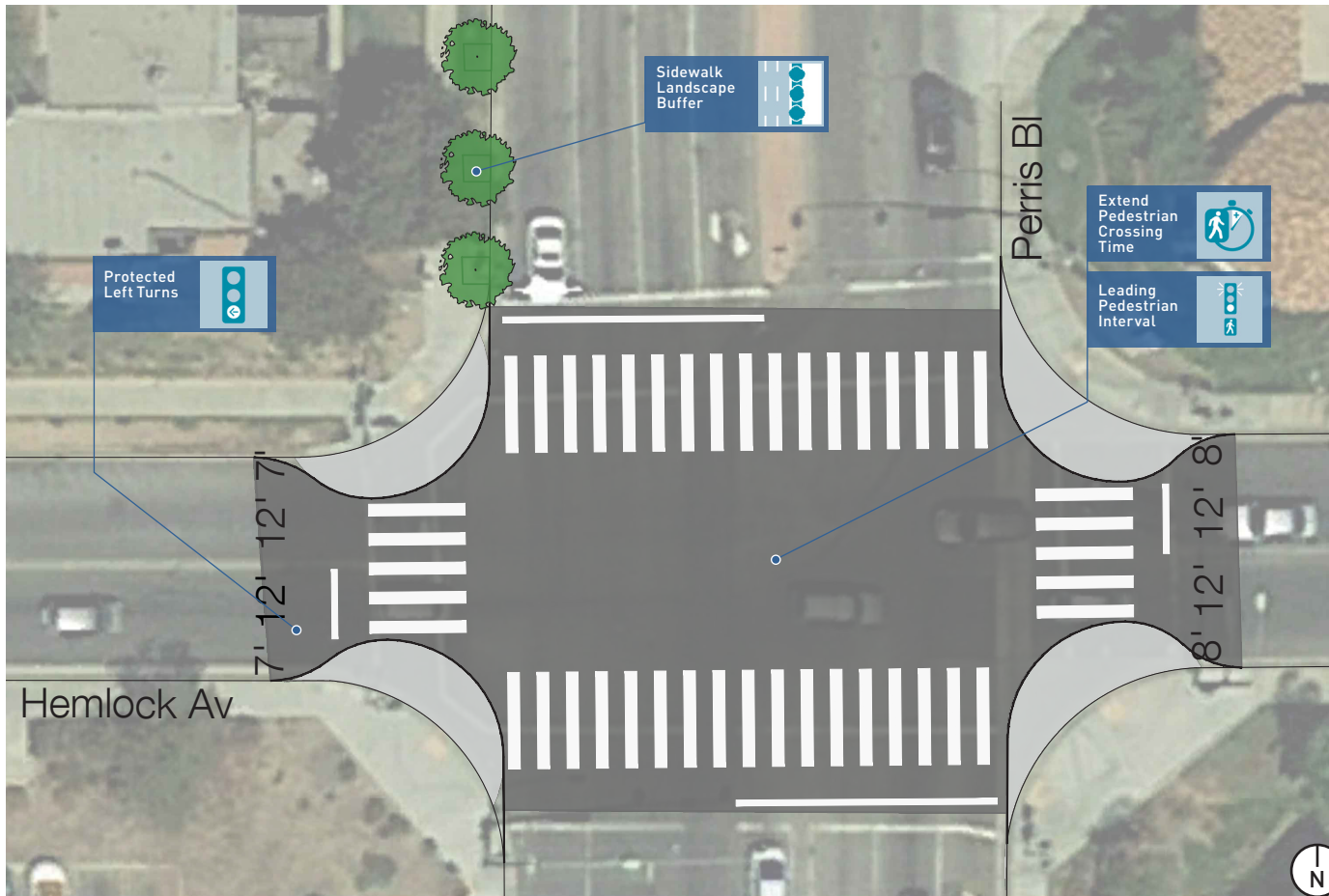
4.9



Project Recommendations (cont.)

The recommended projects at the intersection of **Perris Boulevard & Elder Avenue** (this page) include:

- At Perris Boulevard & Elder Avenue and Perris Boulevard & Hemlock Avenue **Extending Pedestrian Crossing Time** for the side streets to be the same length as the corresponding green phase improves pedestrian safety and convenience.
- A **Road Diet** on the west leg of Elder Avenue with the curbside lane stripped out creates a buffer between pedestrians and vehicles.
- Painted **Bulbouts/ Curb Extensions** on all corners shorten the crossing distance and provide operational benefit.
- A **New Pedestrian Crossing** on the south leg of Perris Boulevard & Elder Avenue and on the north leg of Perris Boulevard & Sunnymead Boulevard creates more opportunities to cross Perris Boulevard along this corridor.

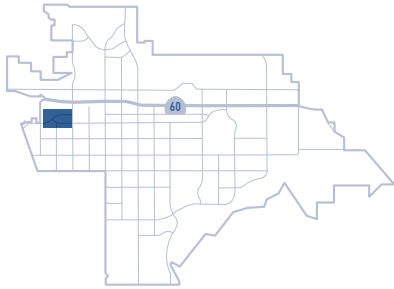


Project Recommendations (cont.)

The recommended projects at the intersection of **Perris Boulevard & Hemlock Avenue** (this page) include:

- **Bulbouts/ Curb Extensions** into Hemlock Avenue with **Dual Curb Ramps** improve pedestrian access, comfort and visibility.
- Moving the west crosswalk closer to the intersection makes it easier for drivers to see pedestrians waiting to cross and adding a **Sidewalk Landscape Buffer** can provide additional separation between pedestrians and vehicles.
- Split phasing to **Protect Left Turns** minimizes vehicle conflicts with pedestrians as they cross through the intersection.

9 Eucalyptus Avenue and Towngate Boulevard from Day Street to Frederick Street



This wide roadway runs from the I-215 freeway to the main commercial area of Moreno Valley, connecting several neighborhoods, the commercial zone, and an off-street path. These land uses and connections to existing active transportation facilities create an opportunity for a multi-modal corridor.

Existing Conditions

- Bus stops located 200+ feet from pedestrian crossings
- Wide roadways and long pedestrian crossing distances
- Fast moving vehicles
- Limited opportunities to cross Eucalyptus Avenue/Towngate Boulevard
- Lack of formalized trail crossings or connections between active transportation facilities

Collision Summary (2009-2017)

	Pedestrian Collisions
8	

	KSI Pedestrian Collisions
3	

Crash Types	
1	Pedestrian at Fault at Signal <input checked="" type="checkbox"/>
2	Pedestrian Crossing Outside of Crosswalk Near Bus Stop <input checked="" type="checkbox"/>
3	Unsignalized Intersections at Night
4	Driver Proceeding Straight on 45+ MPH Streets
5	Pedestrian Victim Age 65+ <input checked="" type="checkbox"/>
6	Pedestrian Victim Age 19 and Under <input checked="" type="checkbox"/>

Project Recommendations

The recommended projects along this **segment of Eucalyptus Avenue/Towngate Boulevard** seek to improve pedestrian safety through several different strategies:

- A formalized **Trail Crossing** at Eucalyptus Avenue & Arbor Park Lane with **Extended Pedestrian Crossing Times, High Visibility Crosswalks, Advanced Stop Bars, and Reduced Curb Radii** at the southwest and southeast corners, improves pedestrian connections while enhancing visibility and comfort.
- At Eucalyptus Avenue & WinCo Driveway, Eucalyptus Avenue & Community Driveway west of Arbor Park, and Towngate Boulevard & Southgate Drive installing new **Pedestrian Hybrid Beacons** or pedestrian signals as new development occurs could create more opportunities for pedestrians to cross. At the WinCo Driveway the upgrade could include a formal **Trail Crossing**.
- **Narrower Lanes** (10 ft.) and upgrading buffered bike lanes to **Protected Bike Lanes** with bollards provides a visual cue slow vehicles traveling on the corridor.
- **Slow Signal Coordination** along the corridor times green lights for vehicles traveling at safer speeds. During the off-peak periods, **Speed Sensitive Rest in Red Signals** cause vehicles moving at speeds above the speed limit to hit a red light and slow down.

Recommendations continue on the following page.

Costs

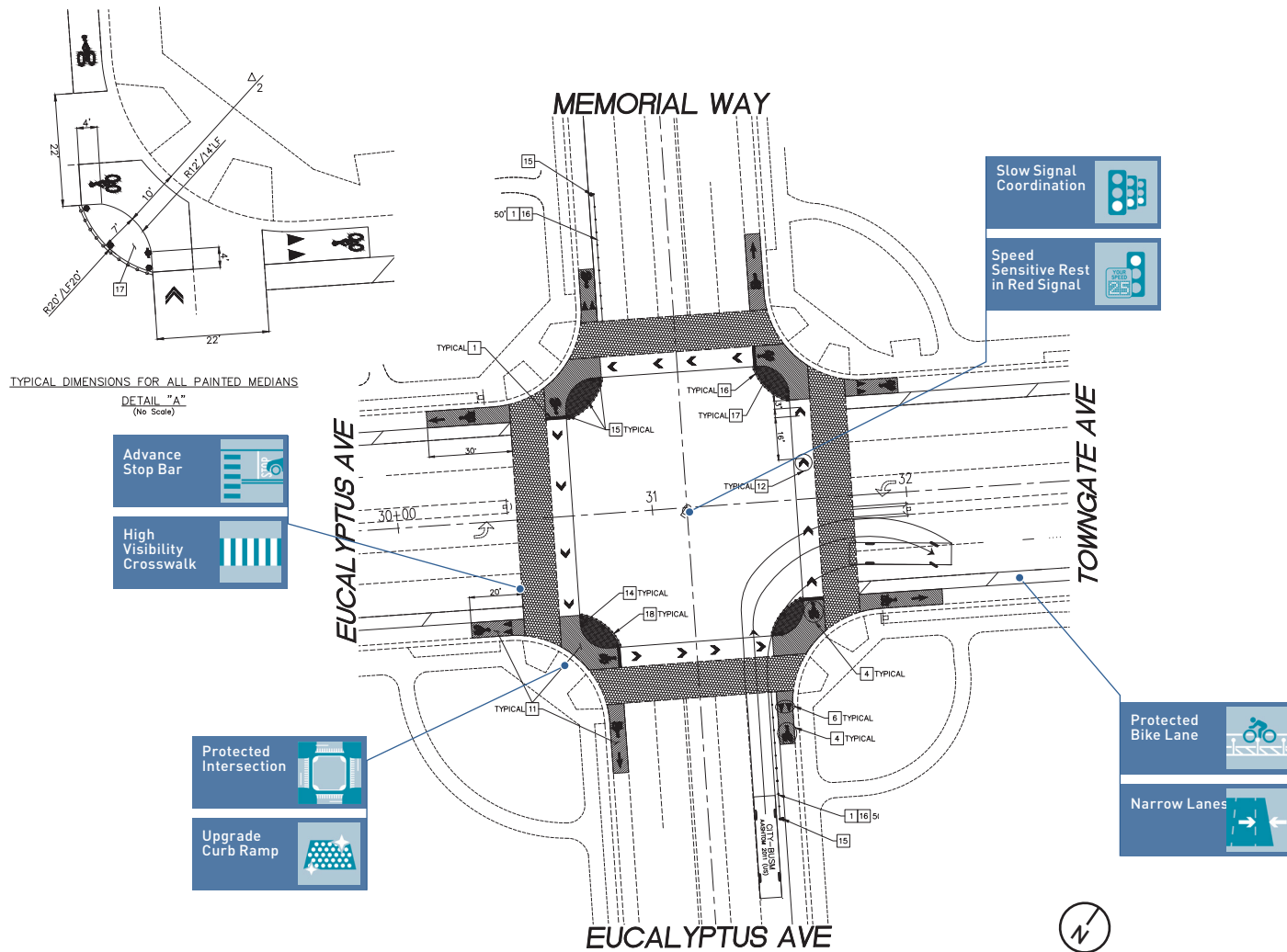
Pedestrian hybrid beacons and new pedestrian crossings	\$539,423
Upgrade pedestrian crossing at Arbor Park Lane	\$73,405
Speed sensitive signals with speed feedback signs	\$112,500
Protected bike lane and protected intersection	\$1,842,428
All other safety construction items	\$88,830
Contingency and non-construction costs	\$2,098,798
TOTAL	\$4,755,384

Benefits

\$21,476,353

B/C Ratio

4.5

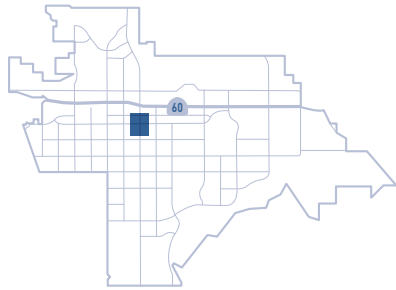


Project Recommendations (cont.)

Additional recommendations include:

- At all intersections along the segment, **Upgraded Curb Ramps** with detectable warning surfaces and **Dual Curb Ramps**, where they are not already implemented, makes crossing more accessible.
- **Relocating Bus Stops Near Intersections** can help discourage pedestrians from crossing outside of intersections and marked crosswalks.
- At Towngate Boulevard & Eucalyptus Avenue, a **Protected Intersection** delineates the path of travel through the intersection for all road users. This multi-modal safety upgrade includes new bike lane approach and departure striping, corner islands, corner bike queuing areas, **High Visibility Crosswalks**, **Advanced Stop Bars**, **Upgraded Curb Ramps**, and **Extended Pedestrian Crossing Times**. Using mountable materials for corner islands can help maintain necessary turning radii for emergency vehicle access.

Source: City of Moreno Valley



This segment of Perris Boulevard is wide with fast-moving vehicles, but passes through residential neighborhoods with several stop-controlled intersections, presenting the opportunity to implement neighborhood traffic calming strategies while improving pedestrian safety.

Existing Conditions

- Bus stops located 200+ feet from pedestrian crossings
- Wide roadways and long pedestrian crossing distances
- More than 1,200 feet between opportunities to cross Perris Boulevard, with a park, residential neighborhoods, and commercial areas on both sides of the street
- Fast moving vehicles and right-turning vehicles moving at high speeds

Collision Summary (2009-2017)

Pedestrian Collisions	Crash Types
12	1 Pedestrian at Fault at Signal ✓
	2 Pedestrian Crossing Outside of Crosswalk Near Bus Stop ✓
	3 Unsignalized Intersections at Night ✓
	4 Driver Proceeding Straight on 45+ MPH Streets
	5 Pedestrian Victim Age 65+ ✓
	6 Pedestrian Victim Age 19 and Under ✓
KSI Pedestrian Collisions	
4	

Project Recommendations

The recommended projects along this **segment of Perris Boulevard** seek to improve pedestrian safety through several different strategies:

- At Perris Boulevard & Eucalyptus Avenue **Reduced Curb Radii** at all corners, **Straighter Crosswalks** on the south and east legs, and **Extended Pedestrian Crossing Times** reduce vehicle-pedestrian conflicts and provide for a more comfortable crossing.
- **High Visibility Crosswalks** and **Advanced Stop Bars** at existing signalized intersections and the proposed new crossings discourage crosswalk encroachment by drivers.
- **New Sidewalks** on Atwood Avenue east of Perris Boulevard and the east side of Perris Boulevard south of Dracaea Avenue provide safer pedestrian connections.

Recommendations for the intersections at Myers Avenue, Atwood Avenue, and Dracaea Avenue can be seen on the following pages.

Costs

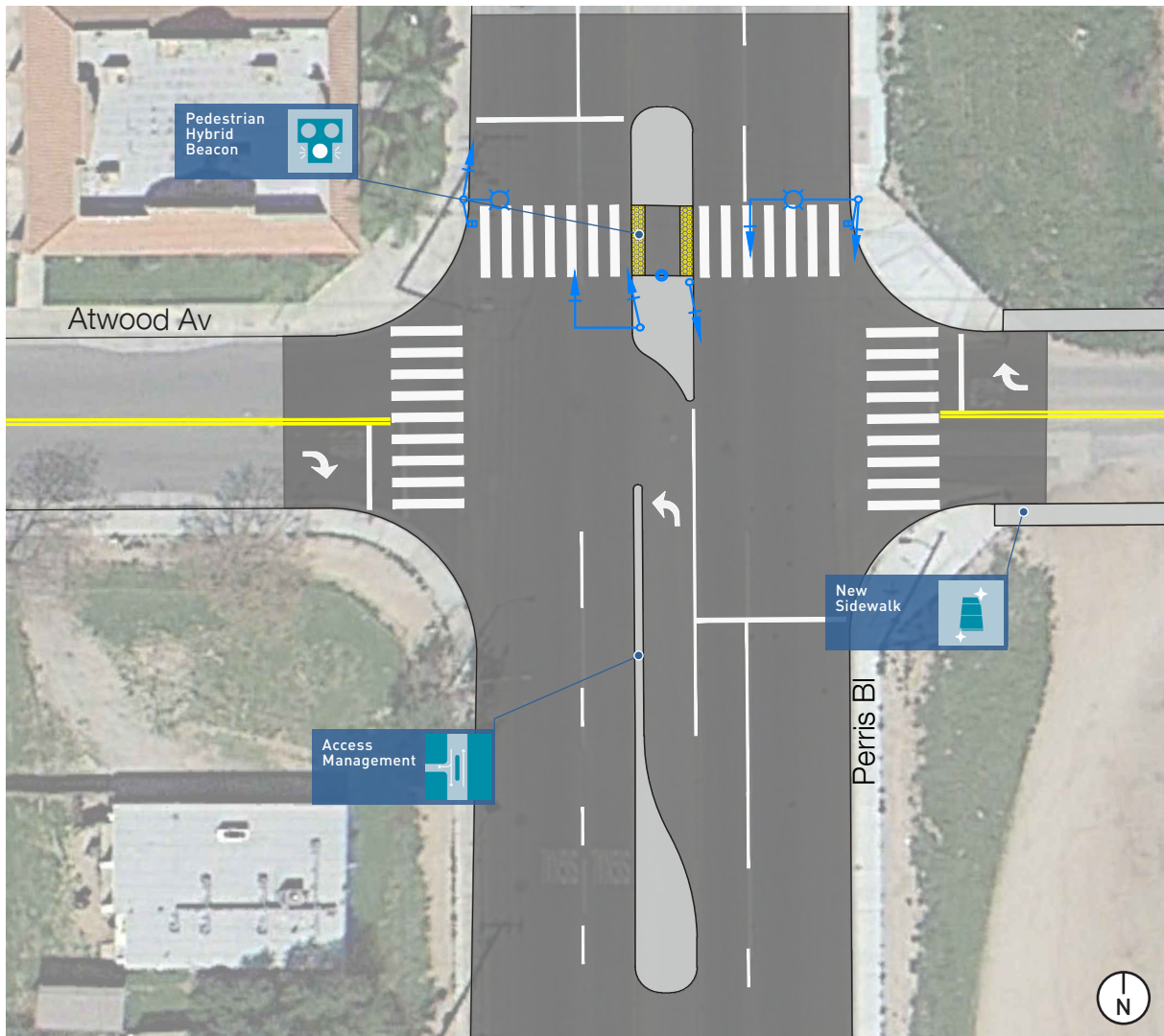
Pedestrian hybrid beacon and access management at Myers	\$192,470
Pedestrian hybrid beacon and access management at Atwood	\$223,895
Pedestrian crossing upgrades and diverters at Dracaea	\$63,338
Protected left turns and signal upgrades at Dracaea	\$46,500
All other safety construction items	\$1,181,975
Contingency and non-construction costs	\$1,349,698
TOTAL	\$3,057,876

Benefits

\$29,489,570

B/C Ratio

9.6



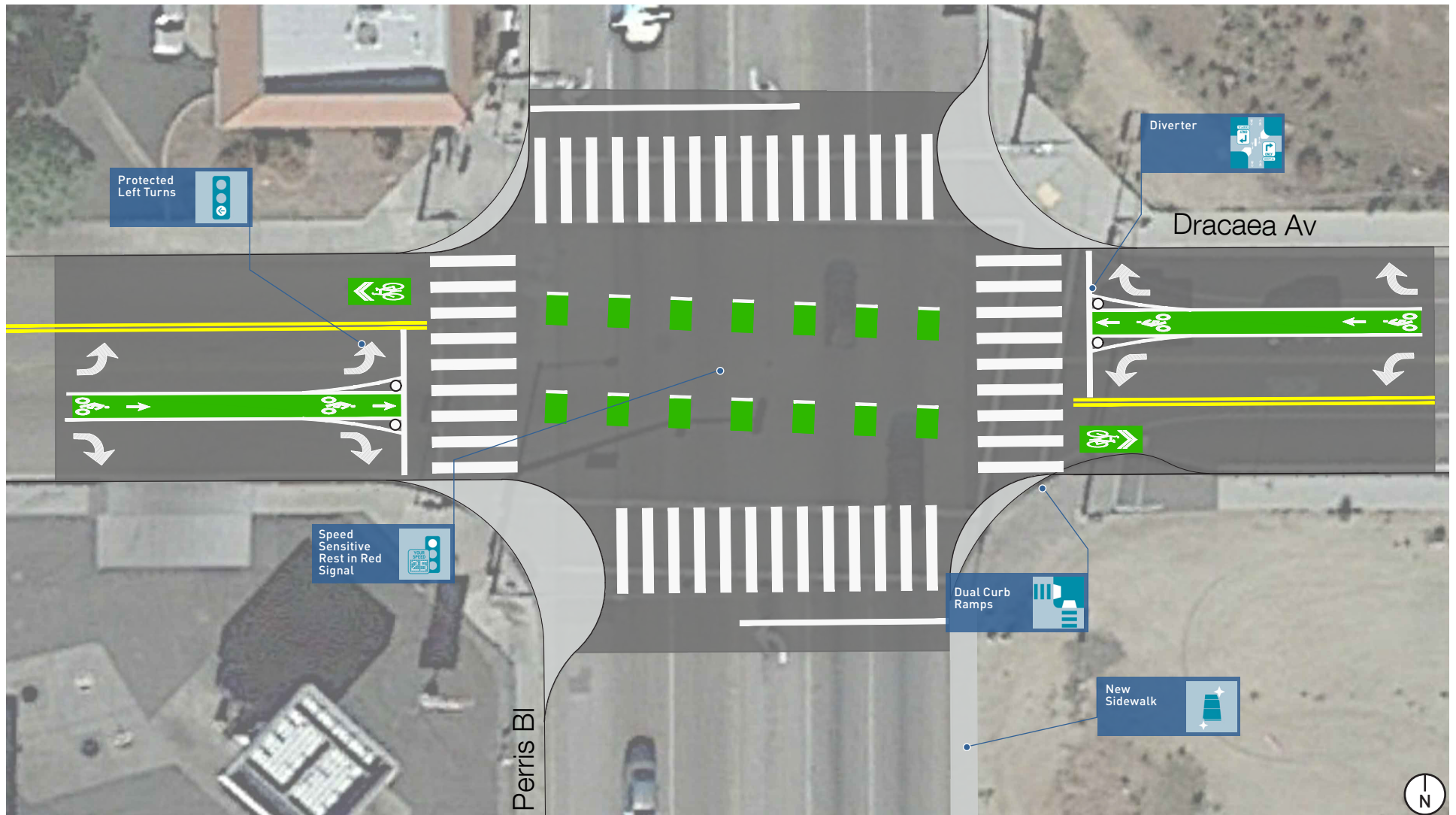
Project Recommendations

The recommended projects at the intersections of **Perris Boulevard at Myers Avenue and Atwood Avenue** (this page) include:

- **New Pedestrian Crossings** across Perris Boulevard at Myers Avenue and Atwood Avenue with **Pedestrian Hybrid Beacons** and **Pedestrian Refuge Islands** provide more opportunities for safe pedestrian crossings between signalized intersections.
- **Access Management** at these crossings using a **Raised Median** to create **Left Turn Restrictions** (except the northbound approach) provide neighborhood traffic calming and minimize vehicle-pedestrian conflicts while maintaining emergency vehicle access into residential neighborhoods.

The recommended projects at the intersection of **Perris Boulevard and Dracaea Avenue** (facing page) include:

- **Diverters** that allow only left and right turns onto Perris Boulevard and prohibit through vehicular traffic on Dracaea Avenue, reduce cut-through traffic on Dracaea and provides opportunities for a safer and slower "Neighborhood Greenway". Bike lane striping on Dracaea through intersection allows the bicyclists and pedestrians to still travel through on Dracaea Avenue.
- At Perris Boulevard & Dracaea Avenue, **Protected Left Turns** with split phasing for the Perris Boulevard approaches, **Reduced Curb Radii**, and **Bus Stops Nearer to the Intersection** discourage risky behavior.
- At Perris Boulevard & Dracaea Avenue **Speed Sensitive Rest in Red Signals** in off-peak hours cause vehicles moving at speeds above the speed limit on Perris Boulevard to hit a red light and slow down.
- **New Sidewalks** and **Dual Curb Ramps** help to improve safe pedestrian access. ●



6

Funding Opportunities

Funding Opportunities for Pedestrian Safety Projects, along with a Summary of Moreno Valley's Previous Grant Funding

6

Although many of the countermeasures identified in this report are perfectly suited for Highway Safety Improvement Program (HSIP) grant funding, Moreno Valley should continue to explore diverse funding sources for implementation of pedestrian safety projects. The following tables summarize recent grant funding awarded to Moreno Valley as well as other potential local, state, and federal programs related to transportation safety.

Moreno Valley Pedestrian Safety Project Funding Opportunities

includes prior funding awards
2014-present

Local & Regional Sources

WRCOG Beyond Grant

Allocated funds to support member agency efforts to improve quality of life in Western Riverside County.

NEXT FUNDING OPPORTUNITY

--

Funding Year (Round)	2016 (Round 1)
Funds Requested	--
Awarded? (Y/N)	Y
Funds Awarded	100%
Total Project Cost	--
Project Name	Community Enhancement Program
Project Description	Included materials and supplies for three Safe Routes to School events, a water station installation, and bike rack installations.
Project Status	--

Funding Year (Round)	2017 (Round 2)
Funds Requested	--
Awarded? (Y/N)	Y
Funds Awarded	\$161,049.24
Total Project Cost	--
Project Name	--
Project Description	--
Project Status	--

Riverside University Health System Public Health Department Safe Routes to School Program

Safe Routes to School (SR2S) programs use a comprehensive approach to make school routes safer for children to walk and bike to school.

NEXT FUNDING OPPORTUNITY

--

Funding Year (Round)	2017
Funds Requested	--
Awarded? (Y/N)	Y
Funds Awarded	--
Total Project Cost	--
Project Name	International Walk to School Day 2017
Project Description	The Public Health Department of the Riverside University Health System reached out to Moreno Valley about initiating non-infrastructure type SR2S projects, including the 2017 International Walk to School Day.
Project Status	Complete

Riverside County Transportation Commission (RCTC) Measure A

Riverside County's first half-cent sales tax for transportation improvements through 2039.

NEXT FUNDING OPPORTUNITY

--

Funding Year (Round)	--
Funds Requested	--
Awarded? (Y/N)	--
Funds Awarded	--
Total Project Cost	--
Project Name	--
Project Description	--
Project Status	--

Riverside County Transportation Commission (RCTC) Transportation Uniform Mitigation Fee (TUMF) program

WRCOG developed and administers the Transportation Uniform Mitigation Fee (TUMF), a program that ensures that new development pays its fair share for the increased traffic that it creates. The TUMF will raise over \$3 billion for transportation projects in Western Riverside County.

NEXT FUNDING OPPORTUNITY

--

Funding Year (Round)	--
Funds Requested	--
Awarded? (Y/N)	Y
Funds Awarded	\$405,488
Total Project Cost	--
Project Name	Moreno Valley Mall Transfer Station
Project Description	This project involved constructing a pedestrian area with benches near a transfer station.
Project Status	Complete

Riverside County Transportation Commission (RCTC) Transportation Development Act (TDA) Article 3 Bicycle and Pedestrian Facilities Program

Each year, 2% of the Local Transportation Fund (LTF) revenue is made available for bicycle and pedestrian facility projects under TDA Article 3, also known as SB 821. Eligible projects include sidewalks, access ramps, bicycle facilities, and bicycle plan development. A Call for Projects is issued biennially in February, and funds are allocated each June.

NEXT FUNDING OPPORTUNITY

--

Funding Year (Round)	2015 (Round 7)
Funds Requested	\$282,179
Awarded? (Y/N)	Y
Funds Awarded	\$282,179
Total Project Cost	\$282,179
Project Name	Cycle 7 ADA Pedestrian Access Ramps
Project Description	Pedestrian curb ramp upgrades at 4 intersections.
Project Status	Complete

State Sources

California Strategic Growth Council (SGC) Transformative Climate Communities (TCC) Program

The Transformative Climate Communities (TCC) Program empowers the communities most impacted by pollution to choose their own goals, strategies, and projects to reduce greenhouse gas emissions and local air pollution.

NEXT FUNDING OPPORTUNITY

--

Funding Year (Round)	2017 (Round 1)
Funds Requested	\$93,960
Awarded? (Y/N)	Y
Funds Awarded	\$93,960
Total Project Cost	--
Project Name	Engage MoVal: Outreach Toolbox for Disadvantaged Communities
Project Description	An outreach program to the residents of the City's disadvantaged communities as defined by the State's CalEnviroScreen tool. This outreach program will reflect a toolbox of strategies and best practices for substantive engagement of residents in the disadvantaged areas of the City and will be utilized as part of the City's upcoming General Plan update process.
Project Status	Not Started

SGC Affordable Housing and Sustainable Communities (AHSC) Program

The Affordable Housing and Sustainable Communities (AHSC) Program makes it easier for Californians to drive less by making sure housing, jobs, and key destinations are accessible by walking, biking, and transit.

NEXT FUNDING OPPORTUNITY

Round 5 Anticipated October 2019

Funding Year (Round)	2014 (Round I)
Funds Requested	\$2,770,723
Awarded? (Y/N)	Y
Funds Awarded	\$2,770,723
Total Project Cost	--
Project Name	Moreno Valley Gateway Pedestrian and Bicycle Improvements
Project Description	--
Project Status	--

Active Transportation Program (ATP)

ATP is a statewide competitive grant application process with the goal of encouraging increased use of active modes of transportation. The ATP consolidates existing federal and state transportation programs, including the Transportation Alternatives Program (TAP), Bicycle Transportation Account (BTA), and State Safe Routes to School (SR2S), into a single program with a focus to make California a national leader in active transportation. The ATP administered by the Division of Local Assistance, Office of State Programs.

NEXT FUNDING OPPORTUNITY

Anticipated Spring 2020

Funding Year (Round)	2014
Funds Requested	\$1,629,000
Awarded? (Y/N)	N
Funds Awarded	\$1,640,000
Total Project Cost	--
Project Name	Citywide Safe Routes to School Pedestrian Facility Improvements
Project Description	Sidewalk gap closures gutter, street lights, and radar speed feedback signs, ADA-compliant pedestrian access ramps, street lights, and radar speed feedback signs near several schools, along with educational activities at the subject school sites.
Project Status	In Progress
Funding Year (Round)	2015
Funds Requested	\$646,000
Awarded? (Y/N)	N
Funds Awarded	--
Total Project Cost	\$646,000
Project Name	Cactus Avenue/Philo Street School Crossing Traffic Signal
Project Description	Install a warranted school crossing traffic signal at the intersection of Cactus Avenue and Philo Street to enhance the safety and mobility for students of Chaparral Hills Elementary and Badger Springs Middle schools.
Project Status	--
Funding Year (Round)	2015
Funds Requested	\$934,000
Awarded? (Y/N)	N
Funds Awarded	--
Total Project Cost	--
Project Name	Gap Closure Sidewalk on Alessandro Boulevard at Old 215 Frontage Road
Project Description	Construct 650-foot of sidewalk segment on the north side of Alessandro Boulevard, east and west of Old 215 Frontage Road, to enhance the safety and mobility for pedestrians.
Project Status	--

Active Transportation Program (ATP)

CONTINUED

Funding Year (Round)	2015
Funds Requested	--
Awarded? (Y/N)	N
Funds Awarded	--
Total Project Cost	\$1,431,000
Project Name	Segment of the Juan Bautista De Anza Multi-Use Trail
Project Description	Construct a multi-use trail and ADA compliant pedestrian path generally along the Juan Bautista De Anza Historic Corridor. It will connect residential neighborhoods directly to three parks, three schools, and existing bicycle facilities.
Project Status	In Progress
Funding Year (Round)	2017
Funds Requested	\$2,849,000
Awarded? (Y/N)	Y
Funds Awarded	\$2,849,000
Total Project Cost	\$3,149,000
Project Name	Juan Bautista De Anza Trail Gap Closure
Project Description	Construct a two mile long bicycle and pedestrian path segment of the Juan Bautista De Anza Trail that connects to an existing segment of the Juan Bautista De Anza Trail, Lake Perris State Park, Rancho Verde High School, and City of Perris' trail network.
Project Status	Not Started
Funding Year (Round)	2018 (Round 4)
Funds Requested	\$8,403
Awarded? (Y/N)	TBD by December 31, 2018
Funds Awarded	TBD by December 31, 2018
Total Project Cost	\$8,653
Project Name	Juan Bautista de Anza Multi-Use Trail Project
Project Description	--
Project Status	--

SB 1 Local Streets and Roads Program (LSRP)

SB 1 dedicated approximately \$1.5 billion per year in new formula revenues apportioned by the State Controller to cities and counties for basic road maintenance, rehabilitation, and critical safety projects on the local streets and roads system.

NEXT FUNDING OPPORTUNITY
Project Lists Due May 2020

Funding Year (Round)	2017
Funds Requested	--
Awarded? (Y/N)	N
Funds Awarded	--
Total Project Cost	--
Project Name	Citywide Slurry Seal Project
Project Description	Approximately 30 slurry seal street projects throughout the City.
Project Status	On Hold

Funding Year (Round)	2018
Funds Requested	\$3,990,000
Awarded? (Y/N)	Not yet, but funding is anticipated.
Funds Awarded	--
Total Project Cost	\$3,990,000
Project Name	Citywide Pavement Rehabilitation Program
Project Description	Surface Remove/Replace and Slurry Seal
Project Status	On Hold

Funding Year (Round)	2018
Funds Requested	--
Awarded? (Y/N)	Not yet, but funding is anticipated.
Funds Awarded	--
Total Project Cost	--
Project Name	Citywide Pavement Rehabilitation Program
Project Description	Slurry Seal (very similar, but slight variation from above project)
Project Status	Not Started

Caltrans Sustainable Communities Grants (Planning Grant Program)

To encourage local and regional planning that furthers state goals, including, but not limited to, the goals and best practices cited in the Regional Transportation Plan Guidelines adopted by the California Transportation Commission.

NEXT FUNDING OPPORTUNITY

Release of Grant Application August 2019

Funding Year (Round)	2016
Funds Requested	\$154,927
Awarded? (Y/N)	Y
Funds Awarded	\$154,927
Total Project Cost	--
Project Name	Dracaea Avenue Neighborhood Greenway Corridor Study
Project Description	To study Dracaea Avenue as a Neighborhood Greenway. Dracaea Avenue provides direct connection to thirteen schools, multi-use trails, four parks, multiple quality bus stops, and two major shopping centers.
Project Status	Not Started

Caltrans Systemic Safety Analysis Report Program (SSARP)

The intent of this program is 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.

NEXT FUNDING OPPORTUNITY

Spring 2020

Funding Year (Round)	2017
Funds Requested	\$135,000
Awarded? (Y/N)	Y
Funds Awarded	\$135,000
Total Project Cost	\$150,000
Project Name	--
Project Description	Create a Pedestrian Safety Study
Project Status	In Progress

Highway Safety Improvement Program (HSIP)

California's Local HSIP focuses on infrastructure projects with nationally recognized crash reduction factors (CRFs). Local HSIP projects must be identified on the basis of crash experience, crash potential, crash rate, or other data-supported means.

NEXT FUNDING OPPORTUNITY Anticipated April/May 2020

Funding Year (Round)	2015
Funds Requested	\$350,000
Awarded? (Y/N)	Y
Funds Awarded	\$350,000
Total Project Cost	\$350,000
Project Name	--
Project Description	Conduct Road Safety Audit and implement eligible recommended improvements at Ironwood Avenue from 500' west of Lasselle Street to Nason Street.
Project Status	In Progress

Funding Year (Round)	2015
Funds Requested	\$140,000
Awarded? (Y/N)	Y
Funds Awarded	\$140,000
Total Project Cost	\$140,000
Project Name	--
Project Description	Conduct Road Safety Audit and implement eligible improvements at Kitching Street between Sunnymead Blvd and Alessandro Blvd.
Project Status	In Progress

Funding Year (Round)	2015
Funds Requested	\$3,841,900
Awarded? (Y/N)	Y
Funds Awarded	\$3,841,900
Total Project Cost	\$3,841,900
Project Name	--
Project Description	Install advanced dilemma zone detection systems at 65 signalized intersections citywide.
Project Status	In Progress

Highway Safety Improvement Program (HSIP)

CONTINUED

Funding Year (Round)	2016
Funds Requested	\$522,300
Awarded? (Y/N)	Y
Funds Awarded	\$522,300
Total Project Cost	\$522,300
Project Name	--
Project Description	Install high-friction surface treatment at spot locations; install speed control system at ten (10) signalized intersections.
Project Status	In Progress

Funding Year (Round)	2016
Funds Requested	\$250,000
Awarded? (Y/N)	Y
Funds Awarded	\$250,000
Total Project Cost	\$250,000
Project Name	--
Project Description	Upgrade existing marked crosswalks on arterials.
Project Status	In Progress

Funding Year (Round)	2016
Funds Requested	\$779,900
Awarded? (Y/N)	Y
Funds Awarded	\$779,900
Total Project Cost	\$779,900
Project Name	--
Project Description	Upgrade existing guardrails throughout the City.
Project Status	In Progress

California Office of Traffic Safety (OTS) Grant Programs

OTS administers traffic safety grants in the following areas: Alcohol Impaired Driving, Distracted Driving, Drug-Impaired Driving, Emergency Medical Services, Motorcycle Safety, Occupant Protection, Pedestrian and Bicycle Safety, Police Traffic Services, Public Relations, Advertising, and Marketing Program, Roadway Safety and Traffic Records.

NEXT FUNDING OPPORTUNITY

Anticipated December 2019

Funding Year (Round)	--
Funds Requested	--
Awarded? (Y/N)	--
Funds Awarded	--
Total Project Cost	--
Project Name	--
Project Description	--
Project Status	--

Caltrans State-Legislated Safe Routes to Schools Program (SR2S)

THIS PROGRAM HAS BEEN FOLDED INTO THE STATE ATP PROGRAM.

SB 1 Solutions for Congested Corridors Program (SCCP)

The Solutions for Congested Corridors Program funds projects designed to reduce congestion in highly traveled and highly congested corridors. This statewide, competitive program makes \$250 million available annually for projects that implement specific transportation performance improvements and are part of a comprehensive corridor plan by providing more transportation choices while preserving the character of local communities and creating opportunities for neighborhood enhancement.

NEXT FUNDING OPPORTUNITY

Applications Due January 2020

Funding Year (Round)	--
Funds Requested	--
Awarded? (Y/N)	--
Funds Awarded	--
Total Project Cost	--
Project Name	--
Project Description	--
Project Status	--

SB1 Local Partnership Program (LPP)

The purpose of this program is to provide local and regional transportation agencies that have passed sales tax measures, developer fees, or other imposed transportation fees with a continuous appropriation of \$200 million annually from the Road Maintenance and Rehabilitation Account to fund road maintenance and rehabilitation, sound walls, and active transportation projects. There is also a competitive grant portion of this project.

NEXT FUNDING OPPORTUNITY
Applications Due January 2020

Funding Year (Round)	--
Funds Requested	--
Awarded? (Y/N)	--
Funds Awarded	--
Total Project Cost	--
Project Name	--
Project Description	--
Project Status	--

SB 1 State Transportation Improvement Program (STIP)

The State Transportation Improvement Program (STIP) is the biennial five-year plan for future allocations of certain state transportation funds for state highway improvements, intercity rail, and regional highway and transit improvements.

NEXT FUNDING OPPORTUNITY
Anticipated July 2021

Funding Year (Round)	--
Funds Requested	--
Awarded? (Y/N)	--
Funds Awarded	--
Total Project Cost	--
Project Name	--
Project Description	--
Project Status	--

Caltrans Strategic Partnerships Grants

To identify and address statewide, interregional, or regional transportation deficiencies on the State highway system in partnership with Caltrans. The transit component that will fund planning projects that address multimodal transportation deficiencies with a focus on transit.

NEXT FUNDING OPPORTUNITY
Release of Grant Application August 2019

Funding Year (Round)	--
Funds Requested	--
Awarded? (Y/N)	--
Funds Awarded	--
Total Project Cost	--
Project Name	--
Project Description	--
Project Status	--

Caltrans Adaptation Planning Grants

To support planning actions at local and regional levels that advance climate change efforts on the transportation system.

NEXT FUNDING OPPORTUNITY
Release of Grant Application August 2019

Funding Year (Round)	--
Funds Requested	--
Awarded? (Y/N)	--
Funds Awarded	--
Total Project Cost	--
Project Name	--
Project Description	--
Project Status	--

California Natural Resources Agency Environmental Enhancement and Mitigation Program

This program supports projects that “contribute to mitigation of the environmental effects of transportation facilities.” According to the program guidelines, projects that fall under the following category can apply: “Mitigation Projects Beyond the Scope of the Lead Agency responsible for assessing the environmental impact of the proposed transportation improvement.”

NEXT FUNDING OPPORTUNITY
Applications Due June 2019

Funding Year (Round)	--
Funds Requested	--
Awarded? (Y/N)	--
Funds Awarded	--
Total Project Cost	--
Project Name	--
Project Description	--
Project Status	--

California Natural Resources Agency Urban Greening Program

This program supports projects that “use natural systems or systems that mimic natural systems to achieve multiple benefits.” Eligible projects include “Non-motorized urban trails that provide safe routes for travel between residences, workplaces, commercial centers, and schools.”

NEXT FUNDING OPPORTUNITY
Concept Proposals Due January 2019

Funding Year (Round)	--
Funds Requested	--
Awarded? (Y/N)	--
Funds Awarded	--
Total Project Cost	--
Project Name	--
Project Description	--
Project Status	--

Federal Sources

Community Development Block Grant (CDBG) Program

The Community Development Block Grant (CDBG) program is a flexible program that provides communities with resources to address a wide range of unique community development needs.

NEXT FUNDING OPPORTUNITY

--

Funding Year (Round)	2015 (Round 6)
Funds Requested	\$434,936
Awarded? (Y/N)	Y
Funds Awarded	\$434,936
Total Project Cost	\$434,936
Project Name	Cycle 6 ADA Pedestrian Ramp Improvements
Project Description	ADA Pedestrian Ramp Improvements.
Project Status	Complete

Funding Year (Round)	2016 (Round 6)
Funds Requested	\$139,591
Awarded? (Y/N)	Y
Funds Awarded	\$139,591
Total Project Cost	\$139,591
Project Name	Elsworth Street and Sherman Avenue Sidewalk Improvements
Project Description	Construction of sidewalks, curbs, and gutters on the west side of Elsworth Street from Alessandro Blvd to Sherman Avenue and on the south side of Sherman Ave from Elsworth Street to Day Street.
Project Status	Complete

Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grant Program

This program supports projects that are "road or bridge projects eligible under title 23, United States Code;" and "intermodal projects." This program replaces the TIGER program.

NEXT FUNDING OPPORTUNITY

--

Funding Year (Round)	--
Funds Requested	--
Awarded? (Y/N)	--
Funds Awarded	--
Total Project Cost	--
Project Name	--
Project Description	--
Project Status	--

A

**Appendix A
Collision Location Tables**

Local Intersection Collisions

	Intersection	All Collisions	KSI Collisions
1	CLIMBING ROSE DR & SCARLET SAGE WAY	2	1
2	CENTERPOINT DR & TOWNGATE PLAZA	2	0
3	CLOVERFIELD RD & DELPHINIUM AVE	2	0
4	DAVIS ST & SANDY GLADE AVE	2	0
5	GALLANT FOX DR & PENUNURI WAY	1	1
6	HEMLOCK AVE & OBISPO DR	1	1
7	MONTALVO RD & VIA DEL NORTE	1	1

Major Intersection Collisions

	Intersection	All Collisions	KSI Collisions
1	FREDERICK ST & SUNNYMEAD BLVD/ SH-60 EB OFF-RAMP	6	0
2	FILAREE AVE & PERRIS BLVD	5	2
3	DRACAEA AVE & PERRIS BLVD	5	1
4	HEMLOCK AVE & PERRIS BLVD	5	1
5	ALESSANDRO BLVD & PERRIS BLVD	5	0
6	HEACOCK ST & SUNNYMEAD BLVD	5	0
7	ALESSANDRO BLVD & INDIAN ST	4	0
8	JOHN F KENNEDY DR & PERRIS BLVD	4	0
9	ATWOOD AVE & PERRIS BLVD	3	1
10	BRODIAEA AVE & PERRIS BLVD	3	1
11	LASSELLE ST & VIA DE ANZA	3	1
12	CAMINO JUANITO & KRAMERIA AVE	3	0
13	EUCALYPTUS AVE & FREDERICK ST	3	0
14	HEMLOCK AVE & PIGEON PASS RD	3	0
15	IRIS AVE & PERRIS BLVD	3	0

MAJOR INTERSECTION COLLISIONS
CONTINUED

Intersection	All Collisions	KSI Collisions
16 IRONWOOD AVE & PERRIS BLVD	3	0
17 ARBOR PARK LN & EUCALYPTUS AVE	2	2
18 JOHN F KENNEDY DR & PEPPER CT	2	2
19 ALESSANDRO BLVD & COVEY QUAIL LN	2	1
20 ALESSANDRO BLVD & RAMSDELL DR	2	1
21 BRODIAEA AVE & KITCHING ST	2	1
22 CACTUS AVE & HEACOCK ST	2	1
23 CACTUS AVE & JOSHUA TREE AVE	2	1
24 FIR AVE & HEACOCK ST	2	1
25 GRAHAM ST & IRONWOOD AVE	2	1
26 HEACOCK ST & IRONWOOD AVE	2	1
27 IRONWOOD AVE & TUSCOLA ST	2	1
28 OLD LAKE DR & PIGEON PASS RD	2	1
29 ALESSANDRO BLVD & COURAGE ST	2	0
30 AVENIDA CIRCO/COACHLIGHT CT & IRIS AVE	2	0
31 COTTONWOOD AVE & ELSWORTH ST	2	0
32 COTTONWOOD AVE & GRAHAM ST	2	0
33 COTTONWOOD AVE & HEACOCK ST	2	0
34 COTTONWOOD AVE & PERRIS BLVD	2	0
35 DRACAEA AVE & HEACOCK ST	2	0
36 DRACAEA AVE & KITCHING ST	2	0
37 ELDER AVE & PERRIS BLVD	2	0

Intersection	All Collisions	KSI Collisions
38 EUCALYPTUS AVE & HEACOCK ST	2	0
39 EUCALYPTUS AVE/MEMORIAL WAY & TOWNGATE BLVD	2	0
40 HEACOCK ST & HEMLOCK AVE	2	0
41 HERITAGE WAY & TOWNGATE BLVD	2	0
42 INDIAN ST & VANDENBERG DR	2	0
43 LASSELLE ST & COLLEGE DR	2	0
44 LORAIN TER & SUNNYMEAD BLVD	2	0
45 PERRIS BLVD & SUNNYMEAD BLVD	2	0
46 SUNNYMEAD RANCH PKWY & VILLAGE RD	2	0
47 ALESSANDRO BLVD & GAYE ST	1	1
48 BAY AVE & HEACOCK ST	1	1
49 BRODIAEA AVE & MORENO BEACH DR	1	1
50 CACTUS AVE & I-215 NB OFF-RAMP	1	1
51 CAMINO FLORES & IRIS AVE	1	1
52 ELY DR & JOHN F KENNEDY DR	1	1
53 GRAHAM ST & OLD VALLEY DR	1	1
54 HEACOCK ST & KERNWOOD DR	1	1
55 INDIAN ST & ONEIDA ST	1	1
56 IRIS AVE & LASSELLE ST	1	1
57 IRONWOOD AVE & PALM LN	1	1
58 IRONWOOD AVE & ZANTAR LN	1	1
59 MYERS AVE & PERRIS BLVD	1	1

Local Roadway Collisions

	Intersection	North/West Extent	South/East Extent	All Collisions	KSI Collisions
1	HEMLOCK AVE	SH-60 WB OFF-RAMP	CALLE SOMBRA	3	1
2	CENTERPOINT DR	TOWN CIR	FREDERICK ST	3	0
3	DAVIS ST	SANDY GLADE AVE	MOONRAKER LN	3	0
4	FILAREE AVE	PERRIS BLVD	SHEILA ST	3	0
5	CLIMBING ROSE DR	SCARLET SAGE WAY	YELLOW IRIS WAY	2	1
6	ATWOOD AVE	INDIAN ST	PERRIS BLVD	2	0
7	DRACAEA AVE	DRIVEWAY	PERRIS BLVD	2	0
8	DRACAEA AVE	PERRIS BLVD	BIRCHWOOD DR	2	0
9	HEMLOCK AVE	ONYX PL	PERRIS BLVD	2	0
10	HIDDEN SPRINGS DR	COUNTRY GATE RD	BOX SPRINGS MOUNTAIN RESERVE DRIVEWAY	2	0
11	MEMORIAL WAY	GATEWAY DR	EUCALYPTUS AVE	2	0
12	CANYONSTONE DR	STONEBRIDGE CT	PUDDINGSTONE DR	1	1
13	GALLANT FOX DR	PENUNURI WAY	COUNT FLEET CT	1	1
14	HEMLOCK AVE	INDIAN ST	OBISPO DR	1	1
15	HEMLOCK AVE	SWEGLES LN	DEERWOOD LN	1	1
16	KALMIA ST	CANDIDA PL	LOMBARDY LN	1	1
17	NUTMEG ST	NINEBARK ST	JIM DR	1	1
18	OLD LAKE DR	PIGEON PASS RD	MEADOW LARK AVE	1	1
19	RAENETTE WAY	DRACAEA AVE	FOXGLOVE WAY	1	1
20	VIA DEL NORTE	MONTALVO RD	SUNNYMEAD RANCH PKWY	1	1
21	WILLOWGROVE PL	FAIRMONT DR	HASTINGS DR	1	1

Major Roadway Collisions

	Intersection	North/West Extent	South/East Extent	All Collisions	KSI Collisions
1	ALESSANDRO BLVD	INDIAN ST	COVEY QUAIL LN	5	2
2	ALESSANDRO BLVD	GAYE ST	PERRIS BLVD	5	2
3	FREDERICK ST	SUNNYMEAD BLVD	CENTERPOINT DR	4	0
4	ALESSANDRO BLVD	GRAHAM ST	ALLESANDRO PLAZA	3	1
5	ALESSANDRO BLVD	BRANDT DR	INDIAN ST	3	1
6	SUNNYMEAD BLVD	FREDERICK ST	OLIVE WOOD PLAZA DR	3	1
7	FREDERICK ST	EUCALYPTUS AVE	DRACAEA AVE	3	0
8	INDIAN ST	BAY AVE	ALESSANDRO BLVD	3	0
9	IRIS AVE	PERRIS BLVD	WEDOW DR	3	0
10	KITCHING ST	DRACAEA AVE	COTTONWOOD AVE	3	0
11	KRAMERIA AVE	CAMINO JUANITO	VISTA CONEJO DR	3	0
12	PERRIS BLVD	SUNNYMEAD BLVD	FIR AVE	3	0
13	PERRIS BLVD	JOHN F KENNEDY DR	FILAREE AVE	3	0
14	SUNNYMEAD BLVD	LORAIN TER	HEACOCK ST	3	0
15	SUNNYMEAD BLVD	HEACOCK ST	BACK WAY	3	0
16	EUCALYPTUS AVE	DAY ST	ARBOR PARK LN	2	2
17	JOHN F KENNEDY DR	PEPPER CT	ALLEY	2	2
18	PERRIS BLVD	DRACAEA AVE	COTTONWOOD AVE	2	2
19	PERRIS BLVD	FILAREE AVE	GENTIAN AVE	2	2
20	ALESSANDRO BLVD	RAMSDELL DR	VIA VARGAS DR	2	1
21	HEACOCK ST	WEBSTER AVE	FIR AVE	2	1
22	INDIAN ST	ONEIDA ST	COTTONWOOD AVE	2	1
23	IRONWOOD AVE	GRAHAM ST	GARY CT	2	1
24	KITCHING ST	ALESSANDRO BLVD	BRODIAEA AVE	2	1
25	PERRIS BLVD	ABBAY LN	HEMLOCK AVE	2	1

**MAJOR ROADWAY COLLISIONS
CONTINUED**

Intersection	North/West Extent	South/East Extent	All Collisions	KSI Collisions
26 PERRIS BLVD	ALESSANDRO BLVD	BRODIAEA AVE	2	1
27 PERRIS BLVD	EUCALYPTUS AVE	ATWOOD AVE	2	1
28 PERRIS BLVD	MYERS AVE	EUCALYPTUS AVE	2	1
29 ALESSANDRO BLVD	COURAGE ST	FREDERICK ST	2	0
30 DAY ST	GATEWAY DR	EUCALYPTUS AVE	2	0
31 DAY ST	SH-60 EBON	CAMPUS PKWY	2	0
32 HEACOCK ST	SUNNYMEAD BLVD	WEBSTER AVE	2	0
33 HEACOCK ST	ATWOOD AVE	DRACAEA AVE	2	0
34 INDIAN ST	ELMENDORF DR	VANDENBERG DR	2	0
35 INDIAN ST	ALESSANDRO BLVD	JENKINS DR	2	0
36 IRIS AVE	CAMINO FLORES	AVENIDA CIRCO	2	0
37 JOHN F KENNEDY DR	PERRIS BLVD	LA BRISIS WAY	2	0
38 KRAMERIA AVE	KITCHING ST	CAMINO JUANITO	2	0
39 LASSELLE ST	DRIVEWAY	VIA DE ANZA	2	0
40 LASSELLE ST	DRIVEWAY	COLLEGE DR	2	0
41 PERRIS BLVD	DELPHINIUM AVE	JOHN F KENNEDY DR	2	0
42 PERRIS BLVD	BRODIAEA AVE	NOGAL ST	2	0
43 PERRIS BLVD	COTTONWOOD AVE	ST CHRISTOPHER LN	2	0
44 PERRIS BLVD	ELDER AVE	SH-60 WBON	2	0
45 PERRIS BLVD	HEMLOCK AVE	ELDER AVE	2	0
46 PIGEON PASS RD	CHAMBRAY DR	HEMLOCK AVE	2	0
47 PIGEON PASS RD	CLIMBING ROSE DR	SEABROOK LN	2	0
48 PIGEON PASS RD	OLD LAKE DR	COUGAR CANYON DR	2	0
49 TOWNGATE BLVD	SOUTHGATE ST	HERITAGE WAY	2	0
50 ALESSANDRO BLVD	KITCHING ST	CHARA ST	1	1

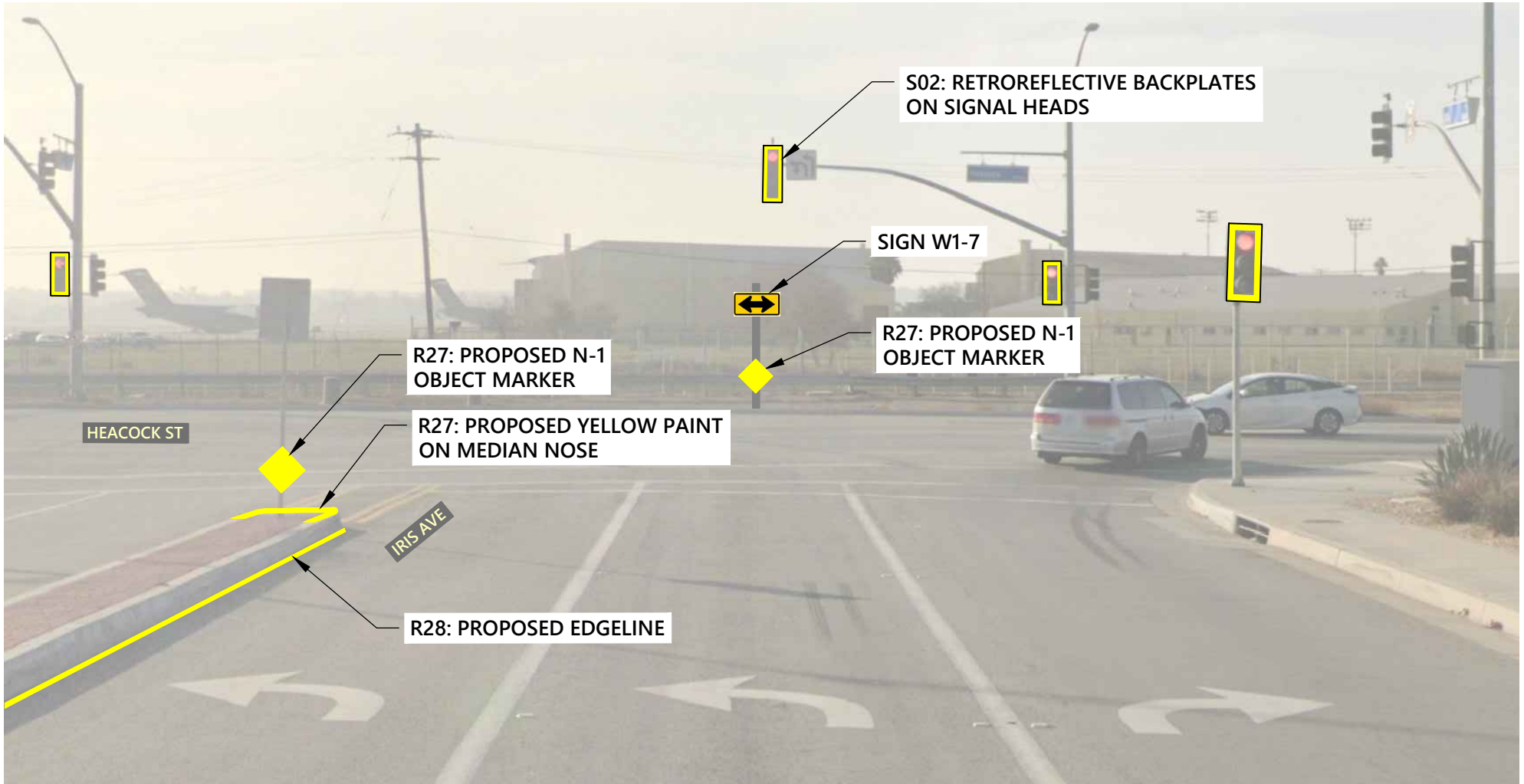
MAJOR ROADWAY COLLISIONS
CONTINUED

	Intersection	North/West Extent	South/East Extent	All Collisions	KSI Collisions
51	ALESSANDRO BLVD	CHERVIL CT	LASSELLE ST	1	1
52	CACTUS AVE	COMMERCE CENTER DR	ELSWORTH ST	1	1
53	CACTUS AVE	GILBERT ST	HEACOCK ST	1	1
54	CACTUS AVE	JOSHUA TREE AVE	PERHAM DR	1	1
55	GRAHAM ST	SUNNYMEADOWS DR	OLD VALLEY DR	1	1
56	HEACOCK ST	GREGORY LN	KERNWOOD DR	1	1
57	HEACOCK ST	BAY AVE	ALESSANDRO BLVD	1	1
58	IRIS AVE	LASSELLE ST	CAMINO FLORES	1	1
59	IRIS AVE	NEW LIGHT WAY	EMMA LN	1	1
60	IRONWOOD AVE	TUSCOLA ST	SLAWSON AVE	1	1
61	IRONWOOD AVE	ZANTAR LN	DAVIS ST	1	1
62	IRONWOOD AVE	HEACOCK ST	TABOR DR	1	1
63	IRONWOOD AVE	IRONWOOD LN	PALM LN	1	1
64	JOHN F KENNEDY DR	LA BRISIS WAY	ELY DR	1	1
65	KRAMERIA AVE	SADDLEBROOK LN	KITCHING ST	1	1
66	LASSELLE ST	VIA DE ANZA	DRIVEWAY	1	1
67	LASSELLE ST	IRIS AVE	B ST	1	1
68	MORENO BEACH DR	ALESSANDRO BLVD	BRODIAEA AVE	1	1
69	PERRIS BLVD	GLOBE ST	CITY BOUNDARY	1	1
70	PERRIS BLVD	RIVARD RD	SAN MICHELE RD	1	1
71	TOWNGATE BLVD	HERITAGE WAY	FREDERICK ST	1	1

Appendix C: Concept Plans prepared for HSIP Cycle 11 Applications



Iris: Between Heacock and Nason

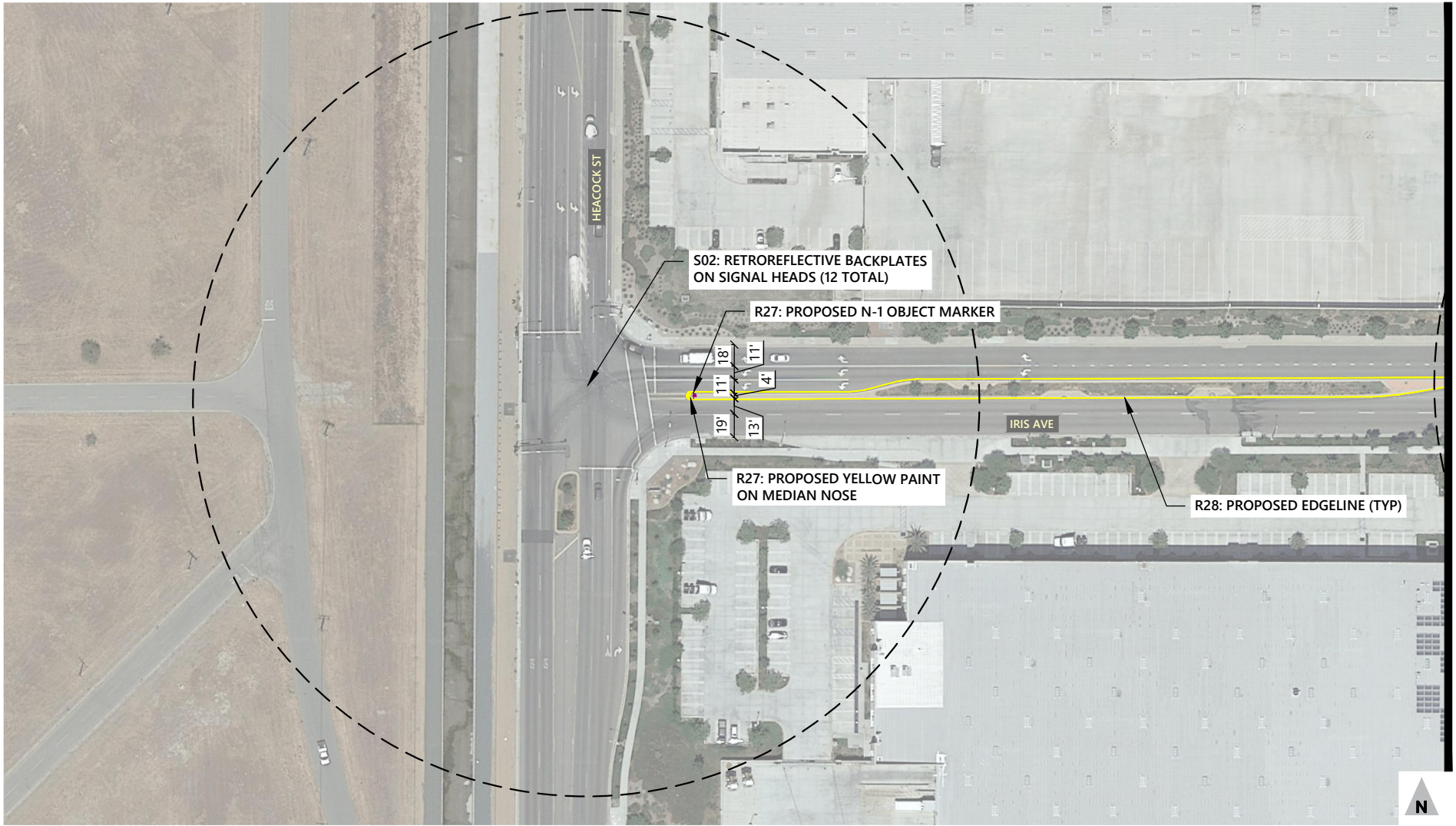


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Aug 30, 2022



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL
DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

Iris Avenue and Heacock Street
08-Moreno Valley-2



MATCHLINE - SEE PAGE 2

GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

LEGEND:

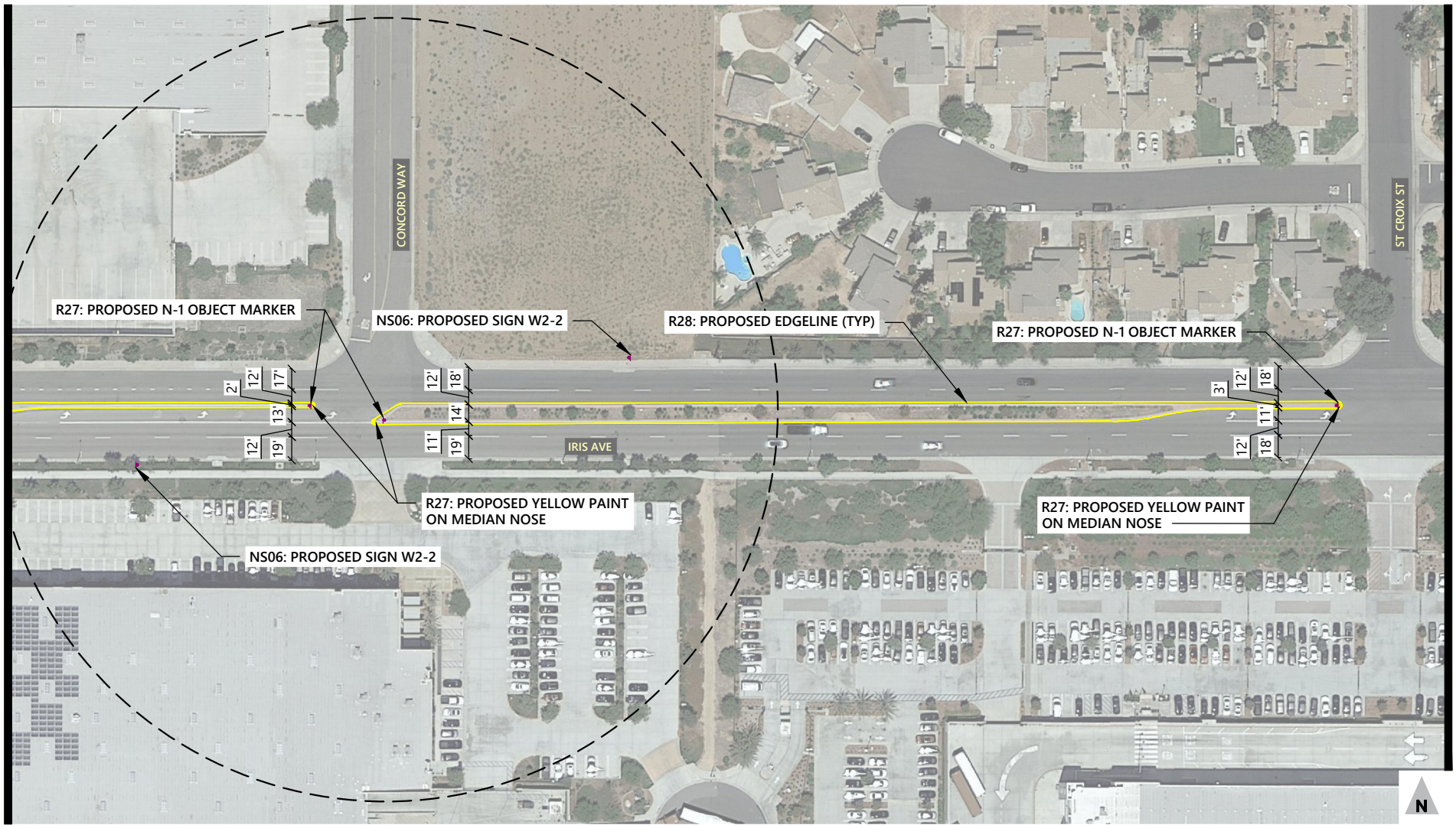
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Aug 30, 2022 CADD FILE: W:\orange county n drive\Projects\0221\0844 moreno valley irsp\Graphics\ACAD\Iris Concept Plans-West.dwg

MATCHLINE - SEE PAGE 1

MATCHLINE - SEE PAGE 3

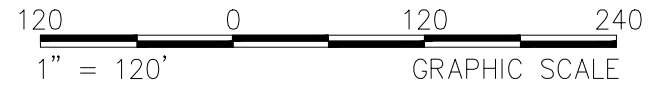


GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

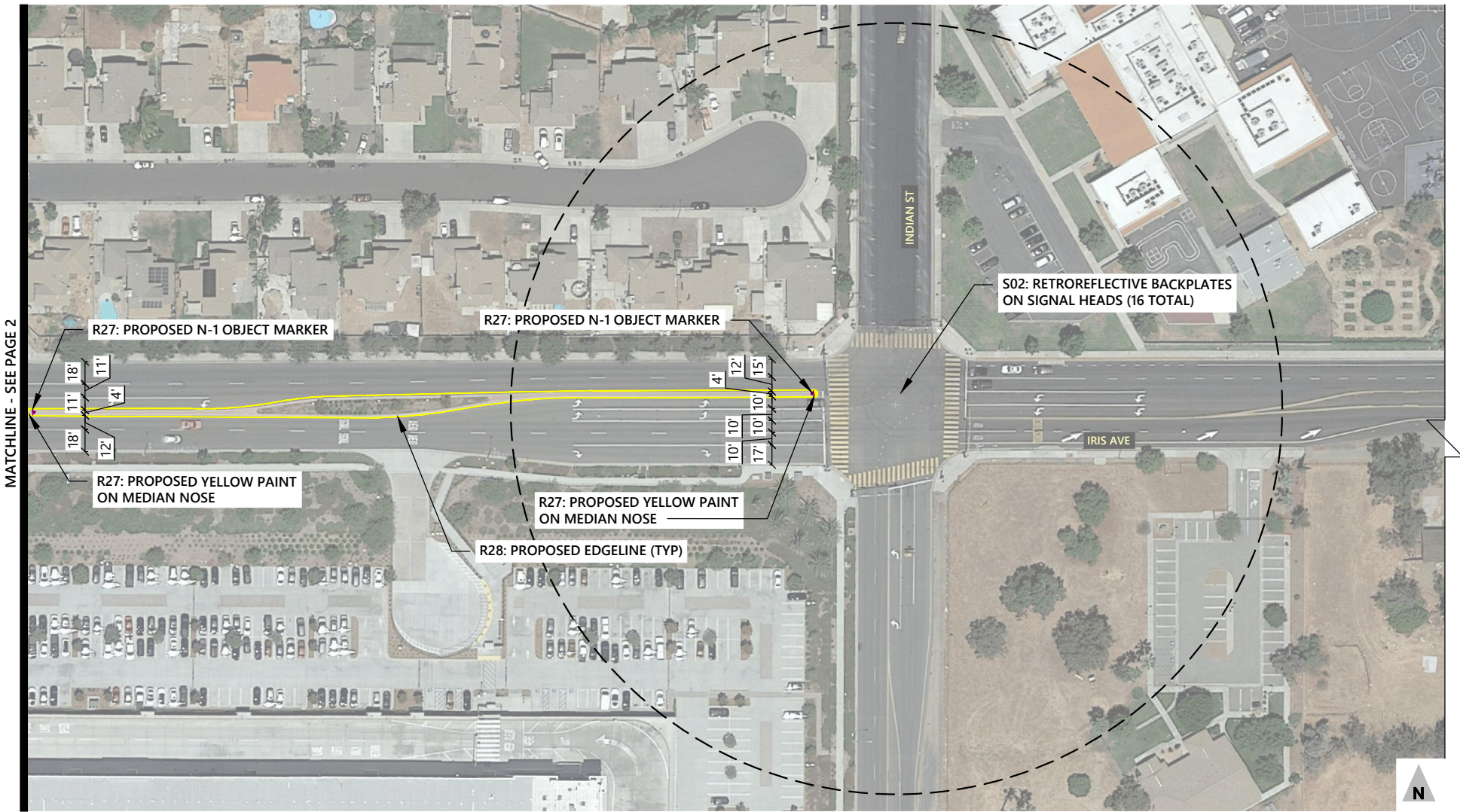
LEGEND:

○ 250 FT INFLUENCE AREA



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

Iris Avenue Between Concord Way and St Croix Street Concept Plan
08-Moreno Valley-2



MATCHLINE - SEE PAGE 2

GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

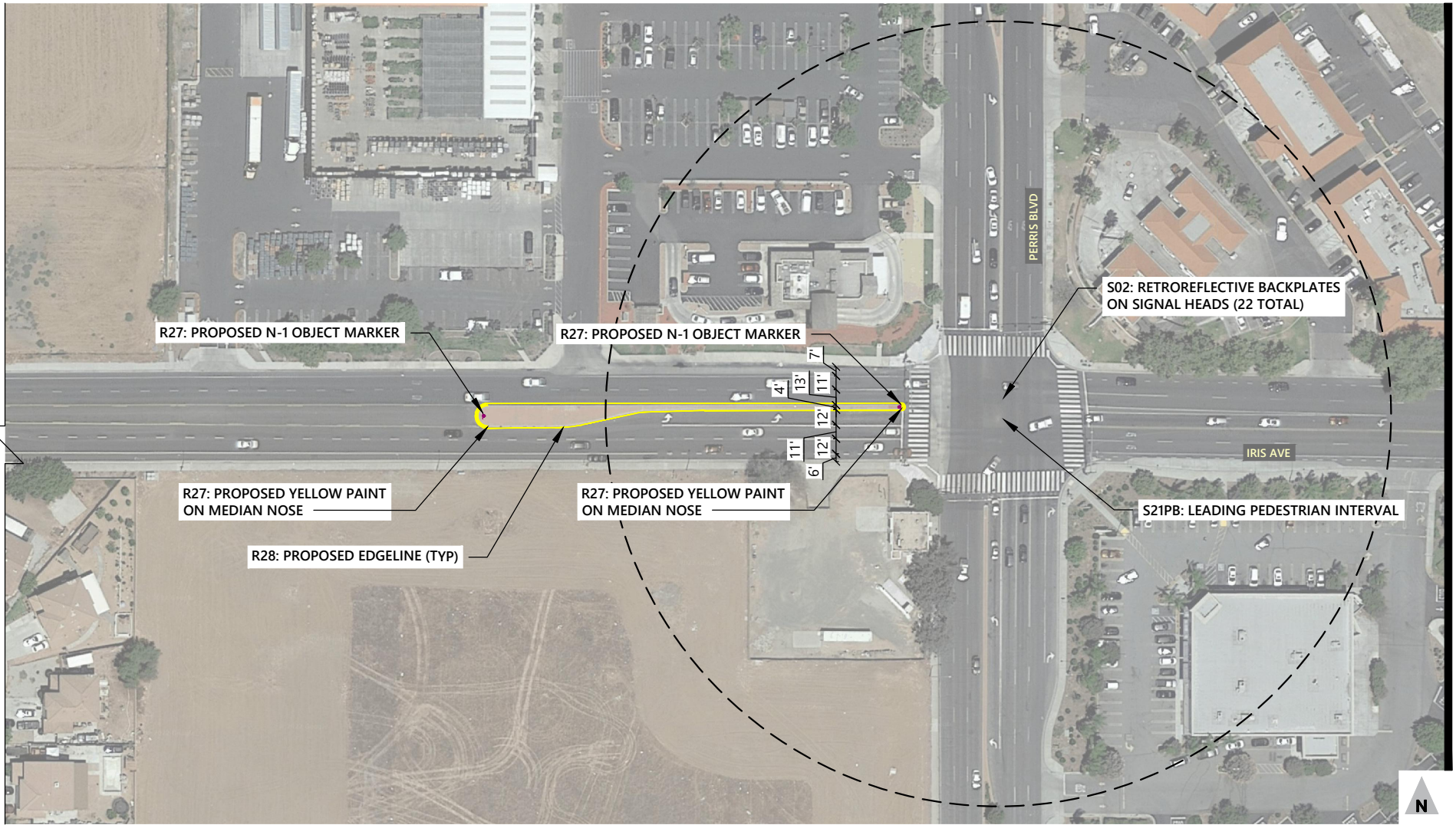
LEGEND:

○ 250 FT INFLUENCE AREA



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

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Aug 30, 2022



MATCHLINE - SEE PAGE 5

GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

LEGEND:

○ 250 FT INFLUENCE AREA



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

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Aug 30, 2022

MATCHLINE - SEE PAGE 4



MATCHLINE - SEE PAGE 6

GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

LEGEND:

○ 250 FT INFLUENCE AREA





GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

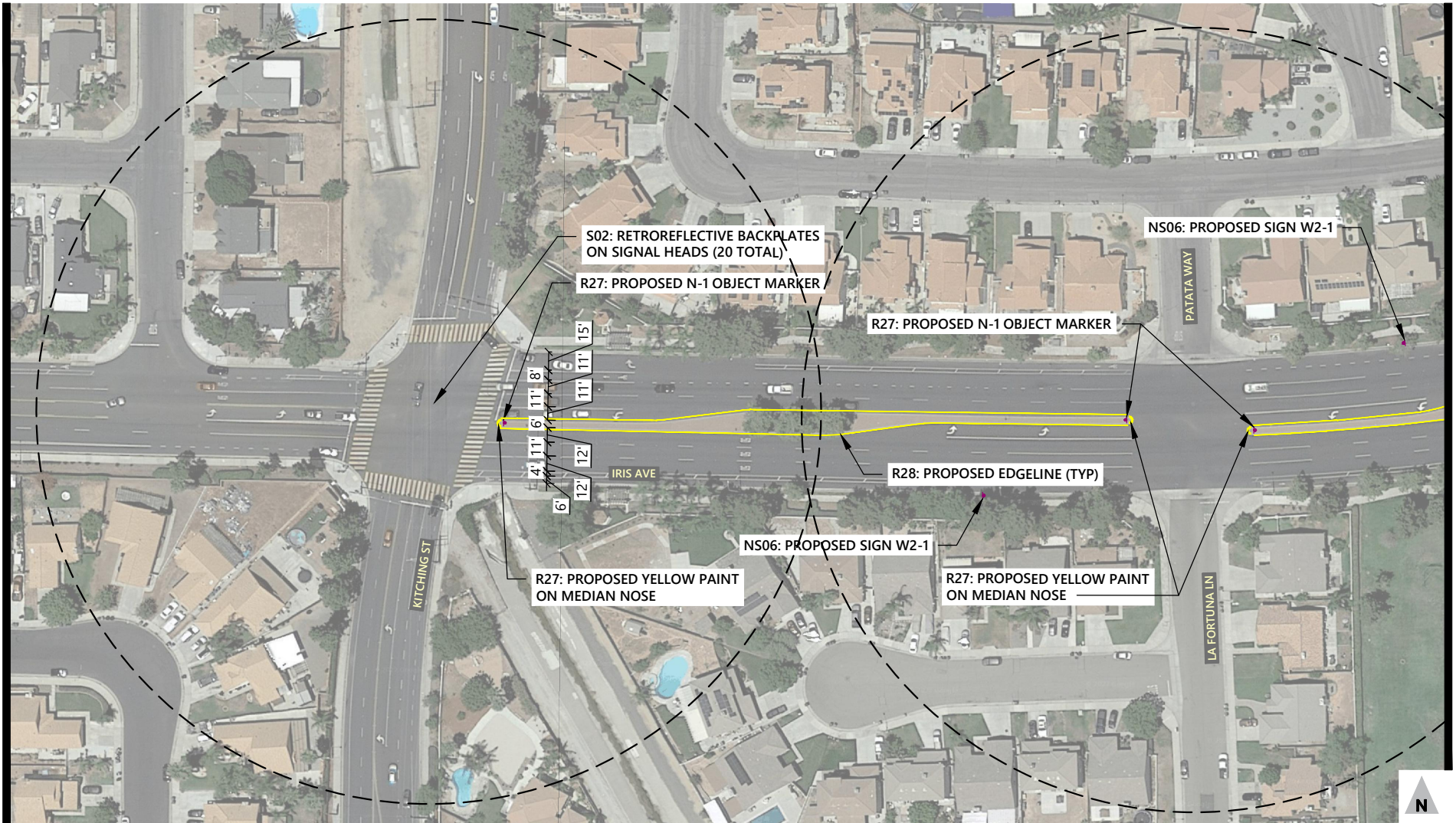
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LEGEND:

○ 250 FT INFLUENCE AREA



MATCHLINE - SEE PAGE 6



MATCHLINE - SEE PAGE 8

GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

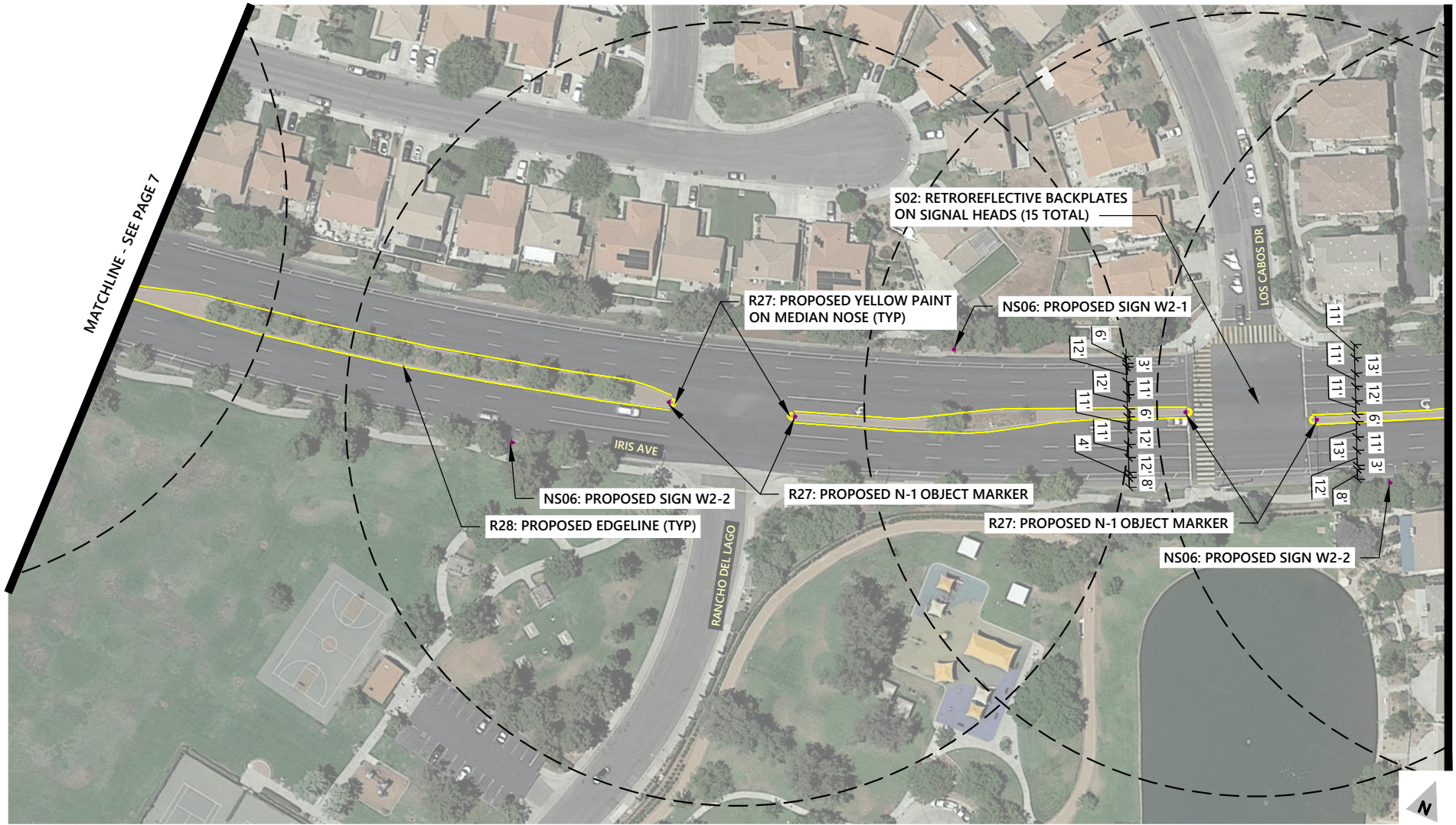
LEGEND:

○ 250 FT INFLUENCE AREA



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

Iris Avenue Between Kitching Street and La Fortuna Lane Concept Plan
08-Moreno Valley-2

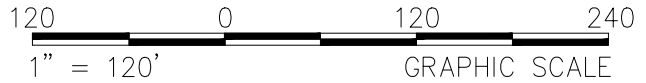


GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

LEGEND:

○ 250 FT INFLUENCE AREA



Iris Avenue Between Rancho Del Lago and Los Cabos Drive Concept Plan
08-Moreno Valley-2

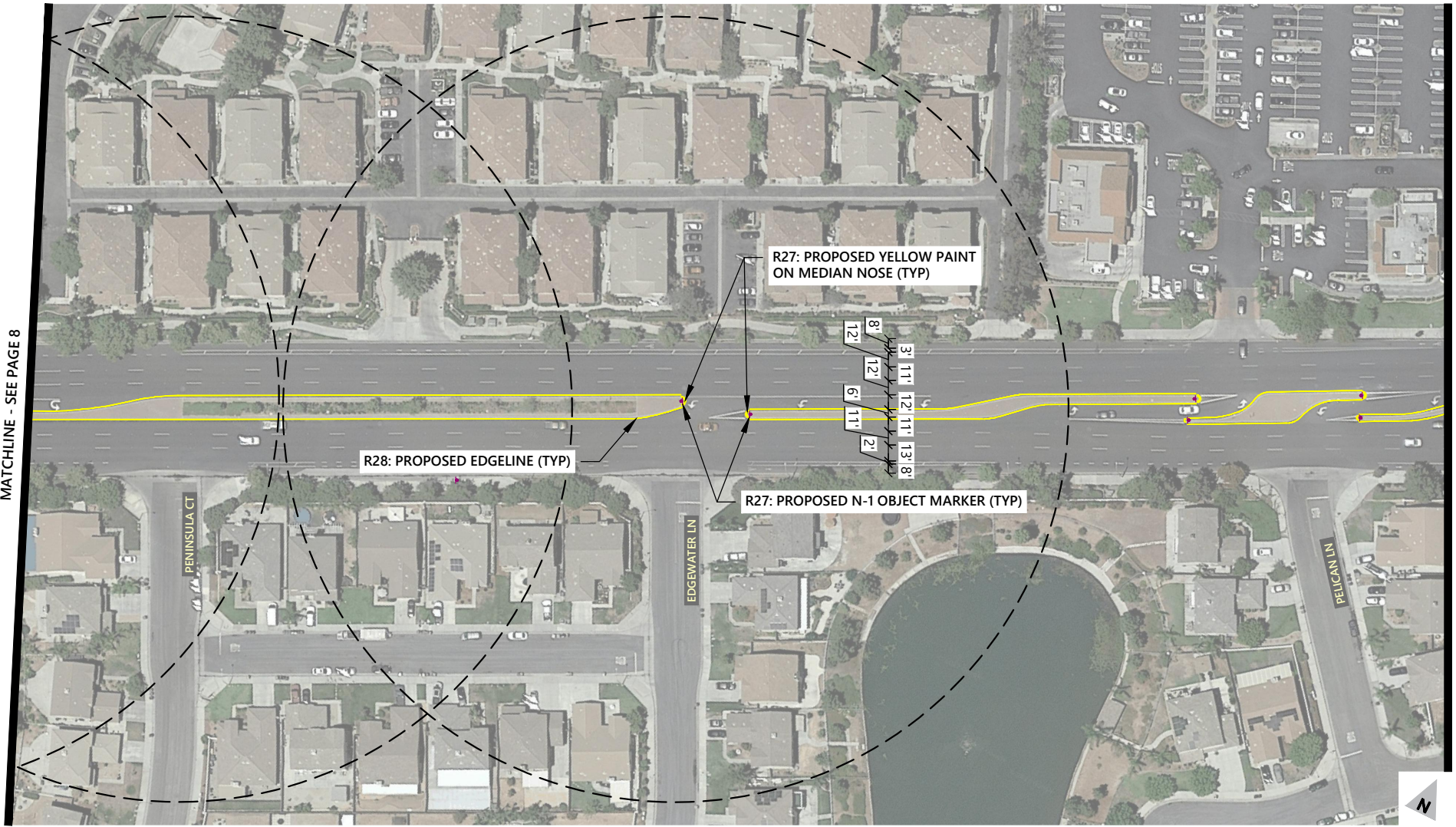
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MATCHLINE - SEE PAGE 9

MATCHLINE - SEE PAGE 7

MATCHLINE - SEE PAGE 8

MATCHLINE - SEE PAGE 10



GENERAL NOTES

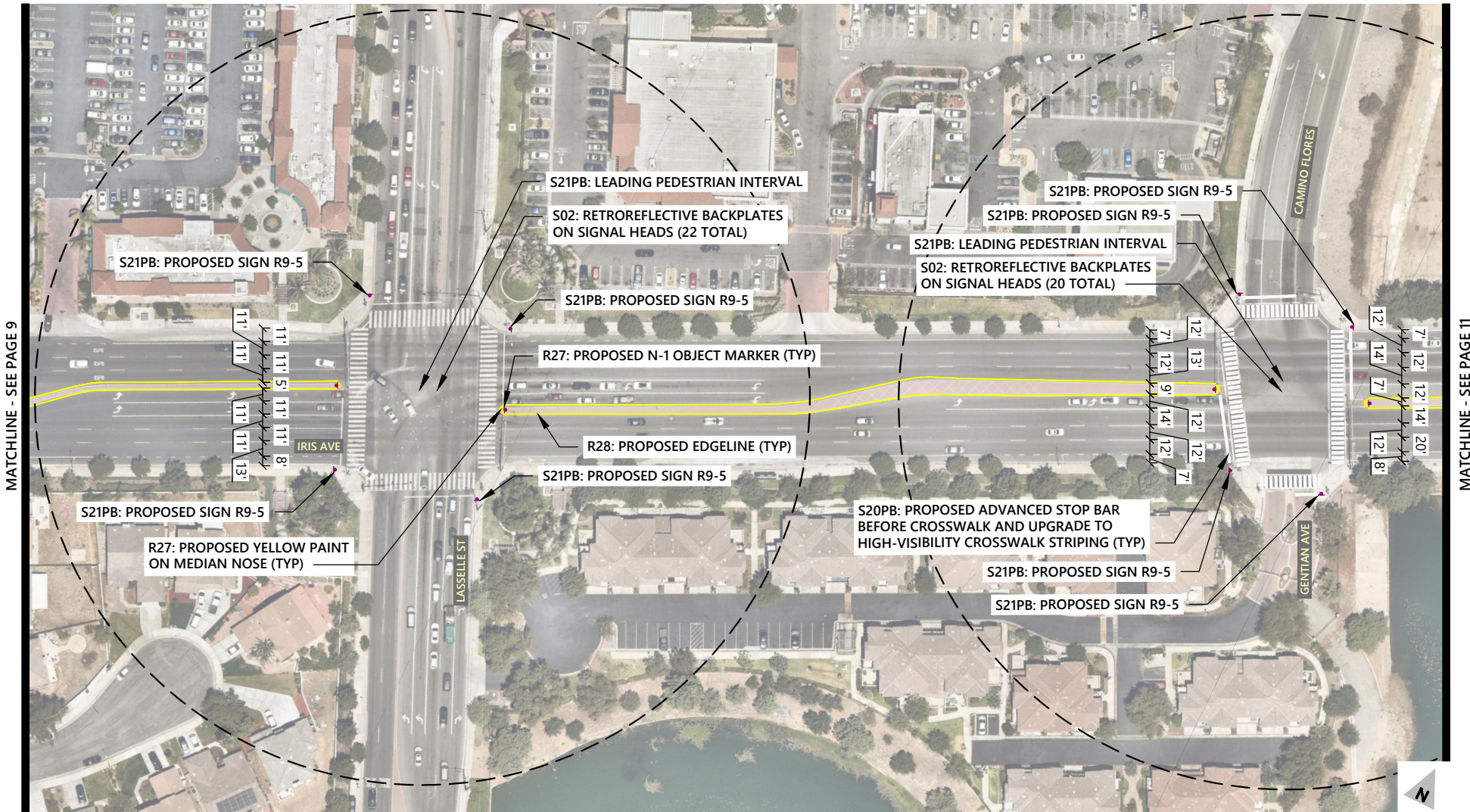
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

LEGEND:

○ 250 FT INFLUENCE AREA



Iris Avenue Between Peninsula Court and Pelican Lane Concept Plan
08-Moreno Valley-2



MATCHLINE - SEE PAGE 9

MATCHLINE - SEE PAGE 11

GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

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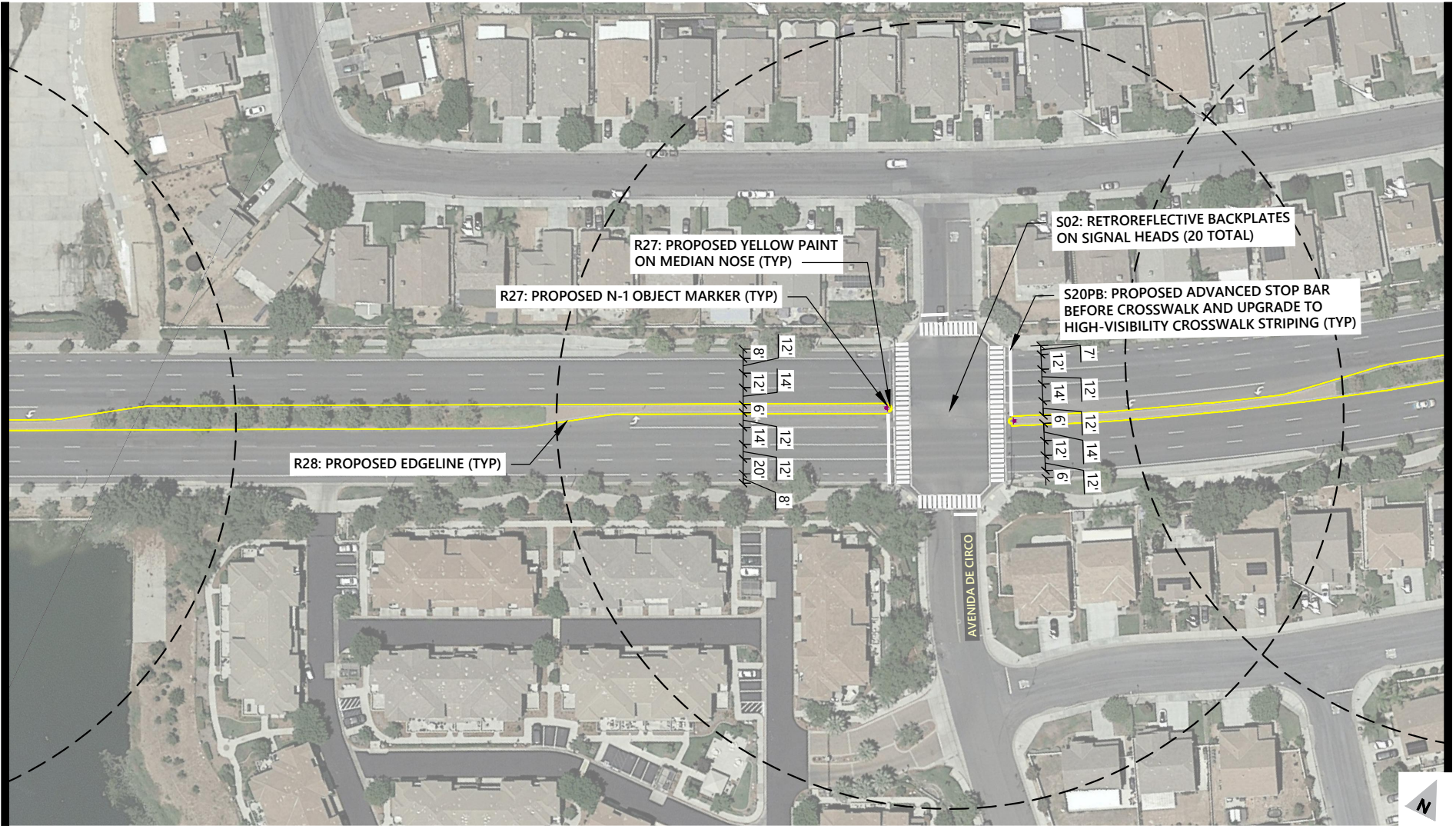
○ 250 FT INFLUENCE AREA



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

Iris Avenue Between Lasselle Street and Camino Flores Concept Plan
 08-Moreno Valley-2

MATCHLINE - SEE PAGE 10



MATCHLINE - SEE PAGE 12

GENERAL NOTES

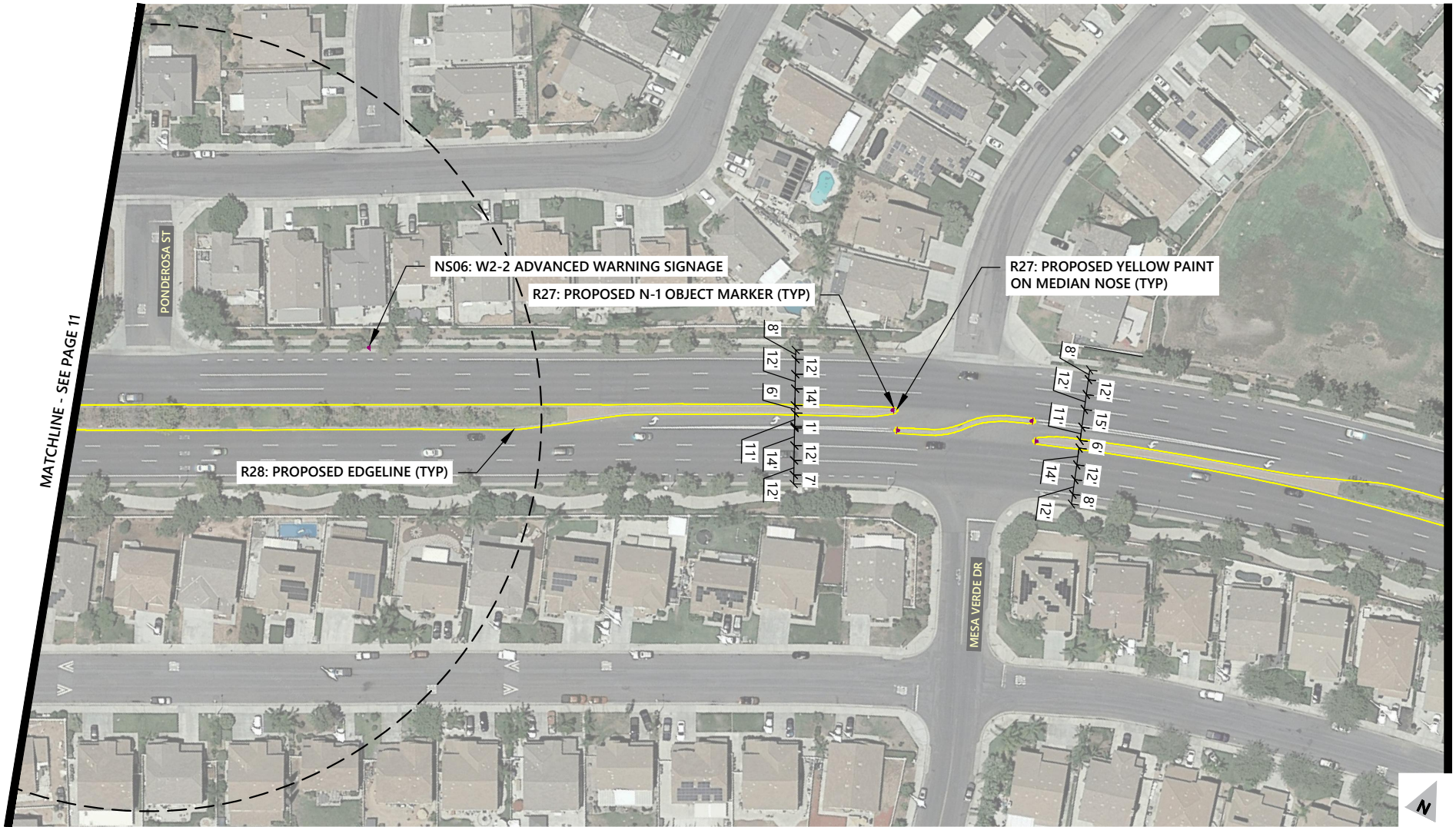
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

LEGEND:

○ 250 FT INFLUENCE AREA



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.



GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

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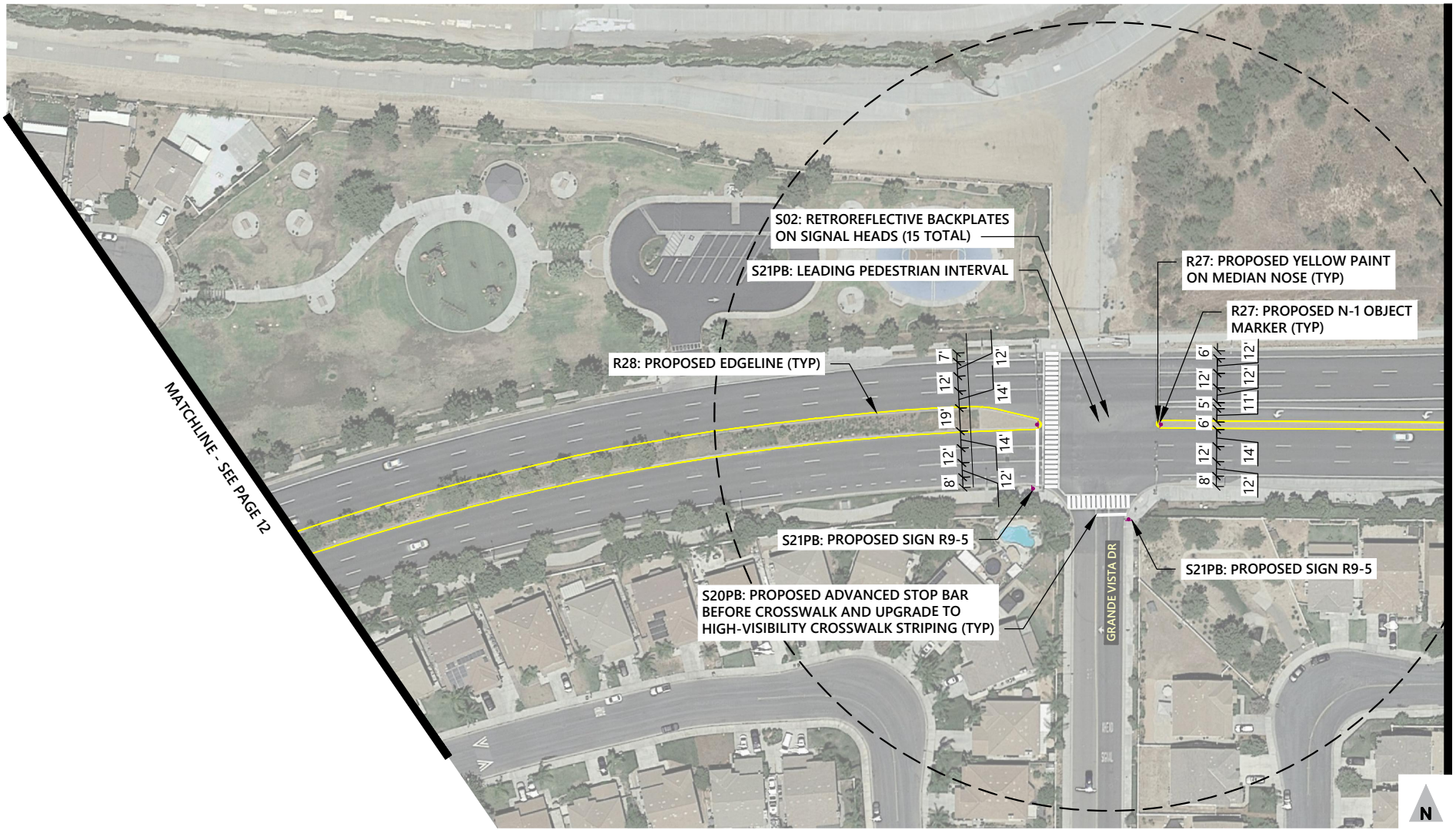
 250 FT INFLUENCE AREA



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

MATCHLINE - SEE PAGE 11

MATCHLINE - SEE PAGE 13



GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

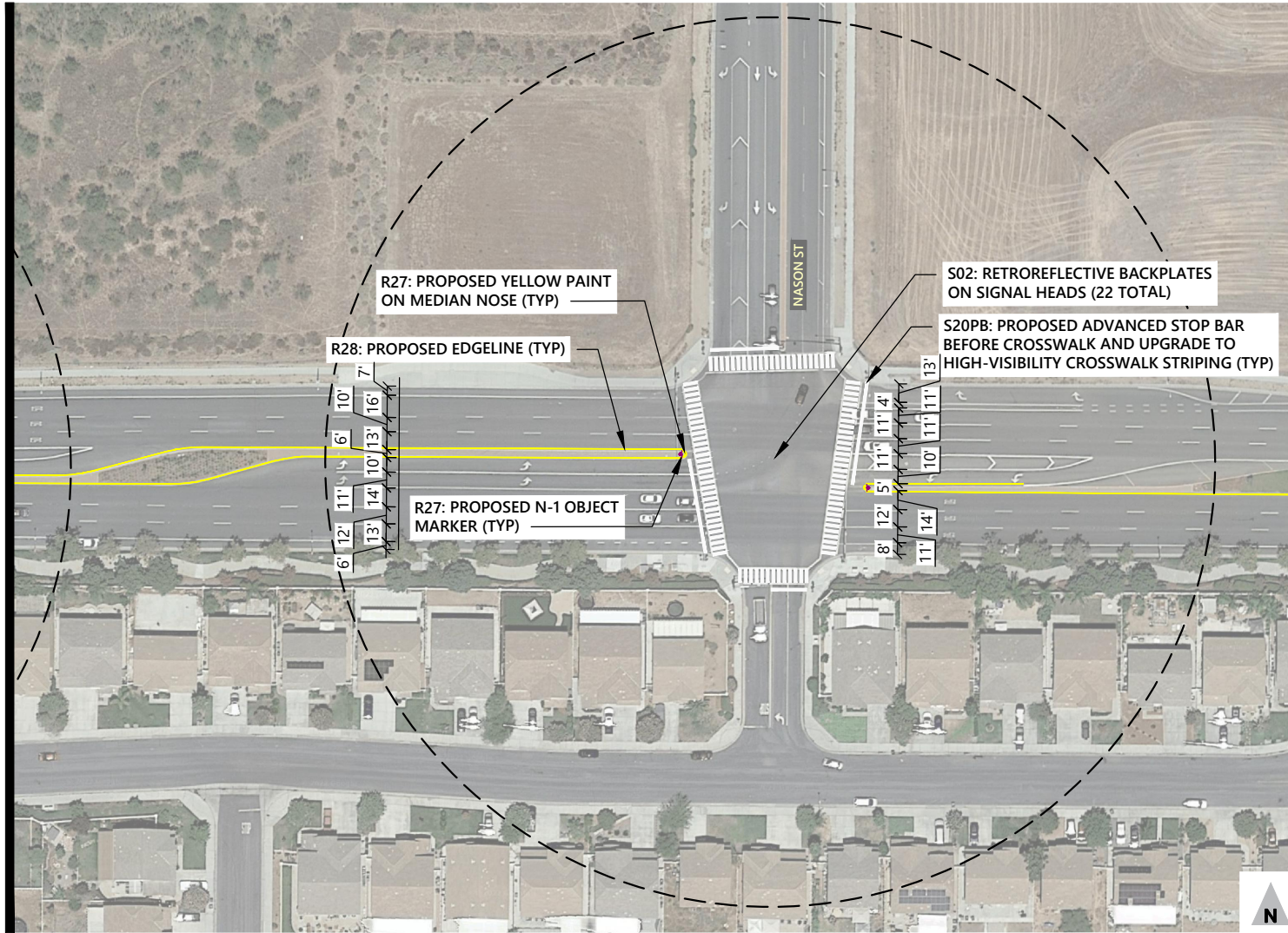
LEGEND:

○ 250 FT INFLUENCE AREA



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

MATCHLINE - SEE PAGE 13



GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED. WIDTHS ARE SHOWN WHERE MEDIAN EDGELINE STRIPING IS PROPOSED FOR REFERENCE.

CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

LEGEND:

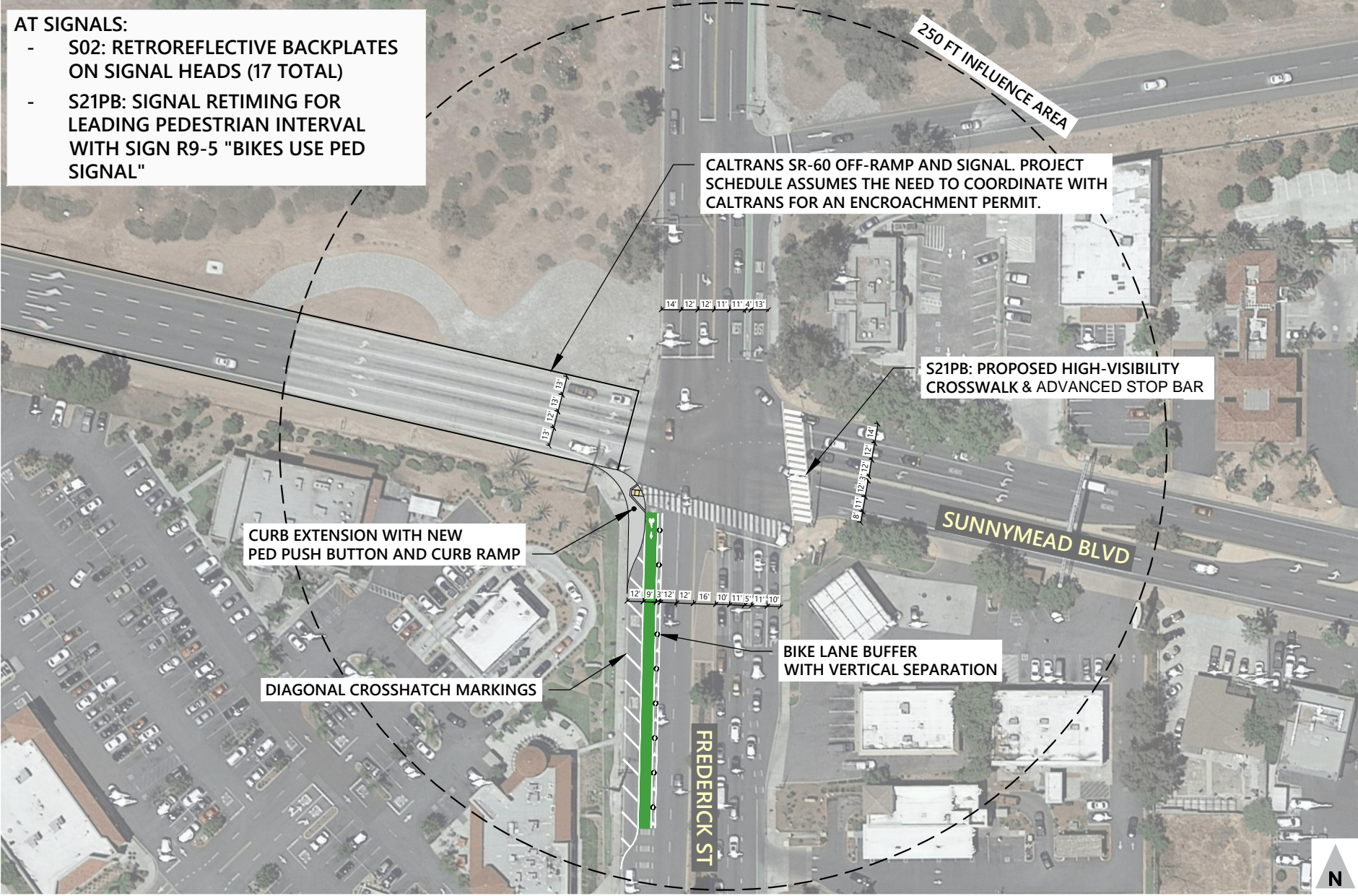
250 FT INFLUENCE AREA





Frederick/Sunnymead Intersection

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Aug 25, 2022



GENERAL NOTE
- CHANGES TO LANE WIDTHS LIMITED TO SOUTH LEG RECEIVING LANES



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

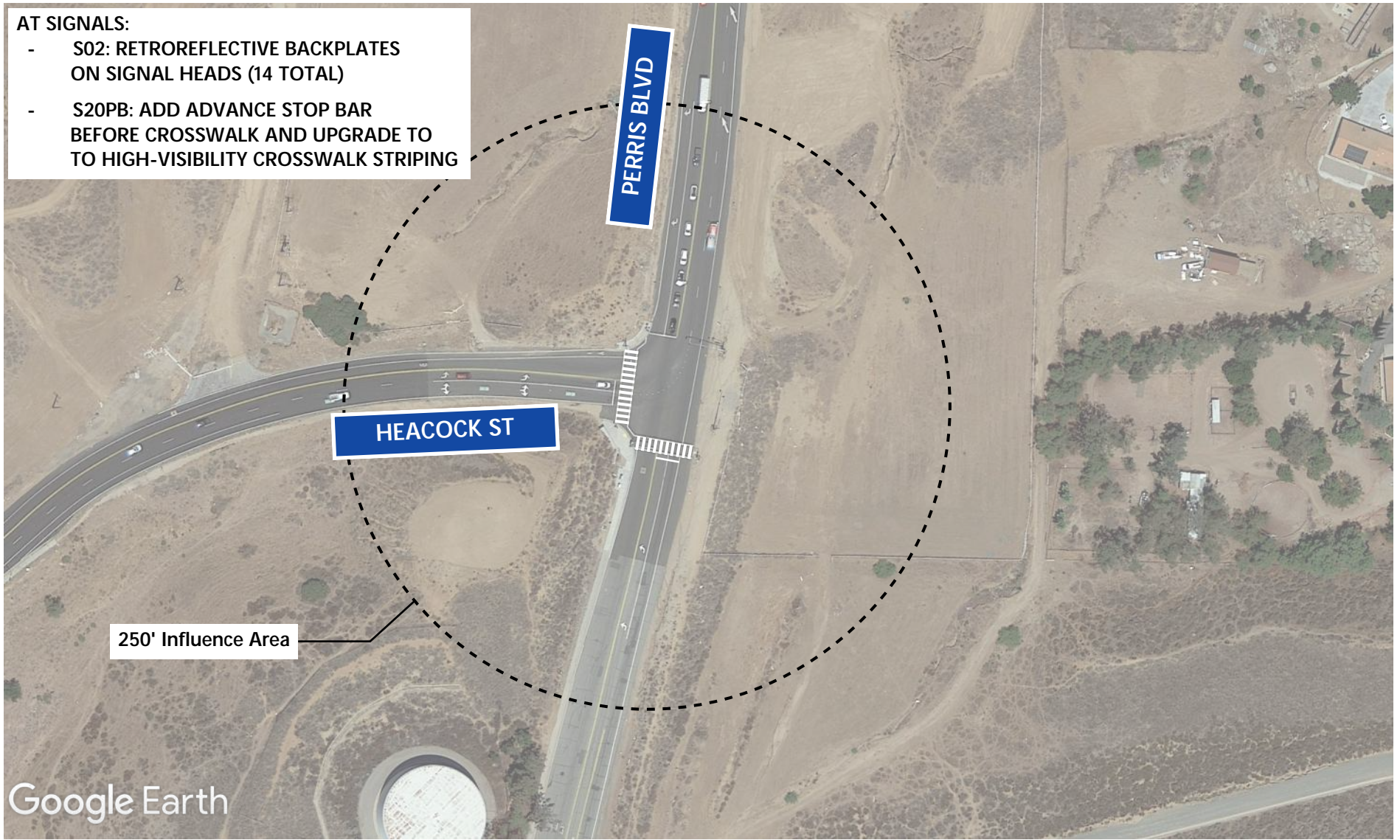
Frederick Street & Sunnymead Boulevard
08-Moreno Valley-4



Perris: 16 Signalized Intersection Locations

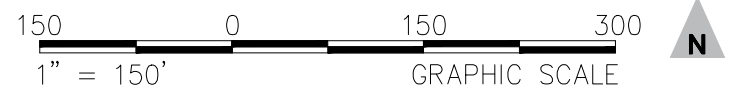
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (14 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO TO HIGH-VISIBILITY CROSSWALK STRIPING



GENERAL NOTES

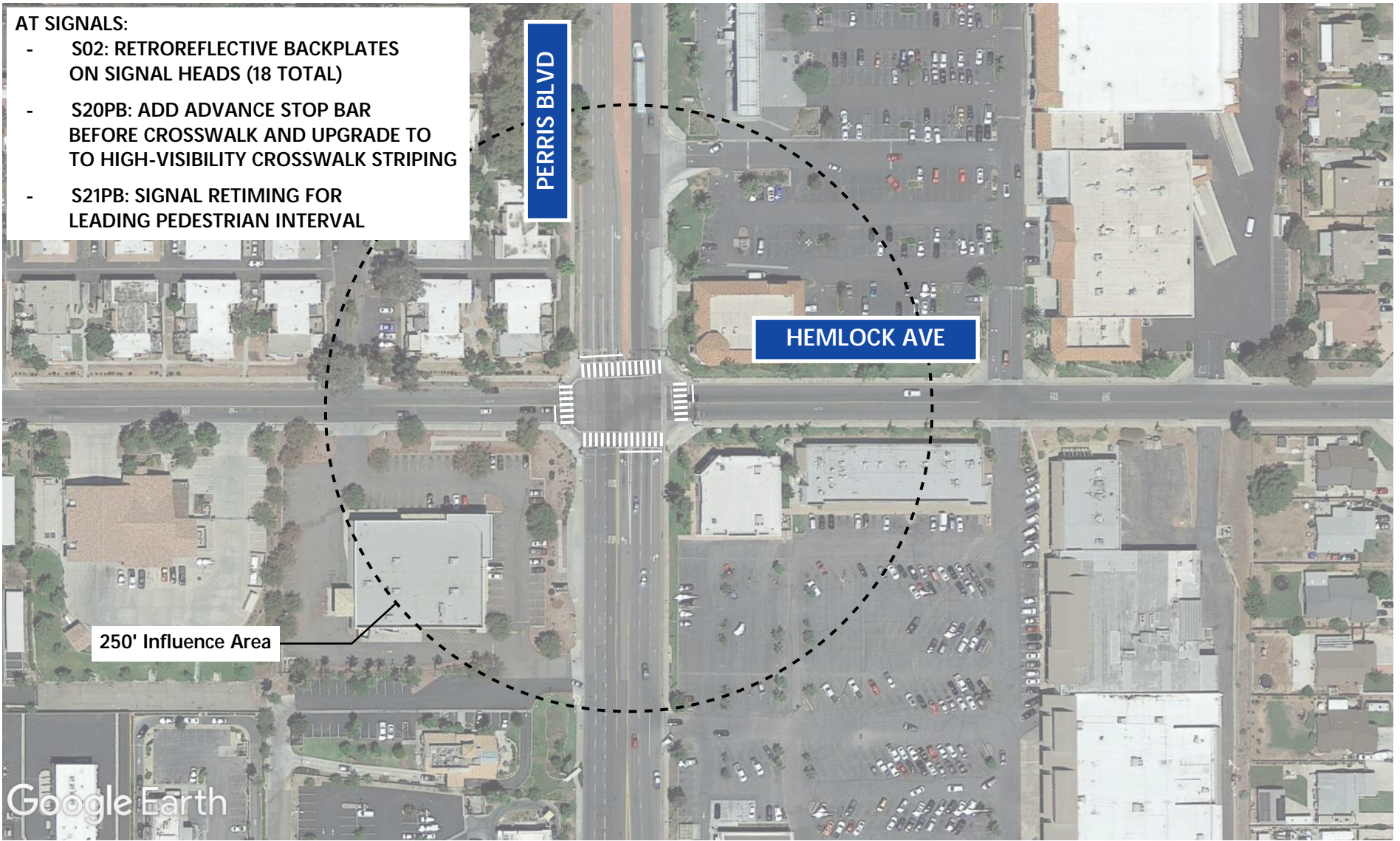
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

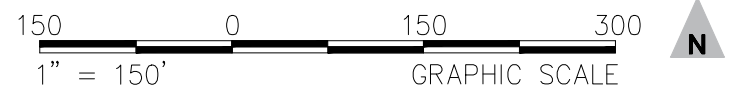
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (18 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING
- S21PB: SIGNAL RETIMING FOR LEADING PEDESTRIAN INTERVAL



GENERAL NOTES

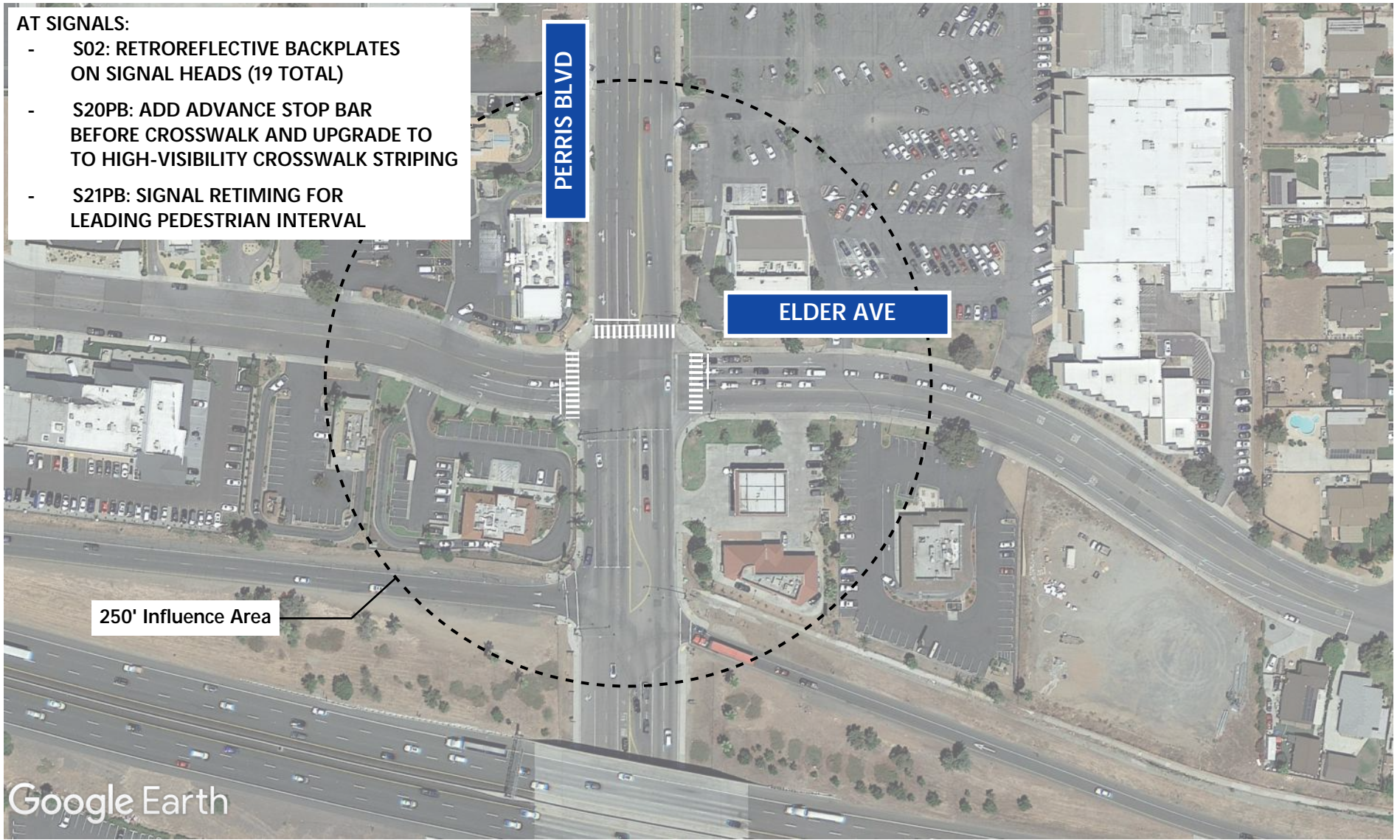
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

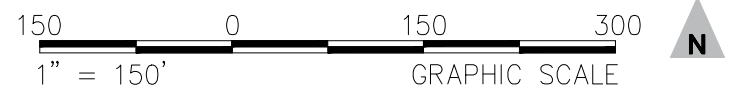
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (19 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO TO HIGH-VISIBILITY CROSSWALK STRIPING
- S21PB: SIGNAL RETIMING FOR LEADING PEDESTRIAN INTERVAL



GENERAL NOTES

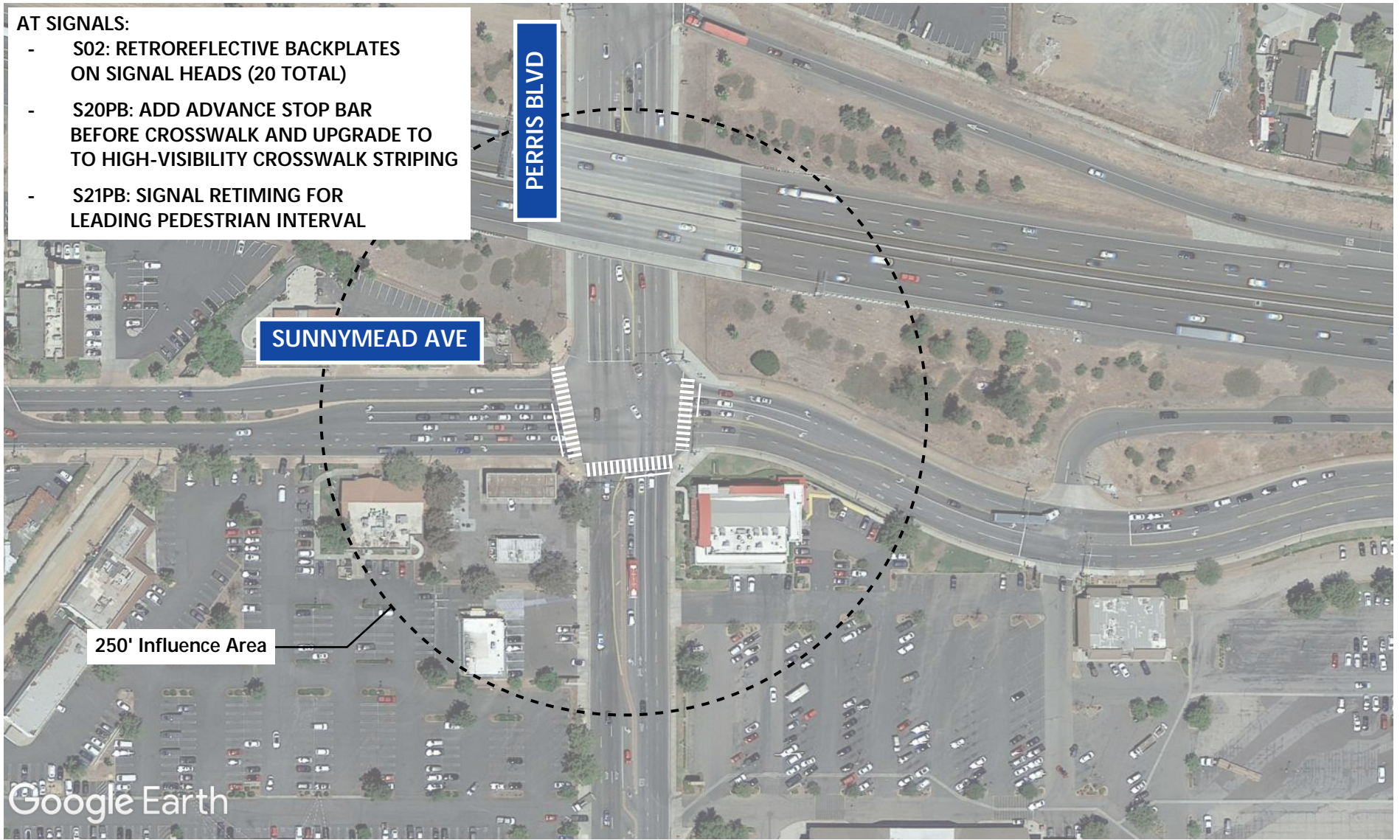
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
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CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

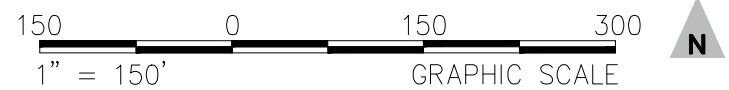
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (20 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING
- S21PB: SIGNAL RETIMING FOR LEADING PEDESTRIAN INTERVAL



GENERAL NOTES

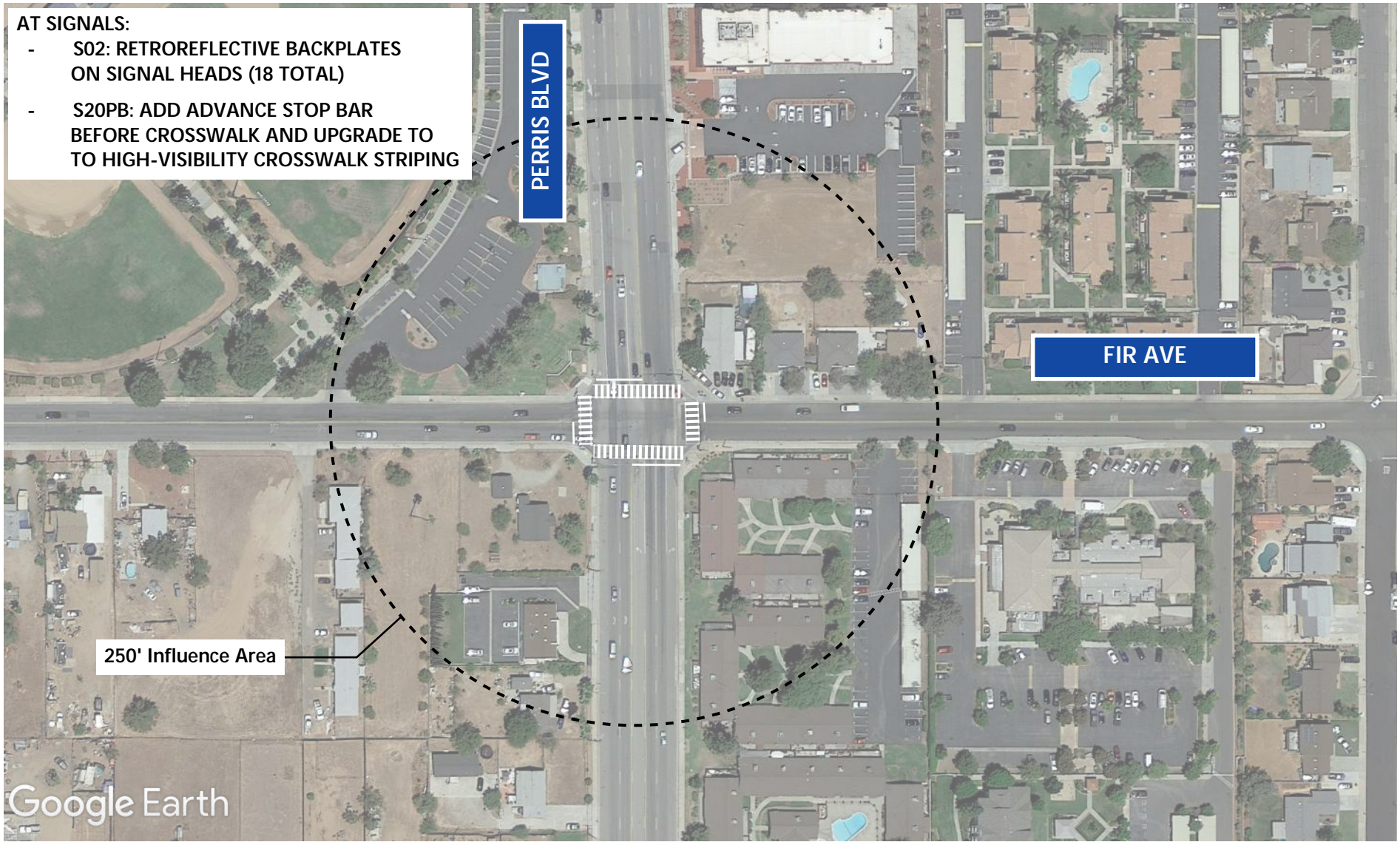
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

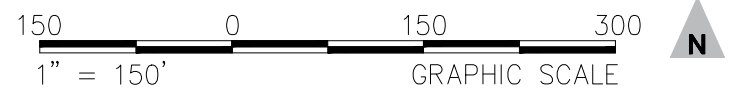
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (18 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING



GENERAL NOTES

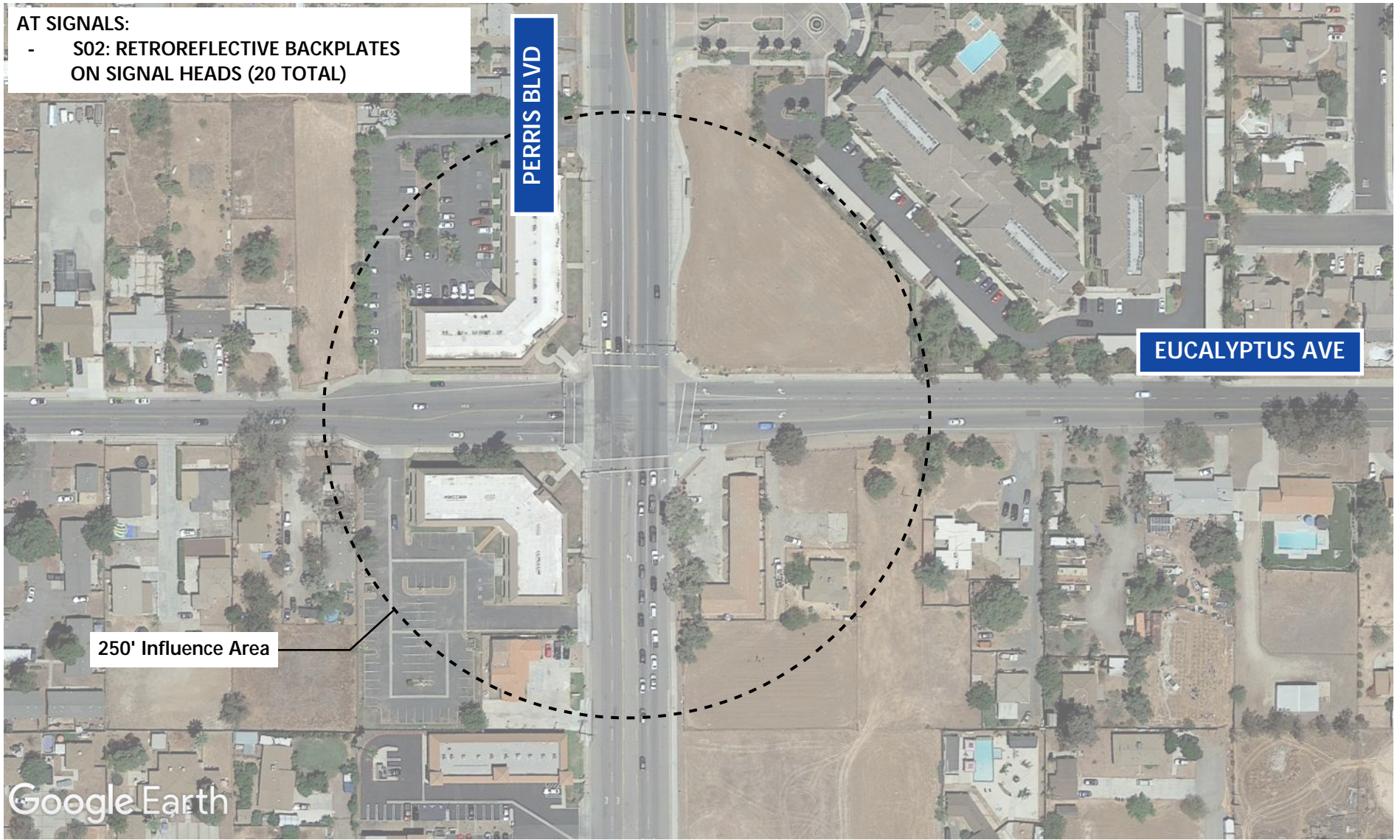
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

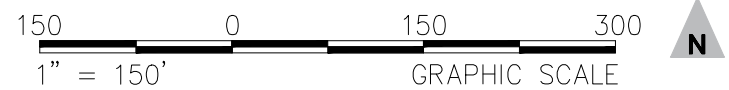
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (20 TOTAL)



GENERAL NOTES

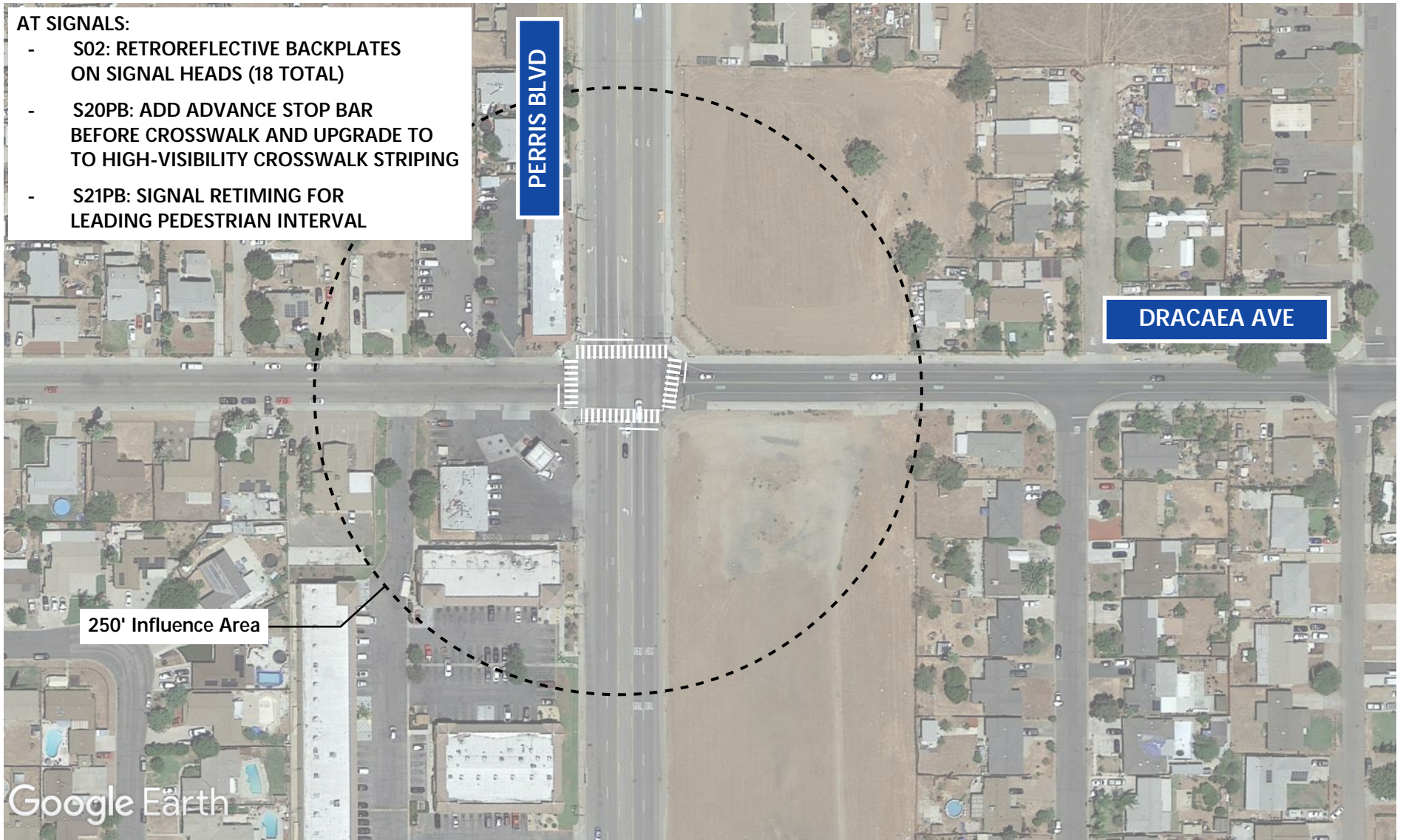
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
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CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

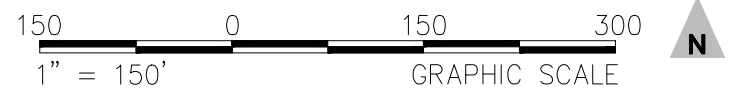
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (18 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING
- S21PB: SIGNAL RETIMING FOR LEADING PEDESTRIAN INTERVAL



GENERAL NOTES

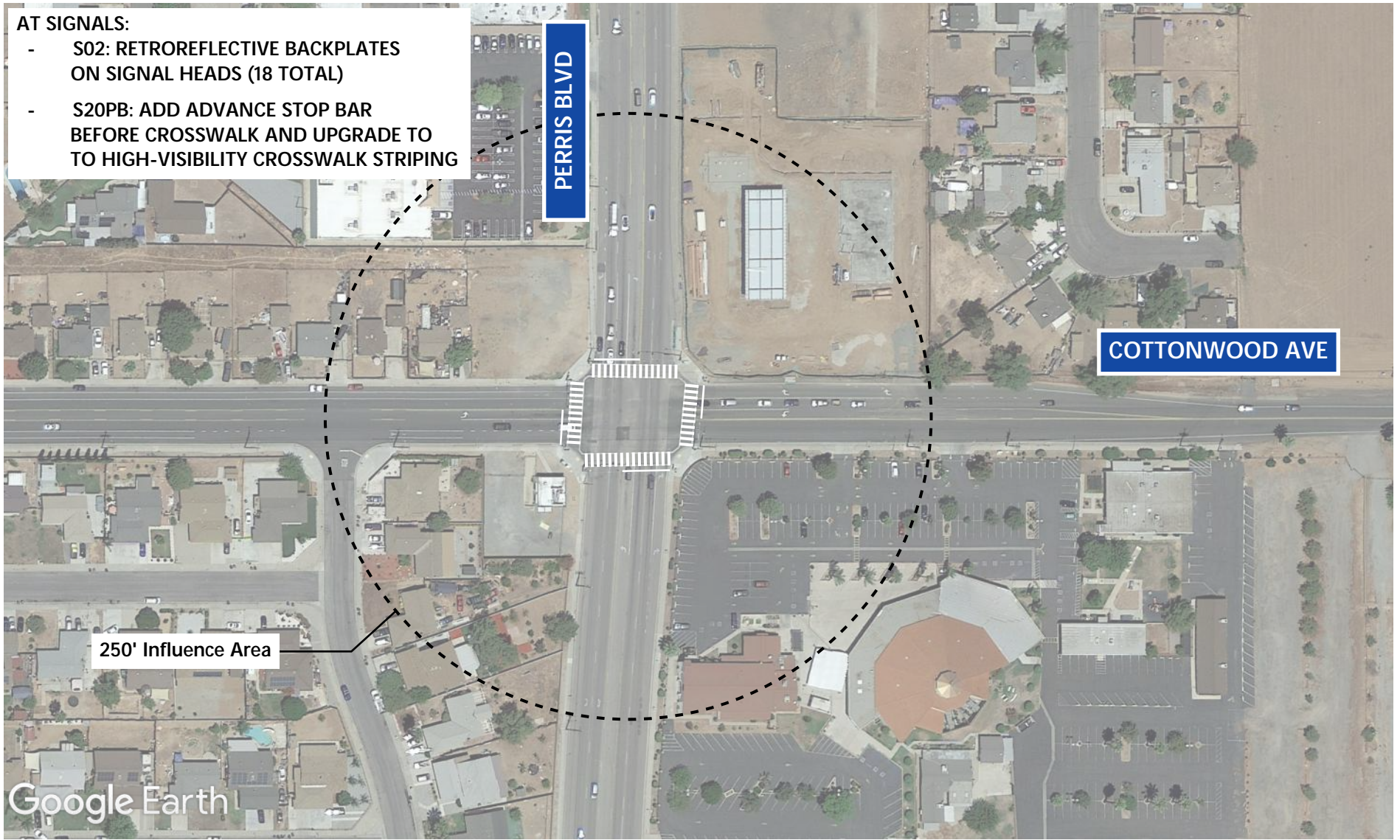
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

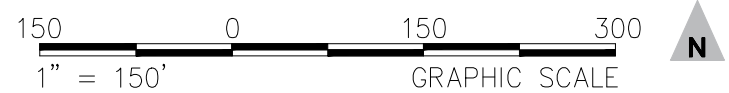
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (18 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO TO HIGH-VISIBILITY CROSSWALK STRIPING



GENERAL NOTES

- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



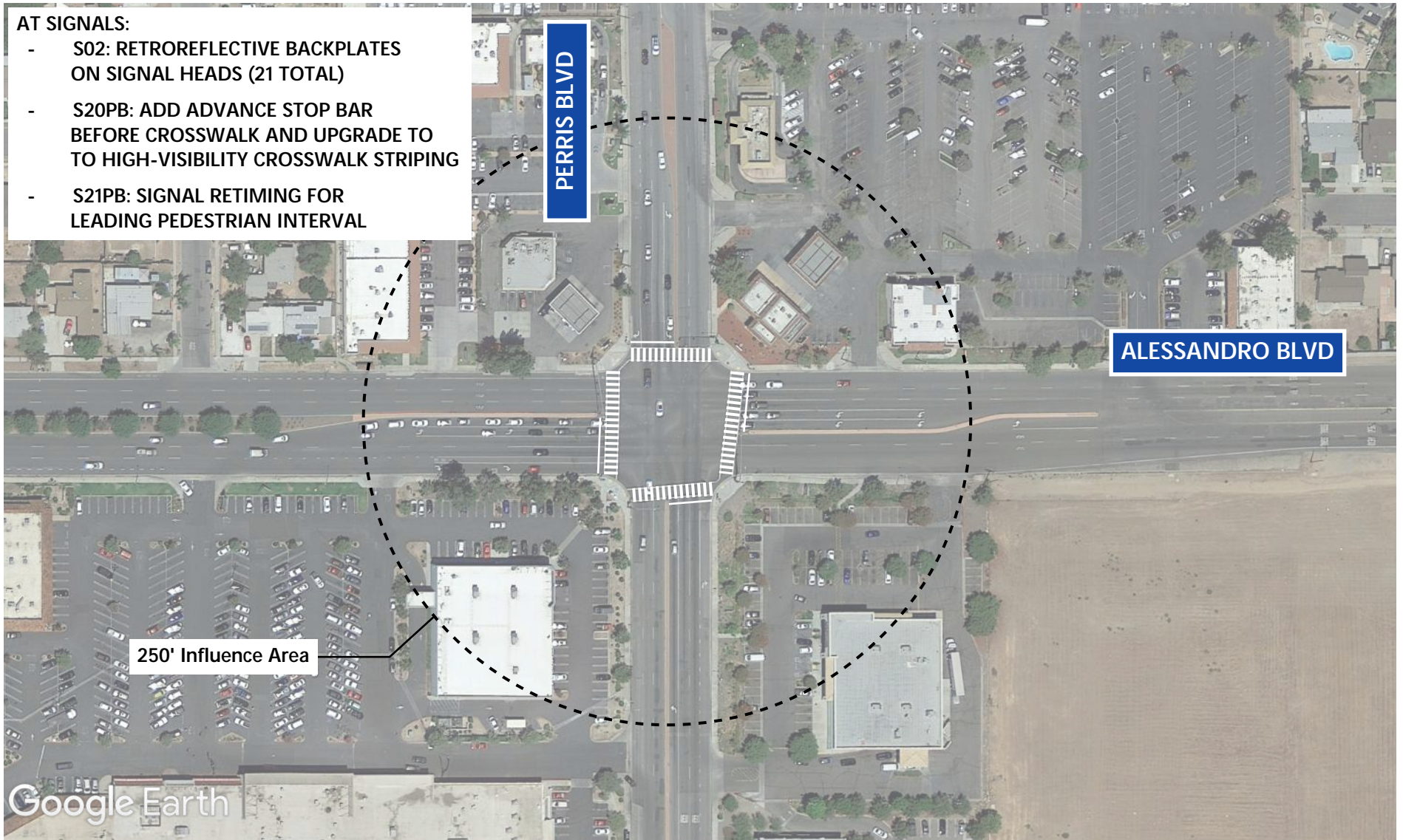
**Perris Boulevard & Cottonwood Avenue Concept Plan
08-Moreno Valley-3**



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

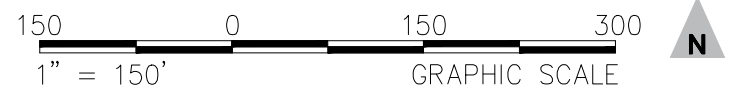
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (21 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING
- S21PB: SIGNAL RETIMING FOR LEADING PEDESTRIAN INTERVAL

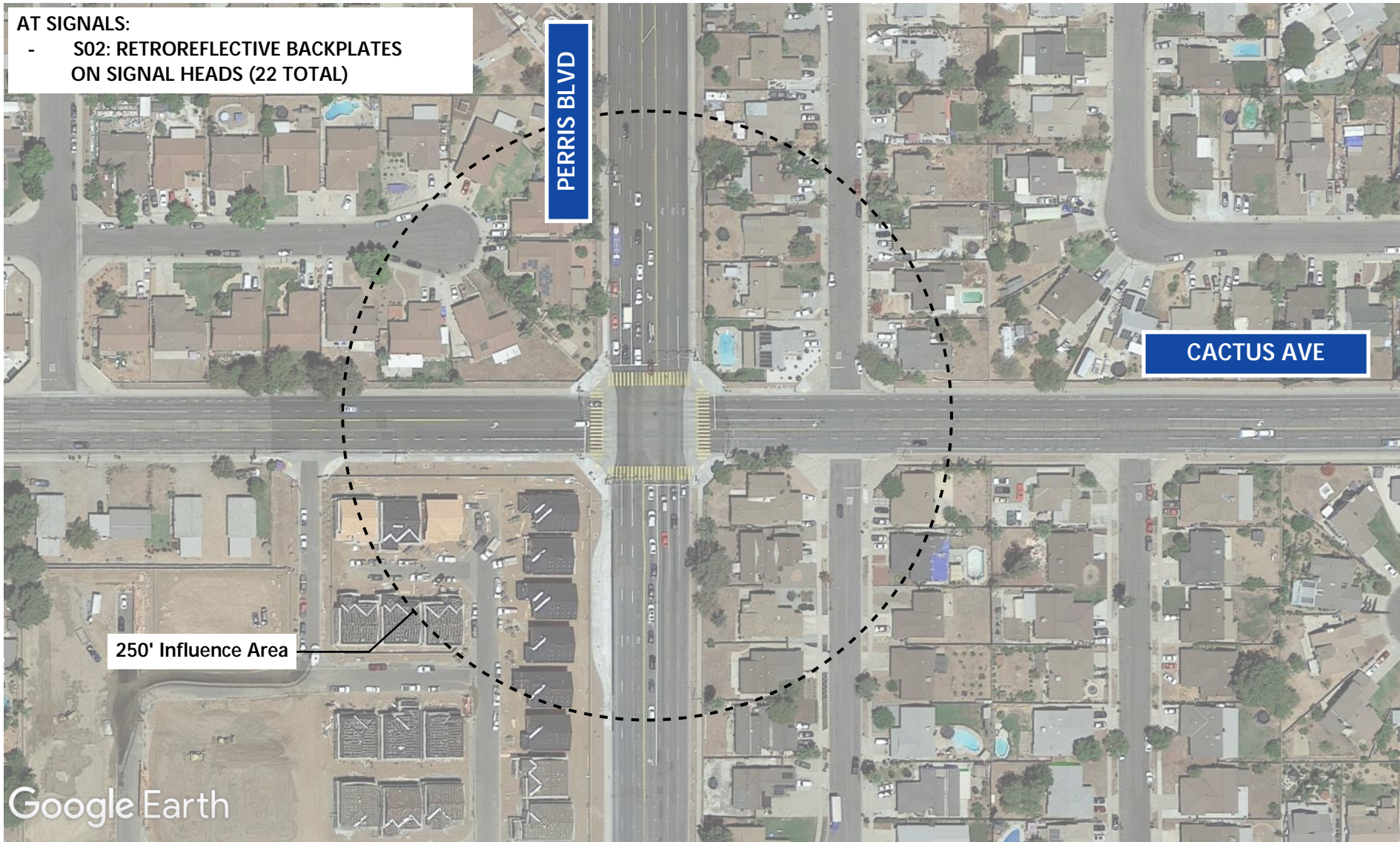


GENERAL NOTES

- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.

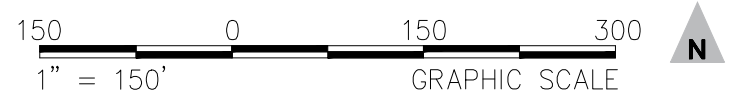


CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.



GENERAL NOTES

- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.

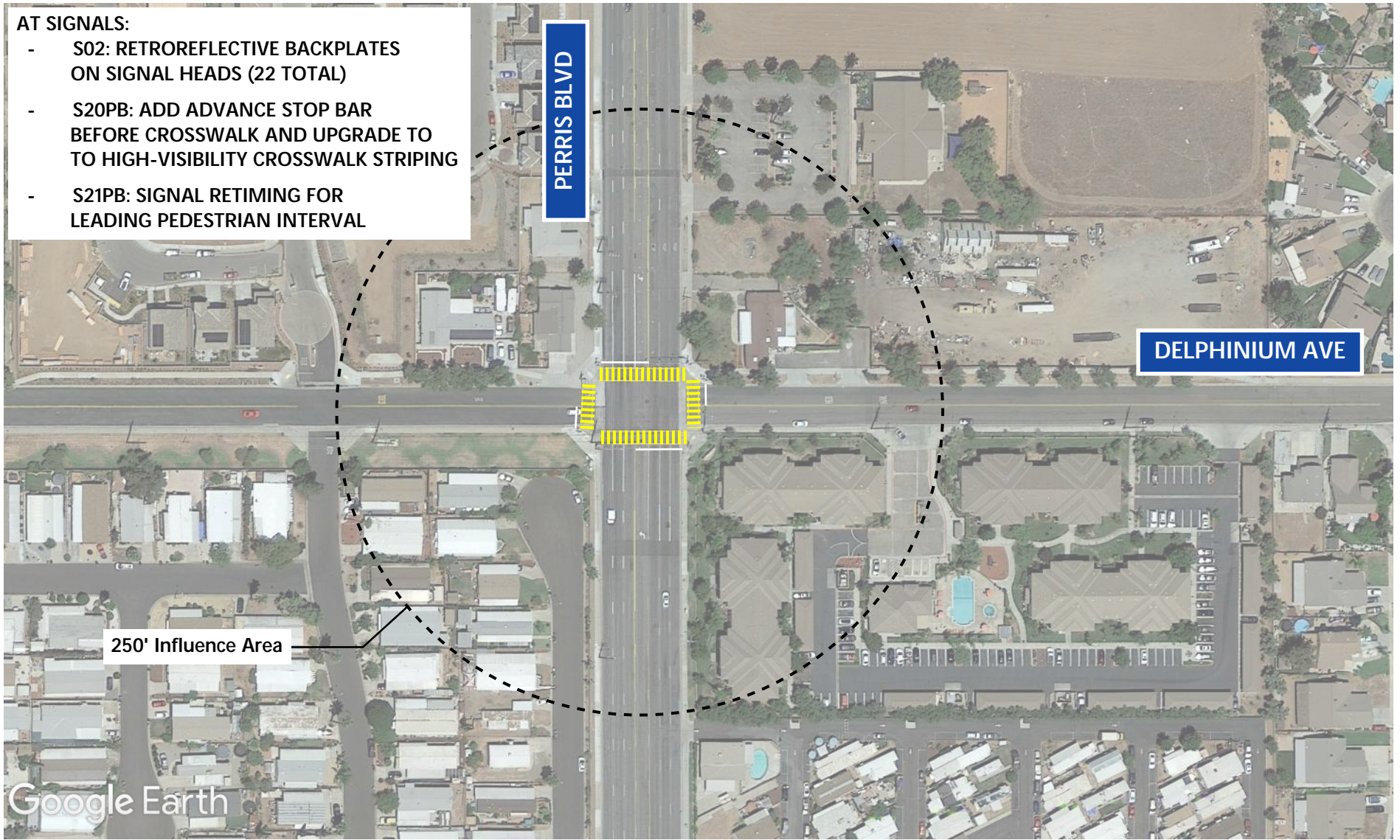


CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

Perris Boulevard & Cactus Avenue Concept Plan
08-Moreno Valley-3

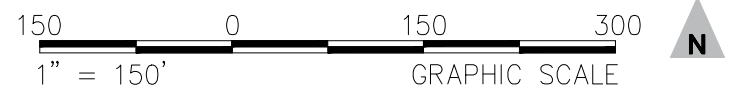
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (22 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING
- S21PB: SIGNAL RETIMING FOR LEADING PEDESTRIAN INTERVAL



GENERAL NOTES

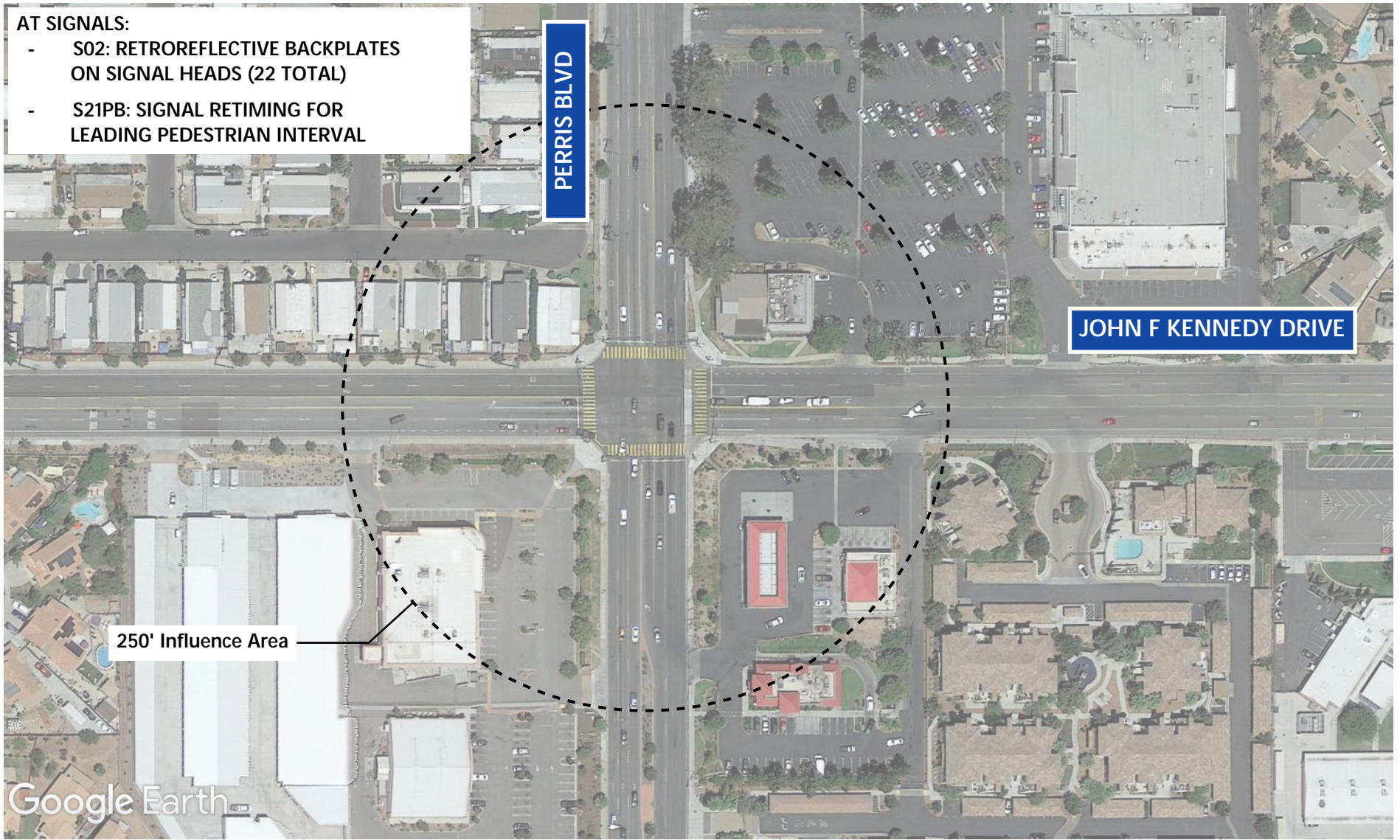
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
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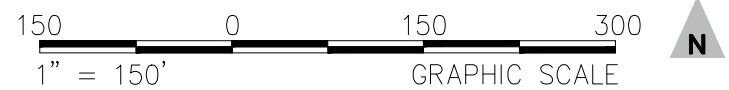
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (22 TOTAL)
- S21PB: SIGNAL RETIMING FOR LEADING PEDESTRIAN INTERVAL



GENERAL NOTES

- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.

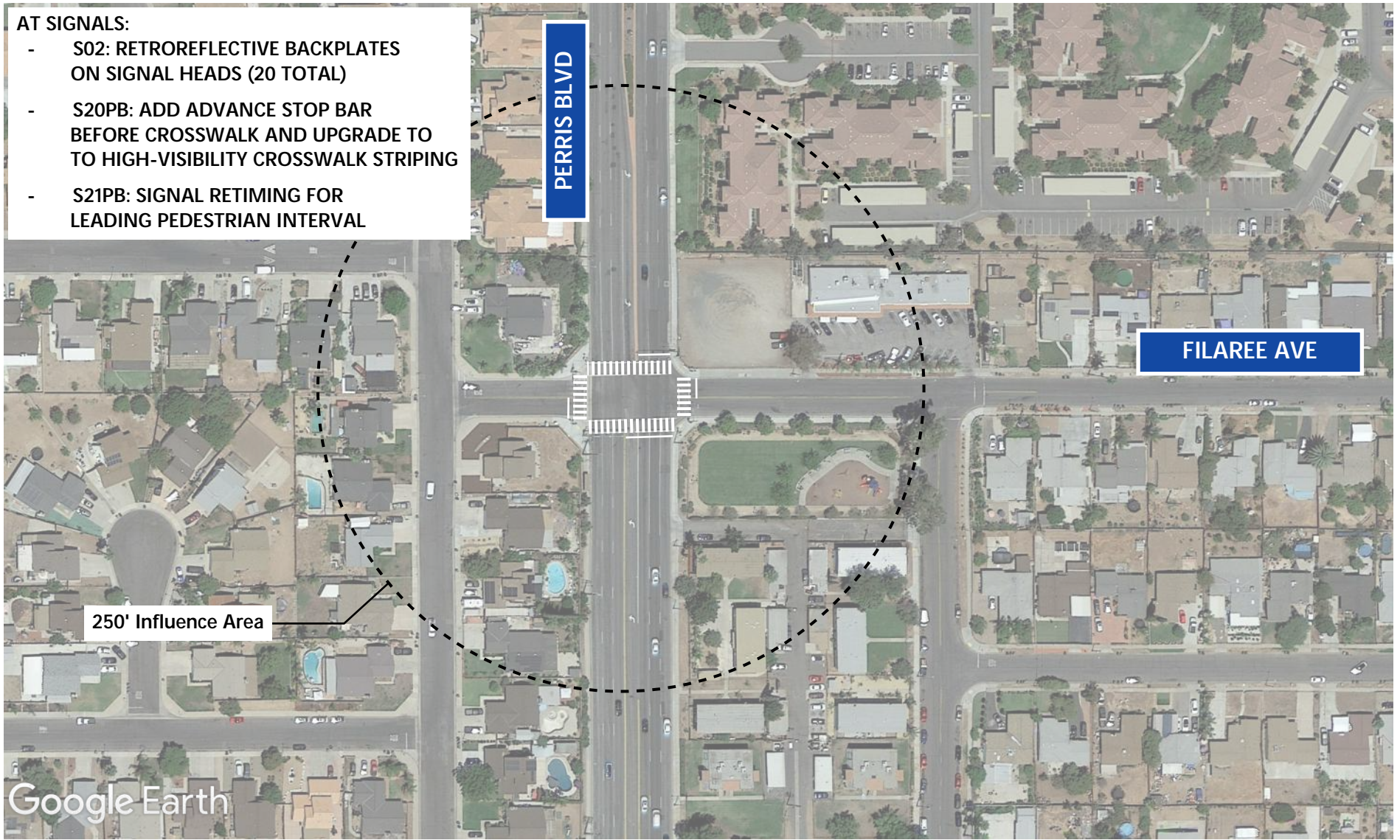


CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

**Perris Boulevard & John F Kennedy Drive Concept Plan
08-Moreno Valley-3**

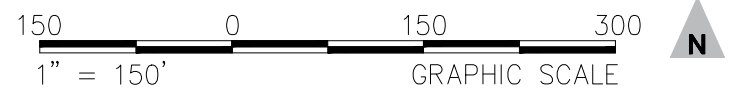
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (20 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING
- S21PB: SIGNAL RETIMING FOR LEADING PEDESTRIAN INTERVAL



GENERAL NOTES

- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



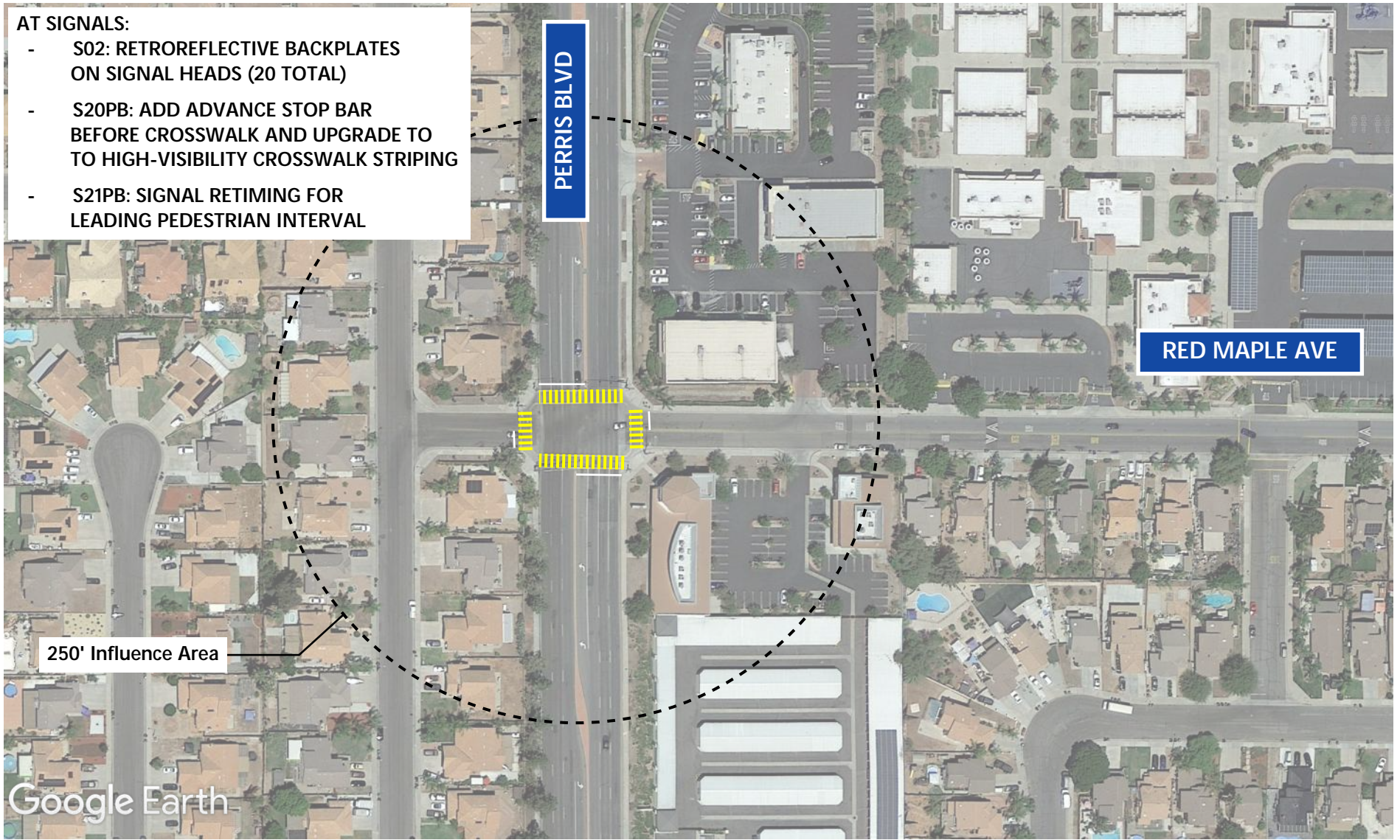
**Perris Boulevard & Filaree Avenue Concept Plan
08-Moreno Valley-3**



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

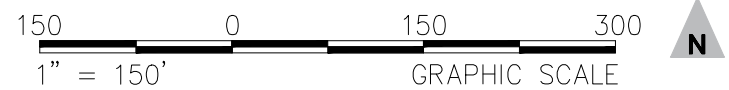
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (20 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING
- S21PB: SIGNAL RETIMING FOR LEADING PEDESTRIAN INTERVAL



GENERAL NOTES

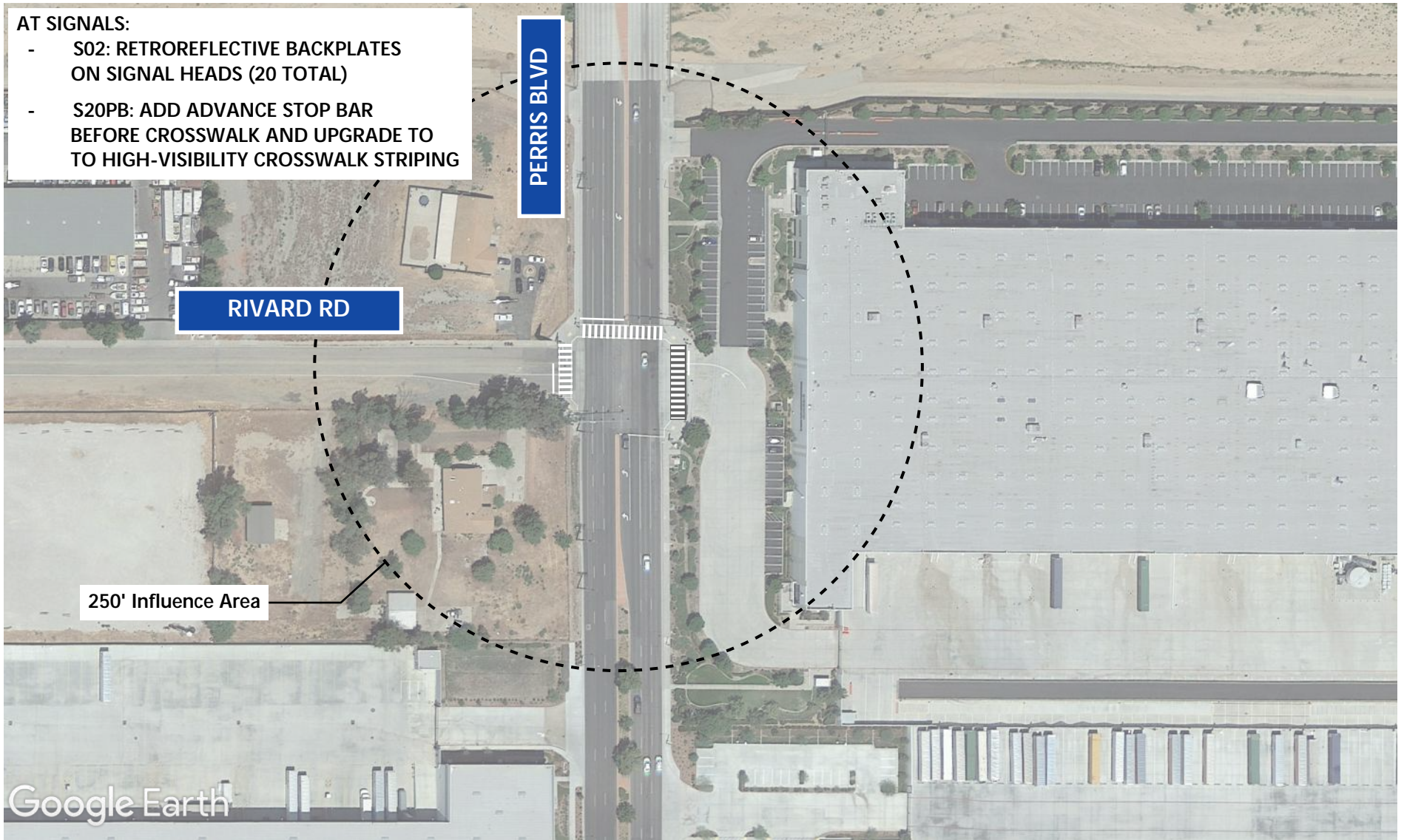
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

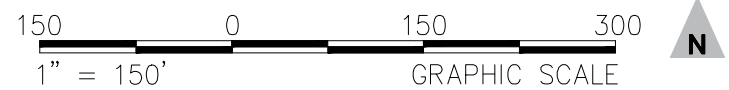
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (20 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING



GENERAL NOTES

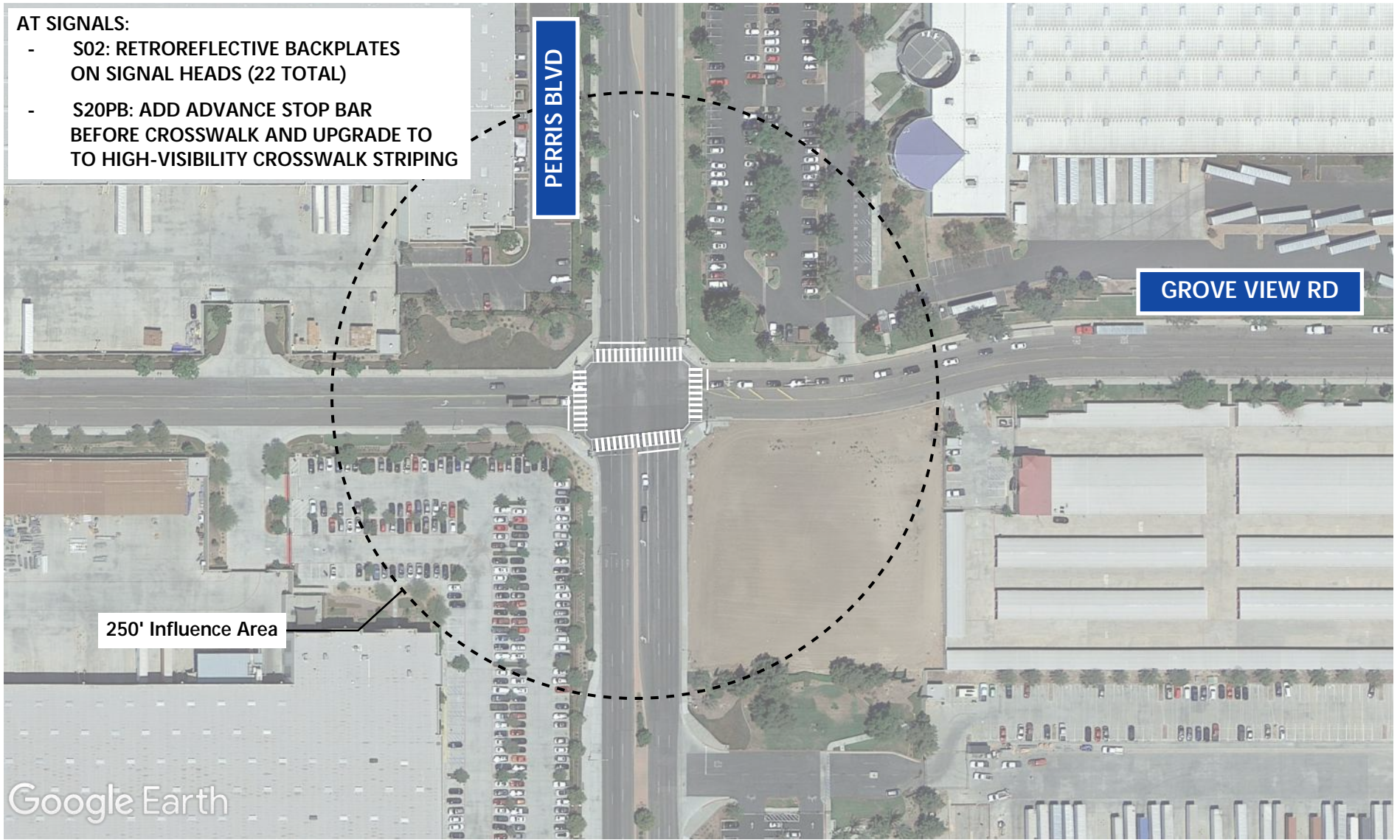
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- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



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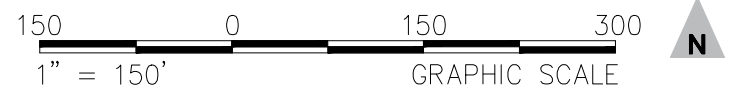
AT SIGNALS:

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (22 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO TO HIGH-VISIBILITY CROSSWALK STRIPING



GENERAL NOTES

- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.



Kitching: Between Cactus and Black Walnut

MATCHLINE - SEE BOTTOM LEFT



MEET EXISTING

KITCHING ST

BLACK WALNUT ST



INSTALL D11-1 AND M6-1 (L) BIKE GUIDE SIGNS

- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (22 TOTAL)
- S21PB: SIGNAL RETIMING FOR LEADING PEDESTRIAN INTERVAL AND R9-5 "BIKES USE PED SIGNAL" SIGN



ALESSANDRO BLVD

EXISTING CENTER LINE LOCATION TO REMAIN (TYP.)

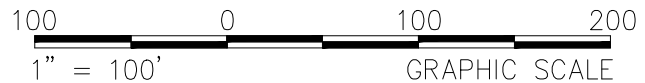
7' 9' 10' 9' 7'
64'

MATCHLINE - SEE TOP RIGHT

MATCHLINE - SEE PAGE 2

GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



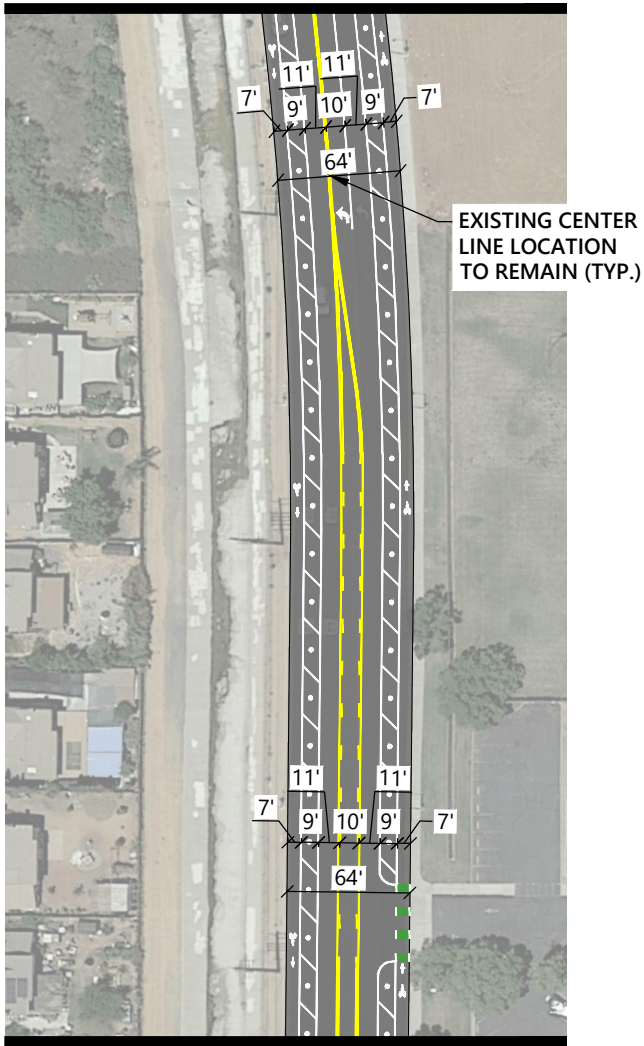
Page 1

**Kitching Street Concept Plan
08-Moreno Valley-5**

CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

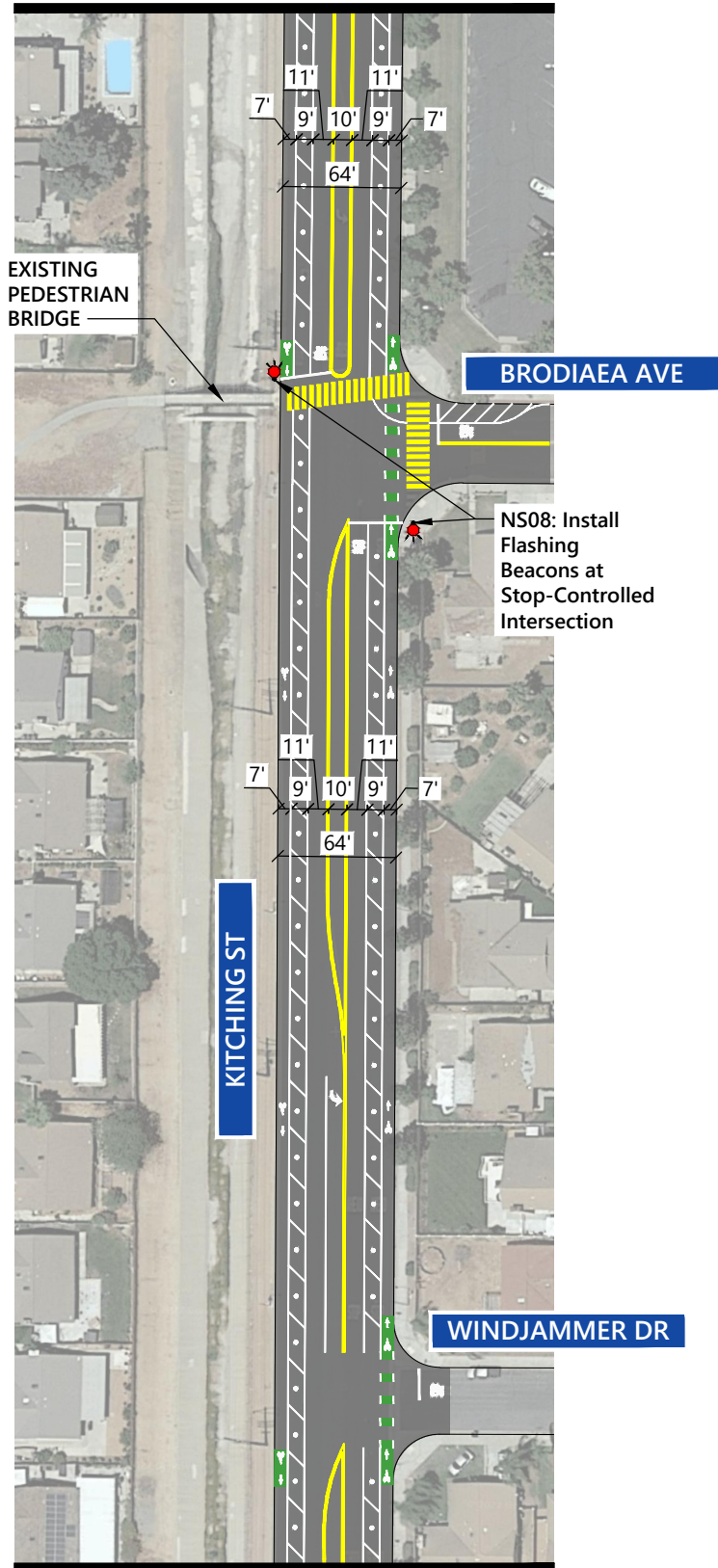


MATCHLINE - SEE PAGE 1



MATCHLINE - SEE TOP RIGHT

MATCHLINE - SEE BOTTOM LEFT



MATCHLINE - SEE PAGE 3

GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



GRAPHIC SCALE

Page 2

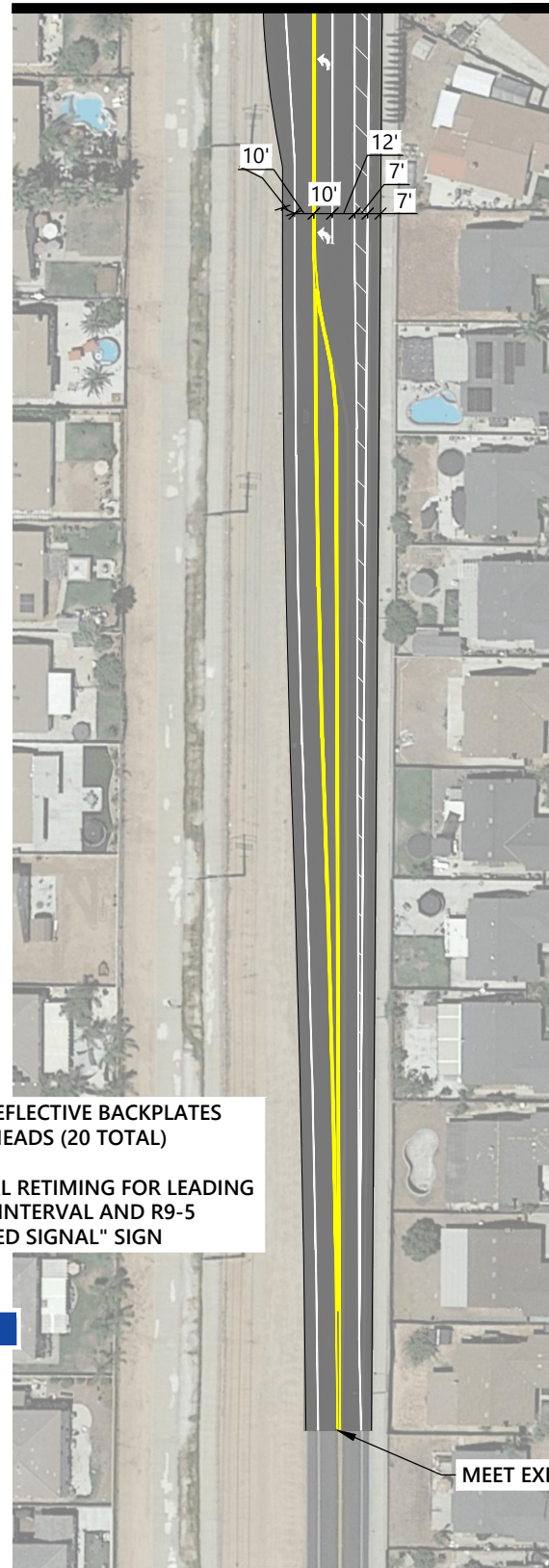
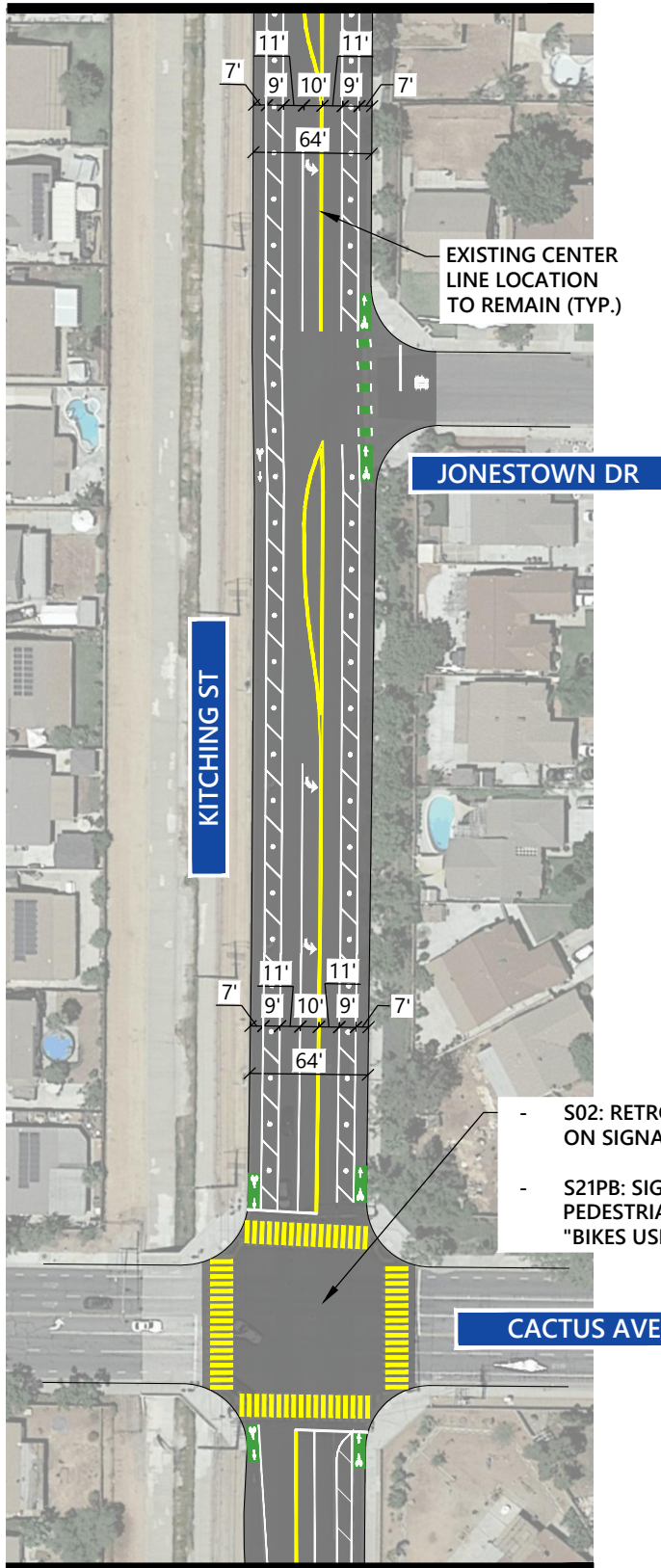
Kitching Street Concept Plan 08-Moreno Valley-5

CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.



MATCHLINE - SEE PAGE 2

MATCHLINE - SEE BOTTOM LEFT



MATCHLINE - SEE TOP RIGHT

GENERAL NOTES

- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



Figure 5C

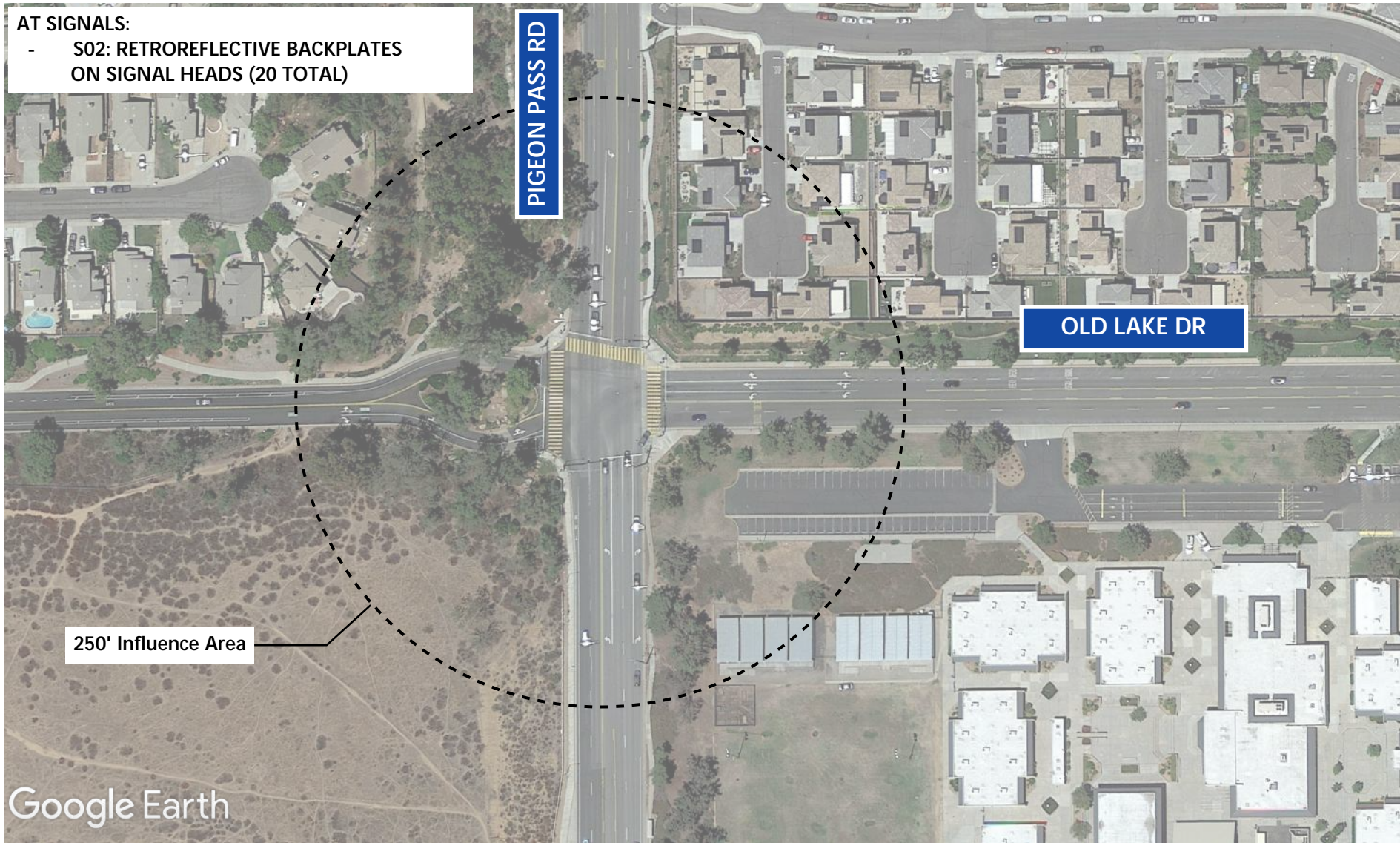
Kitching Street Concept Plan 08-Moreno Valley-5

CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.





Intersections with frequent overnight collisions



AT SIGNALS:
 - S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (20 TOTAL)

250' Influence Area

GENERAL NOTES


- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.

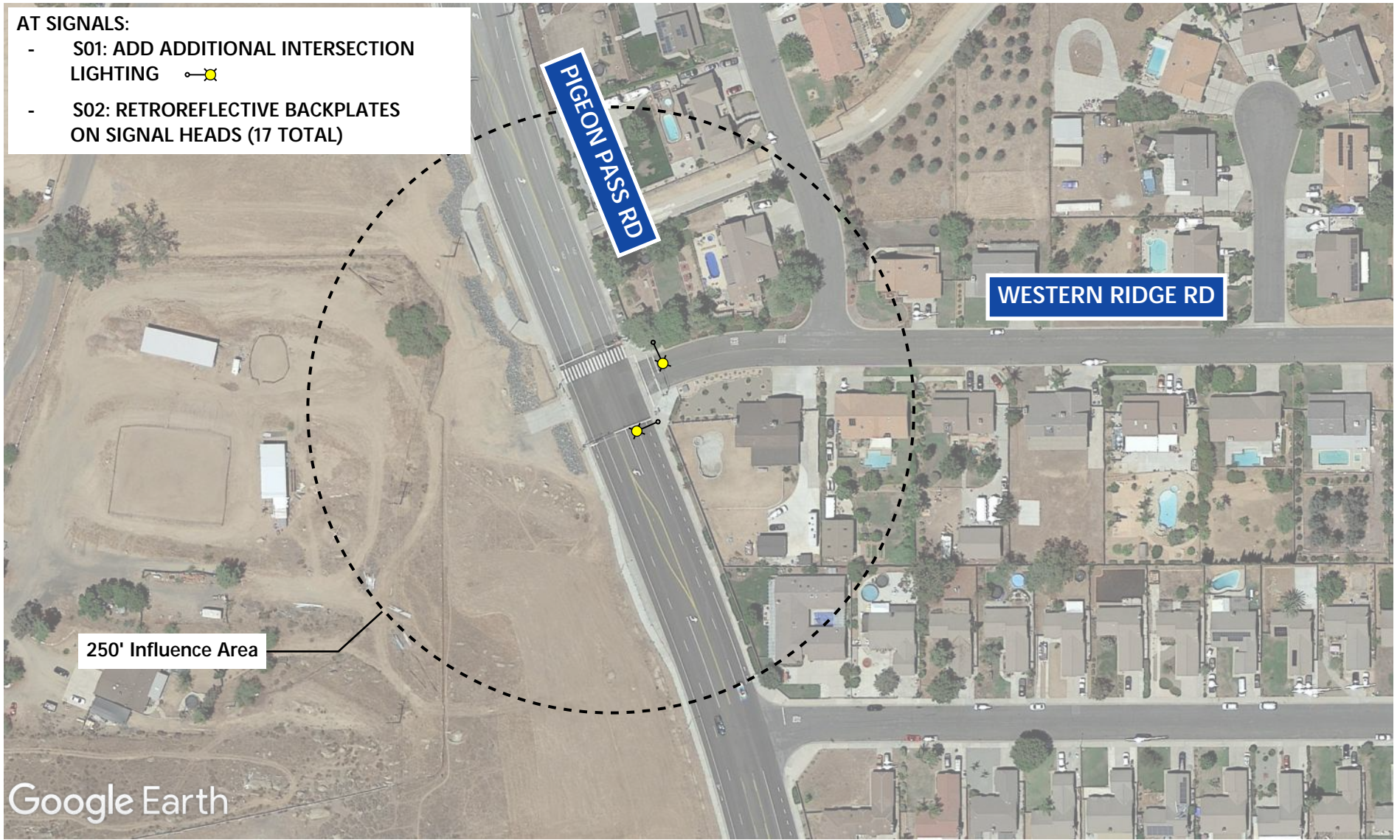


CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

**Pigeon Pass Road & Old Lake Drive Concept Plan
 08-Moreno Valley-6**

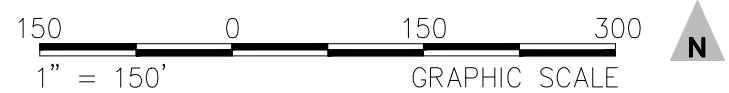
AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (17 TOTAL)



GENERAL NOTES


- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.

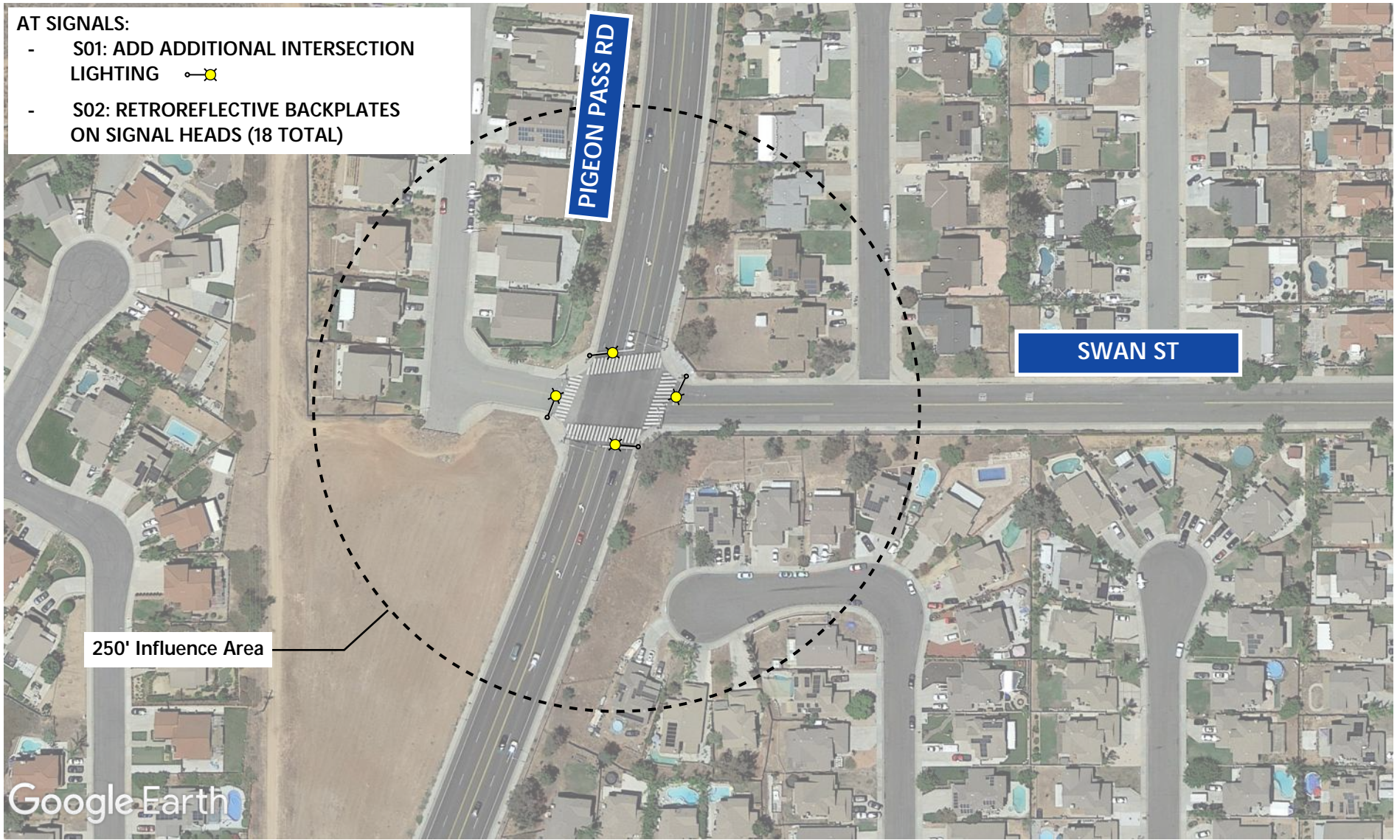


CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

**Pigeon Pass Road & Western Ridge Road Concept Plan
08-Moreno Valley-6**

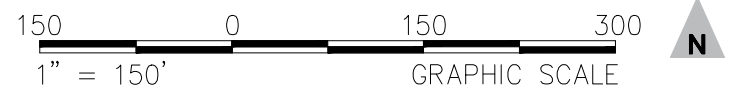
AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (18 TOTAL)




GENERAL NOTES

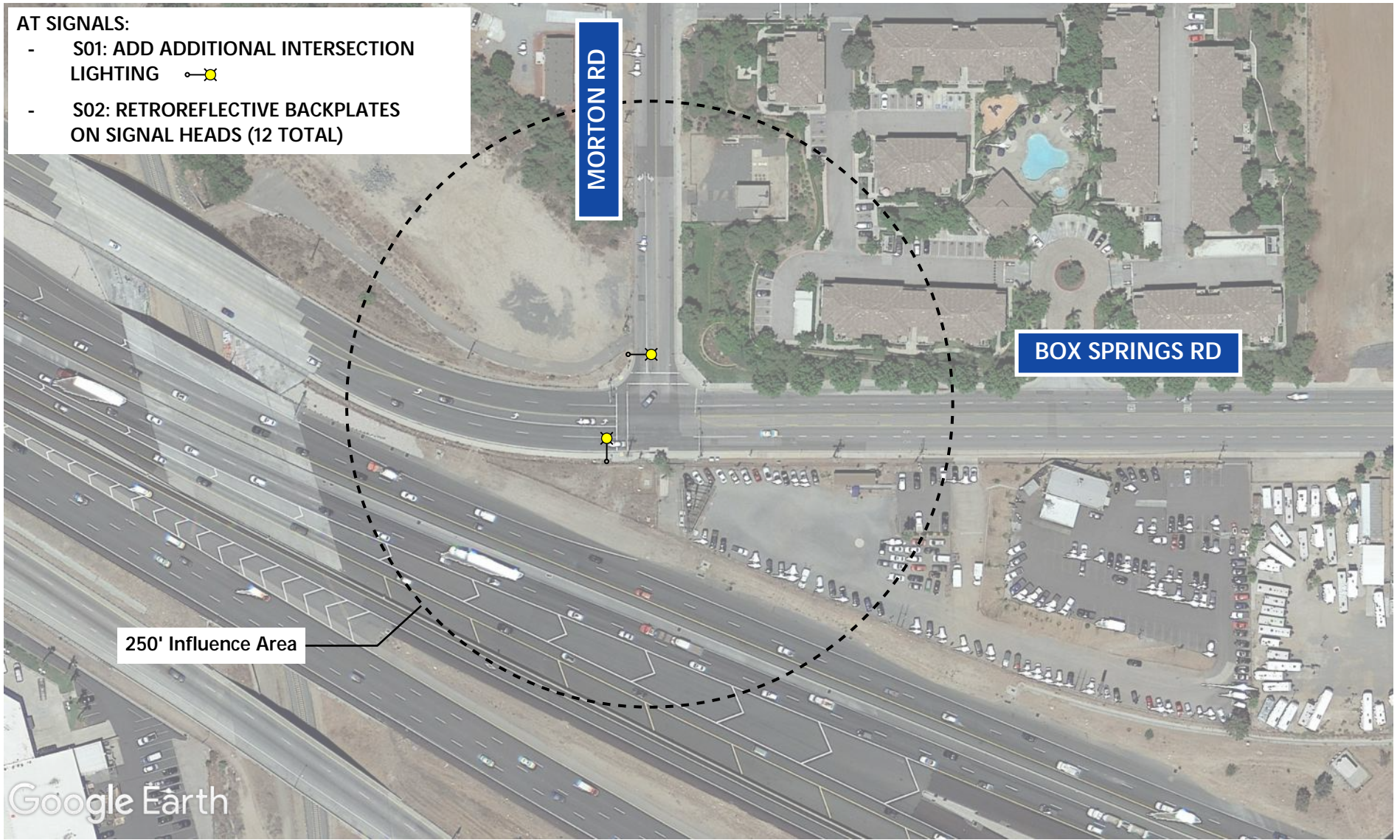
- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.



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AT SIGNALS:

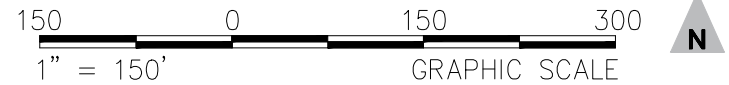
- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (12 TOTAL)



250' Influence Area

GENERAL NOTES


- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.

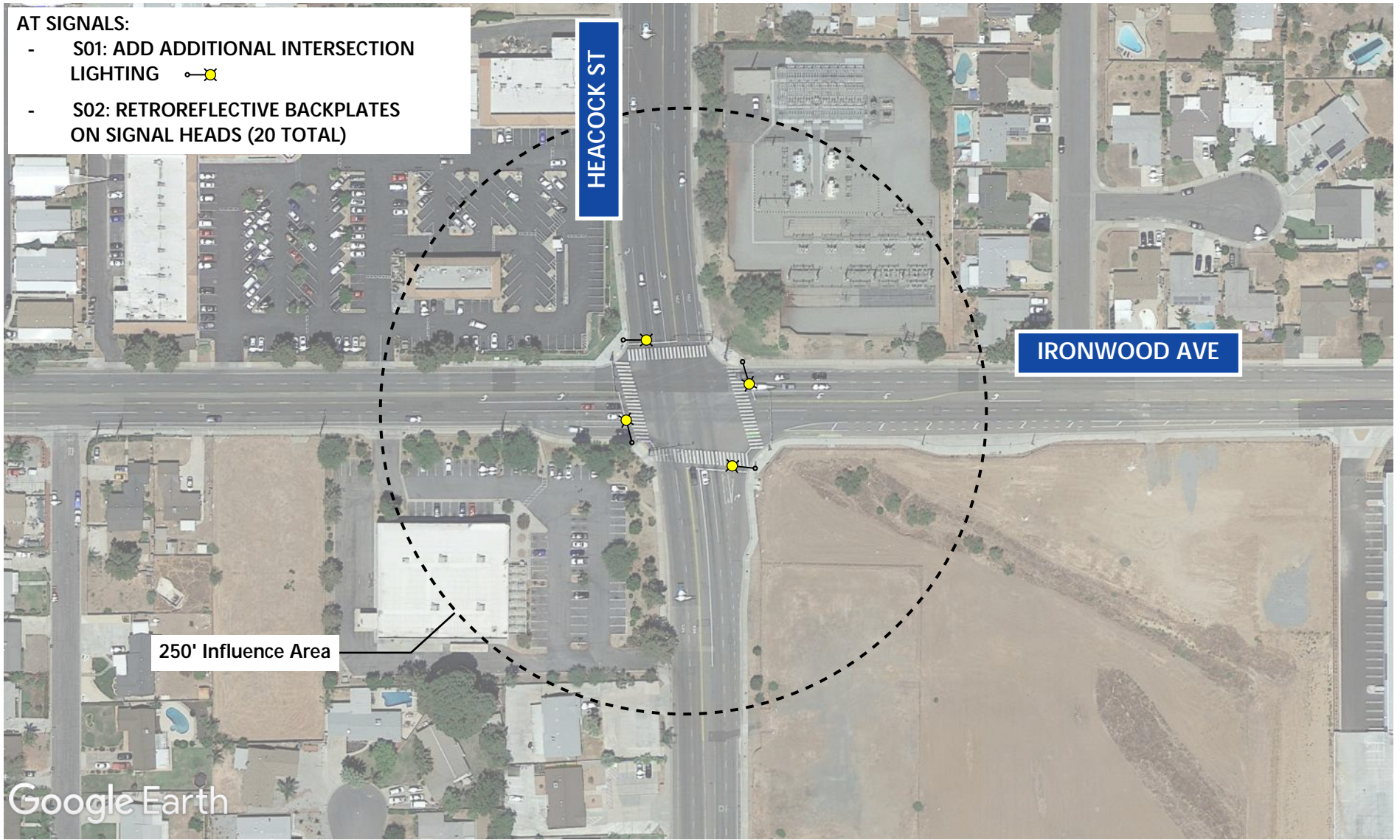


CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

**Box Springs Road & Morton Road Concept Plan
08-Moreno Valley-6**

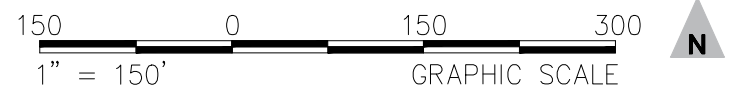
AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (20 TOTAL)



GENERAL NOTES


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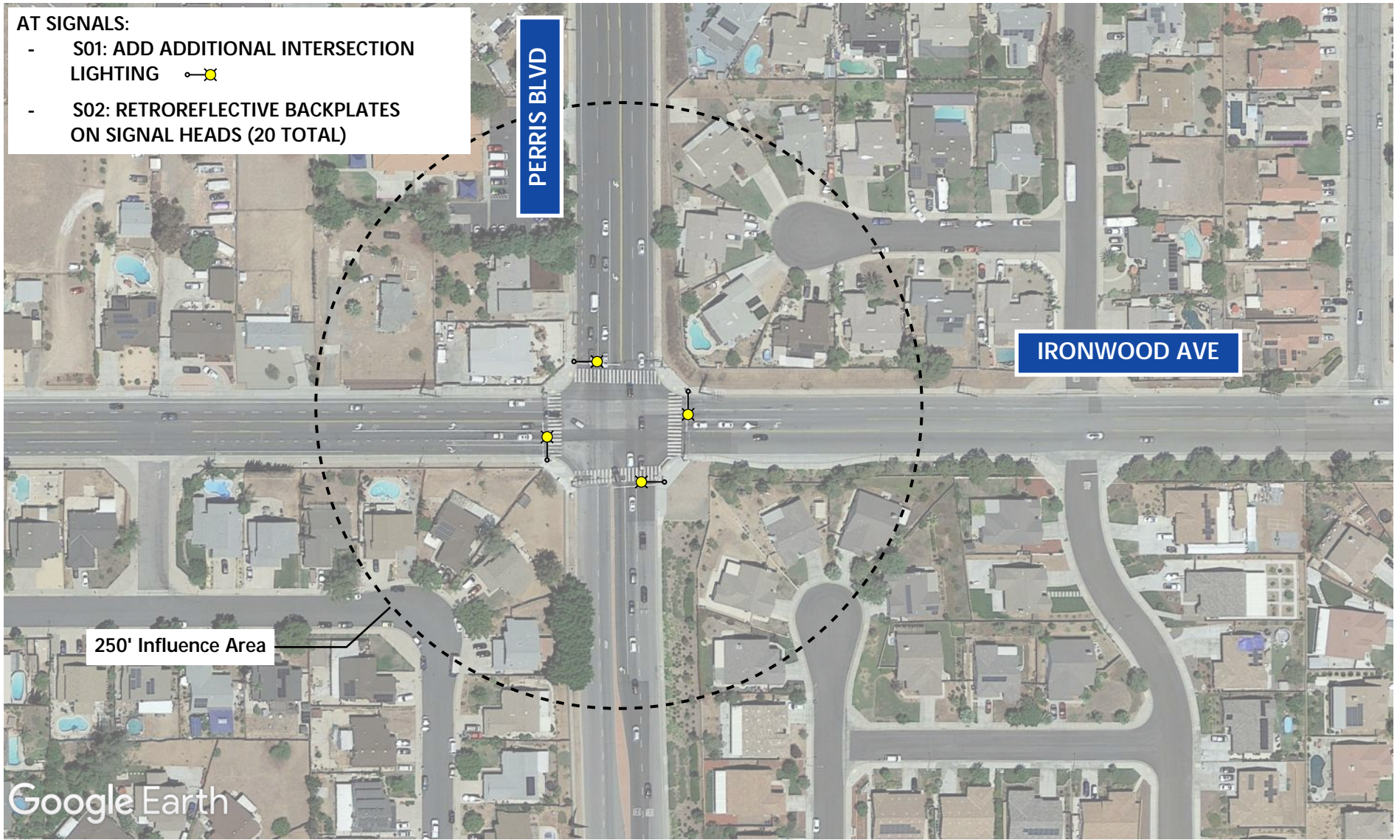


CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

**Heacock Street & Ironwood Avenue Concept Plan
08-Moreno Valley-6**

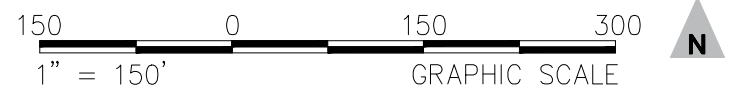
AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (20 TOTAL)



GENERAL NOTES


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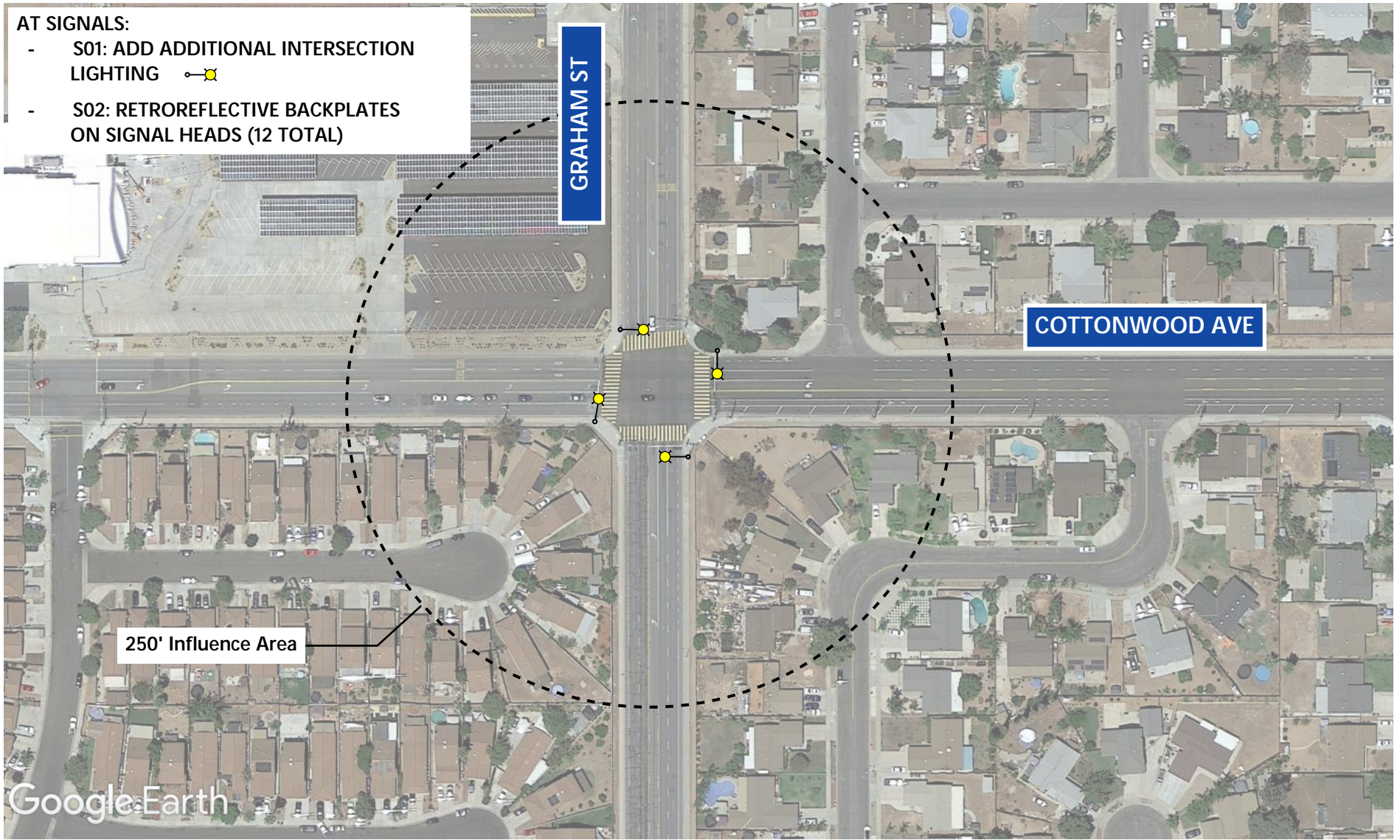


CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

**Perris Boulevard & Ironwood Avenue Concept Plan
08-Moreno Valley-6**

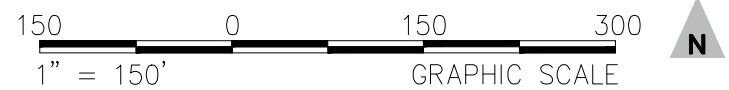
AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (12 TOTAL)



GENERAL NOTES


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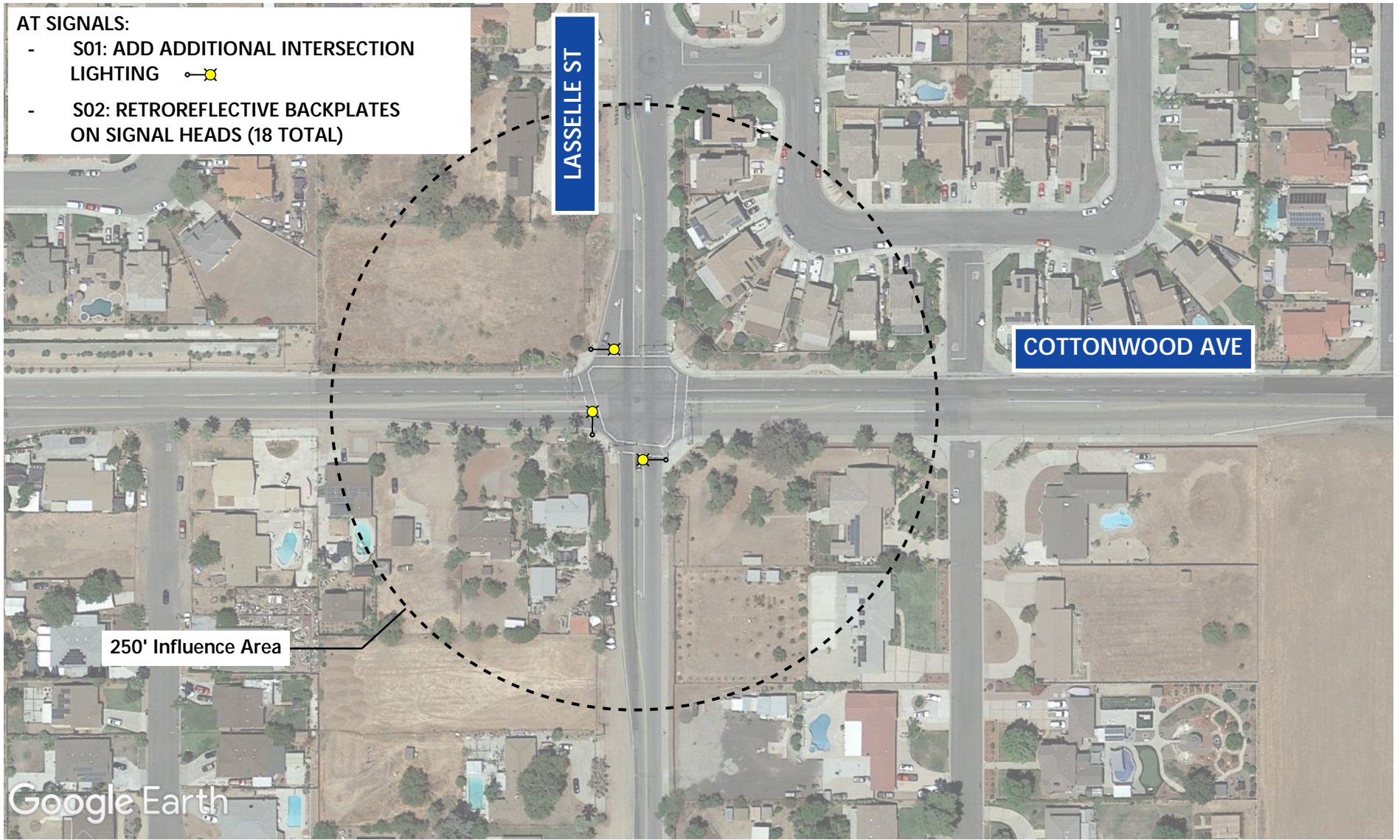


CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

**Graham Street & Cottonwood Avenue Concept Plan
08-Moreno Valley-6**

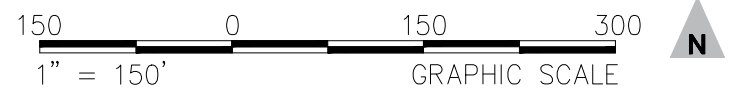
AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (18 TOTAL)



GENERAL NOTES


- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.

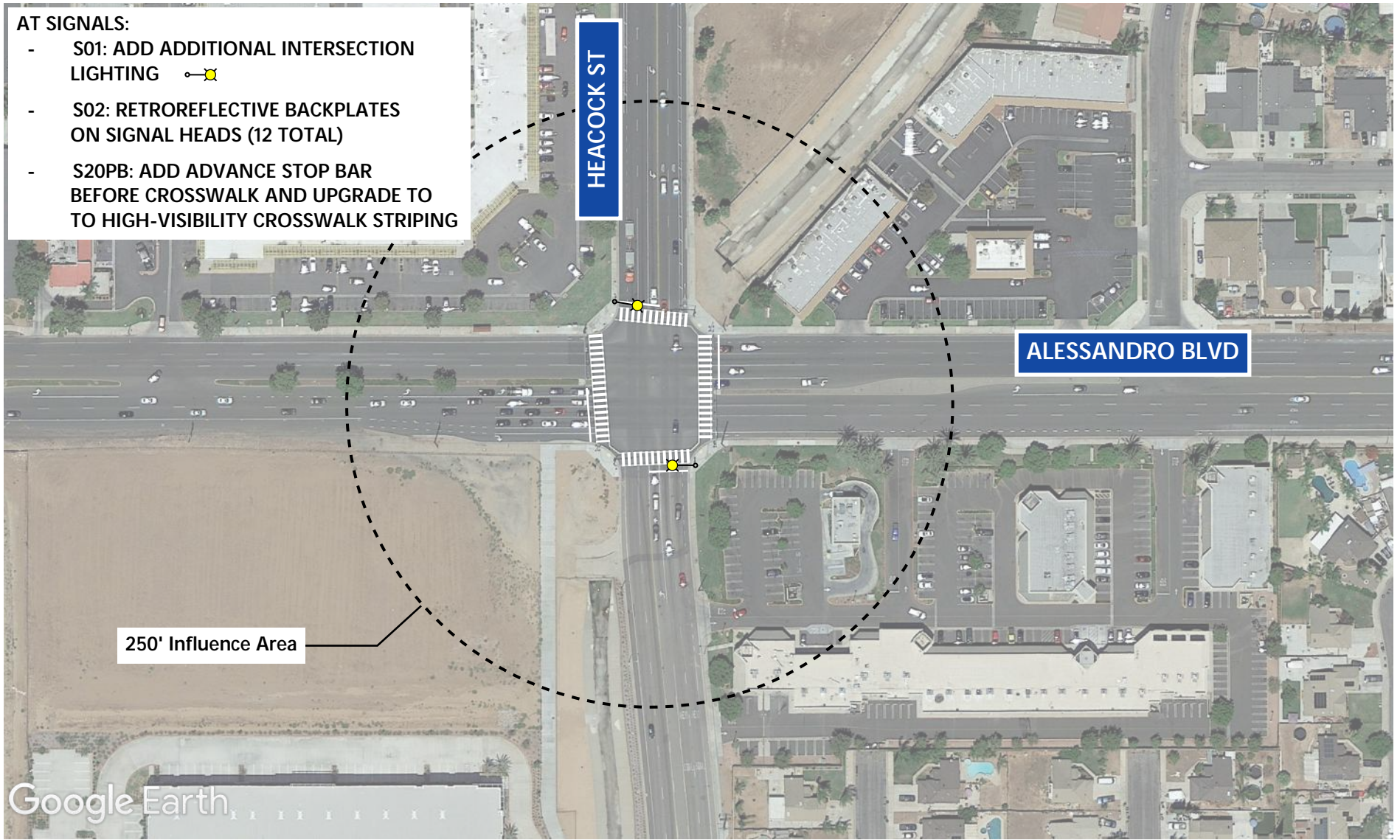


CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

Lasselle Street & Cottonwood Avenue Concept Plan
08-Moreno Valley-6

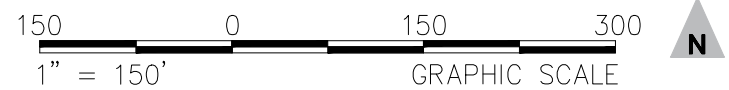
AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (12 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING



GENERAL NOTES

- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.




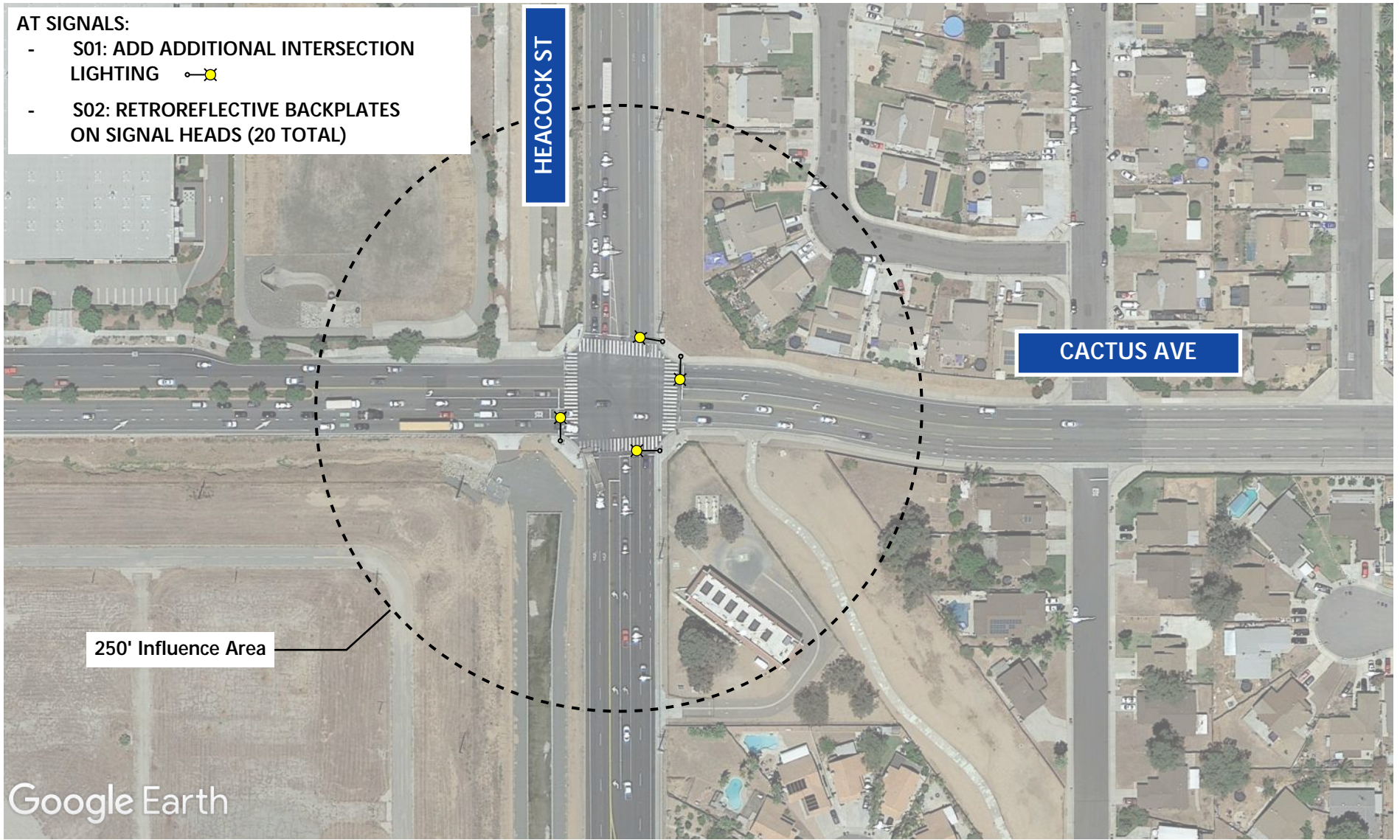
**Heacock Street & Alessandro Boulevard Concept Plan
08-Moreno Valley-6**



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL
DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

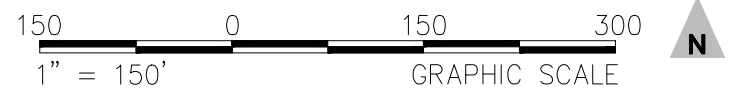
AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (20 TOTAL)



GENERAL NOTES


- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.

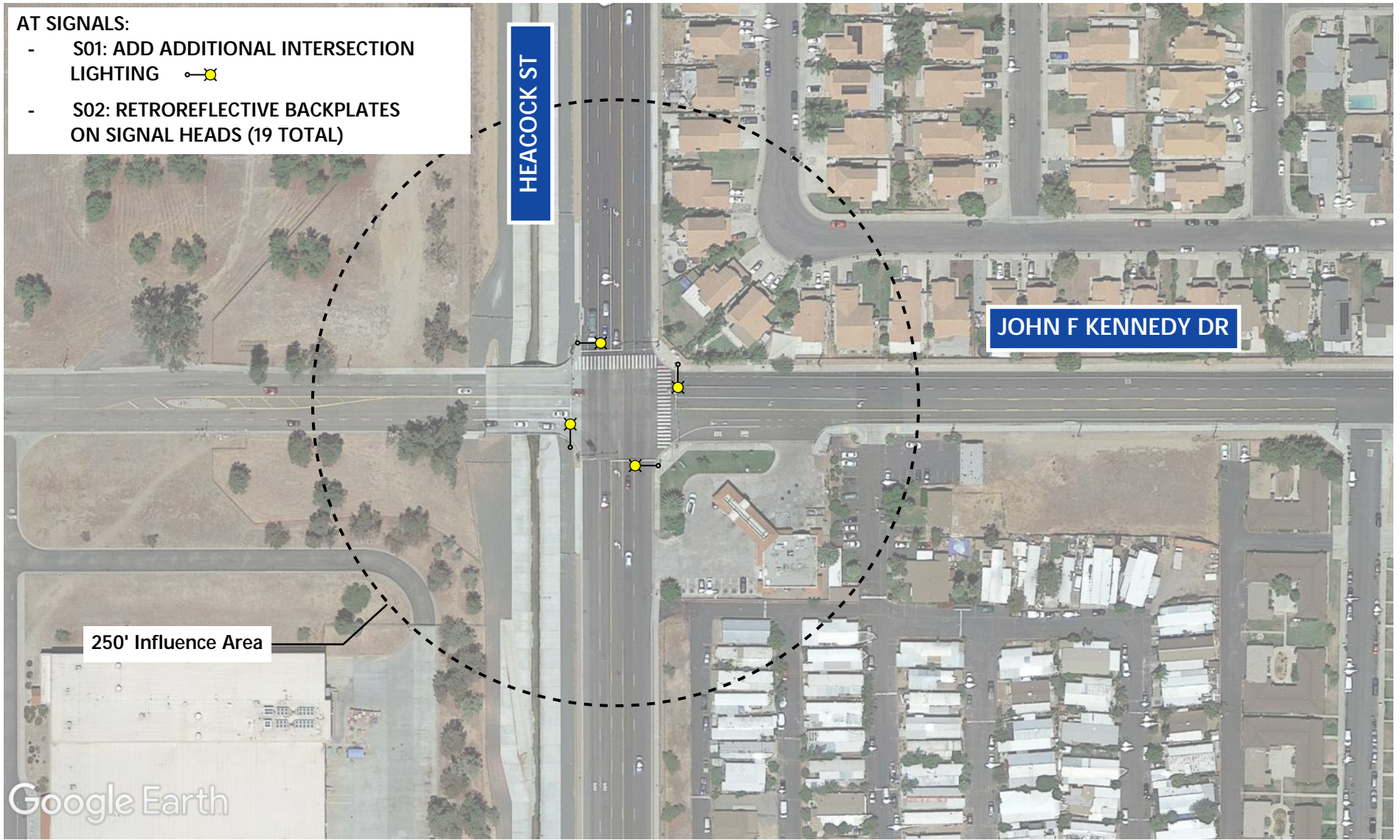


CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

**Heacock Street & Cactus Avenue Concept Plan
08-Moreno Valley-6**

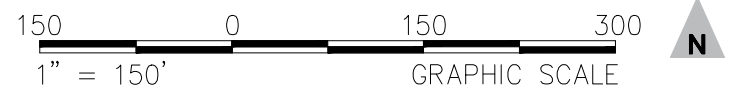
AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (19 TOTAL)



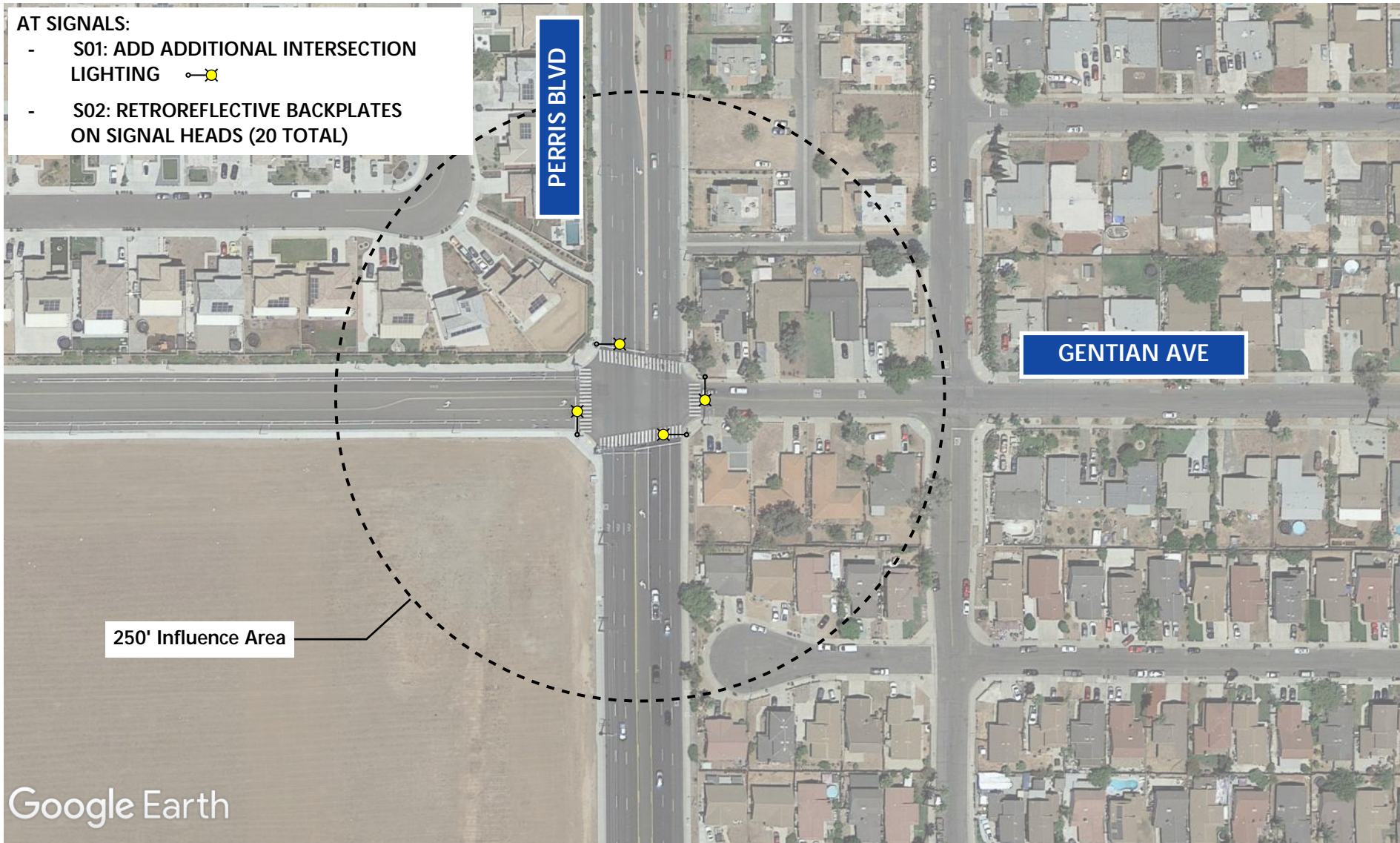
GENERAL NOTES

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- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.




CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

**Heacock Street & John F Kennedy Drive Concept Plan
08-Moreno Valley-6**



AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (20 TOTAL)

GENERAL NOTES


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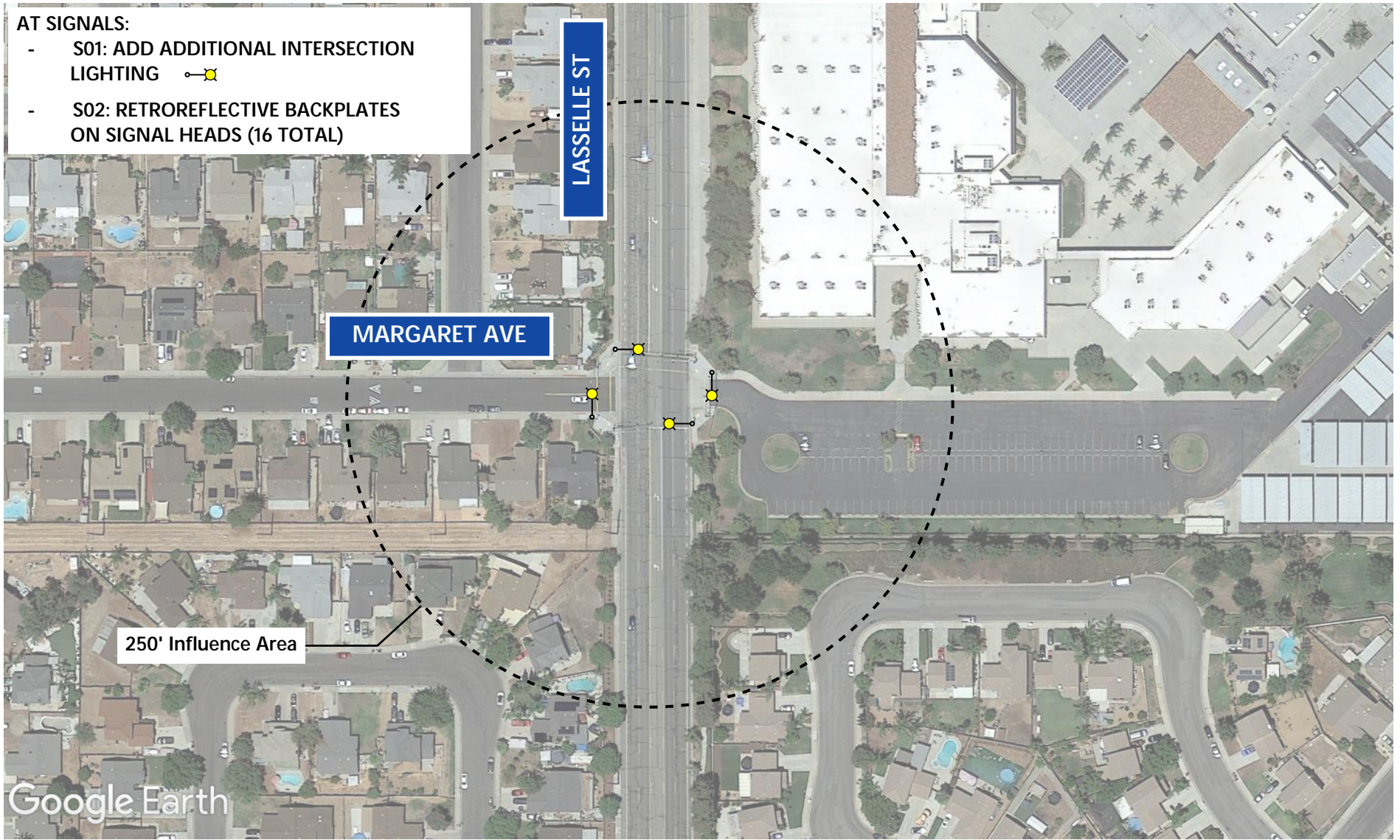


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**Perris Boulevard & Gentian Avenue Concept Plan
08-Moreno Valley-6**

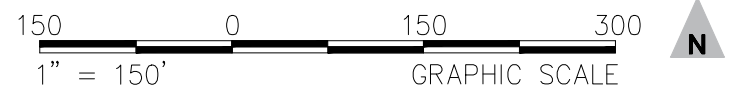
AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (16 TOTAL)



GENERAL NOTES

- NO CHANGES TO EXISTING LANE OR SHOULDER WIDTHS ARE PROPOSED.
- NO ROADWAY EXCAVATION OR DEMOLITION WILL BE REQUIRED.
- ALL COUNTERMEASURES WILL BE INSTALLED WITHIN EXISTING PAVED MORENO VALLEY RIGHT OF WAY.




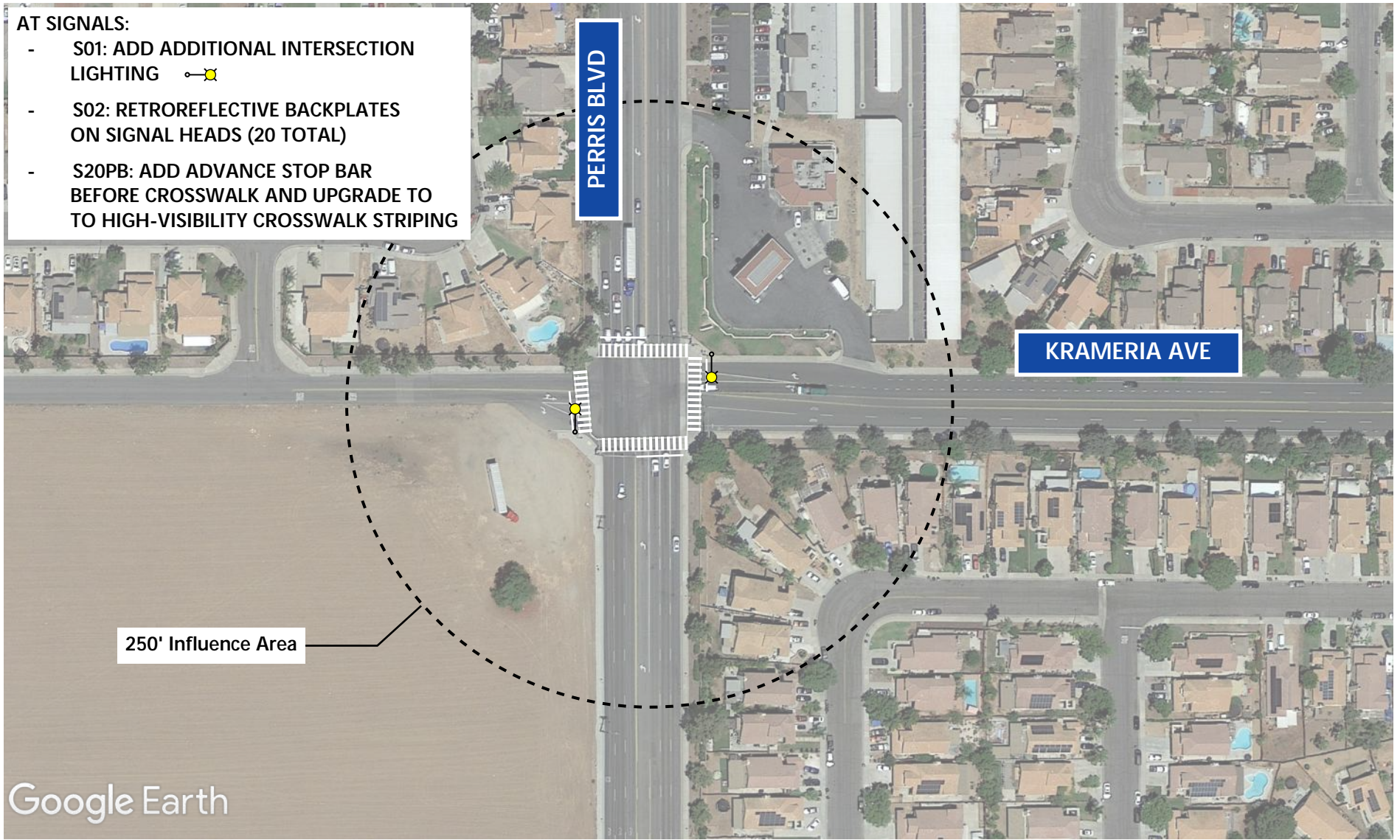
**Lasselle Street & Margaret Avenue Concept Plan
08-Moreno Valley-6**



CONCEPTUAL - NOT FOR CONSTRUCTION. ADDITIONAL
DETAILED ANALYSIS AND ENGINEERING DESIGN REQUIRED.

AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (20 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING



GENERAL NOTES


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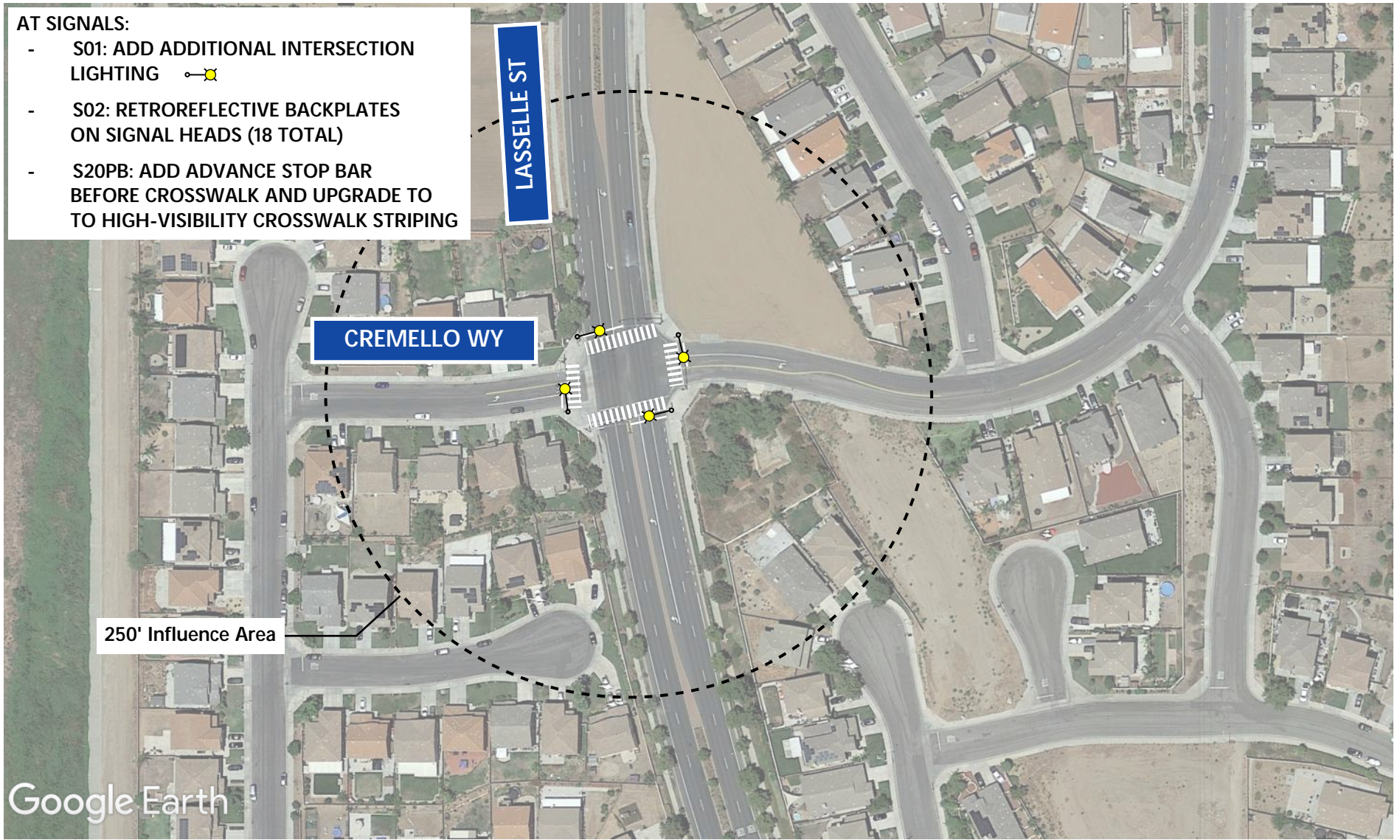


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Perris Boulevard & Krameria Avenue Concept Plan
08-Moreno Valley-6

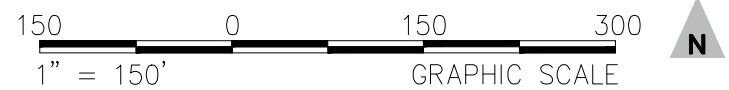
AT SIGNALS:

- S01: ADD ADDITIONAL INTERSECTION LIGHTING 
- S02: RETROREFLECTIVE BACKPLATES ON SIGNAL HEADS (18 TOTAL)
- S20PB: ADD ADVANCE STOP BAR BEFORE CROSSWALK AND UPGRADE TO HIGH-VISIBILITY CROSSWALK STRIPING



GENERAL NOTES

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