# Table of Contents

- Acknowledgments .................................................. i
- Executive Summary ............................................... 1
- Introduction ......................................................... 4
- Context ............................................................... 7
- Community Engagement .......................................... 21
- Local Vision ......................................................... 28
- Next Steps .......................................................... 50
Acknowledgments
City Council
Eric Filseth - Mayor
Adrian Fine - Vice Mayor
Tom DuBois
Liz Kniss
Alison Cormack
Lydia Kou
Greg Tanaka

Technical Advisory Committee
Caltrans
SamTrans
Santa Clara Valley Transportation Authority
San Mateo County Public Health
County of Santa Clara Public Health
City/County Association of Governments of San Mateo County
The City of Redwood City
The City of Palo Alto

Agency Management Team
David Pape, SamTrans
Jarrett Mullen, City of Palo Alto

Consultant Team
Fehr & Peers
CD+2

The Grand Boulevard Palo Alto Safety Study was funded by grants provided by the California Department of Transportation (Caltrans). The contents of this report reflect the view of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the views of Caltrans.
EXECUTIVE SUMMARY

Why Study El Camino from Stanford Avenue to Lambert Avenue?

The regional Grand Boulevard Initiative, and local plans, including Palo Alto’s Bicycle and Pedestrian Plan and Comprehensive Plan 2030, call for El Camino to be a more vibrant and accessible street, with safe transportation options for all modes.

The stretch of El Camino from Stanford to Lambert was selected given the high opportunity for bicycle and pedestrian safety improvements. The bicycle and pedestrian collision rate for the study area is about 1.65 collisions per million vehicle miles as compared to the statewide average of 1.48 for similar roadways.

What are the Study Outcomes?

Two new concept designs were created for the corridor. Both concepts include pedestrian crossing improvements, transit reliability improvements, and opportunities to improve landscaping and placemaking. One concept retains on-street parking, while the other replaces on-street parking with a protected bicycle lane. Neither concept reduces the number of travel lanes on El Camino Real. Explore full concept designs in the Local Vision Chapter. It is important to note that additional studies and community outreach is needed before a preferred concept is ready for final design.
The Option 1 cross-section concept would replace on-street parking with 7-foot, barrier-protected bike lanes the length of the corridor. New controlled mid-block pedestrian crossings would be added to reduce the distance between crossings on the corridor. Option 1 includes transit queue jump lanes at Page Mill/Oregon Expressway and bicycle and pedestrian safety improvements at all intersections.

The Option 2 cross-section design would look the same as the existing cross-section for most of the corridor, but would also add transit queue jump lanes at Page Mill/Oregon Expressway. New controlled mid-block pedestrian crossings would be added to reduce the distance between crossings on the corridor. Bicycle and pedestrian safety improvements, including crossing and turning safety treatments, would be added at all intersections.

What Informed the Design?
Design treatments that mitigate common collision factors and align with community visions were revised through an iterative design process that workshopped each set of concept ideas and designs with study area stakeholders and community members. Read more about the collision analysis and community engagement activities in the Context Chapter.
INTRODUCTION

El Camino Real is a critical arterial that connects communities from Daly City to San Jose. Once the peninsula’s only highway, El Camino retains the auto-oriented character that first emerged in the 1920’s. Today, El Camino Real functions more like a local arterial than a state highway, but struggles to become a destination corridor due to the vehicular focus of its land use profile and streetscape design.

The challenge of transforming El Camino Real to meet current and future needs is being addressed through the Grand Boulevard Initiative, a collaboration of nineteen cities, two counties, and a number of local and regional agencies united to improve the performance, safety and aesthetics of El Camino Real. Land use and infrastructure decisions still rest with local communities while the Grand Boulevard Initiative equips cities with planning tools and design ideas. The Vision of the Initiative, adopted in October 2006, is that “El Camino Real will achieve its full potential as a place for residents to work, live, shop and play, creating links between communities that promote walking and transit and an improved quality of life.” In practice, this has prompted a shift to denser and more mixed-use zoning and land use plans along the corridor, a focus on placemaking and activation of ground-floor spaces, and, as with this project, an emphasis on safe, multi-modal streetscape designs.

Two segments of El Camino, one in Palo Alto and one in Redwood City, were recently selected for a Caltrans-funded streetscape study. These segments were selected due to their high proportion of bicycle and pedestrian collisions as compared to the statewide average collisions for similar roadways. Between 2006 and 2015, 51 collisions involving bicycles or pedestrians took place on the Palo Alto segment between Stanford Avenue and Lambert Avenue.

The aim of the study was to develop conceptual designs that address the collision factors in Palo Alto. The solutions proposed for Palo Alto can serve as guidance for other jurisdictions along the corridor that participate in the Grand Boulevard Initiative.

In Palo Alto, this safety study is called the Grand Boulevard Palo Alto Safety Study and focuses on the 0.85-mile segment seen in Figure 1. It builds off the City’s Draft El Camino Real Master Plan (2007), the Comprehensive Plan 2030 (2017), and Palo Alto Bicycle and Pedestrian Transportation Plan (2012) by advancing the community’s vision for improved pedestrian and bicycle connectivity along and across El Camino, shorter and higher visibility crossings, and enhanced bus stop operations. The study segment also provides a distinct opportunity to dedicate Safe Routes to School linkages between the school enrollment areas that span El Camino Real such as Escondido Elementary, Greene Middle School, and Palo Alto High.

As part of the study, data was collected and public outreach was conducted on existing conditions and community preferences for the study area.
Outreach included pop-up tabling events, stakeholder interviews with business associations and PTAs, and an online survey (see Community Engagement chapter). The resulting design concepts were then shared with community members and the Technical Advisory Committee during two additional rounds of feedback. Two high-level options are presented in this report: Option 1 shows on-street parking replaced with protected bike lanes and Option 2 maintains on-street parking and focuses on parallel bike routes. Both options explore:

- crosswalk location and design
- protected intersection configuration
- intersection safety treatments
- specialized pedestrian signals at unsignalized intersections
- bus stop design, and
- queue jump operations at the Page Mill/Oregon Expressway intersection.

Each concept is accompanied by a planning-level cost estimate and funding plan presented in the Next Steps Chapter.
This chapter summarizes existing land use and roadway conditions along this segment as well as existing planning efforts.

**Existing Plans**
This Study directly tiers off of the State Bicycle & Pedestrian Plan, which aims to “reduce the number, rate, and severity of bicycle and pedestrian involved collisions” as one of four active transportation policies.

Transportation plans previously developed for the study area include the Palo Alto El Camino Real Master Plan in 2007, the Palo Alto Bicycle and Pedestrian Transportation Plan (BPTP) in 2012, and the VTP 2040 Long Range Transportation Plan for Santa Clara County. Ongoing transportation projects along or adjacent to the corridor include Caltrain Electrification and the Neighborhood Traffic Safety and Bicycle Boulevard project. In addition to these transportation projects, two new mixed-use developments are planned for the study area—one at 2585 El Camino Real, between Sherman Avenue and Grant Avenue, and the other at 3001 El Camino Real, between Olive Avenue and Portage Avenue.

The area bounded by El Camino Real and Caltrain is zoned for Pedestrian Transit-Oriented Development and is designated as a Priority Development Area in Plan Bay Area 2040. These designations suggest that both the City of Palo Alto and Santa Clara County are interested in concentrating development around transit and are supportive of fostering a greater mix of land uses to support pedestrian and transit use. The specific recommendations in the above plans and studies are summarized in Figure 2. Some of the highlights include:

- Adding pedestrian safety improvements, such as median refuges, curb extensions, and pedestrian hybrid beacons at both controlled and uncontrolled intersections;
- Enhancing bus operations and stop amenities;
• Replacing and supplementing median street trees and other landscaping improvements; and

• Designating pedestrian and bicycle routes to school along Stanford Avenue and California Avenue.

The planned and recommended improvements contained in these studies helped direct the Grand Boulevard Palo Alto Safety Study in identifying opportunities and constraints for the corridor.

Figure 2. Existing Plans and Projects
<table>
<thead>
<tr>
<th>Project</th>
<th>Safety</th>
<th>Pedestrian</th>
<th>Bike</th>
<th>Transit</th>
<th>Streetscape</th>
<th>Intersection</th>
<th>Corridor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3001 El Camino Real Development</strong></td>
<td>- Signalized crossings</td>
<td>- Pedestrian crossing improvements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Palo Alto ECR Master Plan 2007 “Urban Segment”</strong></td>
<td>- 11 foot travel lanes</td>
<td>- 4-lane segment between Park Blvd and California Ave</td>
<td>- Shorter crossing distances with 4-lane segment</td>
<td></td>
<td>- Median trees between Stanford Ave and Grant</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>El Camino Real Bus Rapid Transit Project</strong></td>
<td></td>
<td>- Curb bulb outs to replace on-street parking at bus stops along El Camino Real</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2012 Bicycle and Pedestrian Transportation Plan</strong></td>
<td>- Recommended “barrier” connections across Caltrain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Stanford Ave</td>
<td>- California Ave</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Safe Routes to School (2012 BPTP)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The boundary for the 2012 BPTP includes the entire city of Palo Alto (extents beyond the limits of this map)*
Who’s Using the Corridor

Given its proximity to land uses as diverse as Stanford University, California Avenue retail corridor, Stanford Research Park and residential neighborhoods, this study section of El Camino Real serves a range of diverse users. Stanford on-campus residents as well as many residents in the Evergreen Park and College Terrace neighborhoods travel along the corridor to work or study at Stanford University, as well as shop, dine, and use services along El Camino Real and California Avenue. The retail uses are also the closest options for residents in the Barron Park, Ventura, and Mayfield neighborhoods. With only a few exceptions, all land uses along the corridor are commercial properties. The businesses range from food establishments to services such as laundromats, banks, and medical offices, and from research offices to retail shops supplying everything from groceries to home goods and electronics. The Stanford Research Park is a regional employment center with support services for R&D pursuits. The office buildings are auto-centric in design, but support campus-wide shuttle and other sustainable transportation services. The few non-commercial uses include multi-family housing, senior housing, and sports fields. These land use and demographic patterns can be seen in Figure 3.

There is a balanced mix of renters and homeowners in the neighborhoods north of El Camino Real, while the Barron Park neighborhood, south of El Camino Real, has a much higher percentage (87%) of owner-occupied homes and in general consists of longer tenured residents. The Ventura neighborhood is the most racially and ethnically diverse neighborhood as well at the neighborhood with the highest portion of low-income residents (15%). The majority of households own at least one vehicle, but many residents, especially those within or adjacent to Stanford, commute to work by using transit, a bicycle, or by walking.

Although there are no schools directly on El Camino Real in the study corridor, multiple elementary schools, Greene Middle School, and Palo Alto High School are a mile or less from the project boundaries. One-quarter to one-third of all households in the study area have school-age children, and many travel along or cross El Camino Real to access their schools.
Figure 3.
Land Uses & Demographics

Adjacent to Stanford:
- Mix of renters and homeowners
- 1/3 of households have children under the age of 18
- 40% of residents walk, bike or take transit to work

Northeast:
- More diverse population, including ~1.5% low-income households & 5% limited English proficiency
- Mix of renters and homeowners
- ~40% households have children under the age of 18
- 1/4 of residents walk, bike, or take transit to work

Southeast:
- 10% of residents walk, bike or take transit to work
- 1/3 of households have children under the age of 18
- Most homes are owner-occupied (87%)
- 11% of residents are elderly (over 75 years old)
- 10% of residents walk, bike or take transit to work
**Existing Transportation Network**

Signalized intersections within the study corridor include Stanford Avenue, Cambridge Avenue, California Avenue, Oregon Expressway/Page Mill Road, and Portage Avenue/Hansen Way. All other intersections are side-street stop-controlled.

Pedestrian infrastructure along the corridor includes curb ramps, truncated domes, crosswalks, and pedestrian countdown signals. All street corners include curb ramps and approximately one-third of these ramps include truncated domes. Marked crosswalks are located at about half of the intersections along the corridor. Sizable crosswalk gaps of over 1,000 feet exist between California Avenue and Page Mill Road/Oregon Expressway, and between Page Mill Road/Oregon Expressway and Portage Avenue. Except for the brick paver crosswalks at Stanford Avenue, all crosswalks use a standard, white paint crosswalk design without interior striping.

There are no bicycle facilities on El Camino Real, but multiple existing and proposed routes intersect El Camino Real in the study area. Class II bicycle lanes are provided south of El Camino Real on California Avenue, Page Mill Road, and Hansen Way. California Avenue facilities transition to Class III shared facilities north of El Camino Real in the retail district. A Class I bike path is provided along the west side of El Camino Real north of the study segment, but ends at Stanford Avenue. A bicycle boulevard is proposed for Stanford Avenue north of El Camino Real. New Class I and Class III bicycle facilities are also proposed for Page Mill Road and Portage Avenue, respectively.

El Camino Real is Palo Alto’s primary bus transit corridor. VTA local, express, and rapid routes traverse the study area as do Stanford Marguerite shuttles. Local route 89 runs along California Avenue connecting to the California Avenue Caltrain Station. Oregon Expressway/Page Mill Road is another transit corridor connecting the Stanford Research Park to locations in the East Bay and Menlo Park via the Dumbarton Express, and to peninsula destinations via VTA express routes and the Stanford Marguerite.

On-street parking along El Camino real is permitted in a patchwork fashion throughout the study area, with large stretches of curb designated as no parking zones. Parking is also interrupted by the multitude of driveways on El Camino Real. Driveways are particularly dense on the southbound segment west of Grant Avenue and on both the northbound and southbound segments east of Olive Avenue.
Figure 5. Bicycle Facilities
Existing Operations and Safety Performance

In order to understand the existing operations of the corridor, roadway demand and parking demand were evaluated. To further understand how the corridor performs from a safety perspective, the study assessed trends in bicycle and pedestrian collision data along the corridor.

The 2016 Average Daily Traffic (ADT) volumes on El Camino Real (Caltrans) are approximately 41,000 south of Page Mill Road and 36,000 north of Page Mill Road. According to industry standard, these volumes on a 35 MPH facility indicate that the corridor currently operates at or slightly over capacity. Observations indicate that this stretch of El Camino Real operates under congested conditions during the AM and PM peak hours.

On-street parking is permitted along most of El Camino Real within the study area and is free throughout. In the northbound direction from Oregon Expressway to College Avenue, a 2-hour limit is in place from 8AM-5PM Monday-Friday. Outside of this restriction, parking duration is unlimited. Occupancy is highly varied along the corridor. Some blocks—such as the north side from College Avenue to Stanford Avenue—are

Figure 6. Parking Occupancy

consistently occupied while others—such as the south side from Lambert Avenue to Olive Avenue—have consistently low utilization. Weekday parking data reveals a midday (12-2pm) peak in utilization of about 70% occupancy for the entire study area. An illustration of weekday and weekend parking utilization can be seen at the block level in Figure 6.

The collision assessment evaluated a ten-year period between 2006-2015, during which there were 31 bike-involved and 20 pedestrian-involved collisions. Figures 7 and 8 summarize the locations of these incidents as well as the primary collision factors and the victim profiles for the incidents. Bicycle collisions are generally clustered around signalized intersections with the exception of the side-street stop-controlled intersection at Olive Avenue. The Portage Avenue/Hansen Way and Cambridge Avenue intersections are the next two locations with the greatest number of bicycle collisions. The four most common crash types in this stretch of El Camino Real are related to high speed traffic, wrong way bicycling, side streets and driveways, and red-light violations. Vulnerable populations, including seniors and children, were involved in 12% of bicycle-collisions.

Pedestrian collisions occurred throughout the corridor, but clustered around three intersections: California Avenue, Sheridan Avenue, and Hansen Way. Seniors (65 or older) were involved in 35% of pedestrian collisions. Red light violations and right turns onto or off El Camino Real were common factors in the collisions, as were crossings at side streets with stop signs.
What Do We Know about These Collisions?

![Pedestrian Collision Profiles](image)

**Collision Type**
- Pedestrian involved collisions along the El Camino Real corridor.

**Collision Intensity**
- Fewer (0)
- More (4)

**Points on the Map**
- Signalized intersection
- Stop sign
- Fatal pedestrian involved collision
- Crosswalk
- Raised Median

**Source:** SWITRS, 2006-2015

**What Do We Know about These Collisions?**

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total collisions</td>
<td>20</td>
</tr>
<tr>
<td>Severe or fatal pedestrian collisions</td>
<td>6</td>
</tr>
<tr>
<td>Side street stop controlled intersection (20% crossing side street in crosswalk, 15% crossing El Camino Real not in a crosswalk)</td>
<td>35%</td>
</tr>
<tr>
<td>Involve seniors (65 or older)</td>
<td>35%</td>
</tr>
<tr>
<td>Red light violation</td>
<td>30%</td>
</tr>
<tr>
<td>Permitted right turns</td>
<td>30%</td>
</tr>
<tr>
<td>High traffic speed</td>
<td>10%</td>
</tr>
</tbody>
</table>

**Note:** Percentages do not add up to 100% due to overlapping collision types
Four Most Common Crash Types on El Camino Real are:

**Exiting Stop-Controlled Side Streets**

Seven of the pedestrian-involved collisions occurred at a side street stop controlled intersection, with four collisions occurring when a vehicle failed to yield to a pedestrian in a crosswalk at a side street stop controlled intersection, and three collisions occurring when a pedestrian crossed El Camino Real. This collision type could occur due to high speeds, unclear sight lines at intersecting side streets, limited gaps in traffic for vehicles exiting a side street, or distance between marked crosswalks on El Camino Real. Solutions to address this collision type differs for the two different types. At side street crosswalks, interventions could include curb extensions, crosswalk daylighting (prohibiting parking for at least 20’ adjacent to a crosswalk for clear sight lines, or installing signals at stop-controlled side streets where vehicle delay is particularly high. On El Camino Real, potential solutions include slow vehicles and improving pedestrian connectivity through new enhanced crosswalks.

**Vulnerable Populations (Seniors)**

Understanding who is walking is an important step to designing pedestrian infrastructure, especially when the presence of vulnerable users may be high. Seven of the collisions involved injuries to seniors walking. Incorporating senior-friendly design, such as slower crossing times at signals, or focusing pedestrian improvements near senior centers such as Sunrise of Palo Alto on El Camino Real, could help to minimize collisions involving seniors.

**Red Light Violations**

This collision profile, which represents six of the 20 pedestrian-involved collisions, describes when either a vehicle or pedestrian entered the intersection against the signal. Solutions to address this collision type could include signal timing adjustments to allow for longer clearance intervals or shorter cycle lengths.

**Right-Turn/Pedestrian Conflicts**

Six of the pedestrian-involved collisions occurred when a vehicle was making a right turn onto or off of El Camino Real – and all but one occurred at signalized intersections. Five of the six collisions occurred while the pedestrian was crossing in a crosswalk. This collision type could be due to high speeds or unclear sight lines. Potential solutions include corner traffic calming such as curb extensions, or crosswalk daylighting.
What Do We Know about These Collisions?

- **Total collisions of this type**: 31
- **High traffic speed and shared travel lane**: 29%
- **Wrong way bicycling**: 29%
- **Side streets and driveways**: 16%
- **Red light violation**: 13%
- **Vulnerable populations (Seniors and Children)**: 12%
- **Dooring**: 6%

*Note: Percentages do not add up to 100% due to overlapping collision types*
Four Most Common Crash Types on El Camino Real are:

**High Speed Traffic and Shared Travel Lane**
Nine of the 31 bicycle-involved collisions fall into this collision profile, which represents mid-block sideswipe and rear-end collisions, and collisions that occurred when a vehicle was changing lanes. The prevalence of this collision profile reflects that bicycles and vehicles currently share travel lanes, and vehicles often travel faster than the 35MPH posted speed limit on El Camino Real. Potential solutions include traffic calming, driver education, clear wayfinding for bicyclists to alternative routes (e.g. bike boulevards), and separated bicycle facilities (e.g. bike lanes or off street pathways).

**Wrong Way Bicycling**
Wrong way riding collisions occur when a cyclist is traveling in the street opposite the direction of vehicular traffic. This type of collision can occur when existing facilities do not meet a cyclist’s desire lines. For example, if an adequate crossing does not exist where a bicyclist wants to cross the street, he or she may ride in the wrong direction to access a signalized crossing. Wrong way bicycling could also indicate a concentration of destinations on one side of the street and may demonstrate demand for a two-way facility. Potential solutions include improved bicycle crossings at key desire lines or an off-street pathway where demand is high on one side of the street.

**Exiting Side Streets and Driveways**
Five of the 31 bicycle-involved collisions occurred when a vehicle or bicyclist entered or exited El Camino Real (to/from a side street or driveway) and failed to yield to a vehicle or bicyclist traveling on the street. This collision type could occur due to high speeds, unclear sight lines at intersecting side streets, or limited gaps in traffic for vehicles exiting a side street or driveway. Solutions to address this collision type include daylighting or green paint at side streets and driveways to improve sight lines and visibility for bicyclists, and traffic calming to reduce speeds.

**Red Light Violation**
This collision profile, which represents four of the 31 bicycle-involved collisions, describes when either a vehicle or bicycle entered the intersection during a red light. Solutions to address this collision type could include signal timing adjustments to allow for longer clearance intervals or shorter cycle lengths, or green paint for increased visibility for bicyclists at intersections.
From the start, the Grand Boulevard Palo Alto Safety Study aimed to be a collaborative planning effort that resulted in an actionable, community-based design. A 9-month public engagement program was implemented with techniques that allowed the project team to work collaboratively with key stakeholders and crowdsource the lived experience of community members who use the corridor on a regular basis. Three rounds of concentrated in-person outreach were paired with each stage of the study. Stage 1 solicited community priorities for the study area and engaged the public in a high-level visioning process, Stage 2 sought feedback on early concepts, and Stage 3 presented full draft concepts to both focused stakeholder groups and the general public.

- **Stage 1 Outreach** (January-February 2018): Envisioning the Corridor
- **Stage 2 Outreach** (May-August 2018): Initial Improvement Ideas
- **Stage 3 Outreach** (October-November 2018): Draft Design Concepts

Key elements of the engagement plan included Pop-Up Events, Online Engagement and Stakeholder Engagement.

**COMMUNITY ENGAGEMENT**

**During Outreach we...**
received over **1,850** comments and reached an estimated **900+** people based on views of the online surveys and people talked to in person.

1,850

PTA  CAABA/ MOCA
General Public
Online Survey
Pop-up Events

“Pop-up” workshops were hosted at various community venues during each stage:

- Jan 14th: Farmer’s Market
- Jan 17th: Country Sun Natural Foods
- Jan 22nd: Cal Ave Caltrain Station
- June 3rd: Farmer’s Market
- Oct 28th: Farmer’s Market

In Stage 1, large-format maps allowed participants to explore the study area, describe their experiences, and identify issues and possible solutions at a zoomed-in scale. Collision data and trends were also shared to provide context of the safety needs on the corridor. In Stages 2 and 3 participants used large-format maps and storyboards to vote and comment on alternative cross-sections, transit reliability treatments, and intersection safety treatments.

Hosting these events as pop-ups allowed the outreach team to meet community members in a place that was convenient and comfortable for them. The conversations happened during their regular errands and adjacent to the study corridor, which helped facilitate conversation and prompt ideas. A combined total of approximately 200 people stopped by one of the pop-ups.
Online Engagement

The team developed an online interactive survey for each stage of outreach using the same materials from the pop-up workshops to bring the experience of the in-person workshops online. People could view the large-format poster boards online and vote for their preferences on potential needs and improvements, such as desired routes, gaps and barriers; important destinations; their preferred cross section; and other specific intersection treatments. The surveys were open during the time-frames specified below. Over 1070 comments were collected through the online project surveys during the following time windows.

- Stage 1: Early January – mid February
- Stage 2: July – August
- Stage 3: Late October – November

The survey was linked through the City’s project webpage, which also included project status updates and a Frequently Asked Questions (FAQs) document that reflected addressed common questions and comments that emerged during the course of study.

Outreach Results

The graphs and maps below provide a visualization of the opinions that were shared during outreach. They are categorized into three main topics: Alternative Cross-Sections, Transit Reliability, and Needs and Opportunities for Bicycle and Pedestrian Crossings.
Alternative Cross-Sections

**OPTION 1**
Install Protected Bike Lanes in Place of On-Street Parking

Top Reasons for Support:

**El Camino Real Access**
In favor of the direct, convenient route that El Camino Real provides to many destinations by bike.

**Bike Safety**
In favor of bike lanes on El Camino Real to increase comfort and safety due to the high volume and speeds on the corridor.

**Multi-Modal Mobility**
Believe that bike lanes may encourage alternate modes other than driving.

**Dislike Parking on El Camino**
Believe that parking on El Camino is unsafe compared to side street or garage options, and that El Camino is inappropriately used for long term parking and not quick shopping trips.

**OPTION 2**
Maintain On-Street Parking and Focus on Parallel Bicycle Streets (like Park Blvd)

Top Reasons for Support:

**Prefer Low Speed Low Volume Routes**
Believe that traffic speeds are too high and parallel streets are safer and more comfortable regardless of bike facilities on El Camino Real.

**Manage Parking**
Prefer maintaining on-street parking to preserve vehicle access and concern with available locations to shift supply.

**Prioritize Vehicles**
Believe that El Camino should be maintained for car throughput and not compromised by increased usage by other modes.

**Too Costly/Time-Intensive**
Believe that improvements to parallel routes are a better investment of the City’s money and time.

---

**Top Concerns at Intersections**

<table>
<thead>
<tr>
<th>Frequent Themes</th>
<th>Preserve Vehicle Access at Intersections</th>
<th>Preserve Right Turn on Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Signal Improvement Needed</td>
<td>Maintain vehicle access at intersections (i.e. do not remove slip lanes and/or left turn access)</td>
<td>Preserve ability to make a right turn on red at signalized intersections; concern that people will not comply with restrictions for right turn on red</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Applicable Intersections</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Stanford Ave</td>
<td>• Grant Ave</td>
<td>• Stanford Ave</td>
</tr>
<tr>
<td>• Cambridge Ave</td>
<td>• Oregon Expwy/Page Mill Road</td>
<td>• California Ave</td>
</tr>
<tr>
<td>• California Ave</td>
<td></td>
<td>• Oregon Expwy/Page Mill Road</td>
</tr>
<tr>
<td>• Oregon Expwy/Page Mill Rd</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Transit Reliability | summary of public comments from stage 2

During Stage 2, an educational poster was used to introduce a suite of options to the public that the city could use to improve transit reliability on the corridor. Although this was not an explicit voting exercise, participants did submit general comments on their support or opposition for these ideas. A summary of the themes we heard is shown below.

The majority of participants commented that they supported improvements that improved transit while integrating safe bicycle travel, such as transit signal priority, queue jump lanes, and floating boarding islands that integrate separated bike lanes.

Some participants commented that they had concerns with improvements that create a potential for mixing of bicyclists with vehicles and transit, such as queue jump lanes and bus bulbs. Specific concerns with bus bulbs included congestion impacts and the potential safety impacts (due to forcing bikes into the shared travel lane) if bike lanes are not installed.

Needs and Opportunities for Bike & Pedestrian Crossings | summary of public comments from all stages
Stakeholder Engagement
Gathering input from stakeholders unique to the El Camino Real corridor was key to building a cohesive vision for the study corridor. Stakeholders included agencies involved with the Grand Boulevard Initiative as well as the Planning and Transportation Commission in Palo Alto.

Focused Groups
Several community groups were engaged directly throughout the course of the study that represented unique user groups on the corridor. Outreach to these groups included round-table discussions, tailored presentations with project updates, and personalized emails with invitations to the online survey. Specific efforts included:

California Avenue Business Association (CAABA/MOCA)
  • Jan 17th: In-person round-table discussion
  • May 23rd: In-person round-table discussion

Schools
  • Jan 22nd: In-person discussion with Escondido Elementary Parent Teacher Association (PTA)
  • June, July, and November 2018: Personalized Emails to Escondido Elementary and Greene Middle School PTA and Safe Routes to School contacts

SRP GO (Stanford Research Park Transportation Management Association)
  • June 28th 2018: Tailored presentation

Pedestrian and Bicycle Advisory Committee
  • Nov 6th 2018: In-person discussion

At in-person discussions, outreach materials from the pop-up events were shared. Attendees were invited to share input on general issues and opportunities as well as specific topic areas used at the pop-up events and were given information on how to share additional input through the online survey.

Technical Advisory Committee
A Technical Advisory Committee (TAC) was assembled at the beginning of the grant timeline to guide the process and provide feedback on key deliverables for both case study cities. Project partners on the TAC were included from both the San Mateo County region and the Santa Clara County region such that each city could learn from each other throughout the parallel processes. The following agencies were represented on the TAC:

  • Caltrans
  • SamTrans
  • Santa Clara Valley Transportation Authority
  • San Mateo County Public Health
  • County of Santa Clara Public Health
  • City/County Association of Governments of San Mateo County
  • The City of Redwood City
  • The City of Palo Alto

The Technical Advisory Committee was convened at four times throughout the project for collaboration on the process and input on relevant deliverables.
LOCAL VISION

The two options for improving El Camino Real between Stanford Avenue and Lambert Avenue were developed in response to collision trends and hotspots, the need for improving access to destinations along the corridor, community input on safety and operational concerns, and the identified need for Safe Routes to School from previous plans. In addition to these safety and access needs, the plans are also consistent with the City of Palo Alto’s Comprehensive Plan 2030, which promotes collaboration with VTA to improve bus service and increase transit ridership on El Camino through improvements such as transit signal priority, queue jump lanes, and bus boarding islands.

To respond to these needs, the City could either install protected bike lanes on El Camino Real (Option 1) or focus bike improvements on parallel routes such as Park Boulevard (Option 2). Both options include pedestrian enhancements at intersections to shorten crossing distances, improve visibility, and slow turning vehicles. New controlled mid-block pedestrian crossings are included at College Avenue, Grant Avenue, and Olive Avenue to reduce the distance between crossings on the corridor. Both options are consistent with goals, policies and programs in the current Transportation Element of the Comprehensive Plan 2030 and present opportunities for improved transit reliability as well as streetscape and placemaking improvements to beautify the corridor with landscaping, street trees, and pedestrian scale lighting.

Figure 12.
Existing Cross-Section
Option 1
The first alternative would install Class IV protected bikeways in place of on-street parking between Stanford Avenue and Lambert Avenue. As shown in the cross-section below, improvements would fit within the existing 104 feet curb-to-curb width. Inside lane widths would be reduced to 11 feet to make room for a wider center median to accommodate pedestrian refuge islands at intersections.

Figure 13.
Option 1 Cross-Section
Why install “Protected Bike Lanes”?

Class IV protected bikeways provide a right-of-way designated exclusively for bicycle travel in a roadway and are protected from other vehicle traffic by physical barriers, including, but not limited to flexible posts, raised curbs, or parked cars.

Available research indicates that when effective intersection treatments are employed, constructing protected bike lanes on busy streets reduces collisions and injuries. Since separated bike lanes are physically separated from vehicular traffic, almost all users (96 percent) feel safer as a result of the separation, which can help attract new riders.

As shown in Figure 14, the majority of potential transportation cyclists (including children and the elderly) fall into the "Interested but Concerned" typology. According to the Federal Highway Administration (FHWA), separated bike lanes have great potential to fill needs in creating low-stress bicycle networks and to appeal to the "Interested but Concerned" group, who may avoid on-street cycling if no physical separation from vehicular traffic is provided.

Figure 14. Four Types of Bicyclists

<table>
<thead>
<tr>
<th>STRONG and FEARLESS</th>
<th>ENTHUSED and CONFIDENT</th>
<th>INTERESTED but CONCERNED</th>
<th>NO way NO how</th>
</tr>
</thead>
<tbody>
<tr>
<td>7%</td>
<td>5%</td>
<td>51%</td>
<td>37%</td>
</tr>
</tbody>
</table>

Source: Dill, Jennifer and McNeil, Nathan, 2016. Revisiting the Four Types of Cyclists

Option 2

The second alternative would maintain on-street parking, and instead would focus potential north-south bikeway enhancements on parallel streets such as Park Boulevard. Some on-street parking would be removed for safety benefits to improve visibility at intersections. Similar to Option 1, this alternative would reduce inside lane widths to 11 feet to make room for a wider median and pedestrian refuge islands at intersections. As shown in the cross-section, improvements would fit within the existing 104 feet curb-to-curb width.

Figure 15.
Option 2 Cross-Section

Note: While this option does not propose bicycle facility improvements on El Camino, the roadway will remain open to bicyclists per the California Vehicle Code.
Tradeoffs
Option 2 would preserve the majority of on-street parking on El Camino Real. However, this alternative would not provide an equivalent degree of bicyclist connectivity or safety as Option 1. Detailed tradeoffs are shown in the Performance Measures section.

Bus Stop Design
Buses along El Camino Real currently travel in the same lane as cars and pull out into the parking lane at bus stops to pick up passengers at the curb. The City of Palo Alto’s Comprehensive Plan 2030 promotes collaboration with VTA to improve bus service and increase transit ridership on El Camino Real through improvements such as transit signal priority, queue jump lanes, and bus boarding islands. The bus stop design being considered for Option 2 is based on available width from the back of sidewalk to the center median and considerations for transit reliability as well as pedestrian comfort. The design allows buses to stop in the travel lane and reduces the width of the outside lane from 12 to 11 feet to accommodate space for a wide sidewalk and transit shelter.

Performance Measures
Performance measures were developed for this plan based on the GBI Guiding Principles¹ and feedback from the City. The performance measures, shown below, present a range of multi-modal and multi-use objectives associated with urban street design. Consistent with best practices in California, the measures also look beyond Level of Service for vehicles and prioritize multi-modal mobility, safety, connectivity, access, and quality of experience. Their purpose is to highlight the strengths and weaknesses of the two conceptual design alternatives and illustrate how these improvements will help reach the overall goals of the project, the public, and the Grand Boulevard Initiative.

¹ https://grandboulevard.net/about/guiding-principles
### Figure 16
Performance Measures

<table>
<thead>
<tr>
<th>PLACE MAKING AND STREETSCAPE</th>
<th>ESCONDIDO BUSINESS DISTRICT</th>
<th>GENERAL PUBLIC</th>
<th>PLAN TRADE-OFFS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create an integrated pedestrian environment with vibrant public spaces and improved landscaping.</td>
<td>10%</td>
<td>18%</td>
<td>18%</td>
</tr>
<tr>
<td>CONNECTIVITY</td>
<td>Provide access by bike to destinations on El Camino Real</td>
<td>13%</td>
<td>14%</td>
</tr>
<tr>
<td>COST</td>
<td>Medium to high cost level</td>
<td>8%</td>
<td>1%</td>
</tr>
<tr>
<td>ENVIRONMENT</td>
<td>Fewer opportunities for green storm water treatments</td>
<td>11%</td>
<td>10%</td>
</tr>
<tr>
<td>MOBILITY AND PARKING MANAGEMENT</td>
<td>No effect on corridor roadway capacity</td>
<td>25%</td>
<td>13%</td>
</tr>
<tr>
<td>COMMUNITY COMPATIBILITY</td>
<td>Received the majority of support during community outreach**</td>
<td>11%</td>
<td>8%</td>
</tr>
<tr>
<td>SAFETY AND PUBLIC HEALTH</td>
<td>Low Bicycle Level of Traffic Stress</td>
<td>21%</td>
<td>36%</td>
</tr>
</tbody>
</table>

*Voting results from stage 1 outreach/Performance Measures/Goal ranking exercise.
**Additional targeted outreach is needed, most likely at a door-to-door scale, especially for businesses that don’t have off-street parking available.
Alternative Designs

Several additional design alternatives are feasible within the available curb-to-curb width of El Camino Real that could address the safety, connectivity and mobility challenges for those who walk and bike on the corridor. However, these alternatives present their own challenges and were not pursued during this study.

Removal of Travel Lane

Benefits: Removing a travel lane would allow for the preservation of all on-street parking along El Camino Real and ample room for bike lanes.

Challenges: The 2007 El Camino Real Master Plan (ECR Master Plan) found that based on an analysis of future traffic volumes, no reduction in lanes along El Camino would be feasible within 400 to 600 feet of Page Mill Road. The plan presents alternatives for “6/4-Lane Hybrid Options”, which recommend the concept of a 5-lane cross section that could be used in locations where a sufficient difference between morning and evening traffic peaks was found to allow an asymmetrical roadway layout. Within the study segment for this study, both “hybrid” alternatives in the ECR Master Plan recommend a 4-lane section between Stanford and College, a 5-lane section between College and California, and a 6-lane section from California to Hansen.

According to the Santa Clara Valley Transportation Authority (VTA), the agency has evaluated many alternatives for a Bus Rapid Transit, or BRT, for the El Camino Real corridor including various lengths of bus-only lanes. After coordination with many of the jurisdictions along the corridor between 2010 and 2014, including the City of Palo Alto, it became clear that unanimous support for the project...
was insufficient to advance any of the designs. As a result of this discussion and opposition of dedicated transit lanes on El Camino, the City Council called for maintaining a 6-lane cross-section in the City’s Comprehensive Plan 2030, which was adopted in November 2017.

Due to this history, removing a travel lane was not considered as part of this study.

**Two-Way Bikeway on West Side of El Camino**

Benefits: A two-way bikeway on one side of the street would allow for the preservation of on-street parking on one side of the street. It would also allow for a continuation of the existing pathway adjacent to Stanford campus.

Challenges: Construction for a two-way bikeway can be costly due to the amount of space that is needed on one side of the road and the resulting asymmetrical cross-section. This may require large right-of-way shifts and property acquisition or reconstruction of the center median with potential reductions in lane widths and sidewalks. The design would require complex transitions at intersections to connect to existing one-way bike routes on side streets. Since El Camino Real has key destinations on both sides of the street, a two-way bikeway would not accommodate safe and intuitive connections to all destinations. For these reasons, a two-way bikeway was not considered as part of this study.

**Draft Corridor Improvement Concepts**

The concept plan lines and renderings in this section present a more detailed layout of each design alternative. The plans are inclusive of:

- safety countermeasures identified to address collision trends
- bus stop layouts
- crosswalk enhancements at priority locations based on feedback from the community and review of key destinations and land uses, and
- opportunities for landscaping

It is worth noting that these plans are conceptual in nature; further work is required before a preferred alternative is chosen and improvements are implemented. Specific studies are identified in the Next Steps chapter of this report that the city should pursue prior to implementation.

**Addressing Safety at Intersections along Protected Bikeways**

If protected bike lanes are preferred on El Camino Real (Option 1), further design will be required to refine the treatments at intersections to address right-turn conflicts along the protected bikeway.

Initial recommendations for treatments at signalized intersections were made for Option 1 following best practices for signalized intersection design along protected bikeways, which are summarized in Appendix B Design Library. The focus for these treatments is minimizing potential “right hook” conflicts between vehicles and bicycles at intersections. Main considerations include existing traffic control, available right-of-way, and the volume of conflicting right turns during the peak periods. At side-street stops, candidate treatments are presented in Appendix B, which will require additional discussion and study prior to choosing preferred treatments due to the uncontrolled nature, permitted left turns, as well as the effect on residential access.

Design options for intersections are described more in detail in the Lessons Learned Appendix, which details tradeoffs between different options while assessing design criteria for each potential treatment.
General Note: Consider driveway consolidation where possible and as redevelopment occurs, to minimize conflicts along protected bikeway.
General Note: Consider driveway consolidation where possible and as redevelopment occurs, to minimize conflicts along protected bikeway.
General Note: Consider driveway consolidation where possible and as redevelopment occurs, to minimize conflicts along protected bikeway.
General Note: Consider driveway consolidation where possible and as redevelopment occurs, to minimize conflicts along protected bikeway.
General Note: Consider driveway consolidation where possible and as redevelopment occurs, to minimize conflicts along protected bikeway.
General Note: Consider driveway consolidation where possible and as redevelopment occurs, to minimize conflicts along protected bikeway.
General Note: Consider driveway consolidation where possible and as redevelopment occurs, to minimize conflicts along protected bikeway.
General Note: Consider driveway consolidation where possible and as redevelopment occurs, to minimize conflicts along protected bikeway.
El Camino Real at California Ave Option 1

Figure 20
El Camino Real at California Ave Option 2
Short Transit Lanes

The City of Palo Alto’s Comprehensive Plan 2030 includes transit priority measures, such as transit signal priority and queue jump lanes, as a mitigation measure to improve transit operations. To align with these goals, the draft designs include a shared transit/right-turn lane along El Camino Real approaching the Page Mill Road-Oregon Expressway intersection. The lanes extend from Page Mill Road to Olive Avenue in the northbound direction and to Grant Avenue in the southbound direction. As shown in Figure 21, a portion of these right-side lanes is exclusive to transit (indicated by solid red paint), and a portion is shared by transit and right-turning vehicles (indicated by dashed red striping). Enforcement will likely be needed during the early phases of implementation to ensure vehicles are using the lane correctly (only merging into the lane where the dashed red striping is located). The San Francisco Municipal Transportation Agency (SFMTA) has a dedicated enforcement program for transit only lanes\(^1\), which includes cameras on board buses to enforce stopping/parking violations in the lanes. These red lanes, when paired with transit signal priority, allow the buses to bypass congested traffic during a red light, or “jump the queue”, to get a head start through the intersection. The design includes separate traffic signals for buses and private vehicles, and accessible signals for pedestrians and bicyclists to indicate when each of the modes can proceed through the intersection. The timing of the traffic signal would be configured to separate right-turning vehicles from conflicting pedestrian and bicycle movements to improve safety. It would also allow for vehicles turning right to proceed at the same time as non-conflicting left turns from the intersecting street (known as an “overlap” phase) to mitigate the delays for right-turning vehicles. Vehicles would be prohibited from making a right turn on red or from making a U-turn under this configuration. An example sequence of traffic signal indications is shown in Figure 22.

A traffic analysis of the draft designs, based on 2018 volumes, showed that the queue jump lanes reduce delay for buses considerably, resulting in improved bus travel times through the intersection and contributing to improved reliability of transit through the corridor. Tables 1 and 2 summarize the intersection delay savings for buses as well as overall person-delay savings under the proposed design relative to the baseline conditions (i.e., without queue jump lanes). It is worth noting that delays for private vehicles through the intersection do not substantially worsen compared to the baseline conditions, due

---


Source: www.actransit.org
to the combination of additional roadway capacity provided by the shared transit/right-turn lanes and the traffic signal timing configuration. Particular movements of concern such as northbound queues during the morning peak hour would not worsen compared to the baseline conditions.

The traffic analysis described above is based on the preliminary draft designs and focused on the intersection of El Camino Real and Page Mill Road-Oregon Expressway. A broader and more comprehensive analysis is recommended in subsequent phases of the project, as explained in the Next Steps section.

Table 1.
Delay Savings during Peak Congested Conditions – Buses only (seconds):

<table>
<thead>
<tr>
<th></th>
<th>PM</th>
<th>AM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Southbound</td>
<td>Northbound</td>
</tr>
<tr>
<td>Present Year Conditions</td>
<td>100</td>
<td>110</td>
</tr>
<tr>
<td>Proposed Design</td>
<td>-35 (35.0%)</td>
<td>-15 (15.0%)</td>
</tr>
</tbody>
</table>

Delays reported are approach delays for buses at the ECR/Page Mill Road intersection. Documented reductions in travel times through intersections with queue jump lanes have ranged from 5% to 15%, and reductions in travel times for exclusive bus lanes have ranged up to 40%. Source: Transit Capacity and Quality of Service Manual, Third Edition, TRB, 2013.

Table 2.
Person Delay Savings during Peak Congested Conditions – Buses and Private Vehicles (person-seconds per hour):

<table>
<thead>
<tr>
<th></th>
<th>PM</th>
<th>AM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Southbound</td>
<td>Northbound</td>
</tr>
<tr>
<td>Present Year Conditions</td>
<td>135,000</td>
<td>89,000</td>
</tr>
<tr>
<td>Proposed Design</td>
<td>-10,500 (8.0%)</td>
<td>-4,500 (5.0%)</td>
</tr>
</tbody>
</table>

*Assumptions: approximately 50% occupancy of buses during the PM peak hour, average occupancy of 1.2 for private vehicles.

Figure 21
Queue Jump El Camino Real: Grant Ave to Olive Ave
Note: In order to preserve bicycle and pedestrian safety as well as vehicle flow for conflicting movements, right turns on red would need to be restricted in each stage.
This chapter covers potential next steps that the City of Palo Alto and Caltrans may undertake to choose a preferred alternative and implement a proposed vision for the El Camino Real corridor. In addition to the planning-level cost estimates, funding strategies, list of Caltrans design decisions and additional recommended studies discussed in this chapter, opportunities for “quick-build” improvements and a “living preview strategy” are also identified in the Lessons Learned Report to continue the momentum of the project through near-term pilot programs and community engagement.

This Study represents a unique partnership between SamTrans, the City of Palo Alto, and Caltrans in which SamTrans took the lead on securing funding and managing the study development. This strategy may be beneficial moving forward to secure funding for final design before the City and Caltrans ultimately deliver the project.

Cost Estimates
Planning level costs were developed as part of the conceptual design process. While more detailed cost estimates will be needed as part of final design, the long-term corridor improvements are estimated to cost approximately $12,620,000 for Option 1 and $10,816,000 for Option 2.

Funding Sources
Implementing the local vision for the corridor will require funding from many different sources to supplement existing available funds.

Existing Funding
In 2017 the City secured $4,655,000 in One Bay Area Grant (OBAG) funding, distributed by VTA, for implementation of improvements along El Camino Real between Oxford Avenue and Grant Avenue, identified prior to this study. Improvements submitted as part of the grant application focus on intersection safety improvements such as curb extensions and additional crosswalk enhancements. The existing funding could be used to implement additional improvements from this study that further the goal of the OBAG program to invest in streetscape, bicycle and pedestrian improvements within or near Priority Development Areas.

To make best use of the grant funding currently available, the city could identify a phasing program that allows construction of common elements between the two potential visions to allow for additional study and outreach prior to final phase of construction for either alternative. The anticipated timeline for the grant money is 2019 for design and 2021 for construction.
Potential Funding
For future phases of the project or to supplement the current OBAG funding, the following funding sources are anticipated to be the best fits for the project:

**Caltrans Active Transportation Program (ATP):** While ATP is one of the most competitive statewide and regional grant funding sources, the El Camino Real corridor in Redwood City is likely a strong contender for grant funding. One of the primary scoring criteria is potential for increased walking and bicycling to and from important destinations, especially among students, which is particularly applicable to El Camino Real if protected bike lanes are installed. With the safety benefits for active modes and the significant walking and biking comfort improvements, the project would likely rank high. This grant would likely only be applicable to the walking and biking related improvements. It is anticipated that some of the landscape and transit improvements would not be eligible. ATP Cycle 5 is expected to start in spring of 2020.

**Caltrans Highway Safety Improve Program (HSIP):** HSIP intends to address areas with serious documented safety records. The primary metric for this is a cost benefit ratio that heavily weighs fatal and severe injuries. As this segment of El Camino Real has a high proportion of bicycle and pedestrian-related collisions, the project will likely be very competitive for this funding source. This grant is primarily used to fund specific safety countermeasures, so project definition requires documented safety benefits for collision type. Collision types on the study corridor identified through this study should be a useful reference for an HSIP application. Another round of HSIP grants is likely to be announced in spring of 2019 or 2020.

**2016 Measure B Sales Tax:** It is anticipated that the 2016 Measure B Santa Clara County transportation sales tax will be an important source for future funding. At present time, though approved by voters in late 2016, it is facing legal challenges. As a result, the timing of potential Measure B funding availability is uncertain.

**Affordable Housing and Sustainable Communities (AHSC) program:** Funded through statewide Cap and Trade funds, the AHSC grants help fund affordable housing but can include substantial transportation improvements within one mile of the affordable housing site. Recent cycles have placed greater emphasis on transportation improvements. Given the need to preserve and accommodate additional affordable housing in the area identified in the 2015-2023 Housing Element and the 2018 Draft Housing Work Plan, this could be an important grant funding source. However, it is reliant upon opportunities to coordinate with housing developers. The City should flag and pursue the grant as interest in affordable housing development arises on parcels along or near the corridor.

**Senate Bill 1:** With the passage of the statewide transportation bill in 2017, additional funding sources are likely to become available for transit projects to reduce vehicle miles traveled (VMT). Bus stop improvements for this corridor, such as bus boarding islands, may be eligible.

**Implementation Process**
As a state-owned facility, improvements along El Camino Real will require final approval from Caltrans through the Project Initiation Documents (PID) process. Specific improvements will require varying levels of documentation, additional study, or review in order to receive approval. The table below summarizes input from Caltrans received during preliminary design review meetings with the agency, as well as the additional studies that may be required and improvements that will require special justification for approval by Caltrans, also called a “Design Standard Decision Document”.

Many improvements being considered are consistent with the Caltrans Strategic Management Plan (2015-2020), which strives to fully integrate bicycles into all aspects of the California transportation system, and are not subject to the Caltrans Design Standard Decision process.

**Pilot Projects**
To continue the evaluation process of the two options presented in this plan, the city can consider strategies for testing portions of the design as part of a temporary pilot project. Quick-build construction strategies, such as those that use a “paint and plastic” approach, can be a useful way to install temporary versions of improvements. Specific quick-build strategies are included in the Lessons Learned and Design Library report for this study.
Caltrans Coordination: Pavement Rehabilitation Project

The State Highway Operation and Protection Program (SHOPP) is a “fix-it-first” program that Caltrans uses to fund the repair and preservation on State highways, with four key assets including pavement, bridges, culverts, and Transportation Management Systems (TMS). SHOPP projects provide opportunities to address other State priorities, such as the implementation of Complete Streets elements, including pedestrian and bicycle facilities identified by Caltrans or local jurisdictions through various planning efforts. For pavement projects, opportunities may include quick-build elements that are consistent with this study such as curb ramp upgrades, crosswalk enhancements, and other low-cost measures such as dedicated bikeways. When SHOPP projects are scoped and developed, Caltrans coordinates with the local jurisdiction and stakeholders to identify opportunities for Complete Streets improvements. In Palo Alto, a pavement project is programmed in the SHOPP and in early development, with anticipated construction scheduled in 2022.

Relinquishment Potential and Tradeoffs

The Grand Boulevard Initiative (GBI) Task Force, together with the Metropolitan Transportation Commission (MTC), initiated a study to explore the process and tradeoffs associated with relinquishing SR 82 (El Camino Real) from state ownership to the local jurisdictions. According to the study, one of the key challenges identified by GBI and other cities in redesigning urban highways like El Camino is the process for transforming state facilities into multi-modal, sustainable streets that encourage walkability and investment in mixed-use development. The State Route 82 Relinquishment Exploration Study analyzes case studies of recent highway relinquishments, including local examples, and determines cost estimates for relinquishment of El Camino based on existing conditions. The intent of the study is to provide information and analysis to cities in Santa Clara and San Mateo counties to make informed decisions about potential relinquishment of El Camino.
Table 3.
Implementation Documentation and Studies

<table>
<thead>
<tr>
<th>Study or Report</th>
<th>Specific Locations and Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required by Caltrans</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Caltrans Design Standard Decision Document (DSDD) | Corridor-wide to document justification for design variances from the Highway Design Manual. Specific improvements include:  
• Lane Widths < 11'  
• Net reduction in shoulder width (conversion of the on-street parking lane to a bike lane with a raised permanent barrier) |
| Detailed Traffic Analysis                     | All study intersections to evaluate access modifications and signal timing changes that are needed to support the recommended design changes. Examples include:  
• Hansen/Portage overlap phases  
• No Right Turn on Red at various intersections with bike boxes  
• Separate Bicycle Phasing (i.e. Stanford Ave)  
• New turn restrictions at Grant Avenue |
| Sight Distance Study                          | At Grant Avenue (PHB location) for Caltrans approval of longitudinal setback of canopy trees from crosswalk of less than 100'. |
| **Recommended by Consultant**                |                                                                                                                                                              |
| Transit Corridor Study                        | Corridor-wide to assess the effects of the project on transit travel time and reliability. Analysis should consider:  
• Extensions of the proposed queue jump lanes at Page Mill Road  
• Options for bus stop locations  
• Additional transit signal priority options  
• Optimized traffic signal timing and progression  
• Coordination with VTA and the City of Palo Alto to identify additional locations for similar treatments |
| SSAR or other systemic safety study           | City-wide for holistic collision review and to understand where El Camino Real falls in range of safety priorities for the City. |
| Bicycle Volume Projections                    | Corridor-wide for grant applications and to understand benefits of project to increase bicycle volumes. |
| Parking and Access Management Study           | Corridor-wide to work with impacted businesses along El Camino Real to identify strategies to address potential loss of on-street parking and access, especially for those that have limited off-street parking. Potential strategies include:  
• Shared parking, especially through public/private partnerships through new development or underutilized parking garages  
• Parking pricing  
• Designated loading/unloading zones at nearby locations (curbside management) |
| Quantitative Performance Measure Scoring      | Corridor-wide to aid in choosing preferred alternative and for quantifiable tradeoffs. |