TOP 5 CORRIDORS

REPORT
DECEMBER 2020

SACRAMENTO

Vision ZERO

Acknowledgements

Elected Officials

Darrell Steinberg
Mayor

Jeff Harris (District 3)
Vice Mayor

Angelique Ashby
District 1

Allen Warren
District 2

Steve Hansen
District 4

Jay Schenirer
District 5

Eric Guerra
District 6

Rick Jennings, II
District 7

Larry Carr
District 8

City Staff

Ryan Moore
Director of Public Works

David Edrosolan
Interim Traffic Engineer

Jennifer Donlon Wyant
Transportation Planning Manager

Leslie Mancebo, Project Manager
Transportation Program Analyst

Project Mangement Team

Jesse Gothan
Supervising Engineer

Megan Johnson
Senior Engineer

William Shunk
Senior Engineer

Phil Vulliet
Senior Engineer

Ryan Billeci
Senior Engineer

James Sellards
Assistant Civil Engineer

Consultant Team

Fehr & Peers

David Carter

Bob Grandy

Adrian Engel

Emily Finkel

Becca Shafer

Cullen McCormick

Erika Kulpa

Mark Thomas

Aaron Silva

Josh Iniguez

AIM Consulting

Gladys Cornell

Nicole Porter

Stockton Boulevard (South) at Riza Avenue

Table of Contents

C-1

Broadway/ Stockton Boulevard

D-1

Stockton Boulevard (South)

E-1

Florin Road

A-A

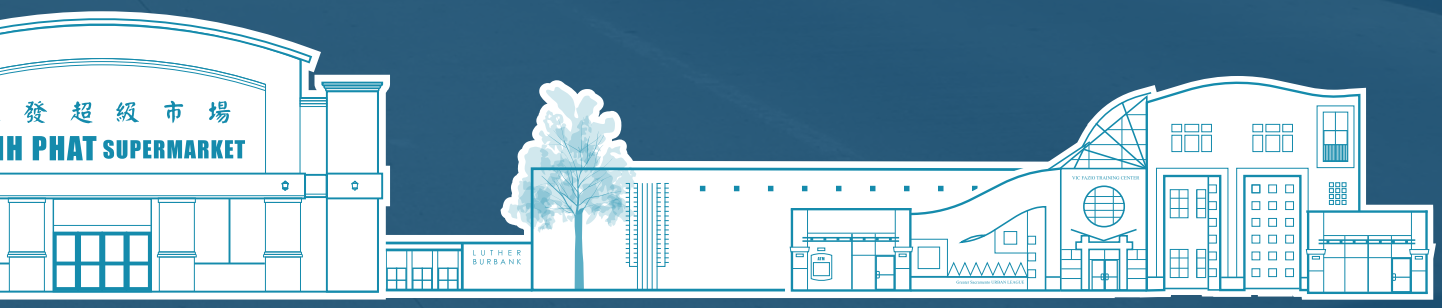
Appendix A- Related Documents

A-B

Appendix B- Technical Calculations

A-C

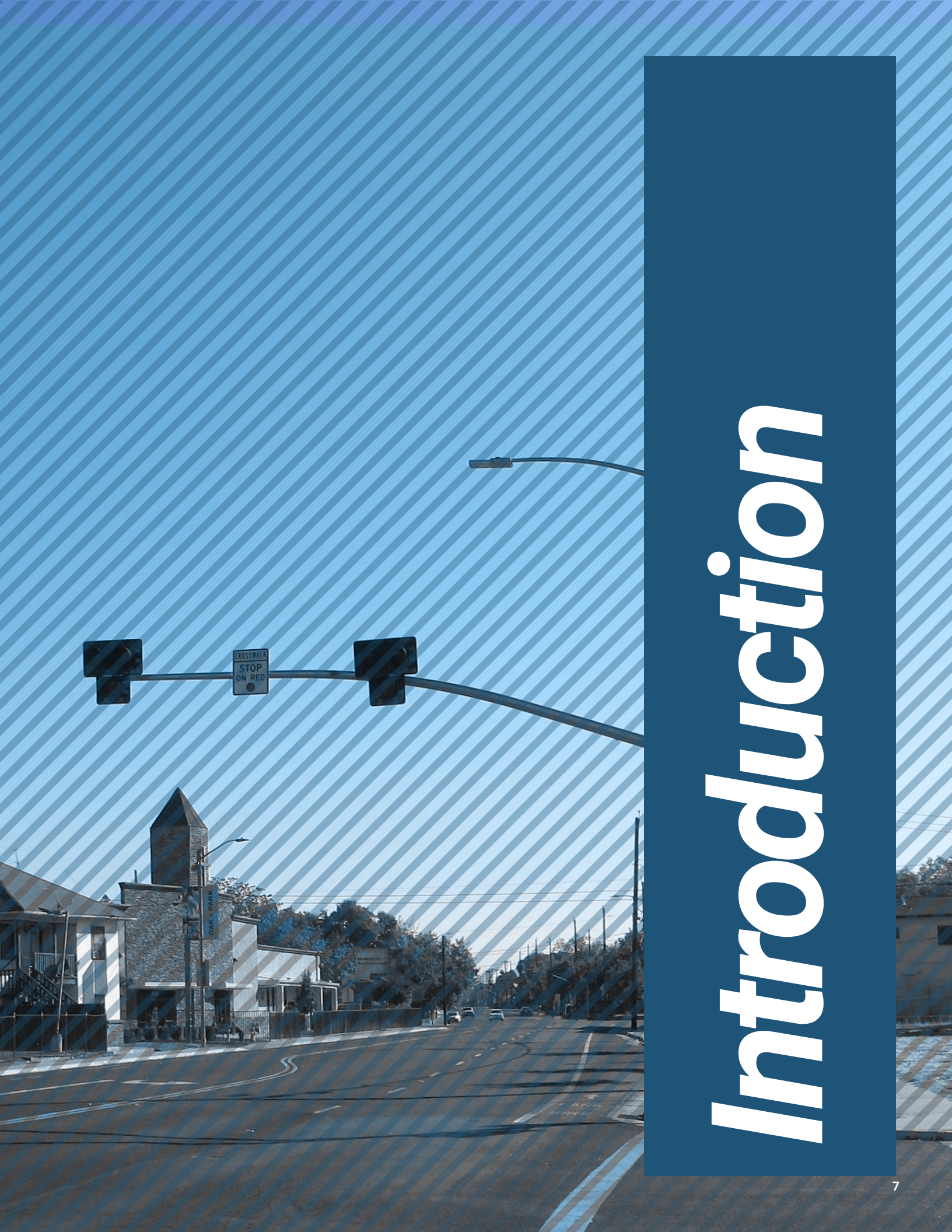
Appendix C- Concept Plans and Cost Estimates



El Camino Avenue at Ueda Parkway

Broadway at 39th Street

Introduction



Introduction

This report presents recommended roadway safety projects for the five one-mile roadway segments with the highest numbers of fatal and serious crashes involving pedestrians, bikes, and motor vehicles in the City of Sacramento. These corridors are:

- **Broadway/Stockton Boulevard:** Martin Luther King Jr. Boulevard to Stockton Boulevard and Broadway to 13th Avenue
- **El Camino Avenue:** Del Paso Boulevard to Steelhead Creek trail crossing
- **Florin Road:** 24th Street to Munson Way
- **Marysville Boulevard**: North Avenue to Arcade Boulevard
- **Stockton Boulevard (South):** McMahon Drive to Patterson Way

Each corridor has its own chapter documenting key features along the corridor such as neighborhood demographics, destinations, and travel statistics, as well as its crash analysis and proposed countermeasures, including their cost and effect on travel.

El Camino Avenue at Del Paso Boulevard

Top 5 Corridors

What is Vision Zero?

Vision Zero is a traffic safety philosophy that rejects the notion that traffic crashes are simply "accidents," but instead preventable incidents that can and must be systematically addressed. Vision Zero starts with the belief that everyone has the right to move safely in their communities, and that system designers and policy makers share the responsibility to ensure safe systems for travel. Through Vision Zero, the City of Sacramento and its partners are committed to working together to create safer streets.In January 2017, the City Council issued a call to action by adopting a resolution with the following goal: **The City of Sacramento will work corroboratively in a data-driven effort to eliminate traffic fatalities and serious injuries by 2027.** Thus, the Vision Zero Action Plan was created, and the document was approved by City Council August 2018.

What is the Vision Zero Top 5 Corridor Study?

This study represents a critical next step in the implementation of Sacramento's Vision Zero program, focusing efforts on implementing near-term roadway improvements on the five corridors within the City that have the highest rates of crashes that result in fatalities and severe injuries. These five corridors were identified through developing of the High Injury Network (HIN), which was developed as a part of the Vision Zero Action Plan. The HIN is based on seven years of crash data (2009 through 2015) for all travel modes, analyzed from the statewide Transportation Injury Mapping System (TIMS).

1. El Camino Ave

Del Paso Boulevard
to
Steelhead Creek trail crossing

2. Marysville Boulevard

North Avenue
to
Arcade Boulevard

3. Broadway/Stockton Boulevard

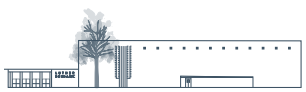
Martin Luther King Jr. Boulevard
to
Stockton Boulevard

Broadway
to
13th Avenue

4. Stockton Boulevard (South)

McMahon Drive
to
Patterson Way

5. Florin Rd



24th Street
to
Munson Way

The "existing conditions" of these corridors (e.g., current travel trends and collision analysis for the years 2009 through 2017) were presented in the Vision Zero Top 5: Existing Conditions Report (see Appendix A).. The Top 5 Corridors Report contains the proposed countermeasures for each of the five corridors, including measured statistics on how implementation of the countermeasures will affect travel and how much they will cost.

Relationship to Vision Zero Action Plan

To help reach its goal of eliminating traffic fatalities and serious injuries by 2027, the City of Sacramento developed a Vision Zero Action Plan, which was adopted by the City Council in August 2018. The Plan used historic crash data to pinpoint the factors contributing to traffic deaths and serious injuries, and it identified proven safety countermeasures to address those factors through education, engineering, enforcement, and evaluation. This Top 5 Corridor Study represents a critical next step in the implementation of City of Sacramento's Vision Zero Program, focusing efforts on implementing near-term improvements on the five corridors within the City that have the highest rates of crashes that result in fatalities and severe injuries.

Identification of Segments

A High Injury Network (HIN) was developed for the City of Sacramento as part of the Vision Zero Action Plan. The HIN identifies corridors with the highest number of fatal and severe crashes for all travel modes (i.e., vehicle, bike, and pedestrian) to better understand existing transportation safety challenges in the City. Seven years of crash data, from 2009 through 2015, was analyzed from the statewide Transportation Injury Mapping Systems (TIMS). TIMS data includes only those crashes that resulted in an injury, ranging from "complaint of pain" to "fatal." Crashes resulting in only property damage, either to a vehicle or other property, are not included in the TIMS data set and were not analyzed as part of the Vision Zero Action Plan and HIN development.

A weighted crash score was created for each roadway segment; crashes involving a fatality or severe injury were given a score of 3, and all other injury crashes were given a score of 1. Weighted crash scores were then analyzed as a rate based on segment length. Segments with a weighted crash score greater than 1 per 300 ft of roadway were included on the HIN.

Once the HIN was developed, the network was divided into corridors approximately one mile in length, to allow for direct comparison and selection of the highest priority corridors. Fehr & Peers identified the ten corridors on the HIN with the highest number of fatal and severe injury crashes per mile.

Each of these corridors have between 10.4 and 7.1 fatal or severe injury crashes per mile. The next five ranked corridors (#6-10) have fatal and severe injury collision rates between 6.2 and 2.1.

Stockton Boulevard (South) south of 48th Avenue


Marysville Boulevard south of Harris Avenue

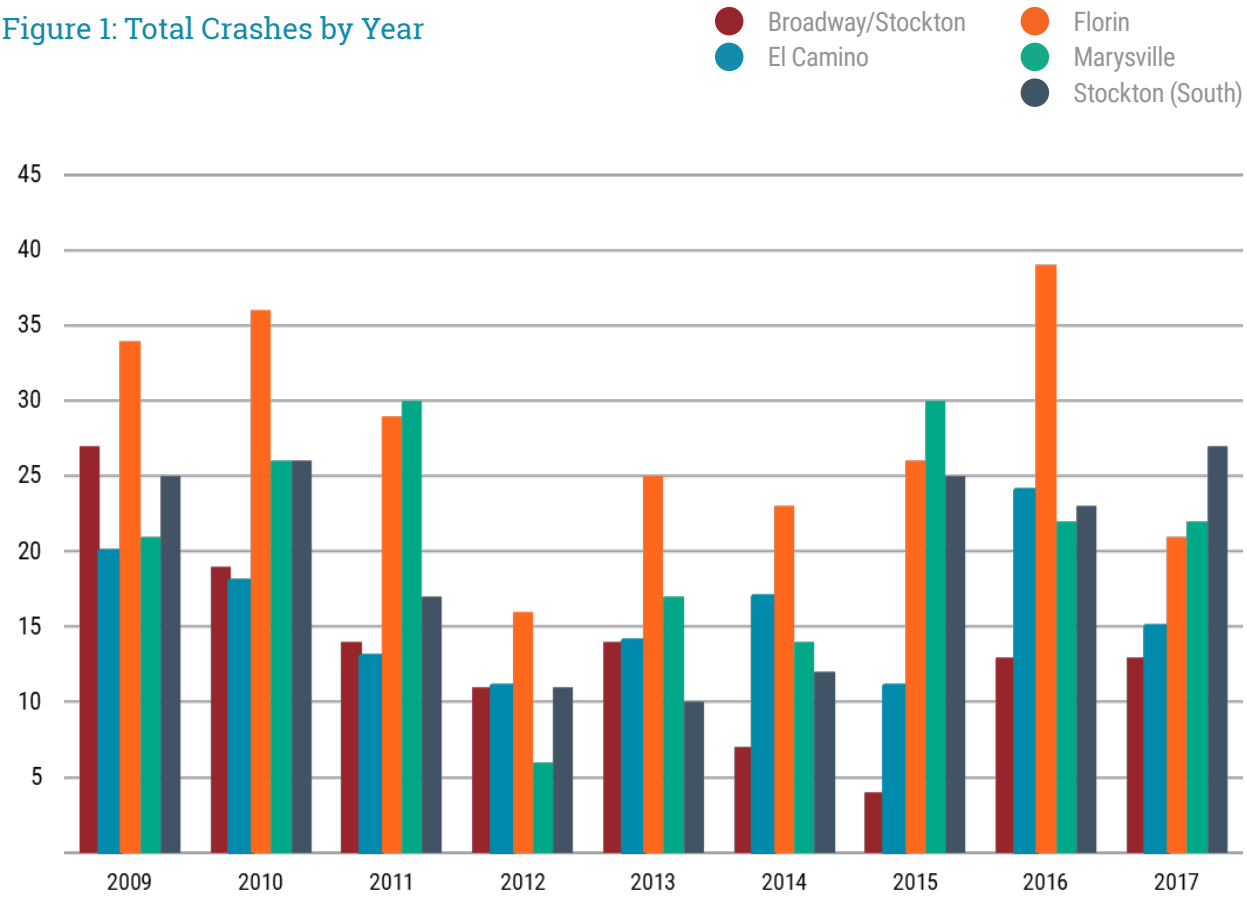
Safety Context Overview

Total Crashes by Year

Figure 1 displays the number of annual injury crashes along each corridor between 2009 and 2017. This figure shows the following:

- The fewest crashes in a year occurred on the Broadway/Stockton Boulevard corridor in 2015, and the highest number of crashes in a year occurred on Florin Road in 2016.
- During the study period, Broadway/Stockton Boulevard is the corridor with the lowest number of total crashes, and Florin Road is the corridor with the highest number of crashes.
- While there were fewer overall crashes between 2012 and 2014, crashes are trending back up to peak numbers seen in 2009 and 2010.

Figure 1: Total Crashes by Year

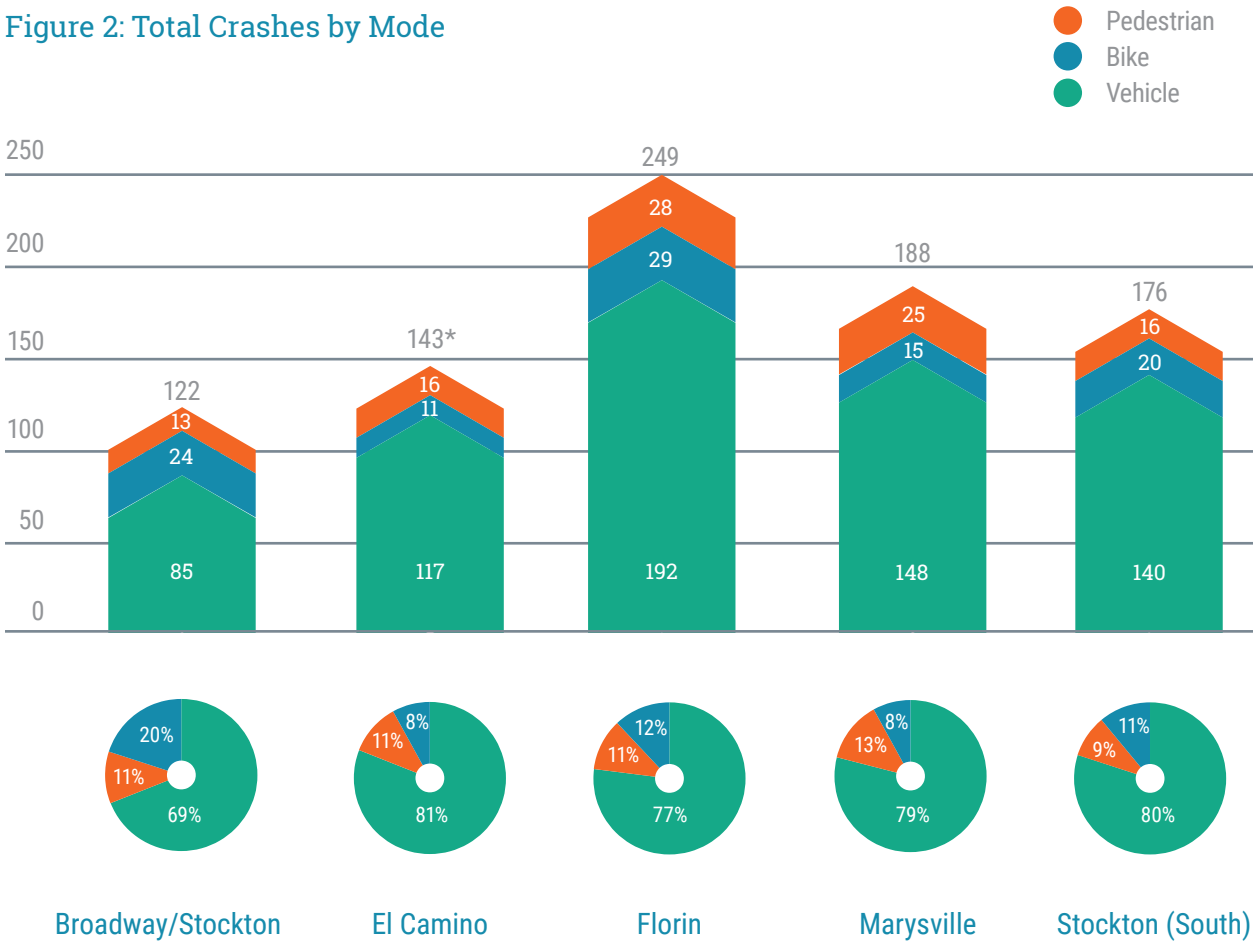


Total Crashes by Mode

Figure 2 displays the number of injury crashes by mode along each corridor between 2009 and 2017 as total and percentages. This figure shows the following:

- Despite having the lowest number of crashes overall, the Broadway/Stockton Boulevard corridor has the largest share of crashes involving a bicyclist (24 crashes, or 20 percent).
- The Marysville Boulevard corridor has the largest share of crashes involving a pedestrian (25 crashes, or 13 percent).
- In absolute numbers, the Florin Road corridor accounts for the highest number of crashes involving pedestrians (28 crashes), bicyclists (29 crashes), and vehicle-vehicle crashes (192 crashes).

Figure 2: Total Crashes by Mode



*One crash on El Camino involved both a pedestrian and a bicyclist.

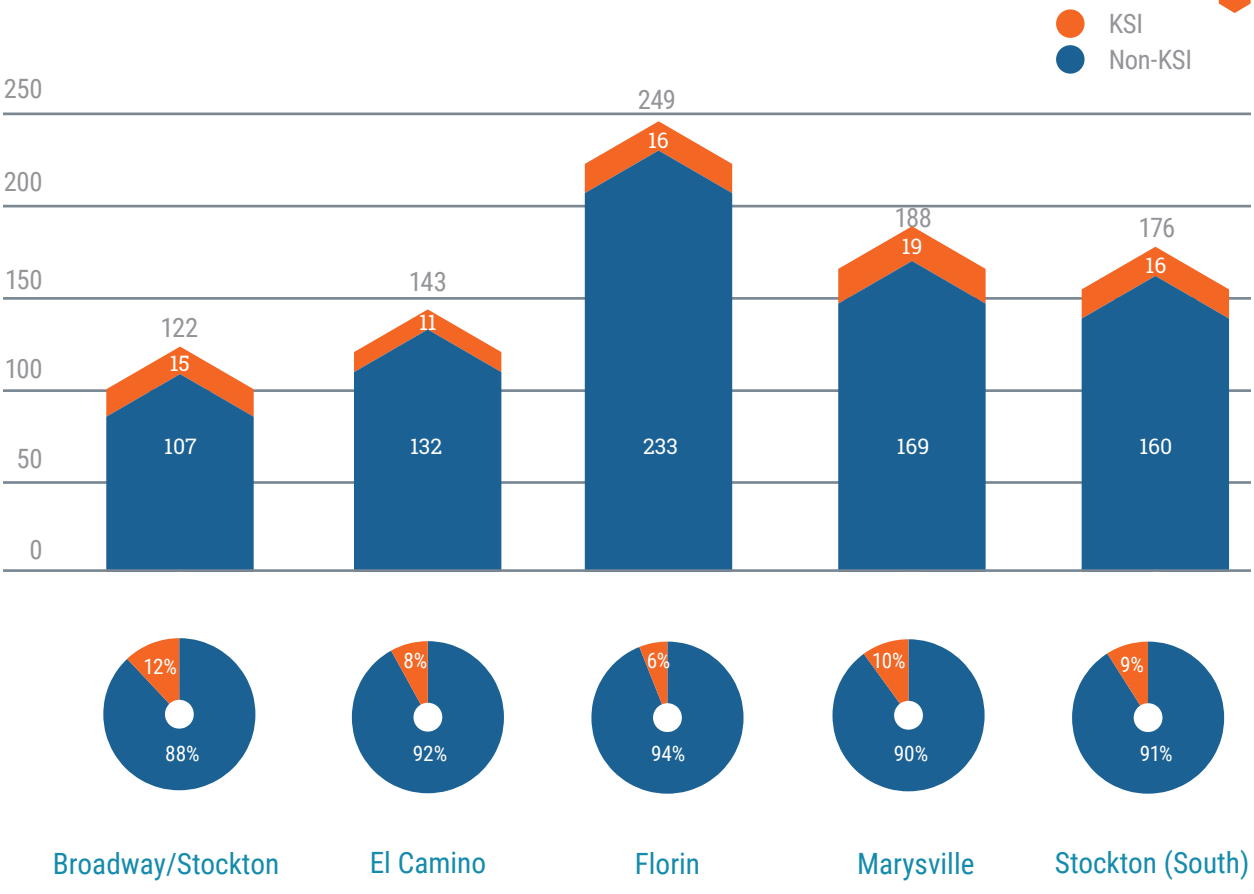
Total Crashes by Severity

Figure 3 displays the number of crashes that resulted in a fatality or serious injury (also called a KSI) along each corridor between 2009 and 2017. This figure shows the following:

- Despite having the lowest number of total crashes overall, the Broadway/Stockton Boulevard corridor has the largest share of crashes that result in a fatality or serious injury (15 crashes, or 12 percent of all injury crashes).
- The Marysville Boulevard corridor has the highest absolute number of crashes resulting in a fatality or serious injury (19 crashes).

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

Figure 3: Total Crashes by Severity

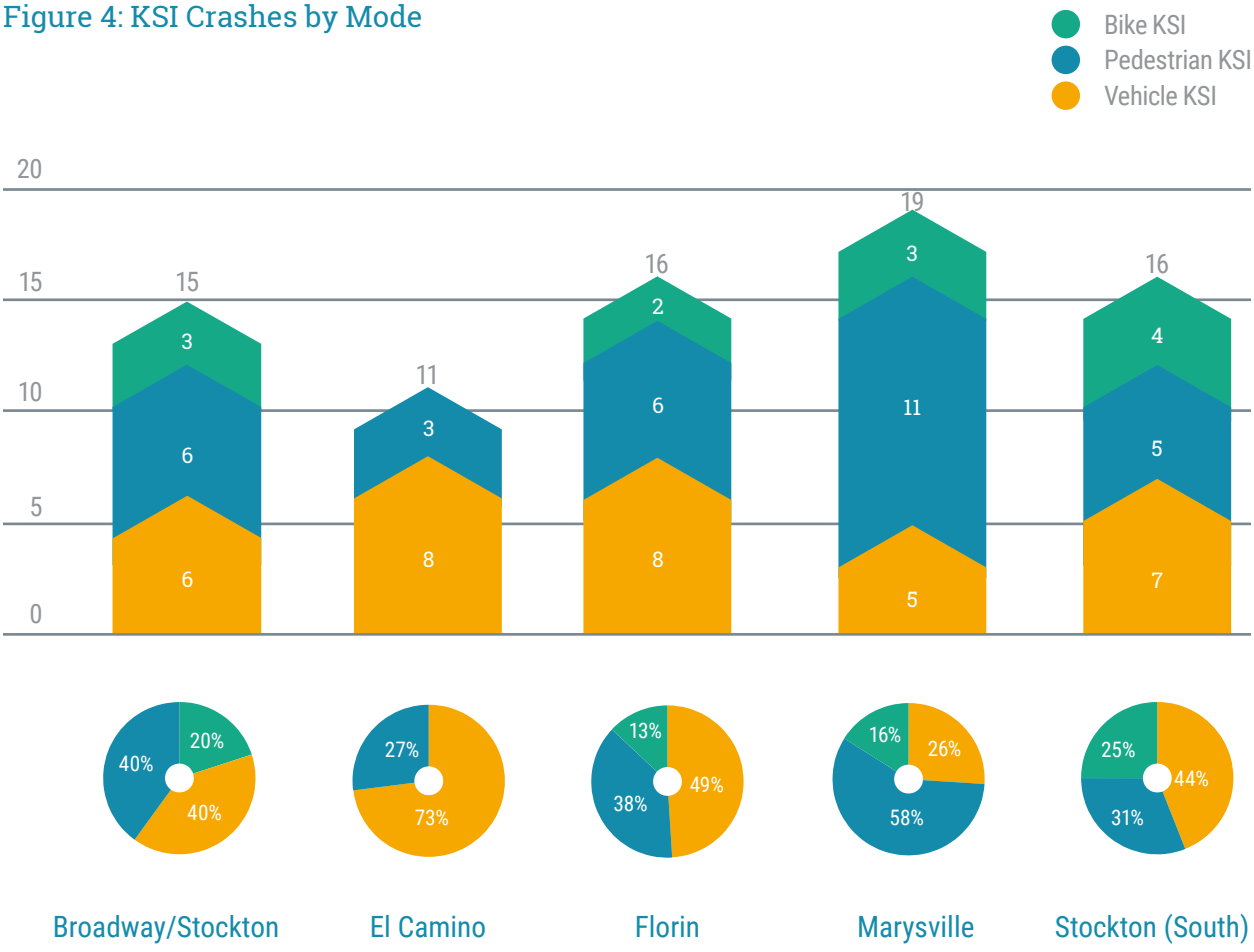


KSI Crashes by Mode

Figure 4 displays the number of crashes by mode that resulted in a fatality or serious injury between 2009 and 2017. This figure shows the following:

- The Marysville Boulevard corridor has the highest number and largest share of KSI crashes that involved a pedestrian (11 crashes, or 58 percent of KSI crashes).
- The Stockton Boulevard (South) corridor has the highest number and largest share of KSI crashes that involved a bicyclist (four crashes, or 25 percent of KSI crashes).
- The El Camino Avenue corridor does not have any bike crashes that resulted in a fatality or serious injury.

Figure 4: KSI Crashes by Mode



El Camino Avenue at Rio Linda Boulevard

Countermeasure Toolbox

Countermeasure Toolbox

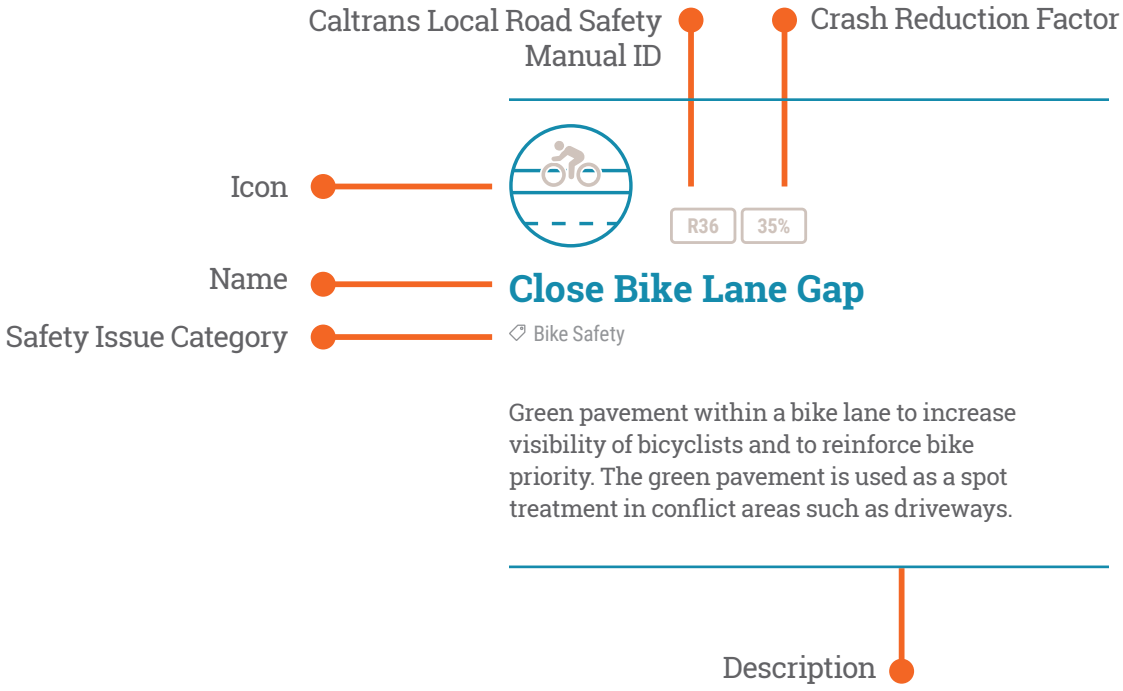
Introduction

This toolbox presents the roadway safety countermeasures applicable on each of the Top 5 Corridors. These countermeasures have been selected specifically for their efficacy in creating safer environments for people traveling on Sacramento's streets, regardless of mode. 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 are noted by an LRSM ID numbers, and include a Caltrans-approved Crash Reduction Factor (CRF) as defined 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. Some of these countermeasures include an associated CRF, which is based on academic research and before-and-after studies, as compiled and reported by the Federal Highway Administration (FHWA).

How to use the Toolbox

A-Z

The countermeasure tools are listed in alphabetical order.



List of Countermeasures


Advanced Dilemma-Zone Detection

Advanced Stop Bar


Bike Conflict Zone Markings


Bulbout


Bus Boarding Islands


Class II Bike Lane


Close Bike Lane Gap

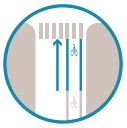

Close Sidewalk Gap


Co-Locate Bus Stops & Pedestrian Crossings


Consolidate Driveways


Countdown Pedestrian Signal Heads


Dual Curb Ramps

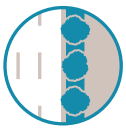

Extend Bike Lane to Intersection


Extend Pedestrian Crossing Time

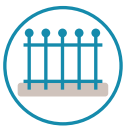

Extend Signal Clearance Time


High Visibility Crosswalk


Intersection Tightening


Landscape Buffer


Leading Pedestrian Interval


Median Barrier Fencing


Narrow Lanes


New Pedestrian Signal


New Traffic Signal


Parking Prohibition


Partial Closure


Pedestrian Recall Signal Timing


Pedestrian Refuge Island


Pedestrian Scale Lighting


Pedestrian Scramble

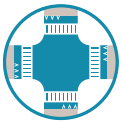

Prohibit Left Turn

List of Countermeasures (cont.)


Prohibit Turns During Pedestrian Phase


Protected Left Turns

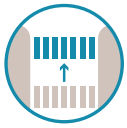

Provide Green Time For Bikes


Raised Intersection

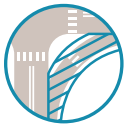

Raised Median


Realign Intersection to 90 Degrees


Red Light Camera


Relocate Crosswalk


Remove Dual Left Turn Lanes


Remove Right Turn Slip Lane


Remove Sight Obstruction


Road Closure


Road Diet


Roundabout


Separated/Buffered Bikeway

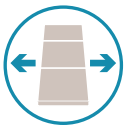

Shorten Signal Cycle Length


Slow Green Wave


Split Signal Phase

Stop Sign


Straighten Crosswalk


Widen Sidewalk

Countermeasures A-C

S4 40%

Advanced Dilemma-Zone Detection

Signals/Signage

Advanced dilemma-zone detection enhances safety at signalized intersections by modifying traffic control signal timing on the fly to reduce the number of drivers that may have difficulty deciding whether to stop or proceed during a yellow phase. This may reduce rear-end crashes associated with unsafe stopping and angle crashes due to red light running.

S20 15%

Advanced Stop Bar

Crossing, Pedestrian Safety

A stop bar placed ahead of the crosswalk at stop signs and signals reduces instances of vehicles encroaching on the crosswalk.

Bike Conflict Zone Markings

Bike Safety

Green pavement within a bike lane to increase visibility of bicyclists and to reinforce bike priority. The green pavement is used as a spot treatment in conflict areas such as driveways.

Bulbout

Crossings, Pedestrian Safety, Speed, Visibility

Raised devices, usually constructed from concrete, landscaping, or paint and plastic materials, that narrow the roadway to reduce speeds of turning vehicles, improve sight lines, and shorten pedestrian crossing distances.

Bus Boarding Islands

Bike Safety, Pedestrian Safety

Dedicated waiting and boarding areas for passengers that are separated from the sidewalk by a bike channel, eliminating conflicts between transit vehicles and bikes at stops.

R32 35%

Class II Bike Lane

Bike Safety

Five to seven foot wide designated lanes for bicyclists adjacent to vehicle travel lanes, delineated with pavement markings.

Countermeasures C - D

R32 35%

Close Bike Lane Gap

Bike Safety

Closing gaps between bike lanes increases the amount of dedicated facilities bicyclists can use, reducing mixing of bicyclists and drivers and increasing network connectivity and visibility of bicyclists in the roadway.

R34 80%

Close Sidewalk Gap

Pedestrian Safety

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

Co-Locate Bus Stops and Pedestrian Crossings

Crossing, Pedestrian Safety

Place bus stops and pedestrian crossings in close proximity to allow transit riders to cross the street safely.

Consolidate Driveways

Bike Safety, Pedestrian Safety, Visibility

Reducing the number of driveway entrances/ exits through consolidation limits the exposure of bicyclists, pedestrians, and drivers to vehicles entering or exiting driveways, reducing conflicts.

S17 25%

Countdown Pedestrian Signal Heads

Crossings, Pedestrian Safety, Signals/Signage

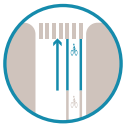
Displays "countdown" of seconds remaining on the pedestrian signal. Countdown indications improve safety for all road users, and are required for all newly installed traffic signals where pedestrian signals are installed.

Dual Curb Ramps

Pedestrian Safety

Dual curb ramps, opposed to single angled 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. These are curb ramps that provide a slope for two directions of the curb, instead of single angled curb ramps.

Countermeasures E - L



Extend Bike Lane to Intersection

Bike Safety

In locations where a bike lane is dropped due to the addition of a right turn pocket, the intersection approach may be restriped to allow for bicyclists to move to the left side of right-turning vehicles ahead of reaching the intersection.

S3 15%

Extend Pedestrian Crossing Time

Crossings, Pedestrian Safety

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

S3 15%

Extend Signal Clearance Time

Signals/Signage

Extending yellow and all red time allows drivers and bicyclists to safely cross through a signalized intersection before conflicting traffic movements are permitted to enter the intersection.

S18/NS20 25%

High Visibility Crosswalk

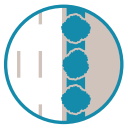
Crossings, Pedestrian Safety, Visibility

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.

Intersection Tightening

Crossings, Pedestrian Safety, Speed, Visibility

Uses temporary materials like paint, plastic bollards, and reflective markers to visually and physically narrow the street at intersections, which can create a shorter crossing for pedestrians and slows vehicles approaching the intersection and turning.



Landscape Buffer

Pedestrian Safety

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

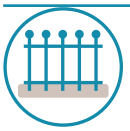
Countermeasures L - P

S21 60%

Leading Pedestrian Interval

Crossings, Pedestrian Safety, 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.



R3 25%

Median Barrier Fencing

Crossings, Pedestrian Safety

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.

Narrow Lanes

Speed

A reduction in lane width, to 11 feet, produces a traffic calming effect by encouraging drivers to travel at slower speeds, lowering the risk of crashing with bicyclists, pedestrians, and other drivers.

New Pedestrian Signal

Crossings, Pedestrian Safety

Pedestrian signals (also called "half signals") can be implemented at mid-block crossing locations to enhance crosswalk safety and increase driver yielding. The signals consist of standard (red-yellow-green) signal heads controlling the roadway approaches, and function similar to a standard traffic signal when actuated by a pedestrian or bike push-button or detection.

NS3 30%

New Traffic Signal

Signals/Signage

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.

30%

Parking Prohibition Near Intersections

Bike Safety, Crossings, Pedestrian Safety, Signals/Signage

By restricting parking at curbs in front of intersection crosswalks, sight lines are cleared between pedestrian crossings and oncoming drivers, reducing the risk of crashing (also called "daylighting).

Countermeasures P - P

Partial Closure

Bike Safety, Crossings, Pedestrian Safety

Partial closures, using a physical barrier across one direction of traffic at an intersection allow full bicyclist and pedestrian passage while restricting vehicle access in one direction. This strategy can be used to minimize conflict points at complicated intersections.

Pedestrian Recall Signal Timing

Pedestrian Safety, Signals/Signage

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 would be displayed every signal cycle without prompting by a pedestrian push button.

S12/NS14 | 25%

Pedestrian Refuge Island

Crossings, Pedestrian Safety, Speed, Visibility

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.

S1/NS1/R1 | 35-40%

Pedestrian Scale Lighting

Crossings, Pedestrian Safety, Visibility

Appropriate quality and placement of lighting can enhance an environment as well as increase comfort and safety. Pedestrian-scale lighting is lower in height than standard streetlighting and is spaced closer together.

S19 | 40%

Pedestrian Scramble

Crossings, Pedestrian Safety, Signals/Signage

Restricts vehicular movements to provide an exclusive signal phase allowing pedestrians to cross in all directions, including diagonally.

S15/NS16 | 50%

Prohibit Left Turn

Bike Safety, Crossings, Pedstrian Safety, Signals/Signage

Prohibitions of 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.

Countermeasures P - R

Prohibit Turns During Pedestrian Phase

Crossings, Pedestrian Safety, Signals/Signage

Restricts left or 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.

S6/S7 | 30-55%

Protected Left Turns

Signals/Signage

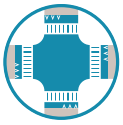
Protected left turns provide an exclusive phase for left-turning vehicles to enter an intersection separate from any conflicting vehicle or pedestrian movements.

S3 | t15%

Provide Green Time For Bikes

Bike Safety, Signals/Signage

Provide or prolong the green phase when bicyclists are present to provide additional time for bicyclist to clear the intersection. Can occur automatically in the signal phasing or when prompted with bike detection. Topography should be considered in clearance time.



Raised Intersection

Crossings, Pedestrian Safety, Speed

Raised intersections are flush with the sidewalk and ensure that drivers traverse the crosswalk slowly. Similar to speed humps and other vertical speed control elements, they reinforce slow speeds and encourage motorists to yield to pedestrians at the crosswalk.

S12/NS14/R8 | 25%

Raised Median

Crossings, Pedestrian Safety, Speed

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.

Realign Intersection to 90 Degrees

Crossings, Pedestrian Safety, Speed, Visibility

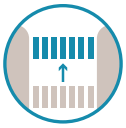
By eliminating acute or obtuse angles between intersection roadways, intersection sight distance may be improved, allowing drivers to see pedestrians more easily. Right-angle intersections can also help to slow down turning vehicles.

Countermeasures R - R

Red Light Camera

Signals/Signage

Red light cameras can be used for automated enforcement to issue citations to drivers running red lights at signalized intersections, and may discourage this behavior.



Relocate Crosswalk

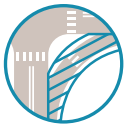
Crossings, Pedestrian Safety, Visibility

Relocating existing crosswalks can help improve pedestrian visibility, shorten crossing distances, and minimize conflicts with vehicles. In some cases, crosswalks currently located between two legs of an offset intersection may be moved to the far side of the intersection to minimize the number of conflicting vehicle turning movements.

Remove Dual Left Turn Lanes

Signals/Signage

Restriping an approach so there is a single left-turn lane instead of dual lefts can help simplify an intersection and create room for a road diet or other geometric improvements.



Remove Right Turn Slip Lane

Bike Safety, Pedestrian Safety, Speed

Closing a free-flow right-turn slip lane can help slow right turning drivers, eliminates an uncontrolled crossing for pedestrians, and shortens pedestrian crossing distances. The space reclaimed in closing the slip lane can be reused as pedestrian space to widen sidewalks, enhance curb ramps, or provide more space for street furniture.

NS11 20%

Remove Sight Obstruction

Visibility

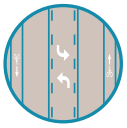
Remove objects that may prevent drivers and pedestrians from having a clear sightline. May include trimming or removing landscaping, or removing or relocating large signs.

Road Closure

Bike Safety, Crossings, Pedestrian Safety

Road closures, using a physical barrier, allow full bicyclist and pedestrian passage while restricting vehicle access. This strategy can be used to minimize conflict points at complicated intersections or to minimize conflicting movements due to turning vehicles.

Countermeasures R - S



R14 30%

Road Diet

Speed, Pedestrian Safety, Bike Safety, Crossings

Road diets generally reassign space in the roadway from vehicle travel lanes to create room for bike 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 crashes.

S16/NS4/NS5 35-67%

Roundabout

Bike Safety, Crossings, Pedstrian Safety, Signals/Signage

Roundabouts are large circular islands, placed in the middle of an intersection, which direct flow in a continuous circular direction around the intersection. Roundabouts can reduce the number of conflict points, compared to an uncontrolled intersection, and decrease vehicle speeds due to intersection geometry. Converting signalized intersections to roundabouts can be especially effective at complex intersections or intersections with high left-turn volumes.

R33 45%

Separated/Buffered Bikeway

Bike Safety

Designated bike lanes, separated from vehicle traffic by a physical barrier, usually bollards, landscaping, or parked cars. These facilities can increase safety by decreasing opportunities for crashing with over-taking vehicles, and reducing the risk of dooring.

S3 15%

Shorten Signal Cycle Length

Signals/Signage

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.

Slow Green Wave

Signals/Signage, Speed

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

Split Signal Phase

Signals/Signage

Opposing legs of an intersection each receive their own phase.

Countermeasures S - W

Stop Sign

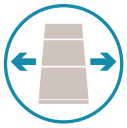
Signals/Signage

When warranted, stop signs provide a cue to drivers to stop and wait for vehicles, bicyclists, and pedestrians to cross before proceeding.

Straighten Crosswalk

Crossings, Pedestrian Safety, Visibility

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



Widen Sidewalk

Pedestrian Safety

Wide sidewalks can provide space for both pedestrians and bicyclists to use a shared facility. Wide sidewalks can be important for locations with high volumes of pedestrians.

Broadway west of Stockton Boulevard

Policy Toolbox

Policy Toolbox

Introduction

As part of the Vision Zero Action Plan, adopted by City Council in August 2018, the City committed to a series of actions that focus on achieving the Vision Zero goal of eliminating traffic fatalities and serious injuries. The development of the Top 5 Corridor Study has provided additional insight into specific tools to consider when updating policies to achieve the Vision Zero goal. Clearly defining policies will allow them to be regularly incorporated into future plans and projects.

Signal Policies

Consistent with Vision Zero Action 5.4 it is recommended that the City update its signal timing policy to improve safety for all modes.

Based upon experience on the Top 5 corridors, some signal timing policies to consider as part of this update include the following:

Maximum Cycle Length

Recommend that the City consider establishing a practice to determine a maximum cycle length for a corridor or intersection, especially along the High Injury Network.

What is Maximum Cycle Length?

A cycle length is the amount of time required to display all phases (red, yellow, green) for each direction of an intersection before returning to the starting point. Cycle lengths are based on traffic volumes and work best within a certain range depending on the conditions of the corridor and intersection. Shorter signal cycles can reduce overall pedestrian wait times and result in improved pedestrian compliance.

Minimum Green Time

Recommend that the City review industry best practices, State and Federal guidance to update the practice for calculating minimum green time with the next update to City signal timing policy.

What is Minimum Green Time?

The minimum green time is the least amount of time that a green signal will be displayed for a specific movement. The time for pedestrians and/or bicyclists crossing with a phase must also be considered and included in the minimum phase length.

Flash Don't Walk Time

Recommend that the City review its practice for calculating pedestrian clearance time with the next update to City signal timing policy.

What is Walk/Flash Don't Walk Time?

The "Flashing Don't Walk" interval follows the "Walk" interval and is often accompanied by a countdown signal. It is used to alert pedestrians that they need to finish crossing and if there is a countdown, it lets pedestrians know how long they have to do so.

Yellow and All Red Clearance Time

Recommend that the City review its practice for calculating intersection clearance times with the next update to City signal timing policy.

What are Clearance Times?

Clearance times include the yellow light and the "all-red" signal time. The yellow signal provides time for approaching vehicles to slow and stop and the "all-red" is the time when a signal is changing from one phase (red, yellow, green) to the next giving time for all vehicles to clear the intersection.

Slow Green Wave

Recommend that the City investigate controlling the travel speed of vehicles by optimizing the cycle length, splits, and offsets to the posted speed or lower where appropriate.

What is a Slow Green Wave?

The concept of a "slow green wave" is a series of traffic signals coordinated to allow for uninterrupted traffic flow of vehicles traveling at the speed limit or lower and require those traveling at faster speeds to stop more frequently.

Pedestrian Recall

Recommend that the City consider implementing pedestrian recall mode to traffic signals on the High Injury Network where appropriate.

What is Pedestrian Recall and Detection?

Activating pedestrian recall mode initiates the pedestrian phase automatically with its corresponding phase for every traffic signal cycle. This means that the pedestrian would not have to push a button in order to see the "Walk" phase. This is typically implemented in areas with high levels of pedestrian activity.

Street Design Policies

Consistent with Vision Zero Action 2.1 it is recommended that the city update street design standards to reflect complete streets and designs reflective of crash reduction factors.

Based upon experience on the Top 5 corridors, some tools to consider as part of this update include the following:

Pedestrian Countdown Signals

Recommend that the City continue its efforts to install pedestrian countdown signals at all signalized intersections.

What are pedestrian countdown signals?

Per the City's draft Pedestrian Crossing Guidelines, pedestrian countdown signals are particularly useful to pedestrians at longer distance crossings, so pedestrians know how much time remains to fully cross the street before the signal changes.

Bikeway Selection

Recommend that the City install the appropriate bike facility based on the guidance in the Sacramento Bicycle Master Plan.

How are bikeways selected?

The Sacramento Bike Master Plan contains a "Bikeway Facility Selection Guidelines" chart to provide a starting point to help identify which bikeway type is appropriate for a road based on its traffic volume and speed limit. Using this chart to build appropriate bike facilities will create a low stress network that is comfortable for riders of all ages and abilities to use.

Sidewalk Widths

Recommend that the City consider a contextual approach to setting the minimum widths of sidewalks with the next update to the street design standards.

How are sidewalk widths determined?

In accordance with ADA accessibility guidelines, sidewalks should at least 5 feet in width. A contextual approach for sidewalk width setting could take into consideration the street type and surrounding land use, requiring wider sidewalks on some streets to enhance safety and comfort for pedestrians.

Lane Widths

Recommend that the City consider exemptions to the standard minimum lane width on the Top 5 Corridors and remaining High-Injury Network, where appropriate.

How are lane widths determined?

City street design standards require minimum lane widths for specific scenarios. A reduction in lane width produces a traffic calming effect by encouraging drives to travel at slower speeds. Other considerations for setting minimum lane widths are truck routes, transit routes, and locations where adjacent lanes are in the opposite direction..

Other Policies

This section documents additional recommended policy modifications based upon experience on the Top 5 corridors:

Speed Limit Setting

Recommend that the City continue to pursue efforts to reduce posted speed limits on the HIN.

How are speed limits set?

State guidelines require surveys of current speeds to be used as the basis for speed limit setting. While continuing to operate within State guidance the City has some tools to ensure that speed limits on the HIN are context sensitive and prioritize the safety and comfort of all road users.

Speed Safety Cameras

Recommend that the City support the use of automated speed enforcement in State Legislation.

What are speed safety cameras?

Speed safety cameras are devices that can identify speeding violations and issue citations. This type of speed enforcement is allowed in many States, it is not allowed in California. The City of Sacramento should continue to support legislative efforts to allow speed safety cameras in California.

Bus Stop Placement and Supportive Facilities

Recommend that the City prioritize pedestrian and bike safety improvements that provide connections to light rail stations and bus stops. At minimum, bus stops should be co-located with an adjacent crosswalk (within 100 feet).

How are bus stop placements determined?

Consistent with the City's draft Pedestrian Crossing Guidelines, recommend that bus stops are placed on the far side of intersections and downstream of adjacent crosswalks, to ensure bus stop does not conflict with crosswalk approach. Recommend that the City also provide adequate sidewalk width on streets with bus routes to provide stop amenities while maintaining space for pedestrian flow.

Newly Adopted or In Process Policies

Complete Streets Policy

In December 2019, the City adopted a Complete Streets Policy to promote safe and convenient travel options on Sacramento's streets for all users of all abilities and ages.

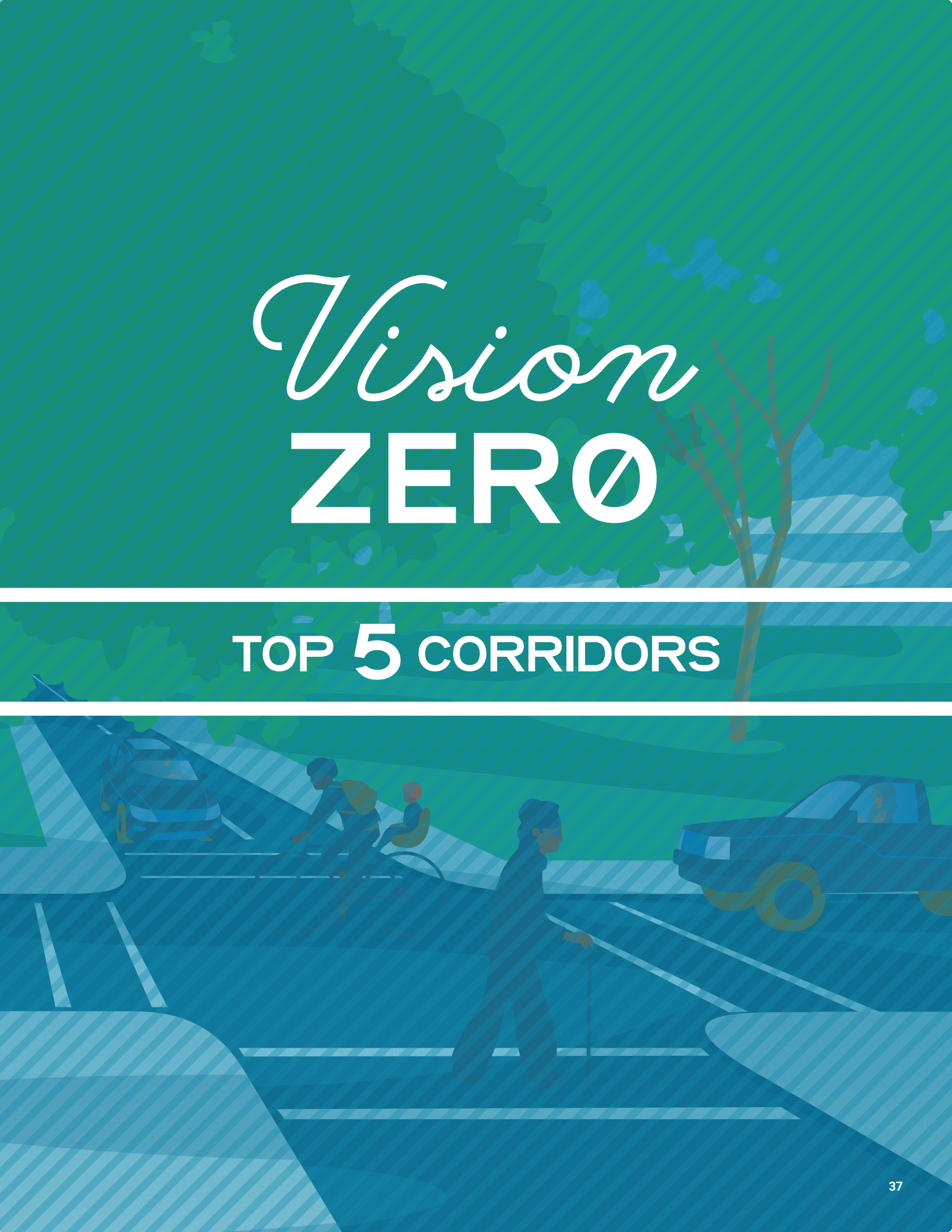
This policy aligns with and supports projects and policies recommended as part of this report, as well as the Action Items listed in the Sacramento Vision Zero Action Plan.

Pedestrian Crossing Guidelines

Recommend that the City update the Pedestrian Crossing Guidelines later this year. The updated guidelines, currently in draft form, will include recommendations related to crosswalk spacing, markings, and safety enhancement facilities.

Key considerations included in the draft Guidelines support the crosswalk safety enhancement recommended in this report. Additionally, marked crosswalk spacing is recommended at least as frequently as shown below:

- Every 800 feet on the Grid
- Every 1,200 feet on the HIN
- Within 100 feet of new transit stops


Vision
ZERO
TOP 5 CORRIDORS

El Camino Avenue at Del Paso Boulevard

El Camino

Vision Zero
Top 5 Corridor

El Camino Avenue

Vision Zero Top 5 Corridor

El Camino Ave & Del Paso Blvd

What is going on?
Between 2009 and 2017, 11 crashes that resulted in a fatality or severe injury (KSI) occurred on the segment of El Camino Avenue between Ueda Parkway and Del Paso Boulevard, three of which involved a pedestrian.

What are the key issues?
Many of the vehicular crashes involved rear-ends, proceeding straight, and driving at an unsafe speed. Additionally, two-thirds of pedestrian crashes involved people crossing the street in a marked crosswalk.

What is the community concerned about?
During outreach, residents spoke of drivers traveling too fast on the corridor, which can make it difficult to cross the street or pull out of driveways.

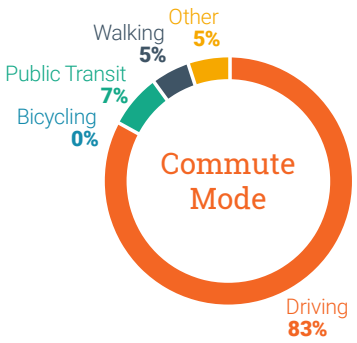
The following pages lay out the existing conditions along the corridor, feedback heard from residents at outreach events, and roadway safety recommendations focused on reducing vehicle speed, improving visibility, increasing compliance with signals and signs, and providing additional crossing opportunities for pedestrians.

Table of Contents

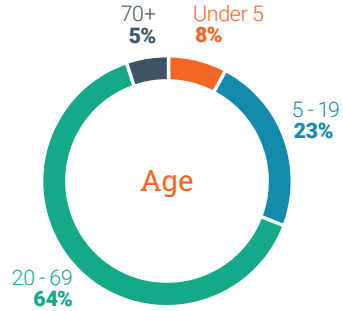
In the Neighborhood

Corridor

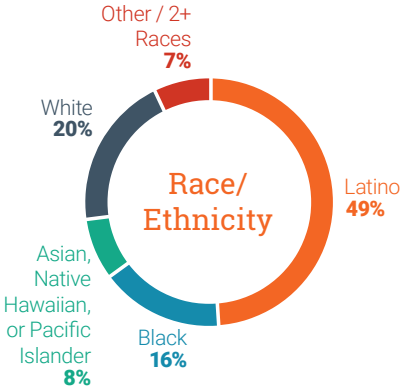
About the Neighborhood



Residents in this neighborhood take transit and walk to work at a higher rate than the City as a whole.



This neighborhood has a higher share of residents age 5-19 than the City as a whole.



65% of the residents in this neighborhood are Black or Latino, compared with 42% citywide.

El Camino Avenue at Edgewater Road


El Camino Avenue at Forrest Street


El Camino Avenue at Traction Avenue

Key Destinations Along the Corridor

Parks
2

Regional Trails
2

Libraries
1

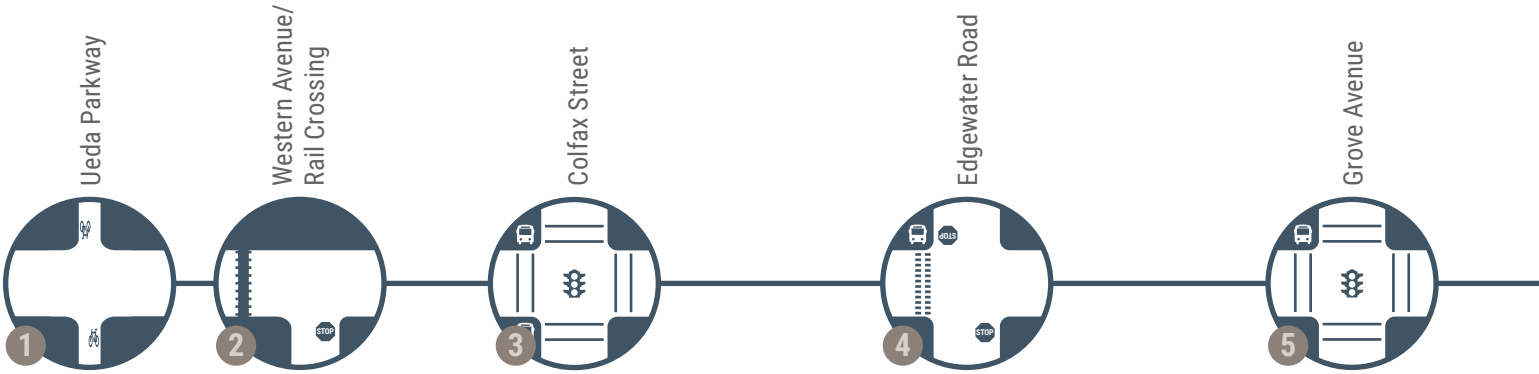
Food Markets
2

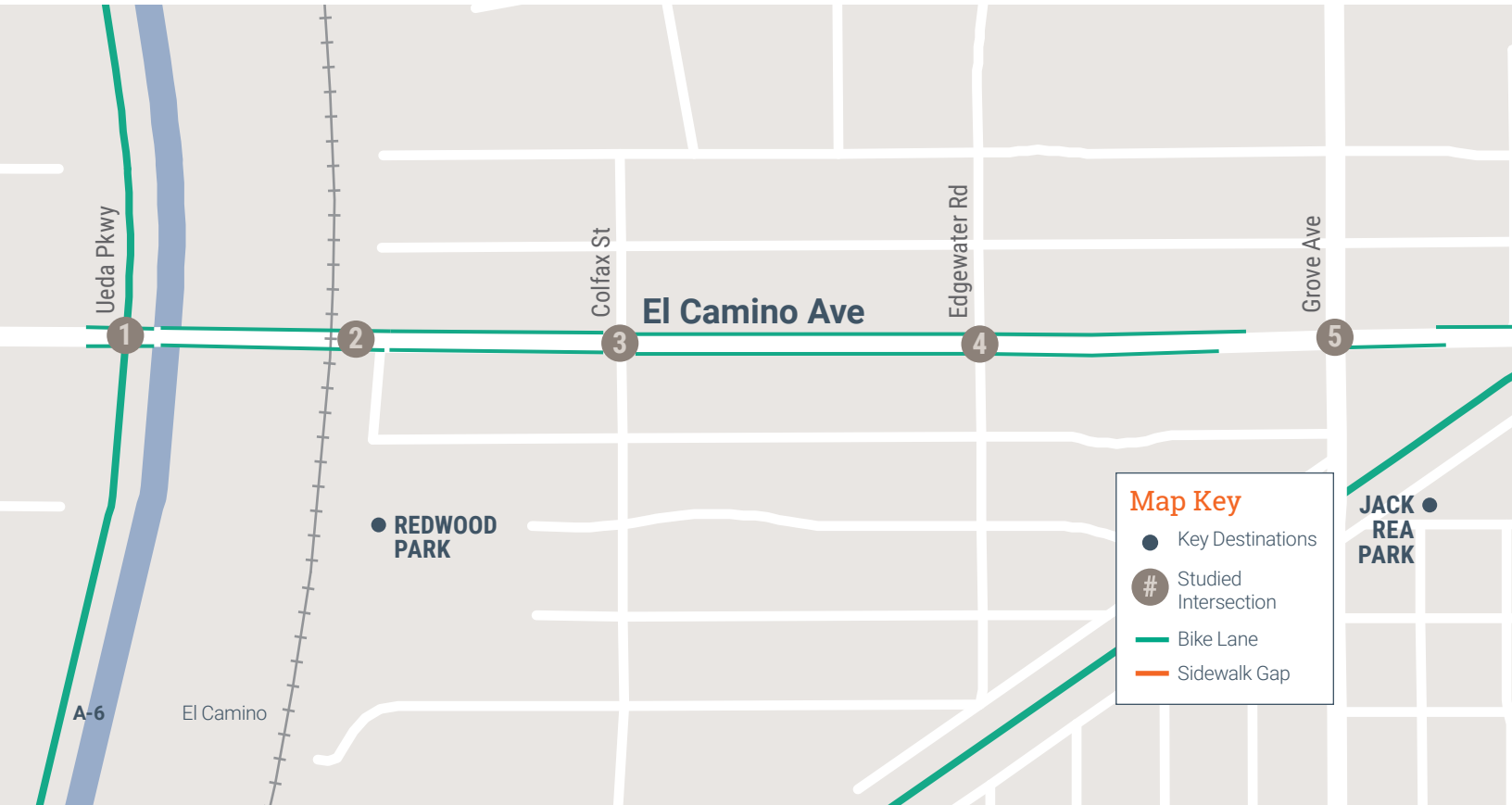
Houses of Worship
2

Travel on El Camino

Key Statistics

Posted Speed Limit	Daily Vehicles	Maximum PM Intersection Vehicle Volume	PM Rush Hour People Walking	PM Rush Hour People Biking
30 MPH	**13,500**	**1,288**	**151**	**158**





Number of Transit Routes

2

#15, #88

Bikeway Type

On-Street Bike Lanes with gaps

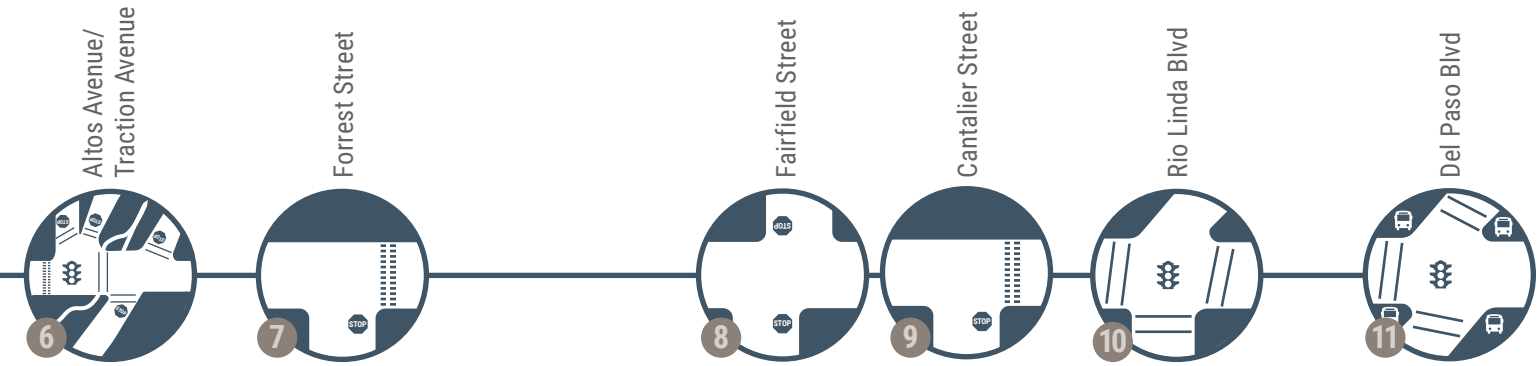
Longest Distance Between Marked Crosswalks

2,100

Ft

Sidewalk Coverage

97%



Crashes on El Camino

Vehicle Crash Types

Unsafe Speed

"Unsafe Speed" was the most common violation, cited in 40% of all crashes.

1 2 3 4 5 6
7 8 9 10 11

Proceeding Straight

80% of drivers were proceeding straight or stopped at the time of the crash.

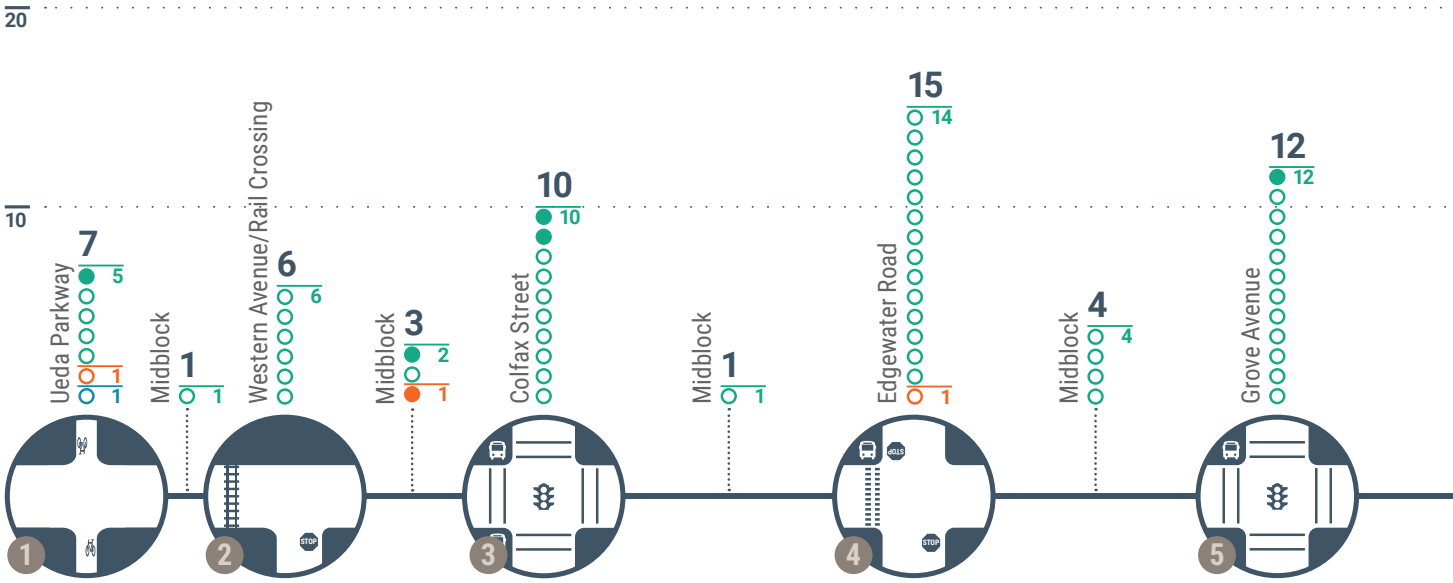
1 2 3 4 5 6
7 8 9 10 11

Rear End

Over 40% of all crashes were rear end.

1 2 3 4 5 6
7 8 9 10 11

Crash Locations



Pedestrian Crash Types

Pedestrian Crossing

The majority of people hit while walking were crossing. 2/3 of people were in the crosswalk.

1 2 3 4 5 **6**
7 8 9 **10** **11**

Weekend

Nearly 2/3 of pedestrian crashes occurred on Friday, Saturday or Sunday.

1 2 3 4 5 **6**
7 8 9 10 **11**

Bike Crash Types

Daytime

10 of 11 total bike crashes occured between 9 AM and 6 PM.

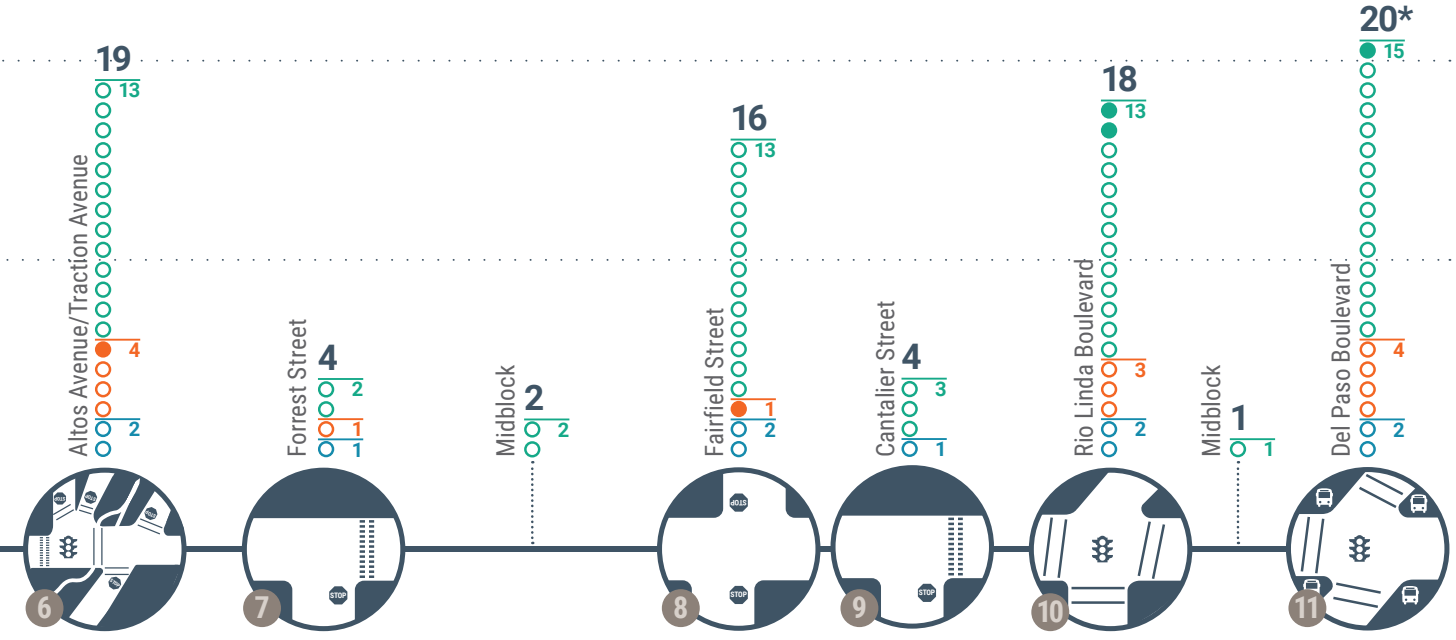
1 2 3 4 5 6
7 8 9 10 11

1 Numbers that are turned on represent a location where crash type has occurred at least three times.

Total Crashes

	All Injury Crashes	Fatal and Severe Crashes
Vehicle	117	8
Pedestrian	16	3
Bike	11	0

*One crash involved both a pedestrian and bicyclist and is identified under both mode categories



Feedback from the Community

> "At the intersection of Del Paso and El Camino, it is hard to cross the street."

> "A lot of homes have their driveways backing into El Camino—there is unsafe backing out due to high speeds and visibility issues."

Grocery Outlet Store Pop-Up Event

Key Themes

Visibility

Residents provided feedback related to nighttime visibility issues due to insufficient lighting, and difficulty turning onto El Camino from driveways and side streets due to sight line issues.

Signals/Signage

Residents described drivers often running red lights and pedestrians crossing against the light - both behaviors theorized to be because of long traffic signal cycle lengths.

Crossings

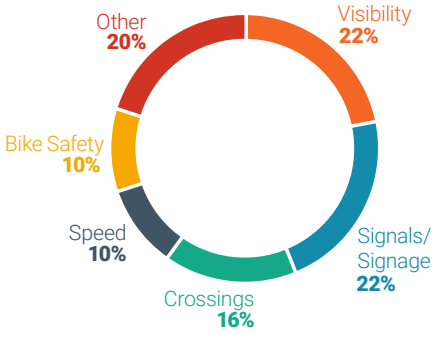
Residents described difficulty in crossing the street at the El Camino/Del Paso intersection due to long distances, long waits, and a missing marked crosswalk.

Speed

Residents described drivers traveling at speeds they felt were too fast, which makes driving and walking along and crossing El Camino feel uncomfortable for them.

Bike Safety

Residents provided feedback that the existing bike lanes are too narrow and often obstructed, and that fast-moving vehicle traffic makes biking uncomfortable.



Engagement Events

November 10, 2018

Old North Sacramento / Dixieanne Community Association Meeting

December 4, 2018

Grocery Outlet Store Pop-Up Event

June 6, 2019

Greater Sacramento Urban League Open House Event

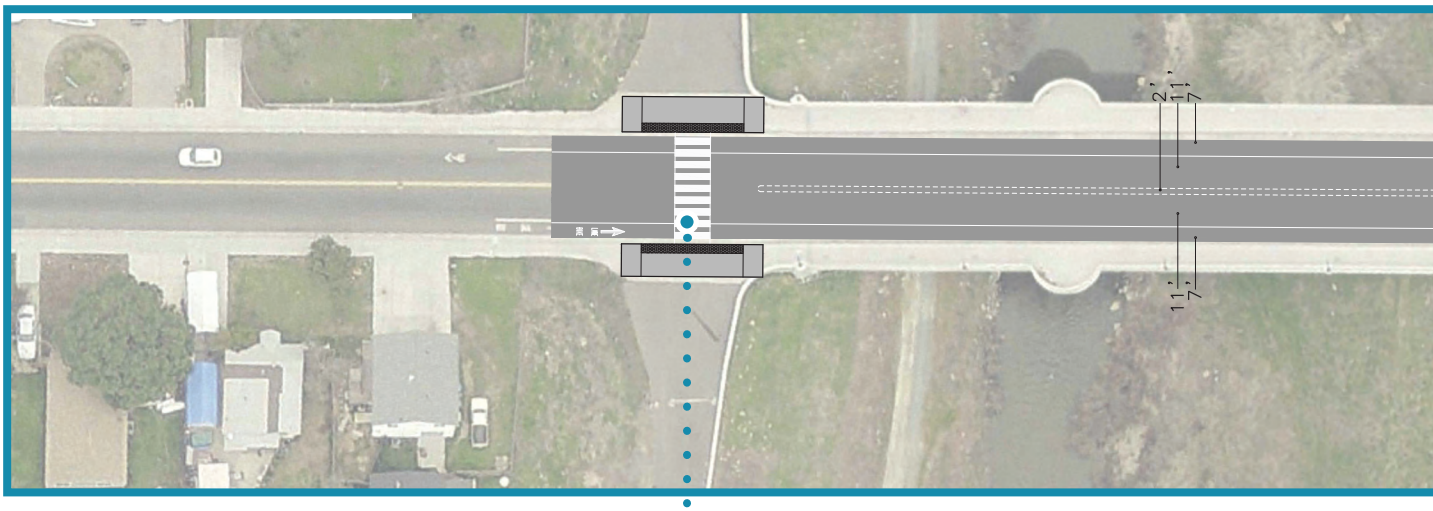
Investments to Enhance Safety

Key Crash Countermeasures

Countermeasure		Crash Type	Feedback Key Theme
Slow Green Wave	TO ADDRESS	Unsafe Speed	Speed
Add New Signal	TO ADDRESS	Pedestrian Crossing	Visibility
Advanced Dillemma-Zone Detection	TO ADDRESS	Rear End	Signals/Signage
Pedestrian Scramble	TO ADDRESS	Pedestrian Crossing	Crossings

El Camino Avenue at Traction Avenue

Conceptual Design for El Camino



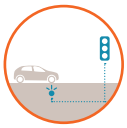
New Pedestrian Signal

Pedestrian Scale Lighting

Narrow Lanes

Slow Green Wave

Pedestrian Recall Signal Timing

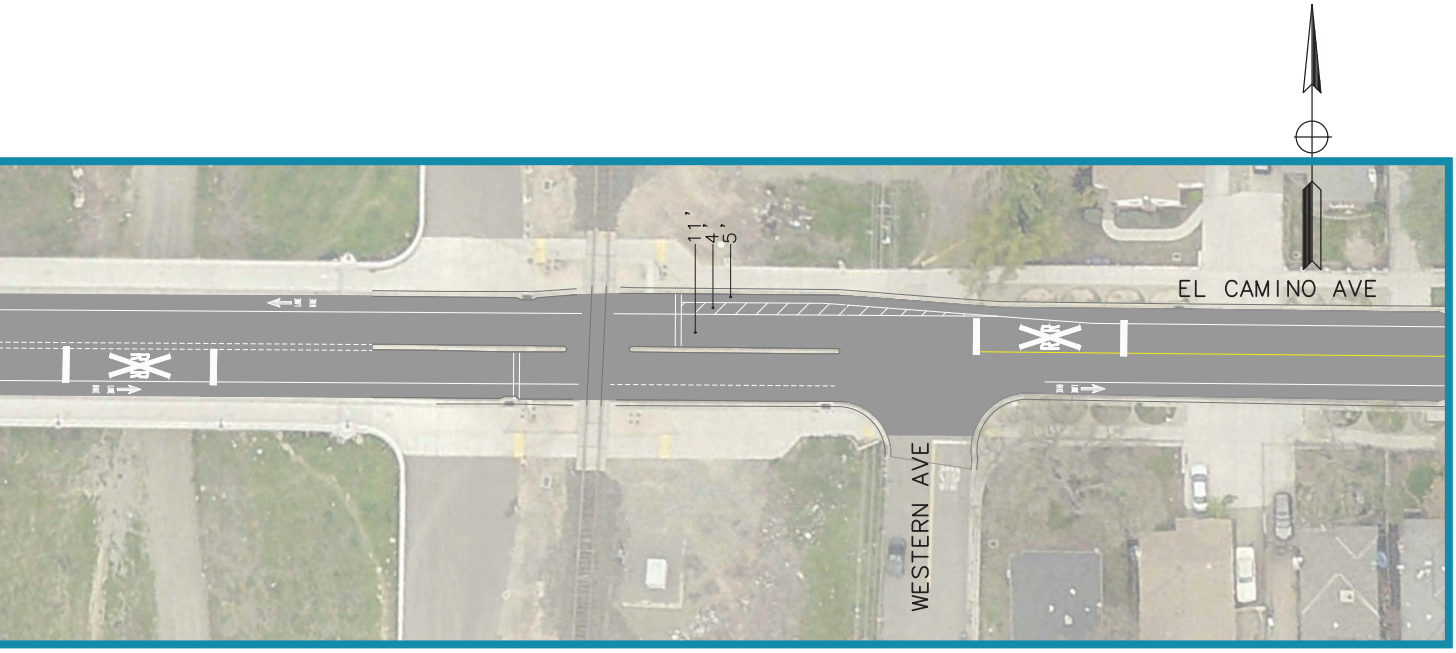


Advanced Dilemma-Zone Detection

High Visibility Crosswalk

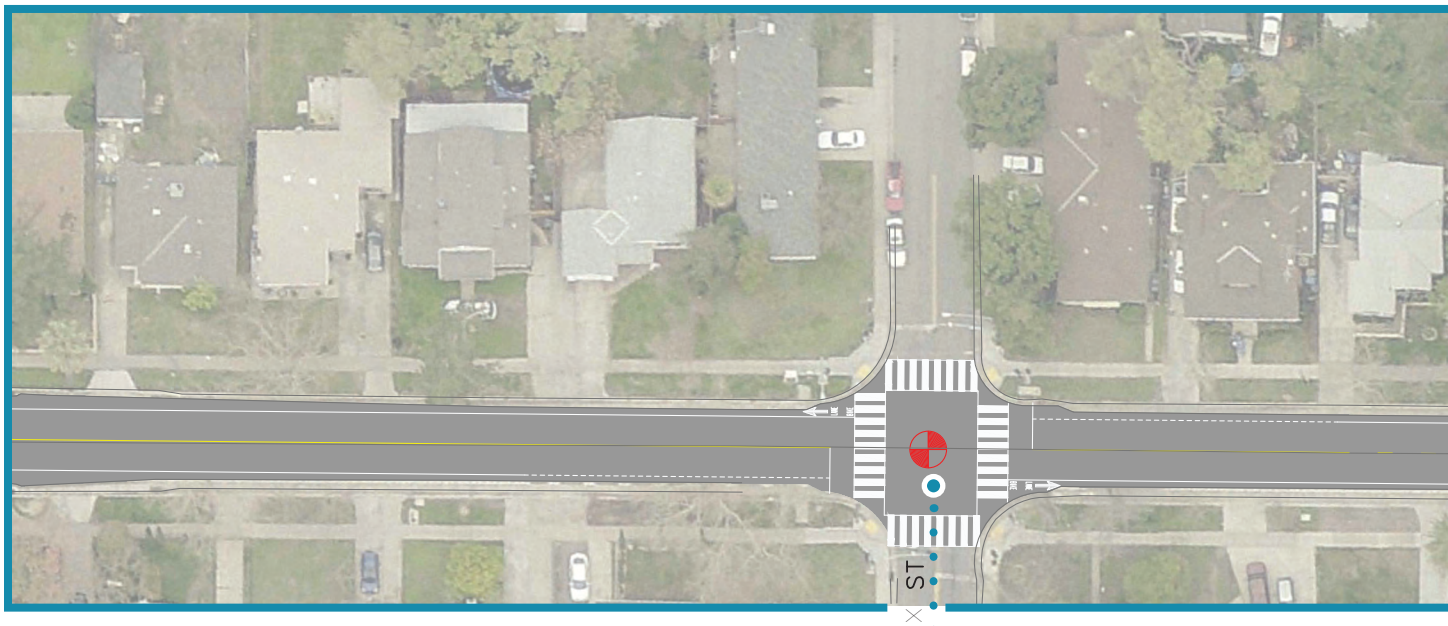
Corridor-Wide Recommendations

Location-Specific Recommendations



Note: Maintain existing 10 foot travel lanes on El Camino Avenue

Conceptual Design for El Camino



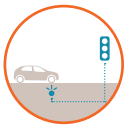
Shorten Signal Cycle Length

Pedestrian Scale Lighting

Narrow Lanes

Slow Green Wave

Pedestrian Recall Signal Timing



Advanced Dilemma-Zone Detection

High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations

Conceptual Design for El Camino

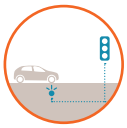
New Traffic Signal

Pedestrian Scale Lighting

Narrow Lanes

Slow Green Wave

Pedestrian Recall Signal Timing

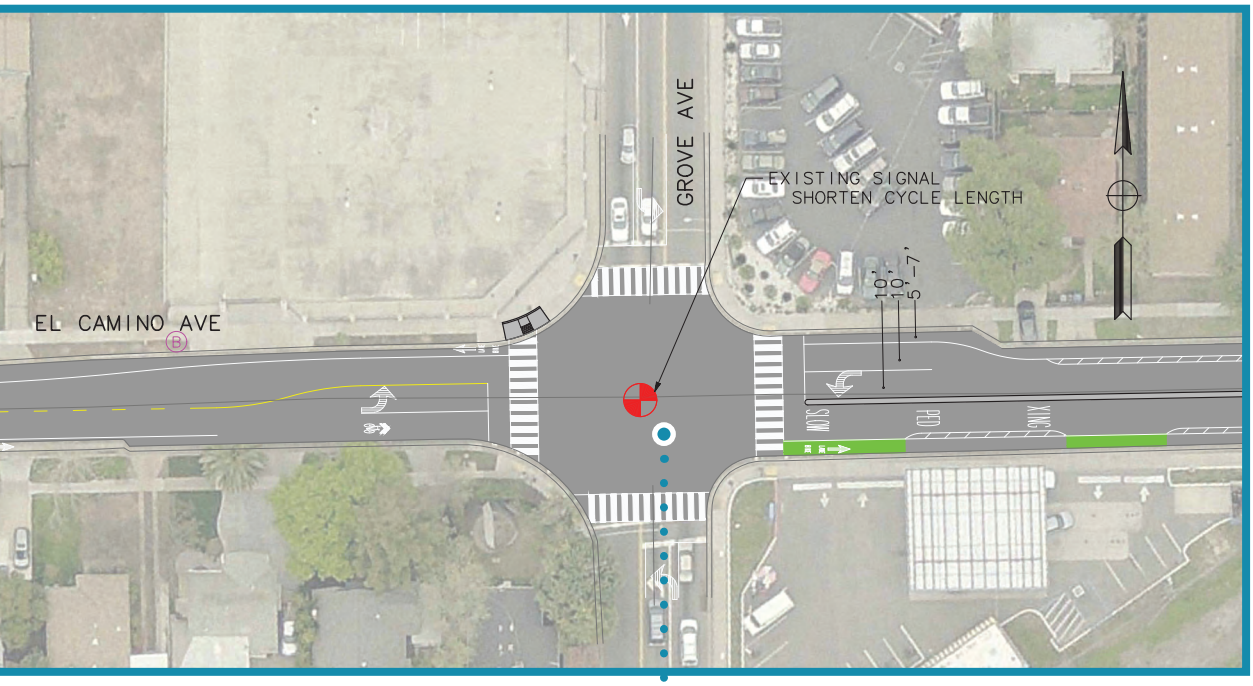


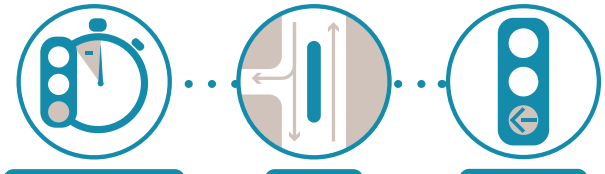
Advanced Dilemma-Zone Detection

High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations



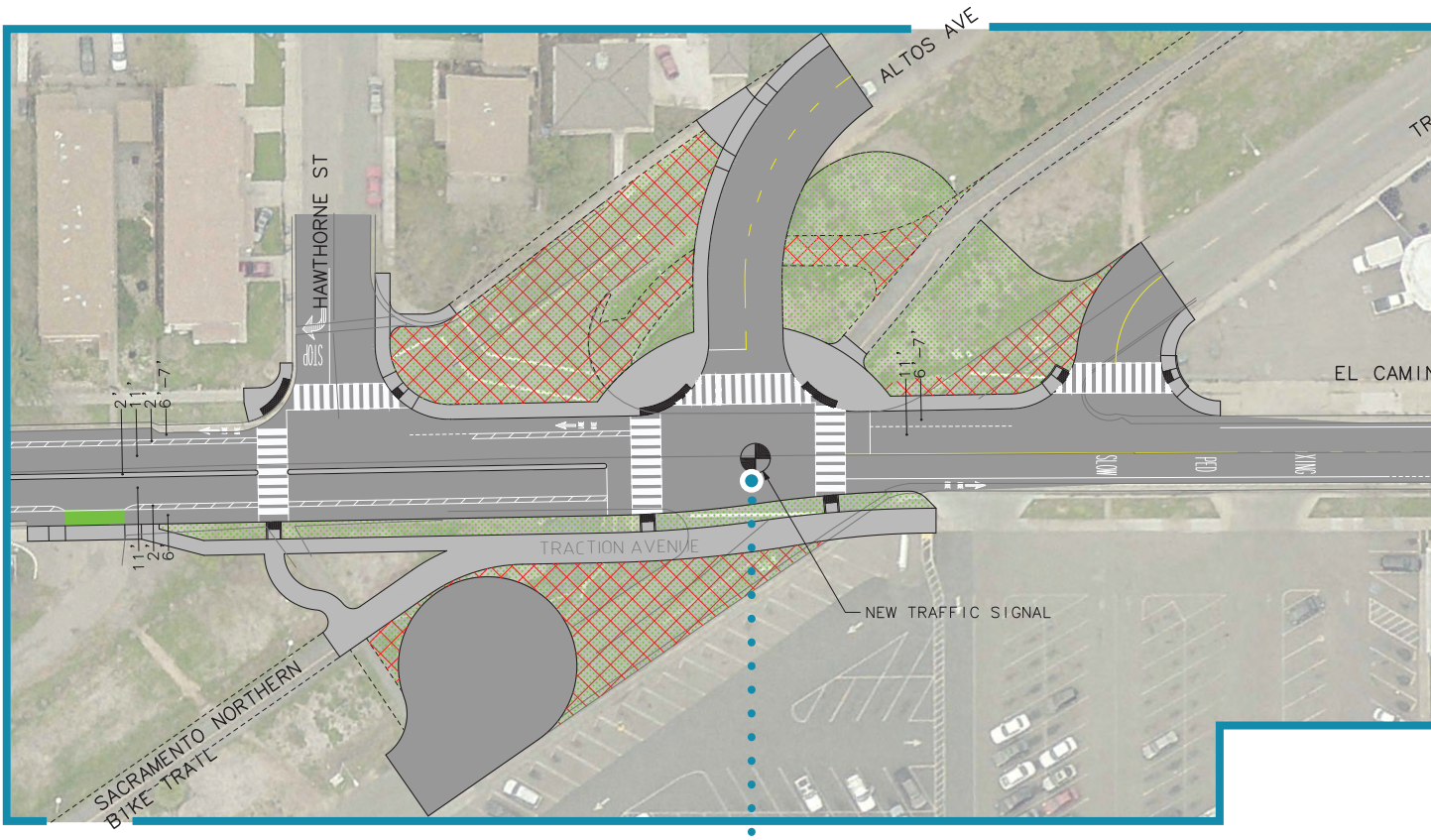


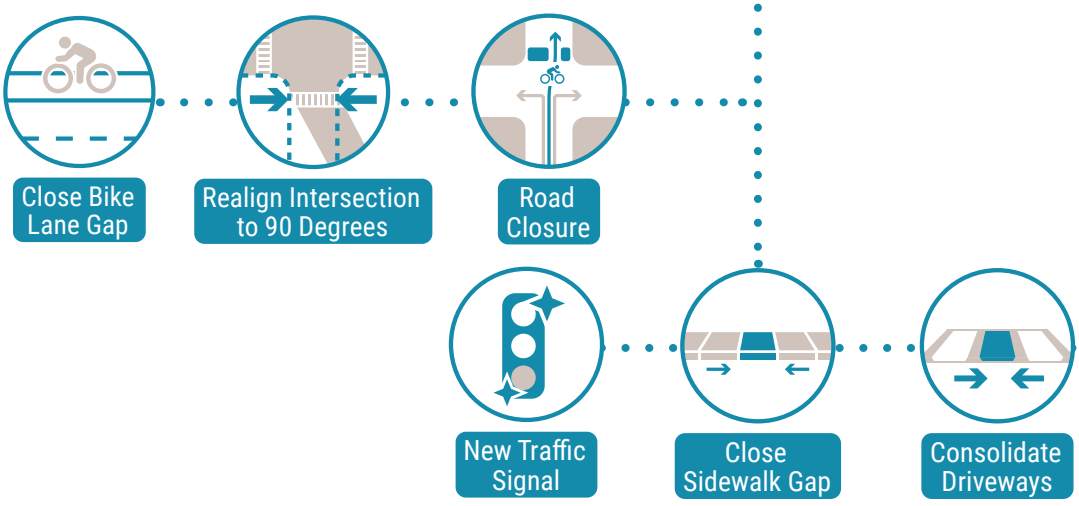
Shorten Signal Cycle Length

Raised Median

Protected Left Turns

Conceptual Design for El Camino





Pedestrian Scale Lighting

Narrow Lanes

Slow Green Wave

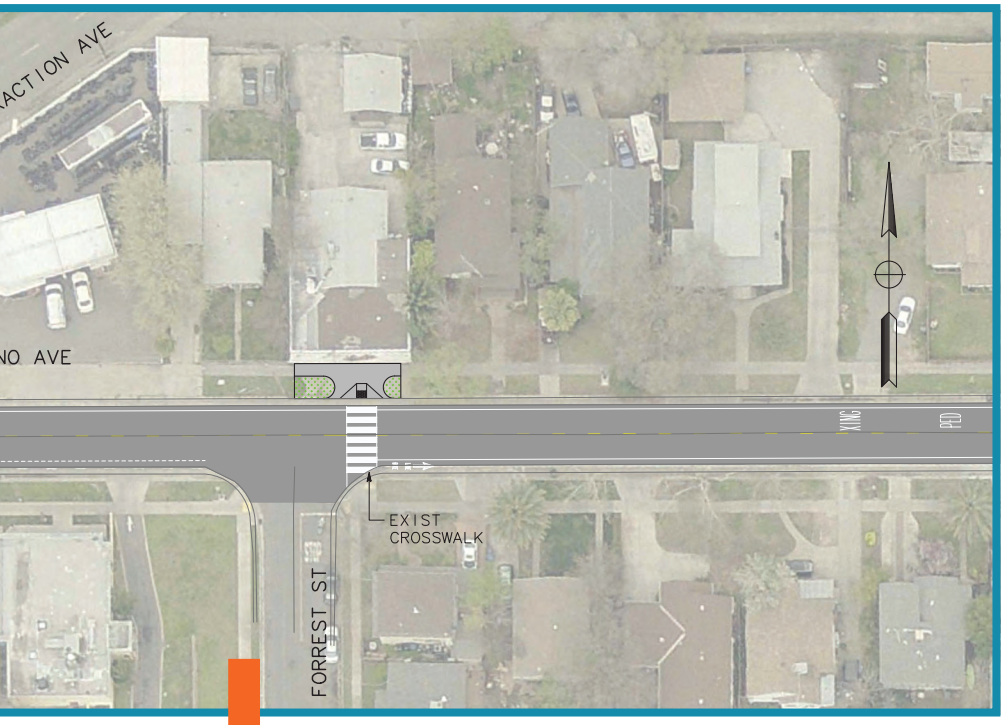
Pedestrian Recall Signal Timing

Advanced Dilemma-Zone Detection

High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations



Project Options

Option 1: Close south leg of Traction Ave, north leg of Traction Ave, south leg of Altos Ave, and Hawthorne Ave is right-in/right-out only. Square up north leg of Altos Ave and install a traffic signal.

Option 2: Close north leg of Traction and south leg of Altos Ave. Hawthorne Ave is right-in/right-out. Square up north leg of Altos Ave and south leg of Traction Ave. Install raised intersection and traffic signal with pedestrian scramble to serve bike and pedestrian traffic using Sacramento North Bike Trail. This option is shown in the concept plans.

Conceptual Design for El Camino

Pedestrian Scale Lighting

Narrow Lanes

Slow Green Wave

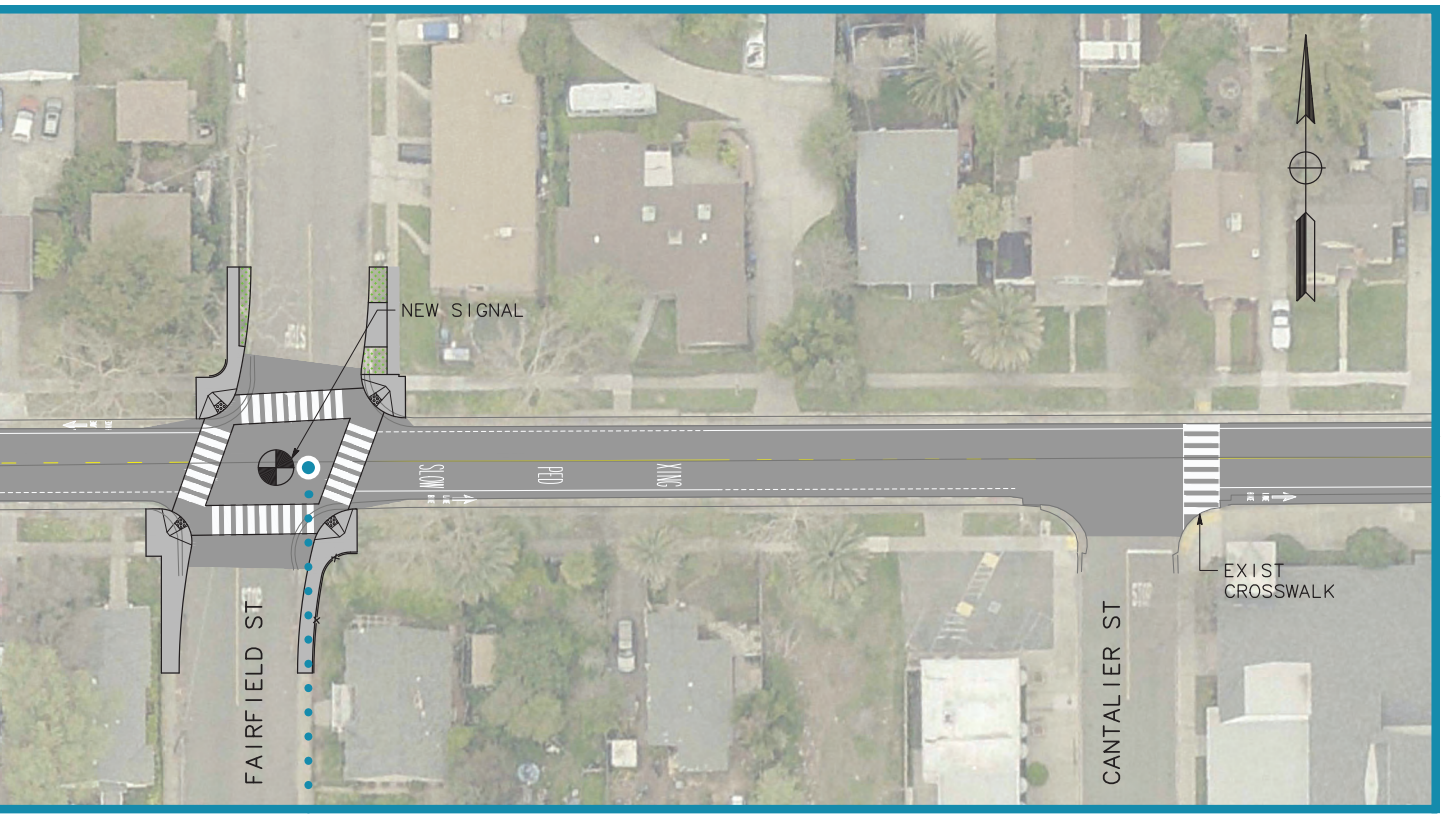
Pedestrian Recall Signal Timing

Advanced Dilemma-Zone Detection

High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations



New Traffic Signal

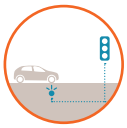
Conceptual Design for El Camino

Pedestrian Scale Lighting

Narrow Lanes

Slow Green Wave

Pedestrian Recall Signal Timing

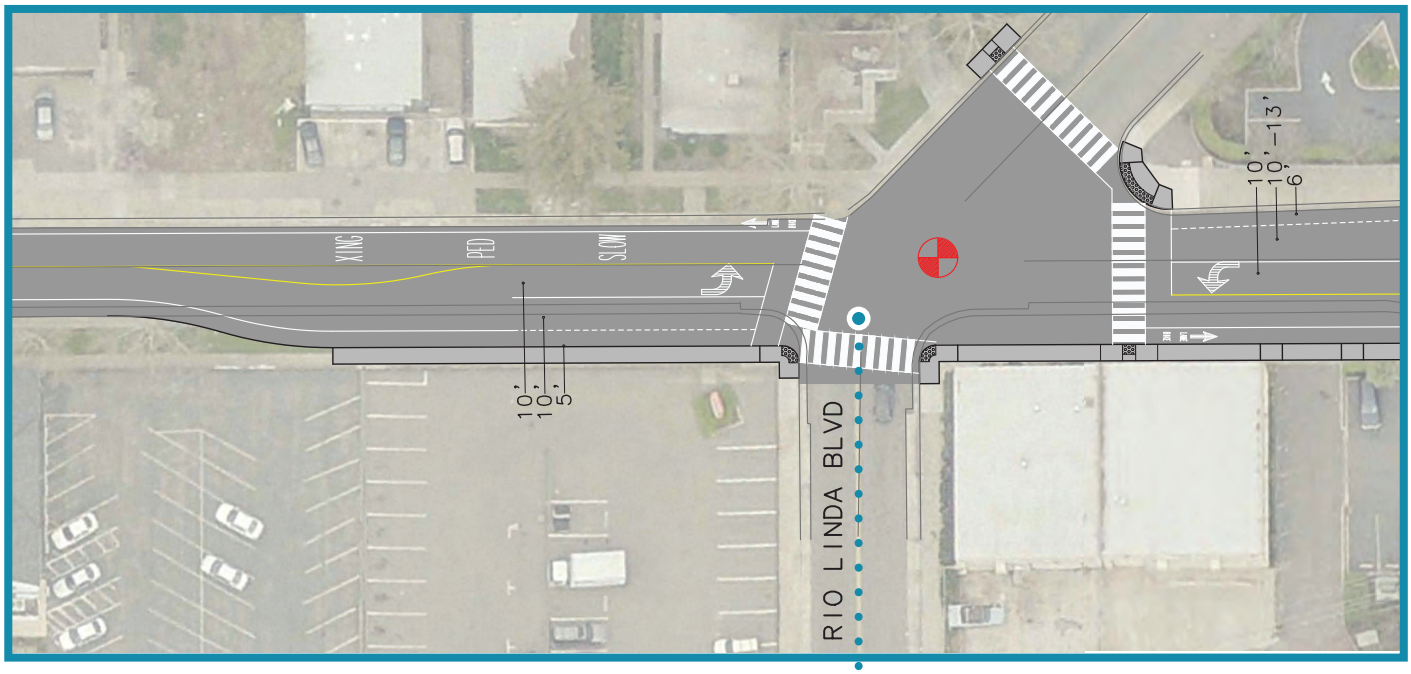


Advanced Dilemma-Zone Detection

High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations



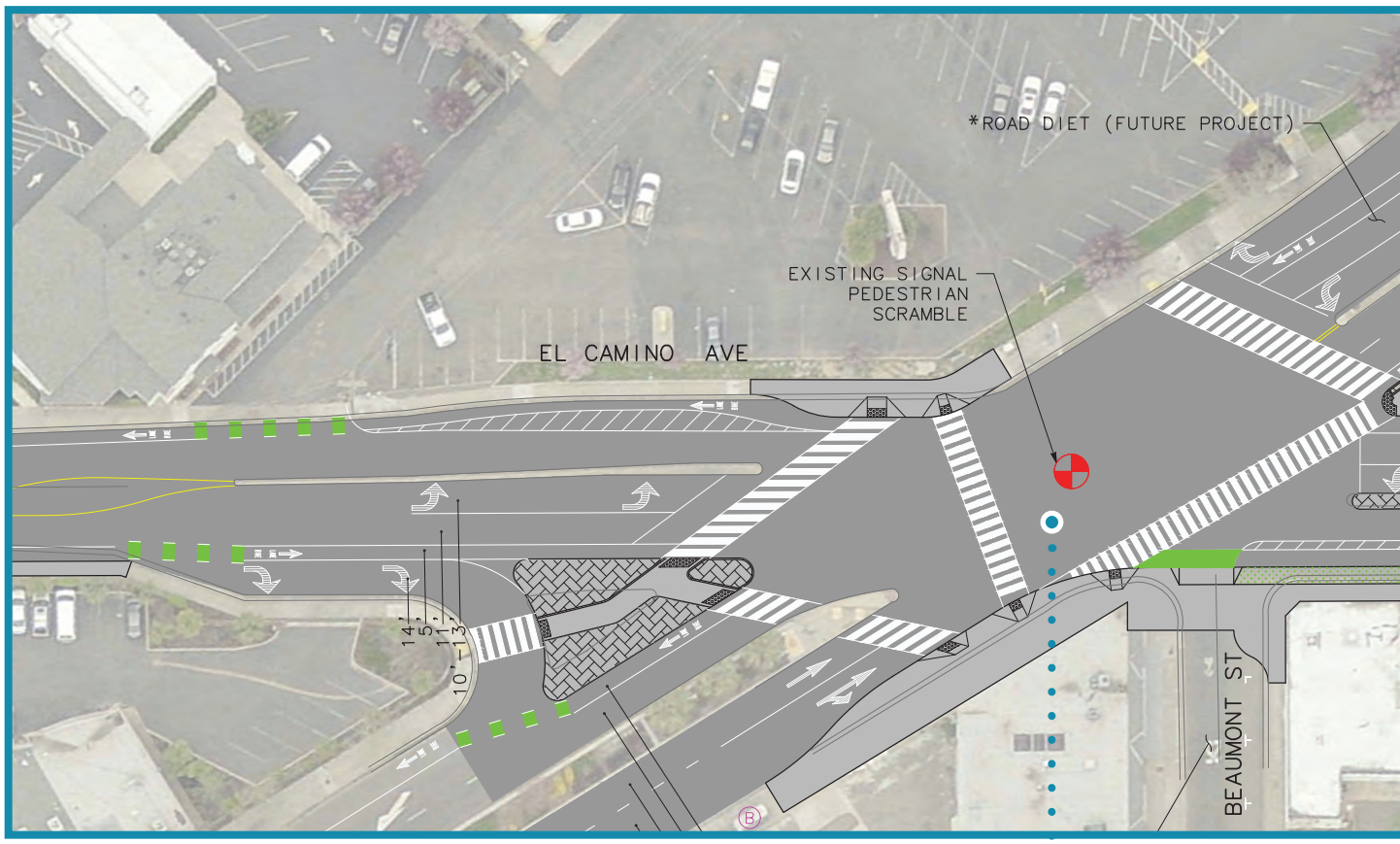
Dual Curb Ramps

Extend Signal Clearance Time

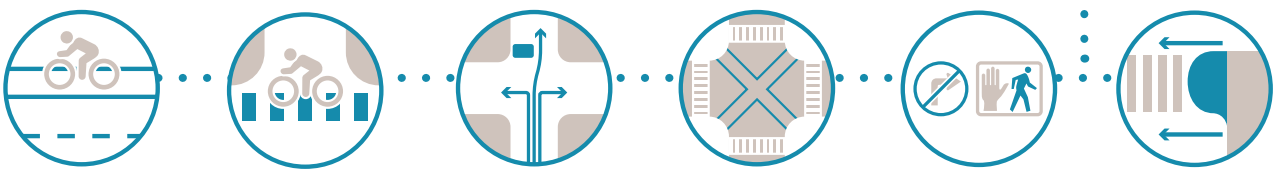
Straighten Crosswalk

El Camino

Conceptual Design for El Camino



* The Del Paso Boulevard Road Diet is not a part of the Top 5 Corridors Plan

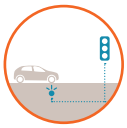



Pedestrian Scale Lighting


Narrow Lanes


Slow Green Wave


Pedestrian Recall Signal Timing


Advanced Dilemma-Zone Detection


High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations

El Camino Avenue/Del Paso Boulevard/Beaumont Street Queues

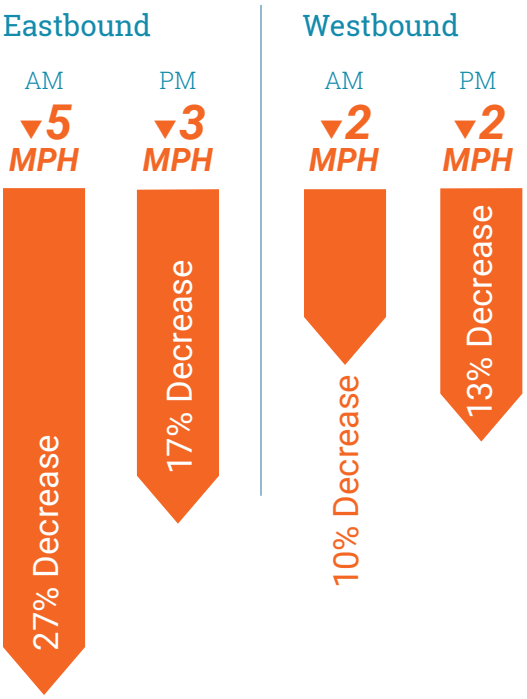
El Camino Avenue is a two-lane, 30-miles-per-hour roadway for most of the study corridor, but east of Del Paso Boulevard, it widens to four-lanes and the posted speed limit increases to 35-miles per hour. It provides an east-west connection over Steelhead Creek and to I-80 Business Loop. As a result, the El Camino Avenue/Del Paso Boulevard/Beaumont Street intersection is very busy. Conditions may be exacerbated with the Vision Zero recommended road diet on Del Paso Boulevard. According to the City's General Plan, the intersection is exempt from the City's LOS D standard and can operate at LOS E conditions during peak hours acceptably.

How Will Travel Change?

Estimated Changes with Project

Average Vehicle Speed

Average vehicle speed along the corridor during peak periods is expected to decrease between 2 and 5 mph as a result of the proposed project. While slower travel speeds result in longer travel times, they reduce traffic fatalities and severe injuries that result from crashes. Additionally, the new traffic signals will create gaps in traffic that will improve access from side-streets and driveways.

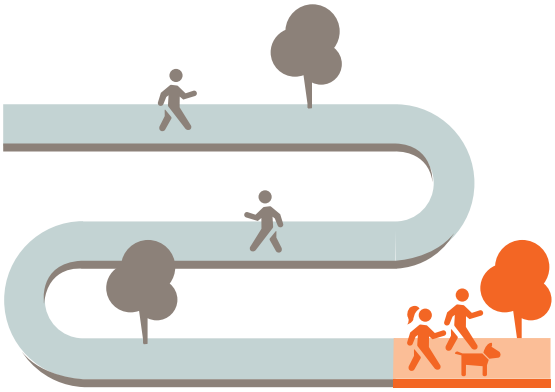


Vehicle Travel Time

Average vehicle travel time along the one-mile corridor during peak periods is expected to increase between 31 and 84 seconds as a result of the proposed project.

Estimated Changes with Project

Sidewalk Coverage

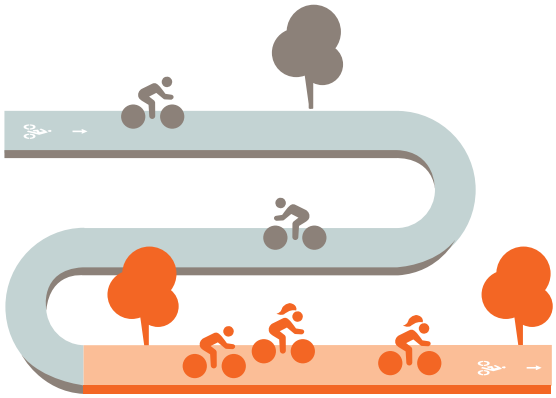


Without project
97% (12,150 ft)

▶

With project
100% (12,500 ft)

Bike Lane Coverage



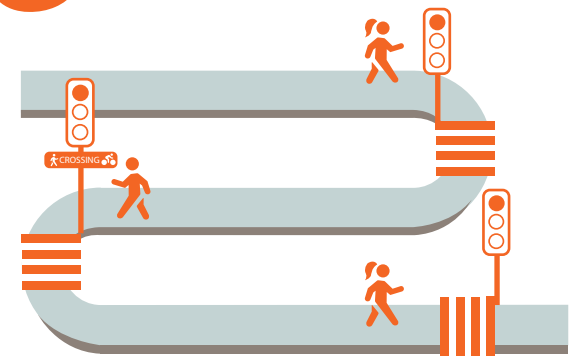
Without project
69% (8,580 ft)

▶

With project
100% (12,500 ft)

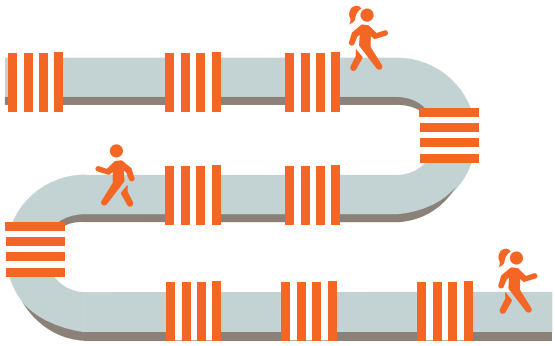
Number of Locations Upgraded to Controlled Crossings

3



Number of Marked Crosswalks

10 ***new crossings***



How Much Will the Project Cost?

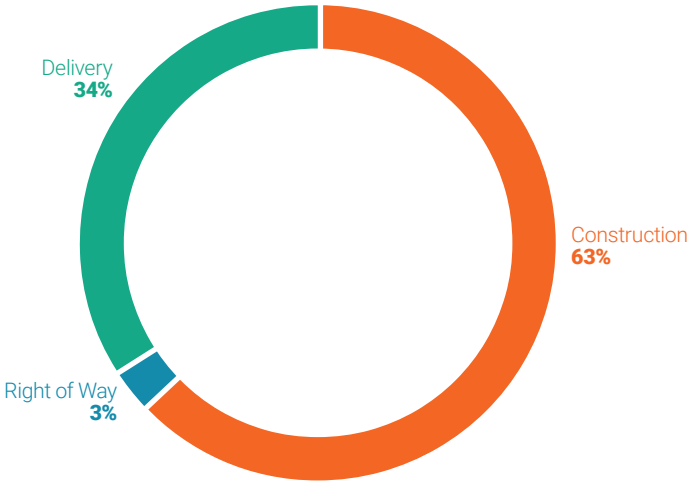
El Camino Avenue Cost Summary

$16,450,000

Construction

Construction costs include the cost to build the primary items associated with the safety countermeasures for the corridor. The items were estimated based on the preliminary design concepts and recent construction bid unit costs with an escalation factor to account for future construction. The costs were broken down into two categories that consisted of major roadway items and electrical items such as traffic signals and lighting. A contingency factor was included to account for refinement of project design, changes in project details, or unforeseen changes in construction costs.

Actual project costs will be determined by surveyed base mapping, geotechnical reports, concept refinement, environmental reviews, right of way availability, project phasing, and bid conditions at the time of advertisement. Project costs should be reviewed prior to any grant application or initiation of a Capital Improvement Project to revalidate and update the assumptions in this study as necessary.



The total project costs shown in the summary chart have been escalated at an assumed 3% per year escalation factor to 2025, the anticipated year of construction.

Right of Way

In addition to construction costs, right of way costs were assumed that include temporary construction easements for items such driveway modifications, curb ramps reconstruction, signal equipment poles and cabinets. It was assumed that each project could be constructed almost exclusively within the roadway prism and right of way acquisition would not be needed along the entire project frontage. Further refinement of the base mapping in subsequent phases of design will more accurately identify specific right of way needs.

Delivery

Project delivery costs are included in the estimates provided in this study. These costs encompass all of the work to complete subsequent phases including preliminary engineering, environmental documentation, final design, right of way engineering, and construction oversight. A breakdown of these costs is provided in Appendix C.

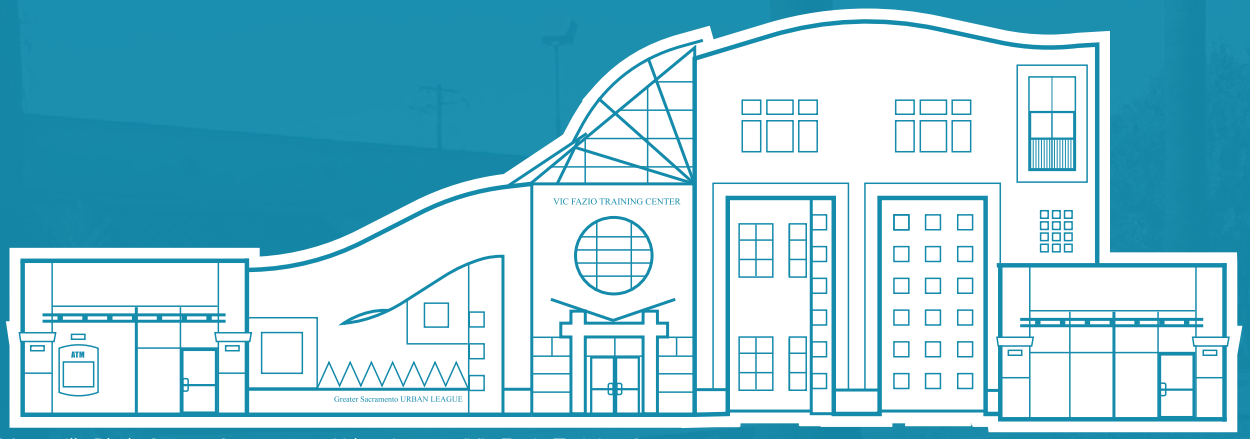
Marysville

Vision Zero Top 5 Corridor

Marysville Boulevard south of North Avenue

Marysville Boulevard

Vision Zero Top 5 Corridor



Marysville Blvd - Greater Sacramento Urban League/Vic Fazio Training Center

What is going on?
Between 2009 and 2017, 19 crashes that resulted in a fatality or severe injury (KSI) occurred on Marysville Boulevard between North Avenue and Arcade Boulevard. Three of these crashes involved a bicyclist and 11 of the crashes involved a pedestrian.

What are the key issues?
Two-thirds of drivers were proceeding straight or stopped at the time of the crash, and alcohol was involved in over half the crashes that resulted in a KSI. Additionally, two thirds of pedestrian crashes involved a person crossing the street in a marked crosswalk, and three-fourths of bike crashes were broadside, or T-Bone, crashes.

What is the community concerned about?
During outreach events, local residents talked about aggressive driving behaviors that included driving at an unsafe speed and lack of attention paid to crossing pedestrians. Residents also described the difficulty crossing the street as a pedestrian because there are not enough marked crosswalks on the corridor.

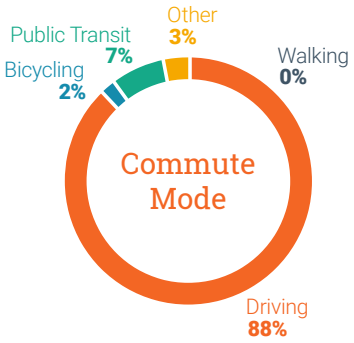
The following pages lay out the existing conditions along the corridor, feedback heard from residents at outreach events, and a set of roadway safety recommendations focused on slowing drivers down and discouraging traffic signal/sign violations as well as providing more opportunities for pedestrians to cross the street at controlled, marked crossings.

Table of Contents

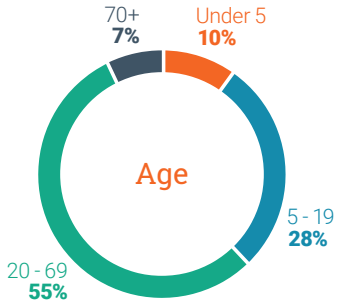
In the Neighborhood

Corridor

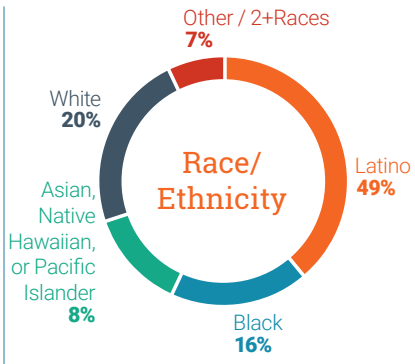
About the Neighborhood



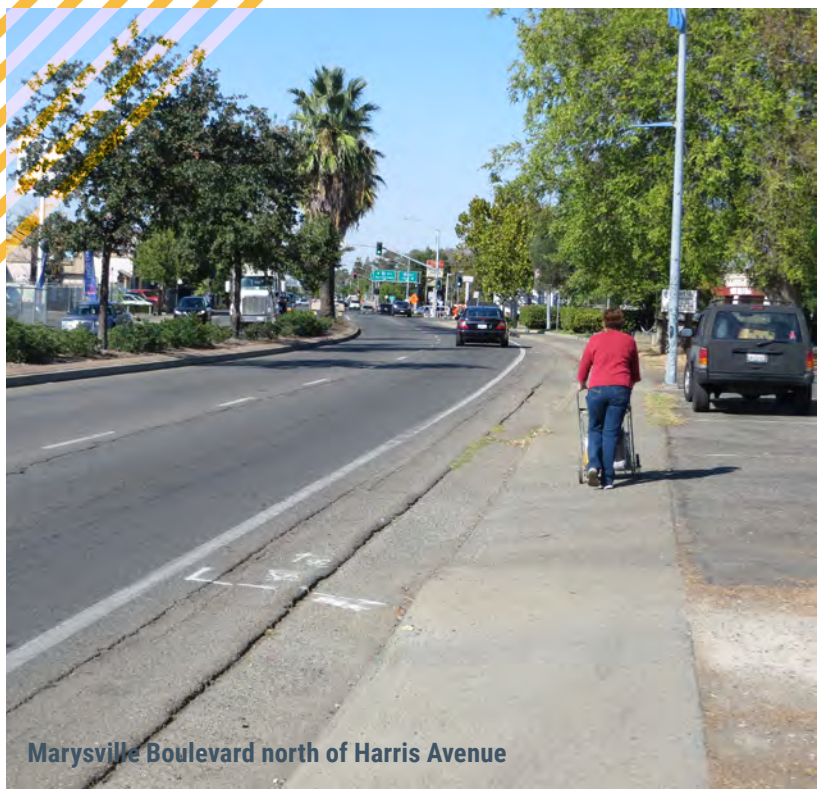
Residents of this neighborhood are more likely to take transit, but less likely to walk to work, when compared with the rest of the city.



Nearly 40% of the residents in this neighborhood are age 19 or under.



57% of the residents in this neighborhood are Black or Latino, compared with 42% citywide.



Marysville Boulevard north of Harris Avenue

Marysville Boulevard at Grand Avenue

Grand Avenue just east of Marysville Boulevard

Key Destinations Along the Corridor

Parks

1

Schools

1

Food Markets

3

Houses of Worship

7

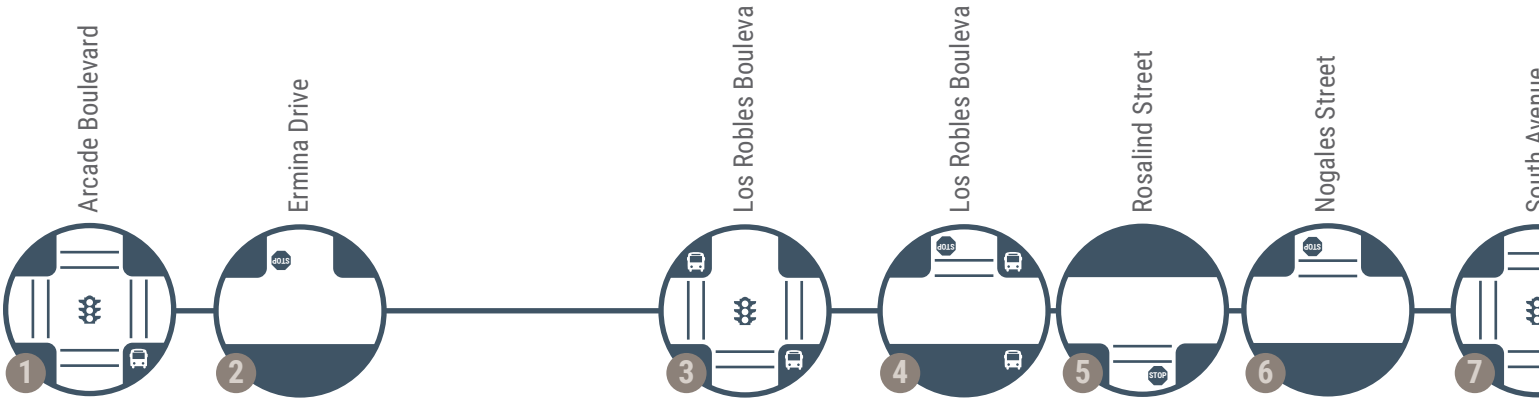
Community Centers

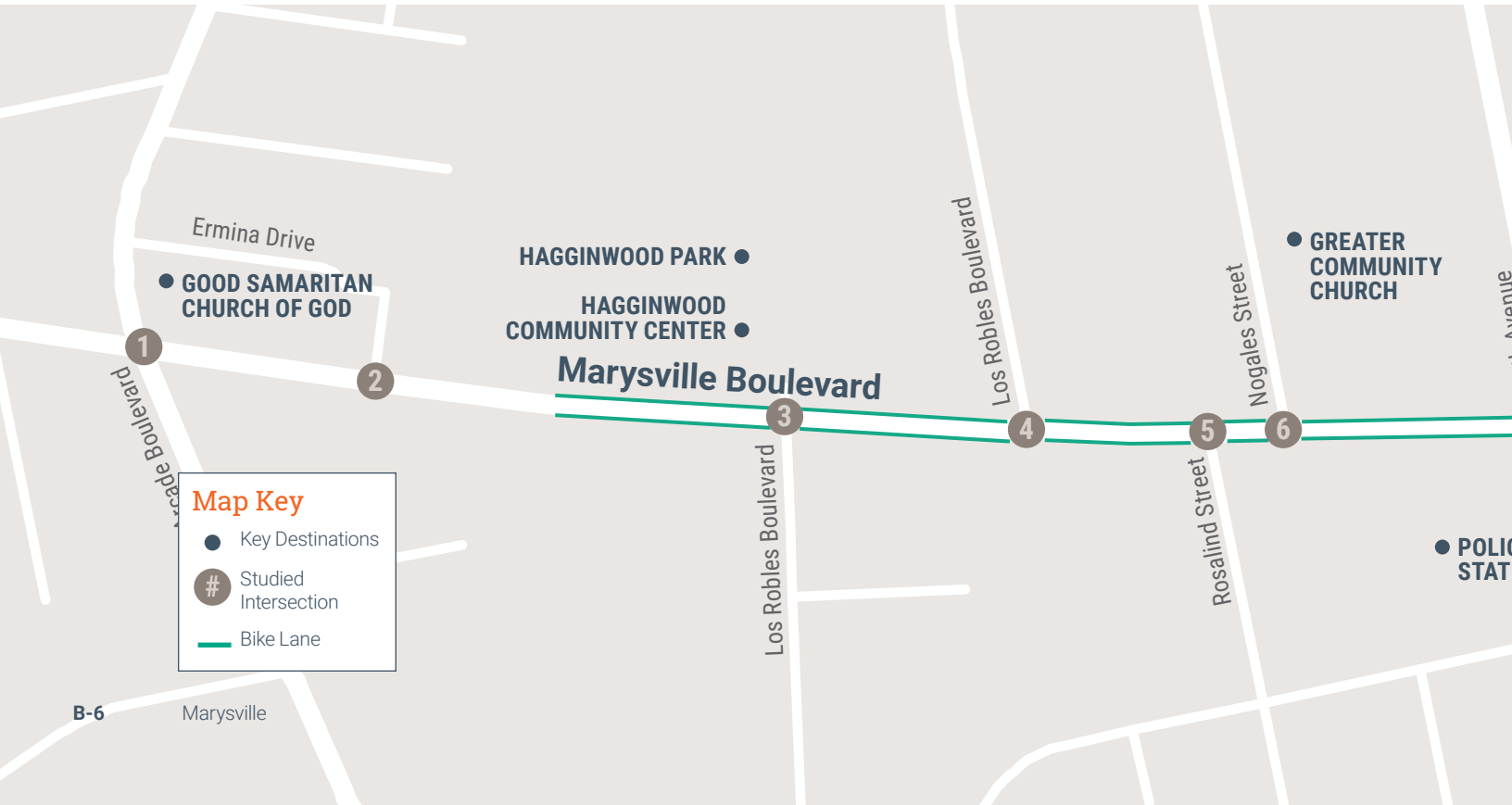
2

Travel on Marysville

Key Statistics

Posted Speed Limit	Daily Vehicles	Maximum PM Intersection Vehicle Volume	PM Rush Hour People Walking	PM Rush Hour People Biking
35 MPH	**26,300**	**2,071**	**201**	**98**





Number of Transit Routes

2

#15, #86

Bikeway Type

On-Street Bike Lanes, with gap

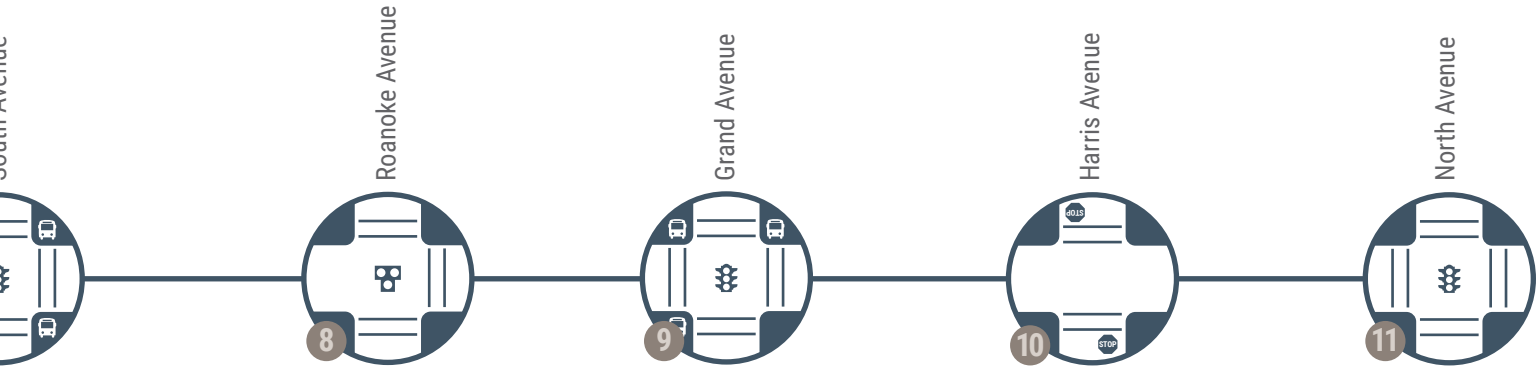
Longest Distance Between Marked Crosswalks

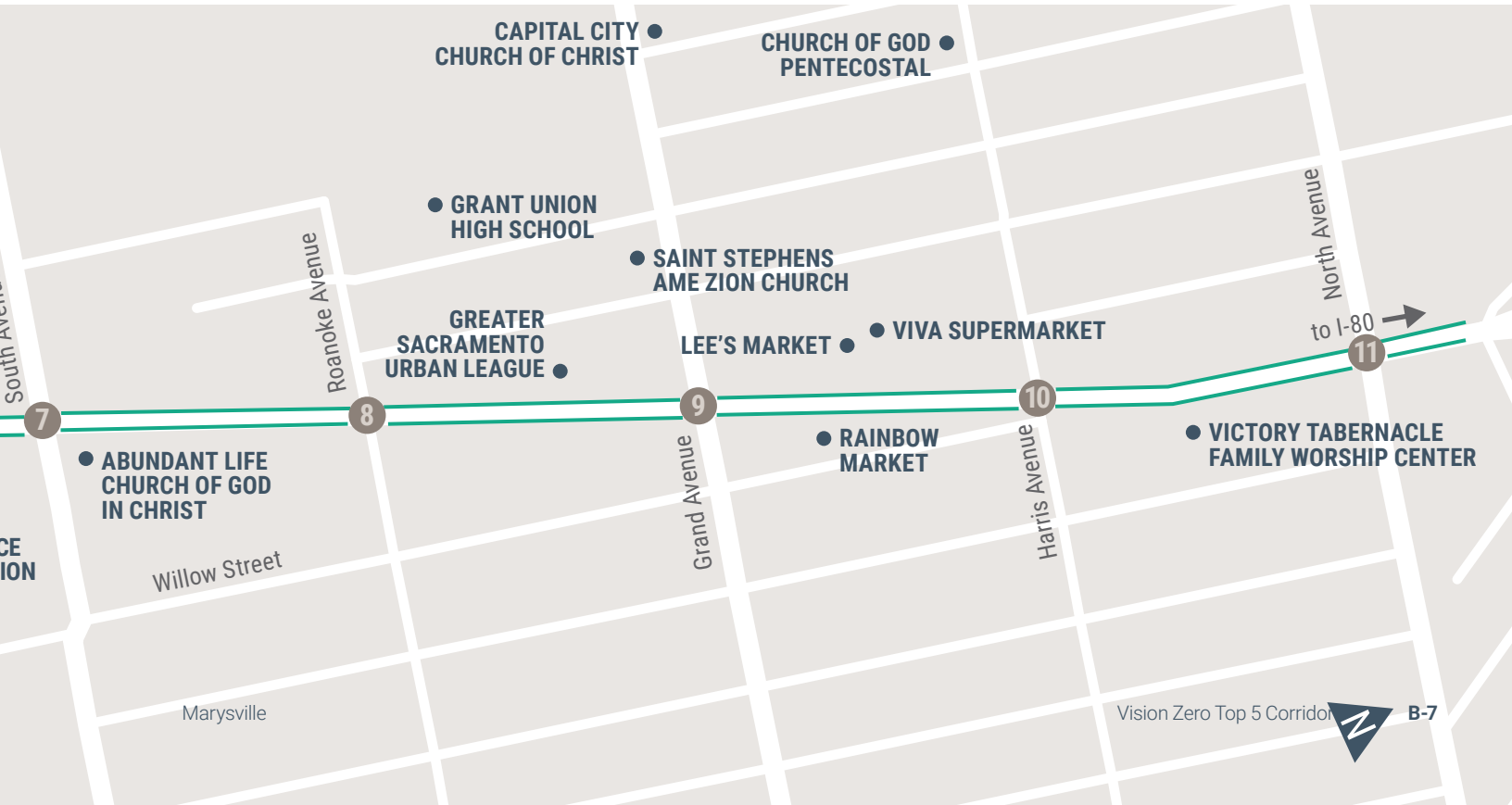
2,550

Ft

Sidewalk Coverage

100%





Crashes on Marysville

Vehicle Crash Types

Proceeding Straight

2/3 of drivers were proceeding straight or stopped at the time of the crash.

1 2 3 4 5 6
7 8 9 10 11

Left Turns

More than 20% of drivers were making a left turn at the time of the crash.

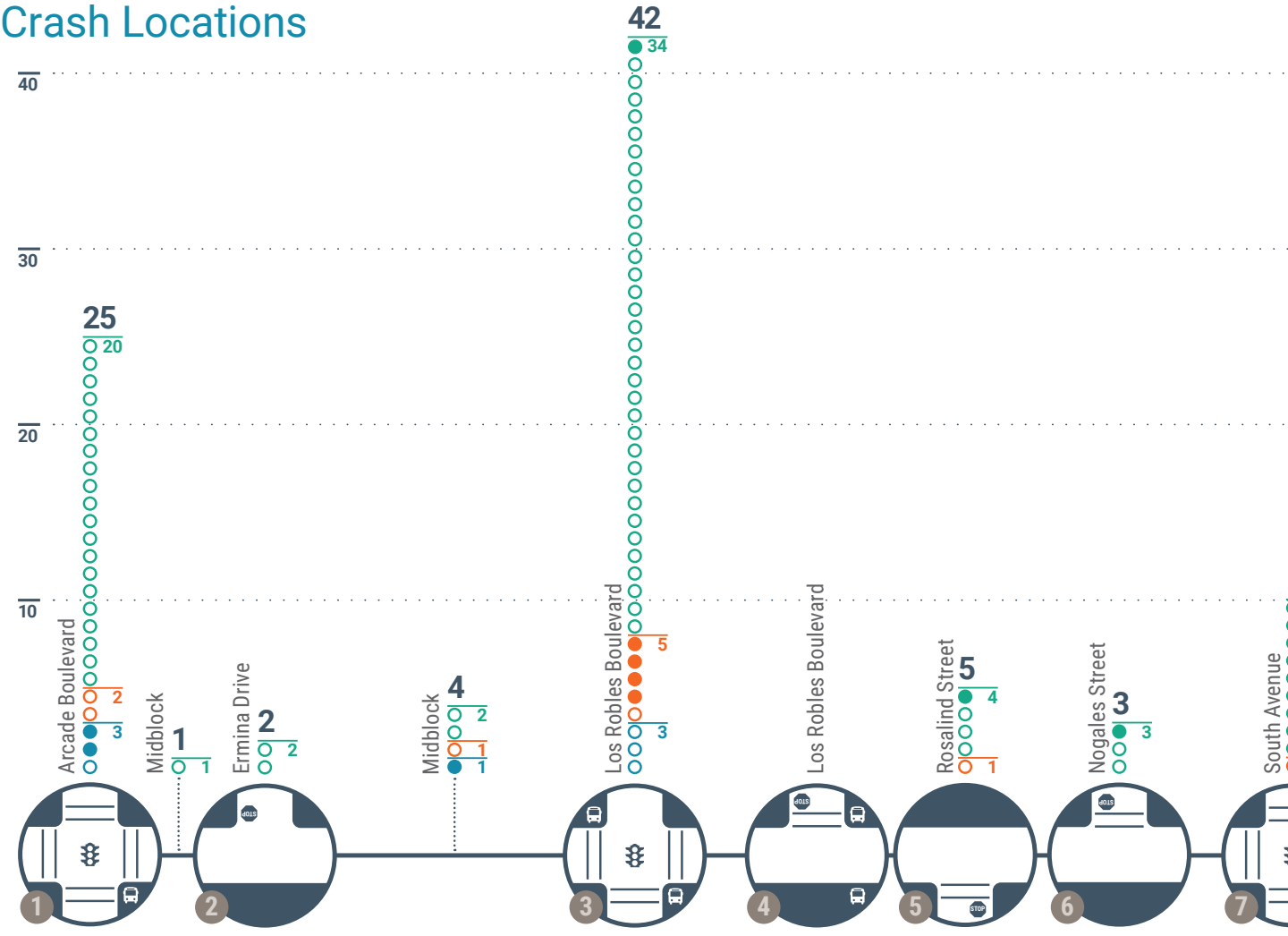
1 2 3 4 5 6
7 8 9 10 11

Broadside

40% of all crashes were broadside, also called T-Bone.

1 2 3 4 5 6
7 8 9 10 11

Crash Locations



Ped Crash Types

Bike Crash Types

KSI & Alcohol Involved

Alcohol was involved in over half of crashes resulting in a fatality or severe injury.

1 2 **3** 4 5 6
7 8 9 10 11

Pedestrian Crossing

Almost all people hit while walking were crossing. 2/3 of people were in the crosswalk.

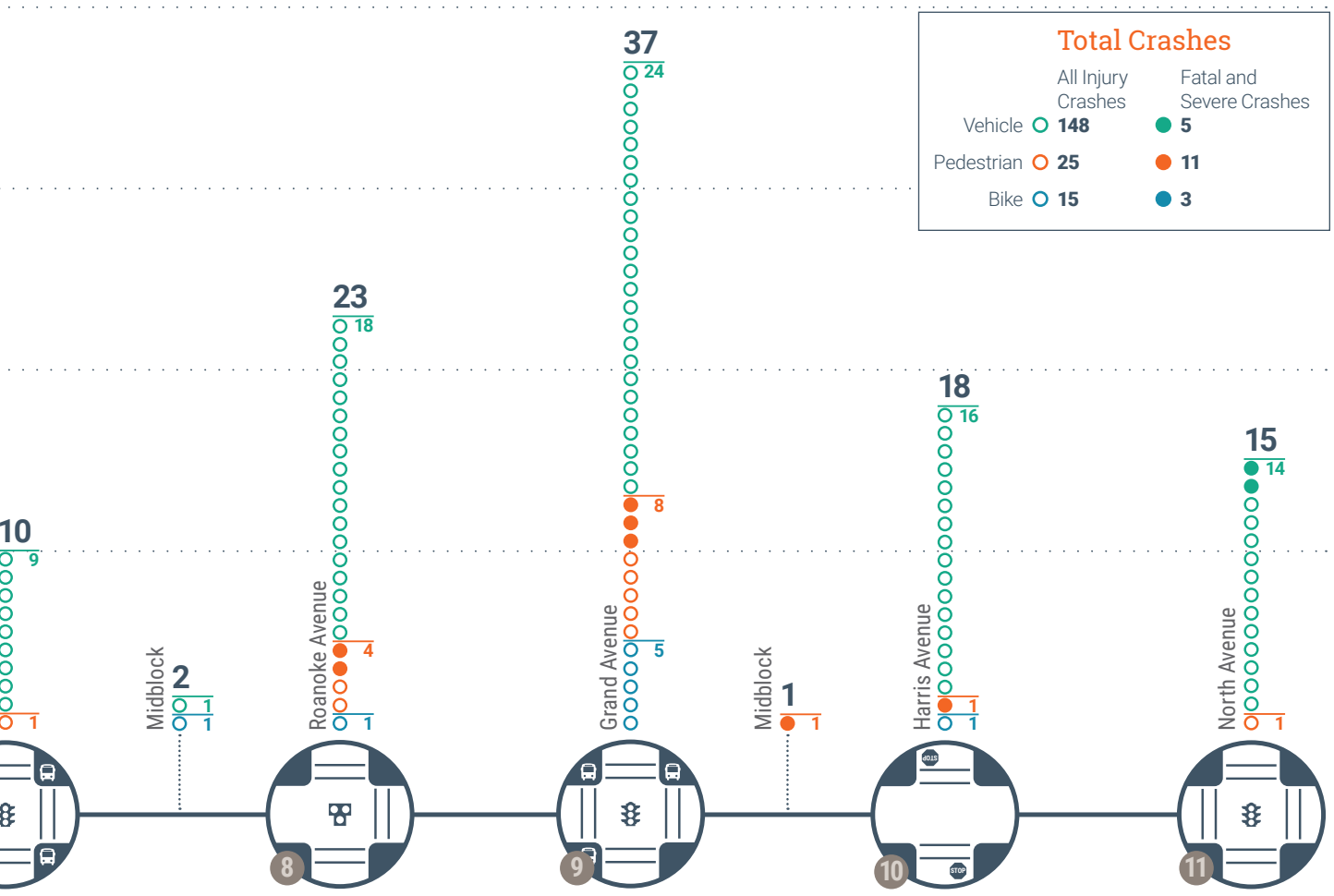
1 2 **3** 4 5 6
7 **8** **9** 10 11

Broadside

3/4 of bike crashes were broadside, also called T-Bone.

1 2 3 4 5 6
7 8 **9** 10 11

1 Numbers that are turned on represent a location where crash type has occurred at least three times.



Feedback from the Community

"Slow down traffic, drivers go over 35 MPH."

"More signals and more crosswalks would make Marysville safer."


Mutual Assistance Harvest Festiva

Key Themes

Visibility

Residents described visibility issues due to skew of intersections and presence of sight obstructions.

Signals/Signage

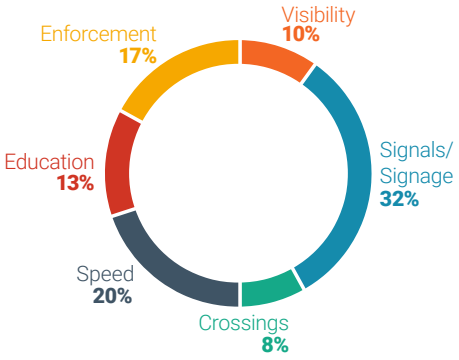
Residents suggested that more signals or flashing beacons could make it safer for pedestrians to cross the street.

Crossings

Residents described difficulty in crossing the street as a pedestrian because crosswalks are located far apart, and drivers do not pay attention to their presence.

Speed

Residents described drivers traveling at speeds they felt were too fast and driving aggressively along Marysville Boulevard.



Engagement Events

October 27, 2018

Mutual Assistance Harvest Festival, Robertson Community Center

December 5, 2018

Hagginwood Community Association Meeting

June 6, 2019

Greater Sacramento Urban League Open House Event

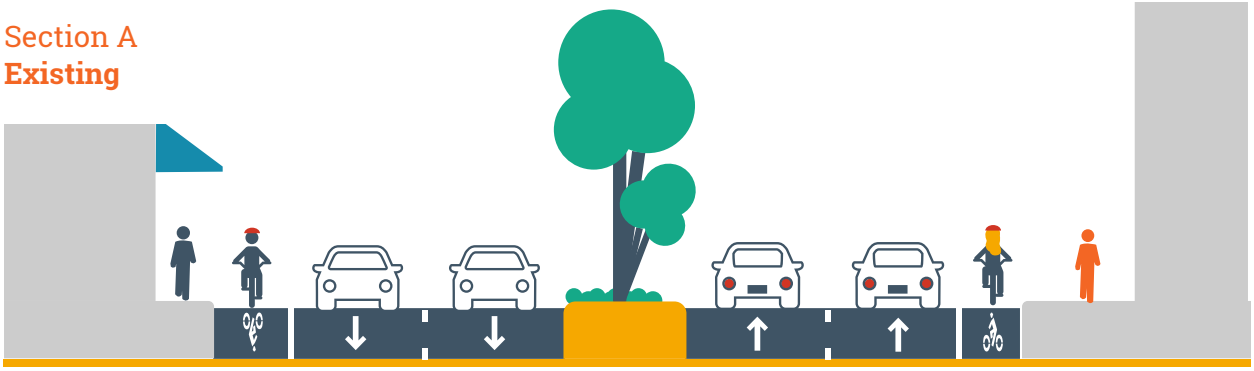
Investments to Enhance Safety

Key Crash Countermeasures

Countermeasure		Crash Type	Feedback Key Theme
Slow Green Wave	TO ADDRESS	Unsafe Speed	Speed
Add New Signal	TO ADDRESS	Pedestrian Crossing	Visibility
Shorten Signal Cycle Length	TO ADDRESS	Signal or Sign Violation	Signals/Signage

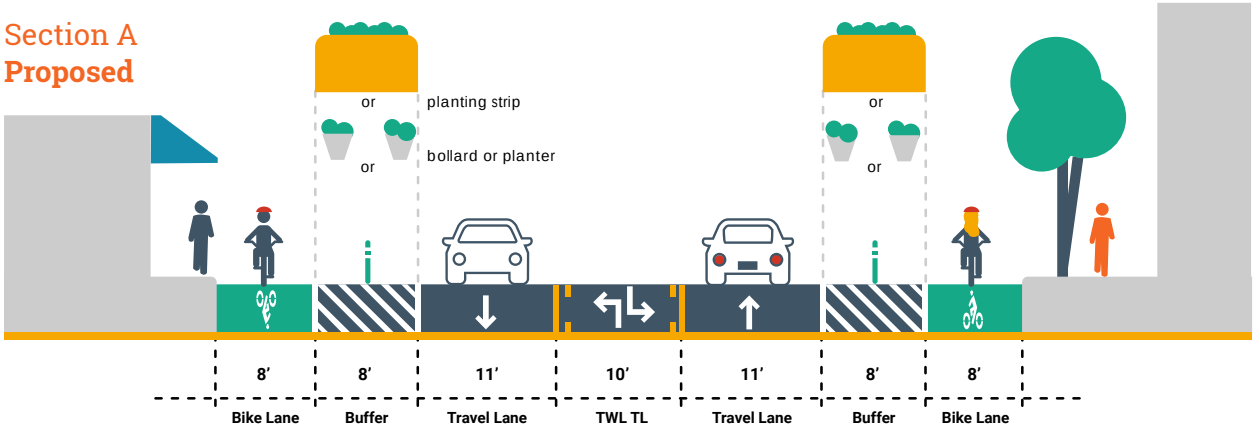
How Will The Roadway Space Be Used?

Section A
Existing

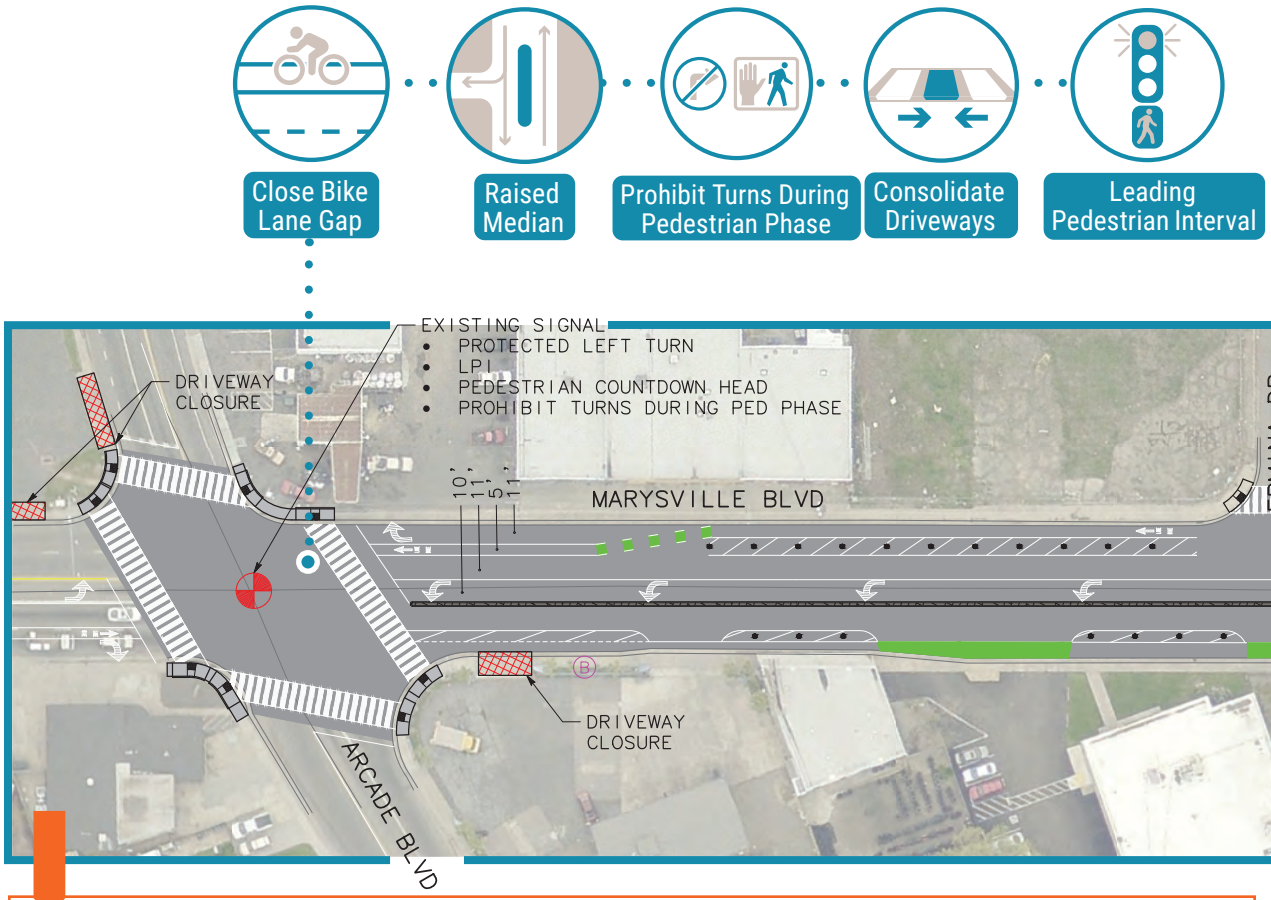


SEE PAGE B-13

Section A
Proposed



Conceptual Design for Marysville



Marysville Boulevard/Arcade Boulevard Queues

During peak hours, drivers use Marysville Boulevard and Arcade Boulevard between I-80 and the Arden-Arcade neighborhood. Therefore, there is a large southbound left-turn volume (595-vehicles) during the AM peak hour, and a large westbound right-turn volume (575-vehicles) during the PM peak hour. The southbound left-turn queue currently spills out of the available storage length of the turn pocket during peak hours, and this condition could be exacerbated by the recommended road diet. However, the recommendations also include the extension of the southbound left-turn lane to 750-feet, which would include restricting the Marysville Boulevard Boulevard/Ermina Drive intersection to right-in/right-out access only. The resulting maximum peak hour queues are shown in Appendix B.

Extend Signal Clearance Time

Slow Green Wave

Road Diet

Separated Bikeway

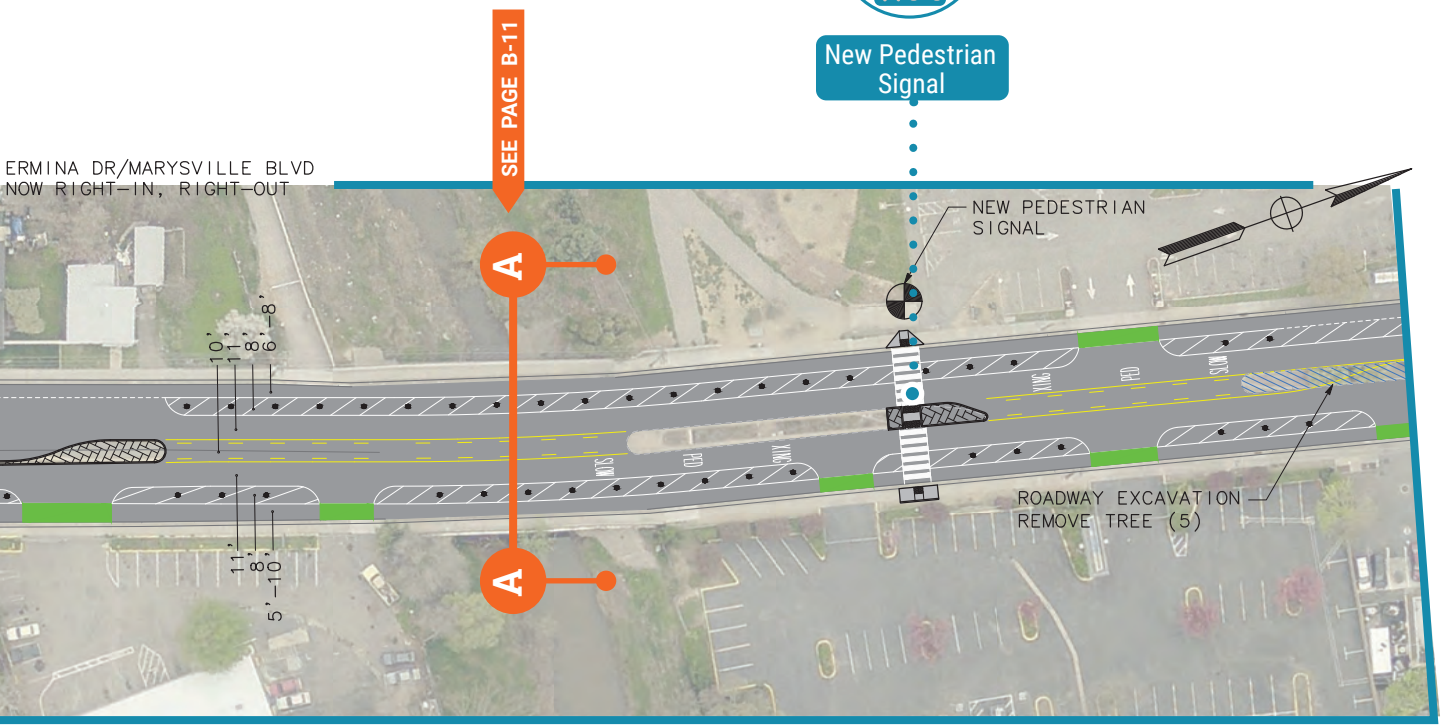
Advanced Dilemma-Zone Detection

High Visibility Crosswalk

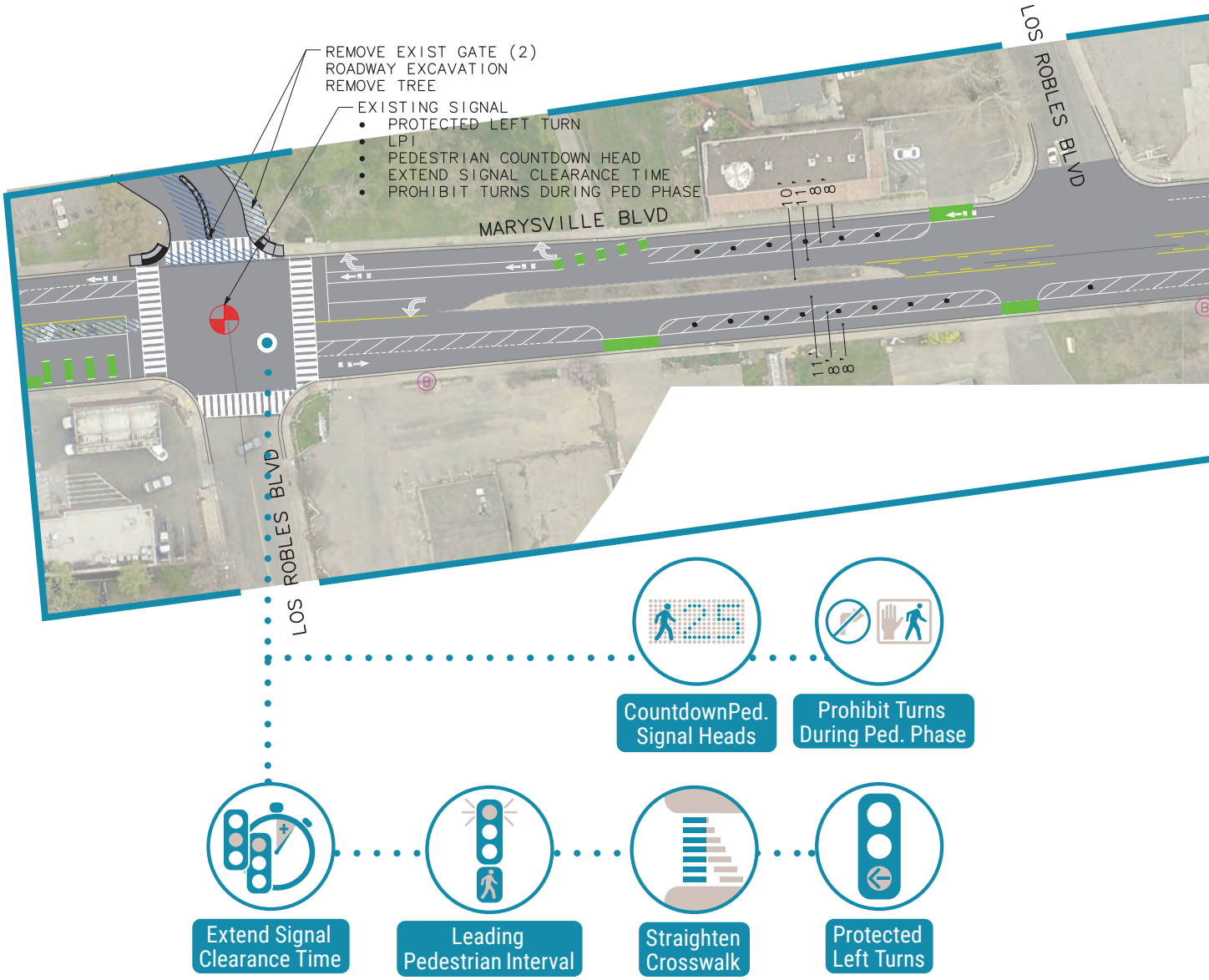
Corridor-Wide Recommendations

Location-Specific Recommendations

New Pedestrian Signal



Conceptual Design for Marysville



Extend Signal Clearance Time

Slow Green Wave

Road Diet

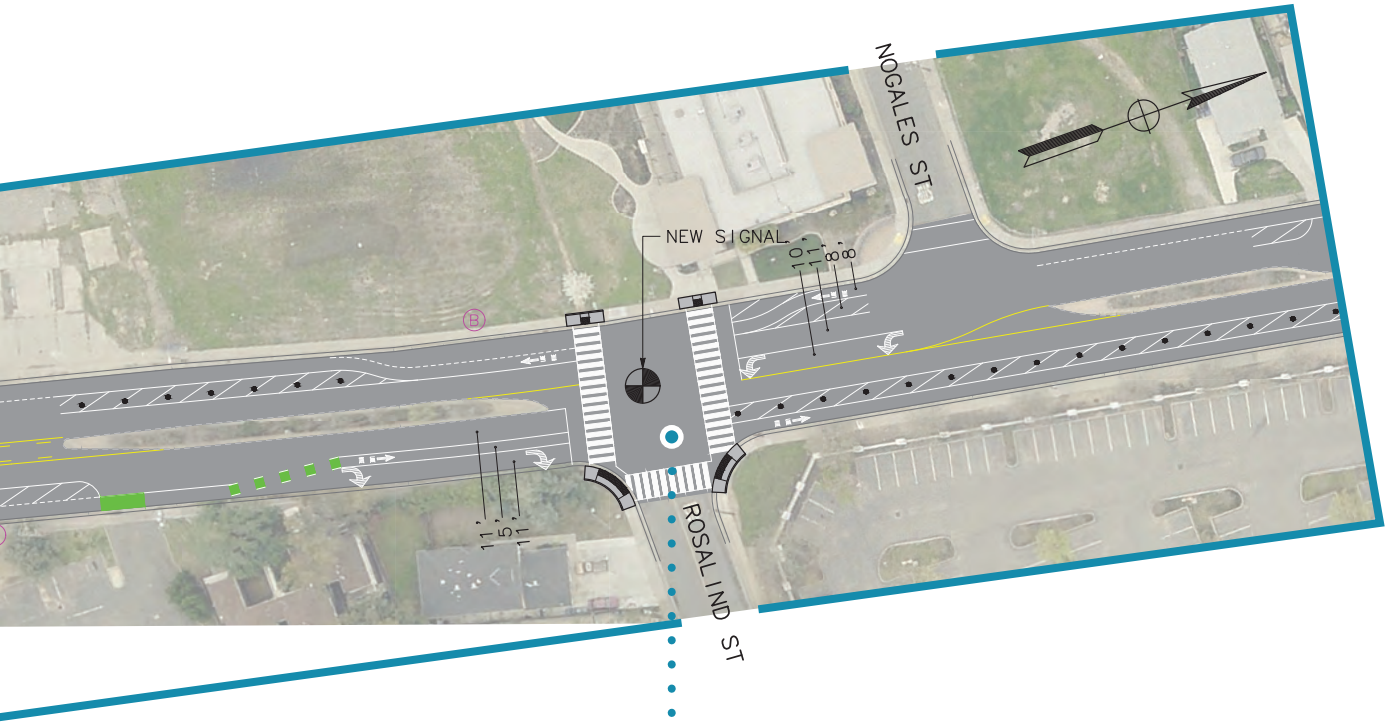
Separated Bikeway

Advanced Dilemma-Zone Detection

High Visibility Crosswalk

Corridor-Wide Recommendations

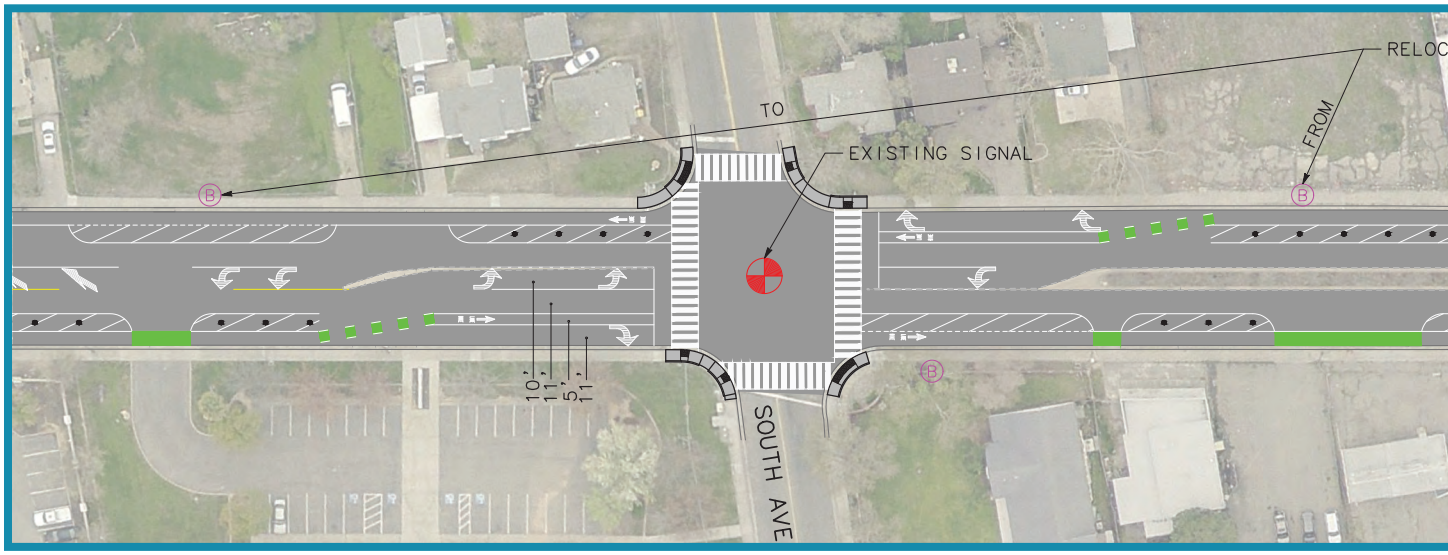
Location-Specific Recommendations



New Traffic Signal

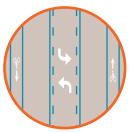
Co-Locate Bus Stops and Ped Crossings

Conceptual Design for Marysville



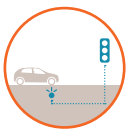
Extend Signal Clearance Time

Slow Green Wave



Road Diet

Separated Bikeway

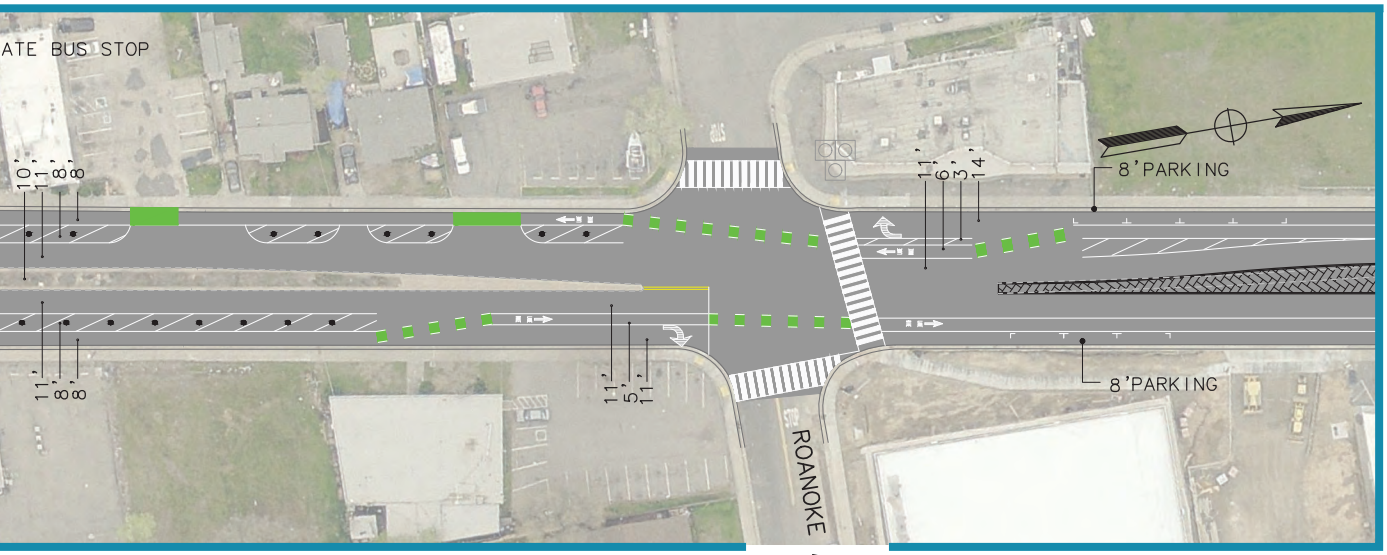


Advanced Dilemma-Zone Detection

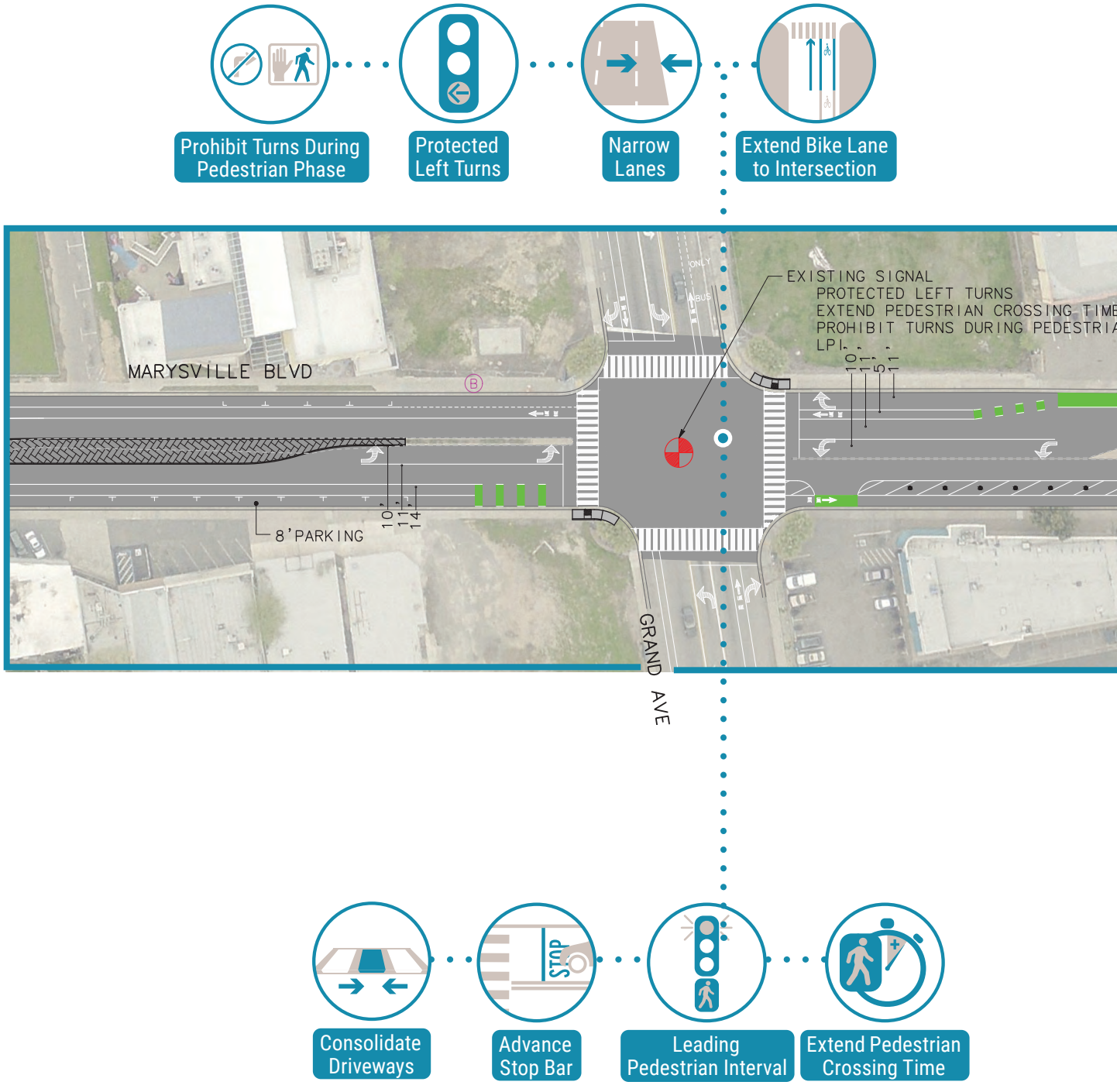
High Visibility Crosswalk

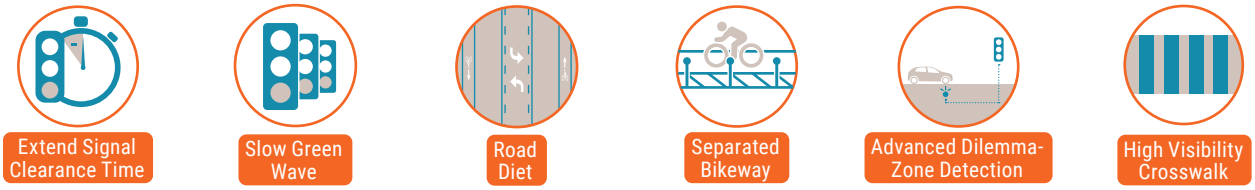
Corridor-Wide Recommendations

Location-Specific Recommendations



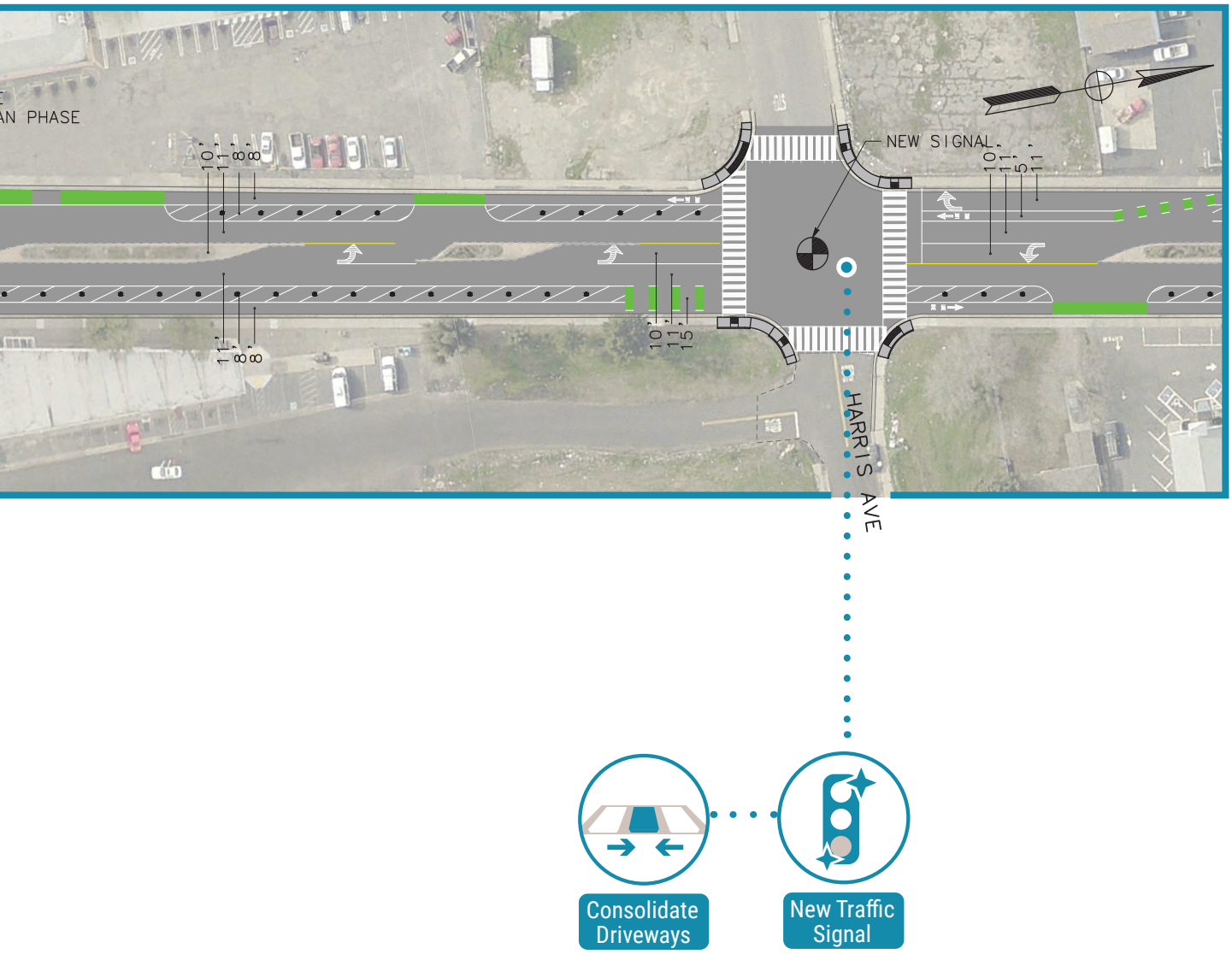
Conceptual Design for Marysville





Corridor-Wide Recommendations

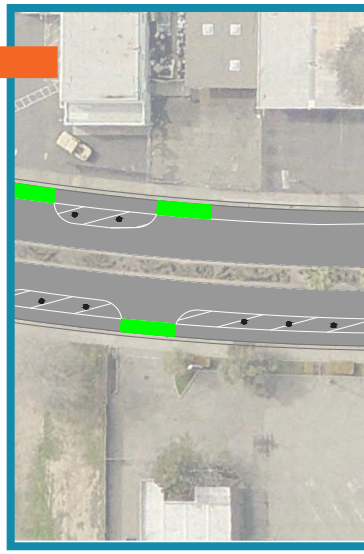
Location-Specific Recommendations



Conceptual Design for Marysville

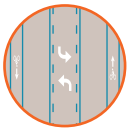
Marysville Boulevard/North Avenue Queues

The Marysville Boulevard/North Avenue intersection is 475 feet away from the merge point of the I-80 eastbound off-ramp to the north. Measures should be taken to ensure that the southbound queue at the intersection does not spill back to the off-ramp. The conceptual plans show the southbound approach is comprised of two-through lanes with a lane drop as the road continues south. The peak hour maximum queues result from this configuration are in Appendix B.



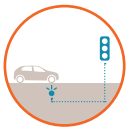
Extend Signal Clearance Time

Slow Green Wave



Road Diet

Separated Bikeway

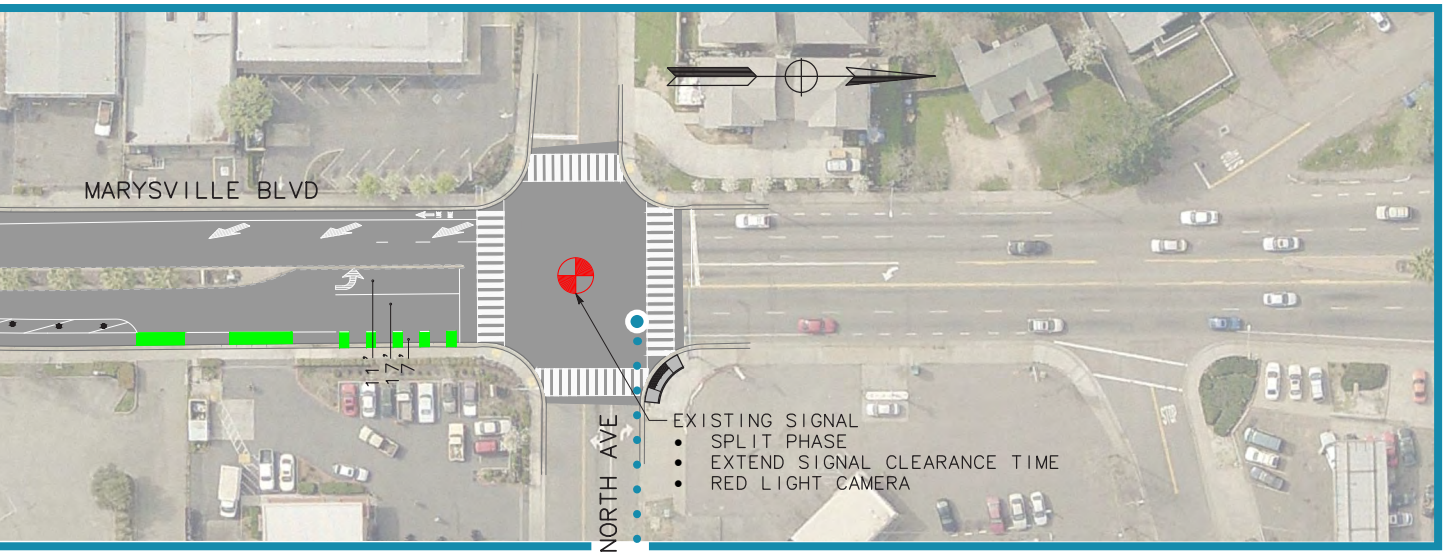


Advanced Dilemma-Zone Detection

High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations



Split Signal Phase

Advance Stop Bar

Extend Signal Clearance Time

Red Light Camera

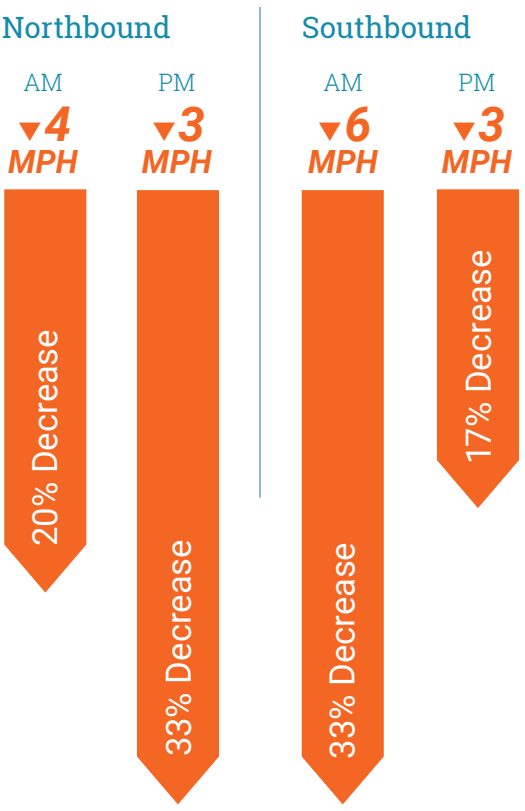
Parking Prohibition

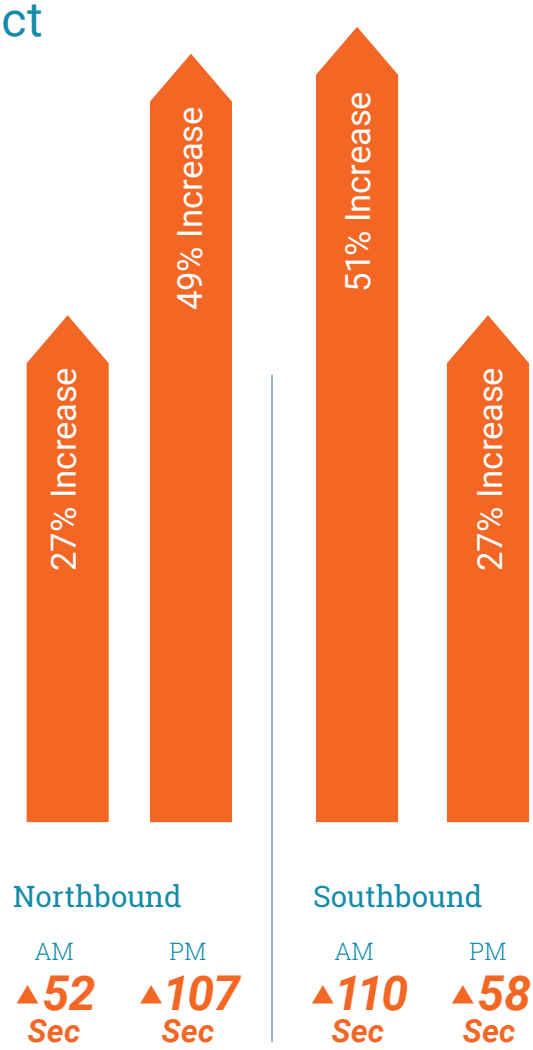
How Will Travel Change?

Estimated Changes with Project

Average Vehicle Speed

Average vehicle speed along the corridor during peak periods is expected to decrease between 3 and 6 mph as a result of the proposed project.While slower travel speeds result in longer travel times, they reduce traffic fatalities and severe injuries that result from crashes.



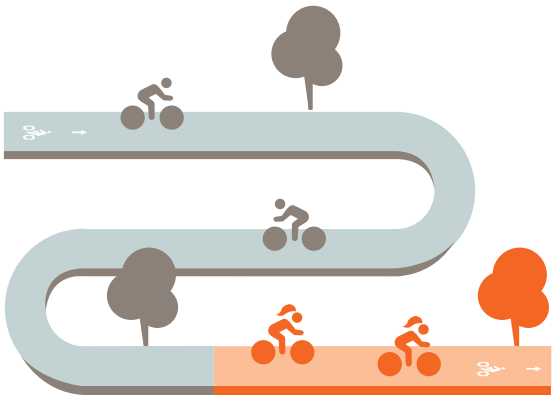


Vehicle Travel Time

Average vehicle travel time along the one-mile corridor during peak periods is expected to increase between 52 and 110 seconds as a result of the proposed project.

Estimated Changes with Project

Bike Lane Coverage

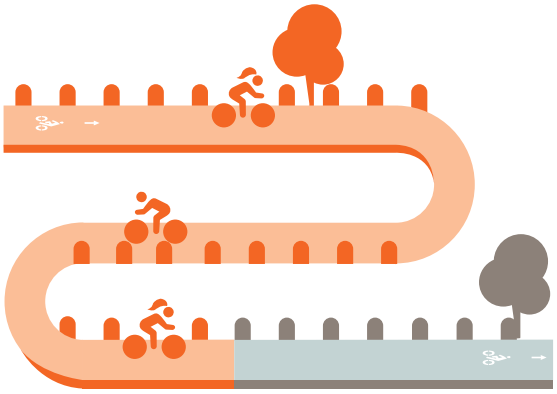


Without project
82% (9,740 ft)

▶

With project
100% (11,830 ft)

Share of Bike Lanes with Vertical Separation



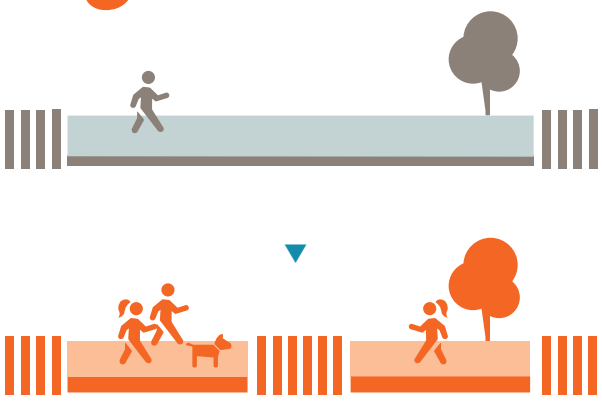
Without project
0% (0 ft)

▶

With project
78% (9,280 ft)

Distance Between Crosswalks

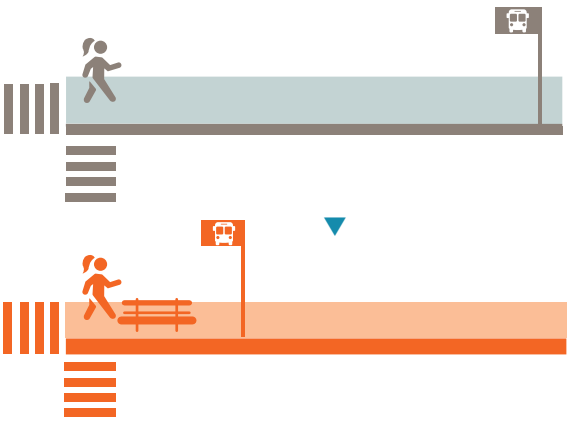
2/3 *of the existing distance*



*Longest distance between crosswalks reduced from 1,230 to 800 ft.

Distance Between Crosswalks and Bus Stops

1/3 *of the existing distance*

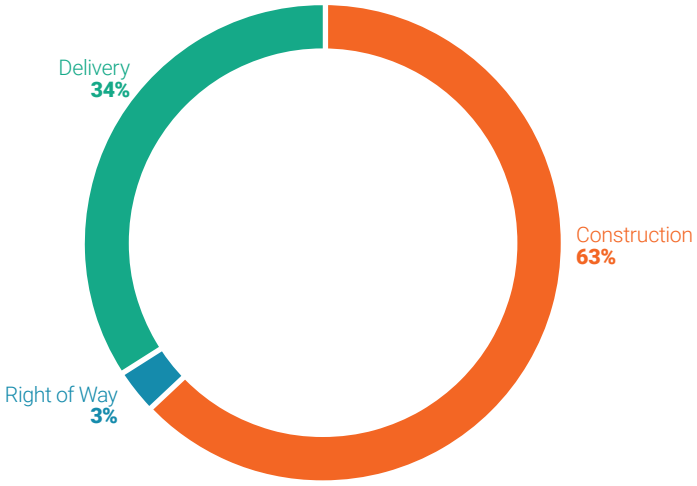


*Longest distance between a bus stop and the closest crosswalk reduced from 630 to 230 ft.

How Much Will the Project Cost?

Marysville Boulevard Cost Summary

$12,850,000



Construction

Construction costs include the cost to build the primary items associated with the safety countermeasures for the corridor. The items were estimated based on the preliminary design concepts and recent construction bid unit costs with an escalation factor to account for future construction. The costs were broken down into two categories that consisted of major roadway items and electrical items such as traffic signals and lighting. A contingency factor was included to account for refinement of project design, changes in project details, or unforeseen changes in construction costs.

Actual project costs will be determined by surveyed base mapping, geotechnical reports, concept refinement, environmental reviews, right of way availability, project phasing, and bid conditions at the time of advertisement. Project costs should be reviewed prior to any grant application or initiation of a Capital Improvement Project to revalidate and update the assumptions in this study as necessary.

The total project costs shown in the summary chart have been escalated at an assumed 3% per year escalation factor to 2025, the anticipated year of construction.

Right of Way

In addition to construction costs, right of way costs were assumed that include temporary construction easements for items such driveway modifications, curb ramps reconstruction, signal equipment poles and cabinets. The preliminary design assumes that the project can be constructed almost exclusively within the roadway prism and right of way acquisition along entire project frontage is not needed. Further refinement of the base mapping in subsequent phases of design will more accurately identify specific right of way needs.

Delivery

Project delivery costs are included in the estimates provided in this study. These costs encompass all of the work to complete subsequent phases including preliminary engineering, environmental documentation, final design, right of way engineering, and construction oversight. A breakdown of these costs is provided in Appendix C.

Broadway/Stockton

Vision Zero
Top 5 Corridor

Stockton Boulevard at Broadway

Broadway/Stockton Boulevard

Vision Zero Top 5 Corridor

Broadway/Stockton Blvd - Colonial Theater

What is going on?
Between 2009 and 2017, 15 crashes that resulted in a fatality or severe injury (KSI) occurred on Broadway/Stockton Boulevard between Martin Luther King Jr. Boulevard and 14th Avenue. Six of these crashes involved a pedestrian and three of these crashes involved a bicyclist. Of the 122 crashes studied on this corridor, 34 crashes (27 percent) occurred at the Broadway/Stockton Boulevard intersection.

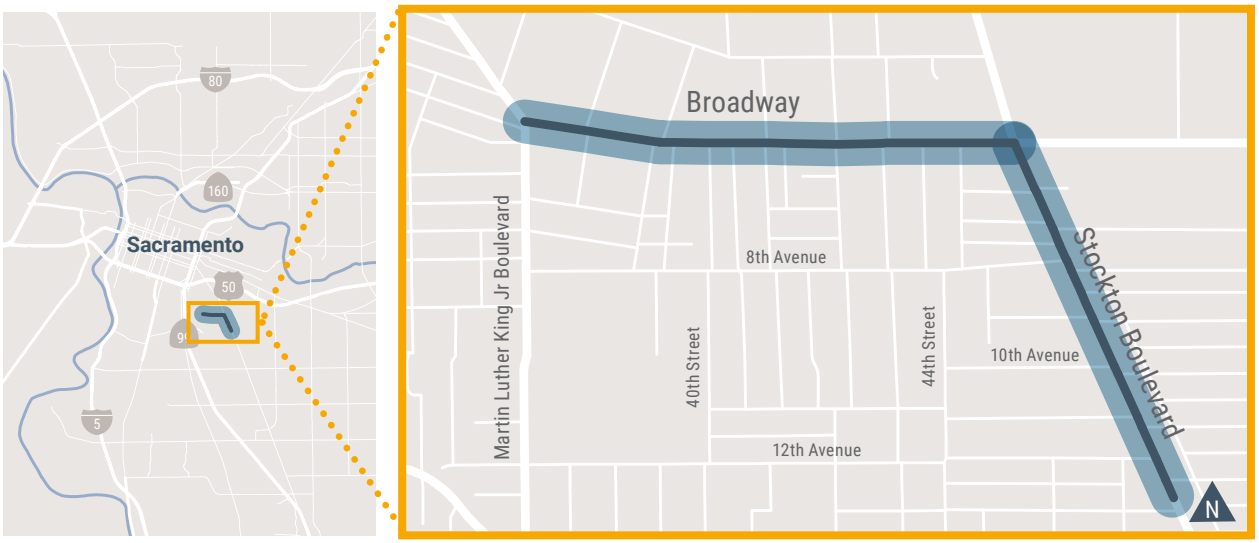
What are the key issues?
Unsafe speed was the most common violation for vehicular crashes, and many drivers were proceeding straight or stopped at the time of the crash. On Broadway, half of the pedestrian crashes involved a pedestrian crossing the street outside of a crosswalk, whereas on Stockton Boulevard, 60 percent of pedestrians hit by drivers were crossing the street in a marked crosswalk. Bike crashes on this corridor involved broadside, or T-Bone, and sideswipe crashes.

What is the community concerned about?
Residents described frequent jaywalking activity throughout the corridor and suggested that it is result of lack of crosswalks, specifically near bus stops. Residents said it is uncomfortable to bike since there are gaps in the bike lanes and drivers tend to speed while traveling. The segment of Stockton Boulevard overlaps with the Stockton Boulevard Corridor Study.
The following pages lay out the existing conditions along the corridor, feedback heard from residents at outreach events, and a set of roadway safety recommendations focused on slowing drivers down, providing separated space for bicyclists, and giving pedestrians more opportunities for safe crossings.

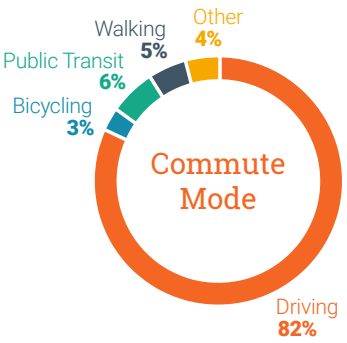
Table of Contents

In the Neighborhood

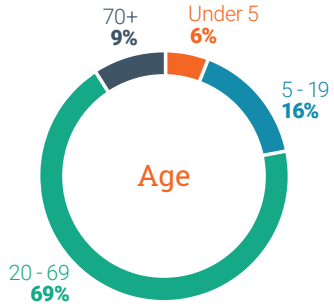
Corridors



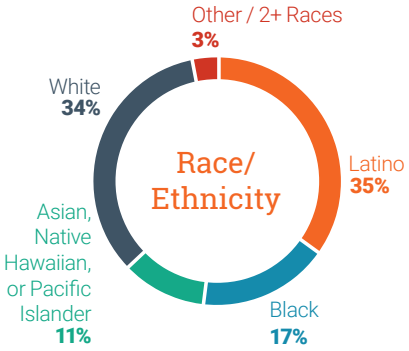
About the Neighborhood



Residents take transit, walk, or bike to work at a higher rate than the city as a whole.



A larger share of residents in this neighborhood are age 20-69, compared with the city as a whole.



52% of the residents in this neighborhood are Black or Latino, compared with 42% citywide.

Broadway at 39th Street

Stockton Boulevard at 8th Avenue

Broadway at Stockton Boulevard

Key Destinations Along the Corridors

Parks

1

Schools & Libraries

2

Food Markets

1

Houses of Worship

5

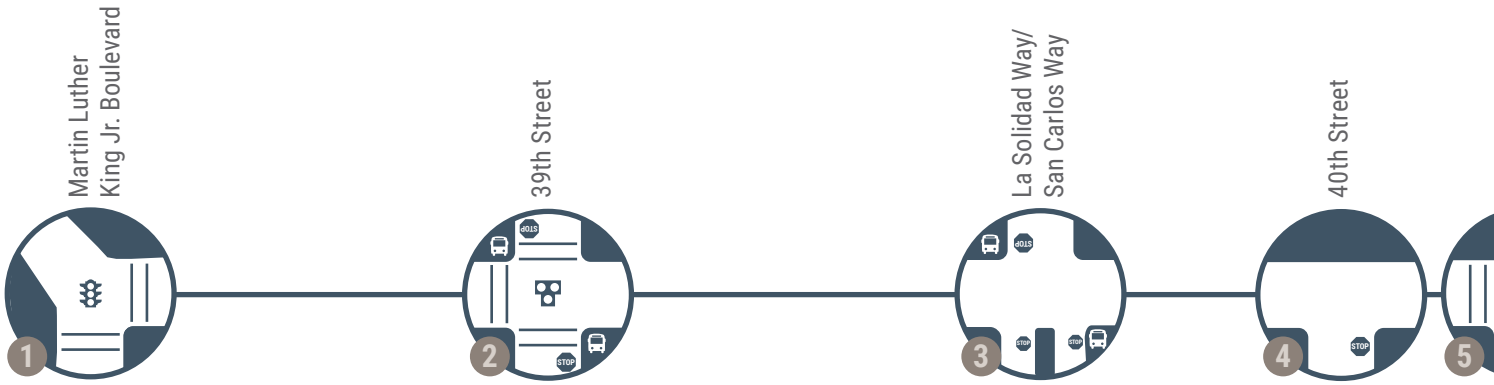
Theaters

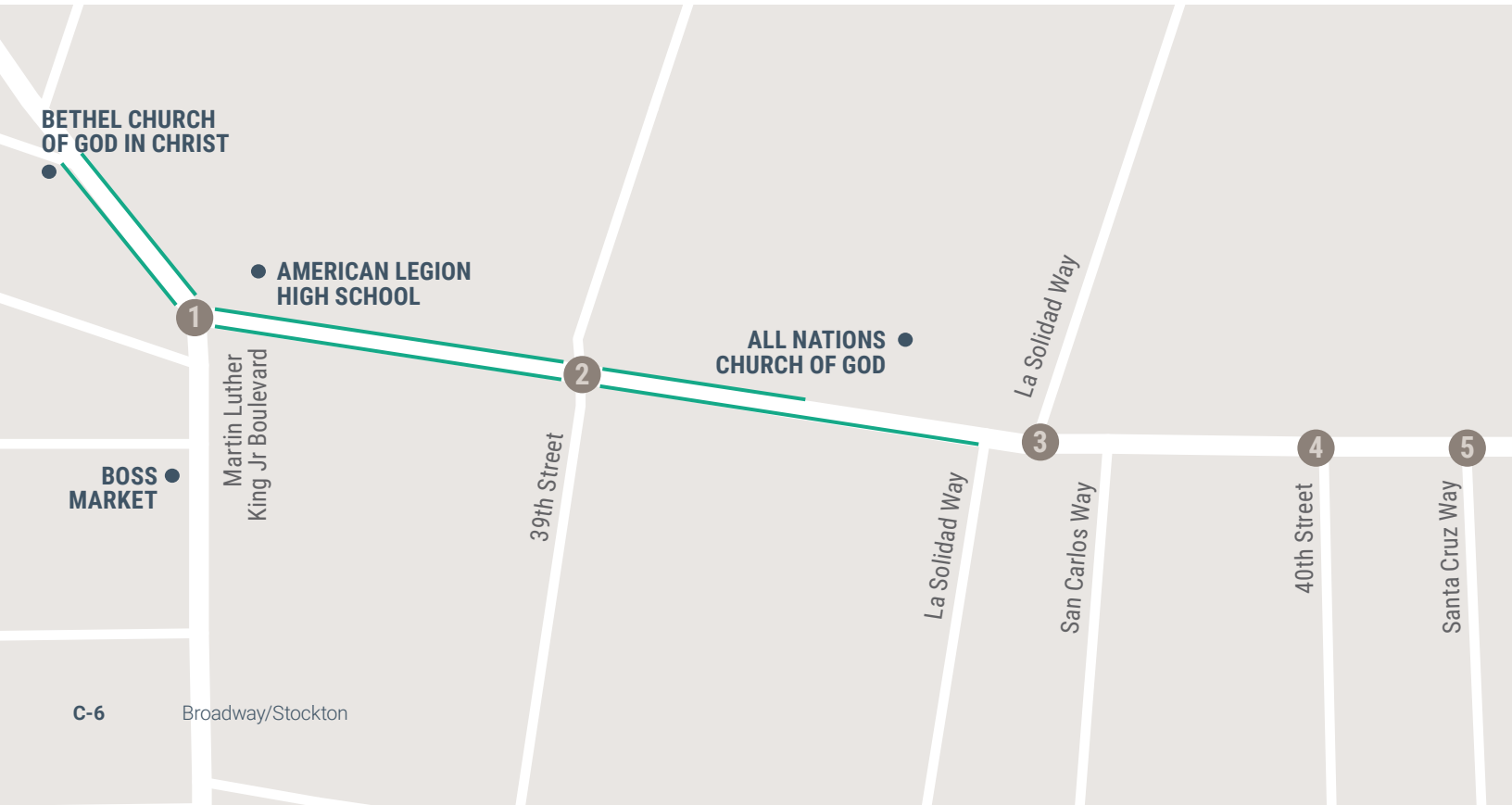
1

Travel on Broadway

Key Statistics

Posted Speed Limit	Daily Vehicles	Maximum PM Intersection Vehicle Volume	PM Rush Hour People Walking	PM Rush Hour People Biking
30 MPH	**15,800**	**1,744**	**126**	**92**





Number of Transit Routes

3

#51, #206, #214

Bikeway Type

On-Street Bike Lanes, with long gaps

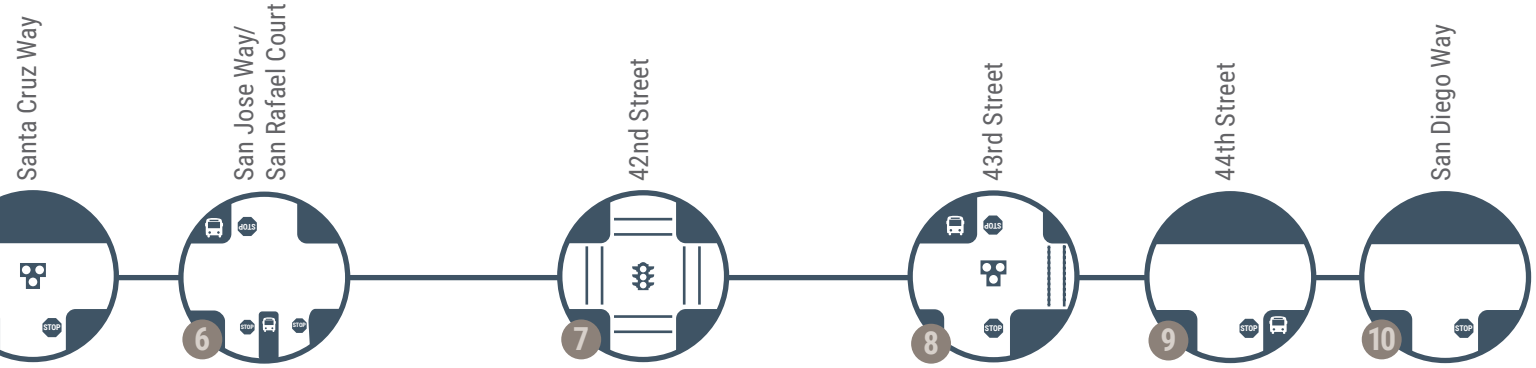
Longest Distance Between Marked Crosswalks

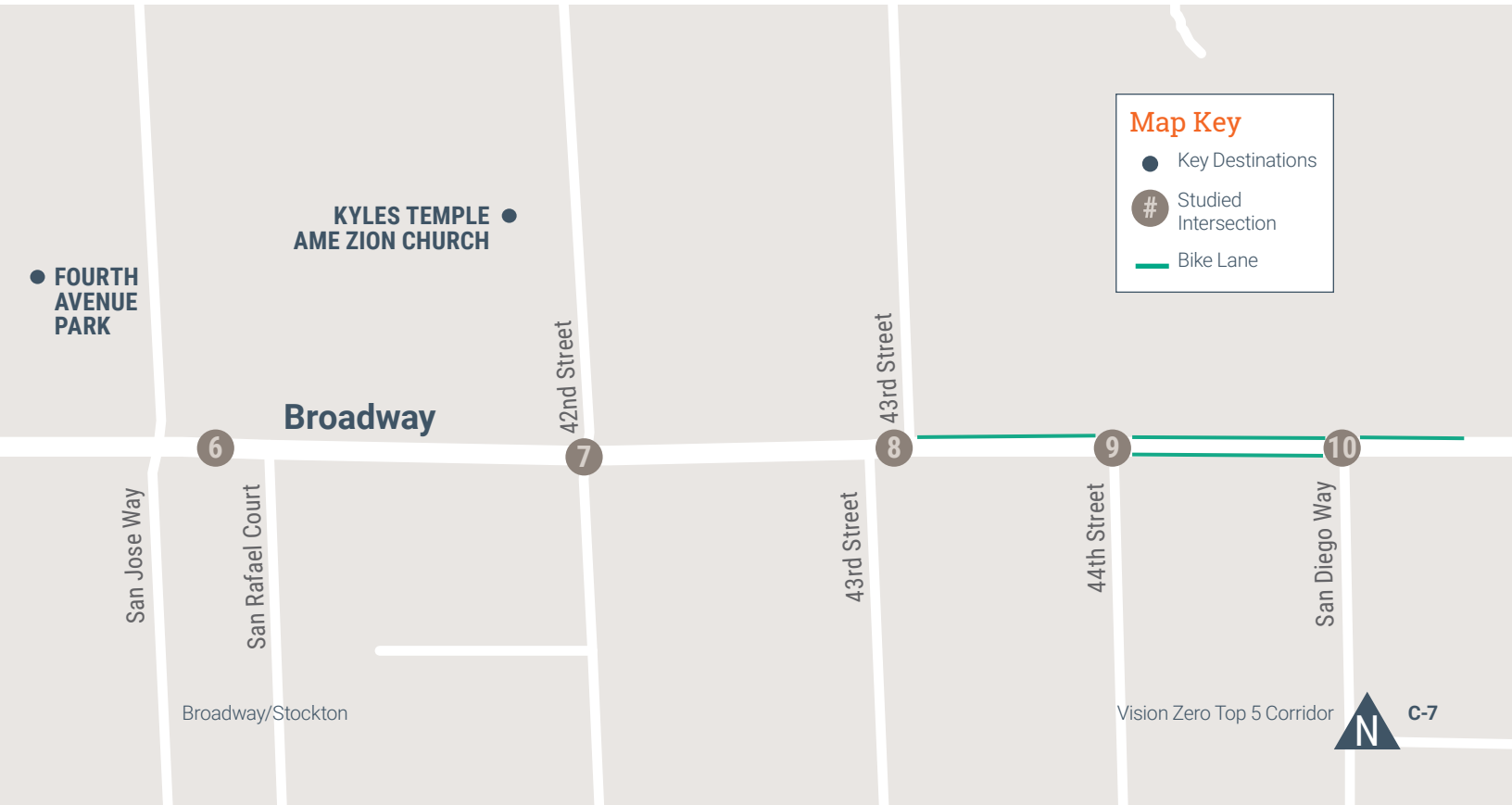
930

Ft

Sidewalk Coverage

100%

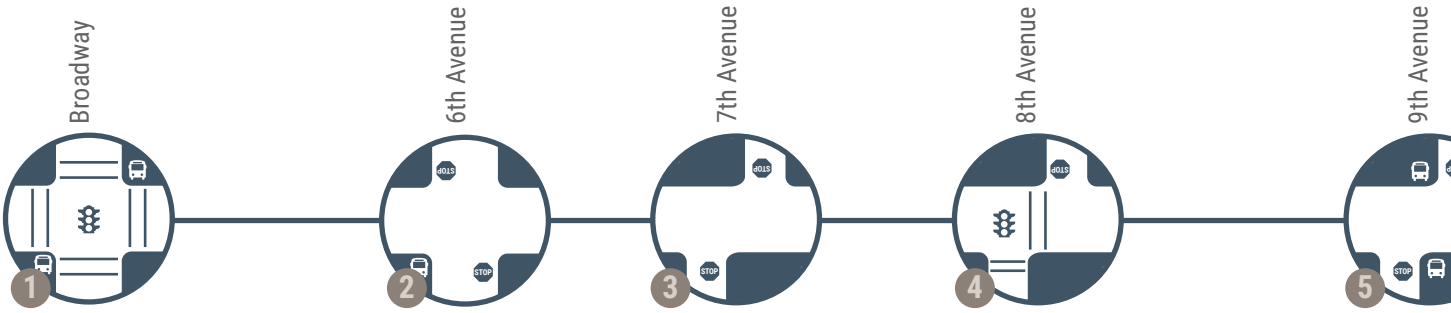


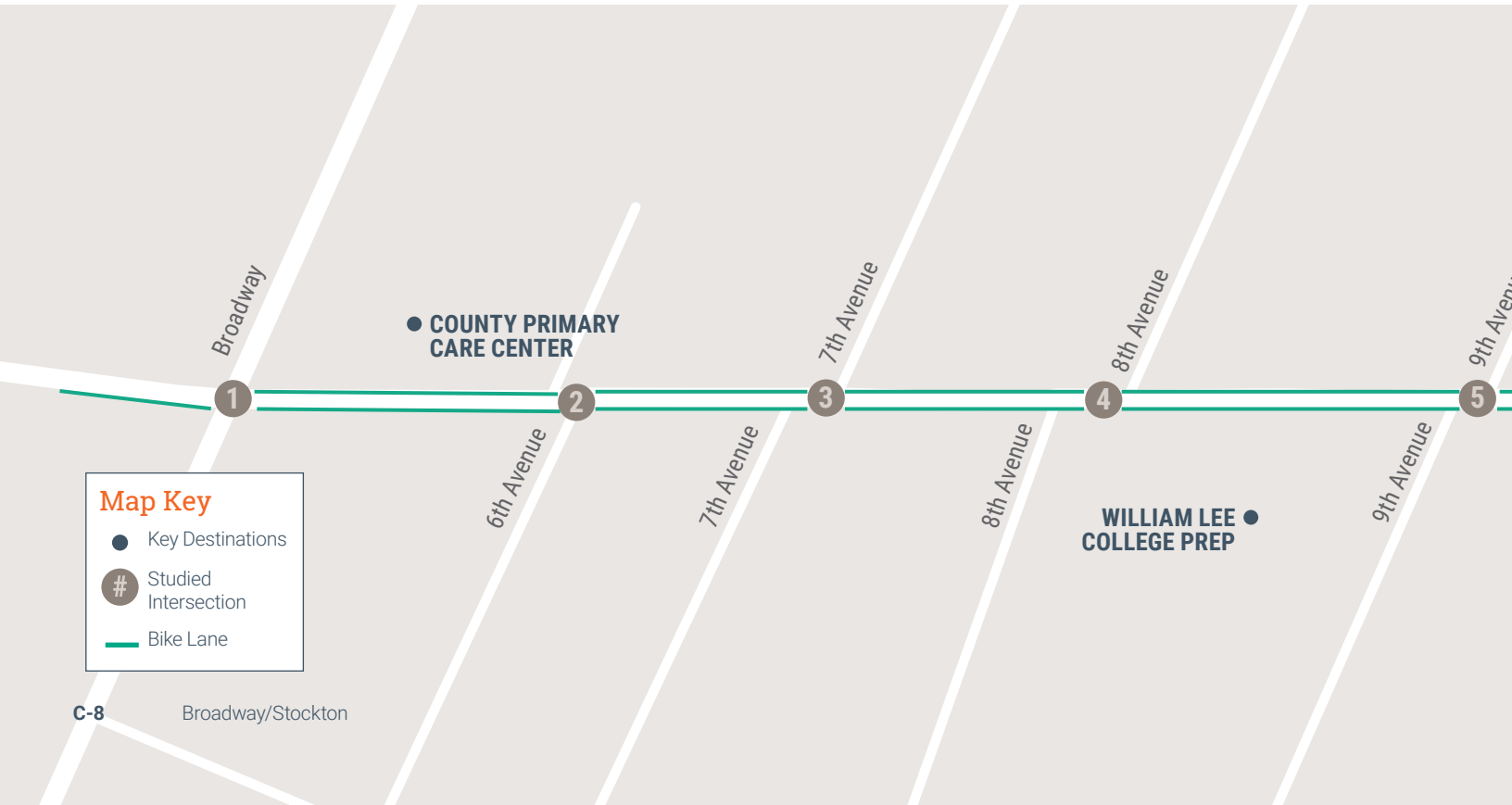


Travel on Stockton

Key Statistics

Posted Speed Limit	Daily Vehicles	Maximum PM Intersection Vehicle Volume	PM Rush Hour People Walking	PM Rush Hour People Biking
35 MPH	**19,600**	**1,843**	**151**	**134**





Number of Transit Routes

2

#51, #213

Bikeway Type

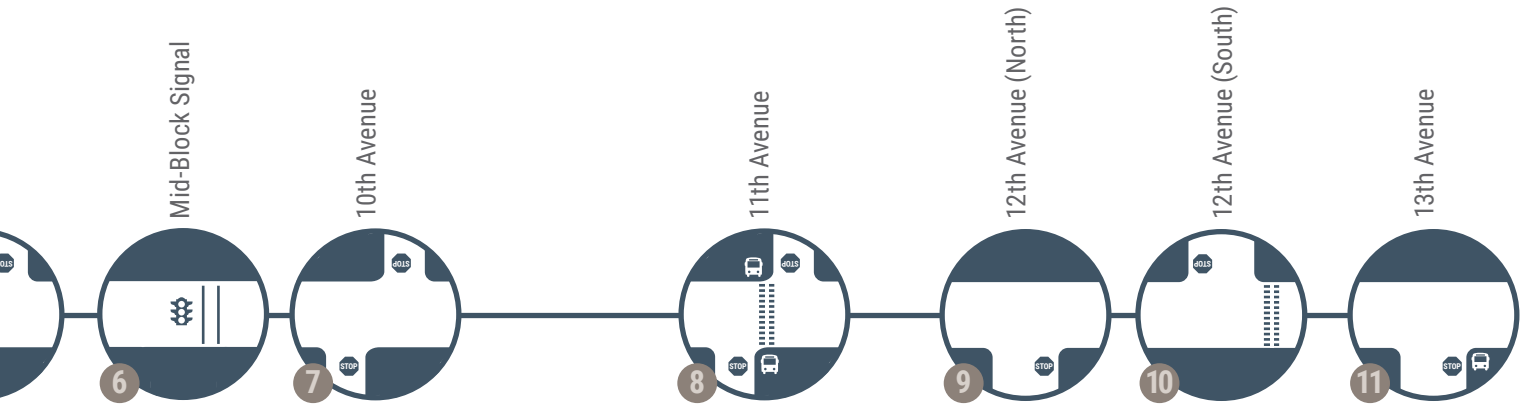
On-Street Bike Lanes

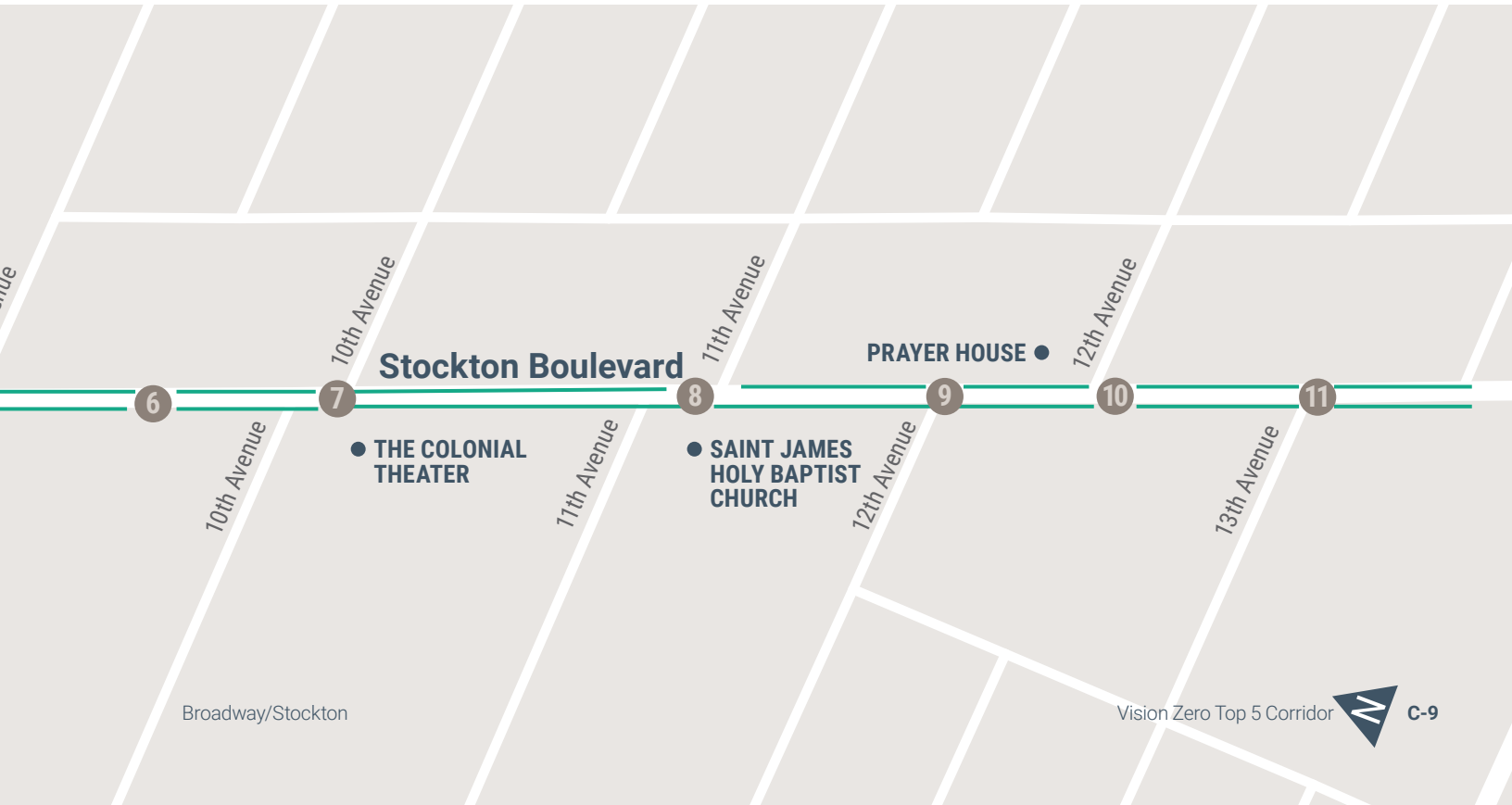
Longest Distance Between Marked Crosswalks

1,560 Ft

Sidewalk Coverage

100%





Crashes on Broadway

Vehicle Crash Types

Unsafe Speed

"Unsafe Speed" was the most common violation, cited in 28% of all crashes.

1 2 3 4 5 6
7 8 9 10

Proceeding Straight

More than 2/3 of drivers were proceeding straight or stopped at the time of the crash.

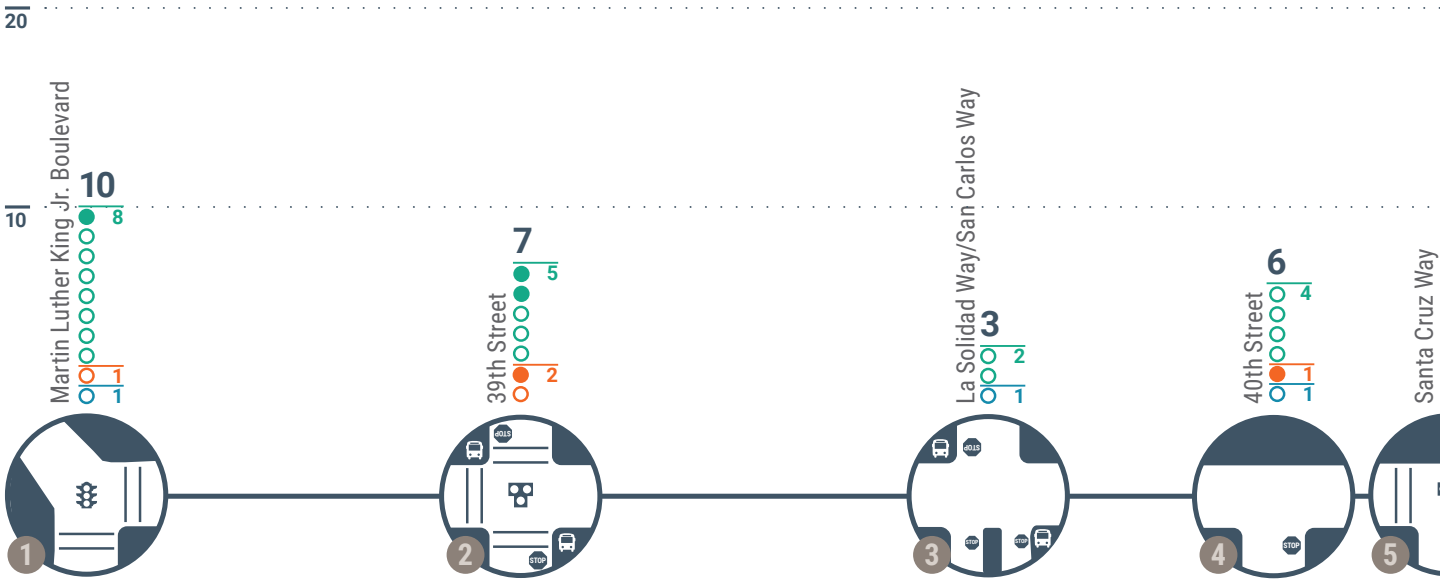
1 2 3 4 5 6
7 8 9 10

Left Turns

Nearly 2/3 of drivers who were turning at the time of the crash were making a left turn.

1 2 3 4 5 6
7 8 9 10

Crash Locations



Pedestrian Crash Types

Not in Crosswalk

Half of pedestrians hit were crossing outside of a crosswalk at the time of the crash.

1 2 3 4 5 6
7 8 9 10

Weekend

Nearly 2/3 of pedestrian crashes occurred on Friday or Saturday.

1 2 3 4 5 6
7 8 9 10

Bike Crash Types

Sideswipe

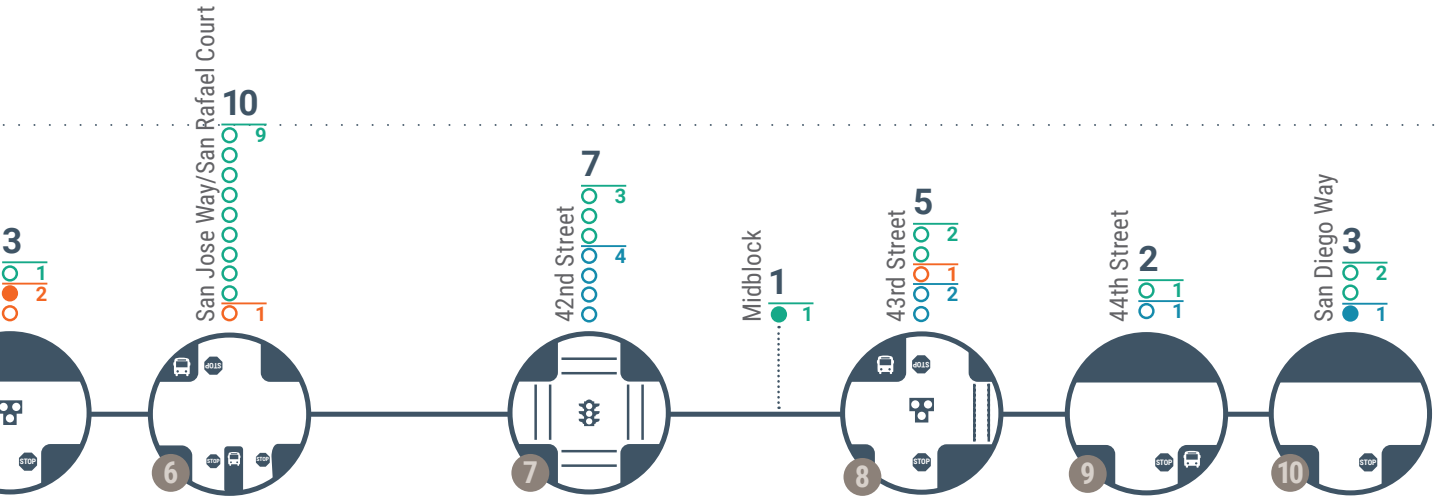
45% of bike crashes were sideswipe.

1 2 3 4 5 6
7 8 9 10

1 Numbers that are turned on represent a location where crash type has occurred at least three times.

Total Crashes

	All Injury Crashes	Fatal and Severe Crashes
Vehicle	38	4
Pedestrian	8	3
Bike	11	1



Crashes on Stockton

Vehicle Crash Types

Unsafe Speed

"Unsafe Speed" was the primary violation cited in 23% of all crashes.

1 2 3 4 5 6
7 8 9 10 11

Proceeding Straight

More than 60% of drivers were proceeding straight or stopped at the time of the crash.

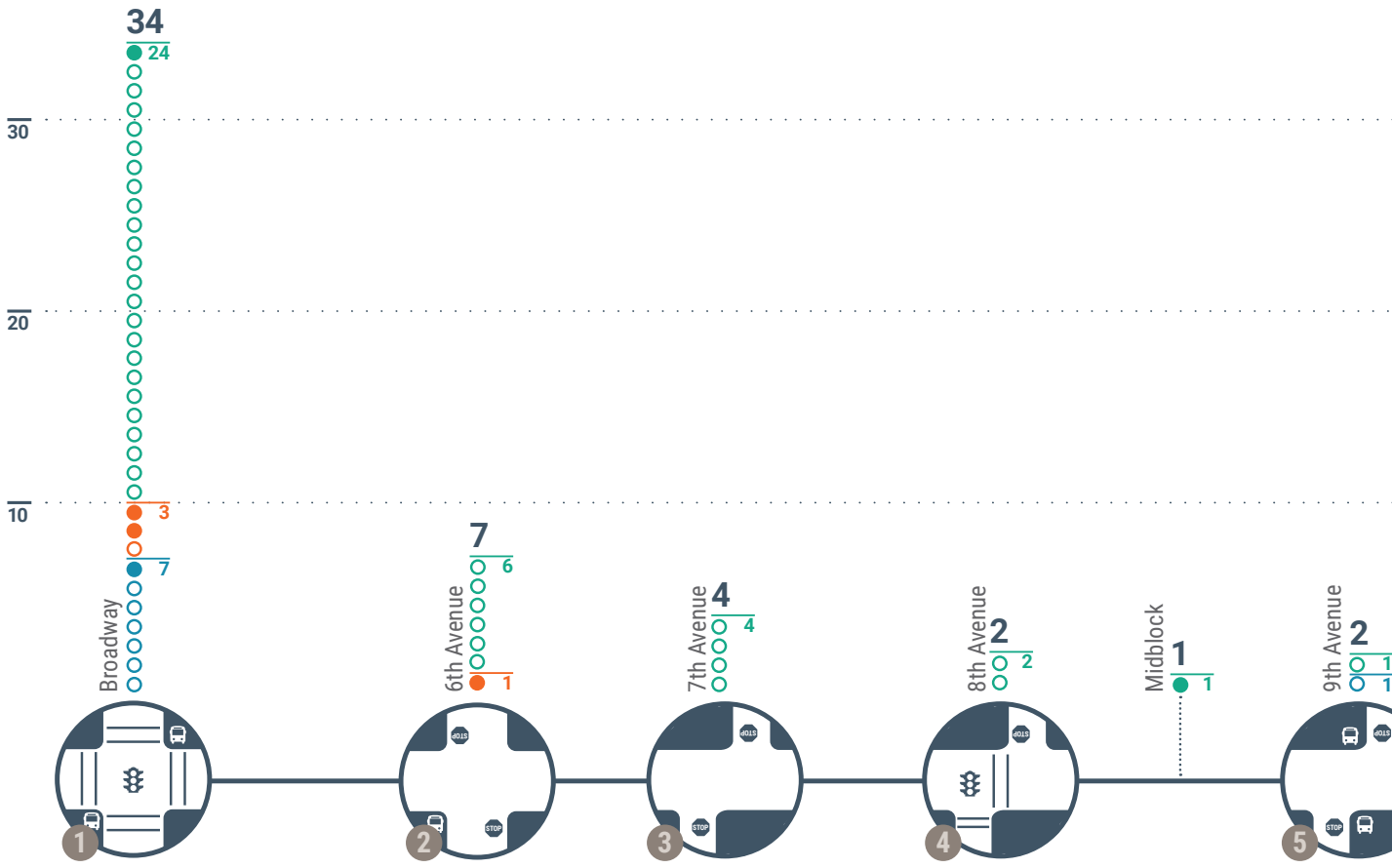
1 2 3 4 5 6
7 8 9 10 11

Broadside

40% of all crashes were broadside, also called T-Bone.

1 2 3 4 5 6
7 8 9 10 11

Crash Locations



Ped Crash Types

Crossing in Crosswalk

60% of pedestrians hit by drivers were crossing in a crosswalk at the time of the crash.

1 2 3 4 5 6
7 8 9 10 11

Bike Crash Types

Broadside

More than 60% of bike crashes were broadside, also called T-Bone.

1 2 3 4 5 6
7 8 9 10 11

Morning

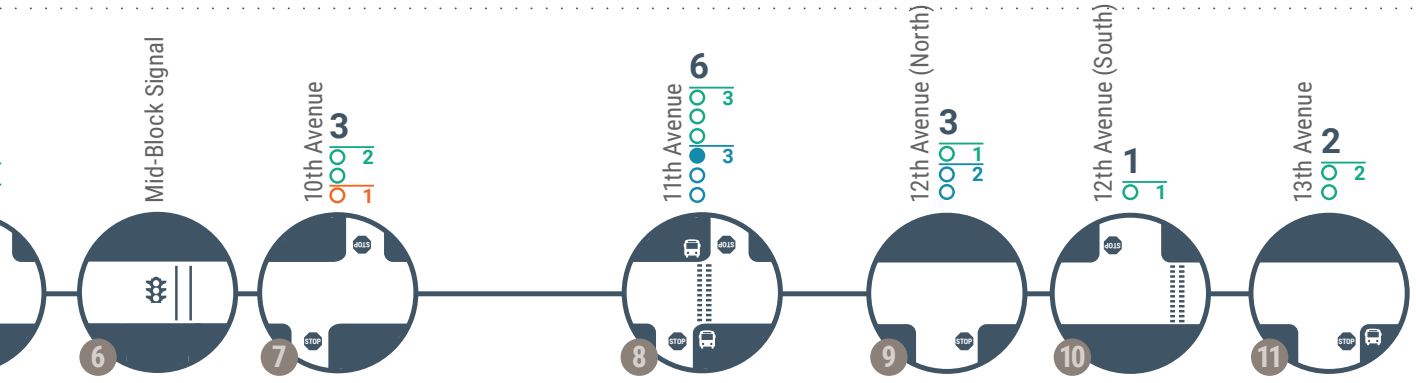
More than 60% of bike crashes occurred before noon.

1 2 3 4 5 6
7 8 9 10 11

1 Numbers that are turned on represent a location where crash type has occurred at least three times.

Total Crashes

	All Injury Crashes	Fatal and Severe Crashes
Vehicle	47	2
Pedestrian	5	3
Bike	13	2



Feedback from the Community

"People drive too fast and run the right turn red lights at the Broadway/Stockton intersection."

"More crosswalks! Cars do not stop, and there are bus stops not too far from crosswalks."


Fall Family Festival

Key Themes

Pedestrian Safety

Residents said that this corridor has a lot of pedestrian activity but believed that drivers should travel more cautiously, specifically when making right-turns on the corridor or driving near crosswalks.

Signals/Signage

Residents described red light running at traffic signals and suggested that more traffic signals could slow down traffic.

Crossings

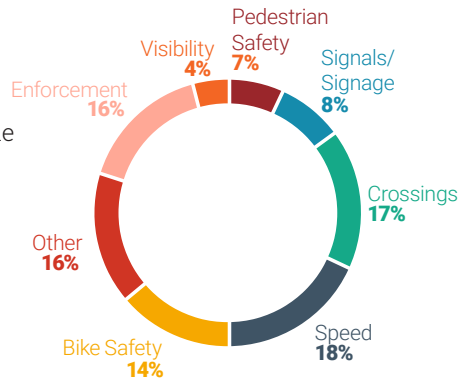
Residents described jaywalking throughout the corridor and suggested that it is result of lack of crosswalks specifically near bus stops.

Speed

Residents described drivers speeding and traveling aggressively through the corridor and said they were uncomfortable walking and biking as a result.

Bike Safety

Residents said it is uncomfortable to bike along the corridor since the bike lanes are inconsistent.



Engagement Events

October 25, 2018

Fall Family Festival, Oak Park Community Center

November 7, 2018

Transit Stop at Broadway/ Stockton Pop-up

May 31, 2018

Let's Move! Event, McClatchy Park

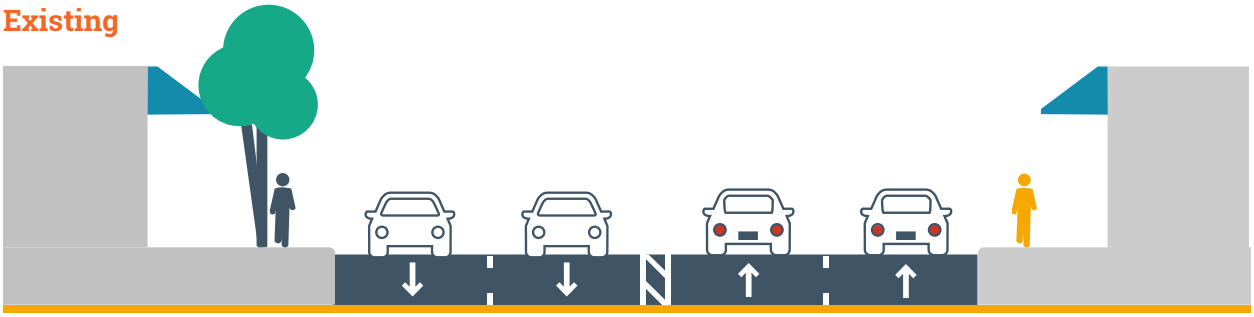
Investments to Enhance Safety

Key Crash Countermeasures for Broadway

Countermeasure		Crash Type	Feedback Key Theme
Road Diet	TO ADDRESS	Unsafe Speed	Speed
Add New Signal	TO ADDRESS	Not in Crosswalk	Crossings
Separated Bikeway	TO ADDRESS	Sideswipe (Bike)	Bike Safety

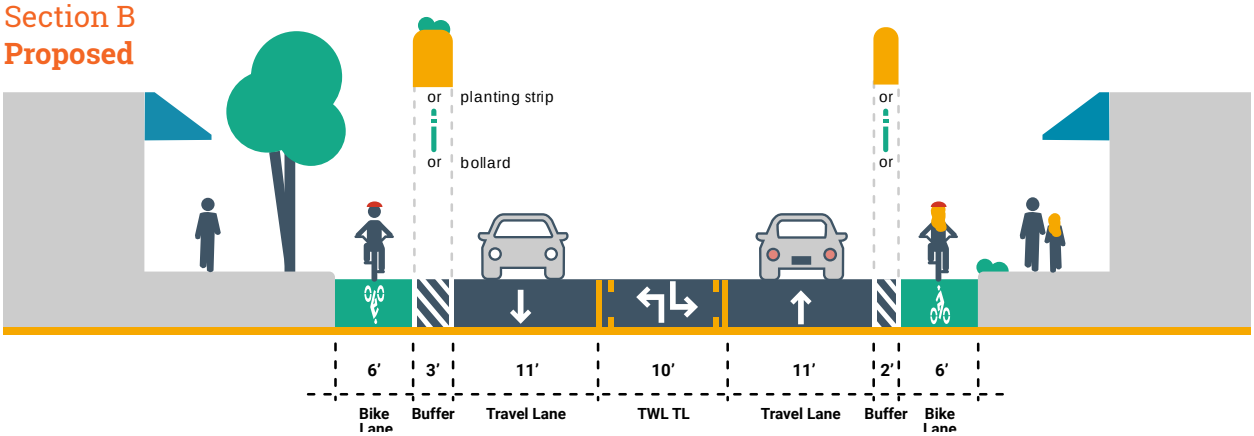
How Will The Roadway Space Be Used?

Section B
Existing



SEE PAGE C-20

Section B
Proposed



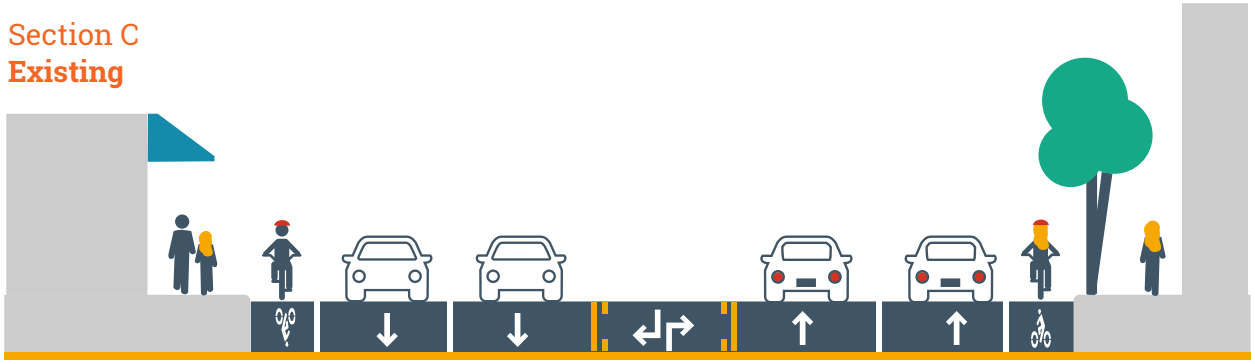
Investments to Enhance Safety

Key Crash Countermeasures for Stockton

Countermeasure		Crash Type	Feedback Key Theme
Road Diet	TO ADDRESS	Unsafe Speed	Speed
Leading Pedestrian Interval	TO ADDRESS	Crossing in Crosswalk	Crossings
Extend Signal Clearance Time	TO ADDRESS	Broadside	Signals/Signage

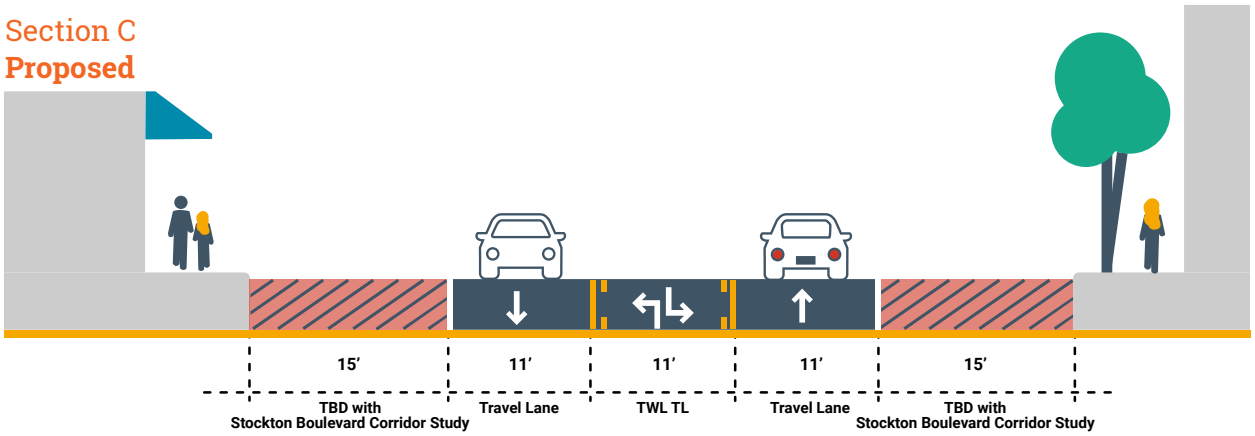
How Will The Roadway Space Be Used?

Section C
Existing



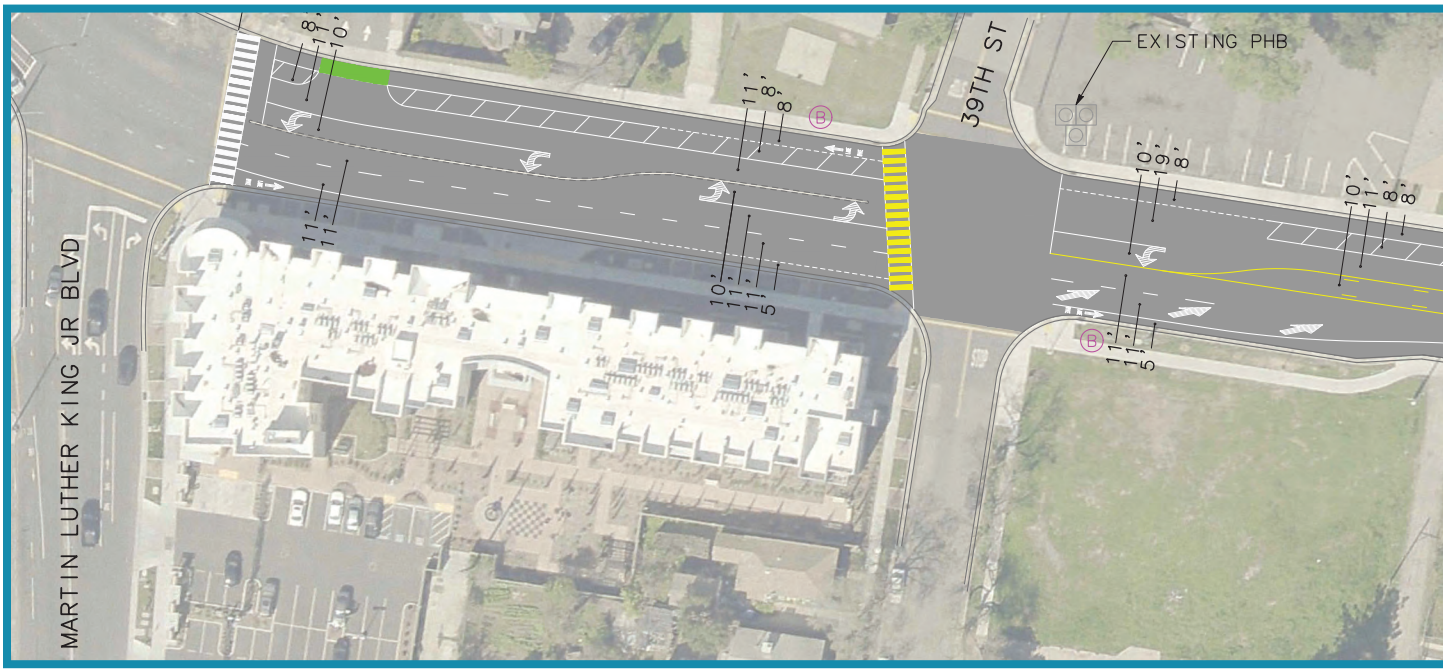
SEE PAGE C-27

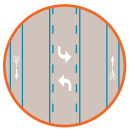
Section C
Proposed



Broadway at 39th Street

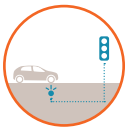
Conceptual Design for Broadway





Road Diet

Separated Bikeway

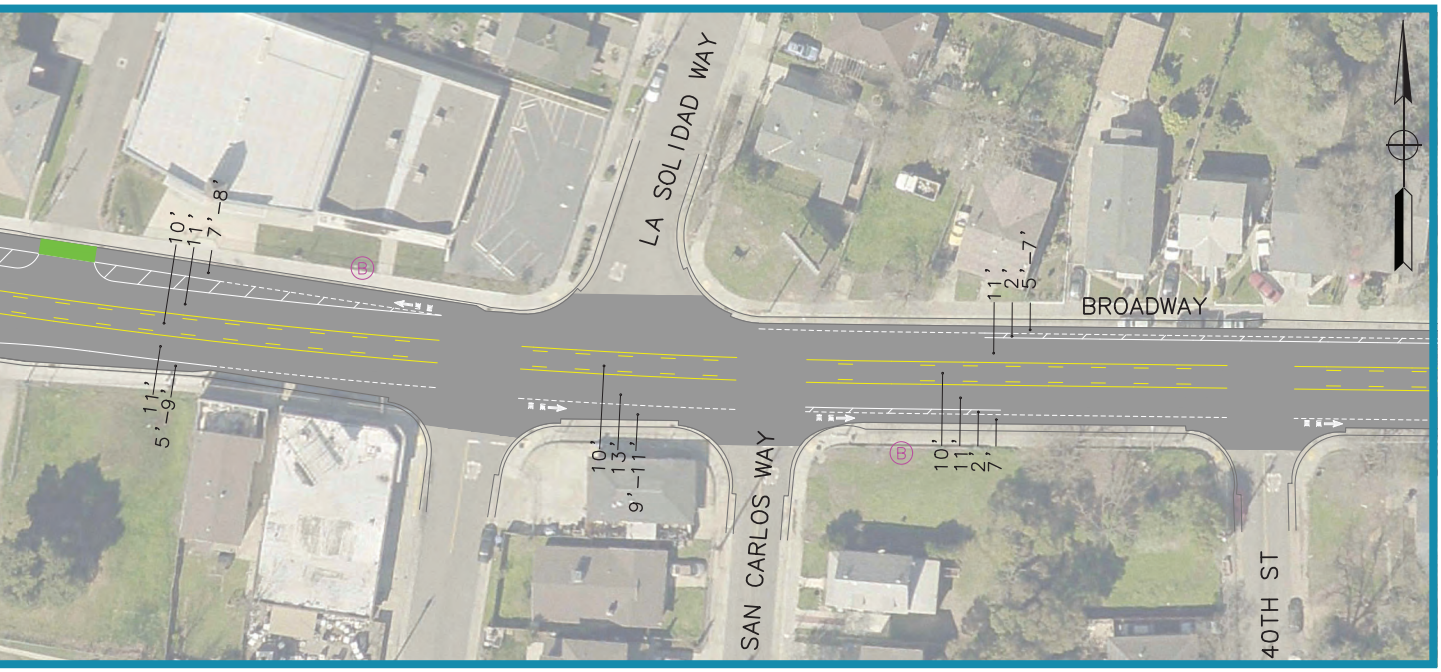


Advanced Dilemma-Zone Detection

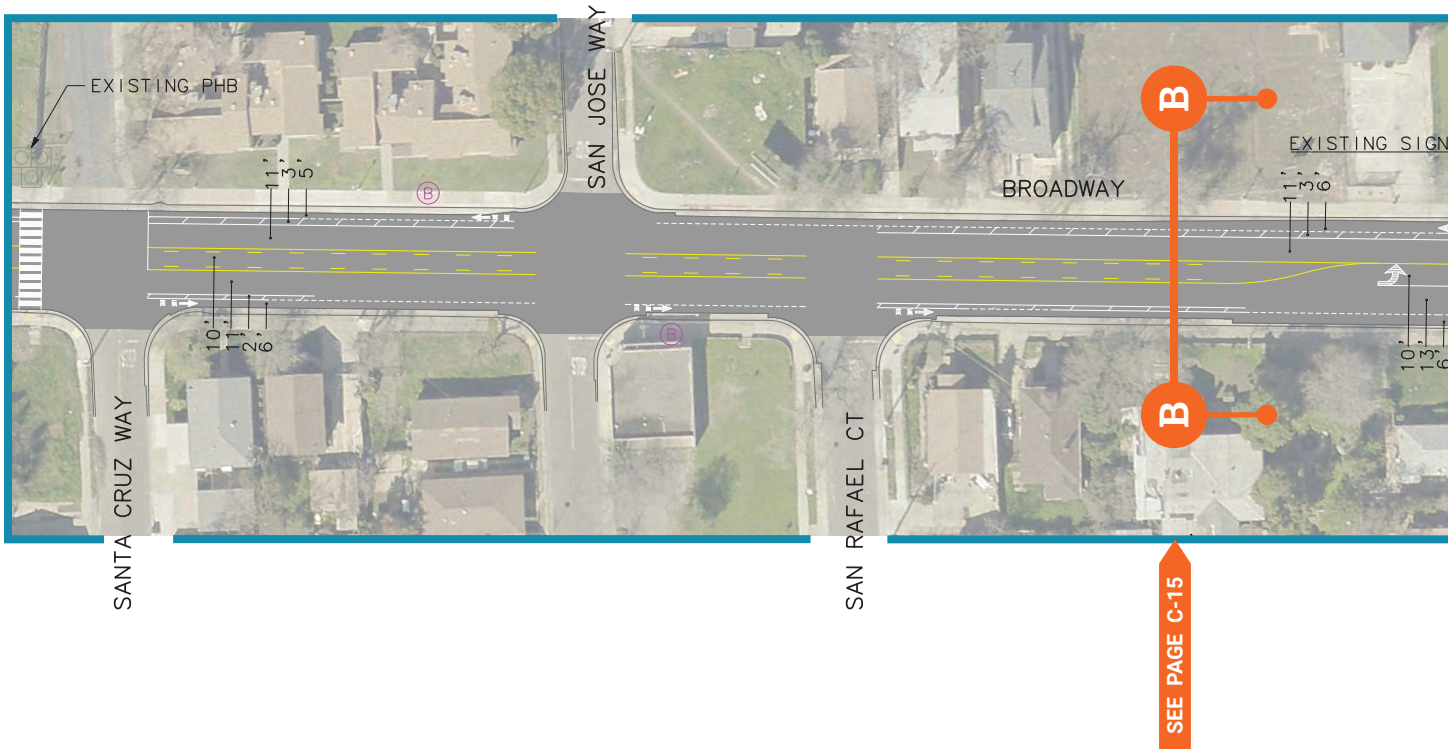
High Visibility Crosswalk

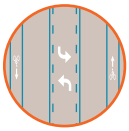
Corridor-Wide Recommendations

Location-Specific Recommendations



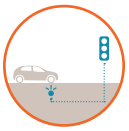
Conceptual Design for Broadway





Road Diet

Separated Bikeway

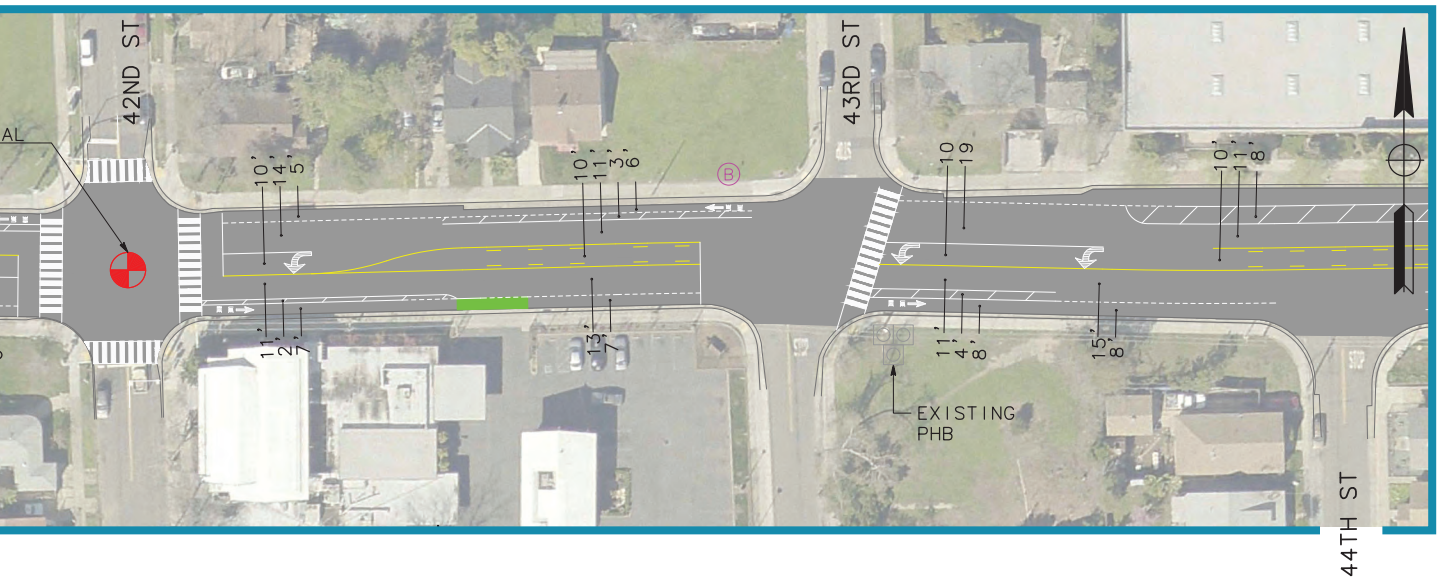


Advanced Dilemma-Zone Detection

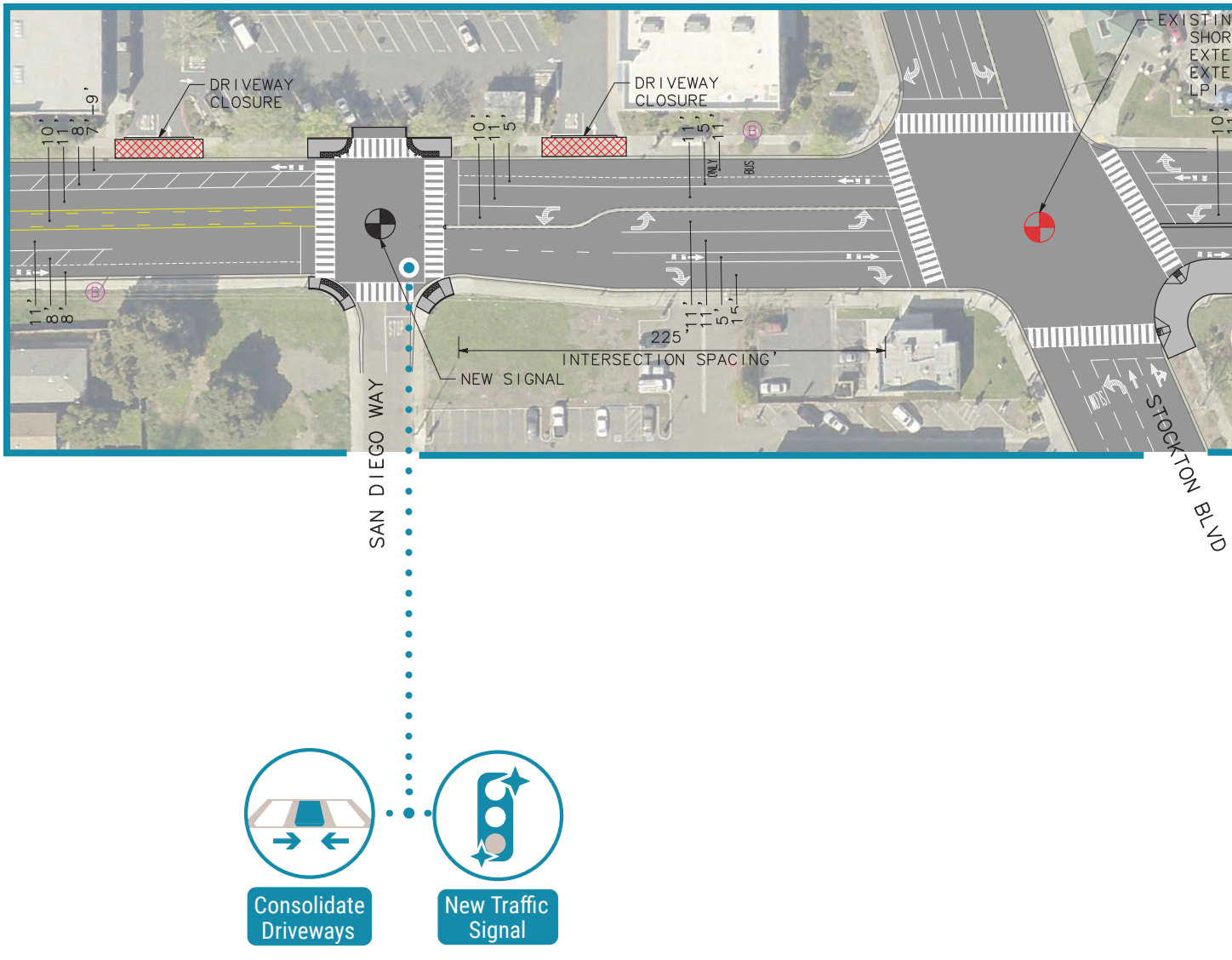
High Visibility Crosswalk

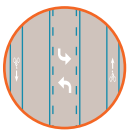
Corridor-Wide Recommendations

Location-Specific Recommendations



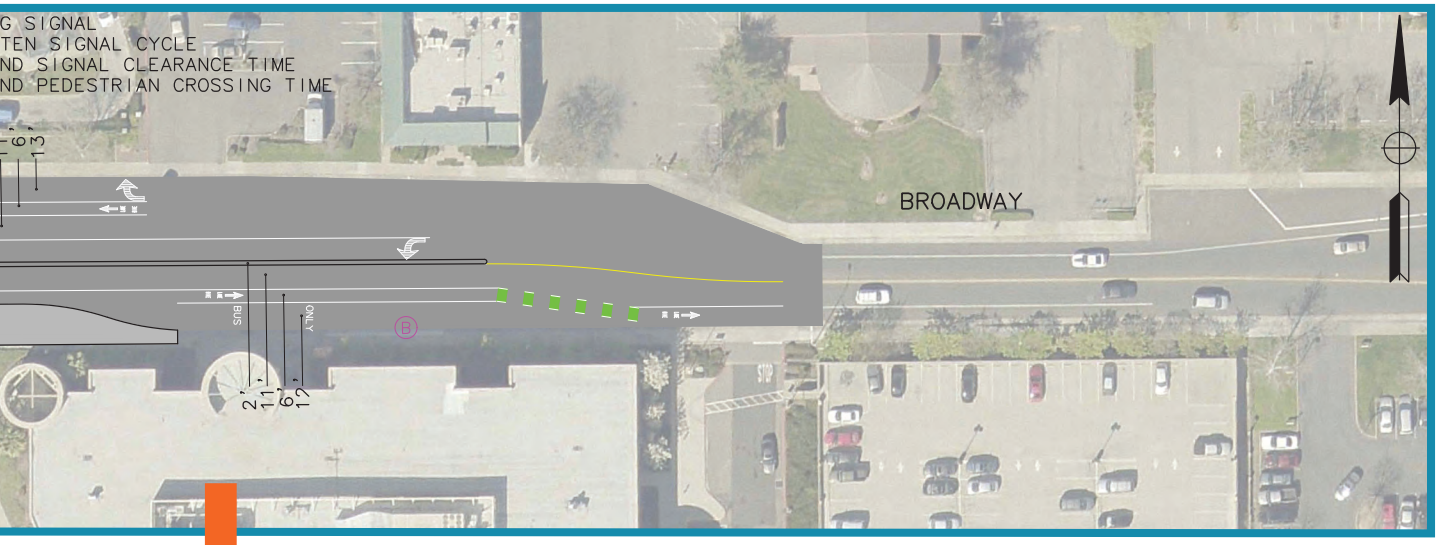
Conceptual Design for Broadway





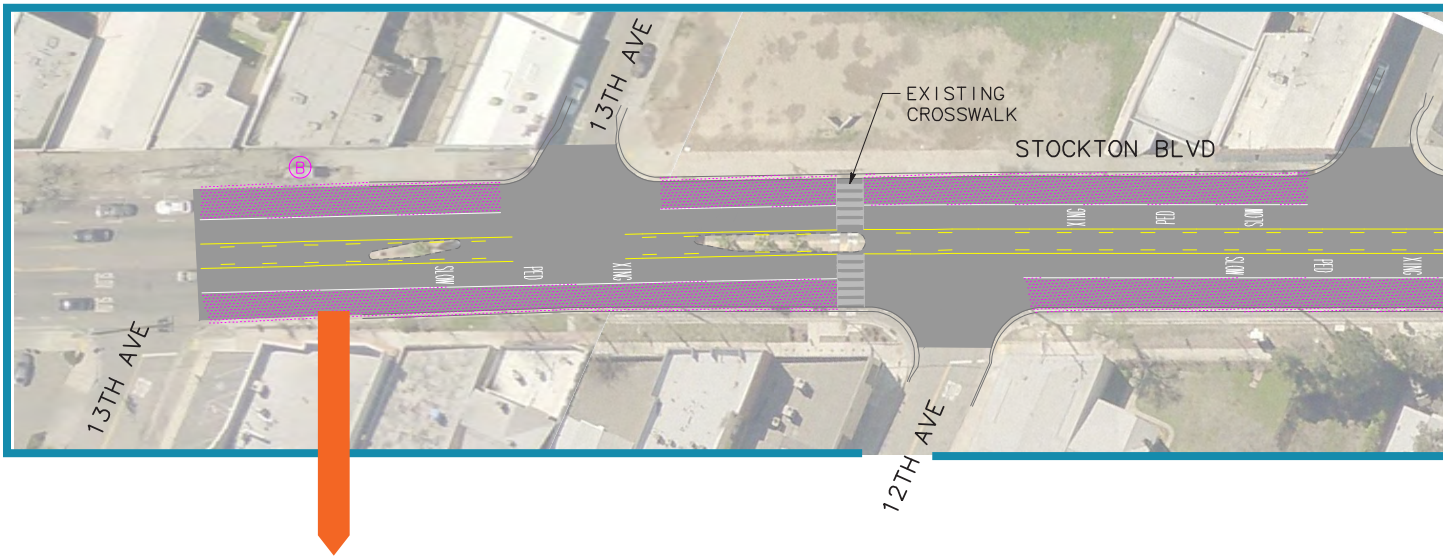
Corridor-Wide Recommendations

Location-Specific Recommendations

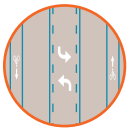


The Vision Zero recommendations include installation of traffic signals at Broadway/San Diego Way and Stockton Boulevard/6th Avenue. This would give pedestrians more opportunities to cross Broadway and Stockton Boulevard at desirable locations. However, City standard for minimum intersection spacing is 250-feet. The traffic signals at Broadway/San Diego Way and Stockton/6th Avenue would be 225-feet from the Broadway/Stockton Boulevard intersection, so the City would need to make exceptions to its Street Design Standards for this location. Traffic signals at these locations add more opportunities for controlled pedestrian crossings for popular pedestrian desire lines.

Conceptual Design for Stockton



Specific use of shaded area to be determined as part of on-going Stockton Boulevard Corridor Study.

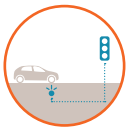


Road Diet

Separated Bikeway

Co-locate Bus Stop and Crosswalk

Bus Boarding Islands

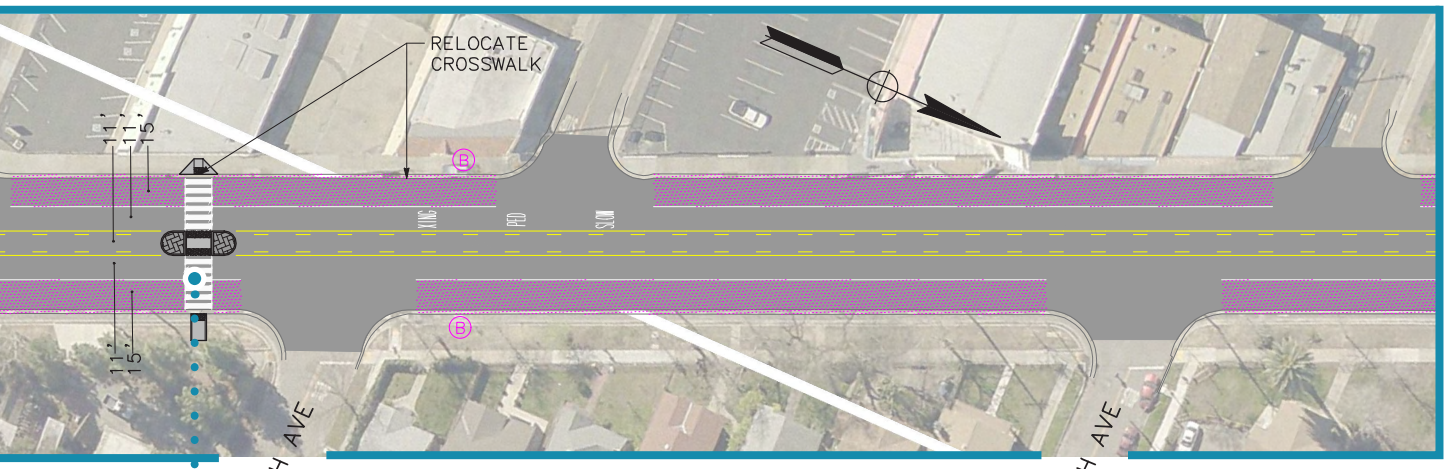


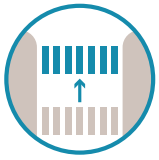
Advanced Dilemma-Zone Detection

High Visibility Crosswalk

Corridor-Wide Recommendations

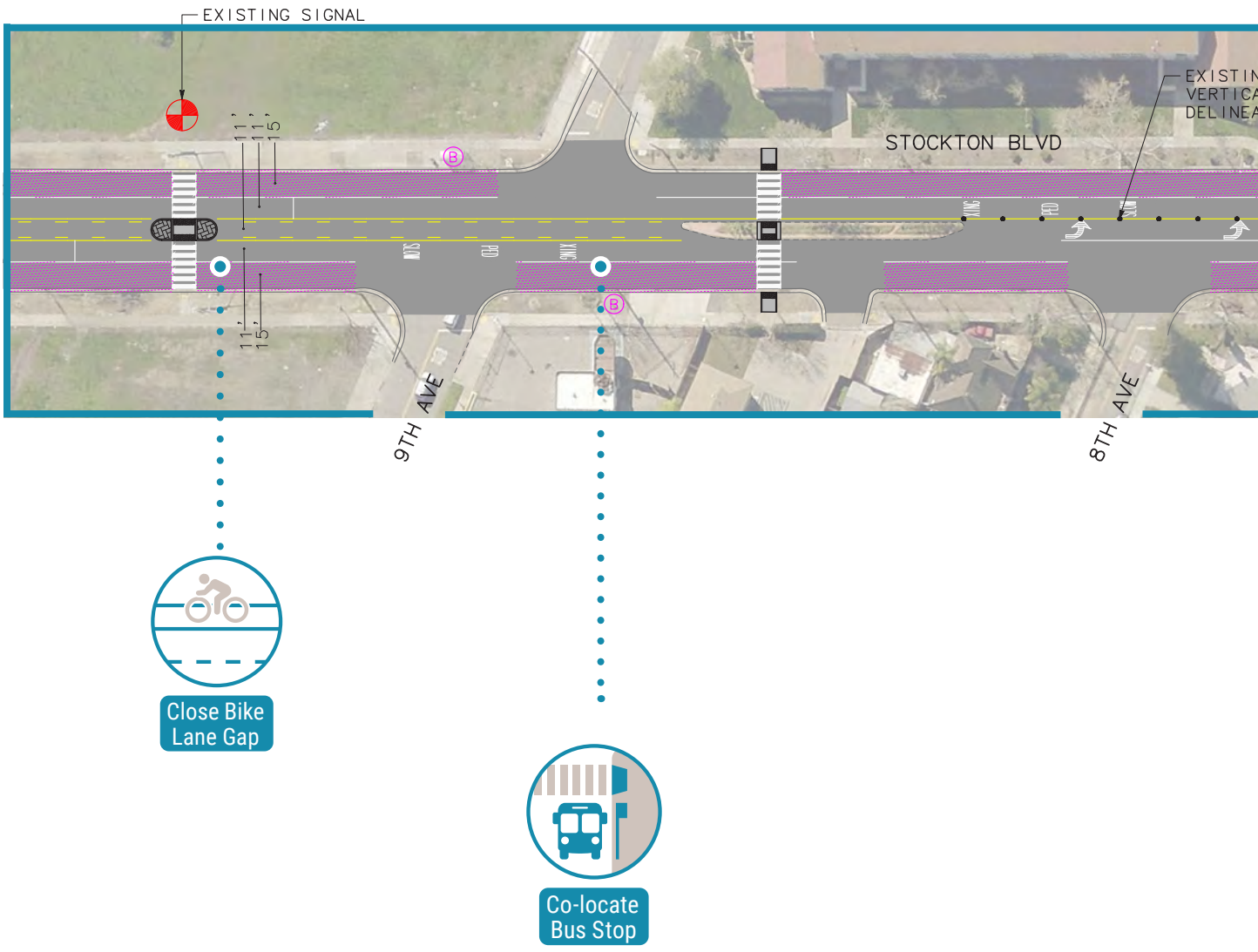
Location-Specific Recommendations

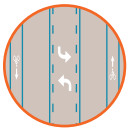




Relocate Crosswalk

Conceptual Design for Stockton

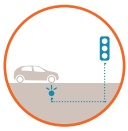



Road Diet


Separated Bikeway


Co-locate Bus Stop and Crosswalk

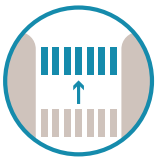

Bus Boarding Islands


Advanced Dilemma-Zone Detection

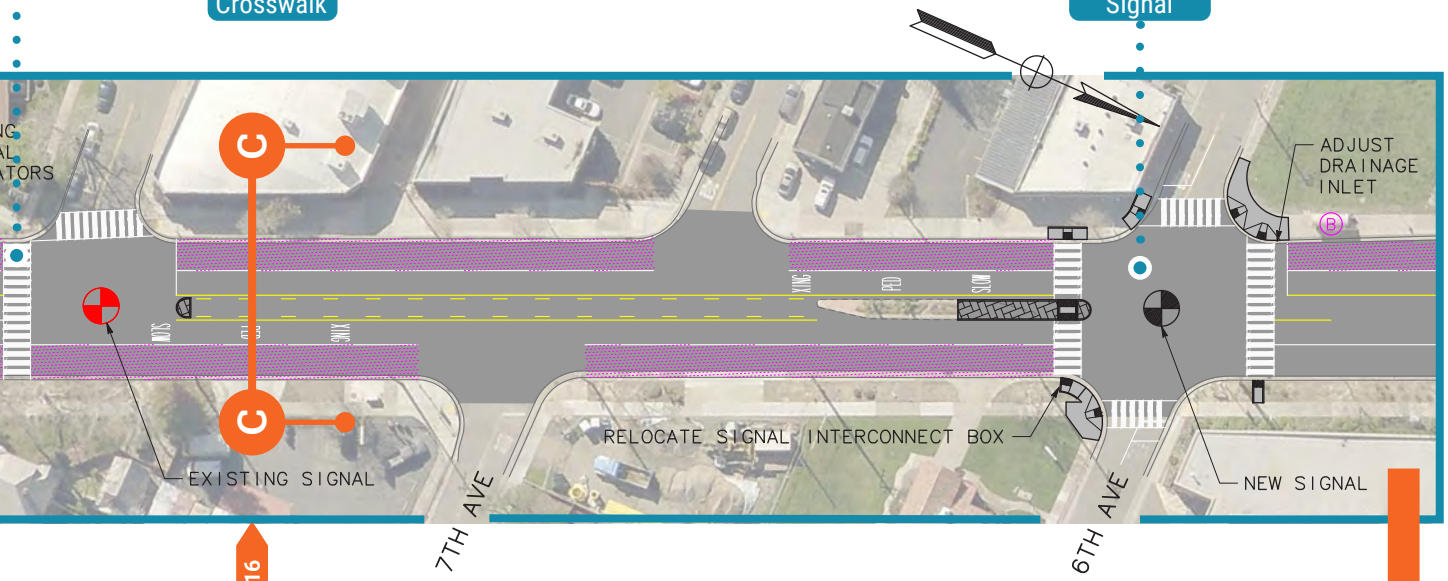

High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations


Relocate Crosswalk

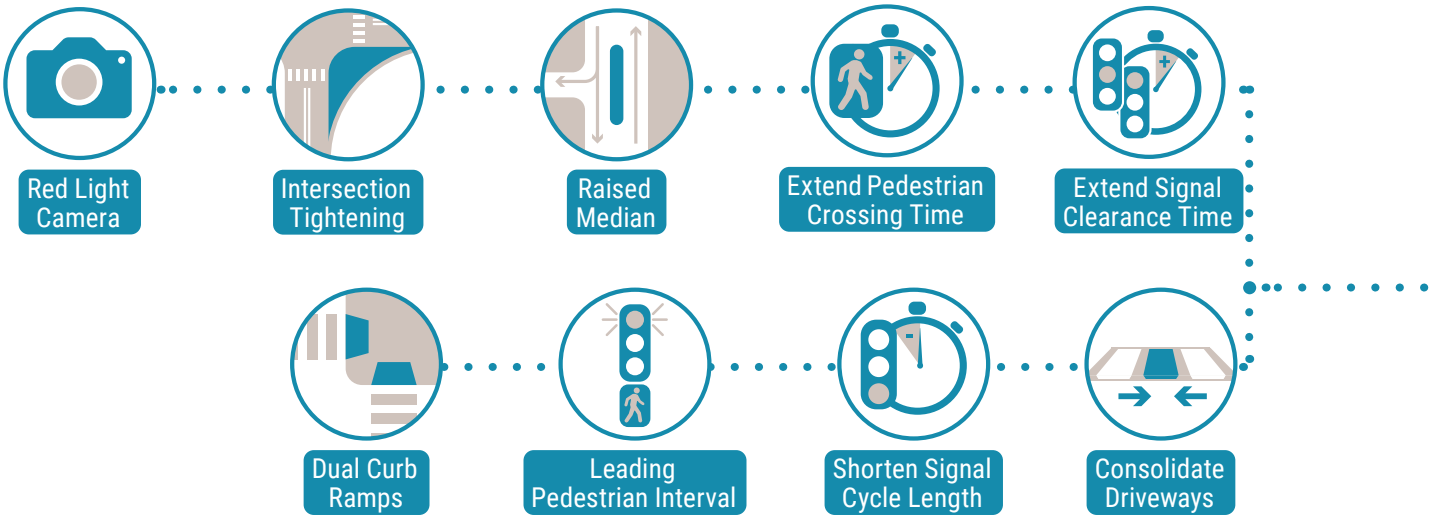

New Traffic Signal

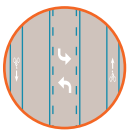


SEE PAGE C-16

The Vision Zero recommendations include installation of traffic signals at Broadway/San Diego Way and Stockton Boulevard/6th Avenue. This would give pedestrians more opportunities to cross Broadway and Stockton Boulevard at desirable locations. However, City standard for minimum intersection spacing is 250-feet. The traffic signal at Broadway/San Diego Way would be 260-feet from the Broadway/Stockton Boulevard intersection. The traffic signal at Stockton/6th Avenue would be 225-feet from the Broadway/Stockton Boulevard intersection, so the City would need to make an exception to its Street Design Standards for this location

Conceptual Design for Stockton

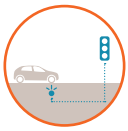



Road Diet


Separated Bikeway


Co-locate Bus Stop and Crosswalk

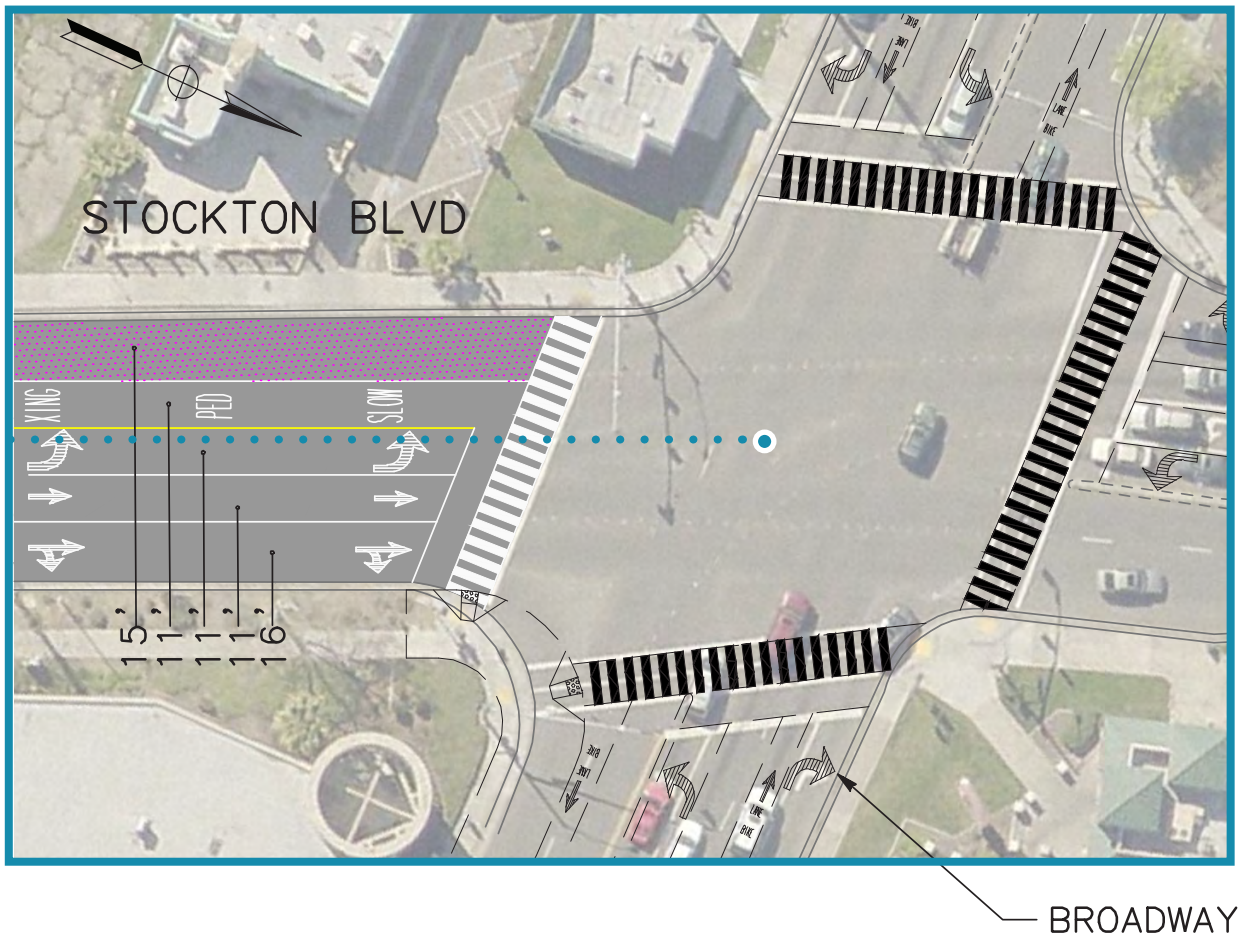

Bus Boarding Islands


Advanced Dilemma-Zone Detection


High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations

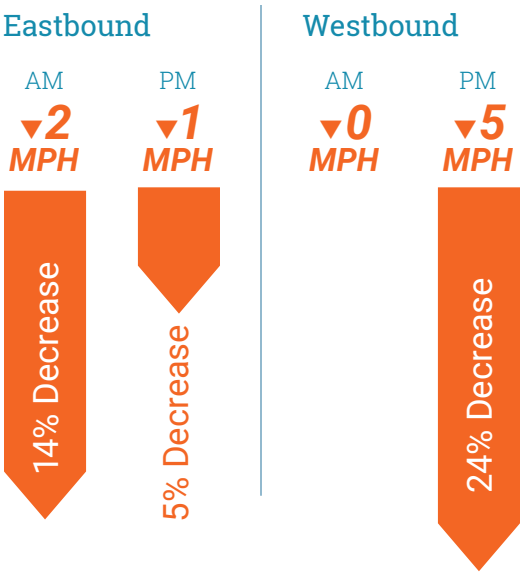


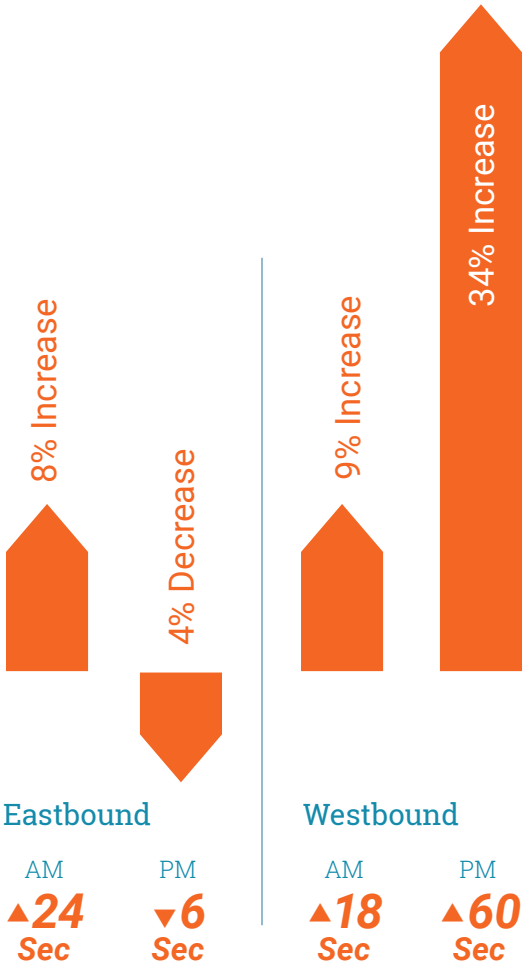
How Will Travel Change on Broadway?

Estimated Changes with Project

Average Vehicle Speed

Average vehicle speed along the corridor during peak periods is expected to decrease between 1 and 5 mph as a result of the proposed project. While slower travel speeds result in longer travel times, they reduce traffic fatalities and severe injuries that result from crashes.



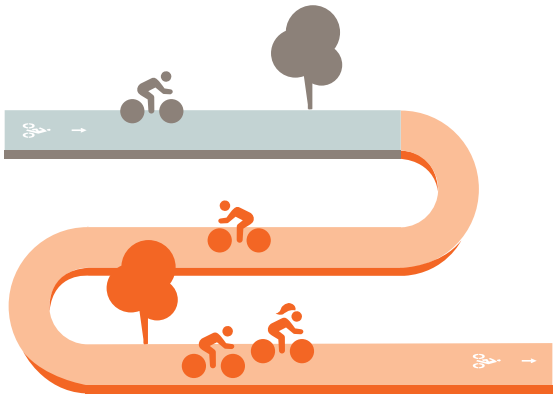


Vehicle Travel Time

Average vehicle travel time along the one-mile corridor during peak periods is expected to change ranging from a 6 second decrease to a 60 second increase seconds as a result of the proposed project.

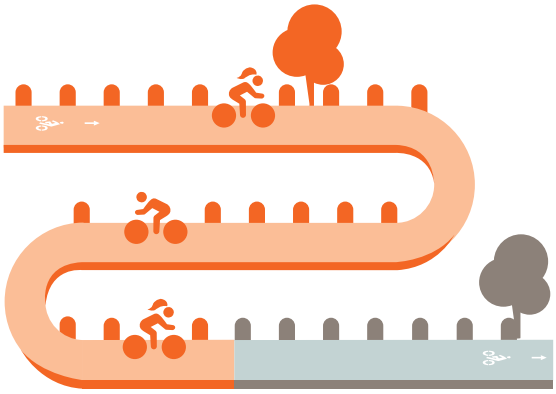
Estimated Changes with Project

Bike Lane Coverage



Without project: **30% (2,180 ft)** ▶ With project: **100% (7,240 ft)**

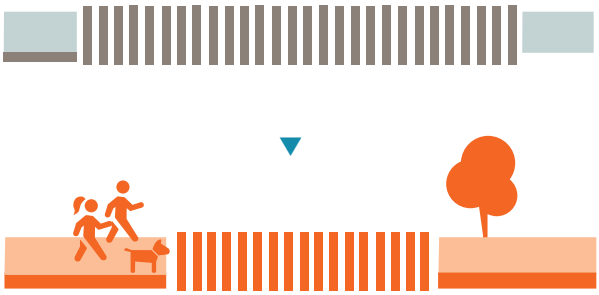
Share of Bike Lanes with Vertical Separation



Without project: **0% (0 ft)** ▶ With project: **72% (5,200 ft)**

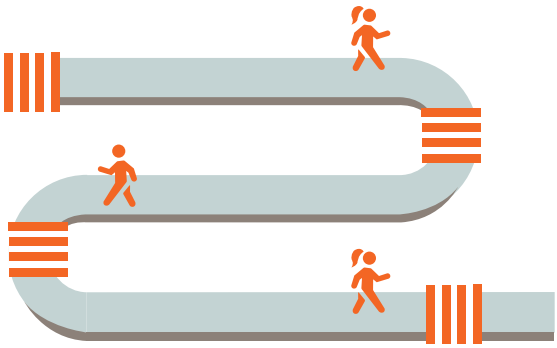
Typical Pedestrian Crossing Width

2/3 *of the existing width*



Number of Marked Crosswalks

4 *new crossings*



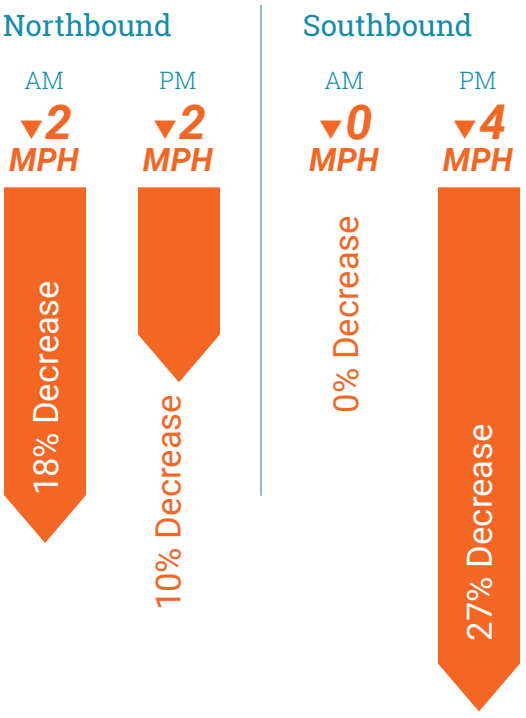
*Longest pedestrian crossing width reduced from 49 to 31 ft.

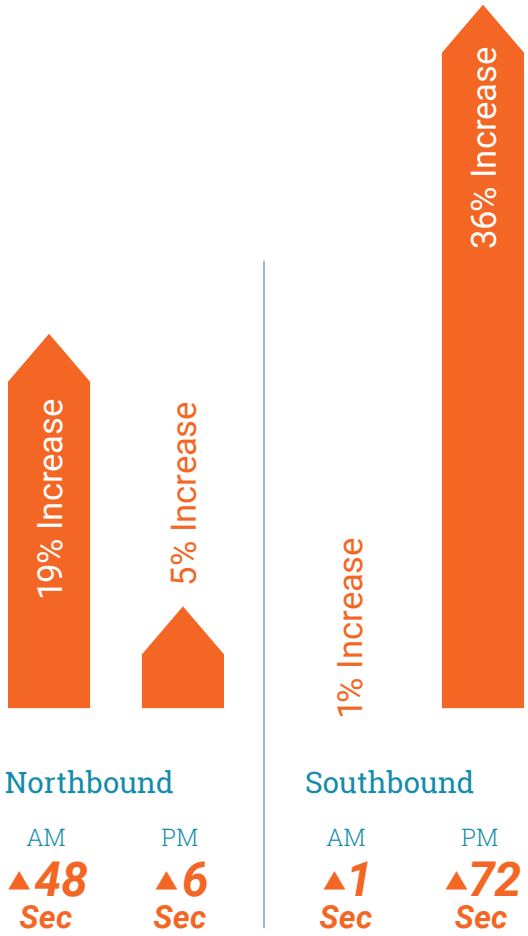
How Will Travel Change on Stockton?

Estimated Changes with Project

Average Vehicle Speed

Average vehicle speed along the corridor during peak periods is expected to decrease between 0 and 4 mph as a result of the proposed project. While slower travel speeds result in longer travel times, they reduce traffic fatalities and severe injuries that result from crashes.



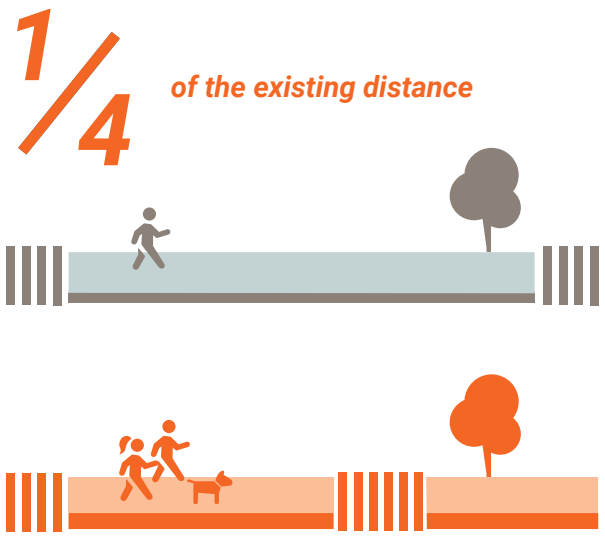


Vehicle Travel Time

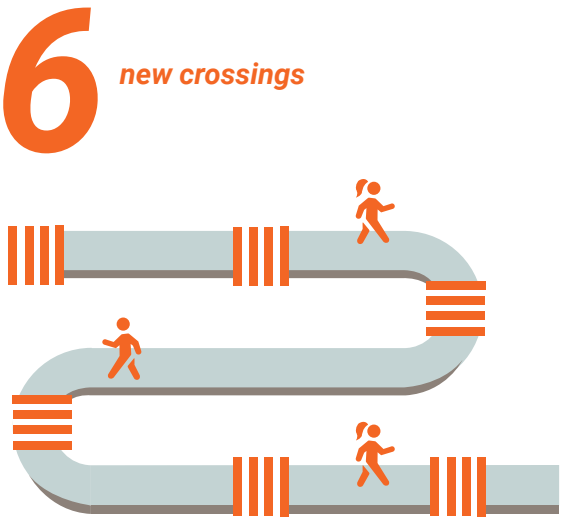
Average vehicle travel time along the one-mile corridor during peak periods is expected to increase up to 72 seconds as a result of the proposed project.

Estimated Changes with Project

Longest Distance Between Crosswalks



Number of Marked Crosswalks



*Longest pedestrian crossing distance reduced from 780 to 200 ft.

How Much Will the Project Cost?

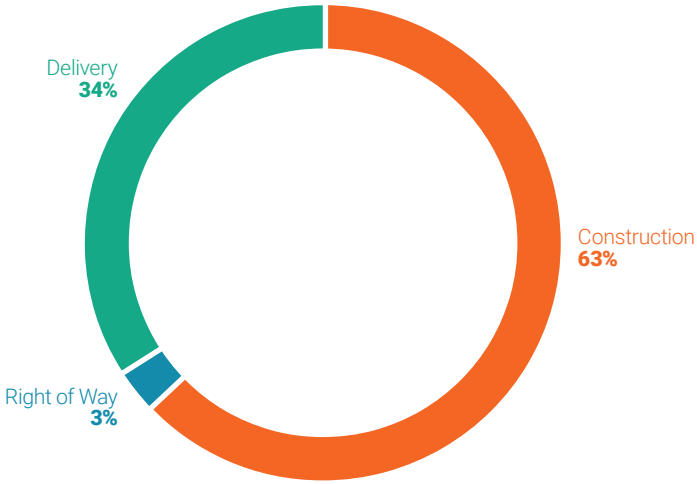
Broadway/Stockton Boulevard Cost Summary

$8,760,000

Construction

Construction costs include the cost to build the primary items associated with the safety countermeasures for the corridor. The items were estimated based on the preliminary design concepts and recent construction bid unit costs with an escalation factor to account for future construction. The costs were broken down into two categories that consisted of major roadway items and electrical items such as traffic signals and lighting. A contingency factor was included to account for refinement of project design, changes in project details, or unforeseen changes in construction costs.

Actual project costs will be determined by surveyed base mapping, geotechnical reports, concept refinement, environmental reviews, right of way availability, project phasing, and bid conditions at the time of advertisement. Project costs should be reviewed prior to any grant application or initiation of a Capital Improvement Project to revalidate and update the assumptions in this study as necessary.



The total project costs shown in the summary chart have been escalated at an assumed 3% per year escalation factor to 2025, the anticipated year of construction.

Right of Way

In addition to construction costs, right of way costs were assumed that include temporary construction easements for items such driveway modifications, curb ramps reconstruction, signal equipment poles and cabinets. It was assumed that each project could be constructed almost exclusively within the roadway prism and right of way acquisition would not be needed along the entire project frontage. Further refinement of the base mapping in subsequent phases of design will more accurately identify specific right of way needs.

Delivery

Project delivery costs are included in the estimates provided in this study. These costs encompass all of the work to complete subsequent phases including preliminary engineering, environmental documentation, final design, right of way engineering, and construction oversight. A breakdown of these costs is provided in Appendix C.

Stockton (South)

Vision Zero
Top 5 Corridor

Stockton Boulevard (South) south of 48th Avenue

Stockton Boulevard (South)

Vision Zero Top 5 Corridor

South Stockton Blvd - Vinh Phat Supermarket

What is going on?

Between 2009 and 2017, 16 crashes that resulted in a fatality or severe injury (KSI) occurred on Stockton Boulevard between McMahon Drive and Patterson Way. Nine of these crashes involved a person walking or biking.

What are the key issues?

Unsafe speed was the most commonly cited violation, while nearly three-fourths of driving were proceeding straight or stopped at the time of the crash. Additionally, nearly half of all pedestrians hit by a driver were crossing in a marked crosswalk. One-third of drivers who hit a bicyclist were making a right-turn.

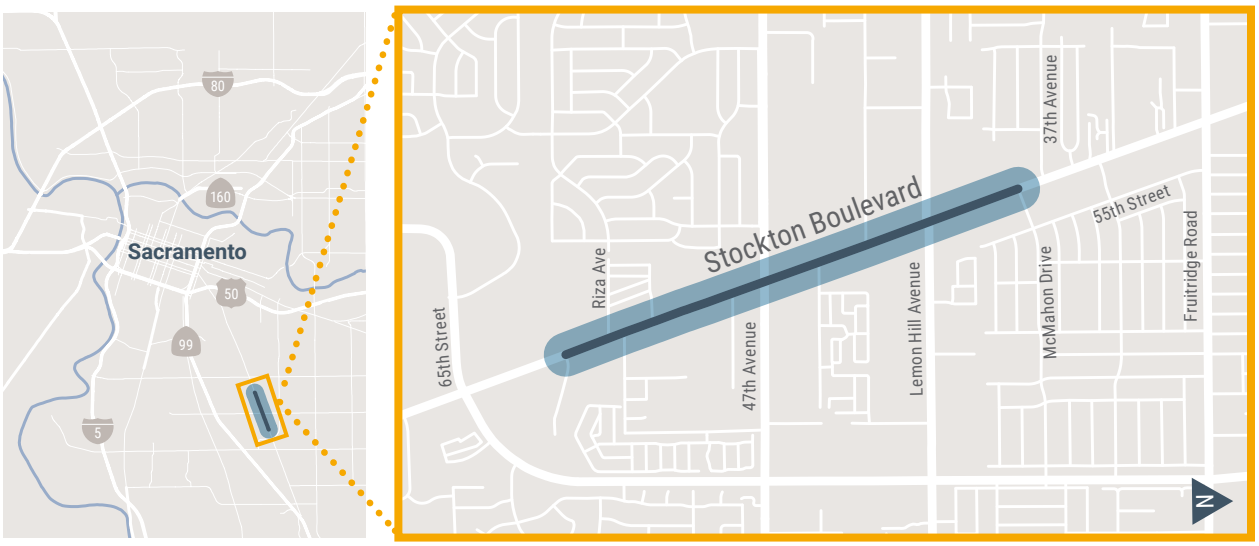
What is the community concerned about?

At outreach events, residents described aggressive driving behavior along the corridor that included driving at unsafe speeds and traffic signal violations. Many residents also said they avoid biking on this segment of Stockton Boulevard because of gaps in the bike lane. The following pages lay out the existing conditions along the corridor, feedback heard from residents at outreach events, and a set of roadway safety recommendations focused on slowing drivers down, improving compliance with signals and signs, and improving safety for people walking and biking.

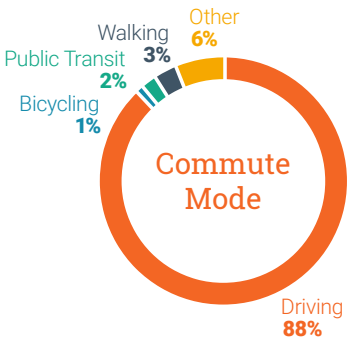
Table of Contents

In the Neighborhood

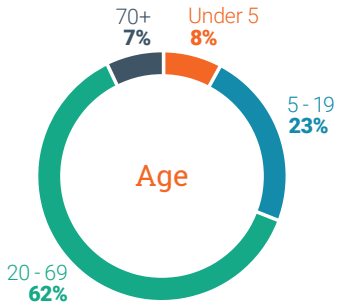
Corridor



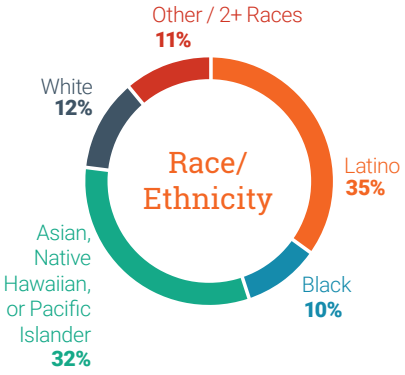
About the Neighborhood



A larger share of residents drive to work in this neighborhood than in the city as a whole.



This neighborhood has a larger share of residents age 19 or younger, when compared with the rest of the city.



32% of residents in this neighborhood identify as Asian, Native Hawaiian, or Pacific Islander, compared with 19% of residents citywide.

Stockton Boulevard (South) at Riza Avenue


Stockton Boulevard (South) south of 48th Avenue


Stockton Boulevard (South) north of Lemon Hill Avenue

Key Destinations Along the Corridor

Schools

4

Food Markets

5

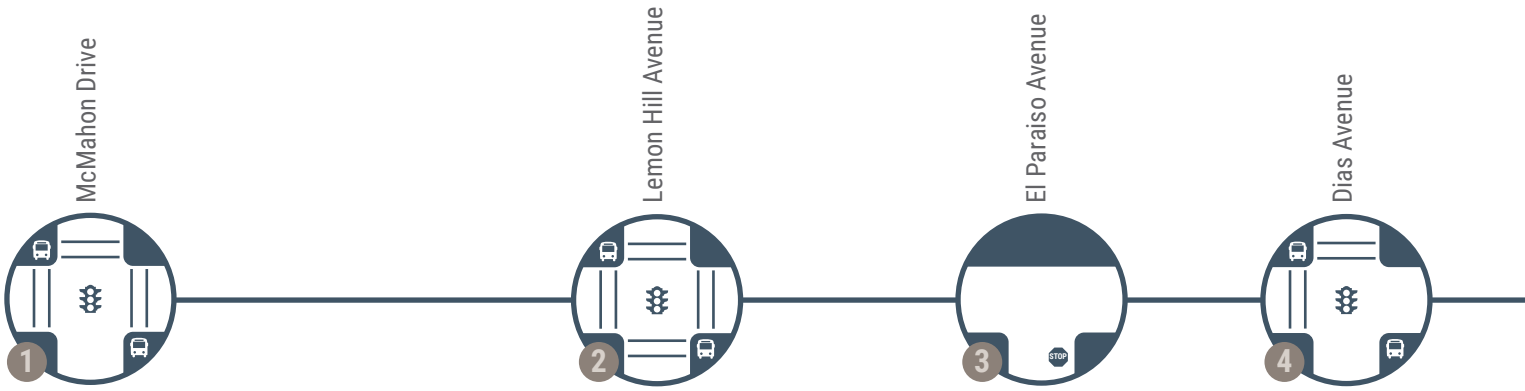
Houses of Worship

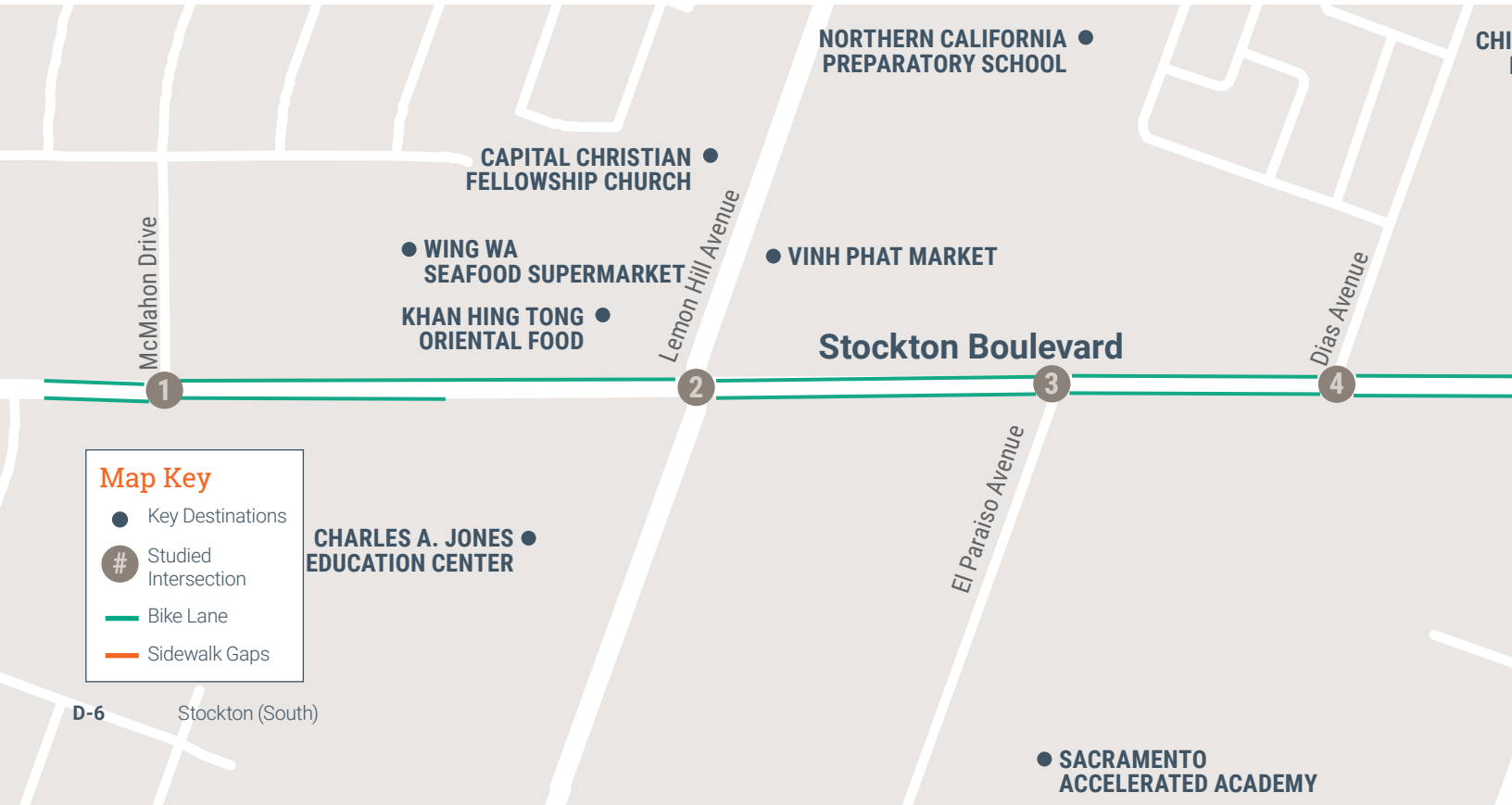
2

Travel on Stockton (South)

Key Statistics

Posted Speed Limit	Daily Vehicles	Maximum PM Intersection Vehicle Volume	PM Rush Hour People Walking	PM Rush Hour People Biking
40 MPH	**29,700**	**2,116**	**121**	**96**





Number of Transit Routes

1

#51

Bikeway Type

On-Street Bike Lanes, with gaps

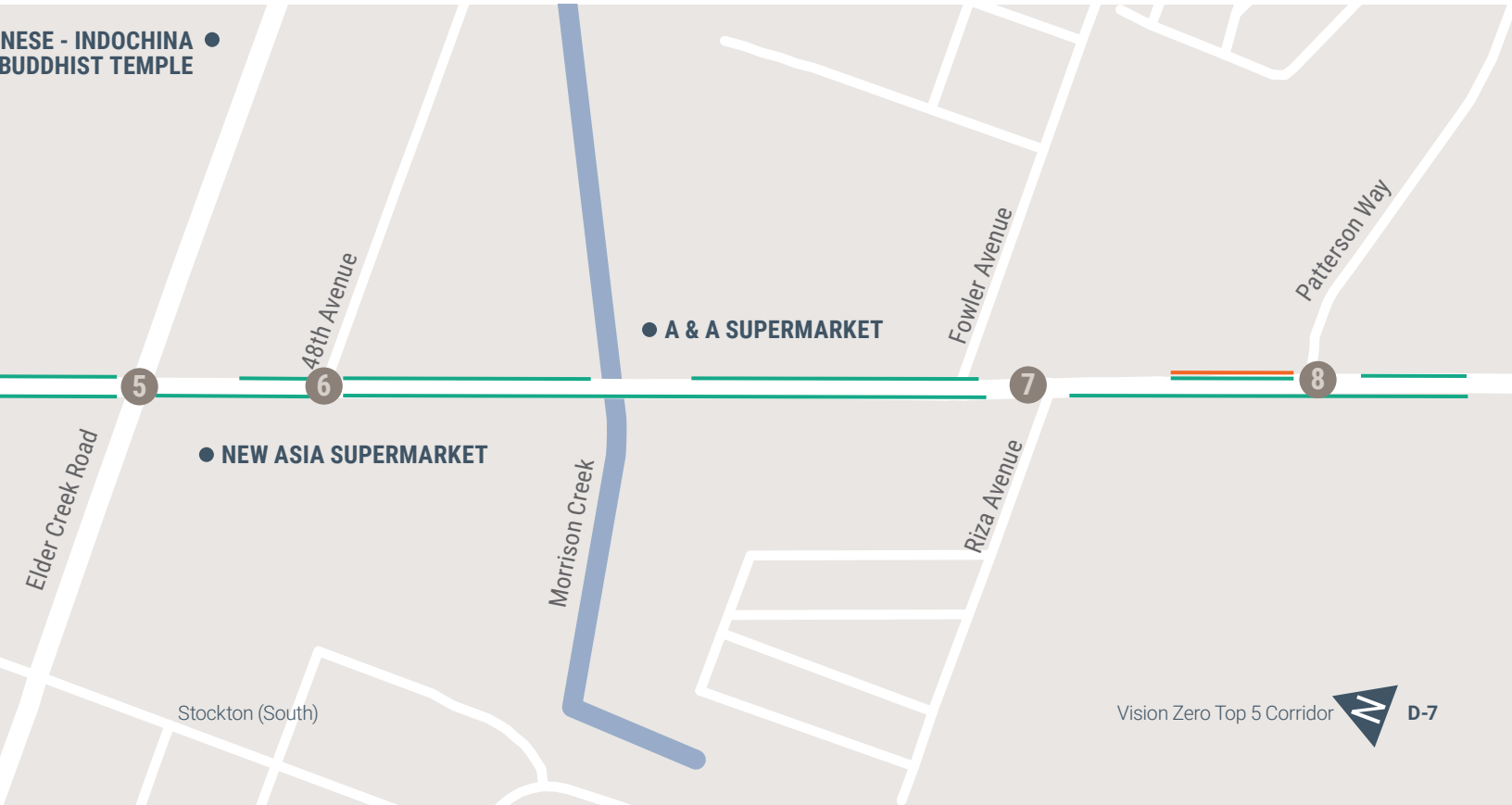
Longest Distance Between Marked Crosswalks

1,780

Ft

Sidewalk Coverage

97%



Crashes on Stockton (South)

Vehicle Crash Types

Unsafe Speed

"Unsafe Speed" was the most common violation, cited in 35% of all crashes.

1 2 3 4 5 6 7 8

Proceeding Straight

Nearly 3/4 of drivers were proceeding straight or stopped at the time of the crash.

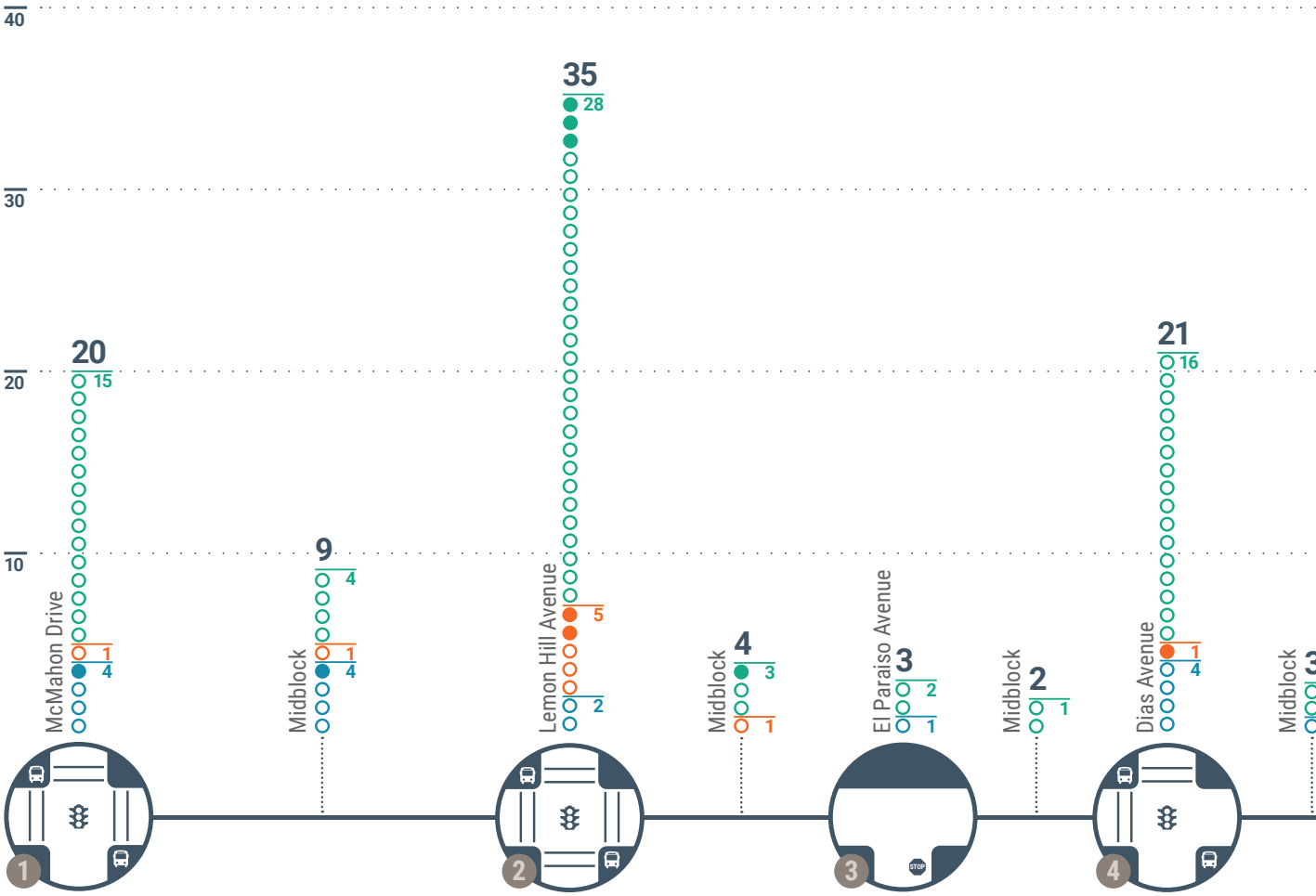
1 2 3 4 5 6 7 8

Rear End

Over 35% of all crashes were rear end.

1 2 3 4 5 6 7 8

Crash Locations



Ped Crash Types

Bike Crash Types

Nighttime

40% of all crashes occurred during nighttime or dark conditions.

1 2 3 4 5 6 7 8

Crossing in Crosswalk

Nearly half of all pedestrians hit by a driver were in a crosswalk at the time of the crash.

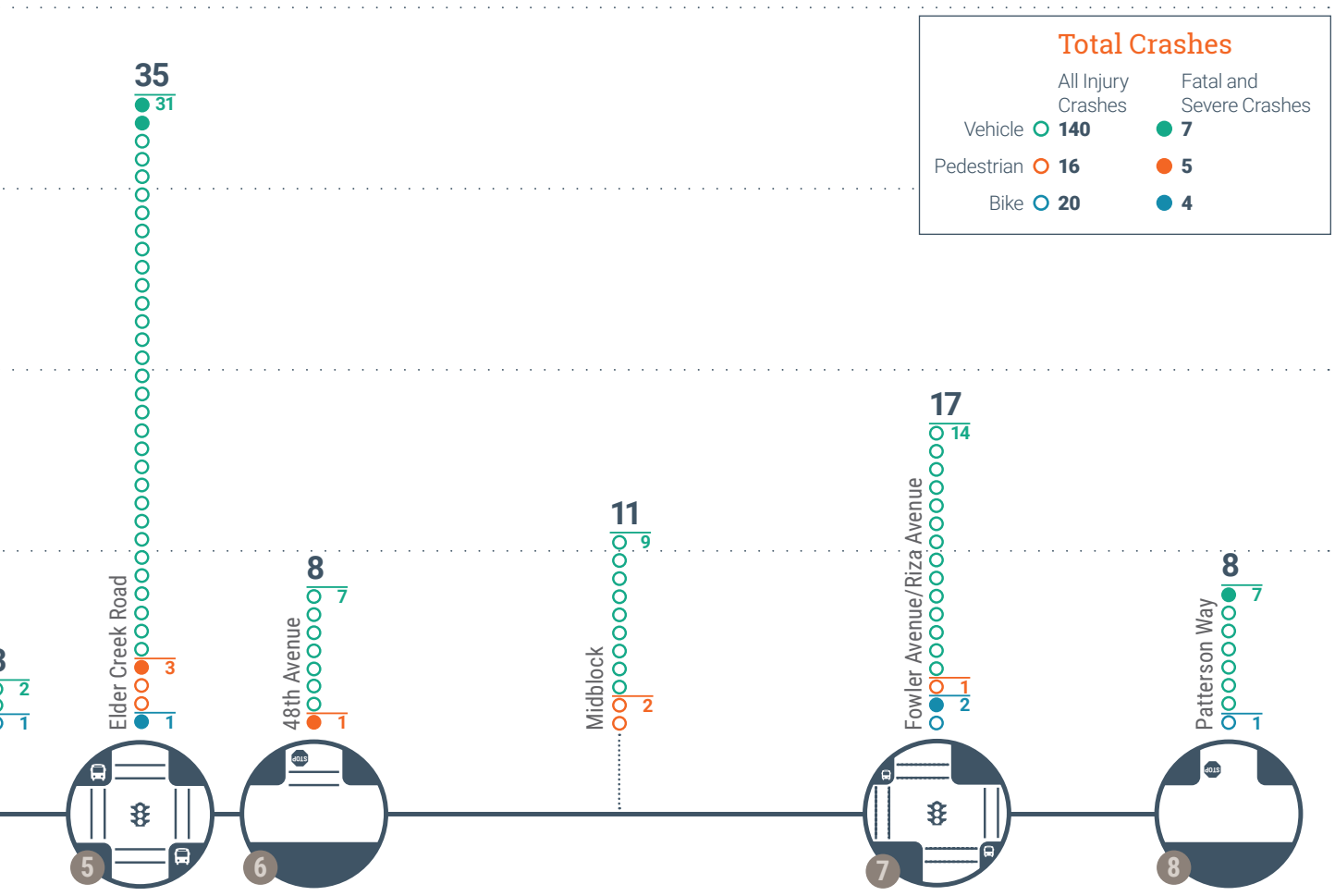
1 2 3 4 5 6 7 8

Right Turns

1/3 of drivers who hit a bicyclist were making a right turn at the time of the crash

1 2 3 4 5 6 7 8

1 Numbers that are turned on represent a location where crash type has occurred at least three times.



Feedback from the Community

> "I won't ride my bike along this corridor because it feels unsafe."

> "My grandma picks me up from school and there are a lot of fast cars."

Peter Burnett Elementary Schoool Community Workshop

Key Themes

Bike/Pedestrian Safety

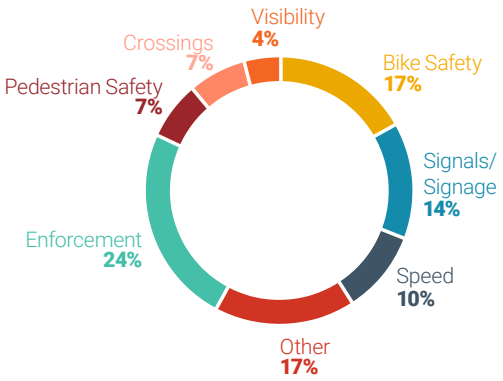
Residents described avoiding biking on Stockton Boulevard because it feels unsafe and there is a lack of connectivity to other bike facilities.

Signals/Signage

Residents described red light running, particularly at the Stockton Boulevard/McMahon Drive intersection.

Speed

Residents described traffic speeding along the corridor.



Engagement Events

November 5, 2018

Peter Burnett Elementary School Community Workshop

June 5, 2019

Luther Burbank High School Community Open House

Investments to Enhance Safety

Key Crash Countermeasures

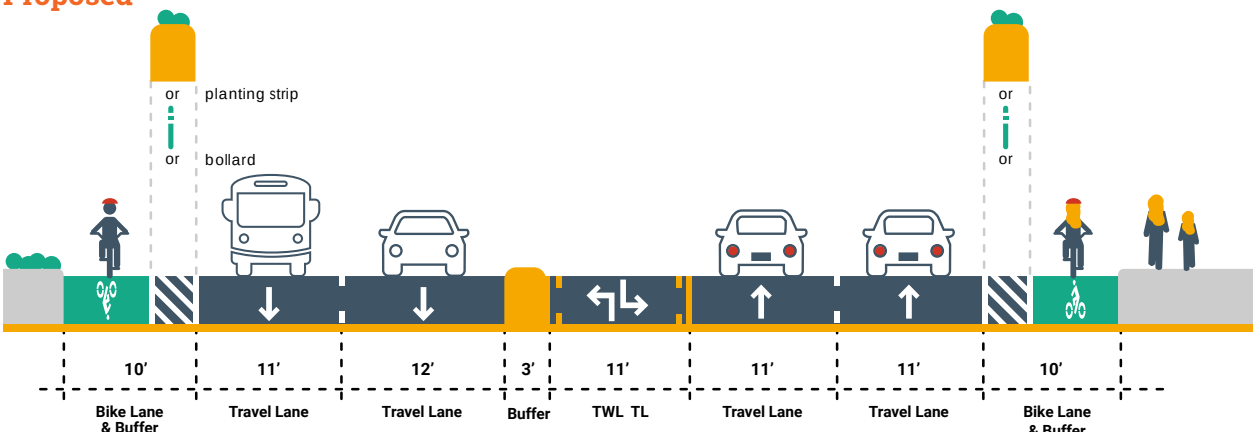
Countermeasure		Crash Type		Feedback Key Theme
Slow Green Wave	TO ADDRESS	Unsafe Speed		Speed
Prohibit Turns During Pedestrian Phase	TO ADDRESS	Crossing in Crosswalk		Bike/Pedestrian Safety
Extend Signal Clearance Time	TO ADDRESS	Rear End		Signals/Signage

How Will The Roadway Space Be Used?

Section D
Existing

SEE PAGE D-17

Section D
Proposed



Conceptual Design for Stockton (South)

Pedestrian Scale Lighting

Advanced Dilemma-Zone Detection

Slow Green Wave

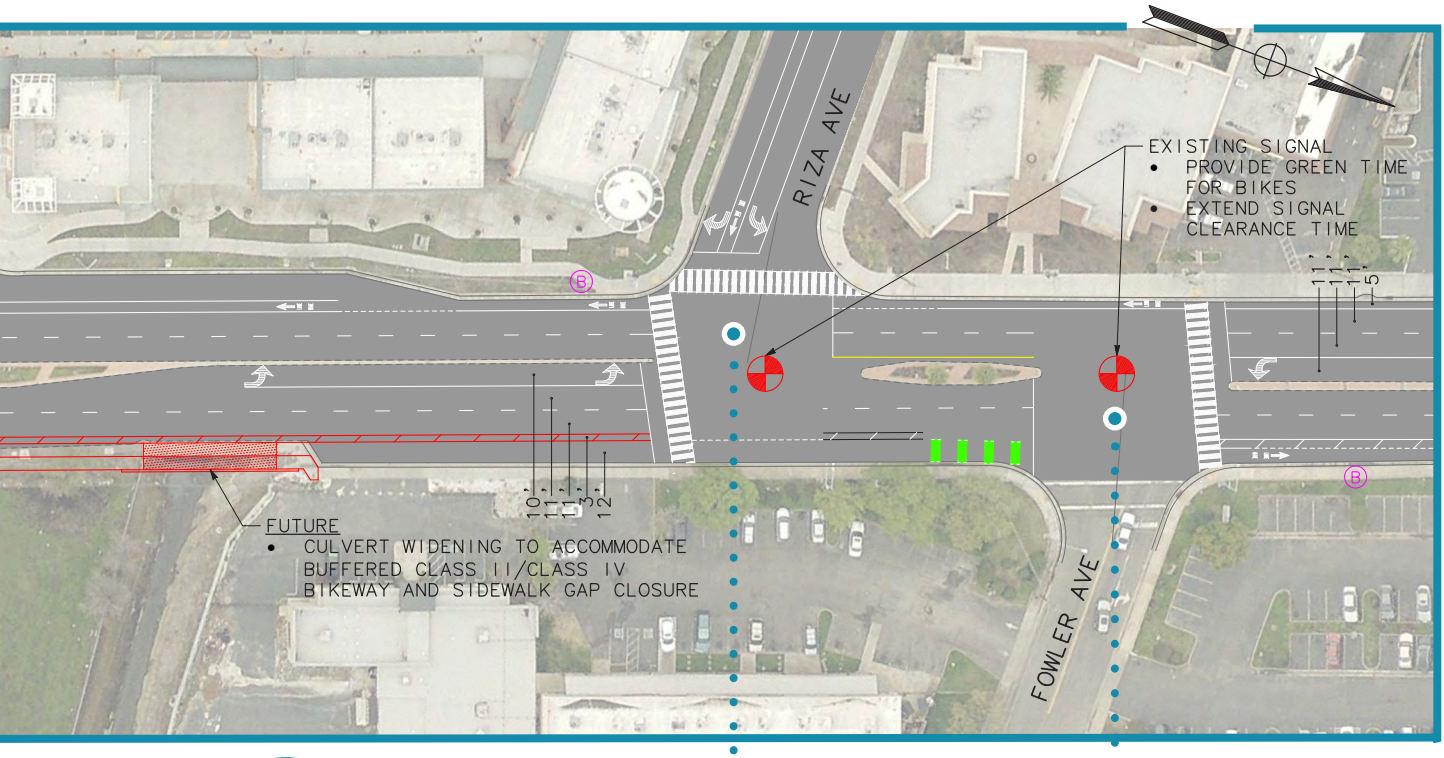
Shorten Cycle Length

Extend Signal Clearance Time

High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations



Remove Dual Left Turn Lanes

Extend Bike Lane to Intersection

Extend Signal Clearance Time

Provide Green Time For Bikes

Bike Conflict Zone Markings

Conceptual Design for Stockton (South)

Pedestrian Scale Lighting

Advanced Dilemma-Zone Detection

Slow Green Wave

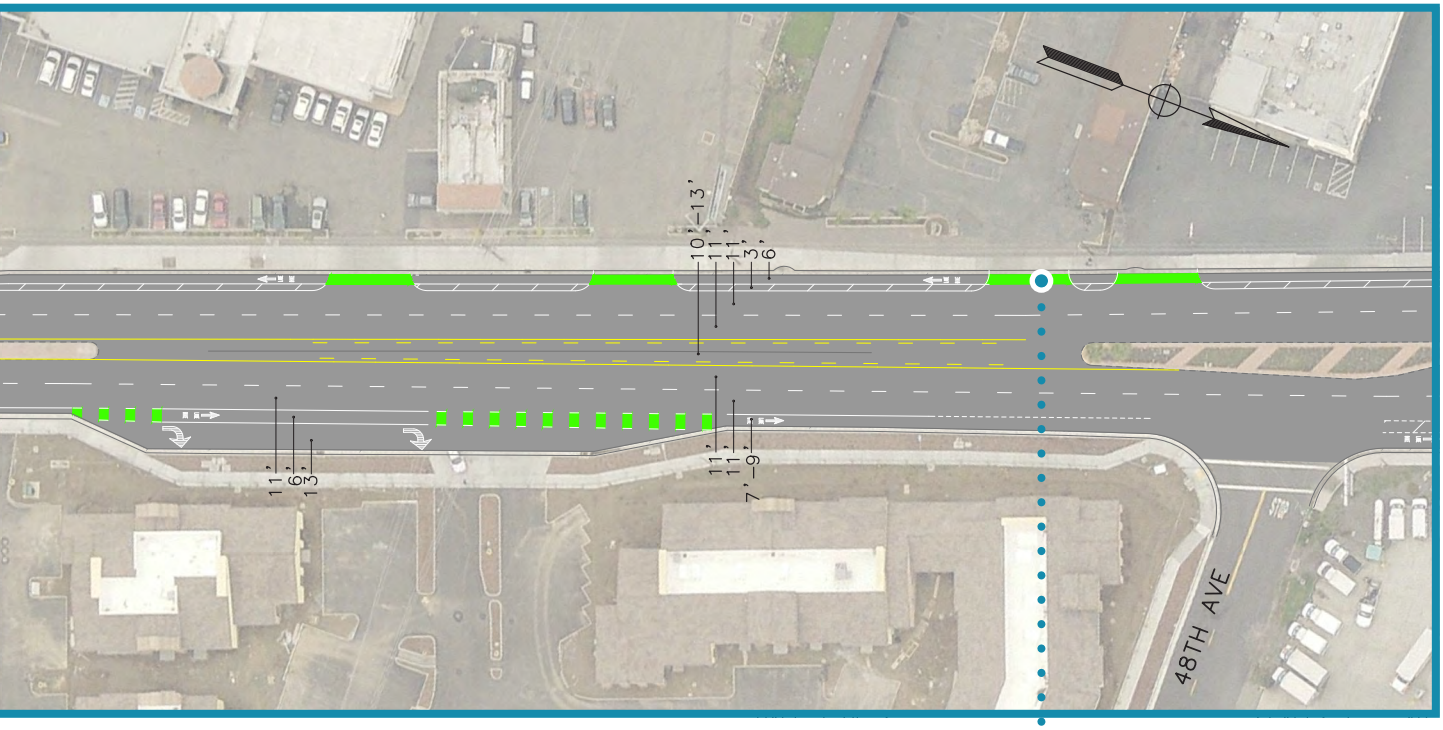
Shorten Cycle Length

Extend Signal Clearance Time

High Visibility Crosswalk

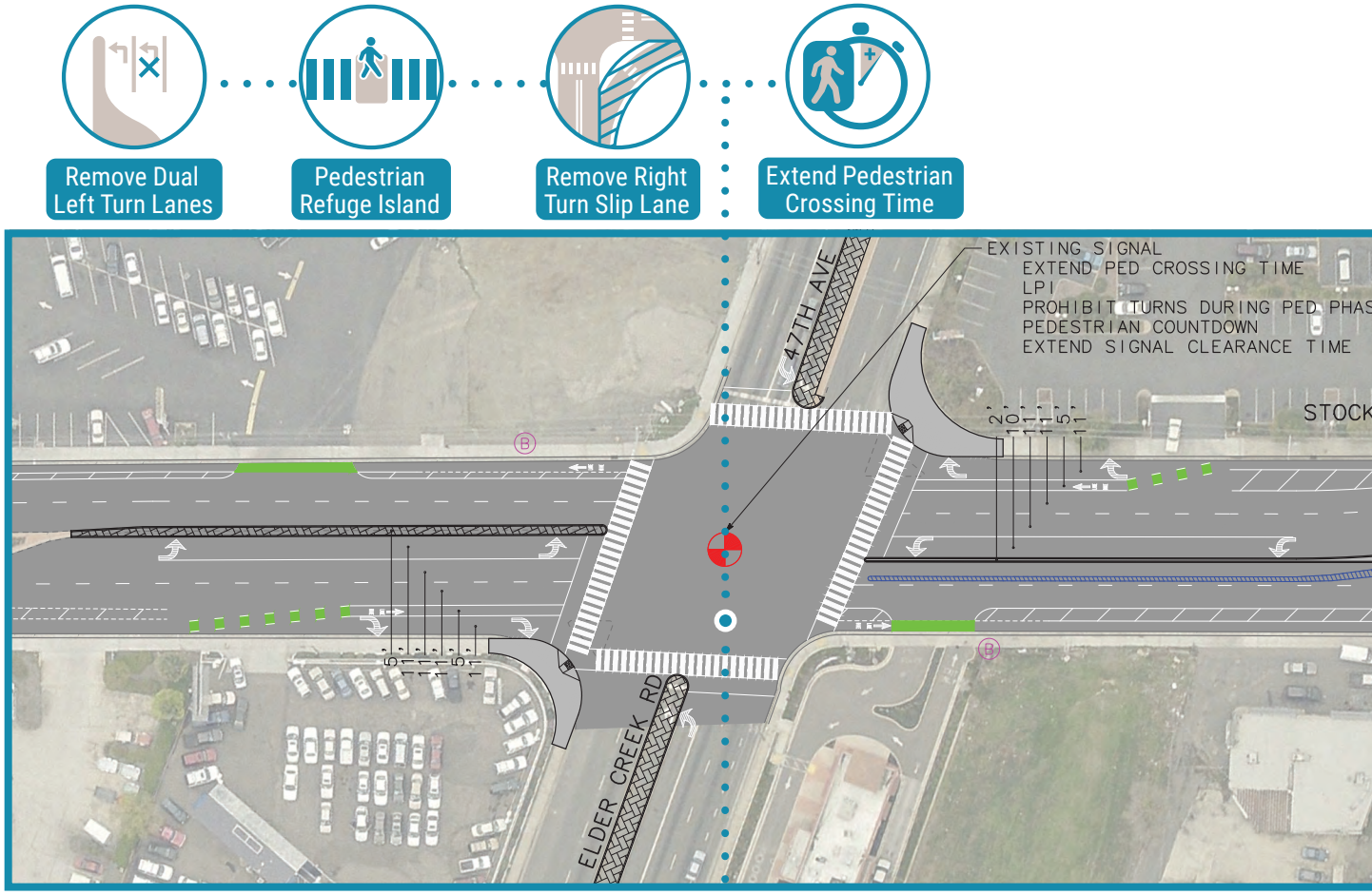
Corridor-Wide Recommendations

Location-Specific Recommendations



Bike Conflict Zone Markings

Conceptual Design for Stockton (South)



Pedestrian Scale Lighting

Advanced Dilemma-Zone Detection

Slow Green Wave

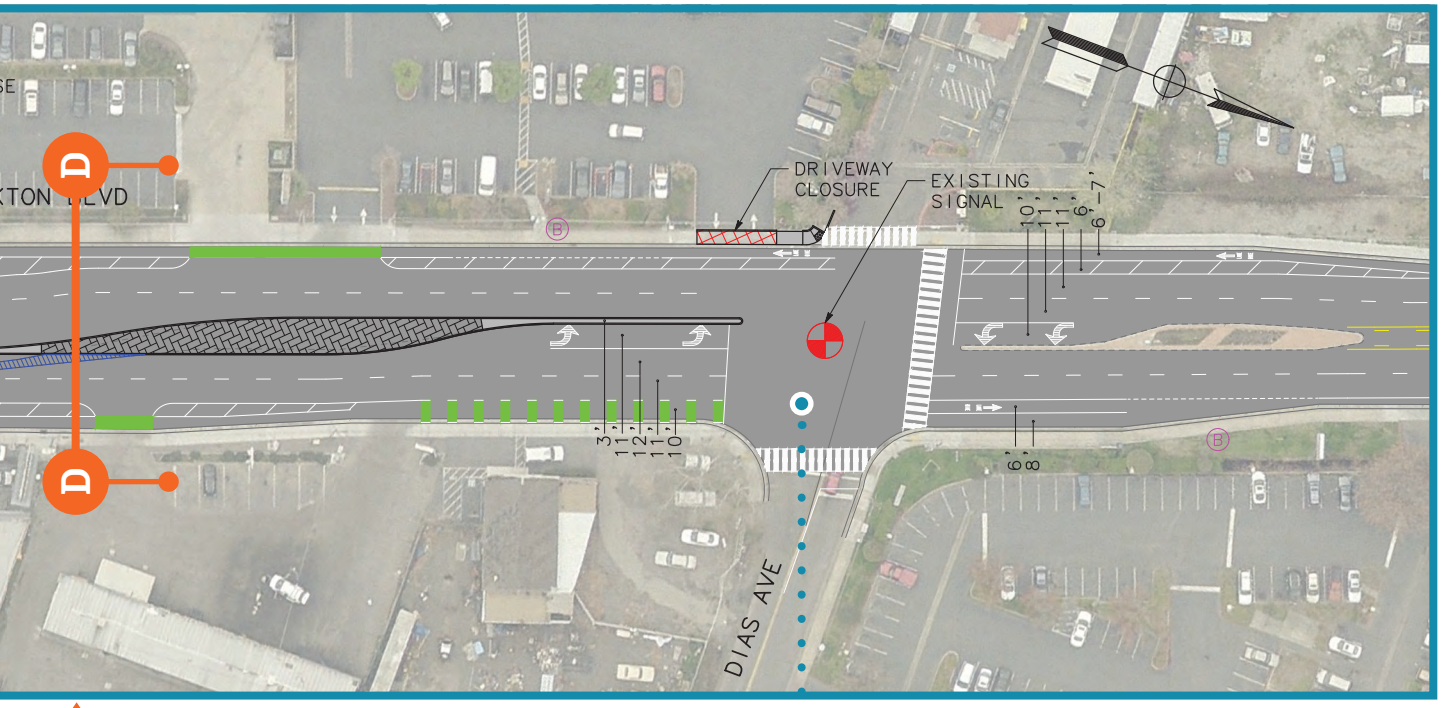
Shorten Cycle Length

Extend Signal Clearance Time

High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations



SEE PAGE D-11

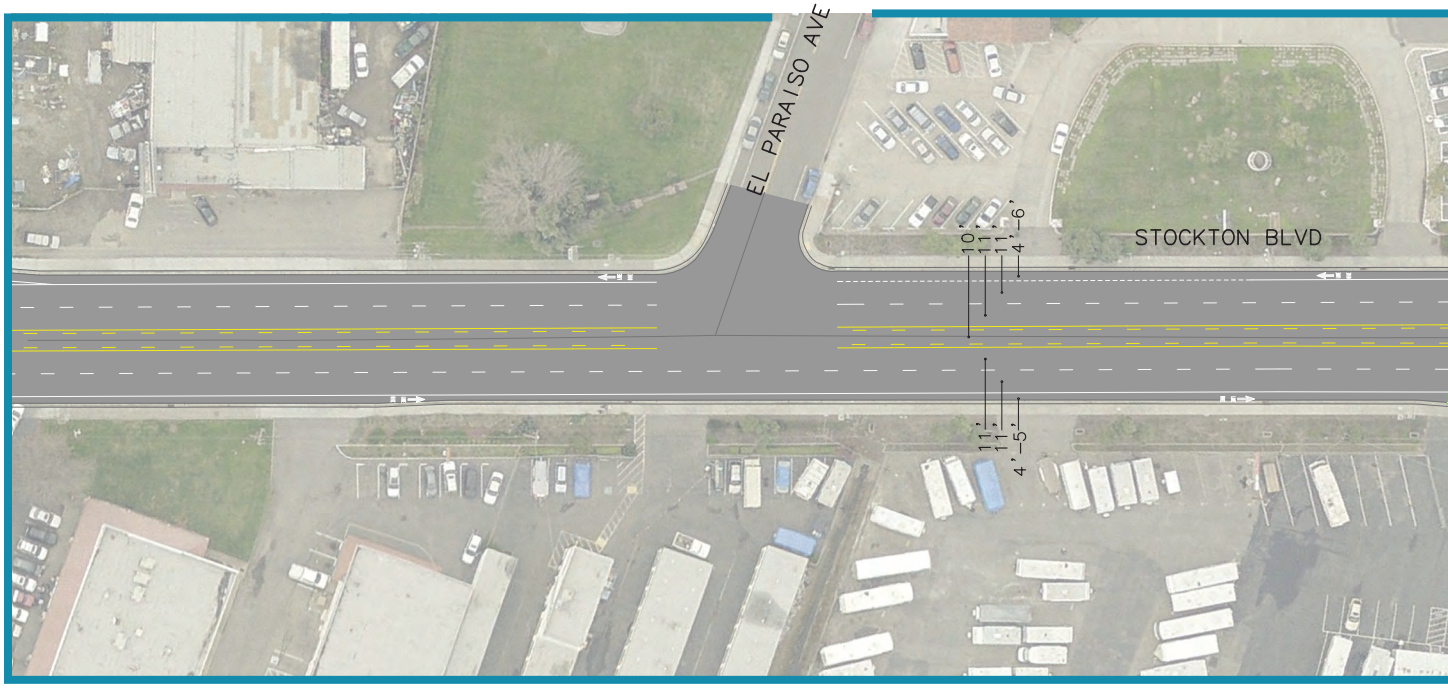
Consolidate Driveways

Bike Conflict Zone Markings

Advance Stop Bar

Stop Sign

Conceptual Design for Stockton (South)




Consolidate Driveways


Extend Pedestrian Crossing Time


Remove Sight Obstruction


Shorten Signal Cycle Length


Leading Pedestrian Interval

Pedestrian Scale Lighting

Advanced Dilemma-Zone Detection

Slow Green Wave

Shorten Cycle Length

Extend Signal Clearance Time

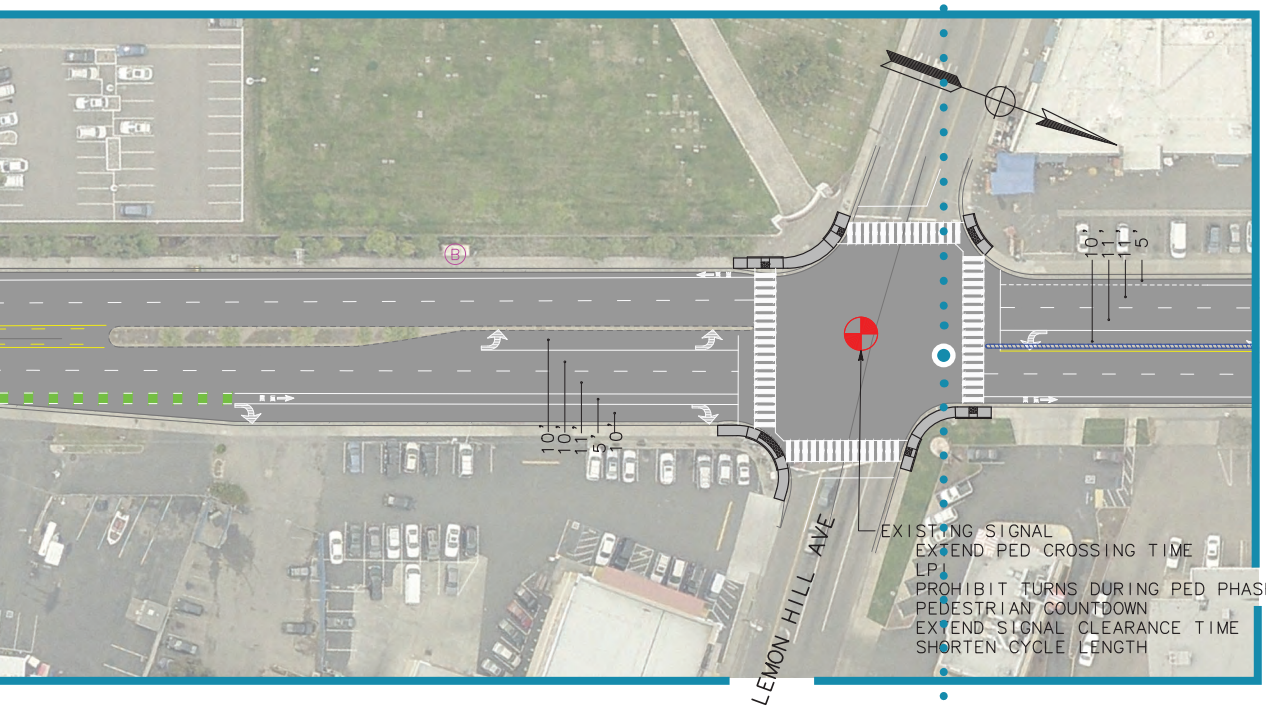
High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations

Extend Signal Clearance Time

Protected Left Turns



Extend Bike Lane to Intersection

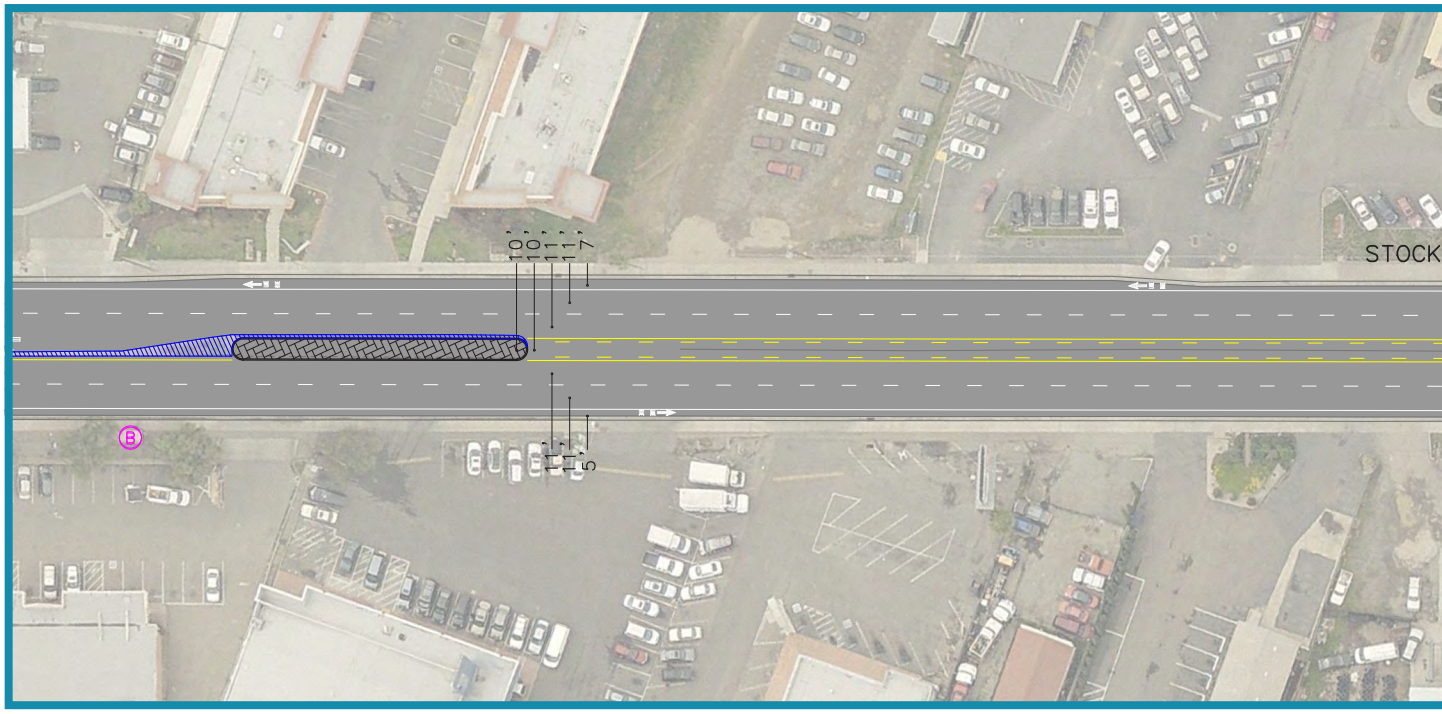
Bike Conflict Zone Markings

Countdown Pedestrian Signal Heads

Intersection Tightening

Prohibit Turns During Pedestrian Phase

Conceptual Design for Stockton (South)



Pedestrian Scale Lighting

Advanced Dilemma-Zone Detection

Slow Green Wave

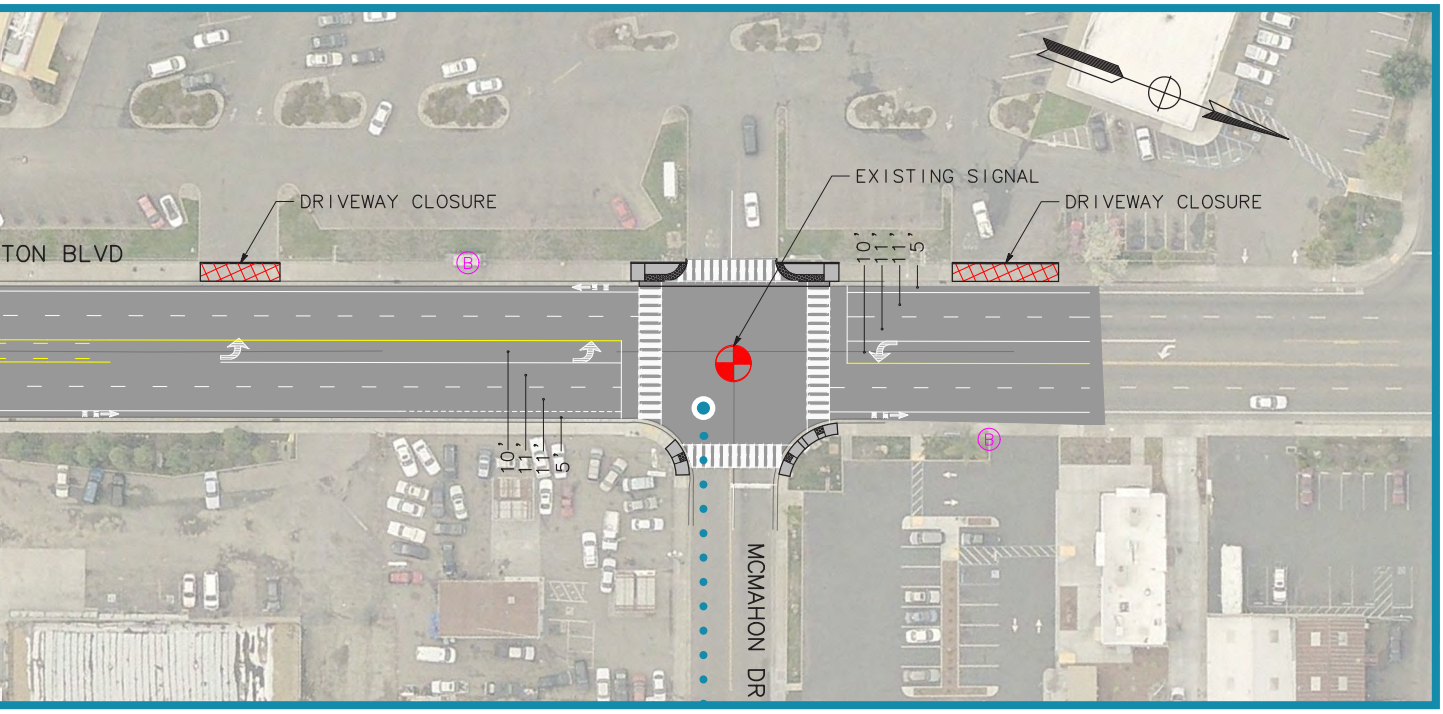
Shorten Cycle Length

Extend Signal Clearance Time

High Visibility Crosswalk

Corridor-Wide Recommendations

Location-Specific Recommendations



Consolidate Driveways

Bike Conflict Zone Markings

Raised Median

Advance Stop Bar

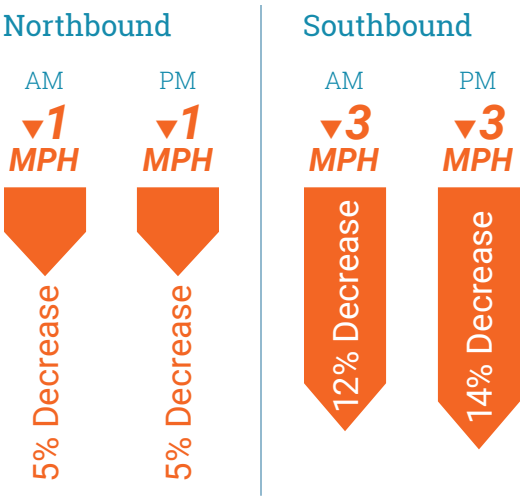
Stop Sign

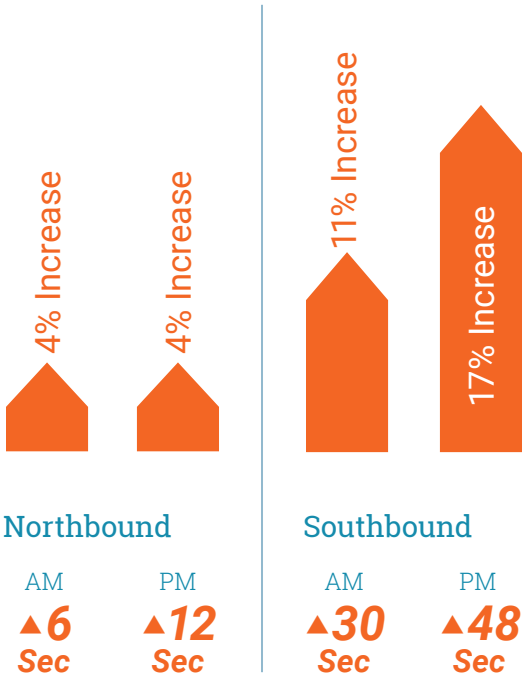
How Will Travel Change?

Estimated Changes with Project

Average Vehicle Speed

Average vehicle speed along the corridor during peak periods is expected to decrease between 1 and 3 mph as a result of the proposed project. While slower travel speeds result in longer travel times, they reduce traffic fatalities and severe injuries that result from crashes.



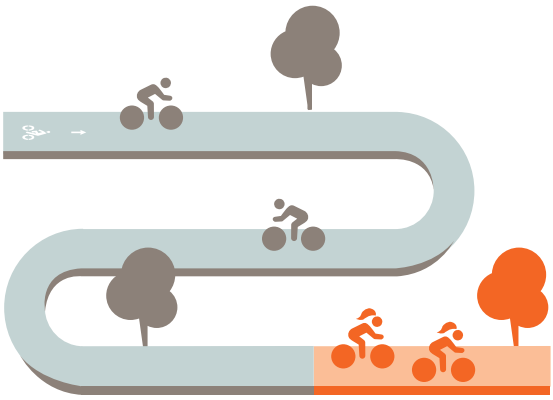


Vehicle Travel Time

Average vehicle travel time along the one-mile corridor during peak periods is expected to increase between 6 and 48 seconds as a result of the proposed project.

Estimated Changes with Project

Bike Lane Coverage

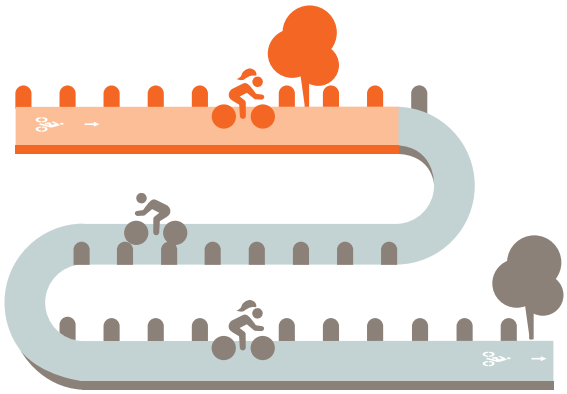


Without project
83% (10,120 ft)

▶

With project
100% (12,250 ft)

Share of Bike Lanes with Vertical Separation



Without project
0% (0 ft)

▶

With project
30% (3,670 ft)

How Much Will the Project Cost?

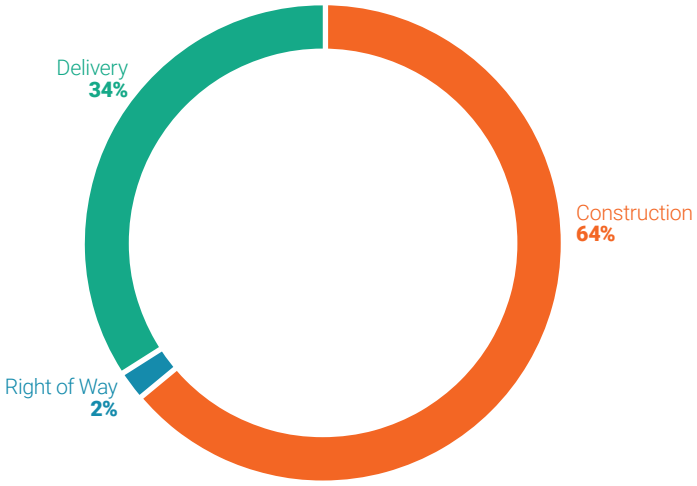
Stockton Boulevard (South) Cost Summary

$9,500,000

Construction

Construction costs include the cost to build the primary items associated with the safety countermeasures for the corridor. The items were estimated based on the preliminary design concepts and recent construction bid unit costs with an escalation factor to account for future construction. The costs were broken down into two categories that consisted of major roadway items and electrical items such as traffic signals and lighting. A contingency factor was included to account for refinement of project design, changes in project details, or unforeseen changes in construction costs.

Actual project costs will be determined by surveyed base mapping, geotechnical reports, concept refinement, environmental reviews, right of way availability, project phasing, and bid conditions at the time of advertisement. Project costs should be reviewed prior to any grant application or initiation of a Capital Improvement Project to revalidate and update the assumptions in this study as necessary.



The total project costs shown in the summary chart have been escalated at an assumed 3% per year escalation factor to 2025, the anticipated year of construction.

Right of Way

In addition to construction costs, right of way costs were assumed that include temporary construction easements for items such driveway modifications, curb ramps reconstruction, signal equipment poles and cabinets. It was assumed that each project could be constructed almost exclusively within the roadway prism and right of way acquisition would not be needed along the entire project frontage. Further refinement of the base mapping in subsequent phases of design will more accurately identify specific right of way needs.

Delivery

Project delivery costs are included in the estimates provided in this study. These costs encompass all of the work to complete subsequent phases including preliminary engineering, environmental documentation, final design, right of way engineering, and construction oversight. A breakdown of these costs is provided in Appendix C.

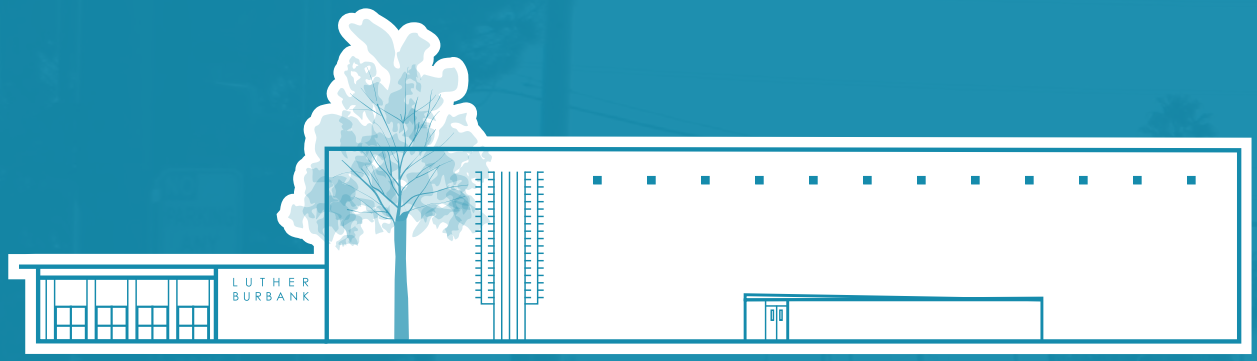
Florin

Vision Zero
Top 5 Corridor

Florin Road at Luther Drive

Florin Road

Vision Zero Top 5 Corridor



Florin Road - Luther Burbank High School

What is going on?

Between 2009 and 2017, 16 crashes that resulted in a fatality or severe injury (KSI) occurred on Florin Road between 24th Street and Munson Way. Eight of these crashes involved a person walking or biking.

What are the key issues?

Three-fourths of drivers who crashed were proceeding straight or stopped at the time of the crash, and nearly half of all crashes cited unsafe speed as the primary violation. Of the pedestrians who were hit, half were crossing the street in a marked crosswalk at the time. Nearly 40 percent of bike crashes involved a driver making a right-turn.

What is the community concerned about?

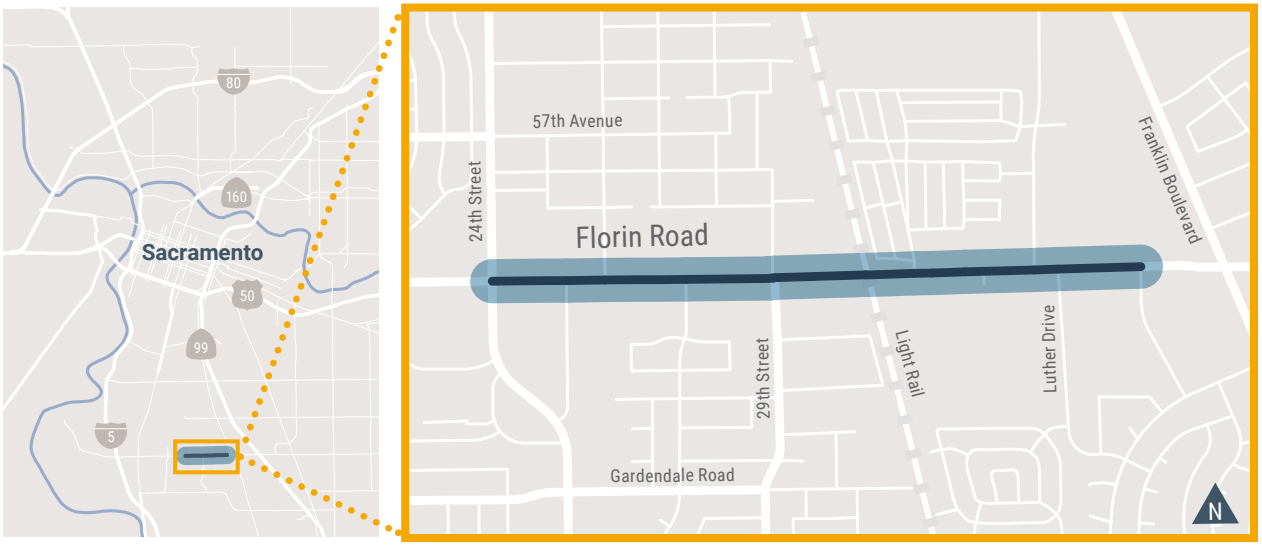
At outreach events, residents described difficulty crossing the street, particularly near the Florin Light Rail Station and Luther Burbank high school.

The following pages lay out the existing conditions along the corridor, feedback heard from residents at outreach events, and a set of roadway safety recommendations focused on slowing down drivers, increasing compliance with signals and signs, and improving safety for people walking and biking

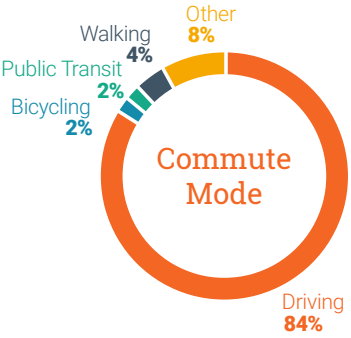
Table of Contents

In the Neighborhood

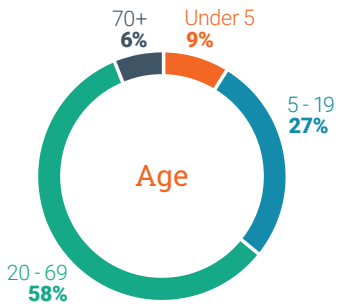
Corridor



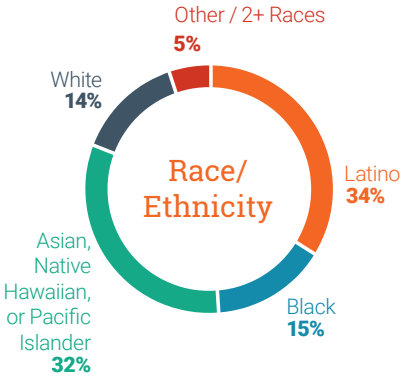
About the Neighborhood



A larger share of residents in this neighborhood walk to work, when compared to the city as a whole.



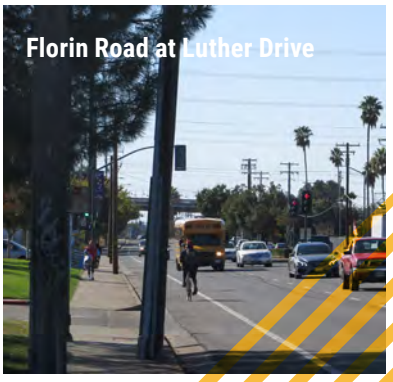
36% of residents in this neighborhood are age 19 or younger, compared with 26% of residents citywide.



81% of residents in this neighborhood identify as Latino, Black or Asian, compared with 61% of residents citywide.

Florin Road east of Luther Drive

Florin Road at light rail crossing



Florin Road at Luther Drive

Key Destinations Along the Corridor

Parks

1

Schools & Libraries

2

Food Markets

1

Houses of Worship

3

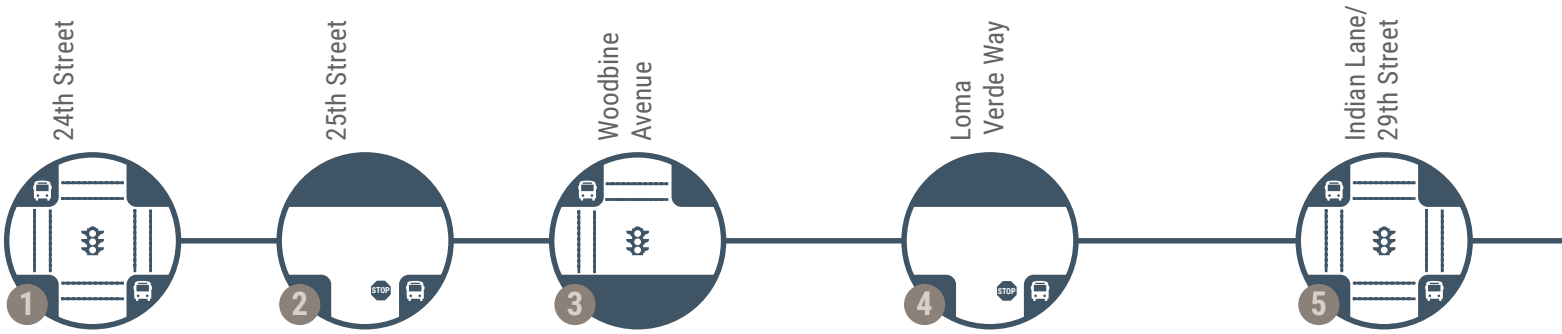
Light Rail Stations

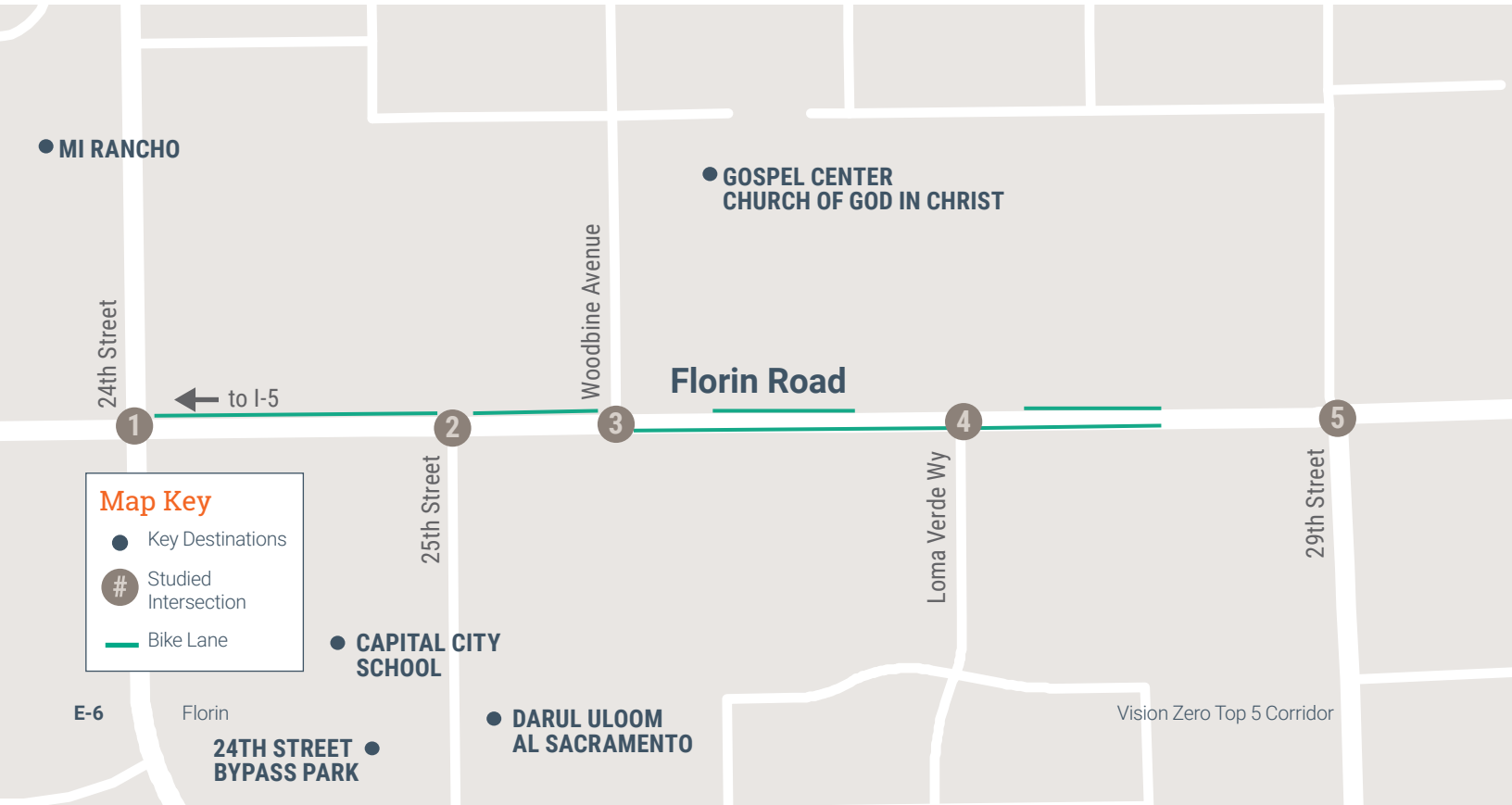
1

Travel on Florin

Key Statistics

Posted Speed Limit	Daily Vehicles	Maximum PM Intersection Vehicle Volume	PM Rush Hour People Walking	PM Rush Hour People Biking
40 MPH	**36,000**	**2,540**	**163**	**119**





Number of Transit Routes

3

#54, #81, Blue Line

Bikeway Type

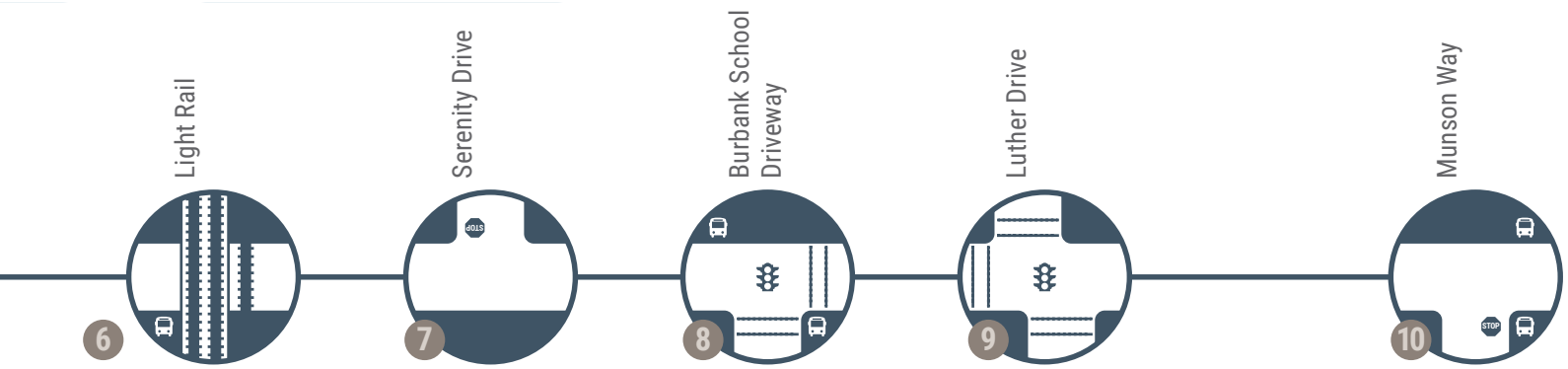
On-Street Bike Lanes, with long gaps

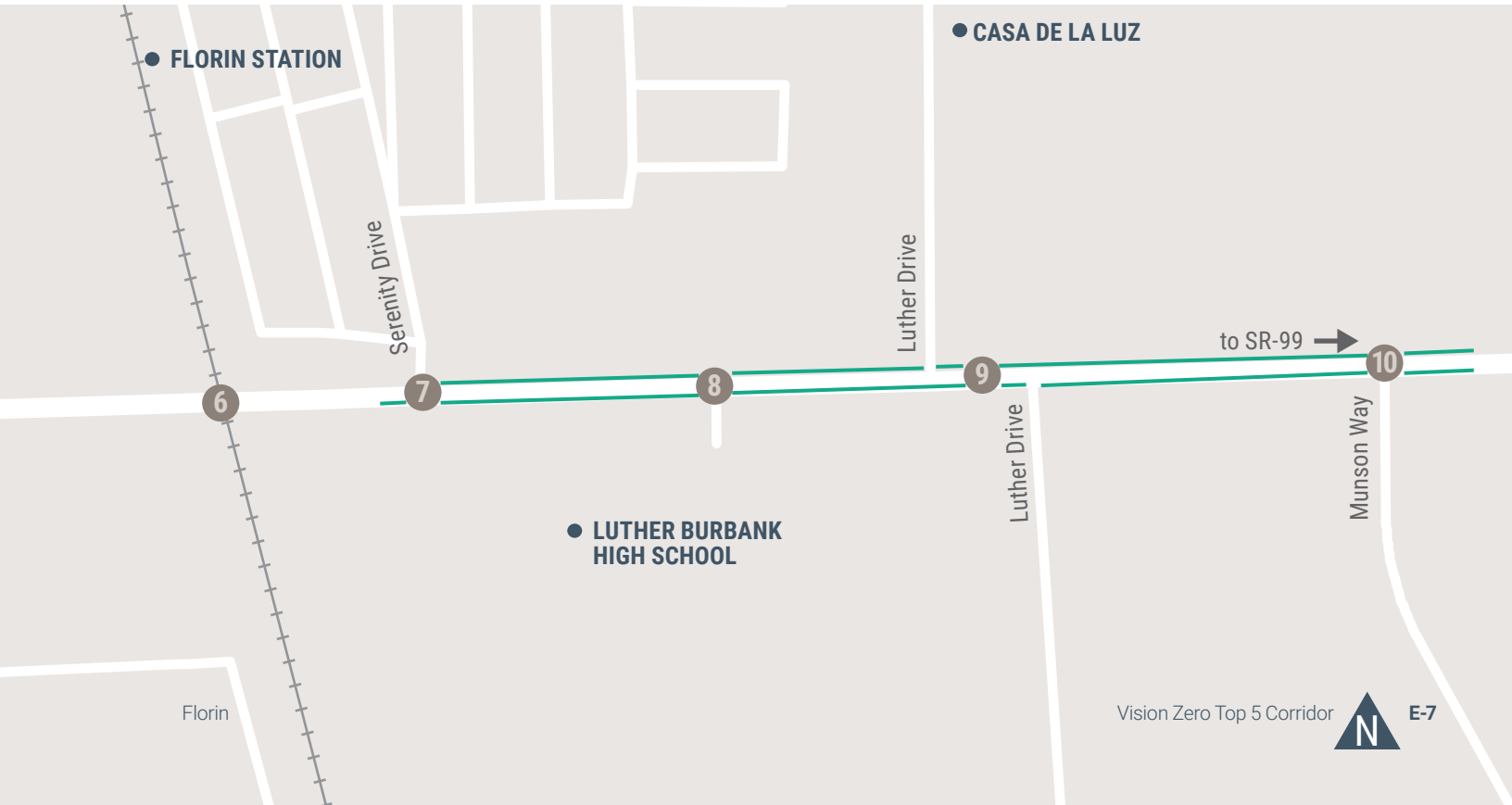
Longest Distance Between Marked Crosswalks

1,740 Ft

Sidewalk Coverage

100%





Crashes on Florin

Vehicle Crash Types

Unsafe Speed

"Unsafe Speed" was cited as the primary violation in nearly half of all crashes.

1 2 3 4 5 6 7 8 9 10

Proceeding Straight

75% of drivers were proceeding straight or stopped at the time of the crash.

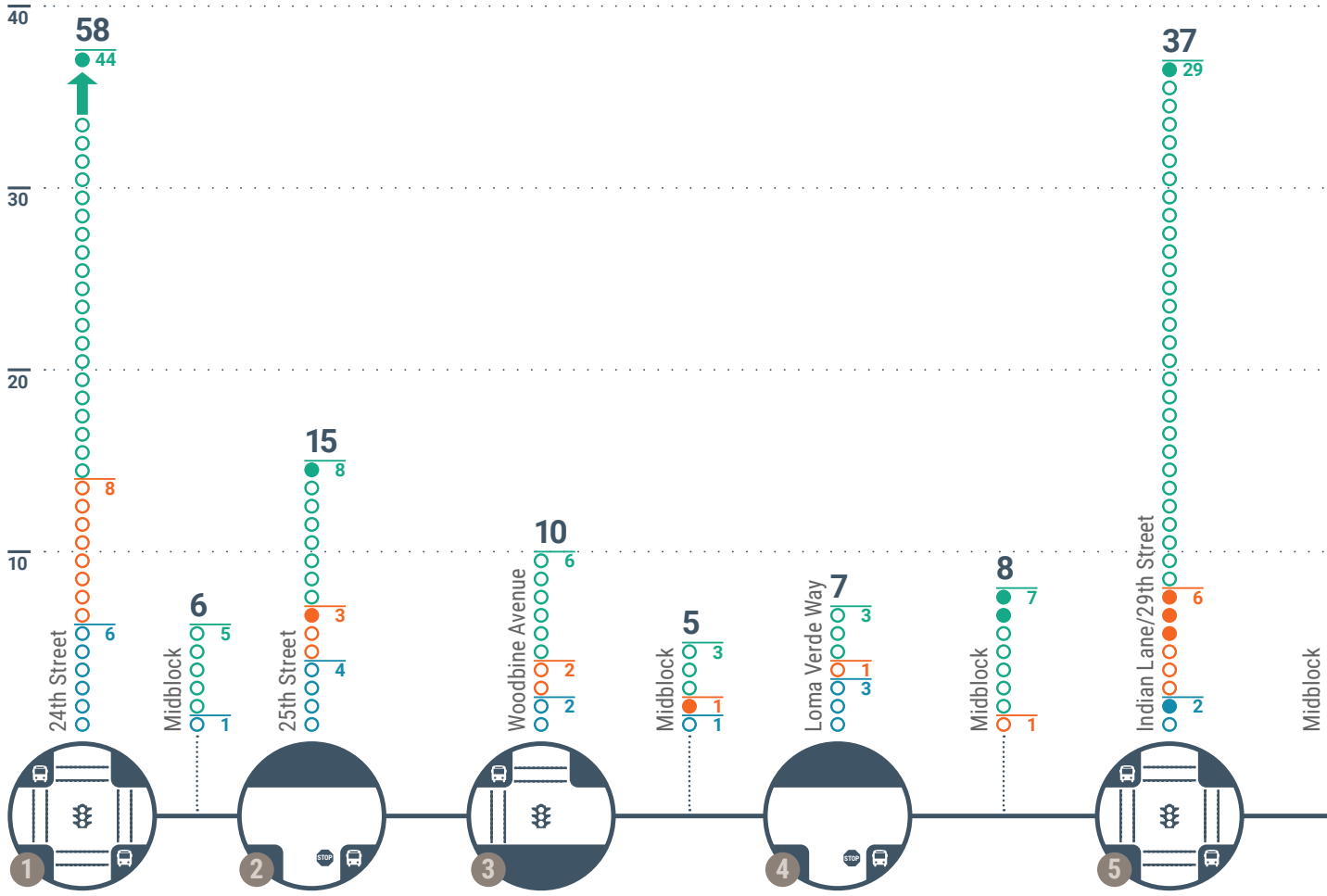
1 2 3 4 5 6 7 8 9 10

Rear End

Nearly half of all crashes were rear end.

1 2 3 4 5 6 7 8 9 10

Crash Locations



Ped Crash Types

Bike Crash Types

Pedestrian Crossing

The majority of people hit while walking were crossing. Half of people were in the crosswalk.

1 2 3 4 5 6
7 8 9 10

Right Turns

In nearly 40% of bike crashes, the driver was making a right turn.

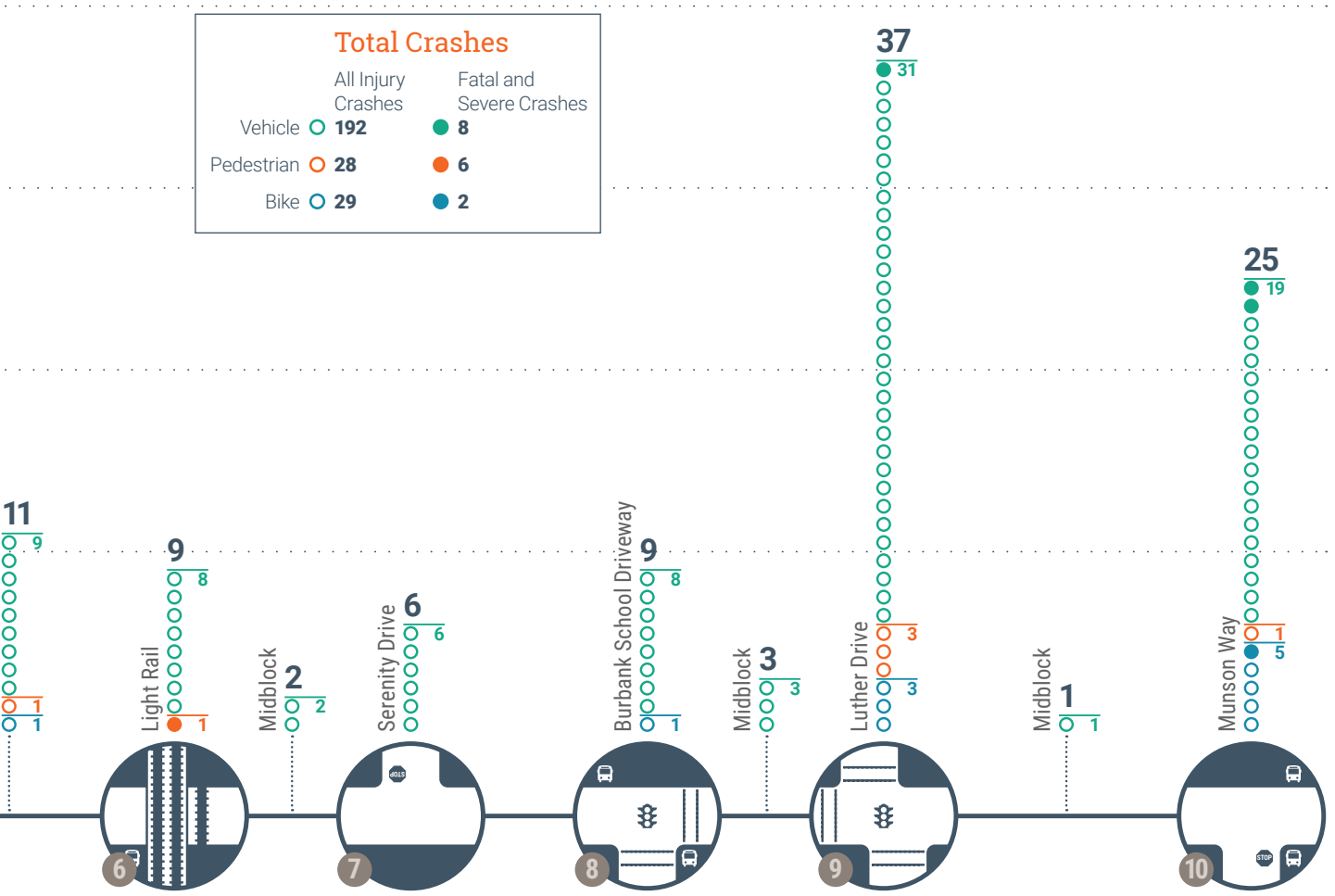
1 2 3 4 5 6
7 8 9 10

Broadside

More than half of bike crashes were broadside, also called T-Bone.

1 2 3 4 5 6
7 8 9 10

1 Numbers that are turned on represent a location where crash type has occurred at least three times.



Feedback from the Community

> "We need to slow drivers down."

> "The signals need more time for crossing (when seniors cross it is too short)."

Luther Burbank High School Community Workshop

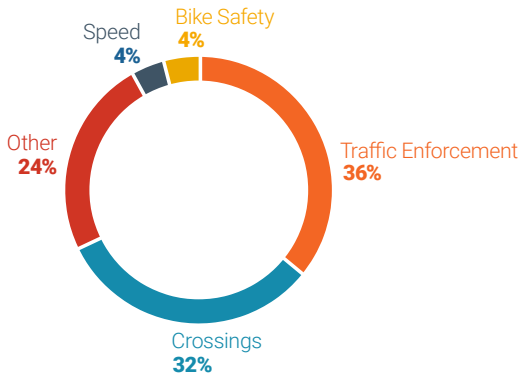
Key Themes

Traffic Enforcement

Residents described speeding, and red light and stop sign running across the corridor and suggested increased speed enforcement could deter this behavior.

Crossings

Residents described difficulty crossing the street, particularly by the Florin light rail station and Luther Burbank High School, due to large spacing between marked crosswalks.



Engagement Events

November 15, 2018

Luther Burbank High School Community Workshop

May 5, 2019

Luther Burbank High School Community Open House

Investments to Enhance Safety

Key Crash Countermeasures

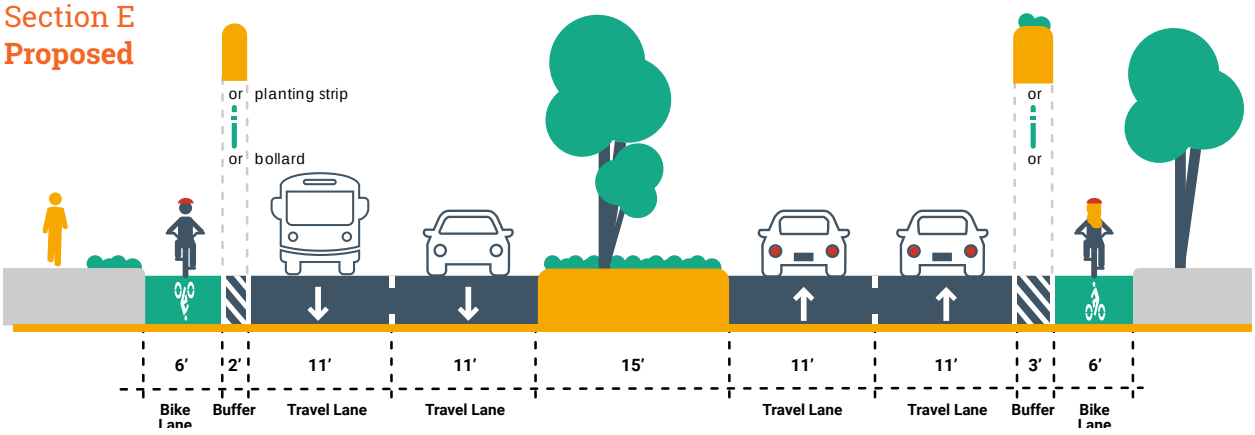
Countermeasure		Crash Type		Feedback Key Theme
Slow Green Wave	TO ADDRESS	Unsafe Speed		Enforcement & Compliance
Add New Signal	TO ADDRESS	Pedestrian Crossing		Crossings
Advanced Dilemma-Zone Detection	TO ADDRESS	Rear End		Enforcement & Compliance

How Will The Roadway Space Be Used?

Section E
Existing

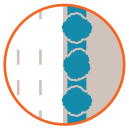
SEE PAGE E-163

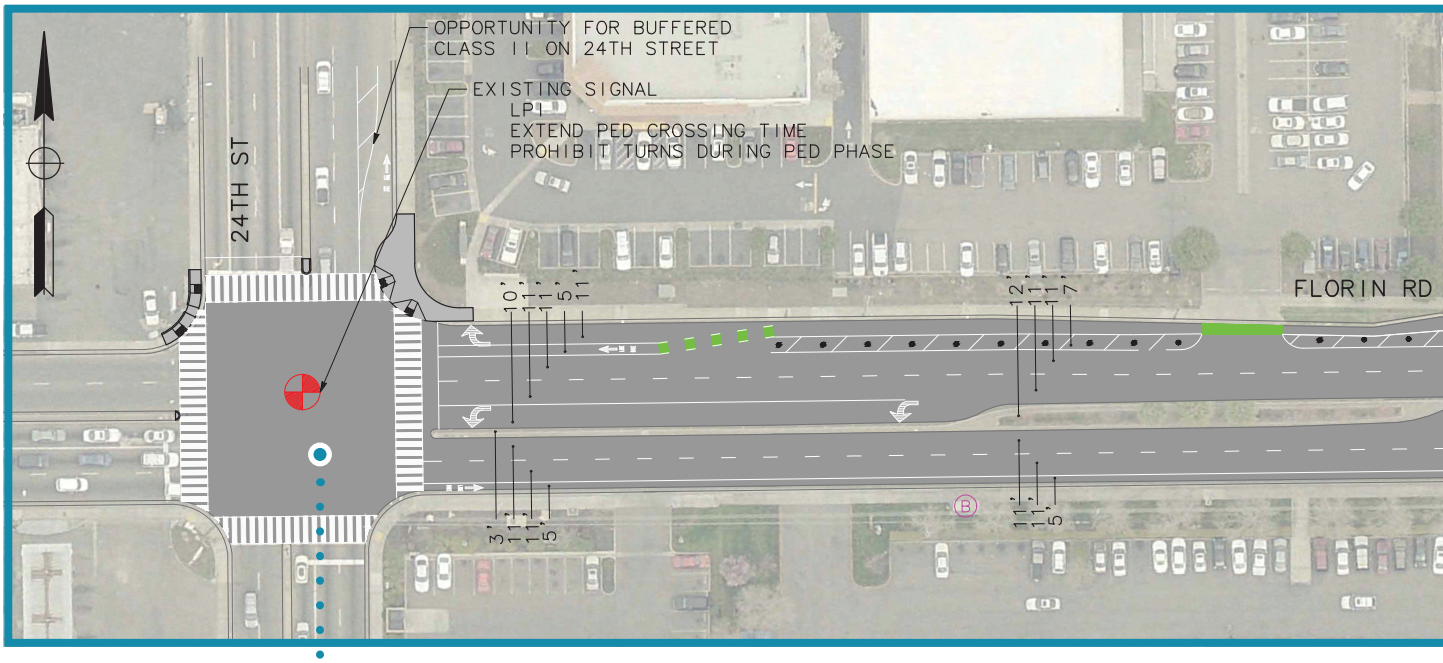
Section E
Proposed



Conceptual Design for Florin


Bike Conflict Zone Markings


Landscape Buffer




Extend Pedestrian Crossing Time

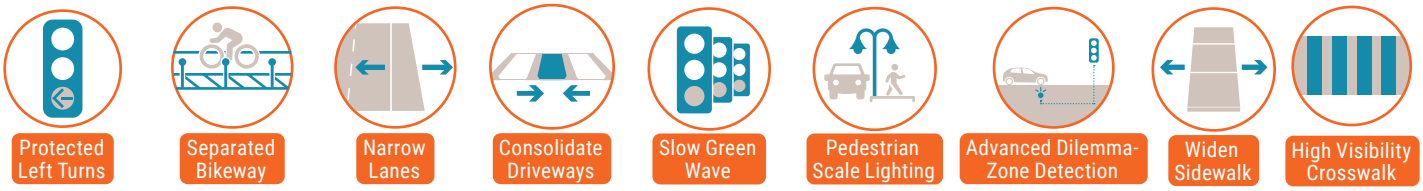

Bulbout


Leading Pedestrian Interval


Consolidate Driveways

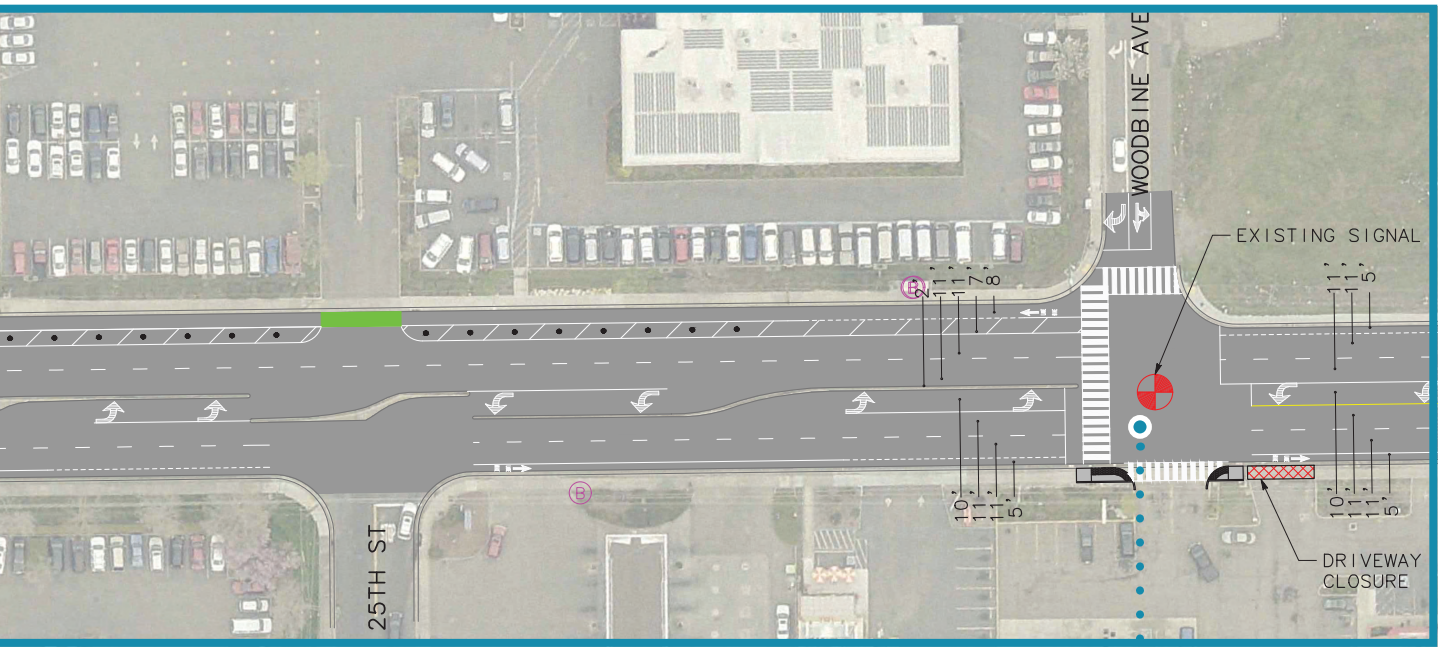

Prohibit Turns During Pedestrian Phase

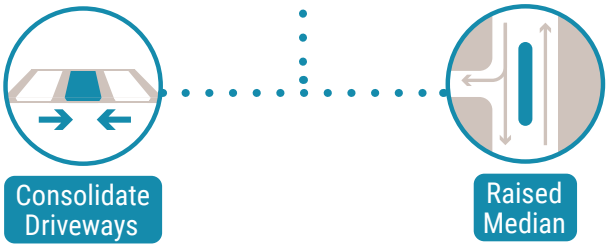

Straighten Crosswalk



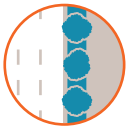
Corridor-Wide Recommendations

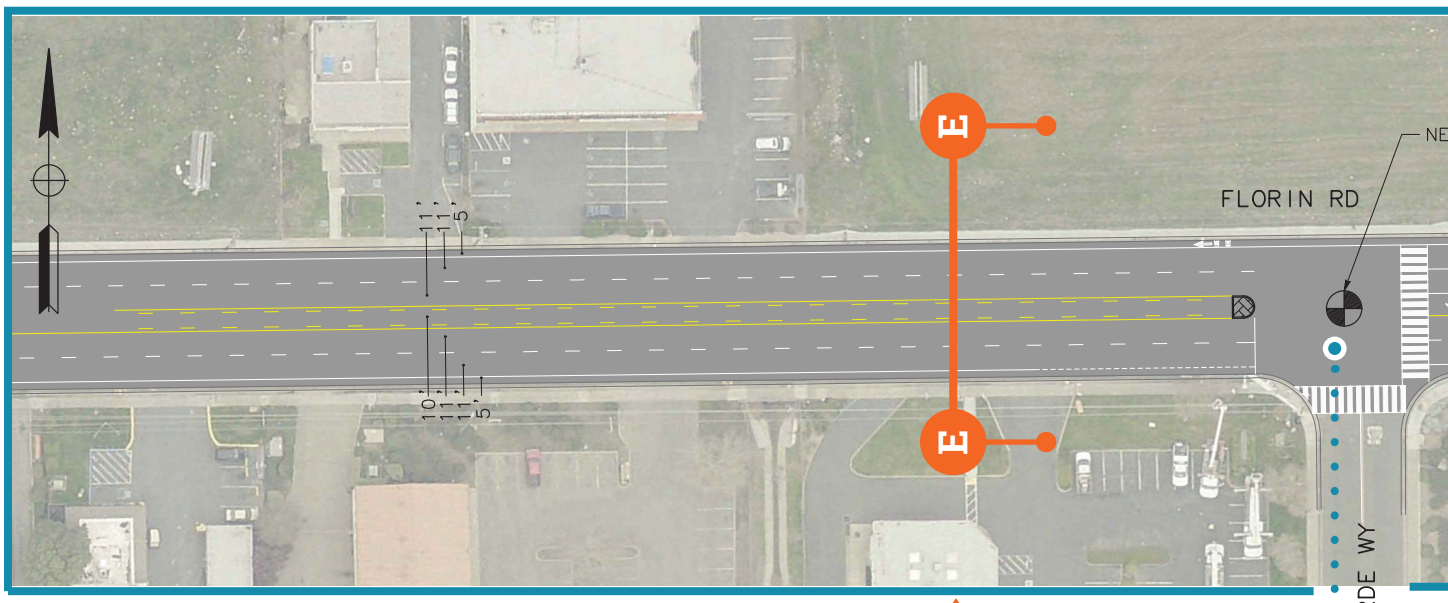
Location-Specific Recommendations

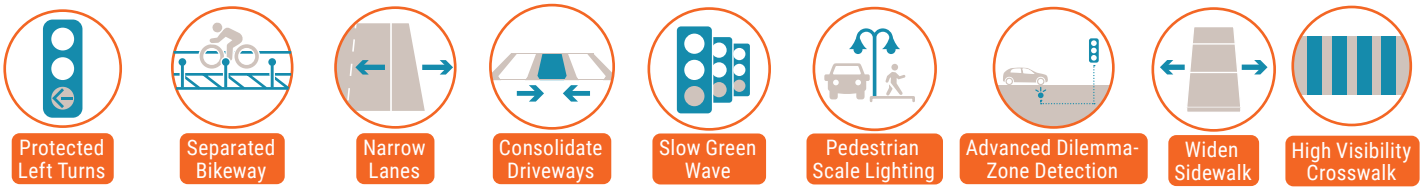




Conceptual Design for Florin

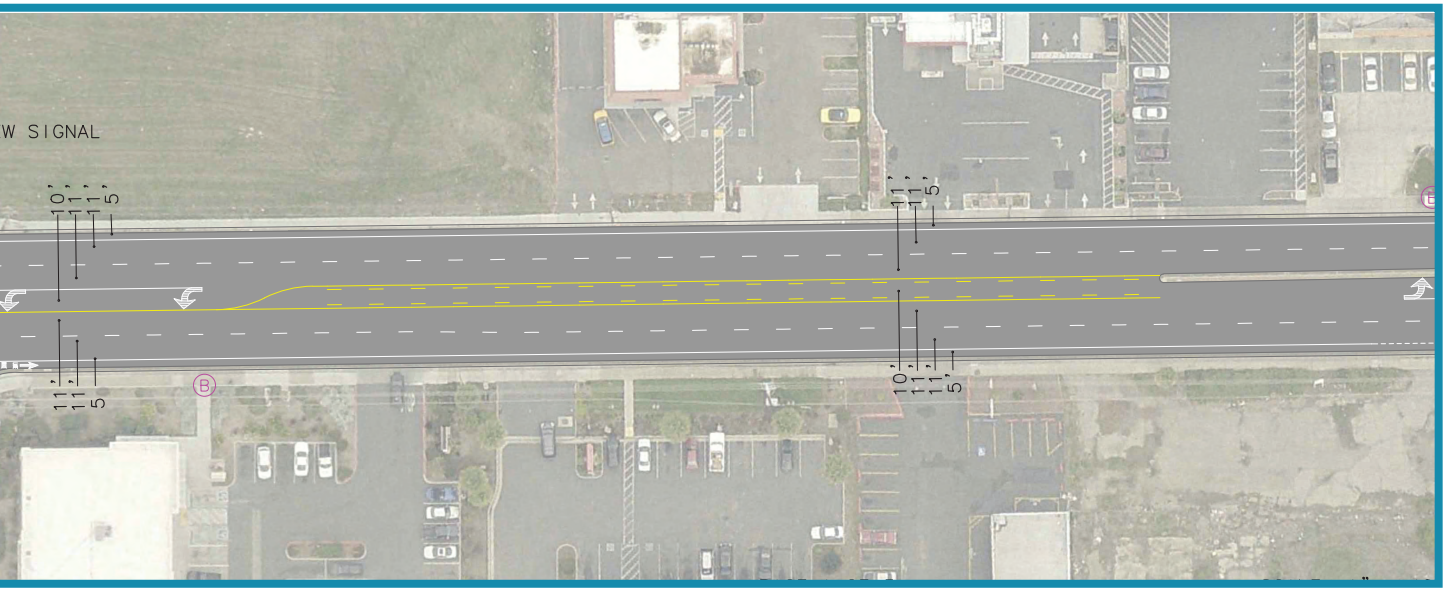






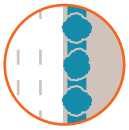
Corridor-Wide Recommendations

Location-Specific Recommendations

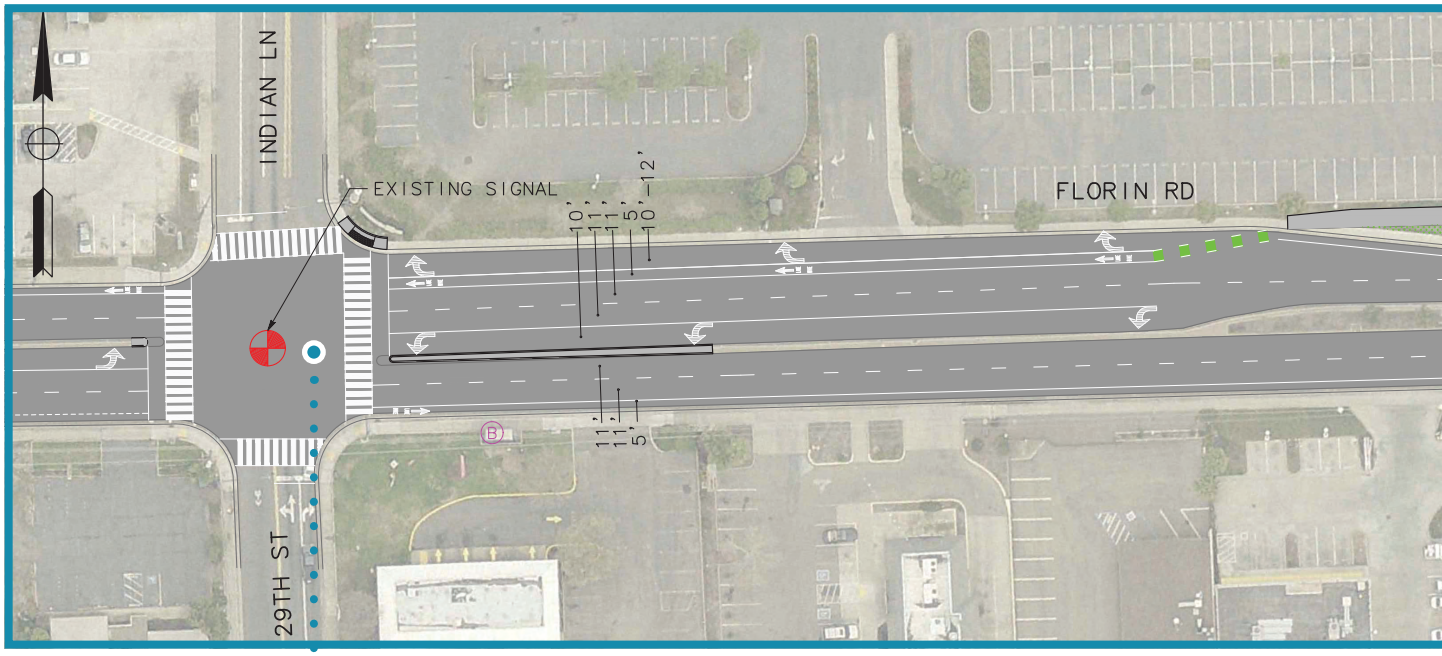


Conceptual Design for Florin

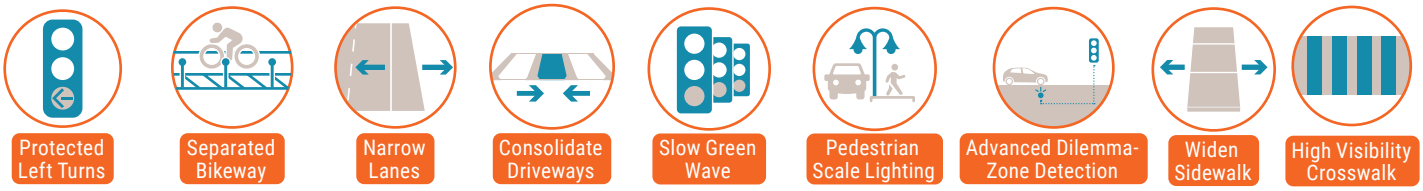
Bike Conflict Zone Markings



Landscape Buffer

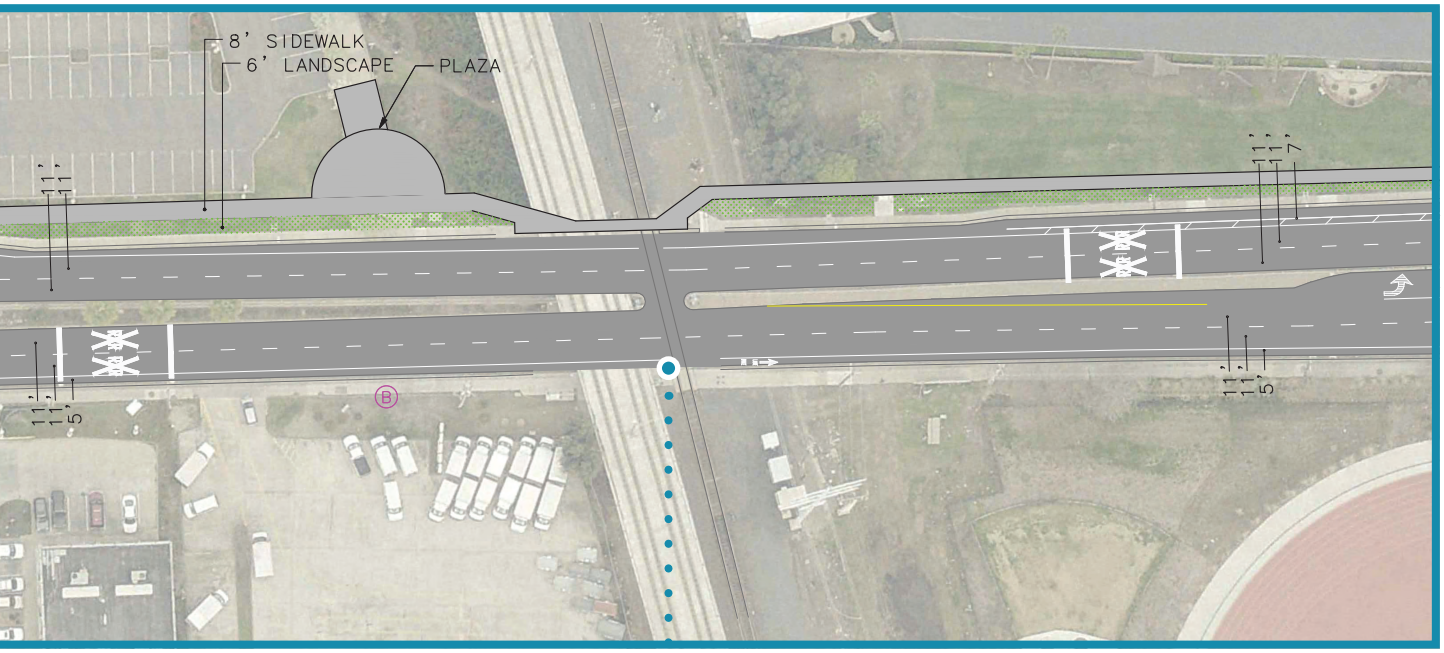


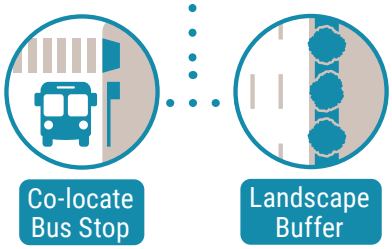
Dual Curb Ramps



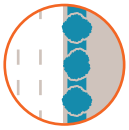
Corridor-Wide Recommendations

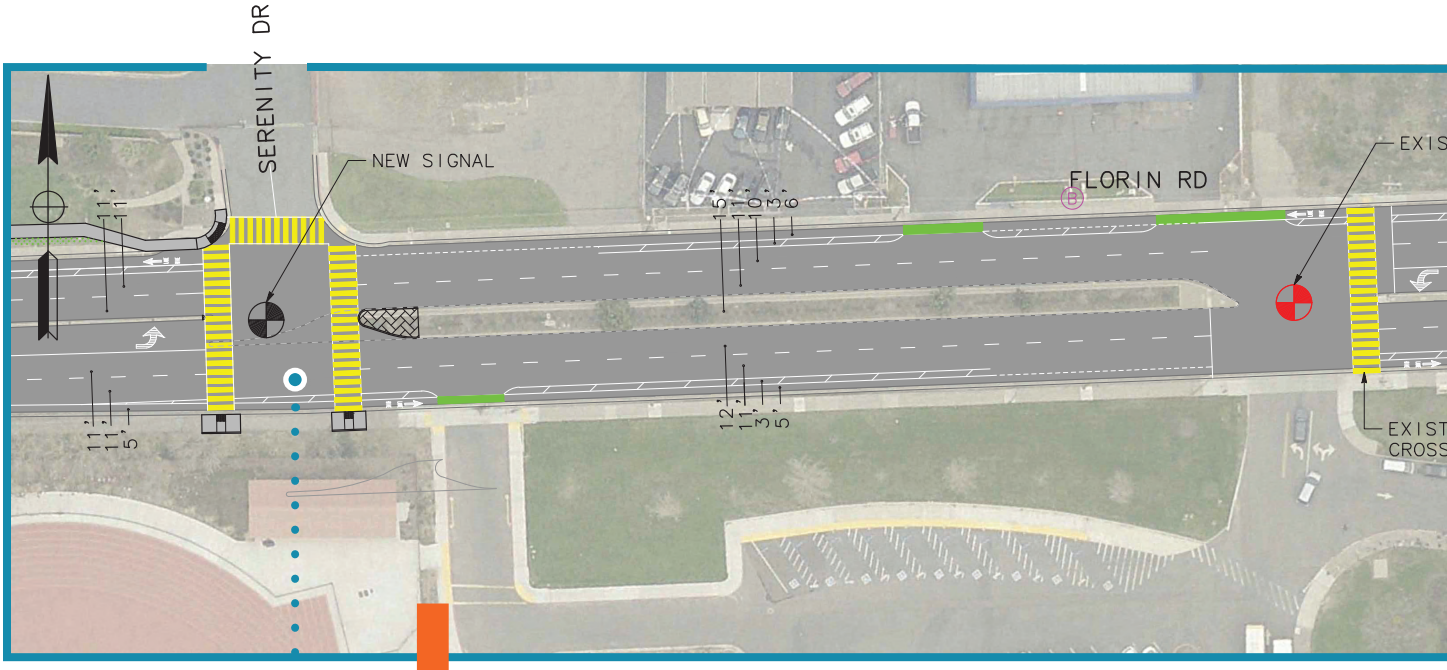
Location-Specific Recommendations





Conceptual Design for Florin

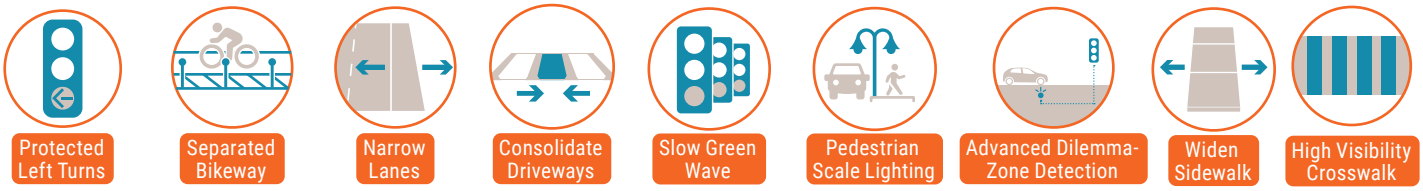




Florin Road/Serenity Drive Queues

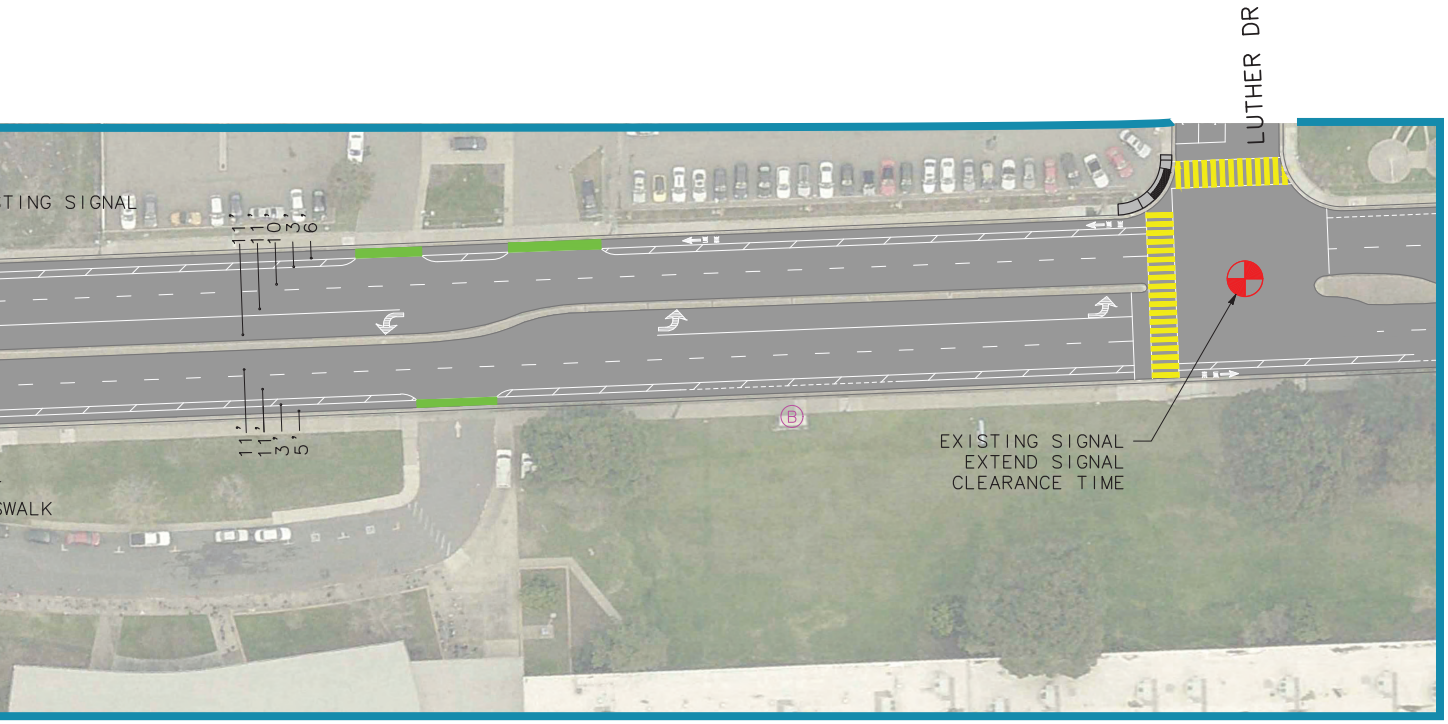
The Florin Road/Serenity Drive intersection is approximately 450-feet east of railroad tracks operated by Union Pacific Railroad. If a signal is installed at Florin Road/Serenity Drive, measures should be taken to ensure the eastbound queue does not spill back onto the railroad.

Queues were calculated from SimTraffic models representing existing conditions with the Vision Zero recommendations implemented. The peak hour maximum queues of this new signal are shown in Appendix B.



Corridor-Wide Recommendations

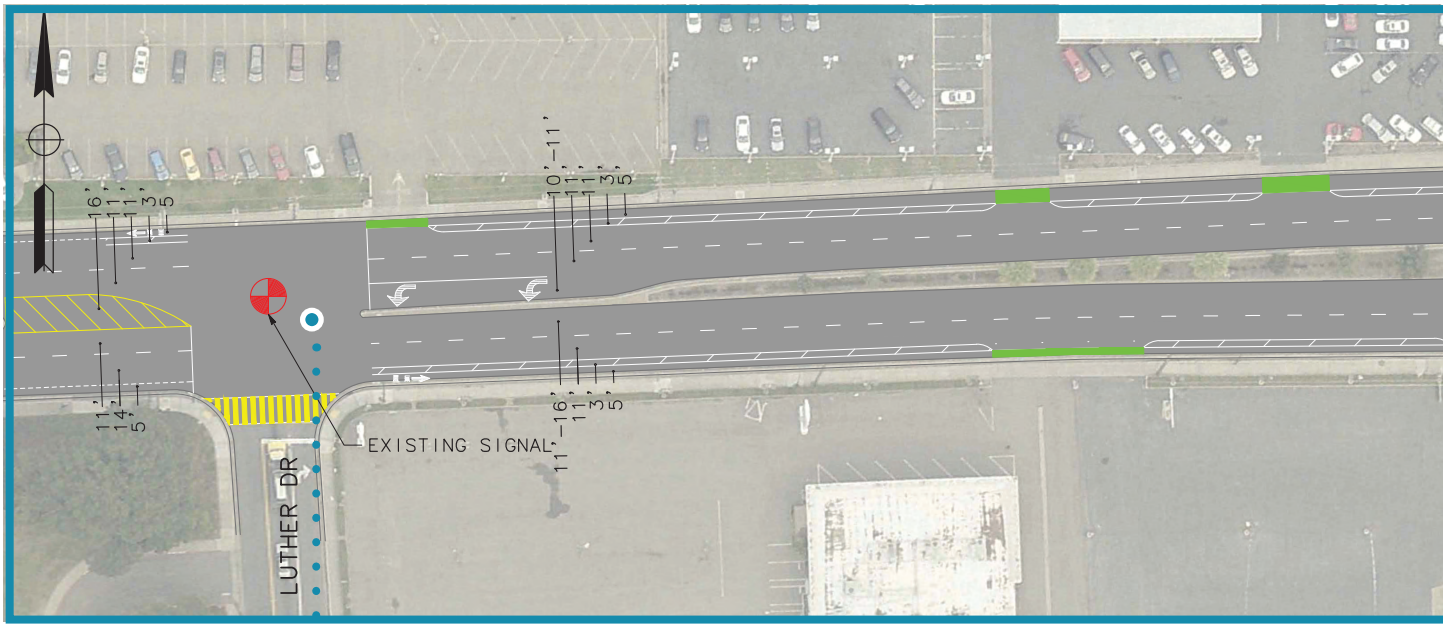
Location-Specific Recommendations



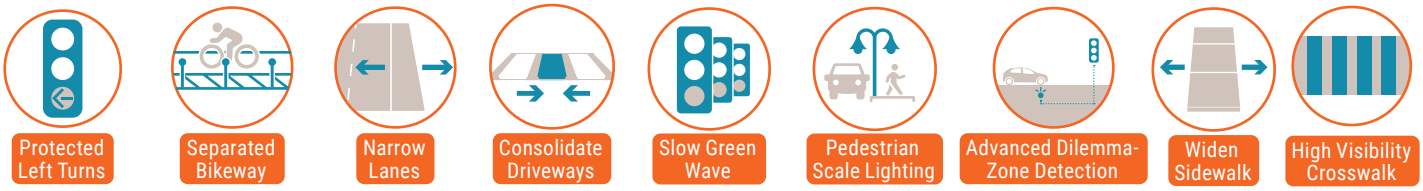
Conceptual Design for Florin

Bike Conflict Zone Markings

Landscape Buffer

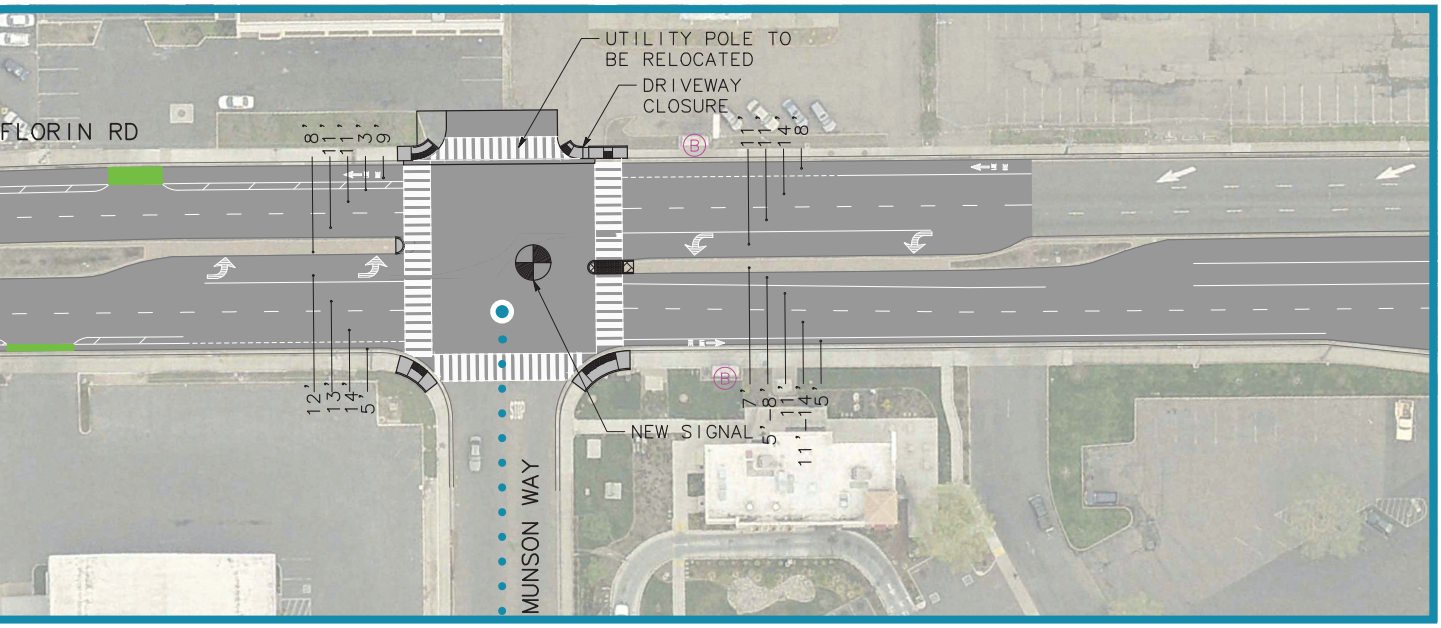


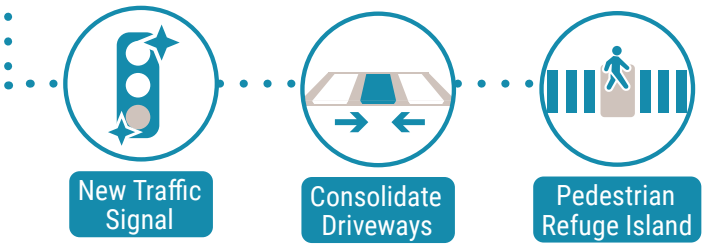
Extend Signal Clearance Time



Corridor-Wide Recommendations

Location-Specific Recommendations



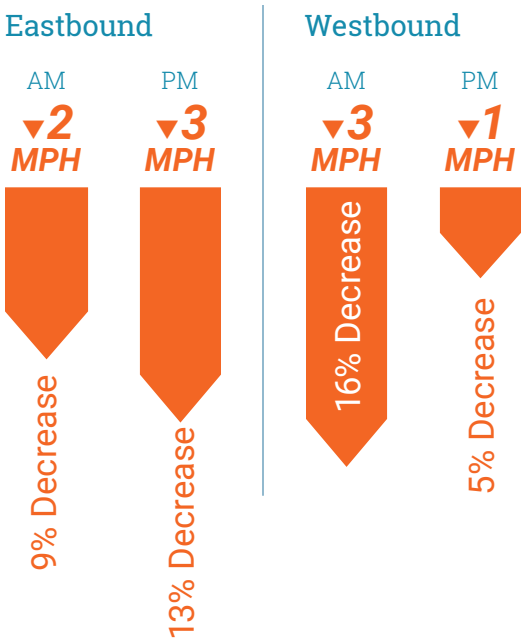


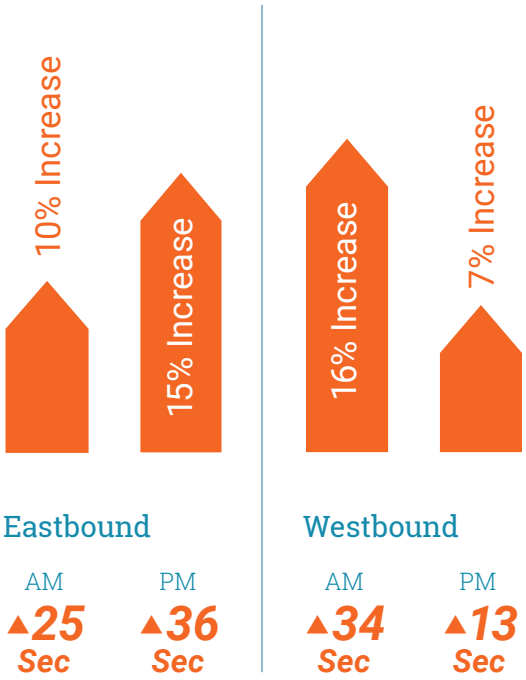
How Will Travel Change?

Estimated Changes with Project

Average Vehicle Speed

Average vehicle speed along the corridor during peak periods is expected to decrease between 1 and 3 mph as a result of the proposed project. While slower travel speeds result in longer travel times, they reduce traffic fatalities and severe injuries that result from crashes.



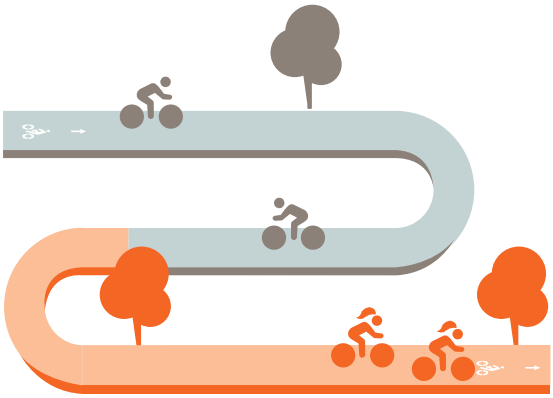


Vehicle Travel Time

Average vehicle travel time along the one-mile corridor during peak periods is expected to increase between 13 and 36 seconds as a result of the proposed project.

Estimated Changes with Project

Bike Lane Coverage

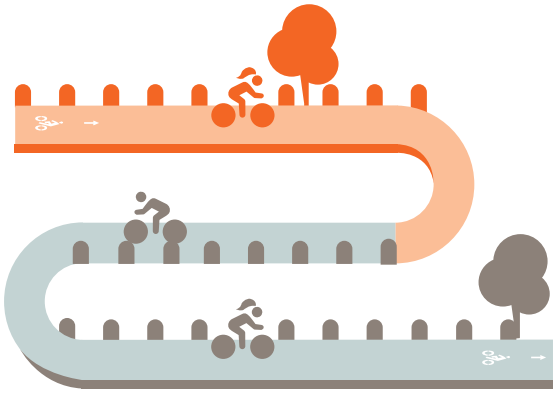


Without project
56% (7,190 ft)

▶

With project
100% (12,780 ft)

Share of Bike Lanes with Vertical Separation



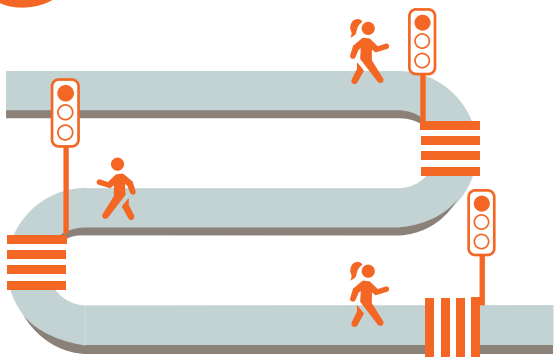
Without project
0% (0 ft)

▶

With project
38% (4,900 ft)

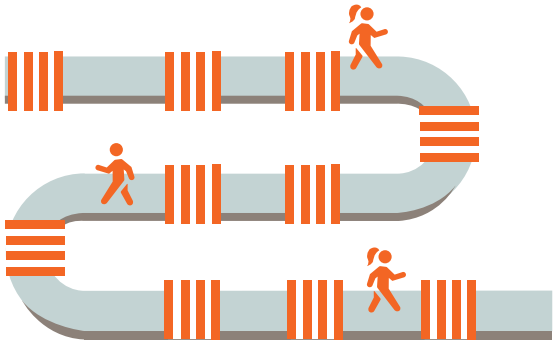
Number of Locations Upgraded to Controlled Crossings

3



Number of Marked Crosswalks

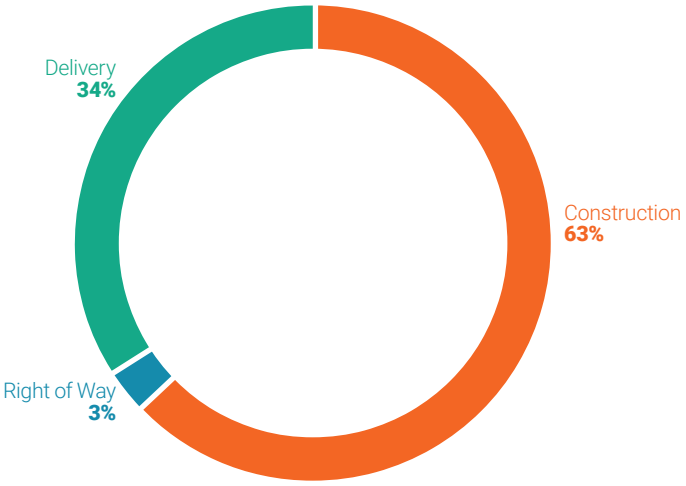
10 *new crossings*



How Much Will the Project Cost?

Florin Road Cost Summary

$11,900,000



Construction

Construction costs include the cost to build the primary items associated with the safety countermeasures for the corridor. The items were estimated based on the preliminary design concepts and recent construction bid unit costs with an escalation factor to account for future construction. The costs were broken down into two categories that consisted of major roadway items and electrical items such as traffic signals and lighting. A contingency factor was included to account for refinement of project design, changes in project details, or unforeseen changes in construction costs.

Actual project costs will be determined by surveyed base mapping, geotechnical reports, concept refinement, environmental reviews, right of way availability, project phasing, and bid conditions at the time of advertisement. Project costs should be reviewed prior to any grant application or initiation of a Capital Improvement Project to revalidate and update the assumptions in this study as necessary.
.

The total project costs shown in the summary chart have been escalated at an assumed 3% per year escalation factor to 2025, the anticipated year of construction.

Right of Way

In addition to construction costs, right of way costs were assumed that include temporary construction easements for items such driveway modifications, curb ramps reconstruction, signal equipment poles and cabinets. It was assumed that each project could be constructed almost exclusively within the roadway prism and right of way acquisition would not be needed along the entire project frontage. Further refinement of the base mapping in subsequent phases of design will more accurately identify specific right of way needs.

Delivery

Project delivery costs are included in the estimates provided in this study. These costs encompass all of the work to complete subsequent phases including preliminary engineering, environmental documentation, final design, right of way engineering, and construction oversight. A breakdown of these costs is provided in Appendix C.

TOP 5 CORRIDORS

Vision ZERO

Appendix A
Related Documents

Appendix B
Technical Calculations

Appendix C

Concept Plans & Cost Estimates

Vision Zero Top 5 Corridors

FAQs

The Vision Zero Top 5 Corridors study represents a next step of the Sacramento Vision Zero Action Plan, focusing efforts on implementing near-term roadway improvements on the five corridors in the city that have the highest rate of crashes that result in fatalities and severe injuries. During public outreach and public comment of this study, a few common questions were posed that were not covered in the Vision Zero Top 5 Corridors report. Responses to those questions are provided below.

1. Why aren't new trees and landscaping included in the Plan?

The recommendations in the Vision Zero Top 5 Corridors Plan are focused on roadway design features that will improve safety based on the collision data that was analyzed. The project team did not identify locations in which a landscape buffer addressed collisions and was a feasible option. There are some recommendations that will require changes to the existing landscaping, such as the modified sidewalk on Florin Rd. and the realignment of the intersection of El Camino Rd. and the Sacramento Northern Bike Trail. This plan does not preclude new trees, landscaping, and other placemaking elements from being considered in the future where there is available space and financial resources to maintain.

2. Why does the plan propose so many new traffic signals?

New traffic signals organize interactions between vehicles, pedestrians, and bicyclists with conflicting movements, and provide an improved crossing for pedestrians. New traffic signals can also slow traffic on long, high-speed straightaways when timed properly. Consistently spaced traffic signals facilitate the "slow green wave" in which signals are coordinated for slower travel speeds.

3. Can you set lower speed limits to reduce speed?

Cities in the State of California must adhere to the California Vehicle Code for setting speed limits. The process for setting speed limits on non-residential streets includes conducting a specific speed survey to determine the, "prevailing speed." The prevailing speed is the speed which 85 percent of the motorists are traveling at or below. The speed limit is set using the prevailing speed, with considerations for other factors such as the type of adjacent development, bicycle and pedestrian activity, and reported collision history. This process prohibits cities from arbitrarily setting speed limits. Roadway design can help to influence prevailing speeds, meaning that in the future a lower speed limit may be warranted along corridors where roadway safety improvements have been made.

4. Will my street be considered for safety improvements?

Per the City of Sacramento's Vision Zero Action Plan, safety improvements are prioritized where historic collision data points to the most need. These locations together are called the High Injury Network. The City's transportation funding priorities include an emphasis on funding future safety projects on the High Injury Network.