April 2020

Tasman Corridor
COMPLETE STREETS STUDY

Final Report

Santa Clara Valley Transportation Authority

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Sunnyvale

Kimley»Horn

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1 INTRODUCTION

Corridor Overview and Description

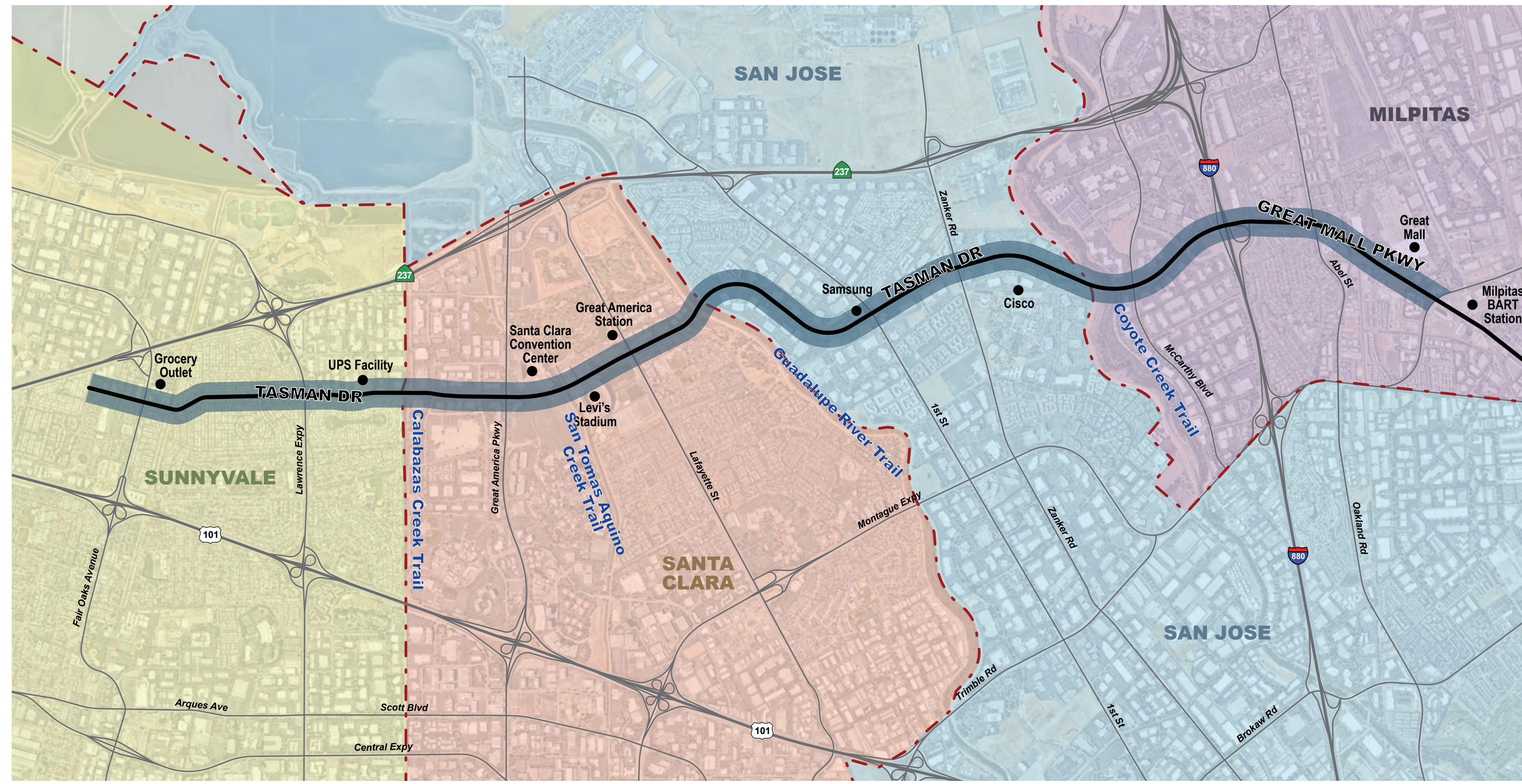
The Tasman Corridor (the "Corridor") serves numerous regional and local trips for workers, residents, and visitors of Silicon Valley. Local and commuter trips along the Corridor are generated by a multitude of low- and medium-density residential complexes, corporate headquarters and other major employment centers, and commercial centers. Regional trips along the Corridor are generated by major entertainment and commercial destinations, including Levi's Stadium, the Santa Clara Convention Center, California's Great America theme park, and the Great Mall. The opening of the new Milpitas Bay Area Rapid Transit (BART) Station is expected to add additional transportation demands for both local and regional trips. Ongoing and planned developments in Milpitas and Santa Clara will add significant new employment, residential, and entertainment uses along the Corridor as well. Transportation modes on or crossing the Corridor include regional light rail operating within the median, several local bus and shuttle routes, commuter and regional rail services, on-street bicycle lanes, four grade-separated regional trails, sidewalks, and four to six lanes of auto traffic.

To provide for the ongoing growth and transportation demands on the Corridor in a sustainable and community-supportive manner, the Tasman Corridor Complete Streets Study ("Study") is the start of a process to enhance the safety, comfort, and reliability of the Corridor's transit, bicycle, and pedestrian facilities, while still accommodating drivers. The Santa Clara Valley Transportation Authority (VTA) led the project effort in close partnership with the Cities of Sunnyvale, Santa Clara, San Jose, and Milpitas ("Partner Agencies"). The outcomes of this Study are intended to assist VTA and the Partner Agencies in implementing a cohesive set of multimodal improvements along the Corridor.

This report details the various components of the Study undertaken by the project team, including the final product of the Study, which is a set of multimodal improvements proposed for the Corridor. The proposed improvements are grouped and packaged as stand-alone projects to better facilitate their implementations.

The Study limits of the Corridor extend 7.1 miles along Tasman Drive and Great Mall Parkway from Morse Avenue to Montague Expressway. The Corridor traverses through the cities of Sunnyvale, Santa Clara, San Jose, and Milpitas. Figure 1-1 presents the limits of the Study Area.

Figure 1-1: Project Study Area



2 PROJECT APPROACH

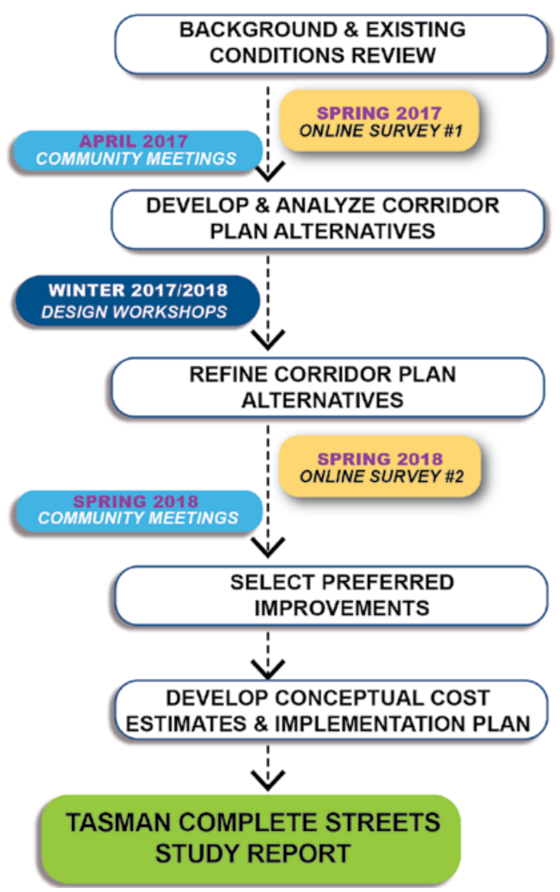
The Study's objective is to identify a set of community-supported improvements to enhance safety, comfort, and reliability of all travel modes along the Corridor. To achieve this objective, this Study included a broad public outreach effort in addition to technical efforts.

Initial Study efforts involved gathering and analyzing data provided by local agencies or collected by the Consultant team and performing field observations of the Corridor. Current and future planned conditions along the Corridor were analyzed as part of this overall existing conditions analysis. In addition, a robust public and stakeholder outreach effort obtained input on Corridor needs, areas for improvement opportunities, and Corridor priorities. Outreach efforts completed in the initial project phase included three community meetings held at different locations along the Corridor, four walk audits that collectively extended the entire length of the Corridor, and an online map-based survey.

Subsequent Study efforts used the existing conditions assessment and first round of public input to identify potential multimodal Corridor improvements. These included enhancements to address spot deficiencies as well as treatments that could be applied to stretches of the Corridor across jurisdictional boundaries to help create a cohesive Corridor and well-connected transportation network. These improvements were reviewed with the Partner Agencies at a set of design workshops; the improvements were then refined based on workshop input and development of preliminary conceptual designs. The conceptual designs were used to create a series of improvement graphics, renderings, and cross-sections that were presented to the public as part of a second round of public outreach.

The feedback received from the second round of public engagement was used to refine the potential improvements further and identify a set of recommended improvements for the Corridor. The refined improvements were then analyzed and evaluated; cost estimates and an implementation plan were developed and are also documented in this report. Figure 2-1 illustrates the project process.

Figure 2-1: Project Process



STUDY OBJECTIVE: identify a set of **community-supported** improvements that strive to enhance safety, comfort, and reliability of all modes along the Corridor

The Corridor: By the Numbers

4 Cities

18,000 Daily Vehicle Volume

7.1 miles

>6,800 Daily LRT Boardings

3 PUBLIC AND STAKEHOLDER OUTREACH ROUND 1

Public and stakeholder outreach was a critical component of this project. From the outset of the project, VTA and the project consultant team participated in regular coordination meetings to request input from and provide project updates to the technical advisory group (TAG), which included representatives from VTA and the four Partner Agencies.

VTA conducted an initial round of outreach to provide information about the purpose of the Study, review existing conditions, provide examples of possible project improvement alternatives, collect input from the community regarding areas of concern and challenges, and answer questions from the public. Activities conducted as part of the first round of outreach include:

- Three in-person community meetings;
- A map-based online survey;
- Four "walk audits," held in each of the four cities along the Corridor; and
- Tabling at Cisco.

Detailed summaries of all outreach activities are provided in Appendix A – Outreach Summaries.

Community Meetings

VTA hosted three community meetings on April 11, 12, and 13, 2017, at three different locations: the Riverwood Grove Community Room (2150 Tasman Drive in Santa Clara), the Lakewood Park Community Room (834 Lakechime Drive in Sunnyvale), and the Centria Community Room (1101 S. Main Street in Milpitas), respectively. Outreach materials publicizing the meetings, as well as materials provided at the meetings, were provided in English, Spanish, and Chinese.

At each meeting the project team provided background information about the project objectives and schedule. Attendees were asked to provide input about where they live, how and when they use the Tasman Corridor, what modes of transportation do they primarily use on the Corridor, what they think the priorities for the Corridor should be, and to mark on the map where hot spots and problematic conditions exist.

Walk Audits

The project team conducted four walk audits on April 27 and 28, 2017, as part of the existing conditions analysis for the Study. These audits had the following purposes:

1. Identify specific issues impacting the pedestrian and bicycle environment and travel along the walk audit routes;
2. Catalog issues within each city along Tasman Drive for presentation in the Existing Conditions Report;
3. Create a shared understanding of infrastructure and behavioral issues that create challenging, uncomfortable, or unsafe pedestrian and bicycling environments; and
4. Discuss potential countermeasures and/or policy and programmatic changes that could address identified issues.

VTA staff, local agency staff, and key stakeholders accompanied the consultant team on each respective walk audit and answered questions about specific existing and planned infrastructure within the walk audit areas as well as general practices with respect to complete streets projects and policies. The group stopped at designated points along the route to note observations about roadway geometry, lane markings, signage, and other issues that affect Corridor transportation.

Online Survey

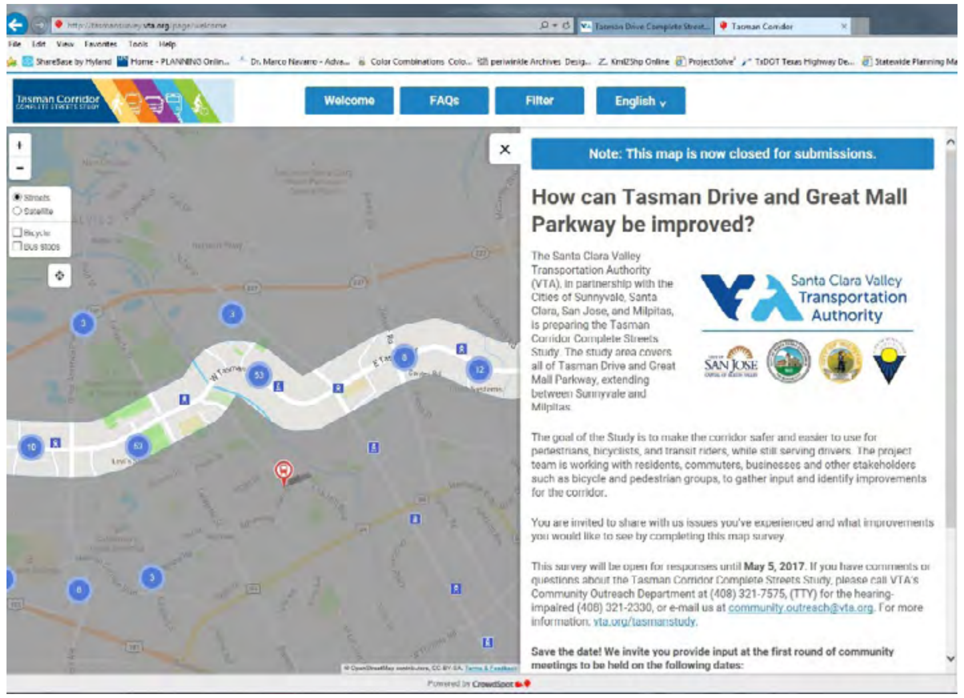
From March 28 to May 5, 2017, the project team conducted an online survey available to the public via the CrowdSpot survey platform. This interactive mapping program allowed participants to share specific "spots" of issues they've experienced and comment on the types of improvements they would like to see. These comments were available for all to see and allowed other participants to add on comments if they agreed or disagreed. A total of 281 "spots" were submitted as part of this survey. In addition to the mapping activity, the survey also included multiple-choice survey questions.

Many of the concerns expressed in the survey responses were related to gaps in facilities or the poor condition of non-auto facilities along the Corridor. The highest-priority needs for the Corridor identified by respondents were:

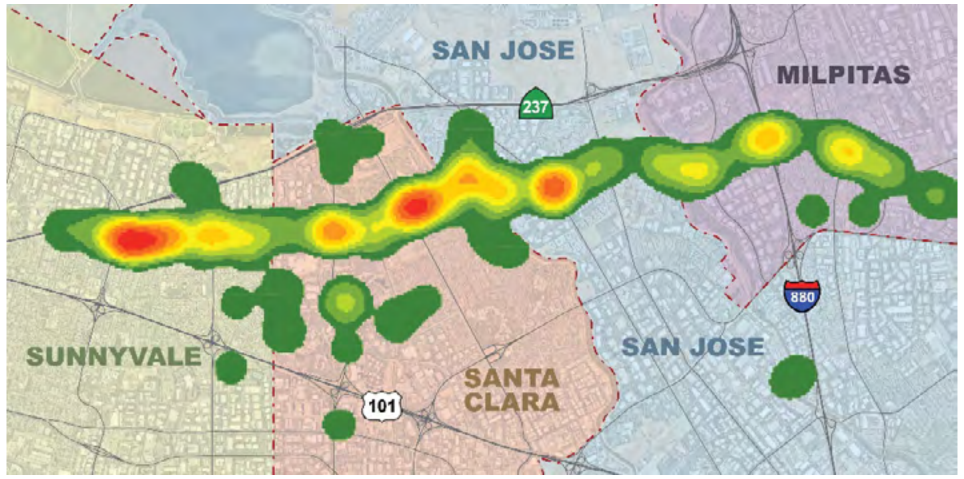
1. Safer or more comfortable sidewalks and completing missing sidewalks
2. Safer or more comfortable bike facilities and completing missing bike facilities
3. Faster light rail service

Figure 3-1 depicts the types of corridor challenges organized by City. As shown in the chart, walk issues were the most common noted, with the largest number of walk issues identified in Sunnyvale, which does not have sidewalks for much of the corridor.

Figure 3-2 depicts some of the responses to the survey questions about corridor usage and corridor needs



CrowdSpot survey interface



Density of CrowdSpot Issue Spots

Figure 3-1: Select Survey Responses

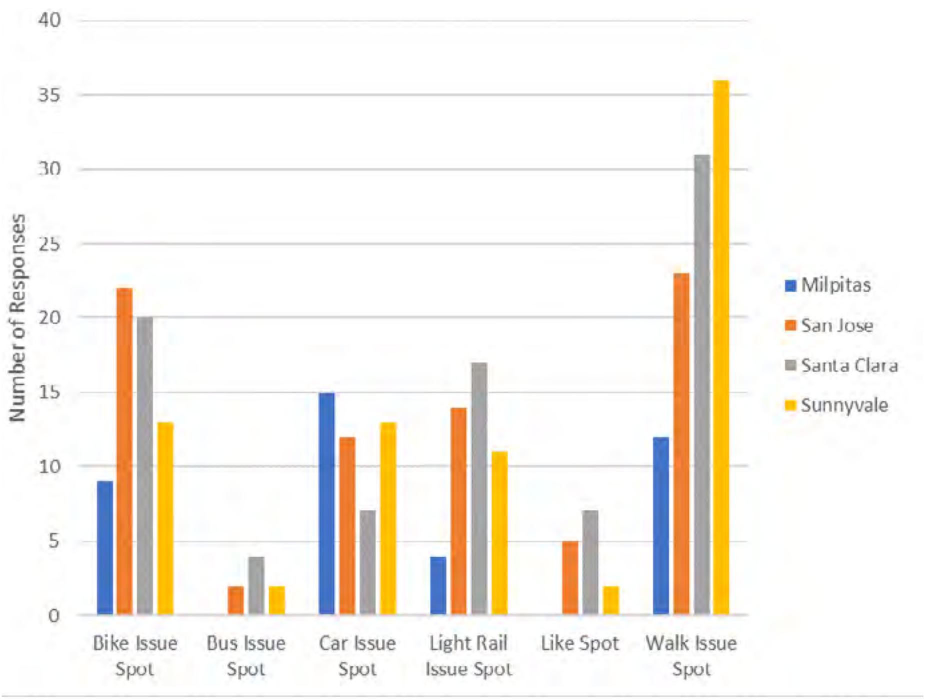
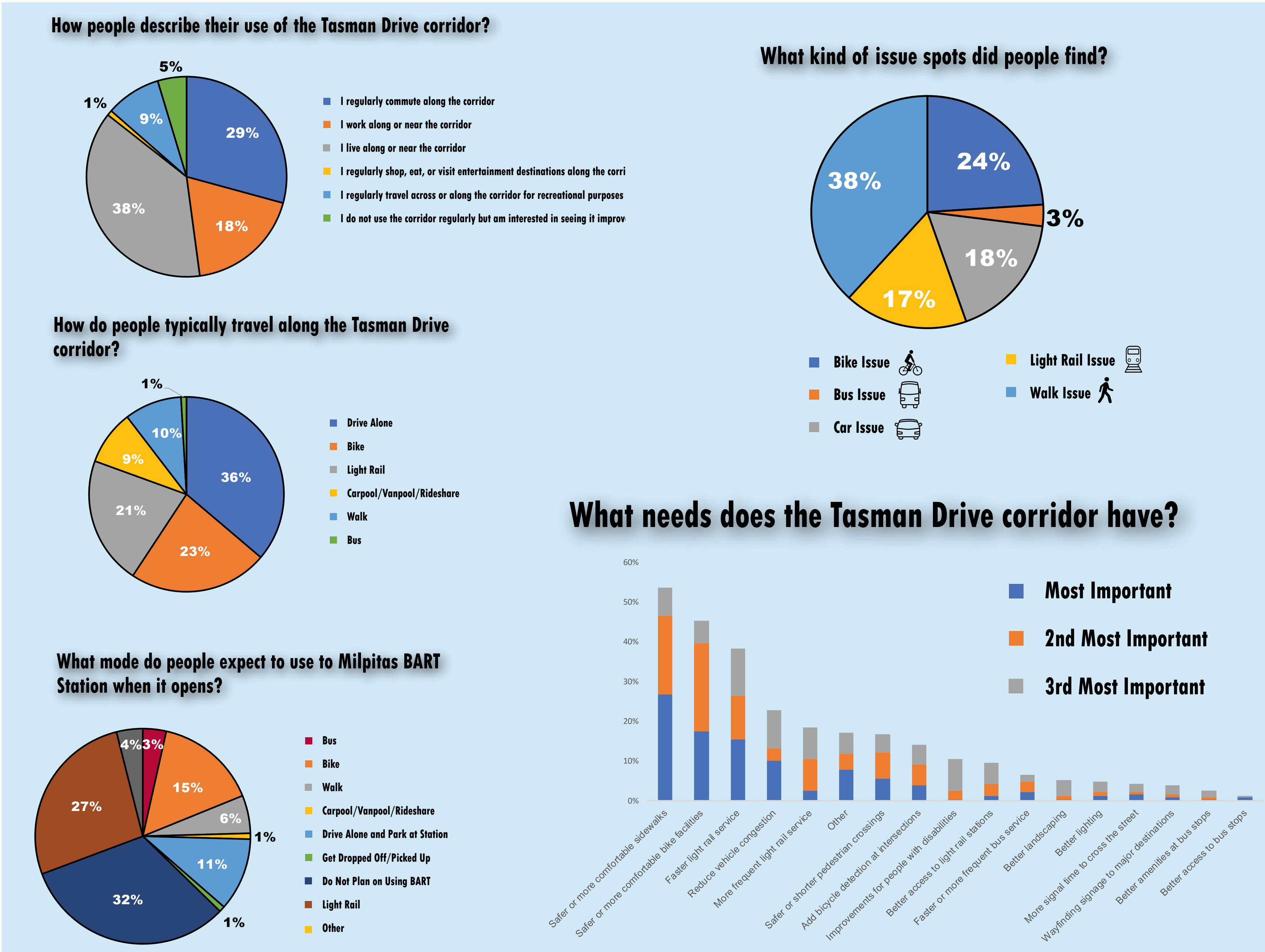


Figure 3-2: Sampling of Public Input Received During Outreach Round 1



4 CORRIDOR NEEDS

Prior to developing any proposed improvements, the project team identified the Corridor's multimodal needs. The needs identification was primarily informed by the first round of public and stakeholder outreach along with field observations.

Bicycle and Pedestrian Connectivity

A major need identified through the existing conditions analysis and public outreach was closing gaps or enhancing connectivity for bicycle and pedestrian facilities. In the online survey, respondents ranked "safer or more comfortable sidewalks and completing missing sidewalks" as the highest need for the Corridor, and "safer or more comfortable bike facilities and completing missing bike facilities" as the second highest priority need for the Corridor.

Some locations along the Corridor are missing sidewalks, and in other locations the obstacles such as poles, fire hydrants, and other utilities, are located within the sidewalk. Figure 4-1 depicts the existing bike facilities along the Corridor and Figure 4-2 depicts the existing pedestrian facilities along the Corridor.

Sunnyvale

In general, Sunnyvale was identified as needing the most improvements to address gaps in connectivity for bicycle and pedestrian infrastructure. For example, Sunnyvale has the largest segments of missing sidewalk including from east of Fair Oaks Avenue to Vienna Drive (on the south side of Tasman Drive), from east of Fair Oaks Avenue to Lawrence Expressway (on the north side of Tasman Drive), from east of Lawrence Expressway to west of Reamwood Avenue, and from Reamwood Avenue to the Calabazas Creek Trail.

Class II bike lanes exist in Sunnyvale between Morse Avenue and Fair Oaks Avenue and between Reamwood Avenue and Calabazas Creek, but the bike lane ends at the bridge crossing over Calabazas Creek. The remainder of the Corridor through Sunnyvale does not have a dedicated on-street bicycle facility. The Calabazas Creek Trail is not well signed and is not fully paved in the area around Tasman Drive.

Santa Clara

In addition to prioritizing sidewalk improvements and providing connections where there are currently gaps in the network in Santa Clara, residents and stakeholders also commented on the uncomfortable length of crossings and lack of pedestrian refuges at intersections.

There is a Class II bike lane on the Tasman Drive between Patrick Henry Drive and the Guadalupe River Trail, but there are several gaps and the bike lane is disconnected from other bicycle facilities along the Corridor. The Class II bike lane has a buffer in some sections, but not all. There is a gap in the bike network on the north side of Tasman Drive between Calabazas Creek Trail and Patrick Henry Drive. Similarly, there is a gap on the south side of Tasman Drive between Patrick Henry Drive and Old Ironsides Drive. The existing bike facility through Santa Clara has limited connectivity to Calabazas Creek Trail and the Guadalupe River Trail.

San Jose

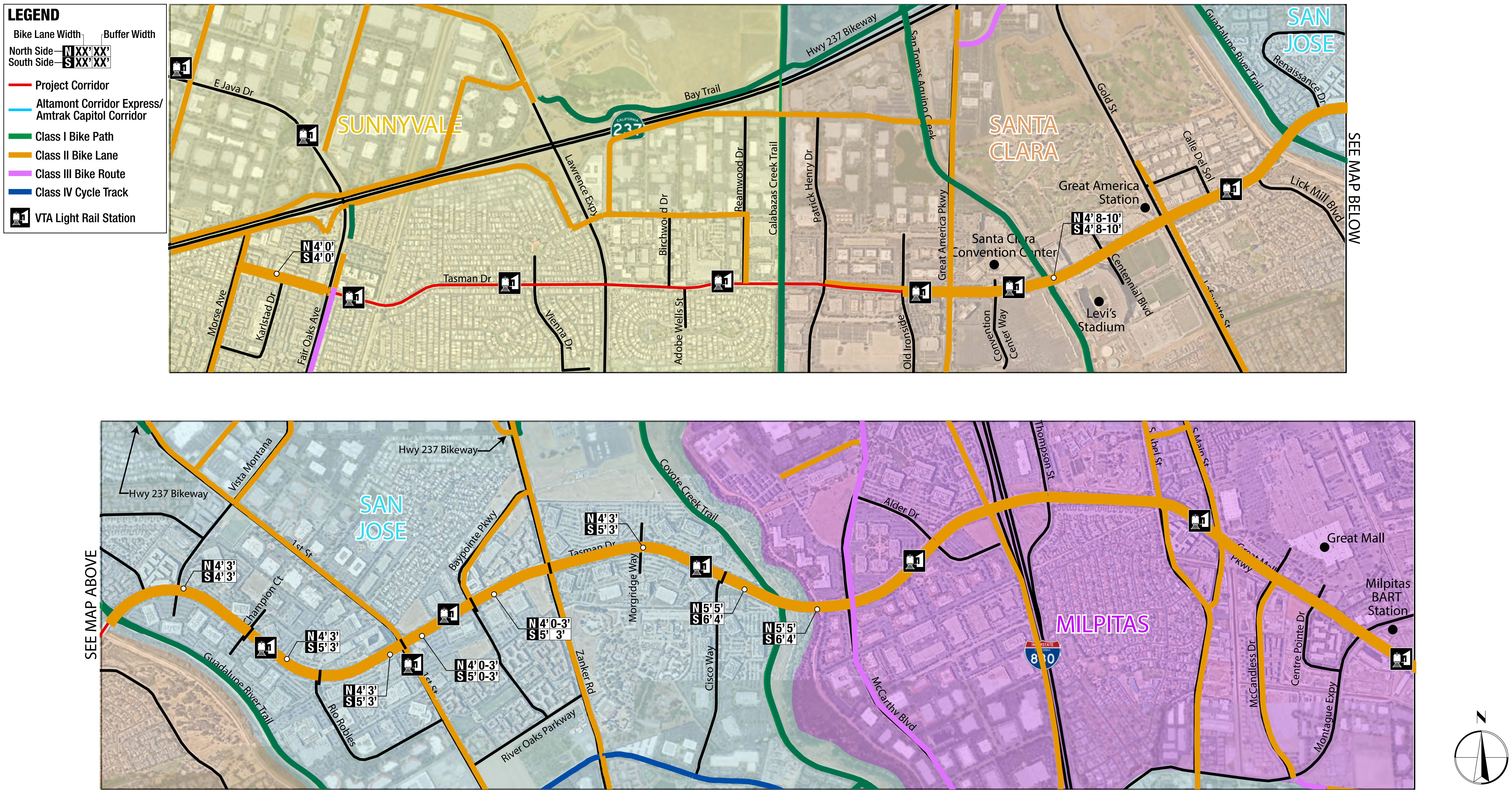
There is an existing Class II bike lane and continuous sidewalk along the Corridor through San Jose. A buffer exists on some segments, but not all. The intersection of Tasman Drive and North First Street was recognized as creating significant challenges to pedestrian and bicycle connectivity due to high levels of delay. The major light rail movements combined with vehicle movements increase wait times for bicyclists and pedestrians navigating the intersection.

Milpitas

In Milpitas, there are gaps in the sidewalk on the south side of Tasman Drive between McCarthy Boulevard and Alder Drive, and to the east of South Main Street due to ongoing construction. The City of Milpitas Conditions of Approval require that the developments install sidewalks along Tasman Drive so the gap east of Main Street is expected to be completed along with the completion of the current construction.

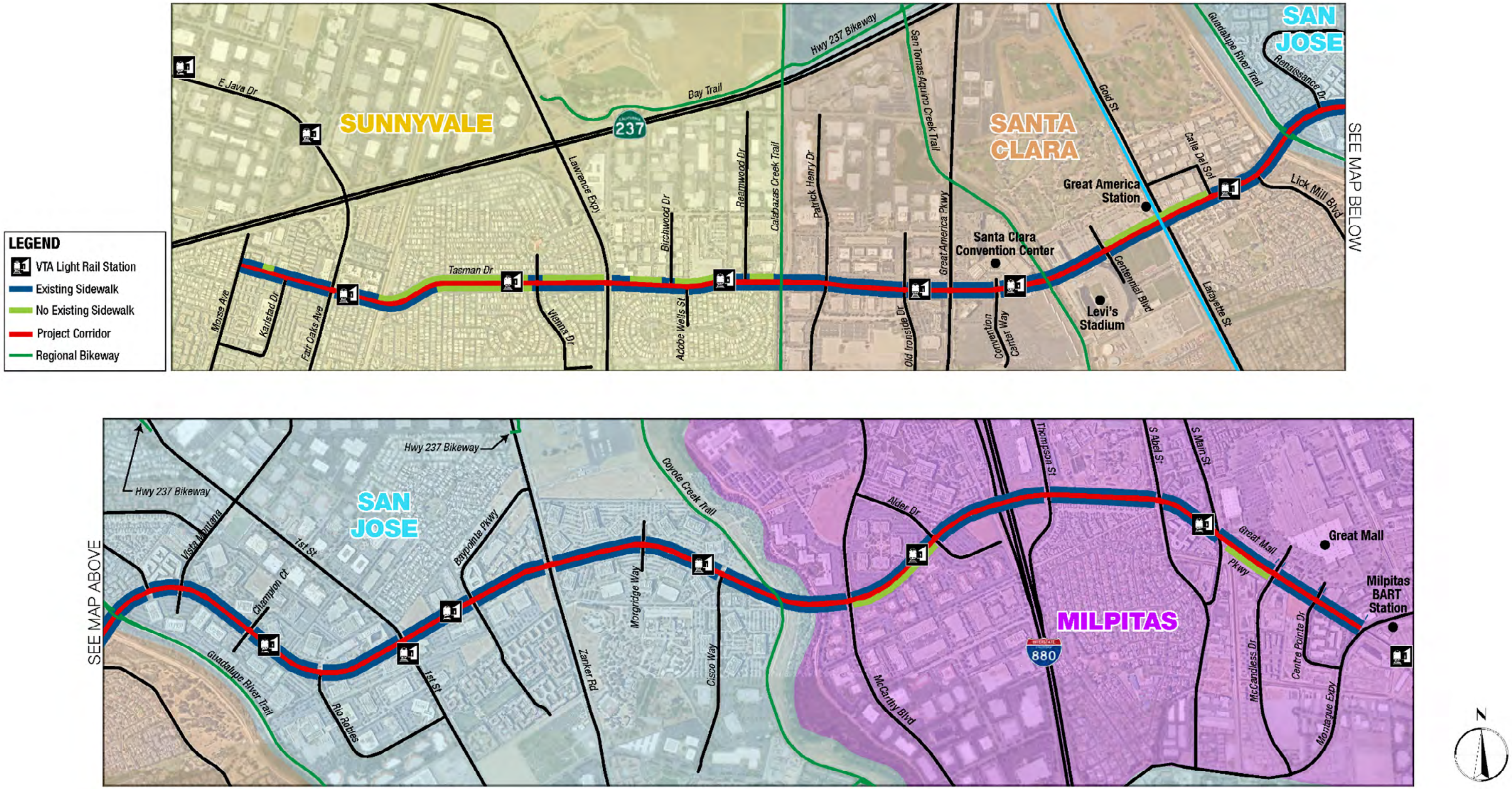
There is an existing Class II bike lane along the Corridor throughout Milpitas. The interchange with I-880, along with the large intersections along the Corridor in Milpitas, present challenges for bicyclists and pedestrians to navigate.

Figure 4-1: Existing Bicycle Facilities Map



Santa Clara Valley Transportation Authority

Figure 4-2: Existing Pedestrian Facilities Map



Safety and Comfort

The consultant team identified areas where facilities do not provide a high sense of safety, as determined through the outreach process and existing conditions evaluation. Figure 4-3 and Figure 4-4 depict all vehicle-involved collisions and collisions involving bicycles and pedestrians, respectively.

Sunnyvale

In Sunnyvale, general comments were made regarding the need for a buffer between the pedestrian walkways and fences. Additionally, blind spots along the roadways were mentioned for which additional lighting would improve visibility. Pedestrians expressed discomfort crossings to and from LRT stations.

The intersection of Tasman Drive and Lawrence Expressway was identified as a point of concern for safety and comfort for pedestrians and bicyclists; issues raised included a lack of shade and general unpleasant atmosphere due to the presence of a high volume of high-speed vehicles.

Between 2011-2015, the City of Sunnyvale had two reported bicycle collisions and four reported pedestrian collisions along the Corridor, including one fatality. The intersection of Tasman Drive with Lawrence Expressway had the largest number of auto collisions and collisions with injuries in the Study area.

Santa Clara

Key issues identified in Santa Clara were the uncomfortable length of crossings and lack of pedestrian refuges at intersections. The bike lanes were also identified as needing more frequent street sweeping as debris regularly builds up in the lanes, causing them to be uncomfortable for bicyclists.

In addition, the overpass connection with Lafayette Street was identified as a point of concern as there exists no convenient connection between Tasman Drive and Lafayette Street.

The wide and busy intersection of Tasman Drive and Great America Parkway was identified as uncomfortable for pedestrians and bicyclists; community members indicated that vehicle turning movements were a major concern at this intersection.

Between 2011-2015, the City of Santa Clara had seven reported bicycle collisions and five reported pedestrian collisions along the Corridor. There were relatively few auto collisions but a number of bicycle- and pedestrian-involved collisions near Calle del Sol and Lick Mill Boulevard.

San Jose

The intersections of Tasman Drive with North First Street and Zanker Road were identified as being particularly challenging to the safety and comfort of bicyclists and pedestrians due to the combination of high vehicle volumes, light rail crossings, and long crossing distances.

The Class II bike lanes throughout San Jose have buffers in some segments but not in others. Continuous sidewalks exist but are narrow and have obstructions in some areas.

There were 11 reported bicycle collisions and five reported pedestrian collisions along the Corridor within the City of San Jose between 2011 and 2015. Those collisions were distributed throughout the Corridor in San Jose.

Milpitas

Crossing the corridor in Milpitas on the eastern edge of the Study Area was noted as a safety concern for pedestrians. Public feedback included a desire for a pedestrian overcrossing at Great Mall Parkway and Main Street.

Between 2011-2015 along the Corridor, Milpitas had 17 reported bicycle collisions, including 2 fatalities, and 7 reported pedestrian collisions, included 1 fatality. Milpitas had a number of locations with high volumes of collisions, including Alder Drive, I-880, and Montague Expressway. The only pedestrian and bicyclist fatalities along the Corridor occurred in Milpitas at the Tasman Drive intersections with Alder Drive and Montague Expressway.

Wayfinding, Signage, and Lighting

Visible and well-lit signage and wayfinding that identify Corridor features are crucial to Corridor operations. Generally, the Corridor lacks consistent wayfinding, transit signage, and pedestrian lighting. This makes it challenging to locate destinations and identify the most direct and comfortable routes. Wayfinding with directions and distances to key destinations such as trails, light rail, bus, and BART stations and other amenities would help orient Corridor users and contribute to a sense of place.

Reliability and Travel Time

Light rail trains operating along the Corridor are frequently delayed due to the presence of numerous traffic signals and high traffic volumes. While light rail operates in an exclusive guideway within the corridor median, it must still cross all signalized intersections west of I-880 at-grade and adhere to all traffic signal indications.

The average speed of both eastbound and westbound trains (routes 901 and 902) for weekday travel time was measured by miles per hour (mph). Average LRT speeds by segment ranged up to 20 mph. The corridor segments with the lowest speeds were those containing stations or approaches to major signalized intersections. The segments with the highest average speeds were those containing fewer intersections or where the LRT guideway is grade-separated. See Figure 4-5 for existing LRT travel times along the corridor.

Corridor Reliability is typically described by the public in terms of observed levels of congestion. The outreach process identified public concerns about vehicles turning south onto Fair Oaks Avenue, citing a short yellow time length and causing a build-up in waiting vehicles. Congestion in the City of Santa Clara was noted for being extremely high during events at Levi's Stadium. Additional concerns were raised regarding poor signal timing at the intersection of Tasman Drive and Great America Parkway. The intersection of Tasman Drive and Vista Montana noted that the left-turning traffic trying to access Highway 237 will typically back up during the evening rush hour and impede traffic in the through travel lanes. On the bridge between San Jose and Milpitas, eastbound travel lanes narrow from three to two, but widen back to three after the bridge. Feedback on this transition was related to heavy congestion as people merge on the bridge during peak hours. Feedback regarding the signalized intersections near the Cisco complexes in Milpitas were noted for their long delays with longer cycle lengths being given to the Cisco exits. The intersections between Tasman and the I-880 ramps were described as constantly congested because of the signal timing and the light rail train.

Figure 4-3: 2011-2015 Statewide Integrated Traffic Records System (SWITRS) Vehicle Collision Locations Map

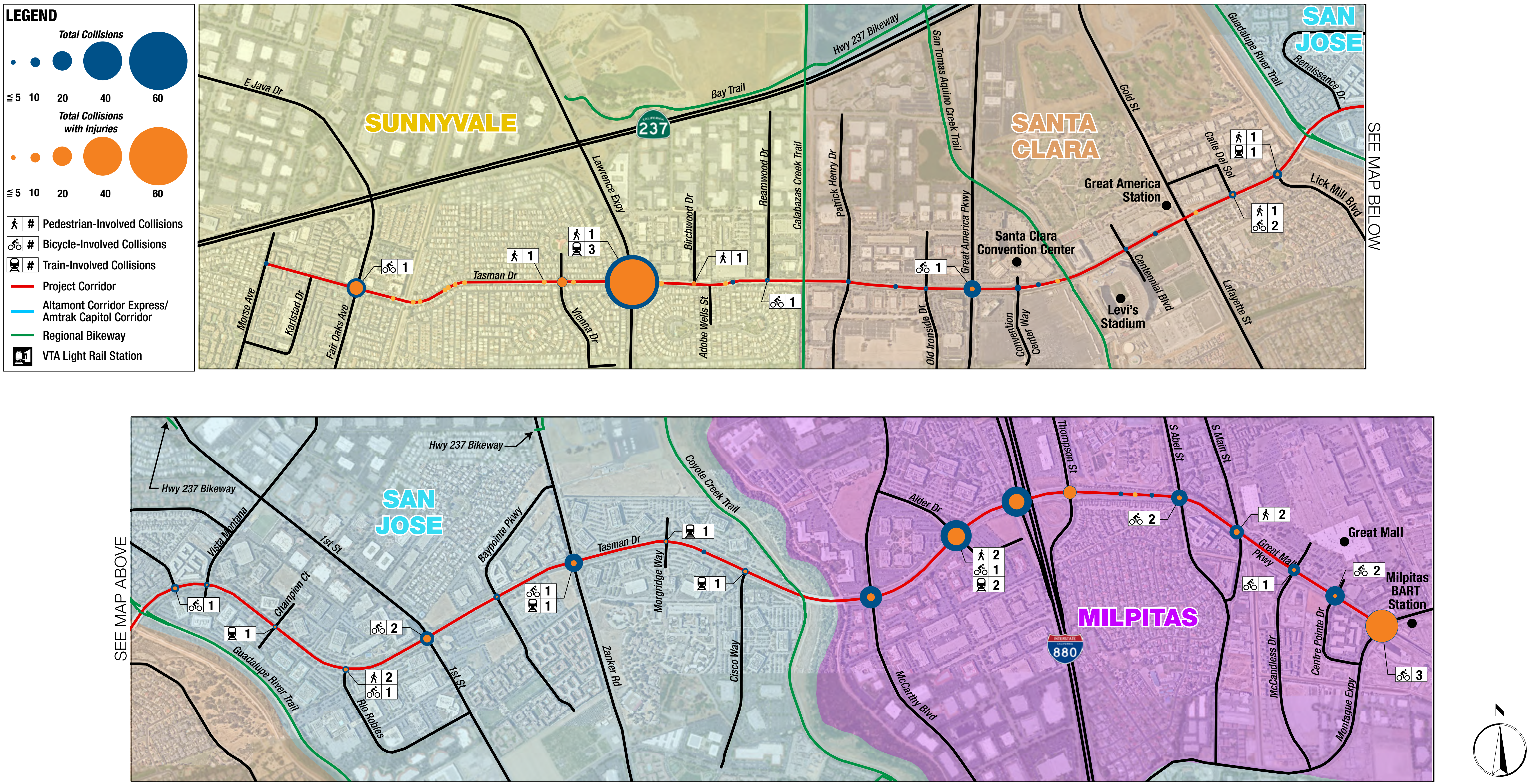


Figure 4-4: 2011-2015 Bicycle and Pedestrian-Involved Collisions Map

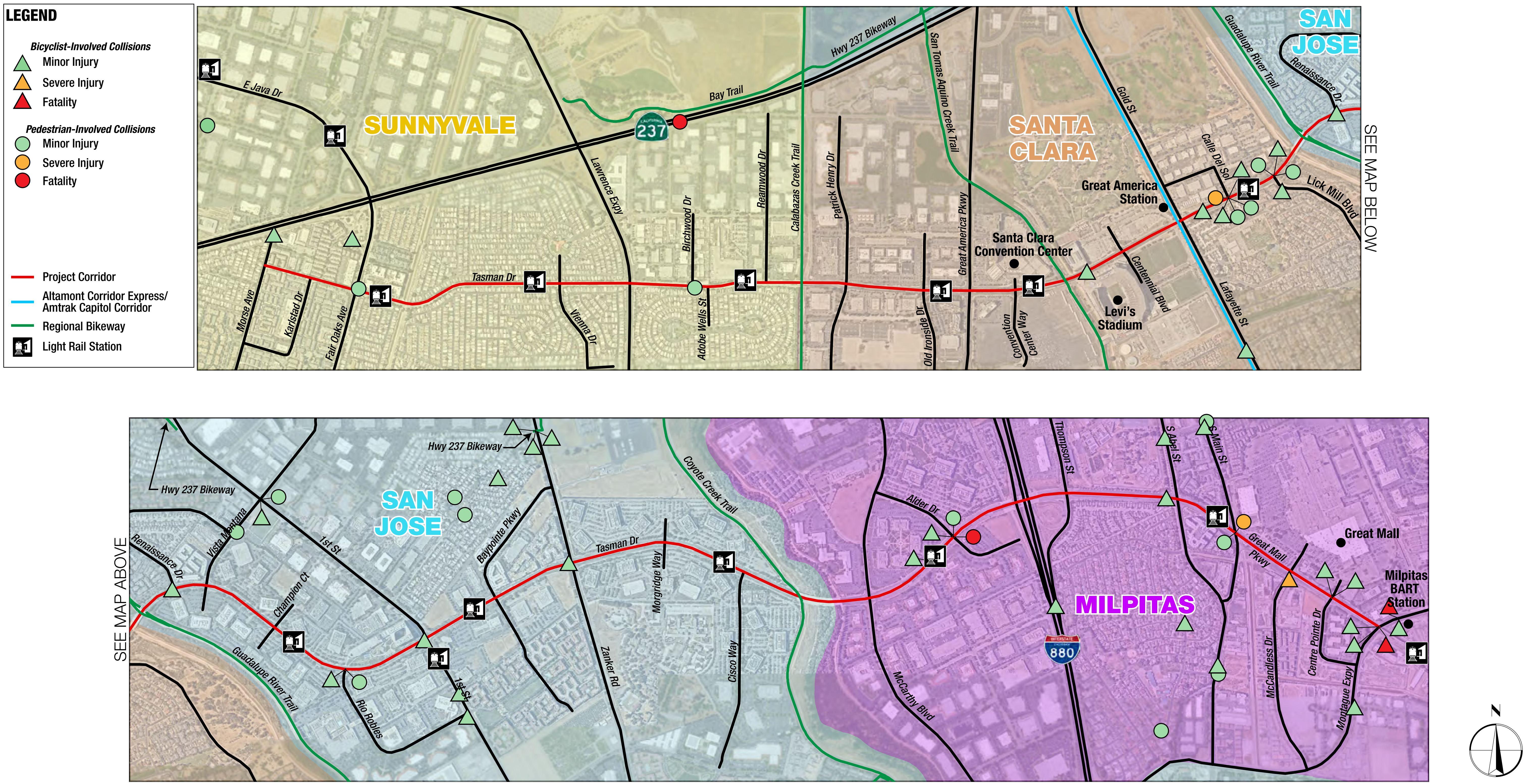
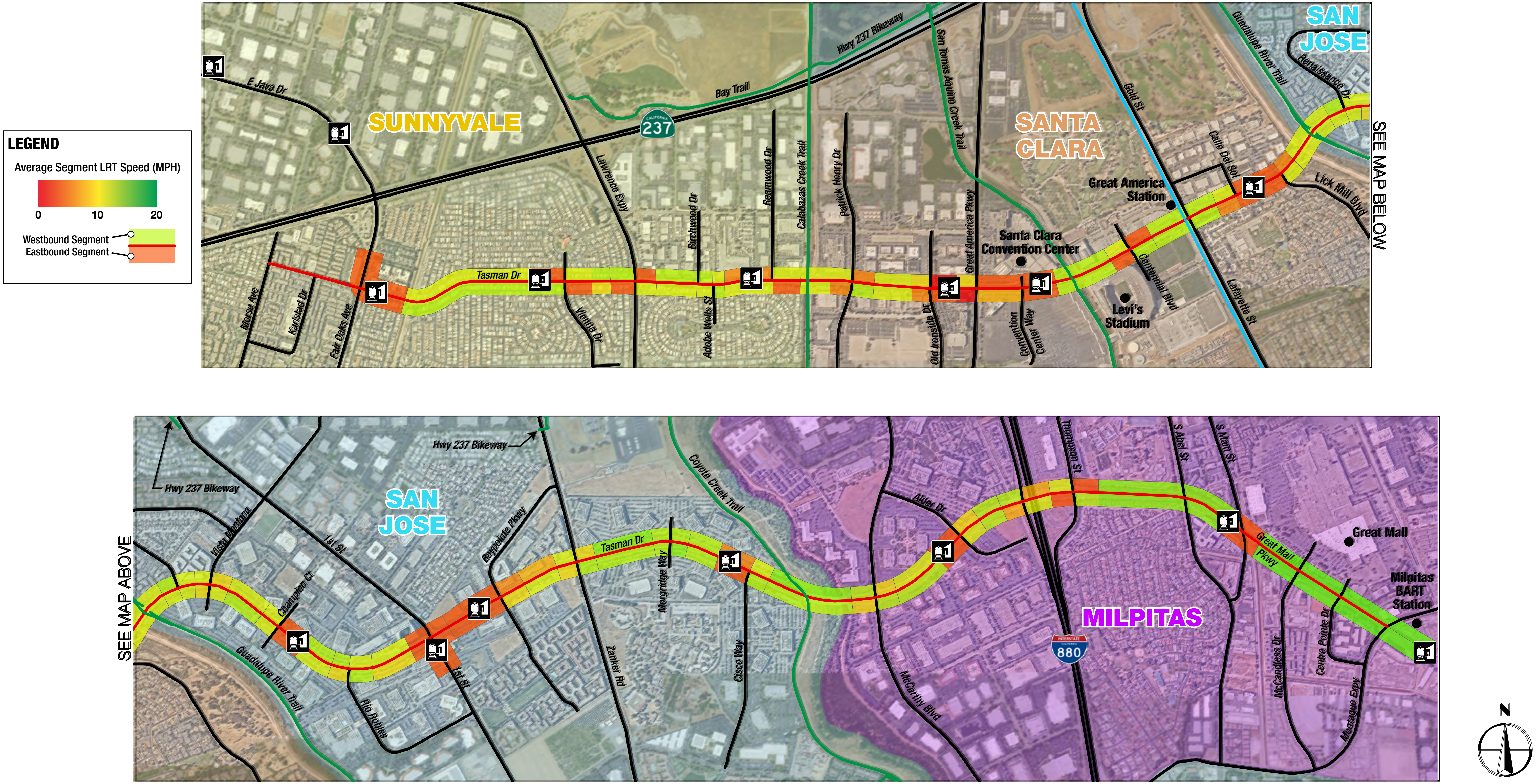


Figure 4-5: VTA LRT Speeds by Segment and Direction (Weekday)



5 PUBLIC AND STAKEHOLDER OUTREACH ROUND 2

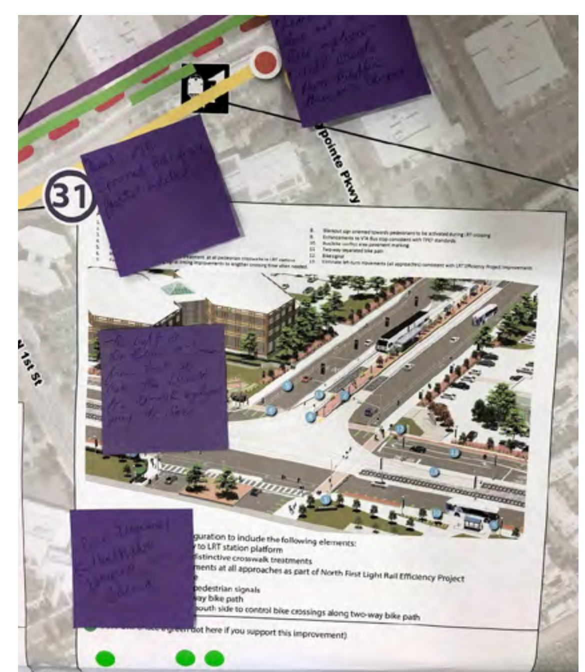
VTA conducted a second round of public and stakeholder outreach in late Spring and early Summer of 2018. The objective of the second round of outreach was to present proposed improvements along the Corridor and obtain feedback on those improvements. Activities conducted as part of the second round of outreach included:

- An in-person community meeting
- Meetings with specific neighborhood associations
- Outreach to individual stakeholder groups
- A map-based online survey

Detailed summaries of all outreach activities are provided in Appendix A – Outreach Summaries. Figure 5-1 depicts the various engagement methods used and the connections made during Outreach Round 2.

Community Meeting

A Corridor-wide community outreach meeting was held on May 23, 2018, from 6:00-7:30 p.m. at Lakewood Elementary School (750 Lakechime Drive) in Sunnyvale. At the meeting, the project team gave a presentation providing background on the project and explained the proposed improvements along the Corridor. Attendees were then asked to visit four stations (one for each City along the Corridor) showing proposed improvements and provide feedback about proposed improvements.



Neighborhood Association Meetings

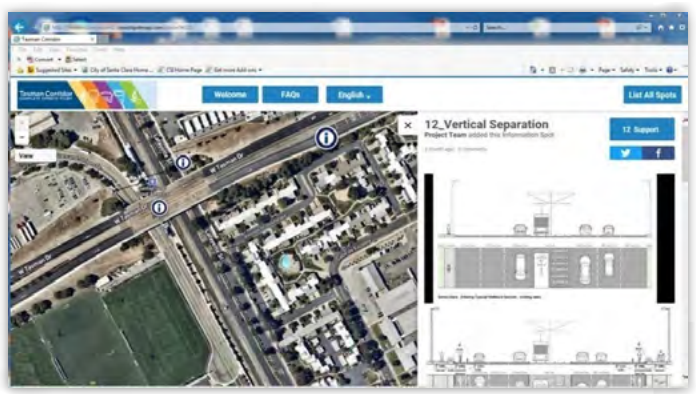
The project team attended meetings of the River Oaks Neighborhood Association (May 2, 2018) and the Sunnyvale Mobile Home Park Alliance (June 14, 2018). At these meetings, the project team gave a presentation on the project highlighting the project background, existing conditions, a brief summary of feedback from previous outreach activities, proposed improvements, and next steps. The project team responded to questions and comments from attendees following the presentations.

Stakeholder Outreach

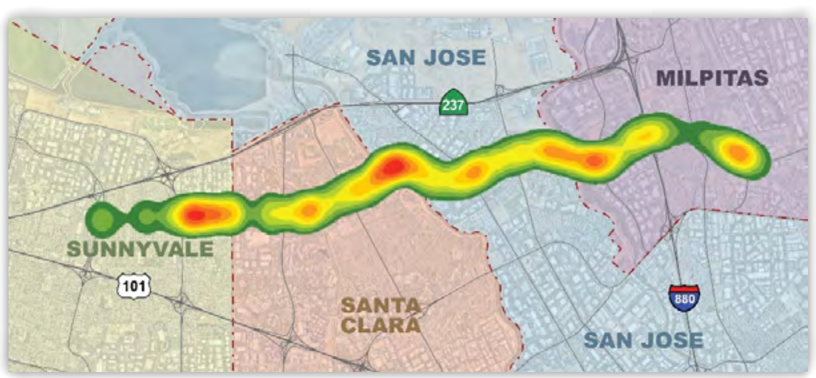
The project team met individually with representatives from Cisco (a major employer with multiple office locations along the Corridor), Levi's Stadium, and Related Properties, the developer of CityPlace. The project team used these meetings to provide background information on the project, explain proposed improvements, and solicit input on those improvements.

Online Survey

The online survey for the second round of public outreach took a different form than the one used during the first round of outreach. For this round, the online survey tool, CrowdSpot, displayed proposed improvements at locations along the Corridor. The survey was distributed via social media, mailers, and local newsletters and was displayed on screens at light rail stations. Survey respondents were encouraged to "support" the improvements, as well as provide direct feedback in the form of comments on each "infospot" (the location of each improvement). These comments were available for all to see and allowed other participants to add follow-on comments if they agreed or disagreed. Respondents could provide their name or reply anonymously. In total, there were 8,154 unique visitors to the online survey with 334 comments received and 1,132 "supports" received for proposed improvements.



Crowdspot survey interface



Density of survey responses in support of improvements

Figure 5-1: Connections Made During Outreach Round 2

6 RECOMMENDED IMPROVEMENTS

This section describes the recommended improvements for the Tasman Corridor. The development of these improvements involved an iterative and collaborative process with input from VTA, the Partner Agencies, stakeholders, and the general public. Improvements were developed based on the needs identified in the early phases of the Study and through the outreach process.

The following section provides descriptions, locations, benefits, and timeframes for the proposed improvements. More detailed concept-level plans for the proposed improvements are provided in **Appendix B – Conceptual Layout of Recommended Improvements**. The improvements recommended as part of this project are based on a conceptual level of design and feedback from VTA and project stakeholders. Further design development work is required in subsequent project phases to confirm design feasibility of the recommended improvements and ensure that the recommendations remain consistent with other related plans and projects and City standards at the time of implementation.

Table 6-1 below presents a summary of the construction cost estimate under Near Term and Ultimate conditions (by City) for all improvements. Detailed cost estimates associated with the various project improvements detailed in the following section are provided in **Appendix C – Cost Estimates**. All costs are in 2019 dollars and are based on the limited conceptual development of the recommendations performed to date.

A summary of the proposed bicycle and pedestrian improvements are included on **Figures 6-1** and **Figure 6-2**, respectively.

Table 6-1: Summary of Total Project Costs by City

City	Total Cost (in 2019 Dollars)	
	Near Term	Ultimate
Sunnyvale	$20,674,000	$725,000
Santa Clara	$5,989,000	-
San Jose	$20,461,000	$6,731,000
Milpitas	$15,542,000	$5,985,000
Total	$62,666,000	$13,441,000

Figure 6-1: Proposed Bicycle Improvement Map

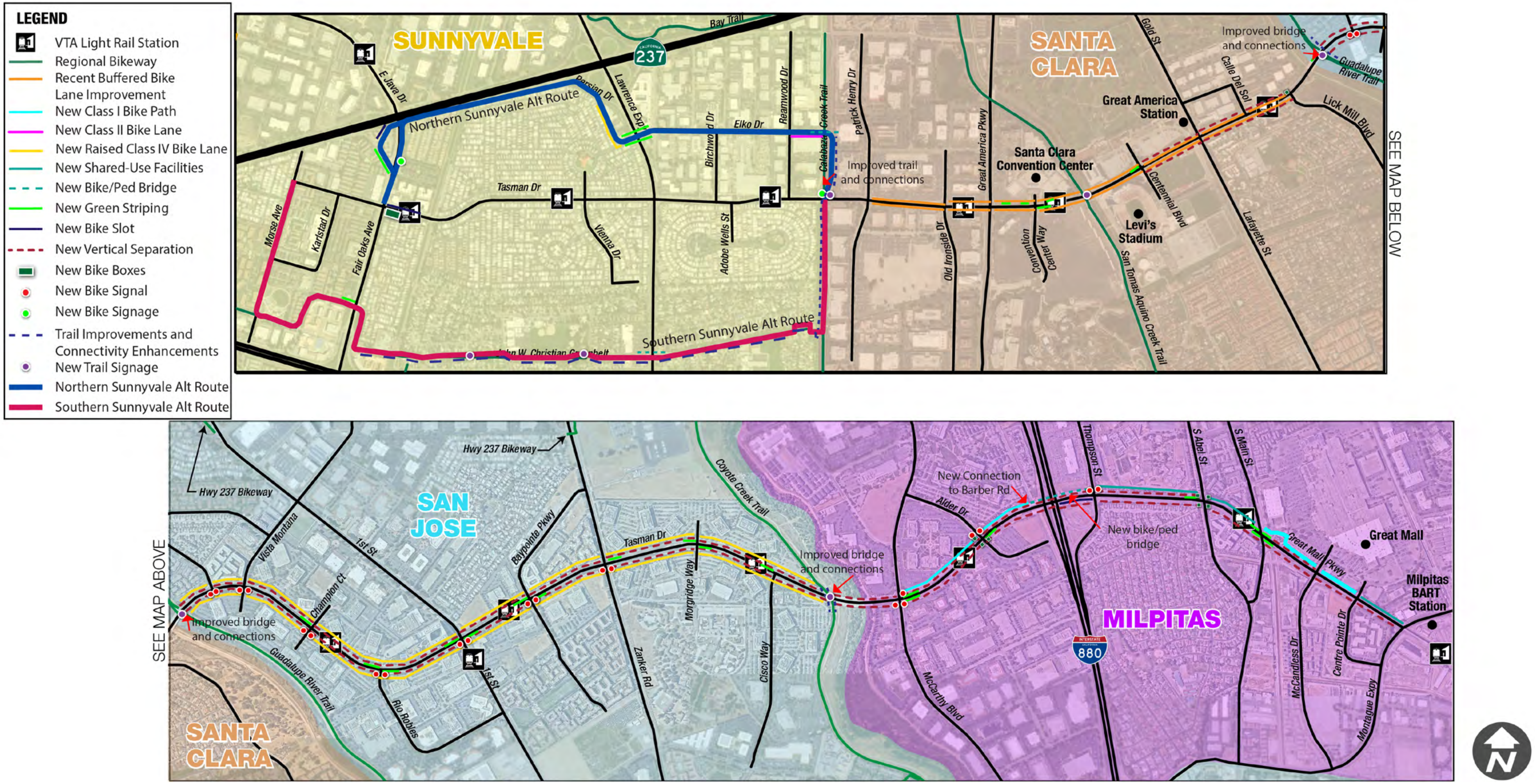
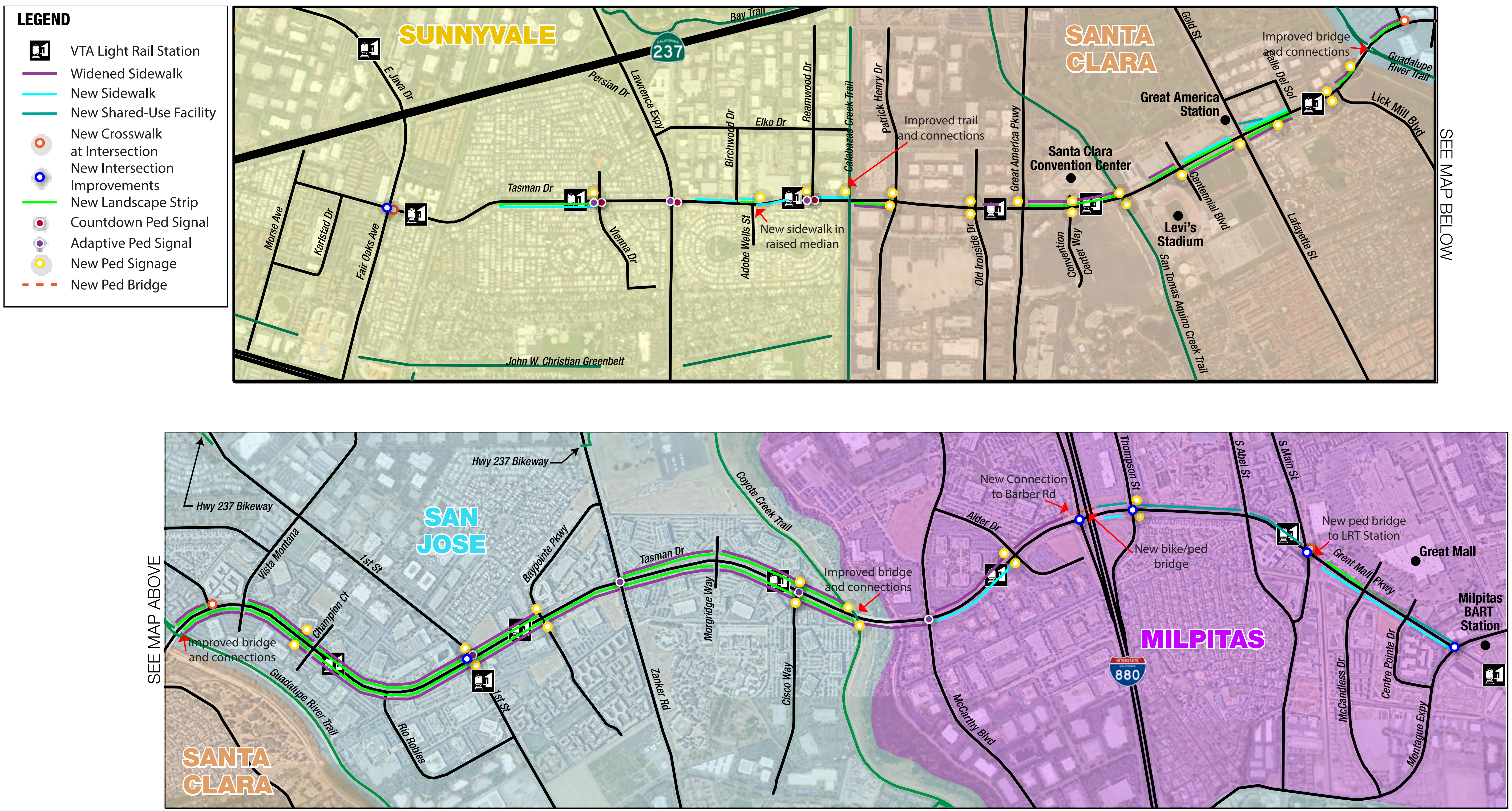


Figure 6-2: Proposed Pedestrian Improvement Map



SV-1 TASMAN/FAIR OAKS INTERSECTION IMPROVEMENTS

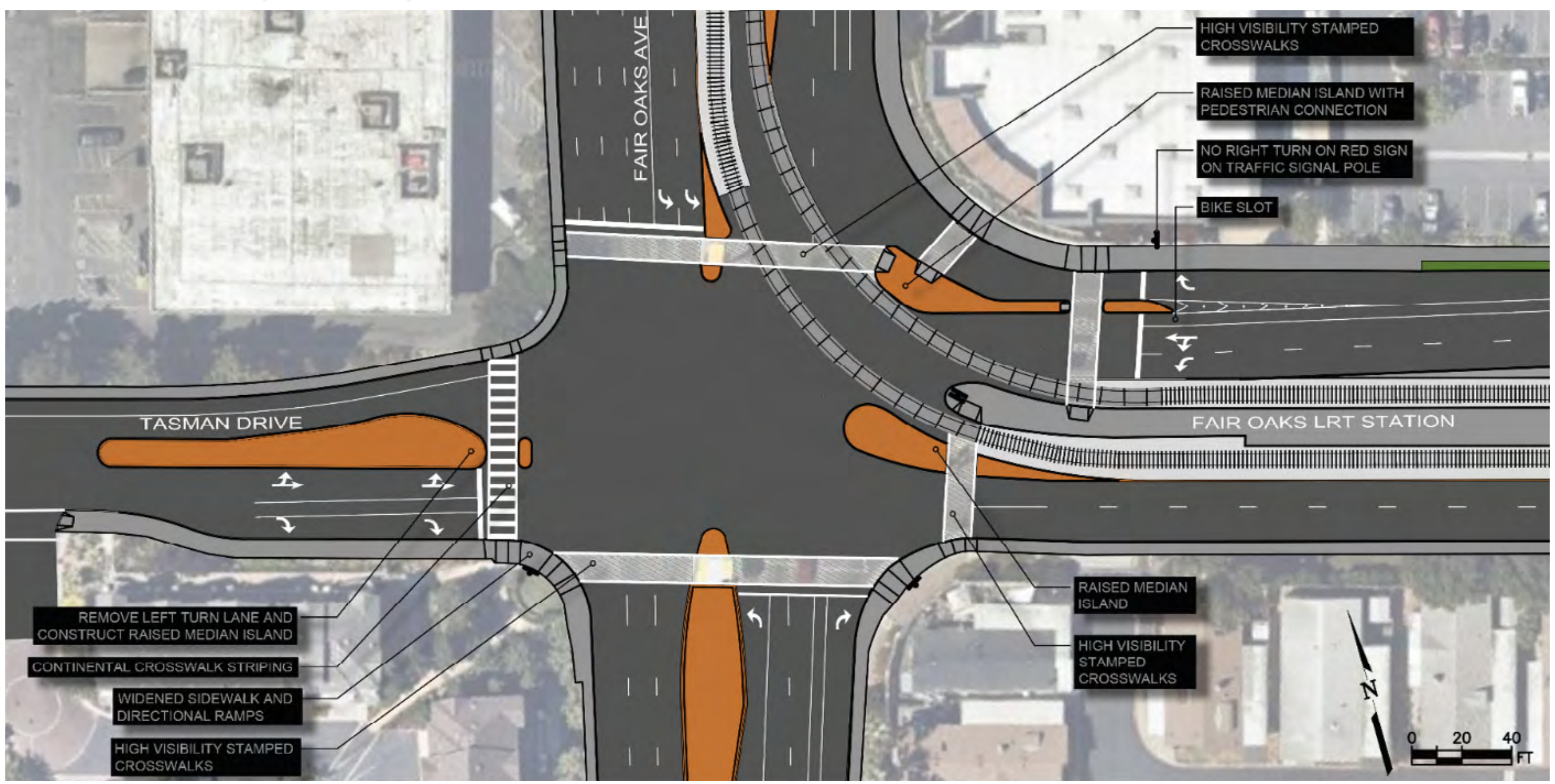
Improvements Description

Reconfigure the intersection of Tasman Drive and Fair Oaks Avenue. This would include the following major intersection improvements:

- On the west leg of the intersection, remove the existing eastbound left-turn lane and construct a raised median with a pedestrian refuge island
- Realign the crosswalk on the east leg of the intersection to shorten pedestrian crossing distance
- Remove one existing westbound through lane and convert outside left-turn lane to a shared left-turn/through lane
- Install a bike slot along westbound approach
- Construct traffic signal modifications to support lane configuration and signal phasing changes
- Reduce turn radii and further channelize westbound right-turn movement, including a raised pedestrian crosswalk
- Provide pedestrian countdown signals

Location

Plan View of Proposed Improvements



Why is this Project Needed?

- Navigation of this intersection is challenging for pedestrians and bicyclists—this was a concern that was frequently raised in the public outreach process. A well-utilized light rail station is located at this intersection generating high levels of bicycle and pedestrian activity.

Benefits of Improvements

- New pedestrian refuge islands and median noses improve pedestrian safety and comfort
- Accessing the Fair Oaks LRT station would be more intuitive and clear with reduced conflicts with LRT tracks
- New westbound bike slot improves bicyclist safety and visibility

Cost

- $1,226,000

Steps to Implementation

1. Incorporate into planning and programming documents, such as countywide transportation plan and City's Bicycle and Pedestrian Plan
2. Obtain environmental clearance (likely a Negative Declaration)
3. Pursue grant funding and program local funds
4. Prepare design plans
5. Coordinate with the California Public Utilities Commission (CPUC) for approval of modified grade crossing (GO-88-B)
6. Construct improvements and modify traffic signal operations

Other Implementation Considerations

- Requires coordination between the City of Sunnyvale and VTA for station-related improvements

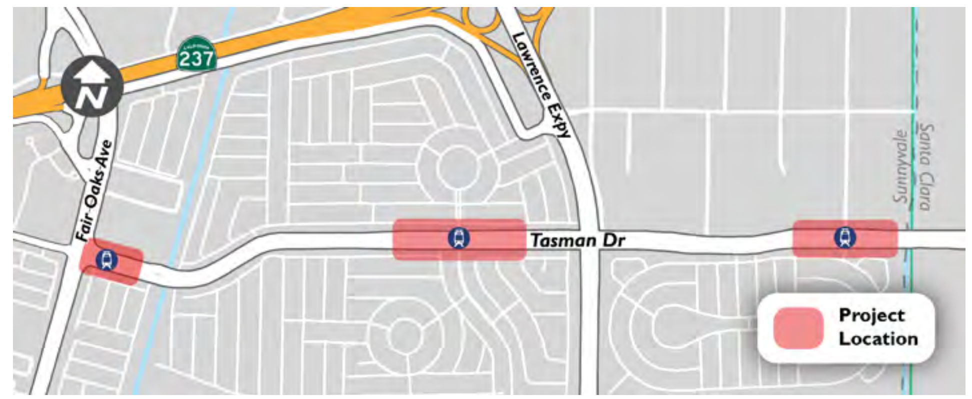
SV-2 SUNNYVALE LRT STATION IMPROVEMENTS

Improvements Description

Construct improvements to the Fair Oaks, Vienna, and Reamwood LRT stations and station areas; major improvements include the following items:

1. Install high visibility, distinctive crosswalk treatment at all pedestrian crosswalks providing access to LRT stations
2. Construct traffic signal modifications
3. Implement adaptive pedestrian signal timing and leading pedestrian interval (LPI)
4. Install blankout signs to be activated during LRT crossing to provide additional pedestrian warning
5. Install enhanced LRT station lighting
6. Install bus/bike conflict area pavement marking
7. Construct landscape strips to buffer sidewalks

Location



Rendering of Proposed Improvements

Why is this Project Needed?

- Pedestrians do not feel comfortable getting to and from LRT stations located in the median—this was a common complaint expressed in the outreach process. Additionally, with the opening of the BART Silicon Valley Phase 1 extension, and the implementation of VTA's 2019 New Transit Service Plan, there is high projected growth in LRT passenger activity, creating a need for amenities to accommodate this increased traffic. Feedback in the outreach process also indicated that the LRT stations also do not currently provide adequate wayfinding signage or posted information to guide passengers.

Benefits of Improvements

- Improves pedestrian visibility
- Establishes priority for pedestrians with implementation of LPI and improves pedestrian safety with median refuges, lighting, widened sidewalks, and buffers
- Enhances amenities for transit users
- Improves visibility of light rail
- Improves wayfinding for light rail users and pedestrians

Cost

- $1,381,000

Steps to Implementation

1. Incorporate into countywide transportation plan
2. Incorporate into VTA Capital Improvement Program
3. Obtain environmental clearance for physical improvements (anticipated to be Categorical Exemption)
4. Pursue grant funding and program local funds
5. Prepare design plans, including urban design, streetscape, and utilities
6. Coordinate with VTA LRT operations on station configuration modifications
7. Construct and update signal timings

SV-3 SUNNYVALE BUS STOP IMPROVEMENTS

Improvements Description

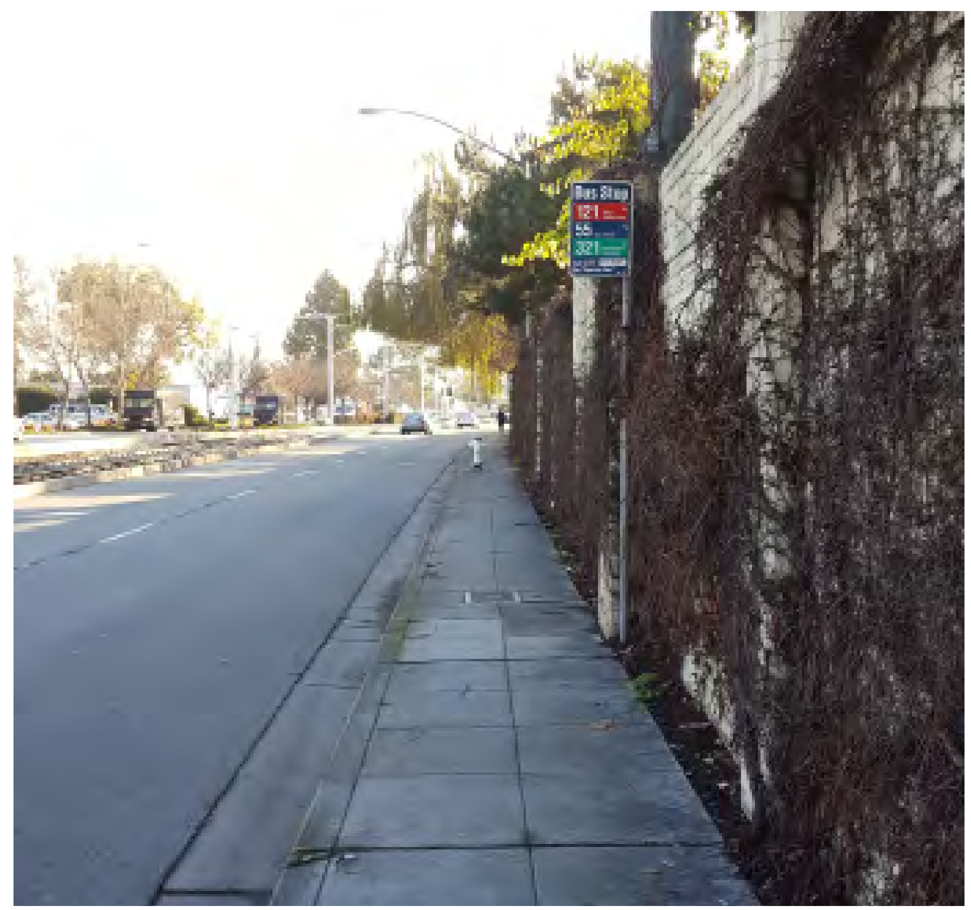
Provide enhancements to all bus stops along the Corridor in Sunnyvale to make them consistent with VTA's Transit Passenger Environment Plan (TPEP) standards. The TPEP classifies bus stops based on daily ridership. Per these definitions, all bus stops along the Corridor in Sunnyvale are classified as Basic Stops, which are those with fewer than 40 daily boardings. Some of the existing bus stops on the corridor will no longer be served by VTA buses under the 2019 New Transit Service Plan.

Basic Stops shall be improved to include the following elements:

- Standard bus stop sign with real-time information decal and schedule display
- Seating
- Bicycle parking (at least one U-rack; more if demand warrants)

Location

Existing bus stops



Existing bus stops

Why is this Project Needed?

- Existing stops have little to no amenities, making waiting for the bus undesirable; providing more amenities at bus stops can reduce perceived wait time, attracting new riders and increasing the visibility of transit service.

Benefits of Improvements

- Enhances amenities for transit users
- Potential for increased transit use

Cost

- $535,000

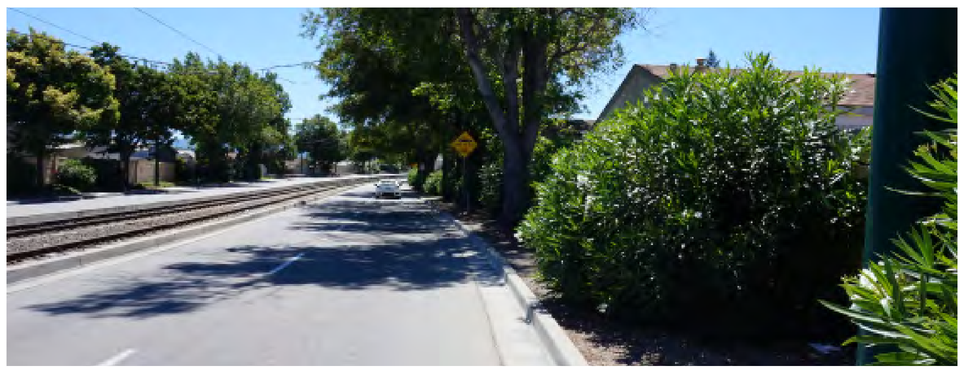
Steps to Implementation

1. Incorporate into VTA Capital Improvement Program
2. Obtain environmental clearance (Categorical Exemption)
3. Pursue grant funding and program local funds
4. Schedule improvements as part of regular stop upgrades process

SV-4 SUNNYVALE SIDEWALK GAP CLOSURE (E/O FAIR OAKS AVENUE TO VIENNA DRIVE)

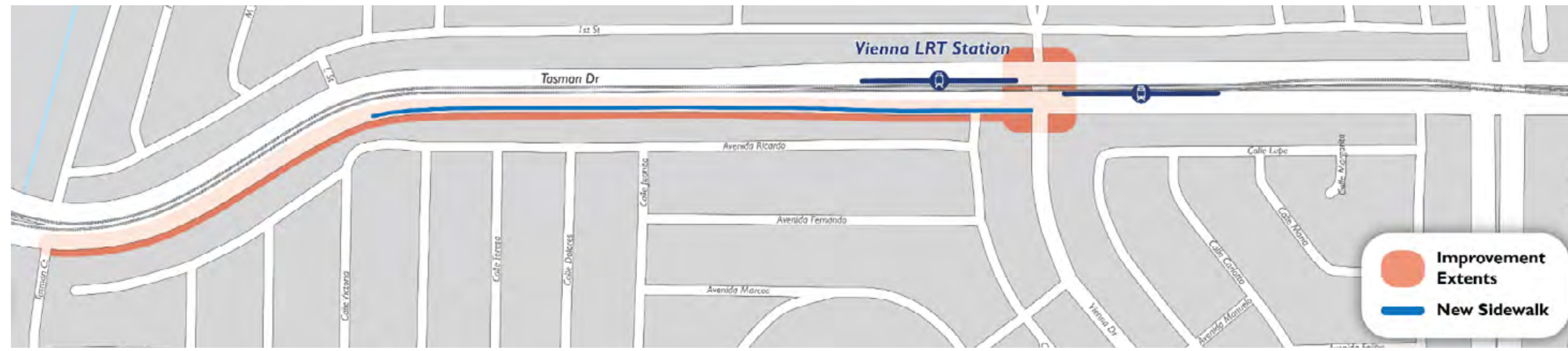
Improvements Description

Provide a new, 1,500-foot separated sidewalk facility (with a landscape strip) on the south side of Tasman Drive to close the existing sidewalk gap to the west of Vienna Drive. Project includes construction of new curb ramps at the Vienna Drive intersection requiring relocation or removal of existing trees.

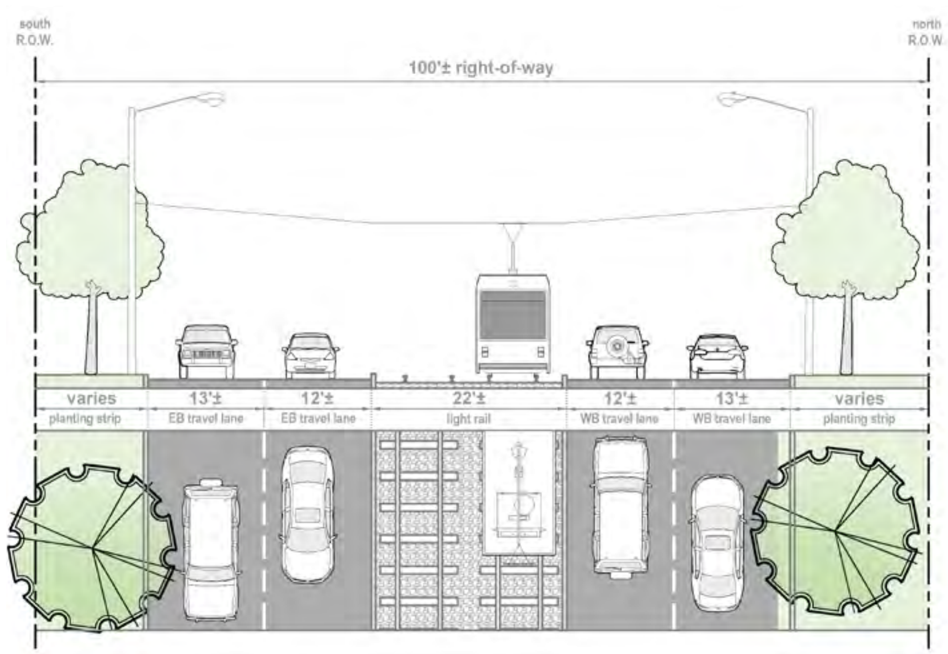


Existing gap in sidewalk on south side of Tasman Drive between Fair Oaks Avenue and Vienna Drive.

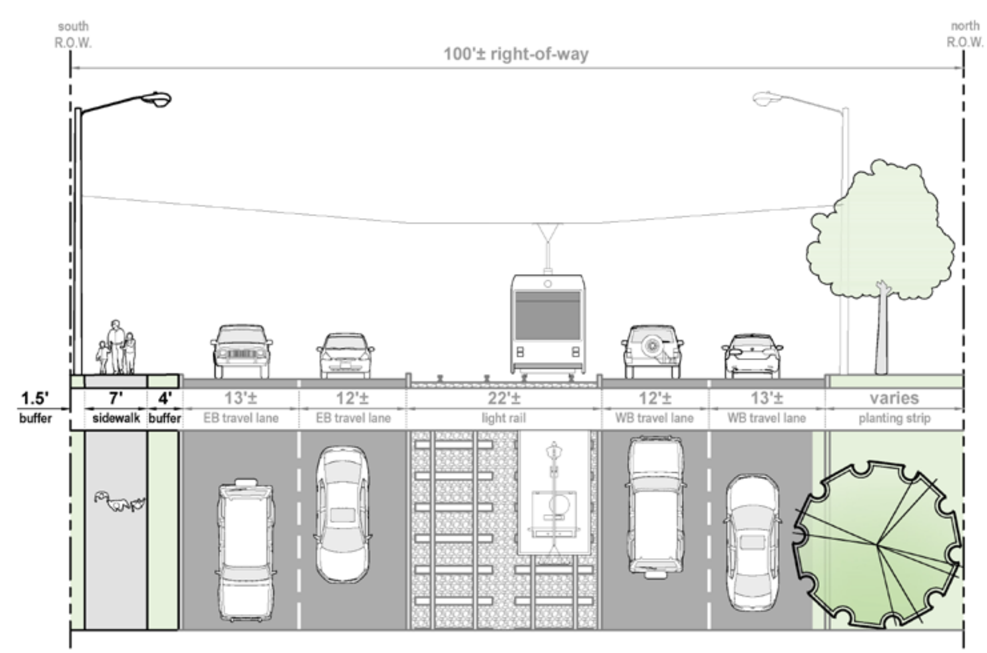
Location



Cross-Sections – West of Vienna Drive (Looking West)



Existing Section between Tasman Ct and Vienna Dr - looking west



Proposed Section between Tasman Ct and Vienna Dr - looking west

Why is this Project Needed?

- There are currently no sidewalks on the south side of the Corridor along the 1,500-foot stretch of Tasman Drive west of Vienna Drive. This gap in the pedestrian network was a major area of concern brought up by residents during the public outreach process

Benefits of Improvements

- Improves pedestrian connectivity
- Improves pedestrian safety through provision of dedicated facility

Cost

- $1,784,000

Steps to Implementation

1. Incorporate into Sunnyvale bicycle/pedestrian plan
2. Obtain environmental clearance, including identifying tree impacts and mitigations. Coordinate with adjacent residents for tree removal/replacement.
3. Pursue grant funding and program local funds
4. Prepare design plans
5. Construct

SV-5 SUNNYVALE SIDEWALK GAP CLOSURE (LAWRENCE EXPY TO REAMWOOD AVENUE)

Improvements Description

Close existing gaps in sidewalk coverage in Sunnyvale between Lawrence Expressway and Reamwood Avenue and provide pedestrian intersection improvements at Birchwood Drive.

In the near term, this project would include the following improvements:

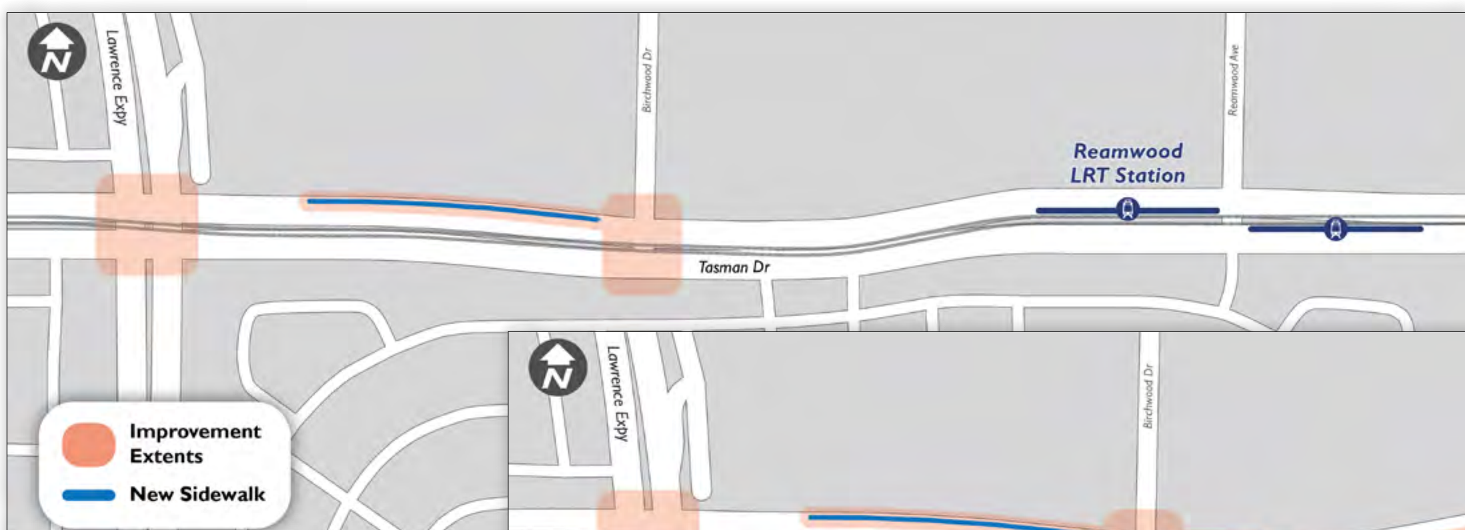
- Construct new sidewalk on the north side of Tasman Drive between Birchwood Drive and Lawrence Expressway
- Construct pedestrian improvements at the intersection of Birchwood Drive and Tasman Drive and the intersection of Reamwood Avenue and Tasman Drive, including tightened curb radii, high-visibility crosswalks, and a pedestrian adaptive signal
- Construct pedestrian improvements at the intersection of Lawrence Expressway and Tasman Drive, including tightened curb radii, high-visibility crosswalks, and a pedestrian adaptive signal."

In ultimate conditions, this project would include the following improvements in addition to the near-term improvements:

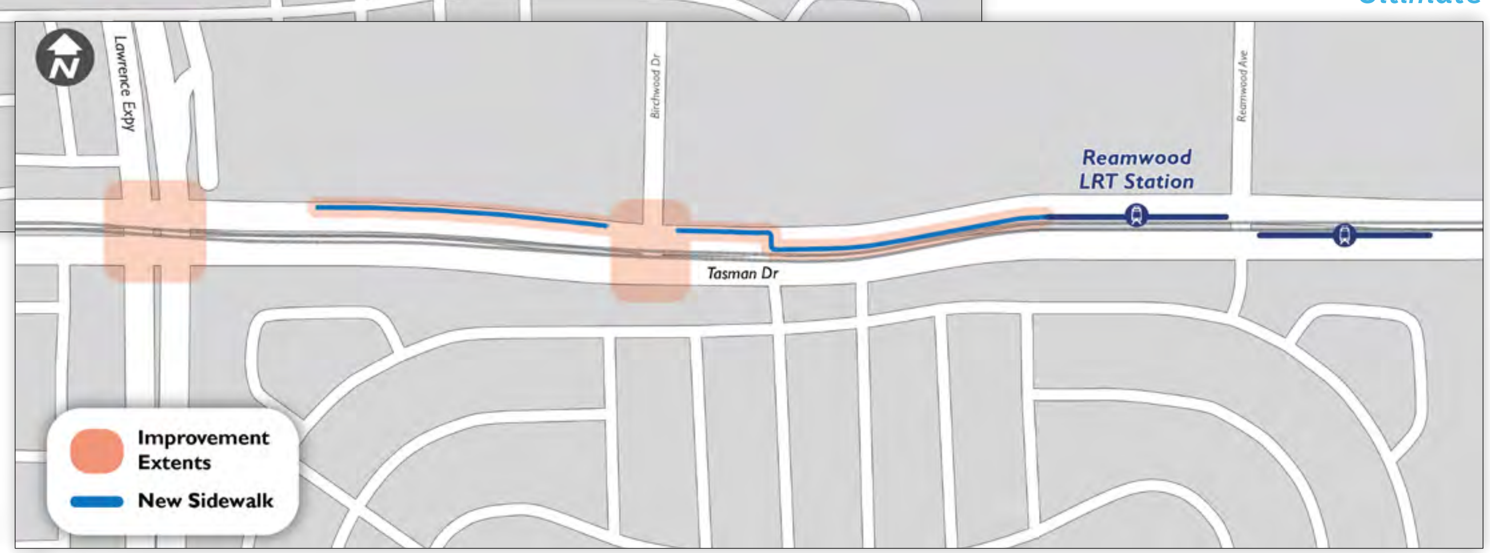
- Construct new sidewalk on the north side of Tasman Drive between Birchwood Drive and Adobe Wells Street
- Install a new crosswalk on the east side of the intersection of Tasman Drive and Adobe Wells Street
- Construct a sidewalk in the median of Tasman Drive, adjacent to the light rail tracks, between the newly-installed crosswalk at Adobe Wells Street and the Reamwood LRT station

Location

Near-term



Ultimate



Why is this Project Needed?

- There is currently a sidewalk gap on the north side of Tasman Drive that stretches from approximately 250 feet east of Lawrence Expressway to the Reamwood LRT station. This diminishes pedestrian circulation in the area and makes it harder to access the Reamwood LRT station. This gap in the pedestrian network was a major area of concern brought up by residents during the public outreach process.

Benefits of Improvements

- Closes pedestrian facility gaps in multiple locations, improving pedestrian connectivity, safety, and comfort
- Improved access to the Reamwood LRT Station

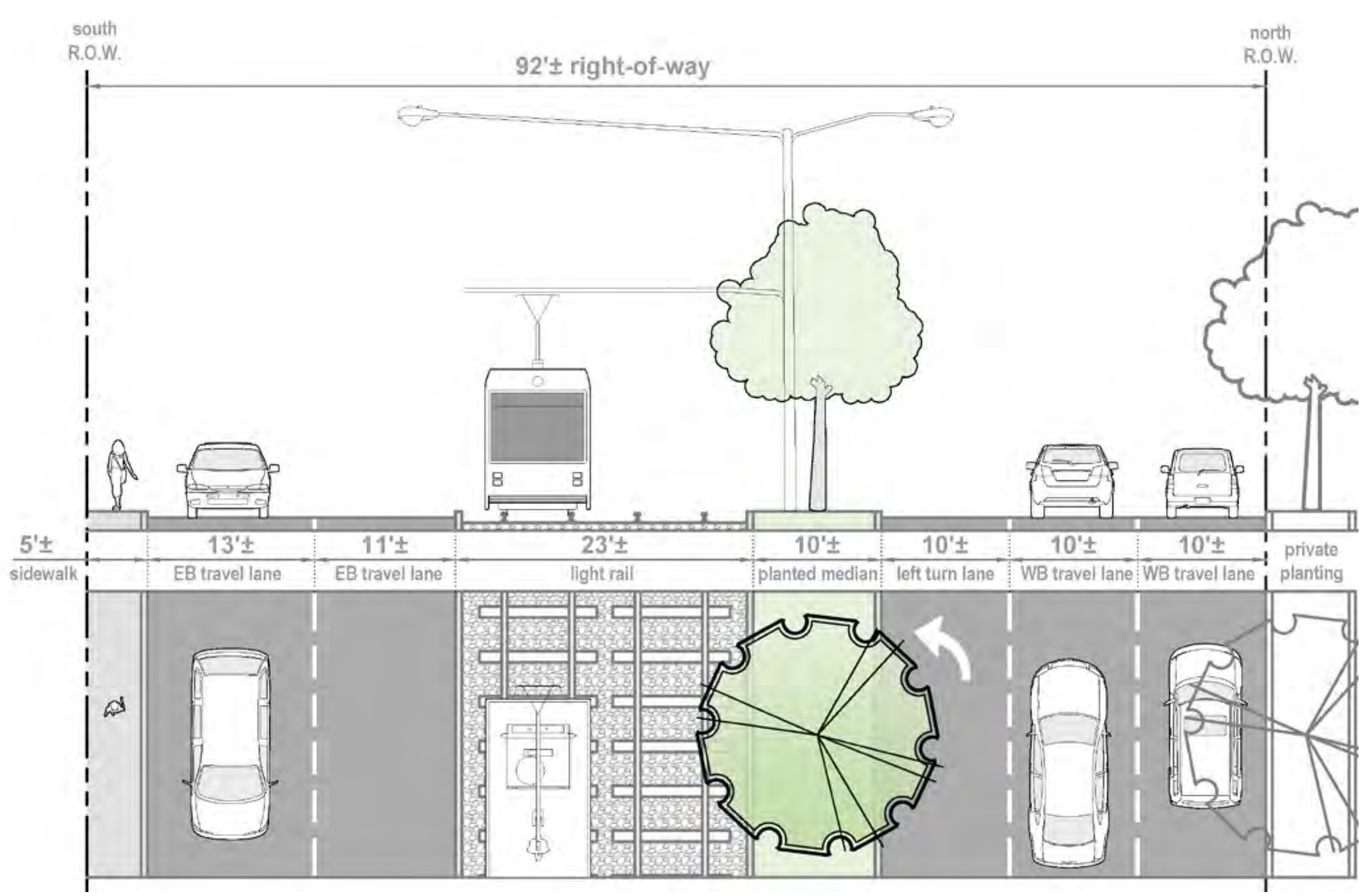
Cost

- $1,258,000 (near-term)
- $465,000 (ultimate)
- $1,723,000 (total)

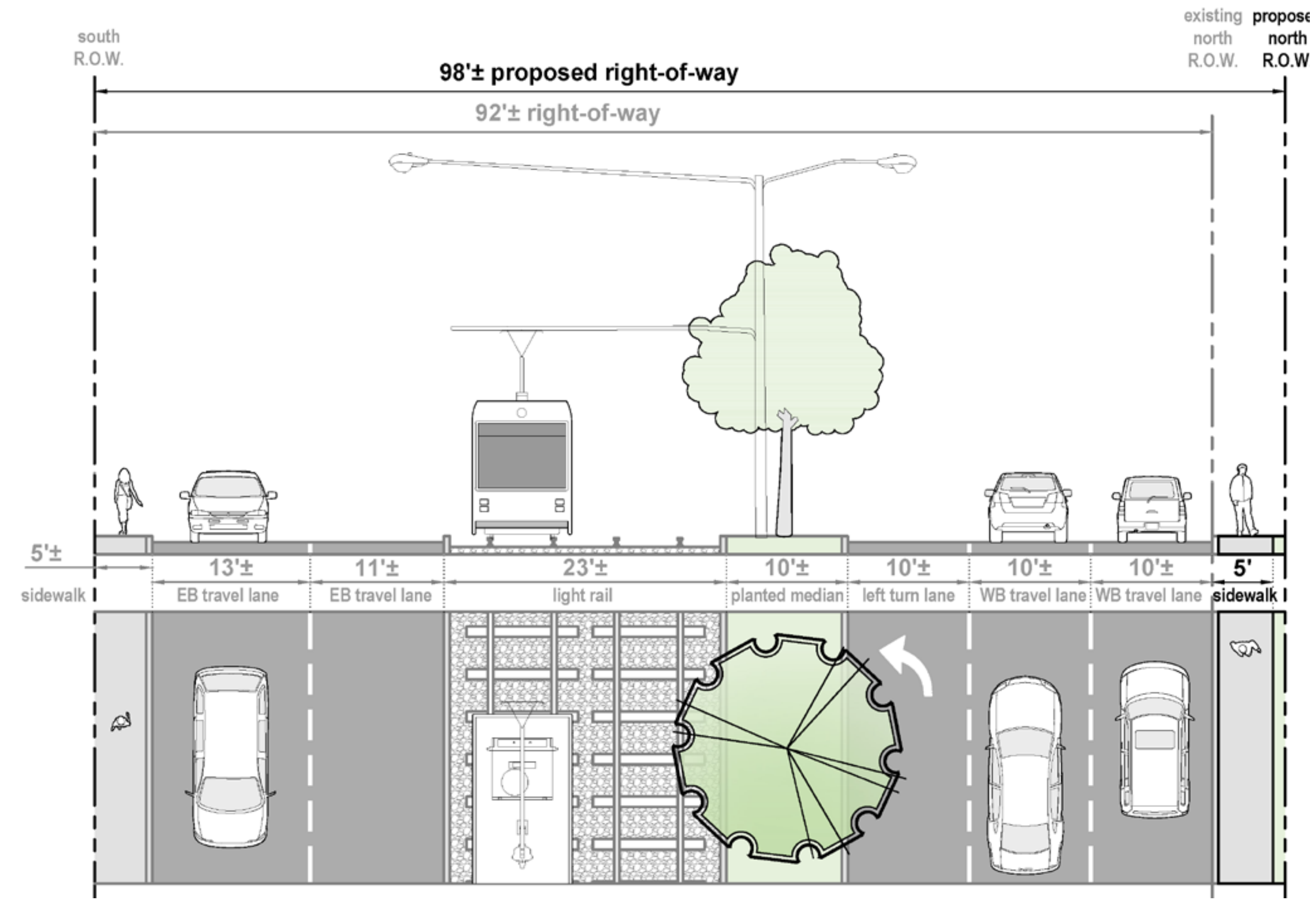
Steps to Implementation

1. Incorporate near-term and ultimate improvements into Sunnyvale bicycle/pedestrian master plan
2. Obtain environmental clearance for near-term improvements (include ultimate improvements as well depending on timeframe)
3. Pursue grant funding and program local funds for near-term improvements
4. Prepare design plans for near-term improvements
5. Construct for near-term improvements
6. Sunnyvale to adopt corridor plan line for ultimate right-of-way needed
7. Obtain additional right-of-way as part of future development project
8. Pursue grant funding and program local funds for ultimate improvements
9. Obtain environmental clearance for ultimate improvements
10. Prepare design plans for ultimate improvements
11. Construct ultimate improvements and prepare new signal timings

Cross-Sections – (Near-Term Improvement) Between Lawrence Expy and Birchwood Dr (Looking West)



Existing Section



Proposed Section

Rendering of Proposed Ultimate Improvements - East of Adobe Wells to Reamwood LRT Station

SV-6 SUNNYVALE SIDEWALK GAP CLOSURE (REAMWOOD AVE TO CALABAZAS CREEK)

Improvements Description

Construction of sidewalk facility on the north side of Tasman Drive between Reamwood Ave and Calabazas Creek at the eastern end of the City. This project includes a set of near-term improvements and a set of long-term improvements.

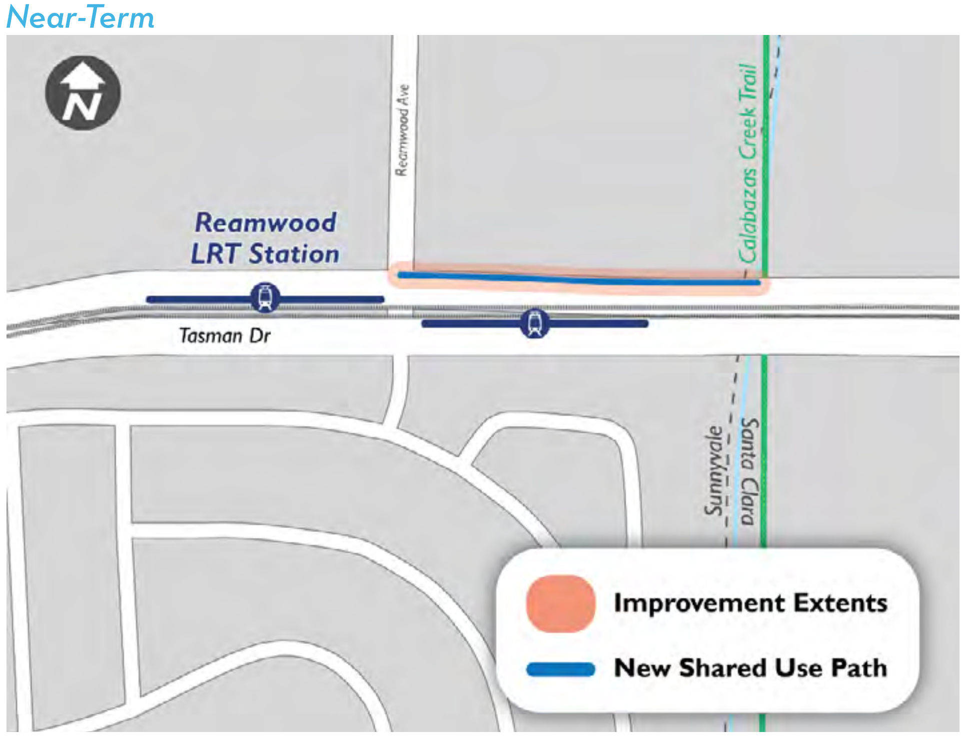
In the near-term, this project would include the conversion of the dedicated bike lane on the north side of Tasman Drive to a shared-use path in order to complete the sidewalk connection between Calabazas Creek and Reamwood Avenue.

In ultimate conditions, this project would include the acquisition of additional right-of-way to provide separate sidewalk and bike lane facilities on the north side of Tasman Drive.

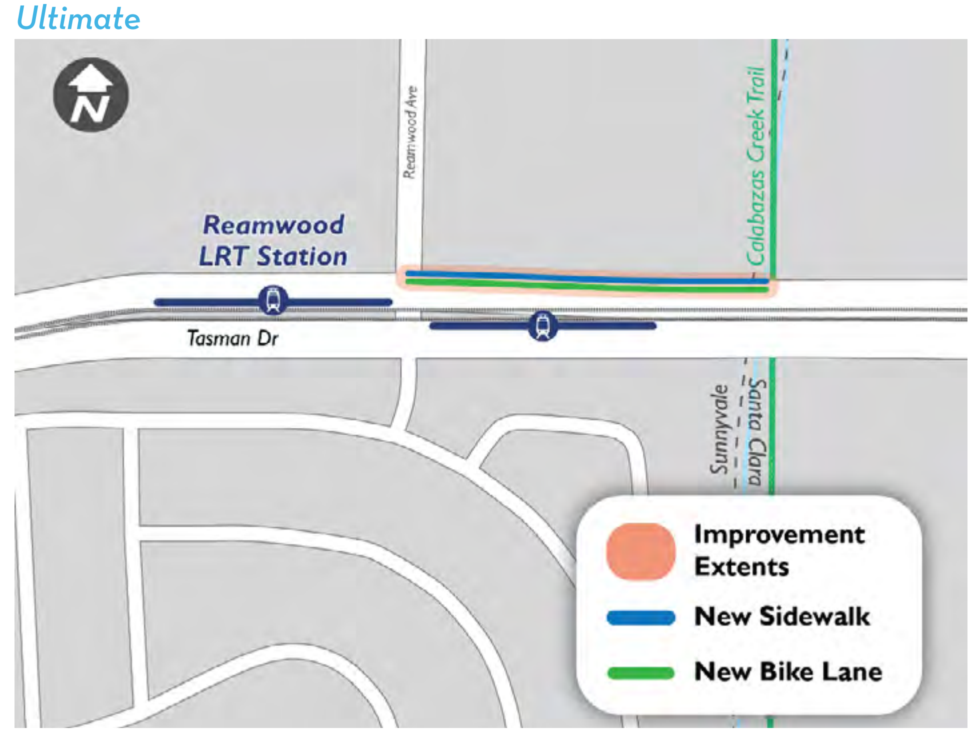
Existing facilities on the north side of Tasman Drive between Reamwood Avenue and Calabazas Creek.

Location

Near-Term



Ultimate



Why is this Project Needed?

- There is currently no sidewalk on the north side of Tasman Drive between Reamwood Avenue and Calabazas Creek; this reduces connectivity to the Calabazas Creek Trail. This gap in the pedestrian network was a major area of concern brought up by residents during the public outreach process

Benefits of Improvements

- Improves pedestrian connectivity
- Improves pedestrian safety through provision of a dedicated pedestrian facility

Cost

- $231,000 (near-term)
- $260,000 (ultimate)
- $491,000 (total)

Steps to Implementation

1. Incorporate near-term and ultimate improvements into Sunnyvale bicycle/pedestrian master plan
2. Obtain environmental clearance for near-term (include ultimate improvements as well depending on timeframe; expected to be Categorical Exemption)
3. Pursue grant funding and program local funds for near-term improvements
4. Prepare design plans
5. Construct
6. Sunnyvale to adopt corridor plan line for ultimate right-of-way needed
7. Obtain right-of-way through coordination with adjacent property owner or with redevelopment of property
8. Obtain environmental clearance for ultimate improvements
9. Pursue grant funding and program local funds for ultimate improvements
10. Prepare design plans
11. Construct

SV-7 CALABAZAS CREEK TRAIL CONNECTION IMPROVEMENT

Improvements Description

- Formalize the existing Calabazas Creek Trail under-crossing of Tasman Drive by paving the trail connection
- Provide gateway landmark and wayfinding signage at the trail entrance and adjacent intersections
- Provide fence and signage to prevent at-grade crossing of Tasman Drive at the trail

Existing Trail Connection

Existing Trail Connection

Location

Example of Proposed Improvement

Why is this Project Needed?

- The Calabazas Creek Trail currently intersects with Tasman Drive, but the light rail tracks in the roadway median force trail users to utilize informal pathways to pass underneath Tasman Drive in order to cross the street.

Benefits of Improvements

- Improves connectivity to the Calabazas Creek Trail
- Improves bicyclist safety by improving infrastructure on an informal path

Cost

- $282,000

Steps to Implementation

1. Incorporate into Sunnyvale bicycle/pedestrian master plan
2. Coordinate with the Santa Clara Valley Water District (property owner)
3. Obtain environmental clearance (anticipated to be categorical exemption)
4. Pursue grant funding and program local funds
5. Prepare design
6. Construct

SV-8 SUNNYVALE ALTERNATIVE BIKE ROUTING (NORTH ROUTE)

Improvements Description

This improvement provides an alternate bike route for bicyclists traveling eastbound or westbound along the Corridor. One of the two alternate routes, which routes bicyclists to the north of Tasman Drive, is shown below.

In the near-term, this project would include upgrades to infrastructure to accommodate a new bicycle route, including new bike lanes, signage, conflict markings, and lighting.

In ultimate conditions, this project would also include the construction of a new bicycle and pedestrian bridge across Calabazas Creek to connect the alternate route to Calabazas Creek Trail.

The full set of the improvements is shown on the figure on the next page.

Why is this Project Needed?

- There is a gap in bicycle facilities along Tasman Drive in Sunnyvale between Fair Oaks Ave and Calabazas Creek; however, right-of-way is also tightly constrained along this portion of the Study Corridor, resulting in the need for alternative bike route(s). Both north and south routes are recommended to provide convenient routing for a variety of trip origins and destinations

Benefits of Improvements

- Closes a major gap in bicycle facilities along the Corridor between Fair Oaks Ave and Reamwood Avenue
- Improves bicyclist safety and comfort along the proposed routes with infrastructure improvements

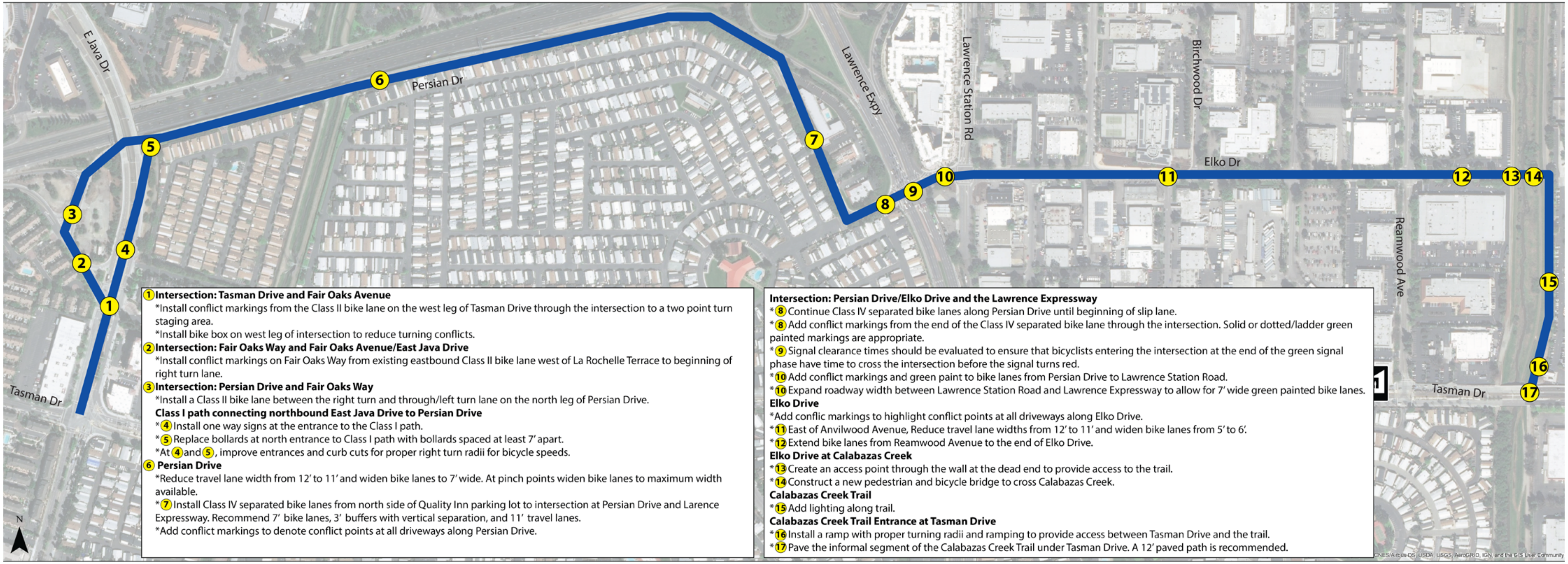
Cost

- $1,262,000 (near-term)
- $2,075,000 (ultimate)
- $3,337,000 (total)

Steps to Implementation

1. Incorporate into Sunnyvale bicycle/pedestrian master plan
2. Obtain environmental clearance for near-term improvements (anticipated to be Categorical Exemption)
3. Pursue grant funding and program local funds
4. Prepare design
5. Construct
6. Coordinate with the Santa Clara Valley Water District for the construction of the bridge over Calabazas Creek. This will likely require further analysis of flow lines, topography and visual impacts
7. Obtain environmental clearance for ultimate improvements
8. Pursue grant funding and program local funds
9. Prepare design
10. Construct

Plan View of Proposed Improvements



SV-9 SUNNYVALE ALTERNATIVE BIKE ROUTING (SOUTH ROUTE)

Improvements Description

This improvement provides an alternate bike route for bicyclists traveling eastbound or westbound along the Corridor. One of the two alternate routes, which routes bicyclists to the south of Tasman Drive, is shown below. This improvement would include upgrades to infrastructure to accommodate a new bicycle route, including new bike lanes, signage, conflict markings, and lighting.

The full set of the improvements is shown in the figure on the next page.

Why is this Project Needed?

- There is a gap in bicycle facilities along Tasman Drive in Sunnyvale between Fair Oaks Ave and Calabazas Creek; however, right-of-way is also tightly constrained along this portion of the Study Corridor, resulting in the need for alternative bike route(s). Both north and south routes are recommended to provide convenient routing for a variety of trip origins and destinations

Benefits of Improvements

- Closes a major gap in bicycle facilities along the Corridor between Fair Oaks Avenue and Reamwood Avenue
- Improves bicyclist safety and comfort along the proposed routes with infrastructure improvements
- Connects and extends the John W. Christian Greenbelt to better connect Sunnyvale Avenue neighborhoods
- Replaces the existing Lawrence Expressway overpass that is not compliant with the Americans with Disabilities Act (ADA)

Cost

- $12,715,000

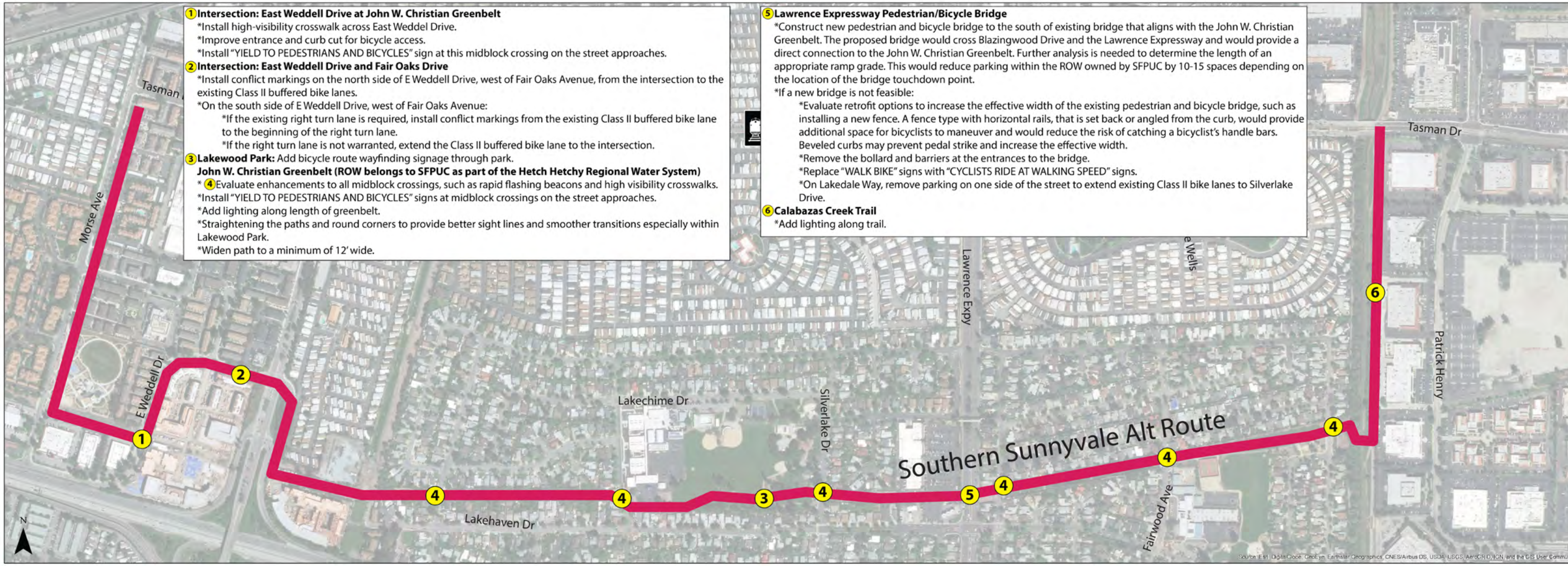
Steps to Implementation

1. Incorporate into Sunnyvale bicycle/pedestrian master plan
2. Coordinate with San Francisco Public Utilities Commission (as owner of Hetch Hetchy corridor) for use of corridor for new Lawrence Expressway pedestrian and bicycle overpass
3. Obtain environmental clearance
4. Pursue grant funding and program local funds
5. Prepare design, including minimizing impact to Lakewood Shopping Center parking lot
6. Construct

Note: In order to expedite provision of improvements, consider advancing other elements besides Lawrence Expressway overpass and utilizing existing Lawrence Expressway overpass at Lakedale Way until new overpass can be construction.

Santa Clara Valley Transportation Authority

Plan View of Proposed Improvements



SC-1 SANTA CLARA SIDEWALK IMPROVEMENTS

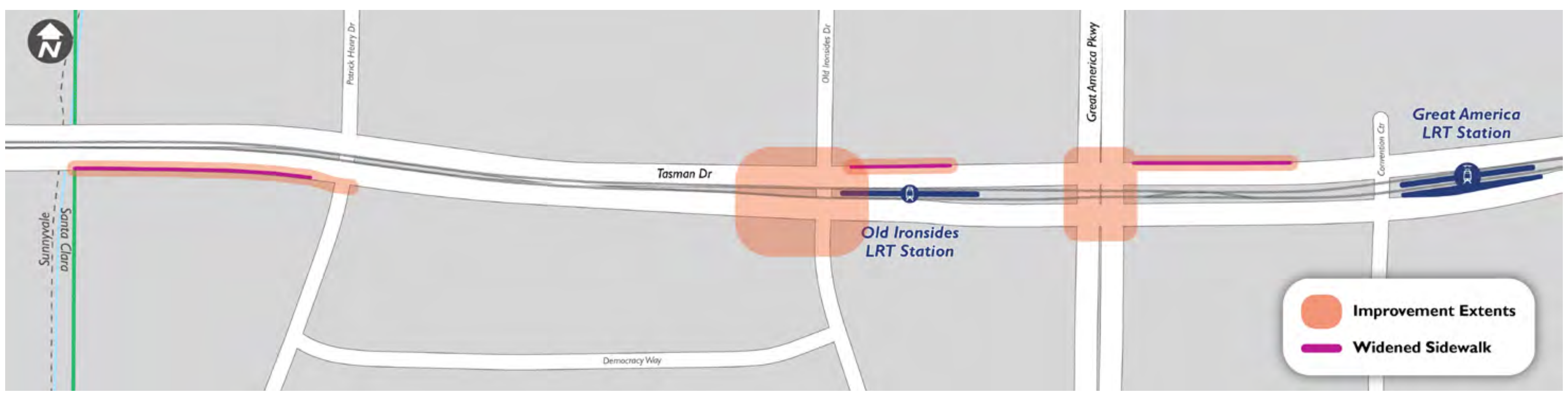
Improvements Description

Provide sidewalk improvements along Tasman Drive throughout the City of Santa Clara. Proposed improvements as part of this project include the following:

- On Tasman Drive between Centennial Boulevard and Calle del Sol, provide new sidewalk on the north side of the street, and widen the existing sidewalk on the south side of the street
- Widen some segments of the existing sidewalk on the north side of Tasman Drive, and provide landscape strips to buffer pedestrians from vehicle traffic
- Tighten curb radii at select locations
- Install accessible pedestrian signals at select locations

Proposed sidewalk widening location between Convention Center Drive and Great America Parkway

Location



Why is this Project Needed?

- There is currently no sidewalk on the north side of Tasman Drive between Centennial Boulevard and Calle del Sol
- Pedestrian connections between Lafayette Street and Tasman Drive are not adequate, especially considering the location of the Great America heavy rail and Lick Mill light rail stations nearby; well-worn desire paths already exist at this location, emphasizing the need to formalize a more direct connection between Lafayette Street and Tasman Drive
- Feedback during the outreach process indicated that pedestrian safety could be improved by providing additional separation between pedestrians and vehicles
- During stadium events, it was observed that the narrow sidewalks near Levi's Stadium were unable to provide the capacity needed to meet the demands of pedestrian traffic

Benefits of Improvements

- Eliminates gaps in pedestrian facilities
- Formalizes pedestrian connections that are already utilized
- Enhances connectivity to and from regional transit facilities, including for connections between regional transit facilities
- Improves pedestrian connectivity to major destinations, such as Levi's Stadium and Convention Center
- Provides additional pedestrian capacity to meet high demand during Levi's Stadium events

Cost

- $3,174,000

Steps to Implementation

1. Incorporate into Santa Clara bicycle/pedestrian master plan
2. Obtain environmental clearance (Categorical Exemption)
3. Pursue grant funding and program local funds
4. Prepare design plans, including urban design, streetscape, and utilities
5. Construct

SC-2 SANTA CLARA BICYCLE IMPROVEMENTS

Improvements Description

Provide bicycle improvements along Tasman Drive in the City of Santa Clara. Proposed improvements as part of this project include the following:

- Within existing striped bike lane buffers east of the new slip ramp on Tasman Drive, provide vertical separation for Santa Clara bike lanes in the form of bollards or raised delineators between the bike lane and general traffic lanes
- Provide bicycle-related striping improvements at intersections, including bike buffers and green striping in conflict zones
- Install bike-friendly inlet grates along Corridor

Location

Example of bike lane vertical separation elements

Why is this Project Needed?

- Existing buffered bike lanes along Tasman Drive in Santa Clara can be improved for cyclists as they do not provide a physical barrier between bicyclists and higher-speed vehicle traffic
- Existing conflict zones are not enhanced with green pavement markings

Benefits of Improvements

- Improves bicyclist safety and comfort through the provision of vertical separation

Cost

- $594,000

Steps to Implementation

1. Incorporate into Santa Clara bicycle master plan
2. Select type of vertical separation and verify street sweeping capability
3. Obtain environmental clearance (Categorical Exemption)
4. Pursue grant funding and program local funds
5. Prepare design plans
6. Construct

SC-3 SANTA CLARA LRT STATION IMPROVEMENTS

Improvements Description

Construct improvements to the Old Ironsides, Great America, and Lick Mill LRT stations and station areas; proposed enhancements include the following key elements:

1. Install high visibility, distinctive crosswalk treatment at all pedestrian crosswalks providing access to LRT stations
2. Construct traffic signal modifications
3. Install blankout signs to be activated during LRT crossing to provide additional pedestrian warning
4. Install enhanced LRT station lighting
5. Install green bus/bike conflict area pavement markings
6. Construct landscape strips to buffer sidewalks

Location

Rendering of Proposed Improvements

Why is this Project Needed?

- Pedestrians do not feel comfortable getting to and from LRT stations located in the median—this was a common complaint expressed during the outreach process. Additionally, with the opening of the BART Silicon Valley Phase 1 extension, and the implementation of VTA's 2019 New Transit Service Plan, there is high projected growth in LRT passenger activity, creating a need for amenities to accommodate this increased traffic. Feedback in the outreach process also indicated that the LRT stations do not currently provide adequate wayfinding signage or posted information to guide passengers.

Benefits of Improvements

- Improves pedestrian visibility
- Establishes priority for pedestrians with implementation of LPI and improves pedestrian safety with median refuges
- Enhances amenity for transit users
- Improves visibility of light rail
- Improves wayfinding for light rail users and pedestrians

Cost

- $1,003,000

Steps to Implementation

1. Incorporate into countywide transportation plan
2. Incorporate into VTA capital improvement program
3. Obtain environmental clearance for physical improvements (anticipated to be Categorical Exemption)
4. Pursue grant funding and program local funds
5. Prepare design plans, including urban design, streetscape, and utilities
6. Coordinate with VTA LRT operations on station configuration modifications
7. Construct and update signal timings

SC-4 SANTA CLARA BUS STOP IMPROVEMENTS

Improvements Description

Provide enhancements to all bus stops on the Corridor in Santa Clara to make them consistent with VTA's Transit Passenger Environment Plan (TPEP) standards. The TPEP classifies bus stops based on daily ridership. Per these definitions, all bus stops along the Corridor in Santa Clara except for one are classified as Basic Stops, which are those with fewer than 40 daily boardings. The eastbound stop at Tasman Drive and Old Ironsides Drive has enough ridership to be classified as a Core Stop, which has between 40 and 199 daily boardings. Some of the existing bus stops on the corridor will no longer be served by VTA buses under the 2019 New Transit Service Plan. Improvements are not currently recommended at those locations.

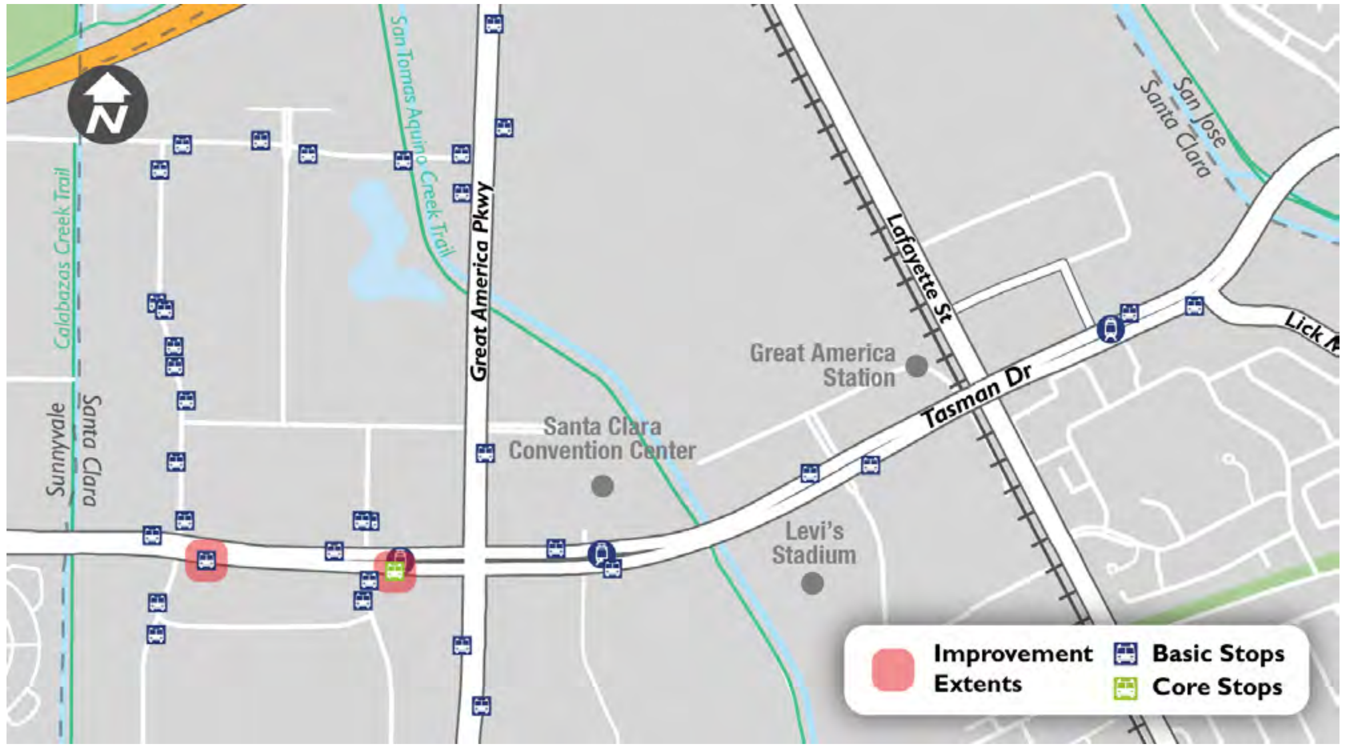
Basic Stops shall be improved so that they include the following elements:

- Standard bus stop sign with real-time information decal and schedule display
- Seating
- Bicycle parking (at least one U-rack; more if demand warrants)

Core Stops shall be improved to include the following enhanced elements:

- Standard bus stop sign with real-time information decal and schedule display
- Shelter with system map
- Seating
- Trash receptacle (install based on need)
- Bicycle parking (at least one U-rack; more if demand warrants)
- In-shelter or pedestrian-activated lighting

Location



Existing Bus Stop

Why is this Project Needed?

- Existing stops have little to no amenities, making waiting for the bus undesirable; providing more amenities at bus stops can reduce perceived wait time, attracting new riders and increasing the visibility of transit service.

Benefits of Improvements

- Enhances amenities for transit users
- Potential for increased transit use

Cost

- $179,000

Steps to Implementation

1. Incorporate into VTA Capital Improvement Program
2. Obtain environmental clearance (Categorical Exemption)
3. Pursue grant funding and program local funds
4. Schedule improvements as part of regular stop upgrades process

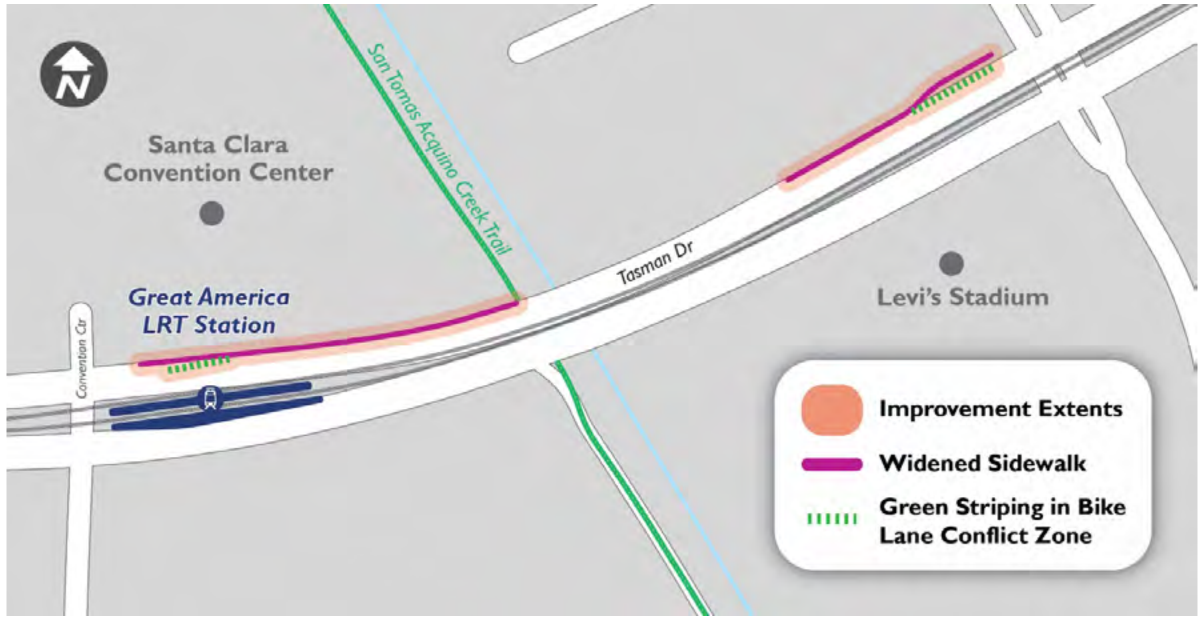
SC-5 LEVI'S STADIUM, CONVENTION CENTER, AND SAN TOMAS AQUINO CREEK TRAIL CONNECTION IMPROVEMENTS

Improvements Description

Improve bicycle and pedestrian facilities along Tasman Drive in the immediate vicinity of Levi's Stadium, the Santa Clara Convention Center, and San Tomas Aquino Creek Trail. Major improvements include the following:

- Install wayfinding signage for San Tomas Aquino Creek Trail
- Widen the existing sidewalk and relocate street lights on the north side of Tasman Drive
- Bicycle facility improvements, including green striping in conflict zones and installation of bike friendly inlet grates

Location



Existing Class II buffered bike lane

Why is this Project Needed?

- Wayfinding to and from San Tomas Aquino Creek Trail is currently lacking. The San Tomas Acquino Creek Trail intersects Tasman Drive mid-block and connections to the nearest intersection do not provide adequate width

Benefits of Improvements

- Improves bicyclist safety and comfort
- Improved wayfinding for San Tomas Aquino Creek Trail users

Cost

- $541,000

Steps to Implementation

1. Incorporate into Santa Clara bicycle/pedestrian master plan
2. Obtain environmental clearance, including identifying tree impacts and mitigations.
3. Pursue grant funding and program local funds
4. Prepare design plans
5. Construct

SC-6 LAFAYETTE STREET CONNECTION

Improvements Description

Provide an accessible pedestrian path within public right-of-way connecting the north side of Tasman Drive at Calle Del Sol to the east side of Lafayette Street.

Location

Pedestrians using informal path to access Tasman Dr from Lafayette St

There is currently a sidewalk gap on the north side of Tasman Drive near Lafayette Street

Why is this Project Needed?

- Existing pedestrian connections between Tasman Drive and Lafayette Street are not adequate and formal connections are not provided. Desire paths within public right-of-way at this location indicate the need for a formalized connection.

Benefits of Improvements

- Reduces pedestrian walking distance for connections between Lafayette Street and Tasman Drive

Cost

- $251,000

Steps to Implementation

1. Incorporate into Santa Clara bicycle/pedestrian master plan
2. Obtain environmental clearance (Categorical Exemption)
3. Pursue grant funding and program local funds
4. Prepare design plans
5. Construct

SC-7 GUADALUPE RIVER TRAIL AREA IMPROVEMENTS

Improvements Description

Provide various bicycle and pedestrian improvements along Tasman Drive in the area around Guadalupe River Trail. Major improvements include the following:

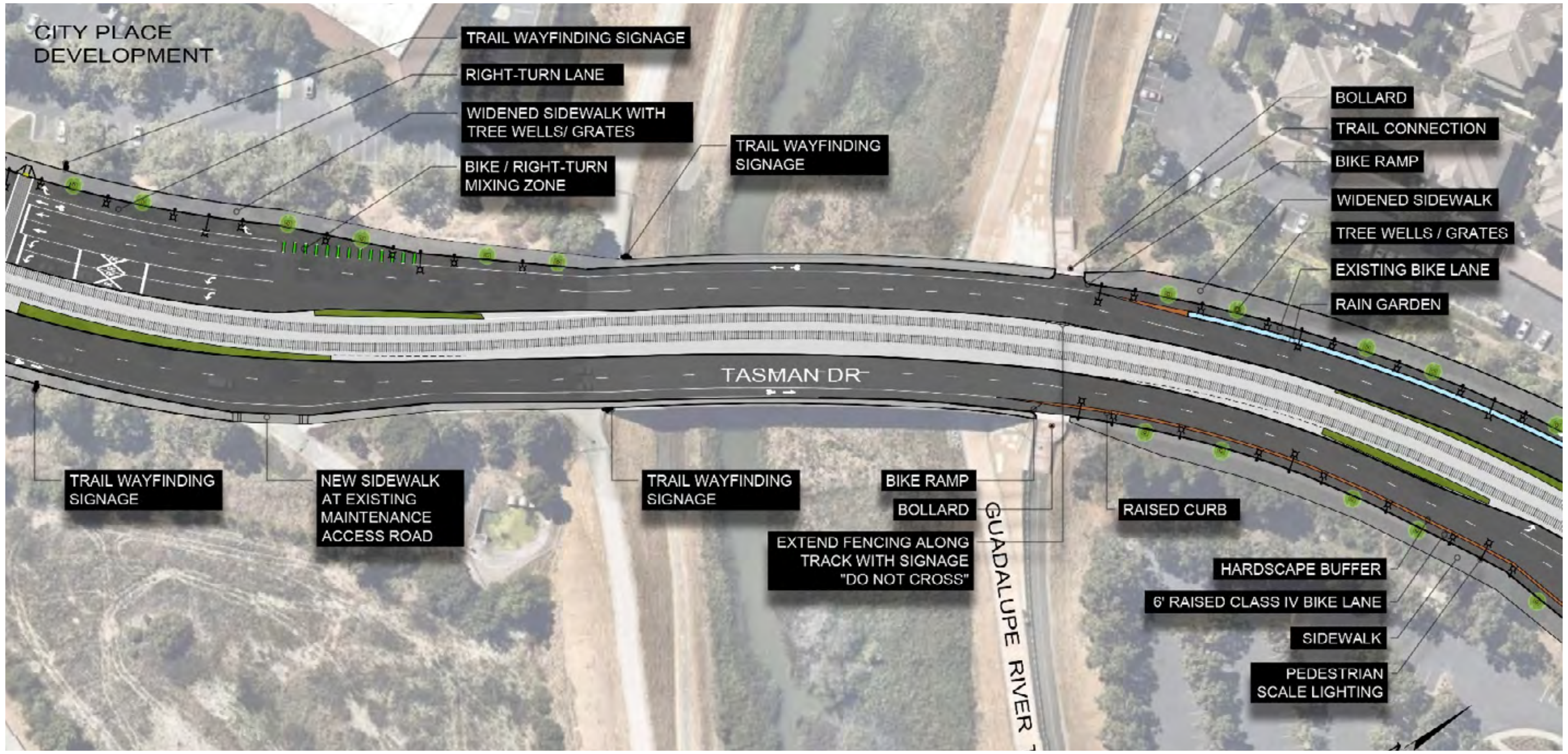
- Construct widened sidewalk and furnishing zone on the north side of Tasman Drive between Lick Mill Boulevard and the Guadalupe River Bridge
- Install wayfinding signage to direct pedestrians to designated trail entry points
- Reconstruct trail maintenance access driveway on the south side of Tasman Drive to a City standard "industrial" or "commercial" driveway to provide a more direct pedestrian path along the sidewalk

As part of the City Place development, a number of additional but separate improvements will be implemented at this location, including:

- Extend Lick Mill Boulevard north of Tasman Drive
- Provision for a second westbound left-turn lane at Lick Mill Boulevard. This project would require the widening of Tasman Drive to accommodate the additional lane

Location

Plan View of Proposed Improvements



Why is this Project Needed?

- The sidewalk is currently narrow with no landscape buffer west of the Guadalupe River
- There is no signage to direct users to the maintained Guadalupe River Trail at the connection of the Guadalupe River service road with Tasman Drive

Benefits of Improvements

- Improves bicycle and pedestrian connections to and from Guadalupe River Trail

Cost

- $381,000

Steps to Implementation

1. Incorporate into Santa Clara bicycle/pedestrian master plan
2. Obtain environmental clearance (Categorical Exemption)
3. Pursue grant funding and program local funds
4. Prepare design plans, including urban design, streetscape, and utilities
5. Construct

SJ-1 SAN JOSE BICYCLE & PEDESTRIAN FACILITY

Improvements Description

Provide various bicycle and pedestrian improvements along Tasman Drive within the City of San Jose. In the near-term, this project includes providing the following major improvements:

- Install rain garden to provide vertical separation for raised bike lane on both sides of Tasman Drive throughout San Jose limits
- Install bike ramps at intersections
- Widen existing sidewalk on the south side of Tasman Drive and provide landscape buffer/furnishing zone
- Install green striping in bike lane conflict areas
- Install wayfinding signage near Guadalupe River Trail
- Install high visibility crosswalk treatments at signalized intersections
- Construct signal modifications and install bike signals at signalized intersections to control bike crossings
- Tighten curb radii at select locations
- Improve bike ramps and bike access between on-street bike facilities and trails
- Improve streetscape with enhanced median and pedestrian realm landscaping

In ultimate conditions, this project would include the following improvements in addition to the near-term improvements:

- Provide a 15-foot sidewalk and furnishing zone on the north side of Tasman Drive
- Widen the Coyote Creek Bridge on the south side to accommodate a third eastbound travel lane, a full-width buffered bike lane, and a 12-foot sidewalk with a 4-foot furnishing zone

The proposed widening of the Coyote Creek Bridge includes improvements located in both the City of San Jose and the City of Milpitas.

Why is this Project Needed?

- Existing sidewalks along the Corridor are narrow and adjacent to roadway, making them uncomfortable for pedestrians
- Limited separation between vehicles traveling at high speeds and bicyclists increases level of stress for bicyclists and discourages bicycle use of the corridor
- Opening of Milpitas BART Station will increase demand for bicycle trips in corridor
- Long crossing distances across Tasman Drive are not comfortable for pedestrians
- Conflict between higher-speed right-turn movements and through bicycle movements at several major intersections

Benefits of Improvements

- Provides increased separation and comfort between bicyclists and autos with installation of physical buffer (rain garden) and control of conflicting movements at intersections
- Widened sidewalks improves pedestrian comfort and capacity
- Furnishing zone provides increased opportunity for landscaping, lighting, and organization of utilities
- Improved bicycle connectivity to regional trail system, LRT stations, and Milpitas BART
- Potential for reduced auto speeds to make corridor more multimodal supportive

Cost

- $16,788,000 (near-term)
- $5,774,000 (ultimate)
- $22,562,000 (total)

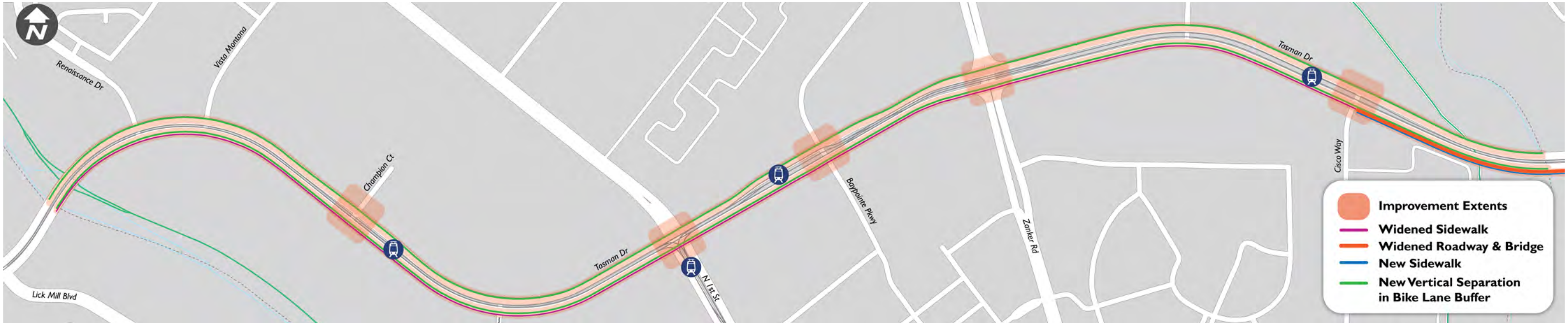
Steps to Implementation

1. Incorporate near-term and ultimate improvements into San Jose bicycle/pedestrian master plan
2. Further develop project concepts and prepare preliminary engineering
3. Obtain environmental clearance for near-term project (likely a Negative Declaration)
4. Adopt plan line for ultimate configuration of the roadway right-of-way
5. Pursue grant funding and program local funds for near-term improvements
6. Prepare design plans for near-term improvements
7. Secure additional right-of-way needed for continuous facility as adjacent property redevelops or fill in right-of-way gaps through acquisition as funding allows
8. Construct near-term improvements and modify traffic signal operations
9. Obtain environmental clearance for ultimate project (may require an Environmental Impact Report [EIR] for bridge widening)
10. Pursue grant funding and program local funds for ultimate improvements
11. Prepare final design of ultimate improvements
12. Construct ultimate improvements

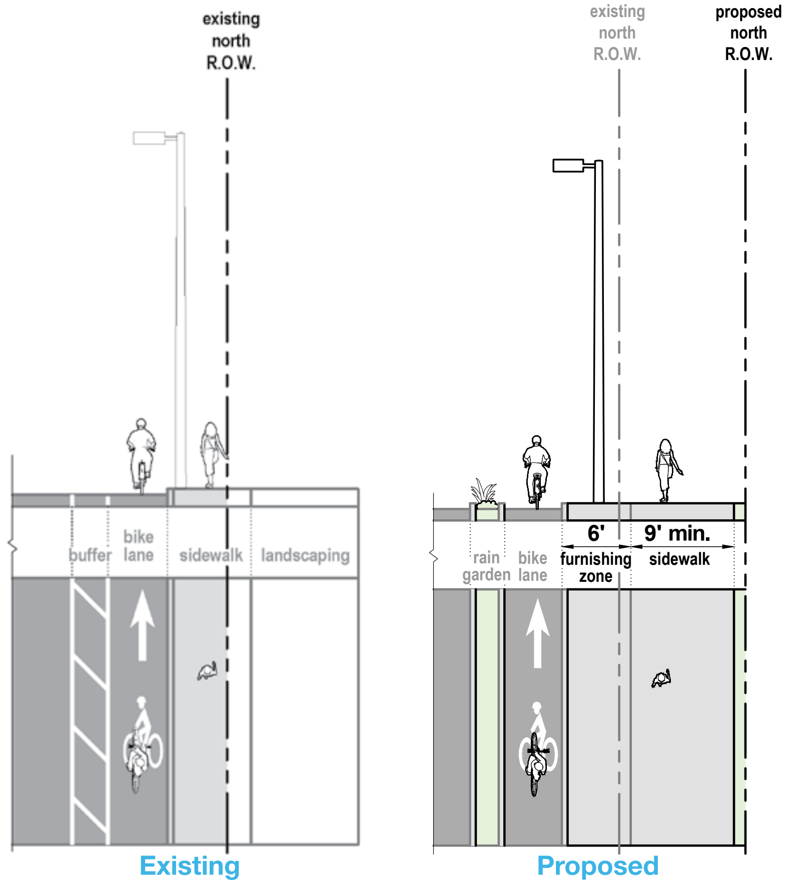
Other Implementation Considerations

- Will require coordination between the Cities of San Jose and Milpitas to identify roles in acquiring funding, procurement, and maintenance of ultimate improvements
- Adoption of plan line will provide City with information needed to obtain right-of-way as adjacent properties redevelop
- Further conceptual design development needed to select a preferred bicycle facility configuration, rain garden design, and verify maintenance feasibility

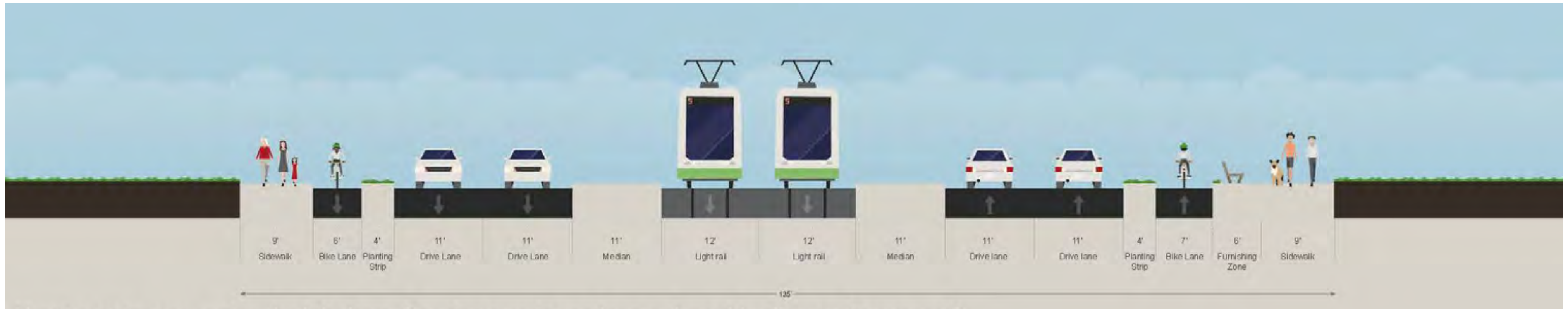
Location



Cross-Sections (Ultimate Improvements) – North Side of Tasman (Looking West)



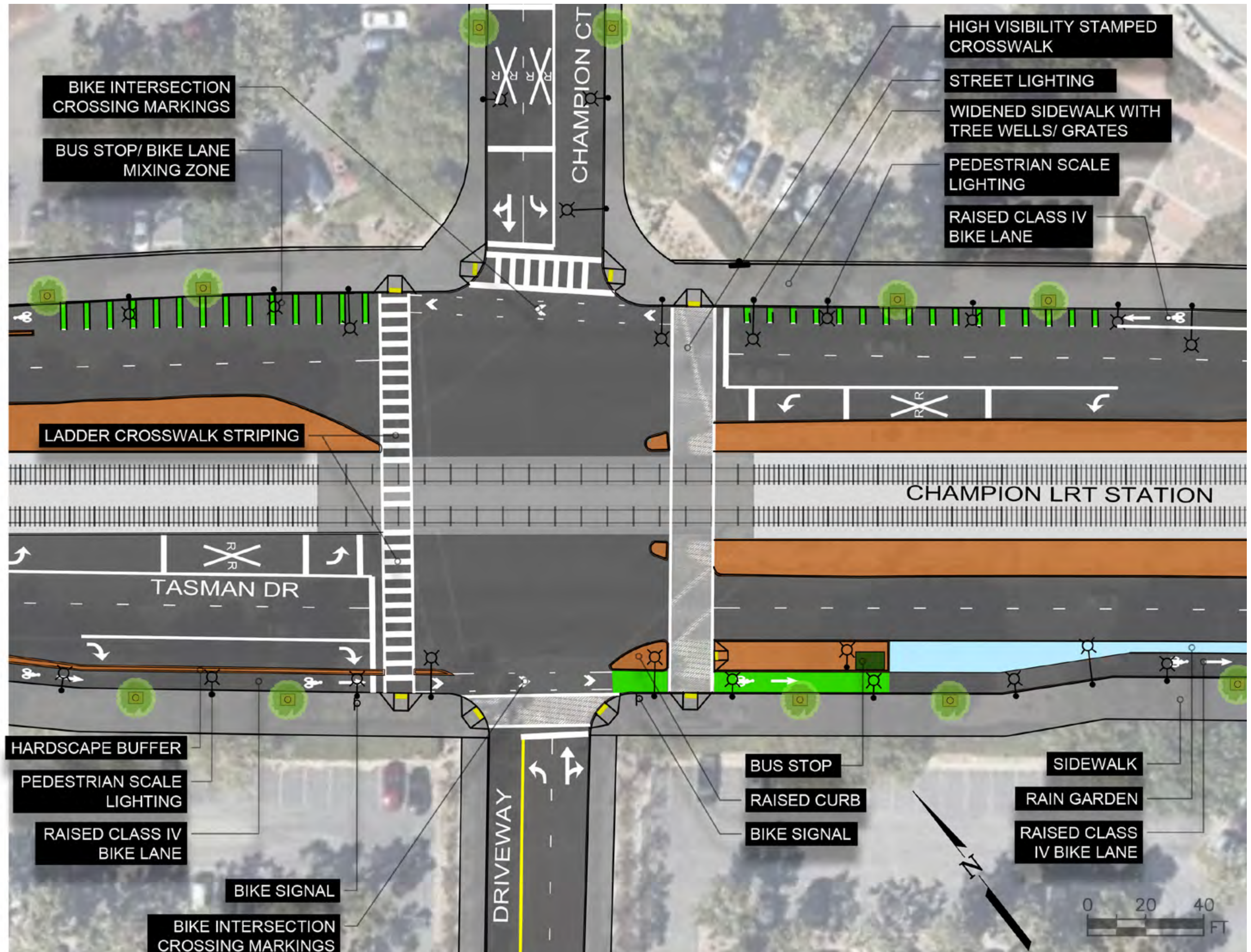
Cross-Sections (Near-Term Improvements) - East of Vista Montana (Looking East)



Planting strips separating the bike lanes function as rain gardens and would collect surface run-off.

Existing and Projected Tasman Drive Mode Split with Cycle Track within the City of San Jose

Plan View of Proposed Improvements at Champion Parkway



Rendering of Proposed Near-Term Improvements

SJ-2 SAN JOSE LRT STATION IMPROVEMENTS

Improvements Description

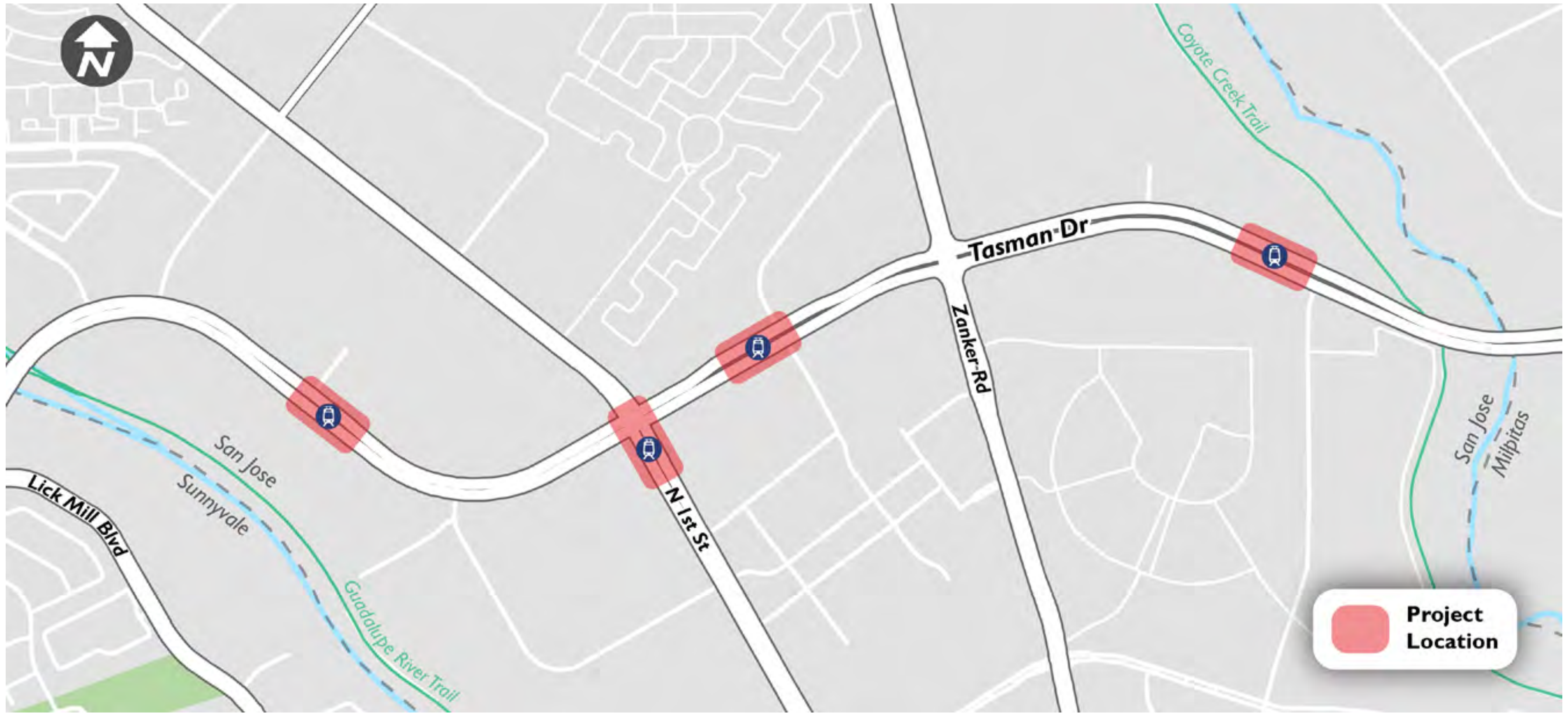
Construct improvements to the Champion, Tasman, Baypointe, and Cisco LRT stations and station areas; proposed near-term enhancements include the following key elements:

1. Install high visibility, distinctive crosswalk treatment at all pedestrian crosswalks providing access to LRT stations
2. Construct traffic signal modifications
3. Install blankout signs to be activated during LRT crossing to provide additional pedestrian warning
4. Install enhanced LRT station lighting
5. Install bus/bike conflict area pavement marking
6. Construct landscape strips to buffer sidewalks
7. Additional modifications to improve pedestrian access to the Tasman Drive LRT Stations

In ultimate conditions, this project would include the following improvements in addition to the near-term improvements:

1. Elimination of one or more left-turn lanes from the Tasman Drive/N. 1st Street intersection, construction raised medians in place of the removed left-turn lanes, and modification of the existing signal timing at Tasman Drive/N. 1st Street to remove left-turn phases

Location



Why is this Project Needed?

- Pedestrians do not feel comfortable getting to and from LRT stations located in the median, particularly at Tasman LRT station
- With the opening of the BART Silicon Valley Phase 1 extension, and the implementation of VTA's 2019 New Transit Service Plan, there is high projected growth in LRT passenger activity creating a need for amenities to accommodate this increased traffic. Feedback in the outreach process also indicated that currently, the LRT stations also do not currently provide adequate wayfinding signage or posted information to guide passengers

Benefits of Improvements

- Improves pedestrian visibility
- Establishes priority for pedestrians with implementation of LPI and improves pedestrian safety with median refuges, lighting, widened sidewalks and buffers
- Enhances amenities for transit users
- Improves visibility of light rail
- Improves wayfinding for light rail users and pedestrians

Cost

- $2,702,000 (near-term), $957,000 (ultimate), $3,659,000 (total)

Steps to Implementation

1. Incorporate into countywide transportation plan
2. Incorporate into VTA Capital Improvement Program
3. Obtain environmental clearance for near-term physical improvements (anticipated to be Categorical Exemption)
4. Pursue grant funding and program local funds
5. Prepare design plans for near-term improvements, including urban design, streetscape, and utilities
6. Coordinate with VTA LRT operations on station configuration modifications
7. Construct and update signal timings
8. Further analysis by VTA on LRT efficiency upgrades needed at Tasman Drive/N. 1st Street intersection
9. Circulation analysis of ultimate improvements
10. Obtain environmental clearance for ultimate improvements
11. Pursue grant funding and program local funds
12. Prepare design plans for ultimate improvements
13. Construct and update signal timings

Rendering of Proposed Near-Term Improvements at Tasman LRT Station (Looking Southeast)

SJ-3 SAN JOSE BUS STOP IMPROVEMENTS

Improvements Description

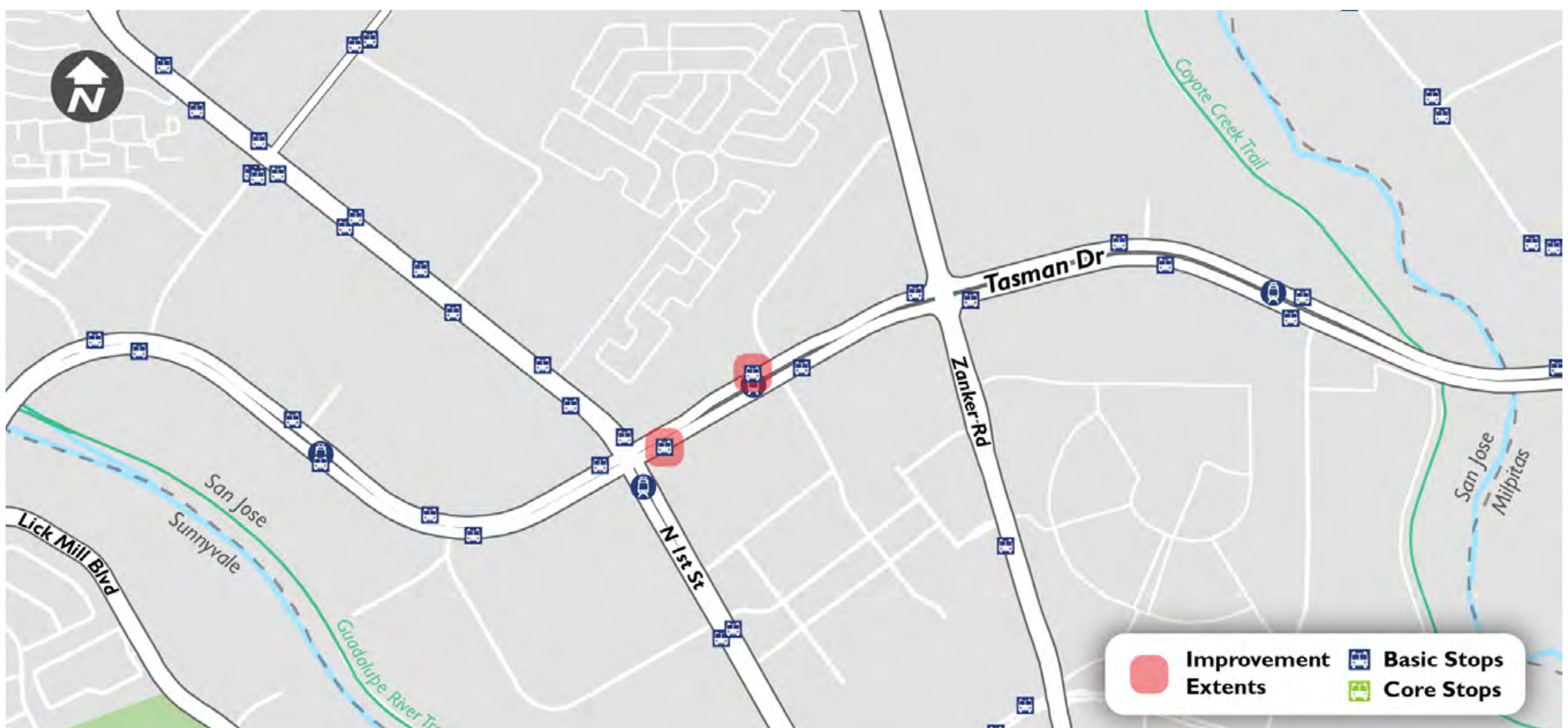
Provide enhancements to all bus stops on the Corridor in Sunnyvale to make them consistent with VTA's Transit Passenger Environment Plan (TPEP) standards. The TPEP classifies bus stops based on daily ridership. Per these definitions, all bus stops along the Corridor in San Jose are classified as Basic Stops, which are those with fewer than 40 daily boardings. Some of the existing bus stops on the corridor will no longer be served by VTA buses under the 2019 New Transit Service Plan. Improvements are not currently recommended at those locations

Basic Stops shall be improved so that they include the following elements:

- Standard bus stop sign with real-time information decal and schedule display
- Seating
- Bicycle parking (at least one U-rack; more if demand warrants)

Existing bus stop in San Jose

Location



Why is this Project Needed?

- Existing stops have little to no amenities, making waiting for the bus undesirable;
- Providing more amenities at bus stops can reduce perceived wait time, attracting new riders and increasing the visibility of transit service.

Benefits of Improvements

- Enhances amenities for transit users
- Potential for increased transit use

Cost

- $179,000

Steps to Implementation

1. Incorporate into VTA Capital Improvement Program
2. Obtain environmental clearance (Categorical Exemption)
3. Pursue grant funding and program local funds
4. Schedule improvements as part of regular stop upgrades process

SJ-4 ZANKER ROAD IMPROVEMENTS

Improvements Description

Implement various pedestrian-focused improvements at the Tasman Drive/ Zanker Road intersection. Proposed improvements include the following:

- Remove pork chop islands at all four corners and construct tighter curb radii to reduce vehicular turning speeds
- Widening of the raised center median on the west side of the intersection by eliminating the westbound slip lane on the west side of the intersection
- Construct traffic signal modifications
- Implement adaptive pedestrian signal timing
- Re-assign westbound lane assignments to provide additional queue storage for the westbound left-turn and require autos to weave across the bicycle lane instead of requiring through bicycles to weave across an auto lane

Location

Why is this Project Needed?

- Intersection has very long crossing distances
- Vehicles make turning movements at higher speeds, resulting in poor pedestrian environment
- Bicycle movements are uncomfortable due to conflict with vehicles traveling at higher speeds

Benefits of Improvements

- Improved pedestrian safety with reduction of crossing distances, improved crosswalk striping, and reduction of "free" right turn movements
- Supplements SV-1 bicycle improvement to make intersection more comfortable to navigate for cyclists

Cost

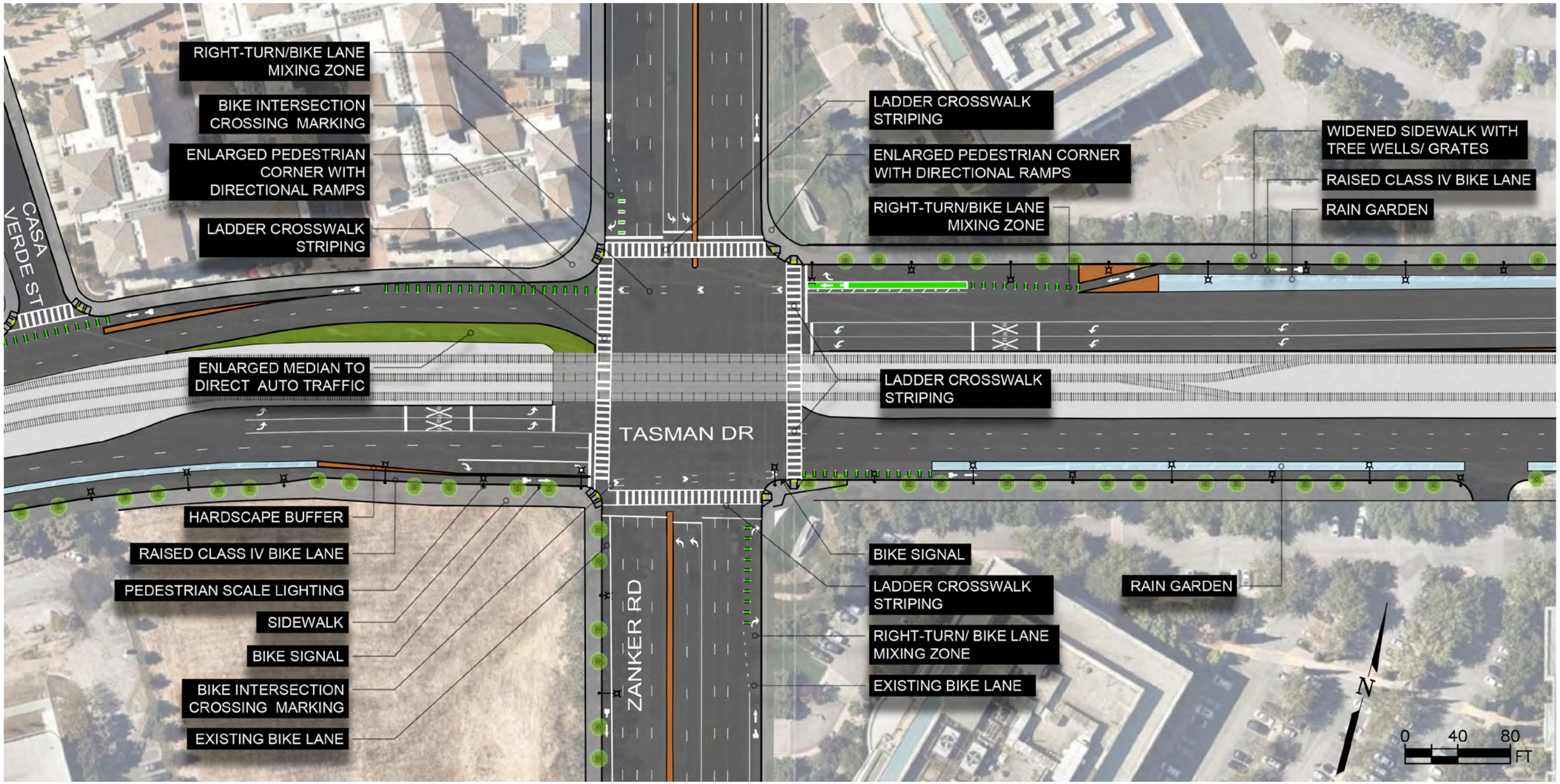
- $663,000

Steps to Implementation

1. Incorporate into San Jose bicycle/pedestrian master plan
2. Obtain environmental clearance (Categorical Exemption)
3. Pursue grant funding and program local funds
4. Prepare design plans
5. Construct

Santa Clara Valley Transportation Authority

Plan View of Proposed Improvements



SJ-5 COYOTE CREEK TRAIL INTERSECTION IMPROVEMENTS

Improvements Description

Provide improvements at and around the connection of Coyote Creek Trail to Tasman Drive to improve safety and accessibility in the area. This project would include the following improvements:

- Reduce westbound lane widths to provide widened bicycle lane and provide bike lane buffer with vertical separation
- Install wayfinding signage along Tasman Drive to direct pedestrians to the Coyote Creek Trail and Cisco LRT Station

An ultimate improvement to widen the Coyote Creek Bridge in the eastbound direction for enhanced auto, bicycle, and pedestrian facilities is included in SJ-1.

Location

The existing sidewalk on Tasman Drive across Coyote Creek is very narrow and uncomfortable.

Why is this Project Needed?

- Existing narrow sidewalks are not comfortable for pedestrians
- Limited separation between vehicles and pedestrians/ bicycles results in high level of stress

Benefits of Improvements

- Provides wider pedestrian facility to improve pedestrian comfort
- Provides enhanced separation between autos and bicyclists, increasing bicycle comfort
- Improved visibility of Coyote Creek Trail

Cost

- $129,000

Steps to Implementation

1. Incorporate into San Jose bicycle/pedestrian master plan
2. Obtain environmental clearance (Categorical Exemption)
3. Pursue grant funding and program local funds
4. Prepare design plans
5. Construct

Other Implementation Considerations

- Will require coordination between the Cities of San Jose and Milpitas to identify roles in acquiring funding, procurement, and maintenance of improvements

MP-1 COYOTE CREEK TO McCARTHY BOULEVARD IMPROVEMENTS

Improvements Description

This project includes various improvements within Milpitas, covering the portion of Tasman Drive stretching from Coyote Creek to the Tasman Drive/McCarthy Boulevard intersection.

In the near-term, proposed improvements include the following:

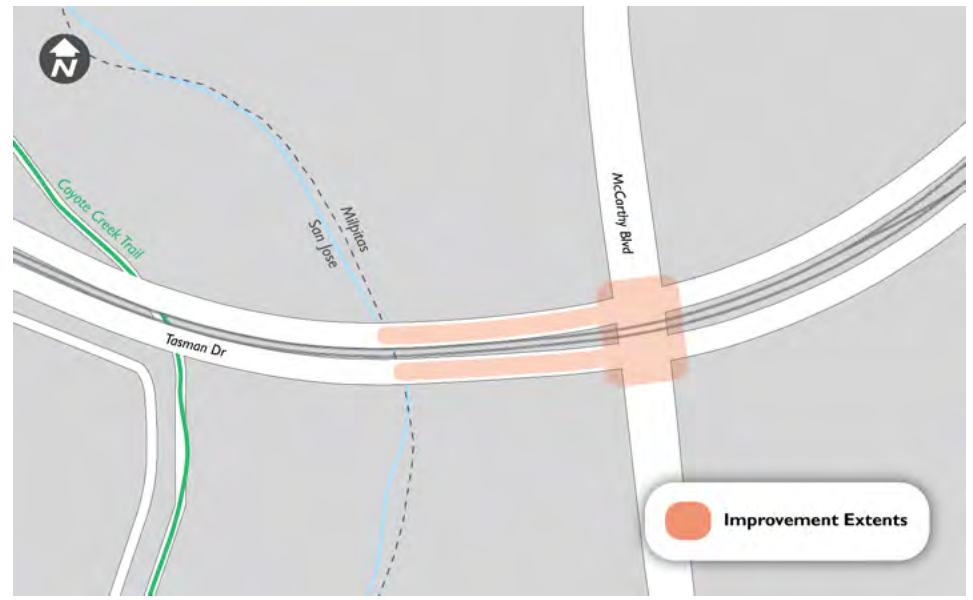
- Install a hardscape buffer adjacent to the existing bike lanes in both directions on Tasman Drive by narrowing the existing travel lanes
- Install wayfinding signage along Tasman Drive to direct pedestrians to Coyote Creek Trail
- Intersection improvements at Tasman Drive/McCarthy Boulevard:
  - » Install high visibility, distinctive crosswalk treatments
  - » Tighten curb radii at intersection corners
  - » Partially protected intersection for cyclists
  - » Extension of median nose(s)
  - » Implement adaptive pedestrian signals
  - » Install bike lane intersection crossing markings and bike signal

An ultimate improvement to widen the Coyote Creek Bridge in the eastbound direction for enhanced auto, bicycle, and pedestrian facilities is included in SJ-1. In ultimate conditions, this project would include the following improvements in addition to the near-term improvements:

- Traffic signal modification at Tasman Dr./McCarthy Blvd. to accommodate third eastbound through lane and associated bicycle and pedestrian improvements listed above.

Existing south leg crossing of McCarthy Boulevard, looking back towards Coyote Creek.

Location



Existing sidewalk on south side of Tasman Dr is narrow

Why is this Project Needed?

- Limited separation between vehicles and pedestrians/bicycles results in high level of stress for those users
- Pedestrian safety concerns resulting from large crossing distances
- Bicycle safety concerns resulting from high vehicle volumes at intersections

Benefits of Improvements

- Provides increased separation between pedestrians/bicycles and the roadway
- Improves pedestrian safety with median refuges and shortened crossing distances
- Enhances ability of cyclists to turn between Tasman Drive and McCarthy Boulevard

Cost

- $125,000 (near-term)
- $32,000 (ultimate)
- $157,000 (total)

Steps to Implementation

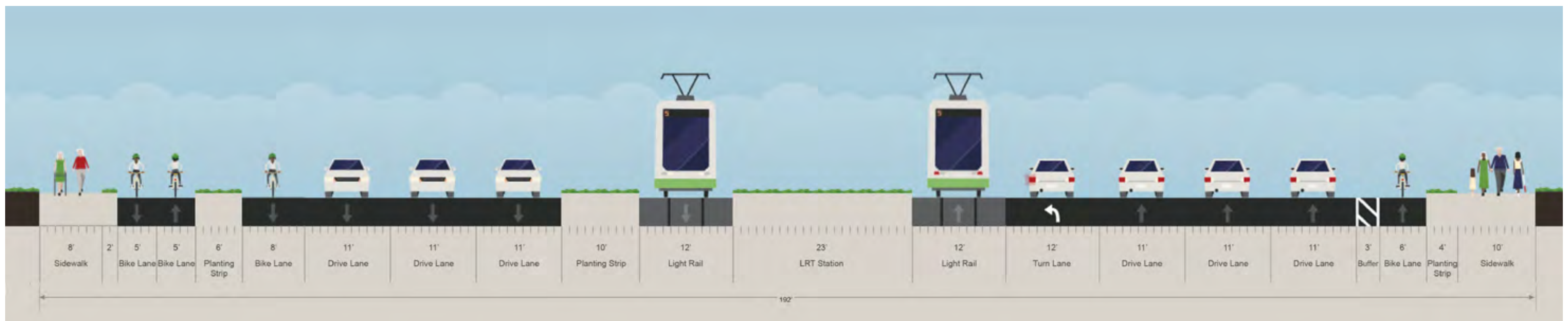
1. Incorporate into Milpitas bicycle/pedestrian master plan
2. Obtain environmental clearance (Categorical Exemption)
3. Pursue grant funding and program local funds
4. Prepare design plans
5. Construct

MP-2 McCARTHY BOULEVARD TO ALDER DRIVE SIDEWALK GAP CLOSURE

Improvements Description

Provide a 10-foot sidewalk and 4-foot furnishing zone on the south side of Tasman Drive to close the existing sidewalk gap between McCarthy Boulevard and Alder Drive.

Cross Section: West of Alder Drive (looking East)



Location

Existing sidewalk gap on the south side of Tasman Drive.

Why is this Project Needed?

- There is currently no sidewalk on the south side of Tasman Drive between McCarthy Boulevard and Alder Drive. This gap in the pedestrian network was a major area of concern brought up by respondents during the public outreach process

Benefits of Improvements

- Improves pedestrian connectivity
- Improves access to I-880/Milpitas LRT Station

Cost

- $1,843,00

Steps to Implementation

1. Incorporate into Milpitas bicycle/pedestrian master plan
2. Obtain environmental clearance (Categorical Exemption)
3. Pursue grant funding and program local funds
4. Prepare design plans
5. Construct

Rendering of Proposed Improvements (looking northeast from McCarthy Boulevard)

MP-3 SHARED USE PATH FROM McCARTHY BOULEVARD TO MONTAGUE EXPRESSWAY

Improvements Description

Provide dedicated bicycle and pedestrian facilities on the north side of Tasman Drive from McCarthy Boulevard to Montague Expressway. In the near-term, these facilities will include:

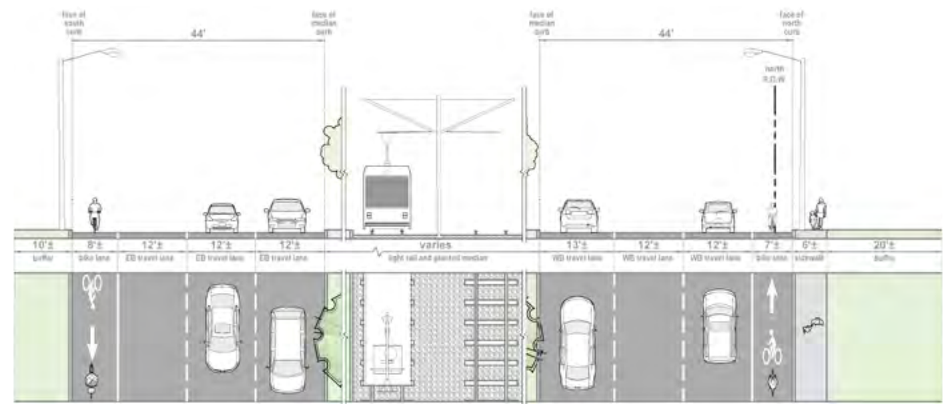
- From McCarthy Boulevard to Alder Drive: A 10-foot Class I bike path and 8-foot sidewalk
- From Thompson Street to Abel Street: A 14-foot shared use path
- From Abel Street to Main Street: A 10-foot shared use path
- From Main Street to Mustang Drive: A 10-foot Class I bike path and 10-foot sidewalk
- From Mustang Drive to Montague Expressway: A 10-foot shared use path
- Install a new crosswalk across Barber Lane adjacent to the pedestrian connection between Barber Lane and Tasman Drive
- Tighten curb radii at intersections to reduce crossing distances

In ultimate conditions, this project would include the following improvements in addition to the near-term improvements:

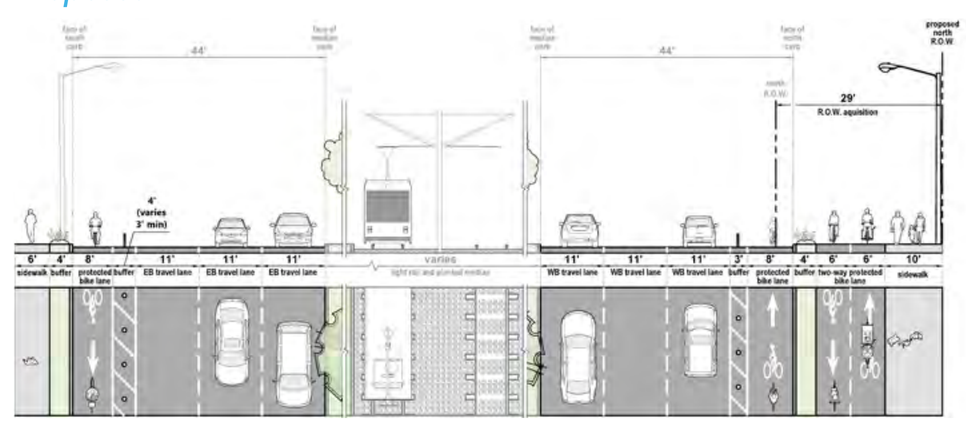
- Acquire additional ROW and widen the bridge over I-880 to provide a 10-foot Class I bike path and 8-foot sidewalk on the north side of Tasman Drive between Alder Drive and Thompson Street
- Provide a bike signal for the Class I bike path crossing at Thompson Street

Cross-Sections - McCarthy Boulevard to Alder Drive (Looking West)

Existing



Proposed



Why is this Project Needed?

- Limited separation between vehicles and pedestrians/ bicycles increases level of stress
- Existing narrow sidewalks are not comfortable for pedestrians

Benefits of Improvements

- Improves bicycle and pedestrian connectivity through Milpitas
- Provides increased separation between pedestrians/ bicycles and the roadway
- Improved access to north-south bike lanes and sidewalks on Barber Lane

Cost

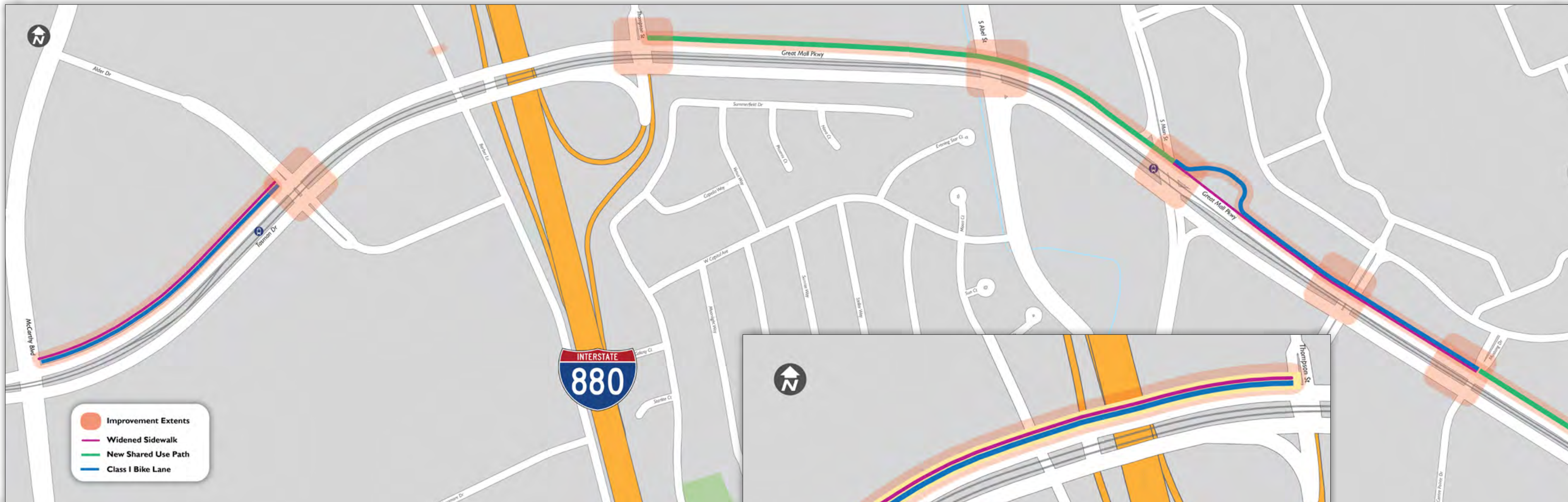
- $8,333,000 (near-term)
- $2,844,000 (ultimate)
- $11,177,000 (total)

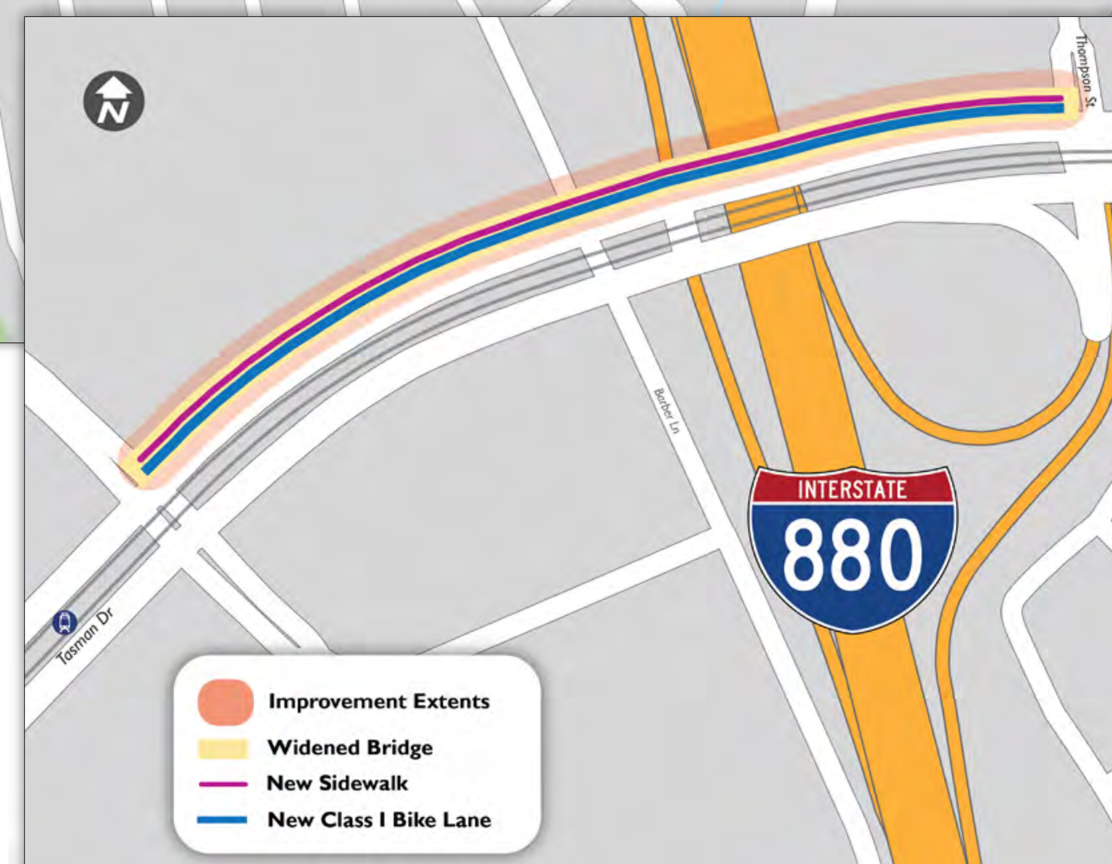
Steps to Implementation

1. Incorporate into Milpitas bicycle/pedestrian master plan
2. Prepare Caltrans Project Initiation Document (PID) and determine approach for Caltrans approval of interchange modification
3. Coordinate with Great Mall to identify opportunities for additional bicycle and pedestrian improvements on mall frontage
4. VTA to coordinate on future use of existing bus transit center at Great Mall and preservation of bicycle/pedestrian corridor through site
5. Obtain environmental clearance for full project (Negative Declaration or Mitigated Negative Declaration anticipated)
6. Adopt plan line for ultimate configuration of the roadway right-of-way
7. Pursue grant funding and program local funds for near-term improvements
8. Prepare design plans for near-term improvements
9. Construct near-term improvements
10. Secure additional right-of-way needed for continuous facility as adjacent property redevelops or fill in right-of-way gaps through acquisition as funding allows
11. Prepare design plans for ultimate improvements
12. Construct ultimate improvements

Location

Near-term





Ultimate

MP-4 BIKE IMPROVEMENTS FROM McCARTHY BOULEVARD TO MONTAGUE EXPRESSWAY

Improvements Description

Provide bicycle-focused improvements along Tasman Drive/Great Mall Parkway between McCarthy Boulevard and Montague Expressway. This project includes the following improvements:

- On both sides of Tasman Drive between McCarthy Boulevard and Montague Expressway reduce travel lane widths to provide a buffered bike lane with vertical separation (Class IV)
- Install green striping in bike lane conflict areas
- Provide two-stage left-turn boxes for bikes at Alder Drive, requiring a right turn on red for some approaches

Additional bike improvements at Abel Drive and Main Street are included in MP-8 and MP-9.

Existing bicycle lanes offer minimal protection from adjacent autos, resulting in an uncomfortable bicycle facility

Bicyclist traveling eastbound at Tasman Drive/I-880 Southbound Ramp intersection

Why is this Project Needed?

- Limited separation between vehicles and bicycles results in high level of stress for bicyclists
- Wide travel lanes encourages higher-speed auto movements

Benefits of Improvements

- Provides increased separation between bicycles and higher-speed vehicles
- Two-stage left-turn boxes improve bicyclist circulation by designating space for left-turning bicyclists to wait for traffic signal

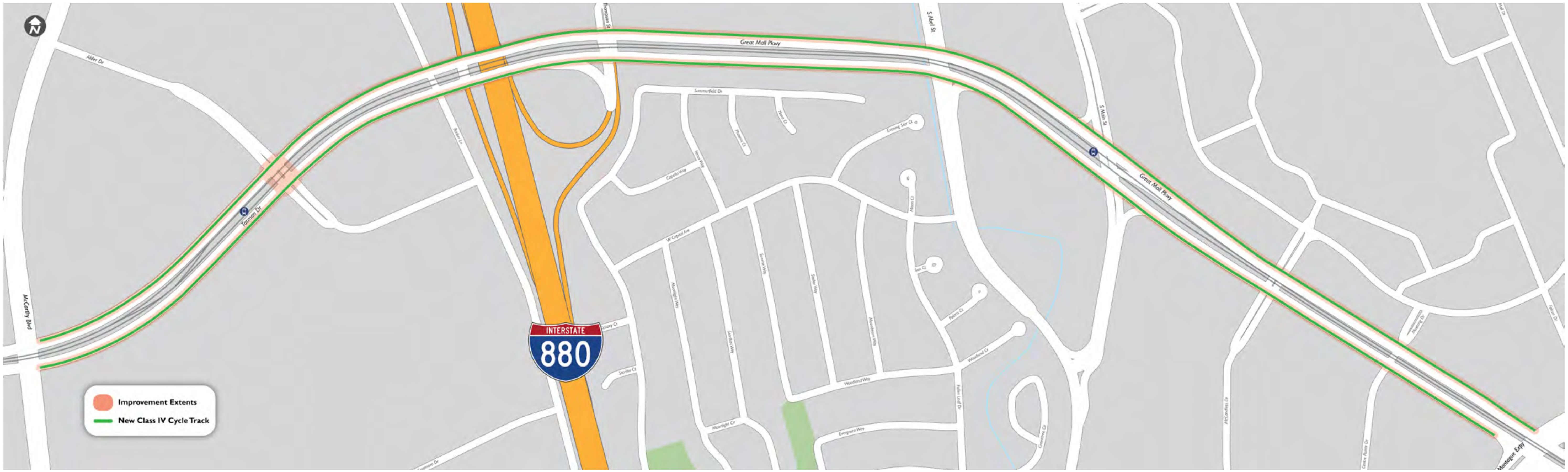
Cost

- $2,331,000

Steps to Implementation

1. Incorporate into Milpitas bicycle/pedestrian master plan
2. Coordinate with Caltrans for improvements through interchange area. Likely can be completed with an encroachment permit or incorporated into other improvements (MP-3 or MP-7)
3. Pursue grant funding and program local funds
4. Prepare final design
5. Construct

Location


Great Mall Pkwy
Great Mall Pkwy
Tasman Dr
McCarthy Blvd
Alder Dr
S Abel St
S Main St
Montague Expy
INTERSTATE
880
Improvement Extents
New Class IV Cycle Track

MP-5 MILPITAS LRT STATION IMPROVEMENTS

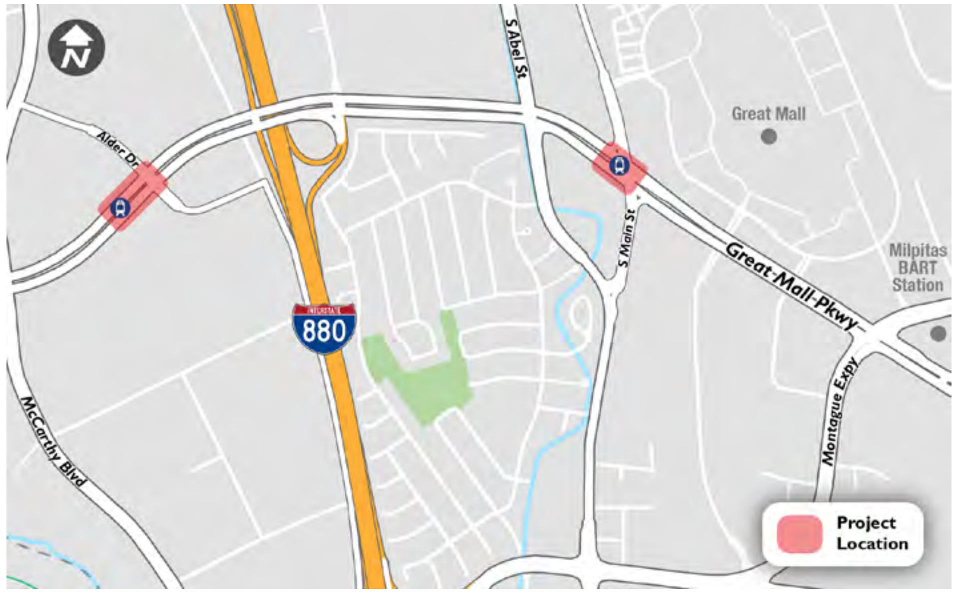
Improvements Description

Construct improvements to the I-880/Milpitas and Great Mall LRT stations and station areas; proposed enhancements include the following key elements:

1. Install high visibility, distinctive crosswalk treatment at all pedestrian crosswalks providing access to LRT stations
2. Construct traffic signal modifications
3. Install blankout signs to be activated during LRT crossing to provide additional pedestrian warning
4. Install enhanced LRT station lighting
5. Install bus/bike conflict area pavement marking
6. Construct landscape strips to buffer sidewalks

In ultimate conditions, this project would include the installation of an elevated pedestrian walkway across eastbound Tasman Drive, connecting the southeastern corner of Tasman Drive/Main Street to the Great Mall LRT station.

Location



Rendering of Proposed Improvements

Why is this Project Needed?

- Pedestrians do not feel comfortable getting to and from LRT stations located in the median—this was a common complaint expressed in the outreach process
- With the opening of the BART Silicon Valley Phase 1 extension, and the implementation of VTA's 2019 New Transit Service Plan, there is high projected growth in LRT passenger activity creating a need for amenities to accommodate this increased traffic (this was also indicated in the feedback received during the outreach process)
- Currently, the LRT stations do not currently provide adequate wayfinding signage or posted information to guide passengers

Benefits of Improvements

- Improves pedestrian visibility
- Establishes priority for pedestrians with implementation of LPI and improves pedestrian safety with median refuges, lighting, widened sidewalks, and buffers
- Enhances amenities for transit users
- Improves visibility of light rail
- Improves wayfinding for light rail users and pedestrians

Cost

- $692,000 (near-term)
- $1,034,000 (ultimate)
- $1,726,000 (total)

Steps to Implementation

1. Incorporate into countywide transportation plan
2. Incorporate into VTA Capital Improvement Program
3. Obtain environmental clearance for near-term physical improvements (anticipated to be Categorical Exemption)
4. Pursue grant funding and program local funds
5. Prepare design plans for near-term improvements, including urban design, streetscape, and utilities
6. Coordinate with VTA LRT operations on station configuration modifications
7. Construct near-term improvements and update signal timings
8. Obtain environmental clearance for ultimate improvements
9. Prepare design plans for ultimate improvements
10. Construct ultimate improvements

MP-6 MILPITAS BUS STOP IMPROVEMENTS

Improvements Description

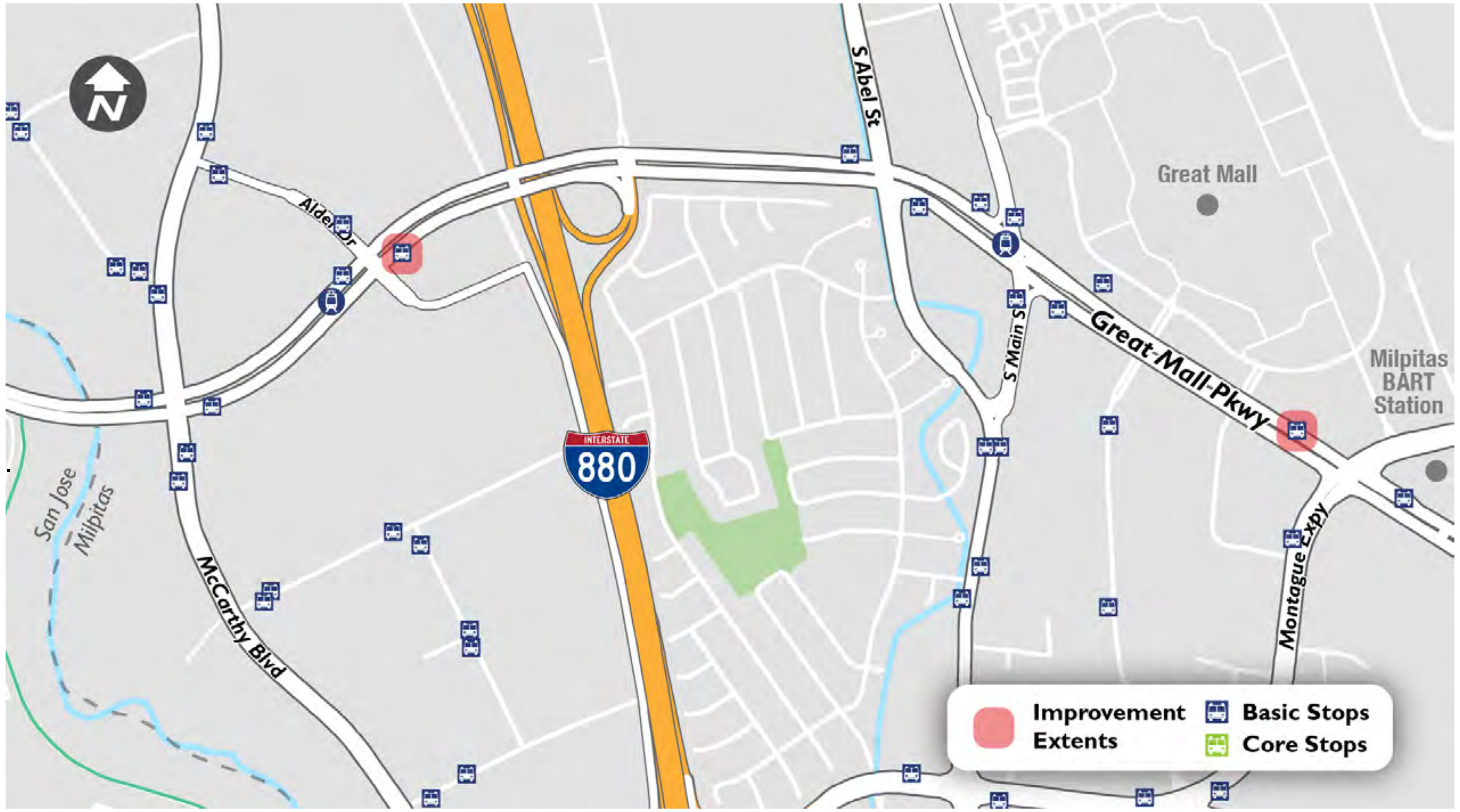
Provide enhancements to all bus stops on the Corridor in Milpitas to make them consistent with VTA's Transit Passenger Environment Plan (TPEP) standards. The TPEP classifies bus stops based on daily ridership. Per these definitions, all bus stops along the Corridor in Milpitas are classified as Basic Stops, which are those with fewer than 40 daily boardings. Some of the existing bus stops on the corridor will no longer be served by VTA buses under the 2019 New Transit Service Plan. Improvements are not recommended at those locations.

Basic Stops shall be improved so that they include the following elements:

- Standard bus stop sign with real-time information decal and schedule display
- Seating
- Bicycle parking (at least one U-rack; more if demand warrants)

Existing bus stop in Milpitas

Location



Why is this Project Needed?

- Existing stops have little to no amenities, making waiting for the bus undesirable
- Providing more amenities at bus stops can reduce perceived wait time, attracting new riders and increasing the visibility of transit service.

Benefits of Improvements

- Enhances amenity for transit users
- Potential for increased transit use

Cost

- $20,000

Steps to Implementation

1. Incorporate into VTA Capital Improvement Program
2. Obtain environmental clearance (Categorical Exemption)
3. Pursue grant funding and program local funds
4. Schedule improvements as part of regular stop upgrades process

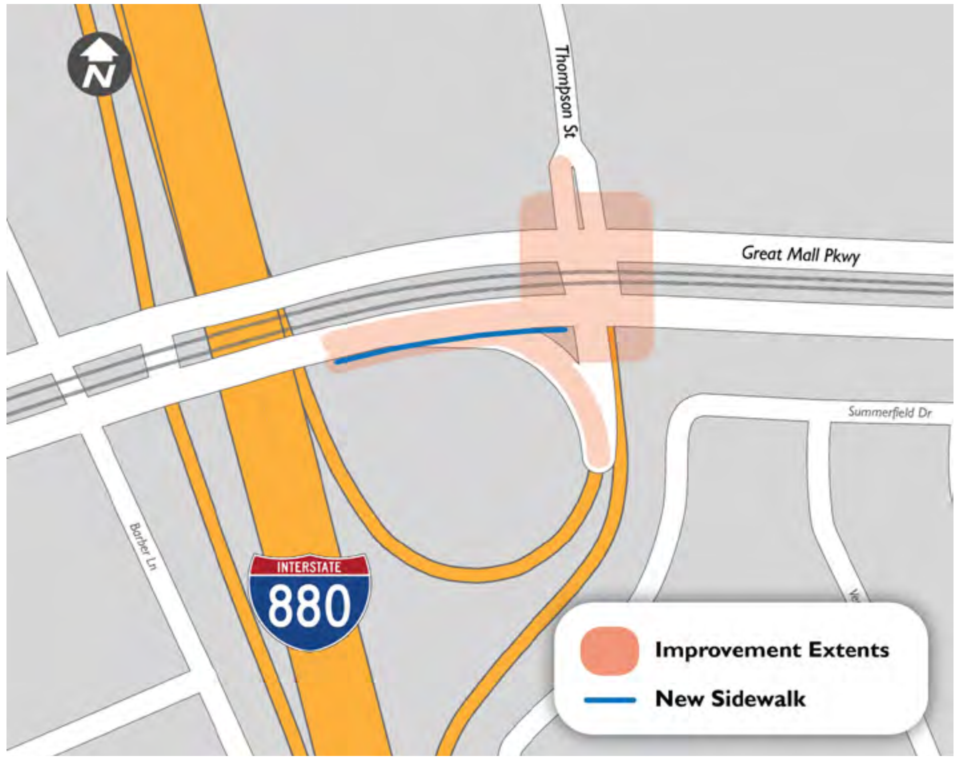
MP-7 I-880 NORTHBOUND RAMP INTERCHANGE IMPROVEMENTS

Improvements Description

Provide various improvements around the interchange of Tasman Drive and the I-880 Northbound ramps. This project includes the following major improvements:

- Reconfigure the eastbound free right-turn movement at the I-880 Northbound loop on-ramp with a signalized right-turn lane
- Install new sidewalk adjacent to the new right-turn lane
- Reduce lane widths at north leg to shorten pedestrian crossing distance
- Install high visibility crosswalk treatments at the I-880 Northbound Ramp intersection
- Install bike slot to provide a dedicated lane for cyclists

Location



Free right-turn movement at I-880 Northbound loop on-ramp presents challenges for pedestrians and bicyclists to navigate

Why is this Project Needed?

- The large size of this intersection makes it difficult for bicycles and pedestrians to navigate it safely and comfortably
- Limited separation between vehicles and pedestrians/ bicycles results in high level of stress
- High vehicle volumes and speeds make weave movement for bicycles and crossing movement for pedestrians across vehicle on-ramp challenging

Benefits of Improvements

- Improves pedestrian visibility
- Improved pedestrian and bicycle safety with elimination of free right-turn movement
- Improved pedestrian comfort by reducing crossing distances

Cost

- $1,026,000

Steps to Implementation

1. Incorporate project into countywide transportation plan
2. Prepare Caltrans Project Initiation Document (PID) and determine approach for Caltrans approval of interchange modification
3. Obtain environmental clearance (Negative Declaration anticipated)
4. Pursue grant funding and program local funds
5. Prepare design plans
6. Construct

Rendering of Proposed Improvements (Looking Southwest Toward I-880)

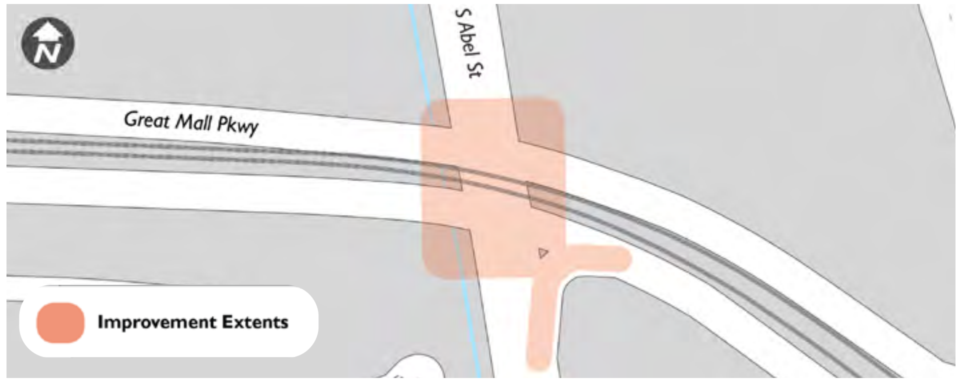
MP-8 GREAT MALL PARKWAY/ABEL STREET INTERSECTION IMPROVEMENTS

Improvements Description

Provide the following improvements at the Great Mall Parkway/Abel Street intersection:

- Install two-stage left-turn boxes for bicyclists to make left-turns
- Install high-visibility crosswalks
- Remove the free northbound right-turn and pork chop island
- Install "No Right Turn on Red" signs for all vehicle approaches

Location



Existing uncontrolled pedestrian crossing across free right-turn at Great Mall Parkway/Abel Street intersection

Why is this Project Needed?

- The large size of this intersection makes it difficult for bicycles and pedestrians to navigate it comfortably
- The existing pork chop island at the southeast corner of the intersection places pedestrians in conflict with higher-speed vehicle traffic
- Difficult for cyclists to make left-turns due to large number of lanes

Benefits of Improvements

- Improves pedestrian visibility
- Improves bicyclist safety by designating space for left-turning bicyclists to wait for traffic signal
- Reduced conflict between pedestrians and autos

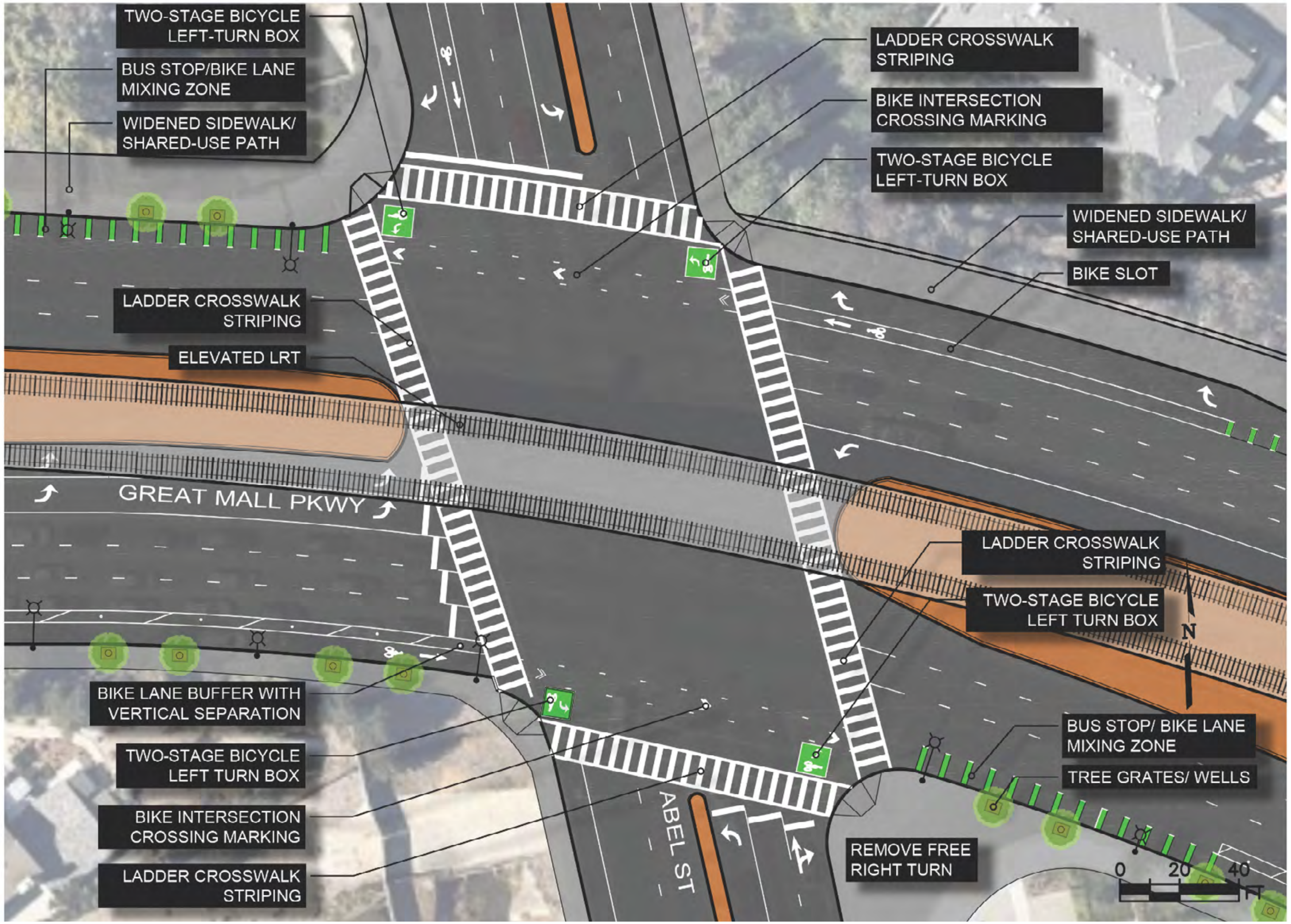
Cost

- $477,000

Steps to Implementation

1. Incorporate into Milpitas bicycle/pedestrian master plan
2. Obtain environmental clearance (Negative Declaration anticipated)
3. Pursue grant funding and program local funds
4. Prepare design plans
5. Construct

Plan View of Proposed Improvements



Santa Clara Valley Transportation Authority

MP-9 GREAT MALL PARKWAY/MAIN STREET INTERSECTION IMPROVEMENTS

Improvements Description

Provide the following improvements at the Great Mall Parkway/Main Street intersection:

- Remove the free right-turn movement on northbound Main Street and square up right-turn movement at intersection
- On both northbound and southbound Main Street, replace one through lane with a buffered bike lane
- With removal of free right-turn and associated pork chop island, relocate the pedestrian crossing of the rail track and eastbound Great Mall Parkway to provide more intuitive and direct pedestrian crossing

Note that MP-5 includes an ultimate improvement that provides an elevated connection from the LRT station to the south side of Great Mall Parkway

Location

Existing Great Mall Parkway/S Main Street intersection

Why is this Project Needed?

- The large size of this intersection makes it difficult for bicycles and pedestrians to navigate it safely and comfortably
- Complicated pedestrian crossing movements to access LRT station results in pedestrian confusion
- Existing free-right turn results in higher-speed conflict between pedestrians and autos

Benefits of Improvements

- More convenient and intuitive access to Great Mall LRT station
- More direct movements for pedestrians on south side sidewalk along Great Mall Parkway
- Improves pedestrian visibility
- Improves pedestrian comfort with reduction of crossing distances, improved crosswalk striping, and removal of free right-turn

Cost

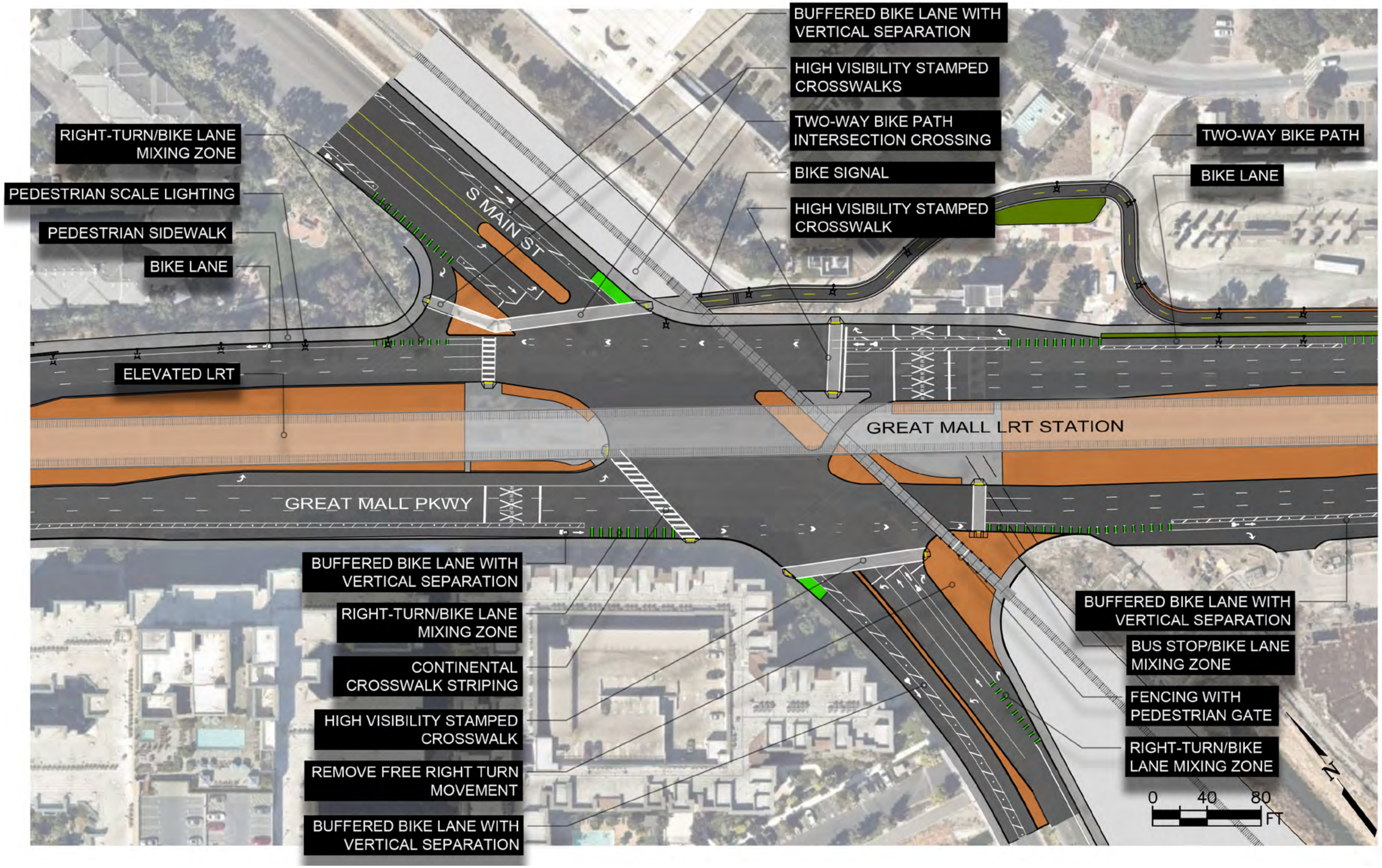
- $617,000

Steps to Implementation

1. Incorporate into Milpitas bicycle/pedestrian master plan
2. Coordinate with CPUC on relocation of existing pedestrian crossing of railroad track, installation of pedestrian crossing gates, and removal of right-turn auto crossing of track
3. Obtain environmental clearance
4. Pursue grant funding and program local funds
5. Prepare design plans
6. Construct

Santa Clara Valley Transportation Authority

Plan View of Proposed Improvements



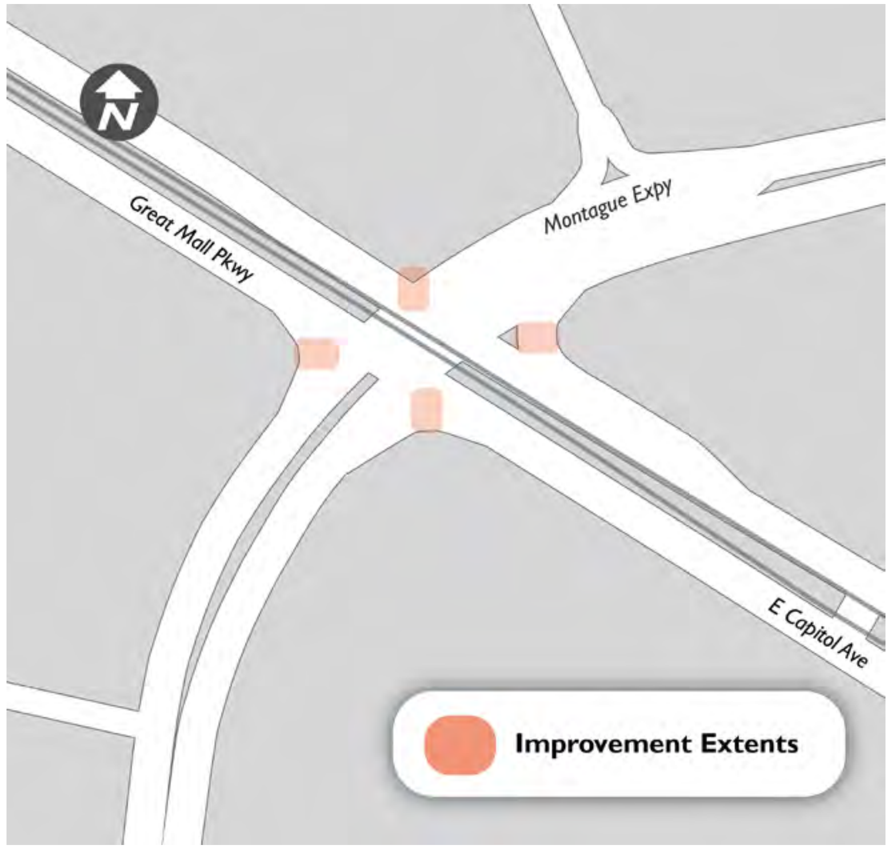
MP-10 GREAT MALL PARKWAY/MONTAGUE EXPRESSWAY INTERSECTION IMPROVEMENTS

Improvements Description

Install raised crosswalks between pork chop islands and sidewalk at the intersection of Great Mall Parkway and Montague Expressway.

Example of proposed raised crosswalks

Location



Why is this Project Needed?

- High-speed conflict between vehicles using free right-turn movements and pedestrians
- This location has experienced a high collision rate, including multiple fatalities

Benefits of Improvements

- Improves pedestrian visibility
- Reduces right-turn vehicle speeds

Cost

- $78,000

Steps to Implementation

1. Incorporate into Milpitas bicycle/pedestrian master plan
2. Obtain environmental clearance (Categorical Exemption anticipated)
3. Pursue grant funding and program local funds
4. Prepare design plans
5. Construct

7 ANALYSIS OF PROPOSED IMPROVEMENTS

This section summarizes the evaluation of the improvements proposed as part of this study and the analysis that informed this evaluation. A detailed Analysis of Proposed Improvements Memorandum and evaluation matrix are provided in **Appendix D - Analysis of Proposed Improvements Memorandum**.

Methodology

Evaluation of the proposed improvements included several different analysis approaches. Evaluation was focused on effects on four different transportation modes on the Corridor: bicycles, pedestrians, transit, and autos. To develop an understanding of impacts to auto traffic operations, a Synchro model of the entire Study Corridor was developed. VISSIM microsimulation models were developed to analyze the segment of the Study corridor in San Jose between Vista Montana and Cisco Way due to the complex nature of the roadway network with the median-running LRT and proposed transit improvements from the VTA LRT Enhancements Project. In both Synchro and VISSIM models, analysis was performed for both Existing and Horizon (2035) conditions, with and without improvements. Pedestrian and bicycle impacts were evaluated qualitatively, in addition to an analysis of level of stress changes resulting from the proposed improvements.

Bicycle

Bicycle service quality is based on the freedom to maneuver around other bicyclists and environmental factors. Environmental factors include the volume and speed of adjacent vehicles, the presence of heavy vehicles, the presence of on-street parking, the quality of the pavement, and the frequency and quality of street sweeping activities. Bicycle LOS improves with greater perceived separation from motorized vehicle traffic, lower motorized vehicle volumes, shorter cross-street widths, and reduced on-street parking conflicts. The proposed improvements provide separation from motorized vehicle traffic with proposed buffers and vertical separation elements and therefore will improve bicycle LOS. Additionally, the implementation of bike signal phasing at intersections in San Jose would reduce conflicts between right-turning vehicles and eastbound through cyclists on the south side of Tasman Drive.

The proposed two-stage left-turn boxes provide bicyclists a safer way to make left turns at intersections without having to maneuver across multilane roadways. Two-stage left-turn boxes require a No Turn on Red (NTOR) restriction since bicyclists will be queuing in front of the right-turn lane. While this affects vehicular operations, safety of bicyclists is improved as the two-stage left-turn boxes allow a protected area for bicyclists to wait for a protected vehicle phase to cross a multilane roadway along the Corridor.

Pedestrian

There are several pedestrian-focused improvements proposed along the Corridor. High-visibility crosswalks are recommended throughout the Corridor to increase pedestrian visibility and comfort. New sidewalks would close existing sidewalk gaps and create a complete, connected network of safe and convenient pedestrian facilities.

Large intersection corner turning radii result in higher-speed auto conflicts with pedestrians, increase the length of pedestrian exposure, and increase length of the pedestrian clearance interval for the affected crosswalks. There are multiple locations where the corner radii are proposed to be reduced to address of these concerns.

LPIs are recommended in higher-activity locations along the Corridor to provide pedestrians with a 3-5 second head start before the vehicular phase turns green. This would allow pedestrians to enter the crosswalk before vehicles begin moving, increasing pedestrian visibility and comfort.

Transit

Transit quality of service is influenced by the quality of the pedestrian and bicycle environments along and near streets with transit service, since all transit trips involve the user being a cyclist or a pedestrian before and after riding transit. LRT station improvements include wayfinding, high-visibility crosswalks, leading pedestrian intervals, and landscape strips to improve the pedestrian comfort and ultimately station access. Furthermore, bus stop improvements consistent with the VTA Transit Passenger Environment Plan (TPEP) include bus shelters, benches, bike racks, real time messaging signs, and trash receptacles.

As vehicular operations continue to reach capacity, mode choice may shift to alternative modes such as bicycling and transit. With BART's Phase I extension opening in the near future, transit ridership is projected to significantly increase along the Corridor, increasing the importance of transit access improvements.

An analysis of LRT travel times was conducted in VISSIM for all analysis scenarios. This analysis was conducted to assess the impacts along Tasman Drive in City of San Jose, with a particular focus on the effects of the ultimate improvements at the Tasman Drive/N 1st Street intersection, which includes the elimination of left-turns at the intersection. The proposed improvements are anticipated to result in a reduction in LRT travel time of up to 47 seconds under Existing Plus Project (Ultimate Improvements) peak conditions and up to 97 seconds under Horizon Plus Project peak conditions.

Auto

Existing

Significant impacts are defined as when the project improvements are anticipated to result in degradation of intersection operations from acceptable level of service (LOS) D or better to unacceptable LOS, or an increase in delay of 4 seconds or more at an intersection already operating at an unacceptable LOS.

With the implementation of SB 743, it is anticipated that the primarily bicycle and pedestrian safety projects identified by this Study would be categorically exempt from requiring a traffic analysis as they would not increase Vehicle Miles Traveled (VMT) and that the LOS impact would not be significant environmental impact. Therefore, the LOS analysis presented here may not require mitigation, but are provided for information purposes to describe the effects of the recommended projects.

Under Existing Plus Project conditions, there are several study intersections which are expected to experience operational improvements with the project improvements. The proposed project improvements are generally not anticipated to result in significant operational impacts for auto users. Based on the Synchro analysis, there are two study intersections listed below which are currently operating at unacceptable levels (LOS E or F) and are anticipated to experience degradation of intersection operations:

- Tasman Drive/Fair Oaks Avenue
- Great Mall Parkway/Abel Street

The degradation of LOS at the Tasman Drive/Fair Oaks Avenue intersection is associated with improving pedestrian access to the LRT Station and further controlling the conflict between right-turn movements from Tasman Drive to Fair Oaks Avenue and pedestrians. The degradation of LOS at the Great Mall Parkway/Abel Street intersection is associated with eliminating the free right-turn movement and adding two-stage left-turn bike boxes. Both improvements would significantly benefit pedestrian and bicycle connectivity and safety.

Along the segment of the Study corridor in San Jose, which was analyzed in VISSIM, all study intersections operate at acceptable levels with and without the project improvements.

Horizon

Under Horizon conditions, based on the Synchro analysis, the proposed project improvements are anticipated to result in operational impacts at three signalized intersections including:

- Tasman Drive/Fair Oaks Avenue
- Tasman Drive/McCarthy Boulevard
- Great Mall Parkway/I-880 NB Ramps/Thompson Street

The degradation of LOS at the Tasman Drive/Fair Oaks Avenue intersection is associated with improving pedestrian access to the LRT Station and further controlling the conflict between the right turn movements from Tasman Drive to Fair Oaks Avenue and pedestrians. The degradation of LOS at the Tasman Drive/McCarthy Boulevard intersection is associated with modifying the eastbound approach to convert the existing shared through/right-turn lane to a dedicated right-turn lane, which is needed with the addition of the raised Class IV bike lane and bike signal. The degradation of LOS at the Great Mall Parkway/I-880 NB Ramps/Thompson Street intersection is associated with eliminating the free right-turn slip lane and signalization of the right-turn movement, which would enhance pedestrian safety across the on-ramp.

An operational analysis was performed using VISSIM for the removal of left-turn lanes at the intersection of Tasman Drive/N 1st Street. The left-turn removal would require redistribution of all left-turn movements to other routes. The effect of this redistribution was analyzed along with the modified operation of the Tasman Drive/N 1st Street intersection. As a result of those potential ultimate modiciations, the following locations are anticipate to incur degradation in operational performance for autos:

- Tasman Drive/Vista Montana
- Tasman Drive/Zanker Road
- Tasman Drive/Morgridge Way
- Tasman Drive/Cisco Way
- Zanker Road/River Oaks Parkway
- Zanker Road/De Soto Road
- VIsta Montana/ Renaissance Drive

The operations at Tasman Drive/N 1st Street would improve significantly with the project due to the left-turn restrictions and are projected to operate at LOS D or better. The number of signal phases at this intersection would be reduced from eight to four, allowing for a shorter cycle length, resulting in shorter queues and lower delay to autos, transit, and pedestrians. The left-turn restrictions would increase left-turning movements at the Tasman Drive/Zanker Road intersection, primarily in the westbound direction, and result in LOS F during both AM and PM peak hours. Queuing from this intersection approach is forecast to extend to the upstream intersections at Tasman Drive/Morgridge Way and Tasman Drive/Cisco Way during the PM peak hour. VISSIM assigns vehicle delay to the nearest downstream intersection; therefore, queuing back from Zanker Road through Morgridge Way and Cisco Way is shown to result in increased delay and reduced level of service at those intersections. Other study intersections along the diversion routes including Zanker Road at River Oaks Parkway and De Soto Road, and along Vista Montana are expected to experience an increase in delay due to the detoured trips.

8 INTEGRATION OF CORRIDOR IMPROVEMENTS AND LAND USE

Land use and transportation are fundamentally dependent on one another. An efficient transportation system that serves multimodal travel patterns cannot be achieved without considering the land use patterns around that system. As population and employment increase along the Corridor, it is important that development and transportation planning efforts are closely coordinated. Planning efforts should encourage land use patterns that lead to travel behaviors that take advantage of proposed improvements (transit, walking, and biking). This section includes an assessment of existing and future land use conditions within each city along the Corridor and discusses the relationship between those conditions and the proposed improvements. Figure 8-1 depicts existing land use along the Corridor.

Sunnyvale

Existing Land Use and Major Destinations

This portion of the Corridor is characterized by residential land uses (single-family homes, apartment complexes, and mobile homes), office buildings, Lakewood Elementary School and Park, Seven Seas Park, Fairwood Park, and light retail and commercial uses. Major employers in Sunnyvale within a five-mile radius of the Corridor terminus include Yahoo! and NASA Ames Research Center. State Route 237 runs slightly parallel to and north of the Tasman Corridor. Baylands Park to the north is a wetland preserve and regional park that provides over 70 acres of trails and playgrounds.

Planned Land Use

Projects near the Corridor that are currently under construction include a four-story 250-unit residential apartment building at 1139 Karlstad Drive, a redevelopment project to build 205 apartment units on 610 East Weddell Drive, a 66-unit affordable housing apartment complex and associated commercial space at 460 Persian Drive, and a 51-room hotel at 1101 Elko Drive.[1] Two hotel developments located north of Tasman Drive are undergoing review.[2] The Planning Commission has also approved smaller townhouse developments and corporate campus expansions for Yahoo and Netapp in the nearby vicinity.

Corridor Improvements

The proposed improvements to the Tasman Corridor located within Sunnyvale include new bicycle paths and new sidewalks along parts of Tasman Drive. New bicycle and pedestrian bridges are proposed at the Calabazas Creek Trail and at the intersection of the John W. Christian Greenbelt and Lawrence Expressway along the southern Sunnyvale alternative route. Bicycle intersection improvements are proposed in each of the alternative routes. Sidewalks will serve the existing residential development, and alternative bicycle route improvements will connect the Corridor to planned development and employers in the vicinity.[3]

1 City of Sunnyvale, 2018. Projects in Sunnyvale. Available online at: https://sunnyvale.ca.gov/business/projects/default.htm. Accessed November.
2 Ibid.

Santa Clara

Existing Land Use and Major Destinations

In Santa Clara, the Corridor passes through a wide variety of land uses. The part of the Corridor adjacent to the City of San Jose serves as the southern boundary of the Tasman East Focus Area Plan, the framework for guiding the high-density transit-oriented development of a 46-acre neighborhood.[4] There are many major regional destinations located along the Corridor in Santa Clara including Levi's Stadium[5], California's Great America theme park, the Santa Clara Convention Center, and the Santa Clara Gateway Business Park. East of Lafayette Street, the existing land uses are residential use (single-family homes and apartment complexes), office buildings, Kathryn Hughes Elementary School, Fairway Glen Park, and part of the Santa Clara Golf and Tennis Club. The area between Lafayette Street and Great America Parkway is characterized by single-family homes, the Santa Clara Golf and Tennis Club, office buildings, an amusement park (Great America), sports fields (Levi's Stadium and Santa Clara Youth Soccer Park), Santa Clara Convention Center, two hotels, and associated parking lots to support those uses. The area between Great America Parkway and Calabazas Creek is largely defined by office buildings and industrial parks, with Mission College at the southwest end of the Corridor.

Planned Land Use

The Tasman East Focus Area Plan was adopted by Santa Clara City Council in October 2018 as a framework for the development of a high-density, transit-oriented neighborhood of up to 4,500 dwelling units with up to 106,000 square feet of supportive retail space.[6] The Plan allows for a school of up to 600 students and approximately 10 acres of parks and open space, all accessible by the Tasman Corridor. There is currently one planned development along the Corridor – City Place Santa Clara, a 9.16 million square-foot (240-acre) village of office buildings, retail, entertainment, 1,680 residential units, hotels, parking, and open space.[7]

3 Ibid.
4 City of Santa Clara, 2018. Tasman East Focus Area Plan. Available online at: http://santaclaraca.gov/government/departments/community-development/planning-division/specific-plans/tasman-east.
5 City of Santa Clara, 2018. Development Projects Story Map. Available online at: http://missioncity.maps.arcgis.com/apps/MapTour/index.html?appid=5afdbed13fad458cb6288c46a0bad060#. Accessed November.
6 City of Santa Clara, 2018. Tasman East Focus Area Plan. Available online at: http://santaclaraca.gov/government/departments/community-development/planning-division/specific-plans/tasman-east. Accessed November.
7 City of Santa Clara, 2018. Development Projects List – City Place Santa Clara. Available online at: http://santaclaraca.gov/Home/Components/BusinessDirectory/BusinessDirectory/216/2495. Accessed November.

Corridor Improvements

The proposed improvements to the Tasman Corridor located within Santa Clara include sidewalk and bike lane improvements, intersection enhancements, and improved trail connections. A new sidewalk and vertically separated bike lanes were proposed in the eastern part of the Corridor to support access to the Tasman East Specific Plan Area and Levi's Stadium. Improved trail connections were included to facilitate access to the San Tomas Aquino Creek Trail and the Calabazas Creek Trail. Additionally, buffered bicycle lanes improvements were recently implemented for most of the Corridor within Santa Clara. Significant growth, activity, and investment can be expected in this area due to the recently approved specific plan and proposed developments. The multimodal improvements proposed will help to accommodate the new population that will activate this area.

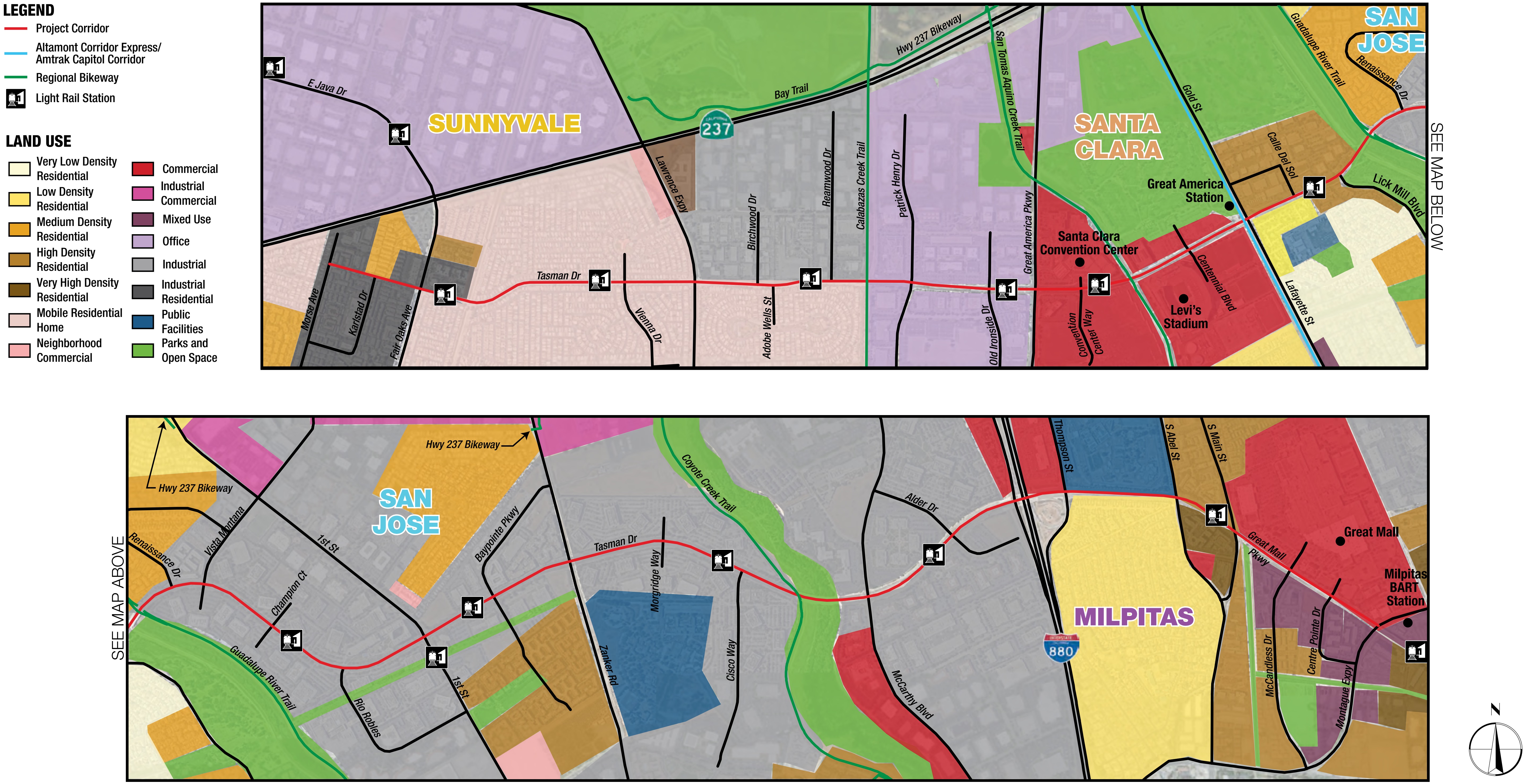
San Jose

Existing Land Use and Major Destinations

The existing land use in San Jose along the Tasman Corridor is largely characterized by industrial park and corporate campuses, with some residential use (multifamily apartment complexes and mobile home parks), two hotels, a VTA maintenance yard, three public parks, and a small amount of commercial retail space. The industries located along this Corridor are mainly computer software, hardware, and research and development, with Cisco having corporate offices at several locations and Samsung Headquarters located along the Corridor in San Jose.

Technology sector employment along Tasman Drive has increased in recent years, including the Samsung Building at Tasman Drive & North First Street.

Figure 8-1: Existing General Plan Land Use Designations



Planned Land Use

The Corridor does not run through any specific plan areas in San Jose, but the Alviso Master Plan is located approximately a half-mile north from Tasman Drive.[8] The Corridor does run through the North San Jose Planning area, which is governed by the North San Jose Area Development Policy, the North San Jose Deficiency Plan, and the North San Jose Area Design Guidelines. There are no planned major developments adjacent to Tasman Drive, but several new office buildings are proposed or under development in a half-mile radius of the Corridor.[9] South of the Corridor, Broadcom is constructing approximately 537,000 square feet of new office space and two parking garages (named Innovation Place) in addition to their existing campus.[10] North of the Corridor, construction is underway for two additional office and research and development projects – the Assembly at North First and 237 @ First Street.[11] The Assembly at North First is a redevelopment project with six buildings totaling approximately 380,000 square feet on 27 acres located at 3930 – 4000 North First Street, the former location of a LAM Research campus. 237 @ First Street is under construction and will contain two 6-story, one 5-story, and one 3-story buildings with approximately 184,000 total square feet.

Corridor Improvements

The proposed improvements to the Tasman Corridor located within San Jose include Class IV cycle tracks and vertical separation for bike lanes along the entire length, bike improvements at intersections, and improved trail connections. As described above, the dominant existing and planned office uses in this portion of the Corridor make it a destination for workers and can potentially provide a large number of commuter users to the proposed bicycle improvements.

Milpitas

Existing Land Use and Major Destinations

The portion of the Corridor east of I-880 includes residential uses (single-family homes and multifamily apartment complexes), two car dealerships, a correctional facility, vacant lots planned to be developed, and a large regional retail presence with the Great Mall. The Corridor terminus is adjacent to the planned Milpitas BART Station at the intersection of Capitol Avenue and Montague Expressway. The portion of the Corridor west of I-880 is characterized by office space and business parks and a park-and-ride lot servicing the nearby light rail station.

8 City of San Jose, 1998. Alviso Master Plan. Available online at: https://sanjoseca.gov/DocumentCenter/View/9341. Accessed November 2018.
9 Silicon Valley Business Journal, October 24, 2018. San Jose Crane Watch – Tracking development in San Jose. Available online at: https://www.bizjournals.com/sanjose/maps/silicon-valley-crane-watch. Accessed November.
10 Ibid.
11 Ibid.

Planned Land Use

The Corridor passes through the Milpitas Transit Area Specific Plan[12] and the Midtown Specific Plan.[13] Both specific plans reference goals regarding increasing housing stock, investing in retail and local economy, improving street character, and enhancing bicycle/pedestrian facilities. The City is currently updating the Midtown Specific Plan (now known as the Gateway/Main Street Specific Plan). This plan will leverage economic development opportunities to develop new connections between Calaveras Boulevard and Evergreen Community College. Most of the approved and pending major developments in the City of Milpitas are located east of I-880, within a half-mile radius of the future BART station and a large concentration of retail space.[14] Most of the proposed developments are mixed-use apartment complexes. The McCandless Mixed-Use Project, located on Great Mall Parkway and along McCandless Drive, is an approved project with approximately 1,000 dwelling units and 100 townhomes. Lyon Communities Montague is located across the street (Capitol Avenue) from the future BART station and will be adding 474 dwelling units on 7.98 acres. The McCandless Mixed-Use Project and the Lyon Communities Montague are located within the Milpitas Transit Area Specific Plan. There are currently two approved developments located in the Midtown Specific Plan, Centria West and 1201 South Main Street, with 366 units on a 5.20 acre site and 204 units on 2.72 acres, respectively.

Corridor Improvements

The proposed improvements to the east of I-880 include a new Class I bike path or shared-use facility along Great Mall Parkway and a new bicycle/pedestrian bridge. A new sidewalk is proposed along the Tasman Tech Business Park west of I-880, and the entire length of the Tasman Corridor in Milpitas will include new vertical separations for bike lanes. The significant increase in residential density associated with new development in Milpitas provides an opportunity to increase pedestrian activity on the street. In combination with the existing retail anchor, the new developments will contribute potential users to support the proposed bike and pedestrian facilities.

Opportunities for Land Use Policies to Encourage Multimodal Corridor Use

The Tasman Corridor connects a diverse array of land uses, major destinations, employers, and housing. Land use policies for adjacent and nearby land should be adjusted to respond to the planned bicycle and pedestrian improvements and high-quality transit available along the Corridor. Parking requirements especially can impact mode choice, as low cost and easy access to automobile parking encourages driving and discourages transit use and other forms of active transportation.

12 City of Milpitas, 2011. Transit Area Specific Plan. Available online at: http://www.ci.milpitas.ca.gov/planning-documents/transit-area-specific-plan/. Accessed November 2018.
13 City of Milpitas, 2010. Midtown Specific Plan. Available online at: http://www.ci.milpitas.ca.gov/planning-documents/midtown-specific-plan/. Accessed November 2018.
14 City of Milpitas, 2018. Development Projects in Milpitas, pending and approved. Available online at: http://www.ci.milpitas.ca.gov/milpitas/departments/development-projects/. Accessed November.

Cities can regulate land use to encourage transit use and active transportation along the Corridor. Zoning codes should be updated to reduce parking minimums and introduce parking maximums while requiring implementation of TDM measures. TDM measures include:

- Establishing or increasing bicycle parking requirements
- Offering free or reduced transit pass to employees and residents
- Transit incentive programs for employees and residents
- Car share spaces
- Implementation of carpool and vanpool programs
- Advertisement of real-time transit schedules inside developments
- Preferential parking for carpool vehicles and electric/alternatively-fueled vehicles
- Shuttle access to transit stations and park and ride lots
- On-site showers and lockers
- A bicycle-share program or free use of bicycles on-site, and
- Unbundled parking.

Other policies which could support multimodal use along the corridor include:

- Require new developments to dedicate right-of-way and construct transit, pedestrian, and/or bicycle facilities adjacent to the Corridor
- Provide density bonuses or height limit exceptions for parcels near the Corridor
- Reduce parking requirements and establish parking maximums
- Streamline the development permitting process for transit-oriented development parcels along the corridor
- Establish impact fee reductions for developments along the corridor based on expected trip generation reductions, especially for those implementing transportation demand management (TDM) programs

These transit-oriented regulations could be implemented by establishing an overlay district along the Tasman Corridor or by establishing a standardized parking reduction that would apply to developments within a certain radius of the Tasman Corridor or transit stops along the Corridor. The allowable percent of parking reduced can be tied to the extent of TDM measures the project implements (e.g., an applicant who provides transit passes, car share, and bike share could receive a 50 percent reduction, while an applicant who only provides transit passes could receive a 20 percent reduction).

Updated regulations would likely only apply to new development along the Corridor, but cities can also develop programs to incentivize current property owners and operators to implement TDM measures. Cities could also encourage property owners to pursue infill development opportunities for overparked sites.

Considering the planned developments and increasing residential density in the area, upgrading multimodal facilities along the Corridor will provide the area's expanding population with high-quality alternatives to driving. Policies and programs that prioritize multimodal transit users must complement these physical improvements to maximize the benefits of the investment along the Corridor and lead to significant change in how residents, employees, and visitors travel.

9 CONCLUSIONS & NEXT STEPS

This Study's proposed multimodal improvements will enhance the safety, comfort, and reliability of all modes along the Corridor. The improvements were identified to target specific multimodal circulation and safety needs identified through an extensive community engagement process. Proposed recommendations were then vetted with Partner Agencies, key project stakeholders, and local residents and employees.

Collectively, the improvements proposed in this Study will:

- Create a cohesive and connected network of bicycle and pedestrian facilities along the Tasman Corridor;
- Encourage increased bicycle activity for all ages and abilities by creating greater separation from automobile traffic and reduce level of traffic stress;
- Contribute to the vibrancy of the Corridor by encouraging pedestrian and bicycle activity through enhanced streetscape and increased user comfort;
- Improve access and capacity to regional transit investments, including BART and LRT, providing a more integrated transportation network;
- Improve the quality and awareness of transit waiting facilities, increasing transit ridership;
- Improve safety for all users by better controlling conflicts, demarking conflict zones, and reducing auto speeds through conflict zones; and
- Improve access to the regional trail network, providing additional opportunities for commute mode shift and recreational bicycle trips.

Achievement of the above outcomes will encourage more people to bike, walk, and take transit, which will provide greater mobility for those who cannot drive, healthier options for residents of all income levels, and reduce greenhouse gas emissions.

For many of the proposed improvements, the next step will be preliminary engineering and environmental review. This will require further coordination between VTA and City staff to confirm and refine the recommended improvements. Further engineering development will include detailed plan lines that will allow jurisdictions to secure the needed right-of-way to implement the proposed improvements. This would require further analysis of utility conflicts, topography, drainage requirements, soil conditions, and structural elements. Environmental review will evaluate the effects of the project on the surrounding community. It is anticipated that many of the improvement projects would be categorically exempt and/or would not result in significant impacts as they would benefit multimodal circulation without impacting other modes or the environment. For those requiring a more rigorous environmental analysis, impacts and mitigations, if any, will be identified.

The environmental analysis will include further analysis of project alternatives, providing additional opportunity for alternatives development and analysis or modifications to the proposed concept to be evaluated. Public outreach is a required and valuable element for any significant environmental process. Progressing through preliminary engineering and environmental review can be a lengthy and intensive process and will be a determining factor in the timing of the proposed improvements.

Another key step in the implementation of these projects is to incorporate the recommendations into upcoming or ongoing bicycle, pedestrian, and other transportation improvement plans. Inclusion of projects in those region-wide or city-wide planning documents is often a key step in securing project funding.

The public entities that control development patterns can utilize this plan to tailor zoning and development regulations to maximize the use of the multimodal transportation facilities planned for the Corridor. Implementing transit-supportive policies for developments in the Corridor will further help the region meet sustainability goals while also securing the success of the multimodal features to be implemented. It is recommended that the four jurisdictions reference the right-of-way requirements identified for the proposed improvements when reviewing and approving new developments along this Corridor to ensure that proposed improvements are not precluded.

One of the principal hurdles in implementing a number of the planned improvements is identifying sufficient funding. By identifying the Corridor needs, potential solutions, and their cost, this plan will aid in identifying and pursuing funding. A collection of different funding sources will likely be required to implement this project. These sources include a collection of local and regional funds, State and Federal grants. Given the multimodal nature of the improvements, they are well-aligned to several existing grant programs and are anticipated to be competitive for funding. The closer improvements are to implementation, the more competitive they will be for the numerous grant funding opportunities.

VTA and the Partner Agencies can also utilize the cost estimates prepared for this Study to update their traffic impact fee programs for new developments. Traffic impact fee funding can be further leveraged as a local match for larger regional, state or federal grant programs.

Close partnership is encouraged between VTA and the Partner Agencies to continue advancing the recommendations developed as part of this project, particularly in defining roles and responsibilities and funding opportunities for implementation.

Appendix A

Outreach Summaries

TASMAN CORRIDOR COMPLETE STREETS STUDY
ROUND 1 PROJECT OUTREACH SUMMARY

Summary of April 2017 Community Outreach Meetings

April 11th,12th, & 13th, 2017

The Santa Clara Valley Transportation Authority (VTA) hosted three community outreach meetings on April 11th, 12th, and 13th, 2017 from 6:00-7:30 p.m. to discuss and present a recently underway study to improve mobility along the Tasman Corridor. The meetings were held at three different locations: the Riverwood Grove Community Room (2150 Tasman Drive in Santa Clara), the Lakewood Park Community Room (834 Lakechime Drive in Sunnyvale), and the Centria Community Room (1101 S. Main Street in Milpitas), respectively.

Approximately forty (40) community members attended the meetings. City staff supported VTA and Consultant staff at each meeting. City staff in attendance were Pratyush Bhatia (Santa Clara), Shahid Abbas and Carol Shariat (Sunnyvale), Ramses Madou (San Jose), and Julie Waldron (Milpitas). Additionally, in Sunnyvale, Councilmember Larry Klein attended the meeting.

VTA Project Manager John Sighamony assisted with the facilitation of the meetings and was supported by Robert Swierk (Principal Transportation Planner) and Karen Gauss (Community Outreach Supervisor). Additional VTA staff that attended one or more of the community meetings included Malahat Owrang (Transportation Planner) and Brent Pearse (Transportation Planner). The project team was represented by Adam Dankberg (Kimley-Horn Project Manager), Robert Paderna (Kimley-Horn), Chelsey Cooper (Kimley-Horn), and meeting facilitator Eileen Goodwin (Apex Strategies).

This was the first round of community outreach meetings with members of the public on the Tasman Corridor Complete Streets Study. The purpose of the meetings was to provide information about the Project purpose, review existing conditions, provide examples of possible project alternatives, take input from the community regarding areas of concern and challenge, and answer questions from the public.

Meeting Summary:

The three meetings maintained the same format, which included a presentation that started slightly past 6:00 p.m. After a brief introduction by the meeting facilitator, VTA's Project Manager thanked the attendees for coming and explained the purpose and objectives of the Study. The Kimley-Horn Project Manager then used a PowerPoint presentation to explain existing conditions and examples of potential project alternatives for various modes along the corridor. In addition, the Project Manager covered the schedule for the Study and opportunities for additional input from the public including future meetings and an on-line survey available until May. Each meeting included a 'Question and Answer' portion where there was opportunity for many questions to be addressed.

The second half of the meeting asked attendees to go to four stations to give input on where they live, how and when they use the Tasman Corridor, what modes of transportation do they primarily use on the corridor, what they think the priorities for the corridor should be, and to mark on the map where hot spots and problematic conditions exist. Prior to adjournment, the facilitator had each station lead (a member of the project team) summarize the overall theme of the input for each meeting. This information is documented by community meeting below.

When asked at sign in how the attendees heard about the meeting, the top responses from all three meetings were as follows:

- Mailed Notices
- NextDoor
- E-blast Lists
- Word of Mouth

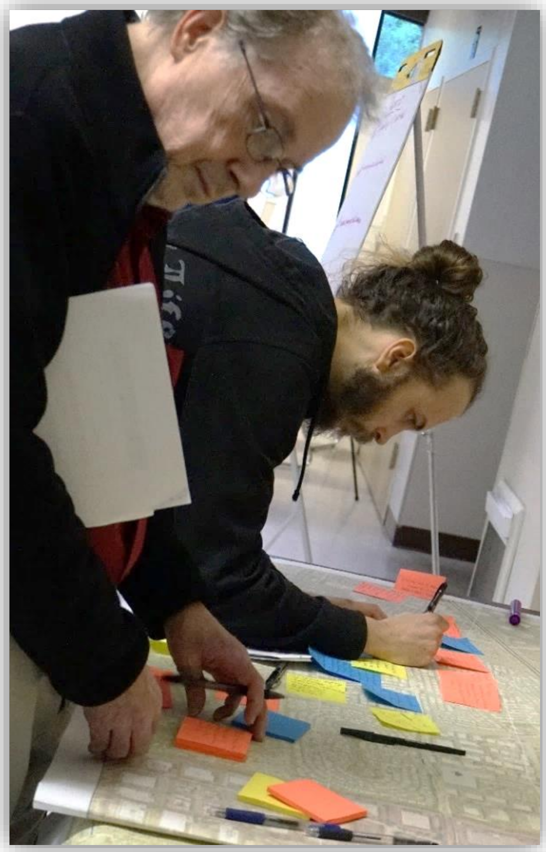
After the presentation, many questions, suggestions, and opinions were offered to the staff and project team. The comments and responses offered during the meeting are captured below in the order they were given at the meeting.

Comment/Question	Response
SANTA CLARA	
Concerned about conflicts between autos turning from Layfette to Route 237 with bicycle riders. There is not a clear understanding between bicyclists and drivers on where to be. The intersection needs work.	Comment noted.

Comment/Question	Response
Concerns for legally blind people. Not all of the legs at the intersection at Lick Mill and Tasman have the beeping.	That may be remedied in an upcoming project. Please mark this on the map at the station.
How do I get from this area to Valley Medical on the bus?	VTA has a trip planning hotline. We can provide that number.
LRT should run earlier on the weekends.	Comment noted.
SUNNYVALE	
How long will the on-line survey be live?	Until May 5th.
Will there be enough money to come into this neighborhood and help fix Lakewood, Lakehaven, Wildwood, Lakechime, etc.? Are you coming into the neighborhoods? There are a lot of accidents on Lawrence between this neighborhood and Route 101. Lakewood and Scandia need pedestrian protection. We need lights all over to make things safer.	Thank you for all of these comments. Please make sure to also mark our maps with the exact locations of your concerns. Big picture, the VTA is funding the Tasman Corridor Study to identify a list of improvements on the Corridor itself or approaching Corridor intersections. City staff is here tonight and is available to discuss other community concerns. At the moment, there is no funding identified for any specific improvements. The Study is funded primarily with federal funds. VTA and the Cities will be looking into various grants, developer fees and sales tax funding to fund the planning, environmental clearance, design and construction of the agreed to priority projects.
Along Tasman there is only one Park and Ride lot. If there was a Park and Ride loot at Grocery Outlet I would ride LRT more.	Comment noted.
Is any of this Measure B funded?	As mentioned previously, the Study is federally funded. There are categories in Measure B that might fund Complete Streets Study projects along Tasman Corridor.
What is local match of a federal project?	The roughly 12% local match was paid by Vehicle Registration Fee funds.
Suppose you decide to drop a lane between Vienna and Fair Oaks, would	It is too soon to tell. Please give us your thoughts at the map station.

Comment/Question	Response
that become wider sidewalk or bike lanes?	
Who would do the construction of the projects in Sunnyvale?	The City would take the lead on implementing the projects.
All of your examples show wide streets. Would you cut the trees down? That would be a big impact. How would you close the lanes?	VTA is looking at different solutions to fit the context of each segment of the Corridor. In Sunnyvale, we are not looking at taking out sound walls or acquiring property for example. VTA is looking at context sensitive solutions.
Turning from Fair Oaks to Tasman is scary on a bicycle.	Comment noted.
Do you have any ideas for pedestrian and bicycle improvements along the Corridor?	It is too early to know exactly what will be recommended yet. For example, the intersections are very wide and give us opportunities to make improvements that would make it safer and more comfortable for bicyclists and pedestrians.
Will eminent domain be used?	We are not looking at projects that will cause right-of-way impacts.
Have you done this sort of thing on other corridors? Where?	Recently the City of San Jose has completed several Complete Streets projects, including in Japantown on North First Street and in Willow Glen on Lincoln Avenue where the road went from four lanes to three lanes with the use of a center turn lane which freed up more space for bicyclists.
What is the City of Sunnyvale's ability to fund these projects?	The City will be looking to VTA as a partner and to support the projects through grants.
How long will it take?	It depends on which type of project is chosen and the funding. As an example, Maude Avenue improvements are going in relatively quickly.
There is a lack of residential-supporting services in this part of Sunnyvale. The City should put in services such as stores and other retail so we don't have to drive all the time.	Comment noted. The City is looking at some rezoning.
Walmart trucks are diverting off Lawrence and down out local streets. Can't the City put up signs and enforce that?	The City will look into that.

Comment/Question	Response
I want speed bumps on Tasman the cars go too fast.	Comment noted.
MILPITAS	
What is the timeframe for these improvements?	It depends on which type of project is chosen, the timing of the funding, and the willingness of the City to prioritize it.
Will Milpitas focus on the roll out of the new BART Station. Is that the strategy?	VTA is realigning their bus system to take advantage of the new BART Station and make great connections. The City of Milpitas is not necessarily focused on the BART Station area when prioritizing improvements and projects.
Thank you for the presentation. It is hard for pedestrians to get to the Great Mall and new BART station. How will I get from here to the new BART station? Do I need to take LRT? I would like better signage. Is the City working on BART?	There will be signage in place directing people to the new BART Station before it opens to the public. We cannot put it up too soon or people will get confused. We can show you the exact route at the map station. Yes, the City and VTA are working together to provide good bicycle, pedestrian and auto access to the new station. There will be an additional pedestrian overcrossing over Montague Expressway.
A security issue is at the Abel and Montague Expressway intersections. There needs to be lighting.	Comment noted.
One of the reasons I use the LRT and Caltrain is because my employer provides it for me for free. I rarely use my car. Does VTA coordinate with employers to have them encourage transit ridership?	Yes. VTA comments on all types of development projects and partners with businesses and housing developers to provide free or reduce price transit passes for residents/employees.
At Main Street and Great Mall and Tasman the light is very confusing and pedestrians get caught in the middle often. Can there be a pedestrian count down put in so people know how much time they have to cross?	We can look at that.
People are confused at that intersection. Can there be a study?	We agree it is confusing.



Report Outs from Stations

Santa Clara

Station 1-Where do you live, how do you use the Corridor?
Attendees came from the immediate neighborhood. Attendees use the Corridor to: • Commute to work; • Get to the LRT to go to the Great Mall; • Drive to the store; • Drive to drop kids off at school; • Take the LRT to bus locations (then to work or hospital); • Take the LRT to downtown San Jose.
Station 2—When and in what mode do you use the Corridor?
• LRT and bus are used for weekday commutes and on the weekends. • Pedestrian activity occurs on a daily basis, along and across Tasman Drive Pedestrians walk to Safeway and Target. • Drivers are headed to 237/101 interchange area or to the Great Mall. • Bicycle activity ranges from weekly to monthly along and across Tasman Drive.
Station 3-Priority Projects
There is a spread of ideas and priorities: • The highest priority from the meeting indicated a desire to have sidewalk improvements and gaps filled. There were comments relating to the length of crossing and lack of refuges for pedestrians. • The second highest priority indicated improvements for bike facilities, which were noted as not being comfortable. • Reduction of vehicle congestion (specifically for the P.M. peak period) was indicated as a high priority as well.
Station 4-Map the issues

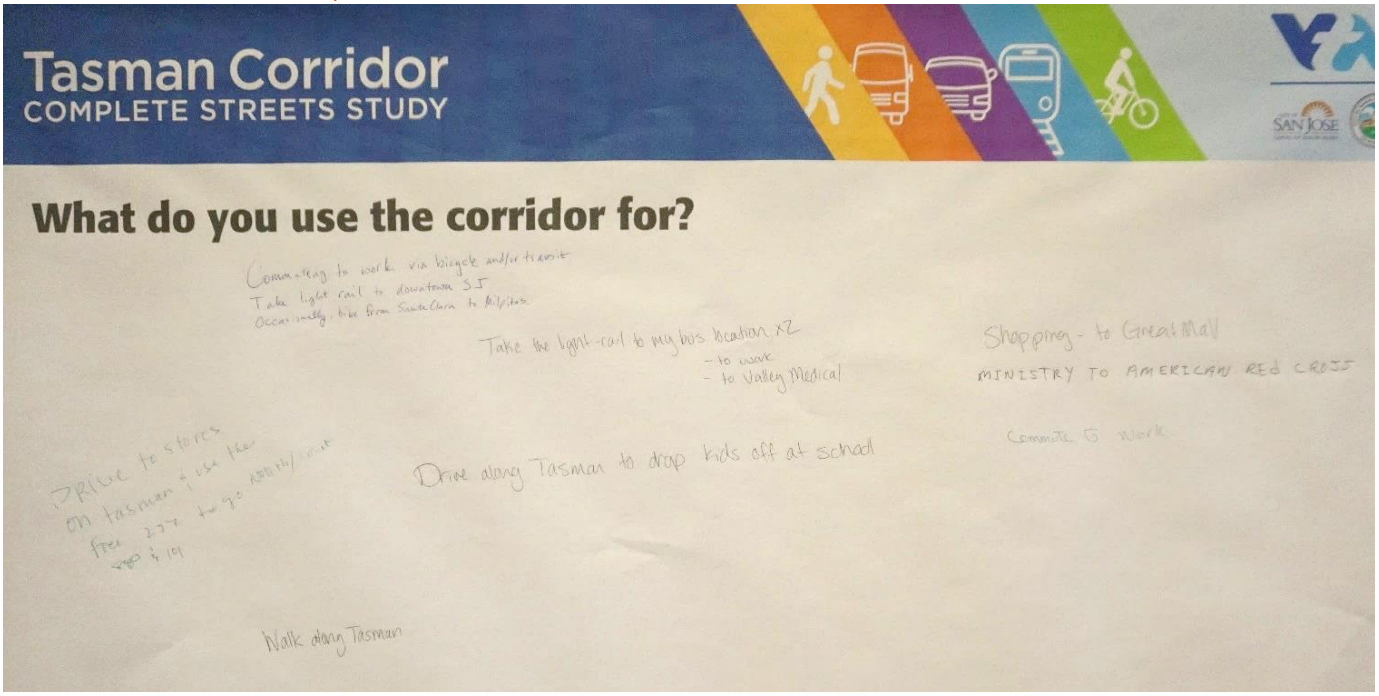
The following comments were listed from the public:
 	
• My bus commute to work involves crossings like this (Great America Parkway at Tasman Drive). It takes 3-4 minutes. Right turning traffic does not yield. I don't usually make it into the intersection before the ped countdown starts flashing.
• This station needs clearer indication which side of platform to wait, to go which way.
• Stadium operations:
  ○ Disables several pedestrian buttons during major events.
  ○ Closes old ironsides LRT station.
  ○ Closes segment of San Tomas Trail.

- Please consider connection on west end to Borregas bicycle corridor.
    - Getting on to 237.
    - Bike trail/riders. Clear paths or fines for not using signs.
    - Lafayette as you turn to go towards 237.
    - This area needs a bike lane. It does not need the striping to this service ramp.
    - Conflict at Lick Mill with right turning traffic.
    - Ramp to trail has abrupt edge.
- ST bike lanes:
    - Need (more frequent) street sweeping.
    - Green striping is bumpy where it is dashed (paint is thick).

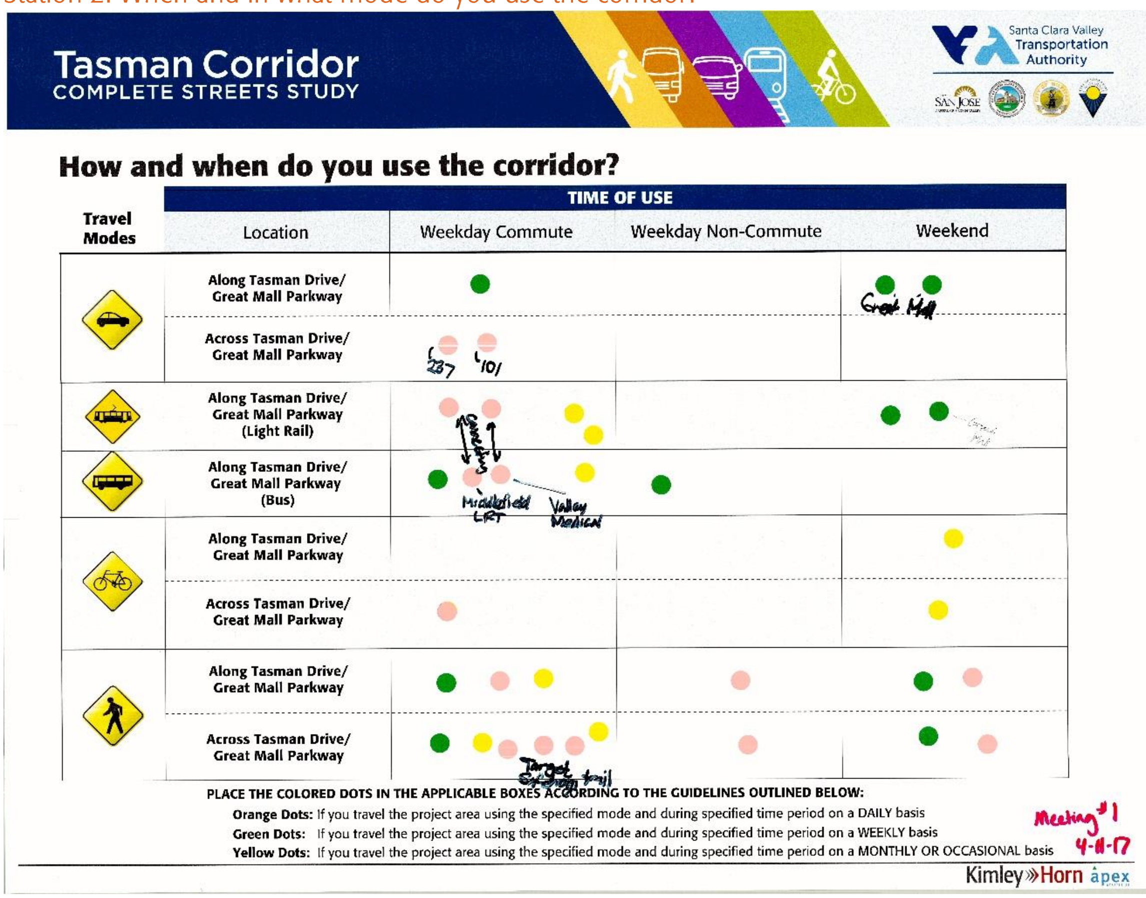
The following maps display the results of the meeting:

Station 1: Where do you live?

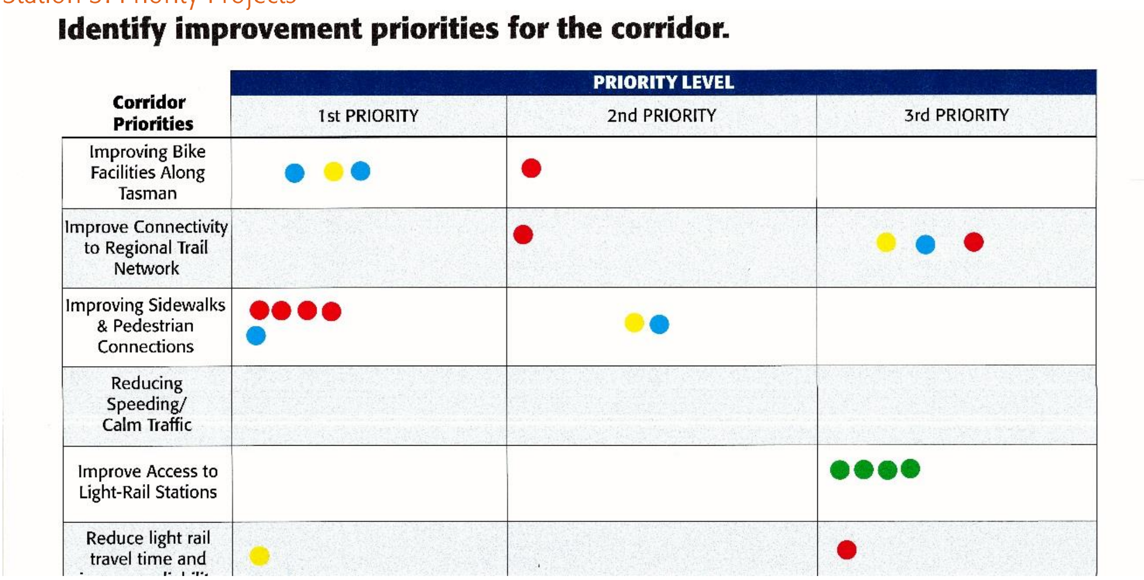
Station 2: How do you use the corridor?



Station 2: When and in what mode do you use the corridor?

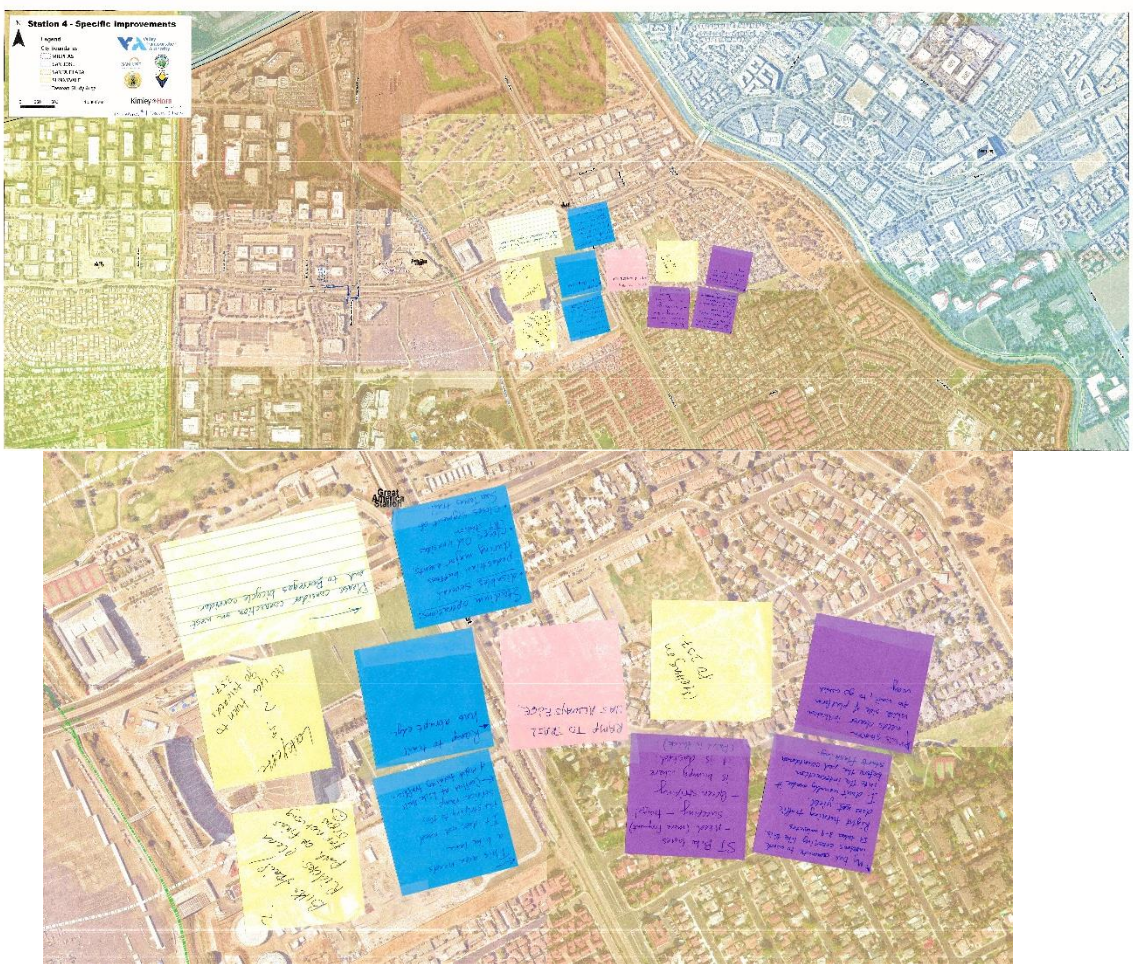


Station 3: Priority Projects


Identify improvement priorities for the corridor.

Corridor Priorities	PRIORITY LEVEL 1st PRIORITY	2nd PRIORITY	3rd PRIORITY
Improving Bike Facilities Along Tasman	● ● ●	●	
Improve Connectivity to Regional Trail Network		●	● ● ●
Improving Sidewalks & Pedestrian Connections	● ● ● ● ●	● ●	
Reducing Speeding/ Calm Traffic			
Improve Access to Light-Rail Stations			● ● ● ●
Reduce light rail travel time and [illegible]	●		●

Station 4: Map the issues



Sunnyvale

Station 1-Where do you live, how do you use the Corridor?

Attendees at the meeting were spread from throughout the area.

Most drive alone to do errands and get to work. They would like to be able to bike and walk more. Attendees use the Corridor to:

- Walk/Bike to LRT to commute to work and visit Great Mall;
- Ride bike for recreation during non-commute times;
- Walking along the corridor to the shopping area;
- Drive to Great Mall and to the supermarket;
- Exercise, trail usage, places with low traffic noise.

Station 2—When and in what mode do you use the Corridor?

- Driving along Tasman during all time periods was indicated as a highly popular mode of transportation. Attendees indicated they drove alone regularly.
- Light rail was indicated as a popular mode on the weekends and for special events.
- Bike did not seem popular and was viewed as scary.
- Walking was minimally mentioned and pedestrian activity was indicated as walking along Tasman to get to parks and recreation areas.

Station 3-Priority Projects

- Priority level of modes was highly focused on bicycle and pedestrian connections/access.
- Light rail use was indicated as a medium priority, but comments indicated a desire to better access LRT.

Station 4-Map the issues

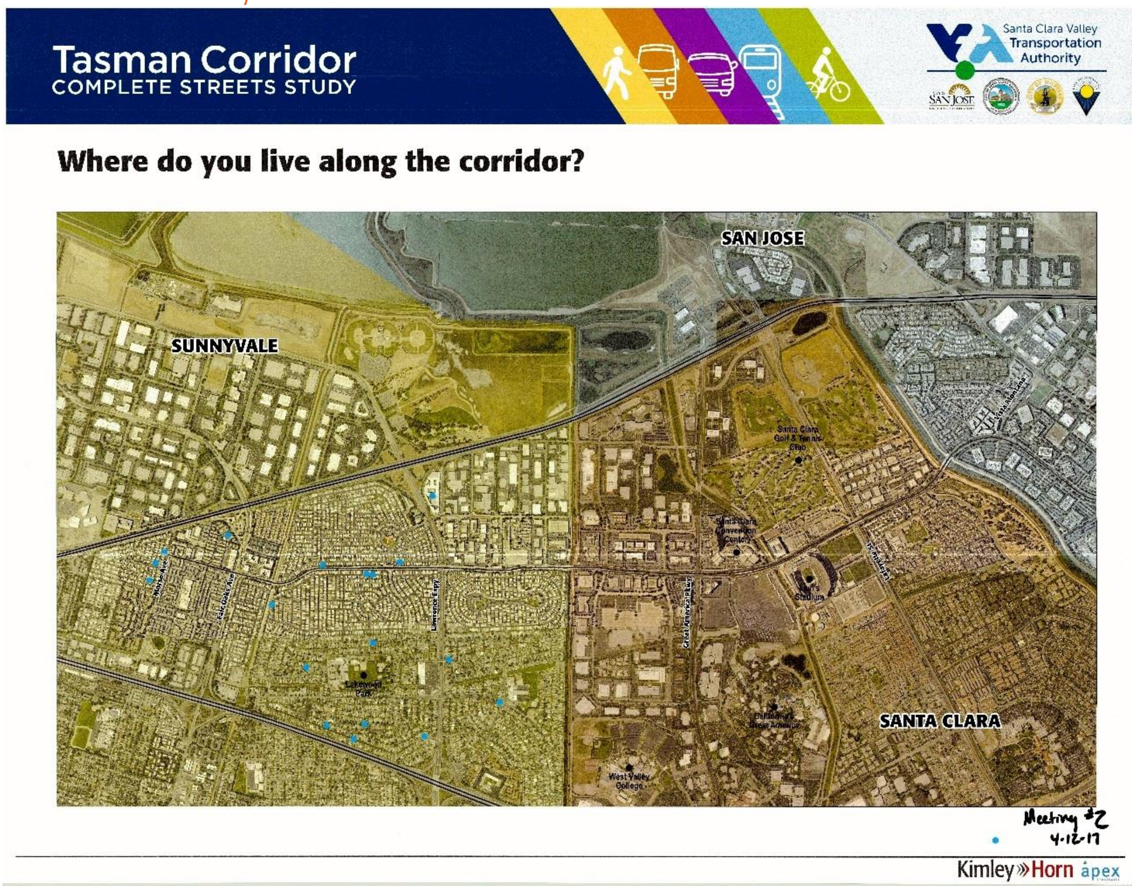
The following comments were listed from the public:

- Morse Avenue need transit & ped access to retail (which is non-existent).
- Morse Avenue to Fair Oaks only one side has sidewalk.
- Bike path across Fair Oaks is treacherous.
- Fair Oaks rail intersection is non-intuitive.
- Longer yellow re-program timing on Fair Oaks, turning left from Tasman to South on Fair Oaks. I frequently enter intersection on green and am not through when it turns red.
    - Timing much too short a lot of the time. (referring to above comment).
- Light at Fair Oaks and Tasman to turn left onto Fair Oaks is not long enough in the AM.
- Can we use the levy access for bike/pedestrian access?
- Tasman and Fair Oaks intersection is confusing and dangerous for pedestrians.

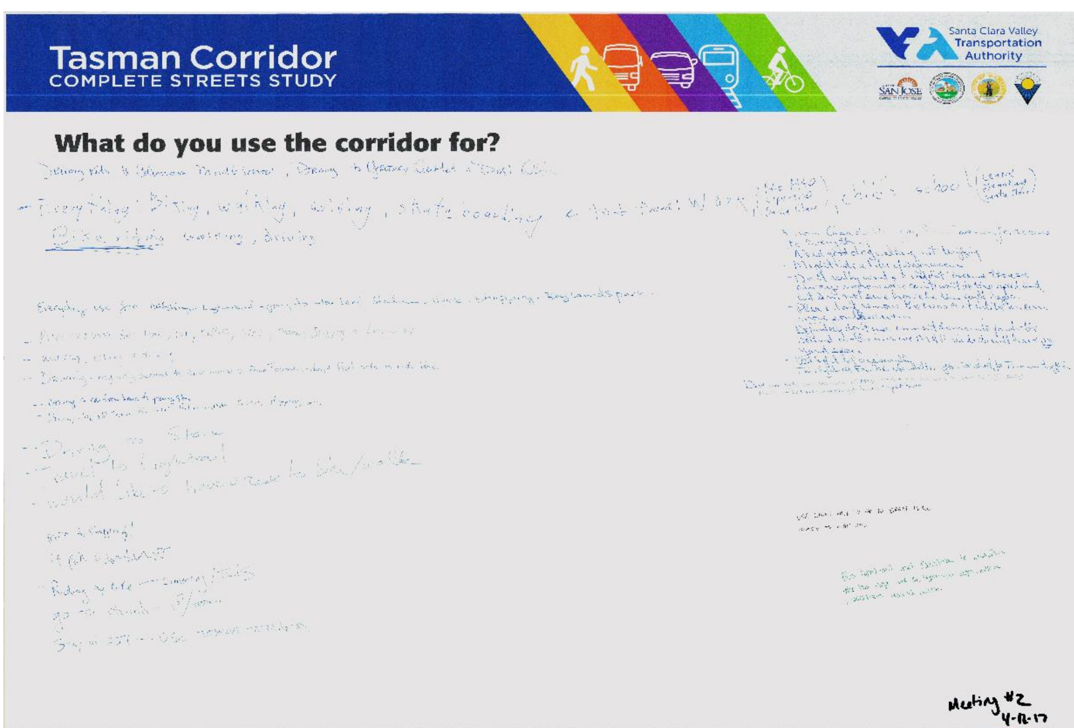
- Tasman Court to Vienna Drive one lane – This intersection has less car traffic and is not safe for neighbors to walk to store.
- Less lanes. More ped access. Take out the trees, but re-plant them.
- Do not want to lose the trees.
- Reduce speed limit from Lawrence to Fair Oaks.
- Do not remove trees on Tasman Drive
- Need buffer between ped walkway and fences.
- More lights on blind spots on road.
- Bike lane/pedestrian walkway between Fair Oaks and Lawrence. (Please don't remove the trees)
- Do not remove trees.
- No good sidewalks for pet walking etc., from Vienna to Fair Oaks and Vienna.
- Intersection at Tasman/Vienna – The people from Casa/Plaza MHP attempt to run down pedestrians on a regular basis. Cars do not yield to right turns speed through regardless of straight-ahead.
- Lake Haven coming into Lakewood needs speed bumps before and after Silver Lake.
- Cars make U-turn at Lake Haven/Sandid to access HWY 101 – bad.
- Speed bumps into both sides of Lake Haven – Sandid. Lake Bird Avenue – Speed bumps.
- Want bike lanes even narrow lanes would be better than nothing.
- Not enough ped access on Lawrence.
- Lawrence Expressway no shade – seems unpleasant, dangerous to get to Tasman/Light rail.
- No trees along Tasman from Lawrence to Fair Oaks as road is too narrow.

The following maps display the results of the meeting:

Station 1: Where do you live



Station 2: How do you use the corridor?



Station 2: When and in what mode do you use the corridor?

Tasman Corridor
COMPLETE STREETS STUDY

How and when do you use the corridor?

Travel Modes	Location	TIME OF USE: Weekday Commute	Weekday Non-Commute	Weekend
	Along Tasman Drive/ Great Mall Parkway			
	Across Tasman Drive/ Great Mall Parkway			
	Along Tasman Drive/ Great Mall Parkway (Light Rail)	wheelchair	W.C - Kaiser MV	W.C; DT SJ; DTSJ events
	Along Tasman Drive/ Great Mall Parkway (Bus)	wheelchair	W.C	W.C
	Along Tasman Drive/ Great Mall Parkway			Calaveras Creek Trail
	Across Tasman Drive/ Great Mall Parkway			
	Along Tasman Drive/ Great Mall Parkway			
	Across Tasman Drive/ Great Mall Parkway			

PLACE THE COLORED DOTS IN THE APPLICABLE BOXES ACCORDING TO THE GUIDELINES OUTLINED BELOW:

Orange Dots: If you travel the project area using the specified mode and during specified time period on a DAILY basis

Green Dots: If you travel the project area using the specified mode and during specified time period on a WEEKLY basis

Yellow Dots: If you travel the project area using the specified mode and during specified time period on a MONTHLY OR OCCASIONAL basis

Meeting #2
4-12-17

Kimley»Horn apex

Station 3: Priority Projects

Tasman Corridor
COMPLETE STREETS STUDY

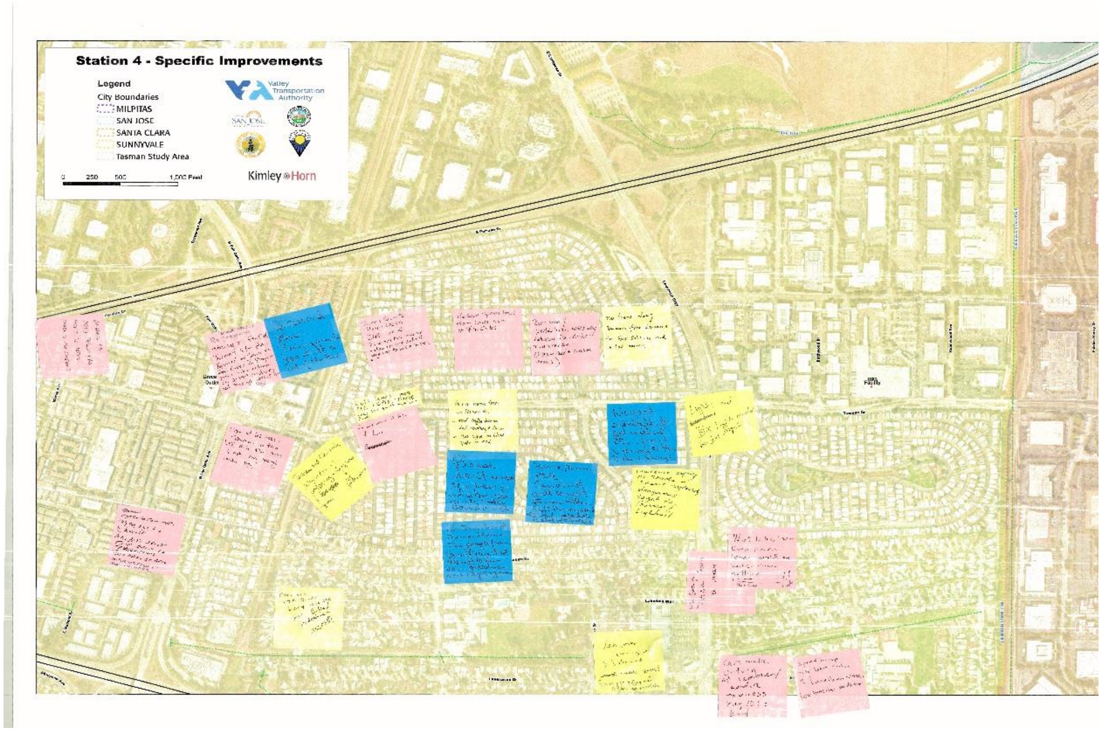
Identify improvement priorities for the corridor.

Corridor Priorities	PRIORITY LEVEL: 1st PRIORITY	2nd PRIORITY	3rd PRIORITY
Improving Bike Facilities Along Tasman			
Improve Connectivity to Regional Trail Network			
Improving Sidewalks & Pedestrian Connections			
Reducing Speeding/ Calm Traffic			
Improve Access to Light-Rail Stations			
Reduce light rail travel time and improve reliability			
Reduce Vehicle Congestion			

Meeting #2
4-12-17

Kimley»Horn apex

Station 4: Map the issues



Milpitas/San Jose

Station 1-Where do you live, how do you use the Corridor?
The meeting attendees were from the immediate area. At this meeting, participants indicated many different uses for the corridor. These included: • Driving to school and the store (it was indicated that to some, driving was the only comfortable mode of transportation along the corridor); • Using light rail to access the mall, special events; • Most comments indicated a desire to use other modes more (walking, biking, using light rail), but due to access and safety, they feel unable.
Station 2—When and in what mode do you use the Corridor?
• Driving along and across the corridor was ranked as the highest used mode of transportation during all time periods along the corridor by attendees. • One LRT commuter indicated they travel from Caltrain to Stanford. • Bicycling and walking were also noted for their use, but mostly to trails or the Great Mall.
Station 3-Priority Projects

- Pedestrian sidewalks and bike projects were indicated as the biggest priority for the corridor.
- Reduction of vehicle congestion along the corridor was the next highest priority indicated by attendees.

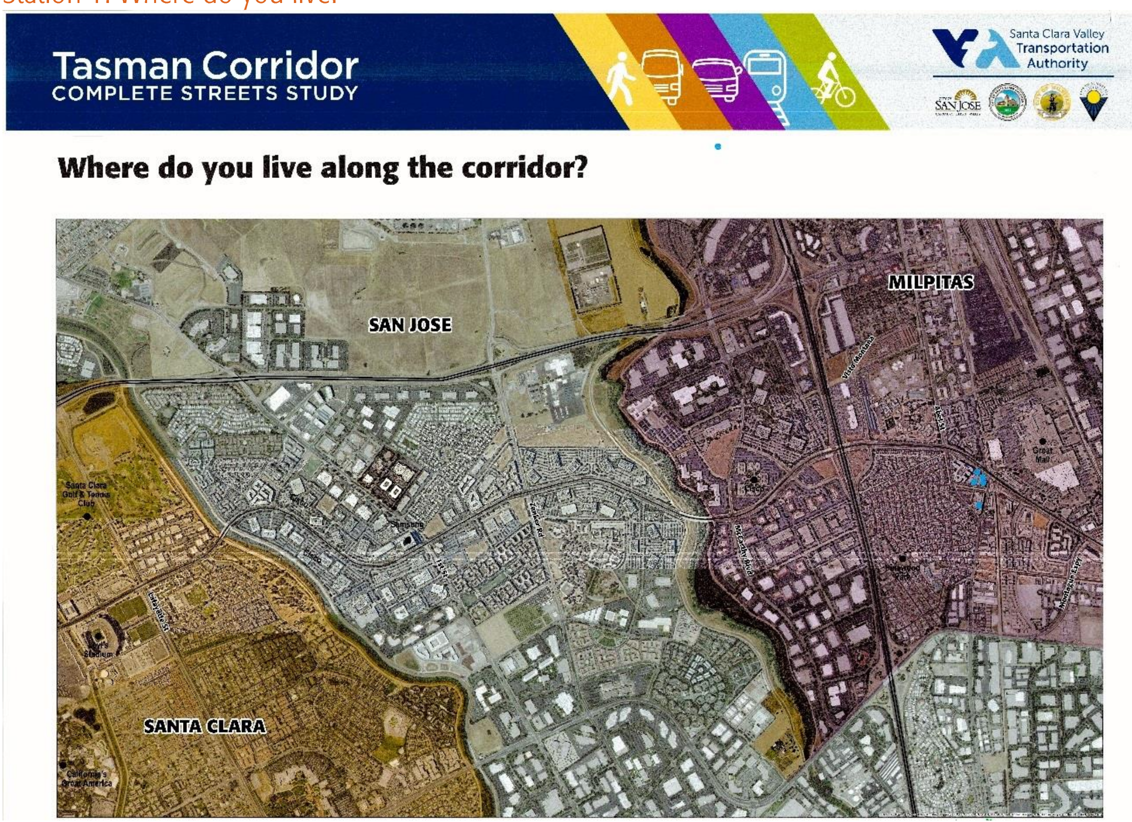
Station 4-Map the issues

The following comments were listed from the public:

- This intersection is a nightmare to cross (Tasman and Zanker Rd).
    - Another vote for pedestrian over crossing (both across Great Mall Pkwy and Main Street).
- Need a way to get from point A to BART Station for pedestrians efficiently and safely.
- Free transfer from VTA Great Mall Station to BART Milpitas Station.
- Waiting at traffic lights at intersections near Cisco are too long.
    - They are biased to Cisco's favor and many times no one from Cisco is there.

The following maps display the results of the meeting:

Station 1: Where do you live?



Station 2: How do you use the corridor?

Tasman Corridor
COMPLETE STREETS STUDY

What do you use the corridor for?

Drive + walk to mall & light rail

WALK/BIKE TO LIGHT RAIL TO COMMUTE TO WORK + VISIT GREAT MALL

Ride bike for recreation during non commute (except at and going home)

WALKING TO SHOPPING AREA

Drive to the mall, some shopping down at the supermarket

EXERCISE, trail usage, places w/ low traffic noise

Station 2: When and in what mode do you use the corridor?

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

How and when do you use the corridor?

Travel Modes	Location	Weekday Commute	Weekday Non-Commute	Weekend
		TIME OF USE		
	Along Tasman Drive/ Great Mall Parkway	-to 237	-to 237	—Tasman nk to 237
	Across Tasman Drive/ Great Mall Parkway			
	Along Tasman Drive/ Great Mall Parkway (Light Rail)	— Connect to Caltrain Station	DTSJ or Mountain View	
	Along Tasman Drive/ Great Mall Parkway (Bus)		(a few times - Fremont BART)	
	Along Tasman Drive/ Great Mall Parkway			- to trails (GRT and Coyote Creek) Great Mall
	Across Tasman Drive/ Great Mall Parkway	- to Great Mall LRT		
	Along Tasman Drive/ Great Mall Parkway		- Great Mall	
	Across Tasman Drive/ Great Mall Parkway	— to Great Mall LRT	-Great Mall	

Meeting #3
4-13-17

PLACE THE COLORED DOTS IN THE APPLICABLE BOXES ACCORDING TO THE GUIDELINES OUTLINED BELOW:

Orange Dots: If you travel the project area using the specified mode and during specified time period on a DAILY basis
Green Dots: If you travel the project area using the specified mode and during specified time period on a WEEKLY basis
Yellow Dots: If you travel the project area using the specified mode and during specified time period on a MONTHLY OR OCCASIONAL basis

Kimley»Horn apex

Station 3: Priority Projects

Tasman Corridor
COMPLETE STREETS STUDY

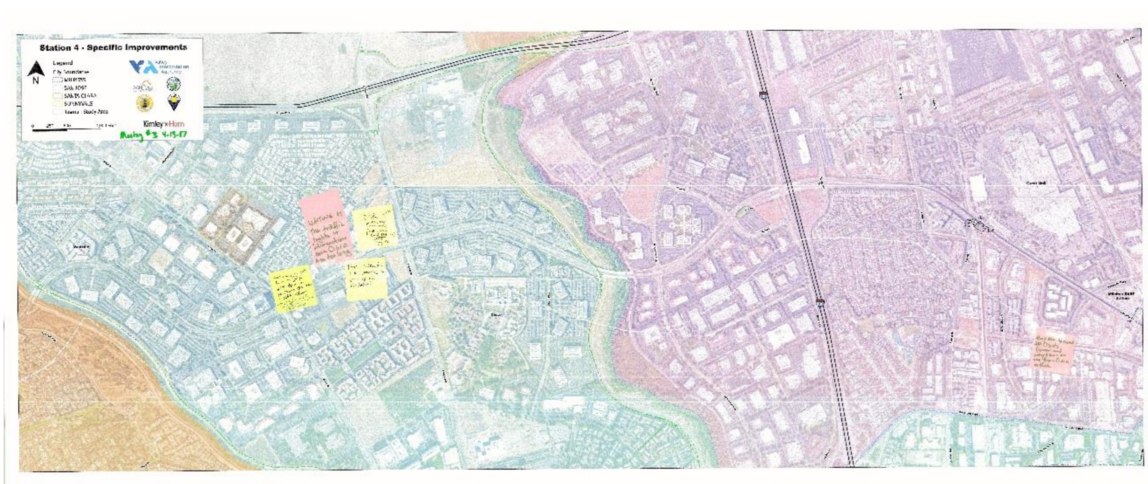
Identify improvement priorities for the corridor.

Corridor Priorities	PRIORITY LEVEL 1st PRIORITY	2nd PRIORITY	3rd PRIORITY
Improving Bike Facilities Along Tasman			
Improve Connectivity to Regional Trail Network			
Improving Sidewalks & Pedestrian Connections			
Reducing Speeding/ Calm Traffic			
Improve Access to Light-Rail Stations			
Reduce light rail travel time and improve reliability			
Reduce Vehicle Congestion			

Meeting #3 4-13-17

Kimley»Horn apex

Station 4: Map the issues



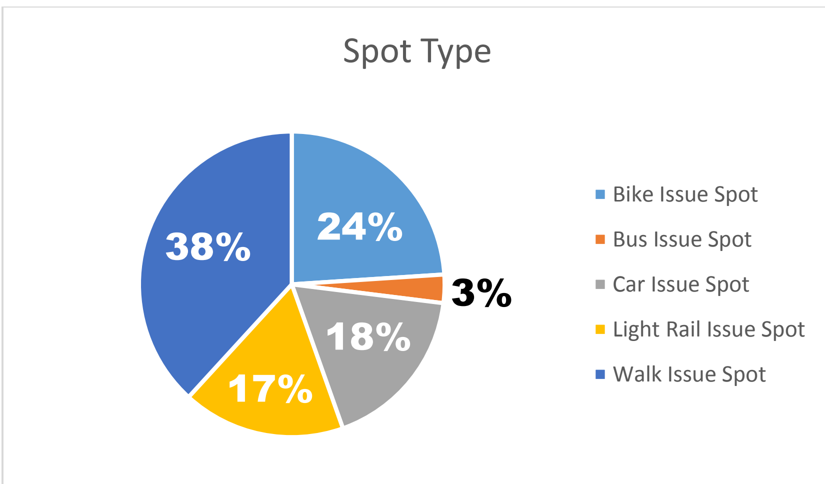
Online Survey Results Summary

Summary of Responses

In addition to the community meetings portion of outreach for this project, VTA also hosted an online survey using the Crowdspot tool. This interactive mapping program allowed participants to share specific "spots" of issues they've experienced and comment on the types of improvements they would like to see. These comments were available for all to see, and allowed other participants to add on comments if they agreed/disagreed. In total, there were 236 survey responses. Respondents could provide their name or reply anonymously. A total of 98 emails were provided by survey takers.

281 spots were provided as part of this survey. A portion of these data points (approximately 15%) were located well from the Tasman Drive Corridor, which for the purpose of this survey was defined as 100-feet adjacent to the corridor. **Attachment 1: Crowdspot Issue Spot Locations from Survey #1** is a visual representation of the concentration of locations where survey respondents commented, including those locations not lying along Tasman Drive.

Participants were given the opportunity to identify specific "issue spots" for walking, biking, light rail, buses, and cars. They were also able to indicate "like spots" where there is a positive attribute to the corridor. The following table summarizes the total number of "issue" and "like" spots noted on the website, including those outside of the corridor study area.



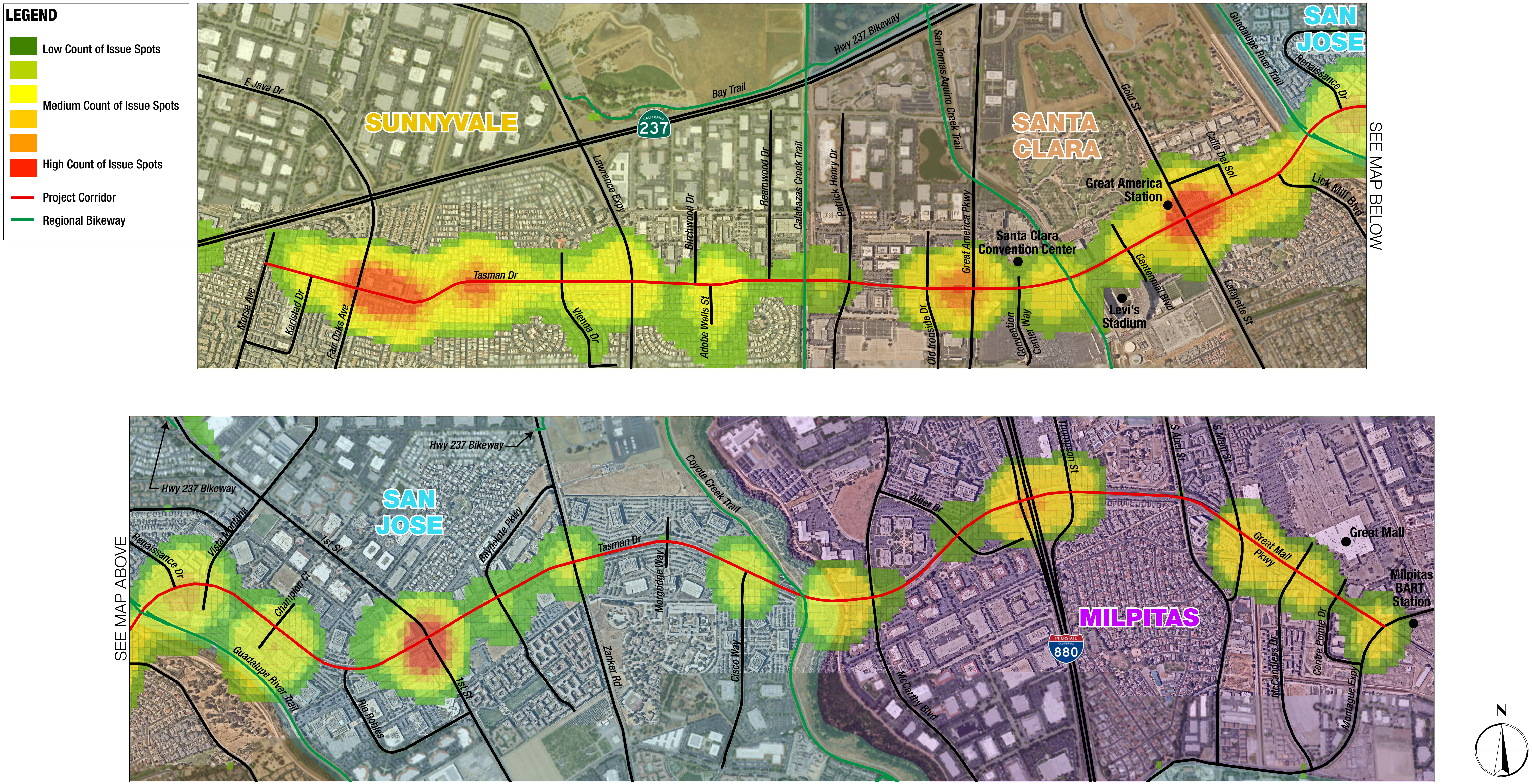
Survey Results

In addition to identifying specific locations of interest on the map, a general survey was hosted on the website. (**Attachment 7** *includes the questions and the available answer choices.)* The following questions were asked of participants:

1. How would you describe yourself in relation to the Tasman Drive/Great Mall Parkway corridor?
2. How do you typically travel along the Tasman Drive/Great Mall Parkway corridor?

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



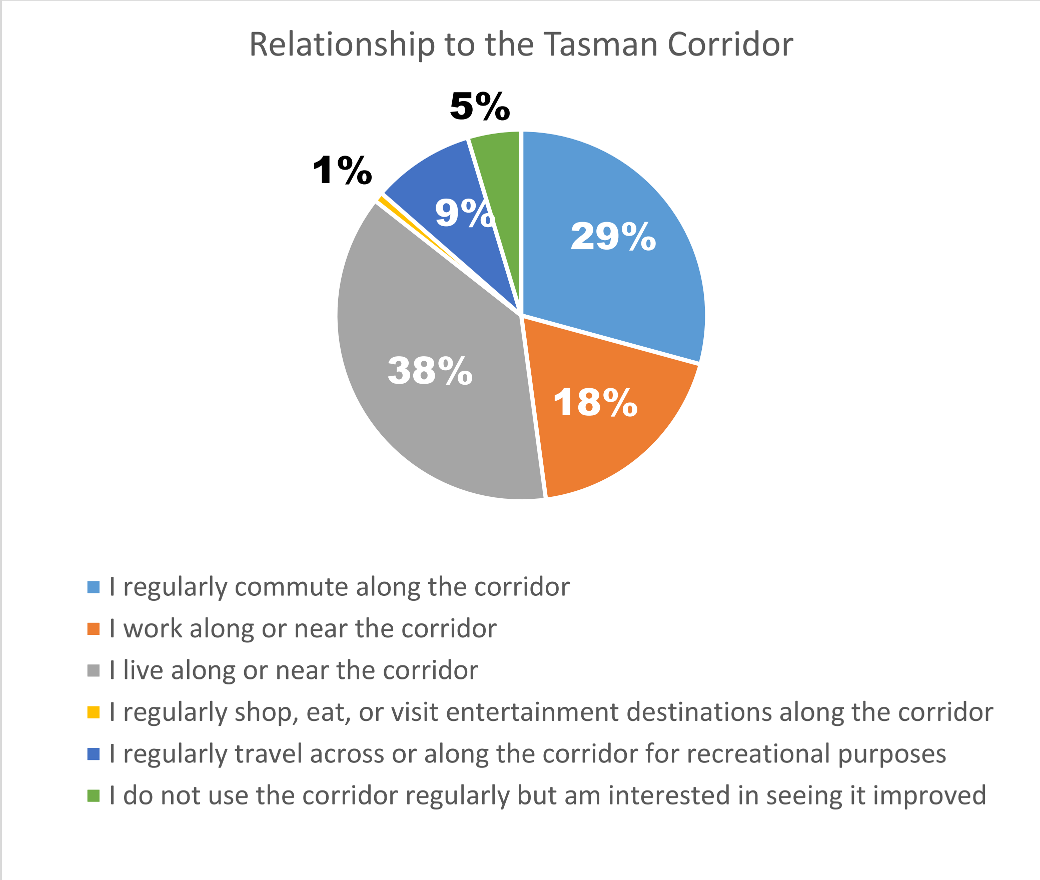
05/2017

Attachment 1: All Issue Spot Locations from Crowdspot Survey #1

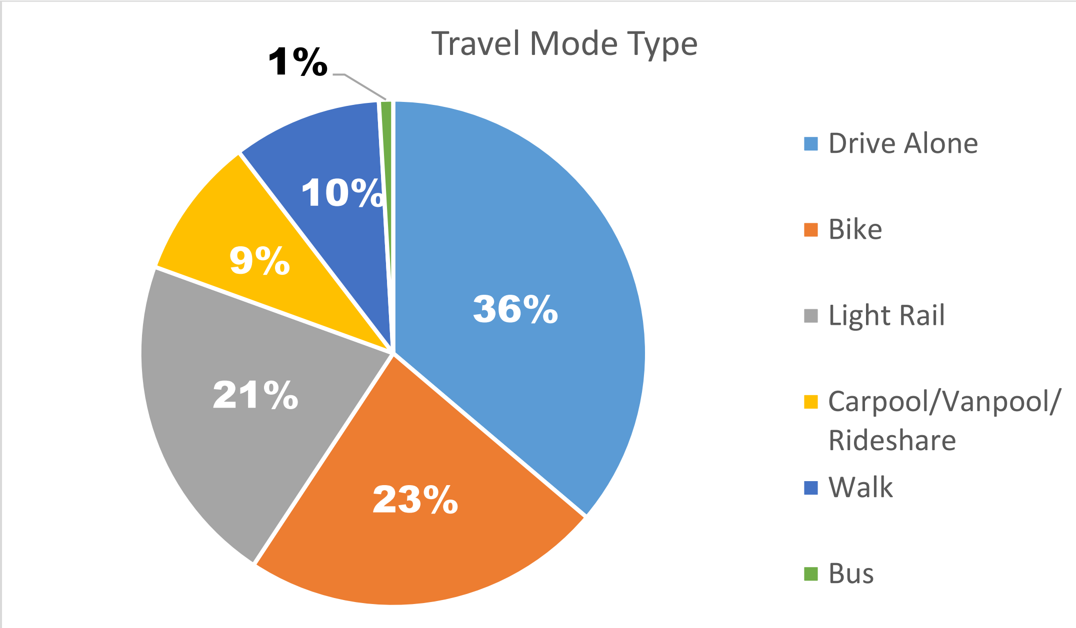
Kimley»Horn

3. Please rank the top three corridor needs in the order you feel are the most important or are most needed, with #1 being the most important. Respondents are presented with three drop-down lists next to 'most important', '2nd most important', and '3rd most important'.
4. When the Milpitas BART Station opens, do you expect to use it? If so, how will you get to and from the station?

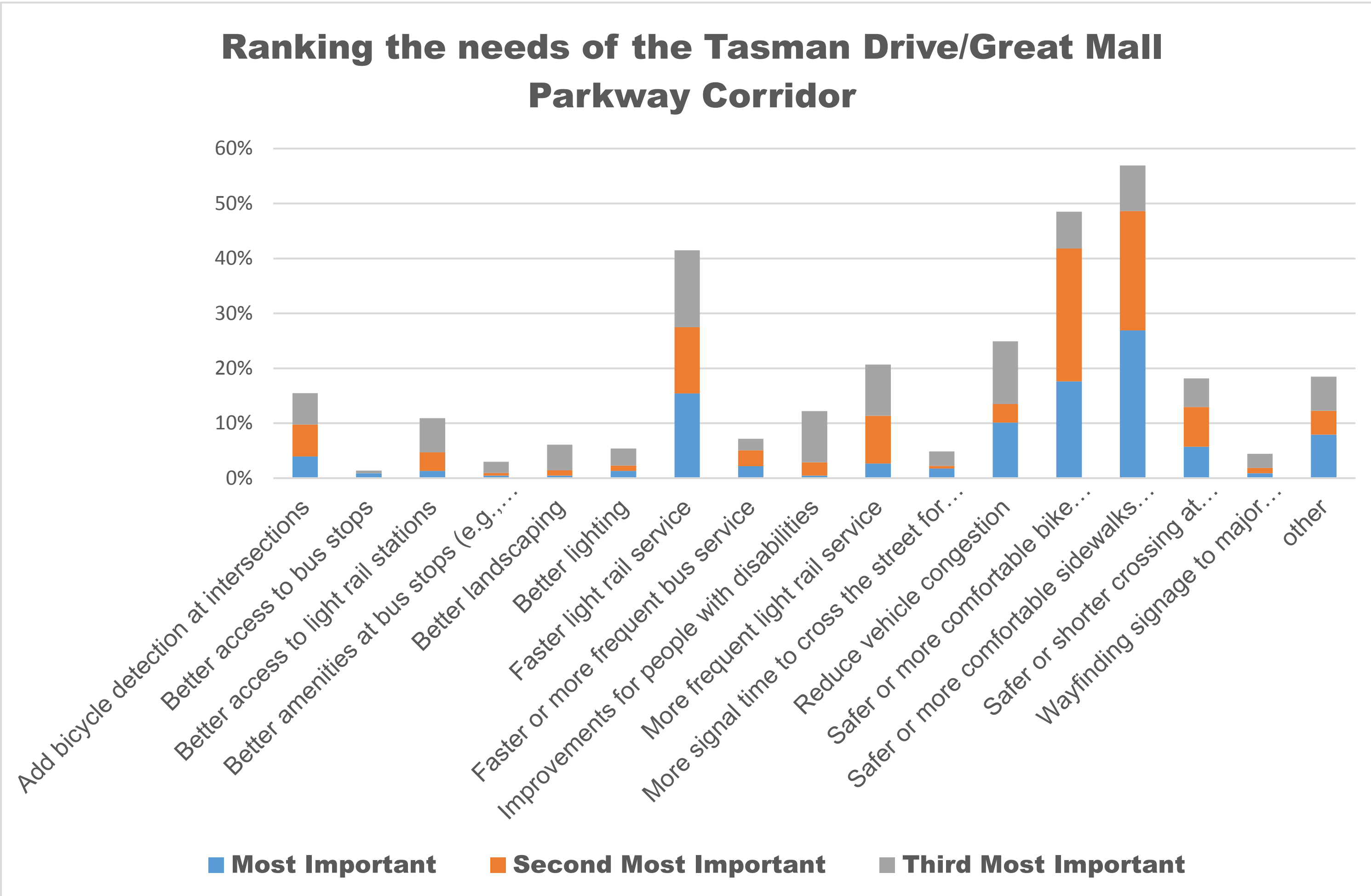
To provide context on the persons participating in the survey, the first question was designed to identify the main way in which the respondent was connected to the Tasman Drive/Great Mall Parkway Corridor. The majority of the respondents (56%) indicated that either live or work along or near the corridor. Due to the format of the survey, it is feasible to assume that the 85% of respondents that live, work, or commute along the corridor also shop, eat, or use the corridor for recreational purposes.



Question two of the survey asked participants how they typically travel along the Tasman Drive/Great Mall Parkway corridor. Forty-five percent (45%) of respondents use some form of personal vehicle to travel, whether that is by driving alone or participating in a carpool, vanpool or rideshare. Twenty-one percent (21%) of respondents indicated they use light rail, but only 1% use the bus service. Over a quarter of participants indicated they bike or walk along the corridor. The responses from this question further indicate that although there is a high portion of vehicular travel, the mode splits for transit and active modes of transportation are substantial and require an in-depth look at the infrastructure of each mode along the corridor.



The third question in the survey provided an opportunity for participants to rank their priorities of needs for the Tasman Corridor. Question three asked participants to rank the top three corridor needs in the order they felt are the most important or are most needed, with #1 being the most important. Respondents were presented with three drop-down lists to select their 'most important', '2nd most important', and '3rd most important' choices. Attachment 2 contains the full list of choices for this question. The ranking of each need is displayed in the following chart.



The following table assigns points to each of the listed need options. Each instance when it was ranked at Most Important, the need was assigned three points. Two points were assigned to each time it was ranked second most important, and one point for it being the third most important.

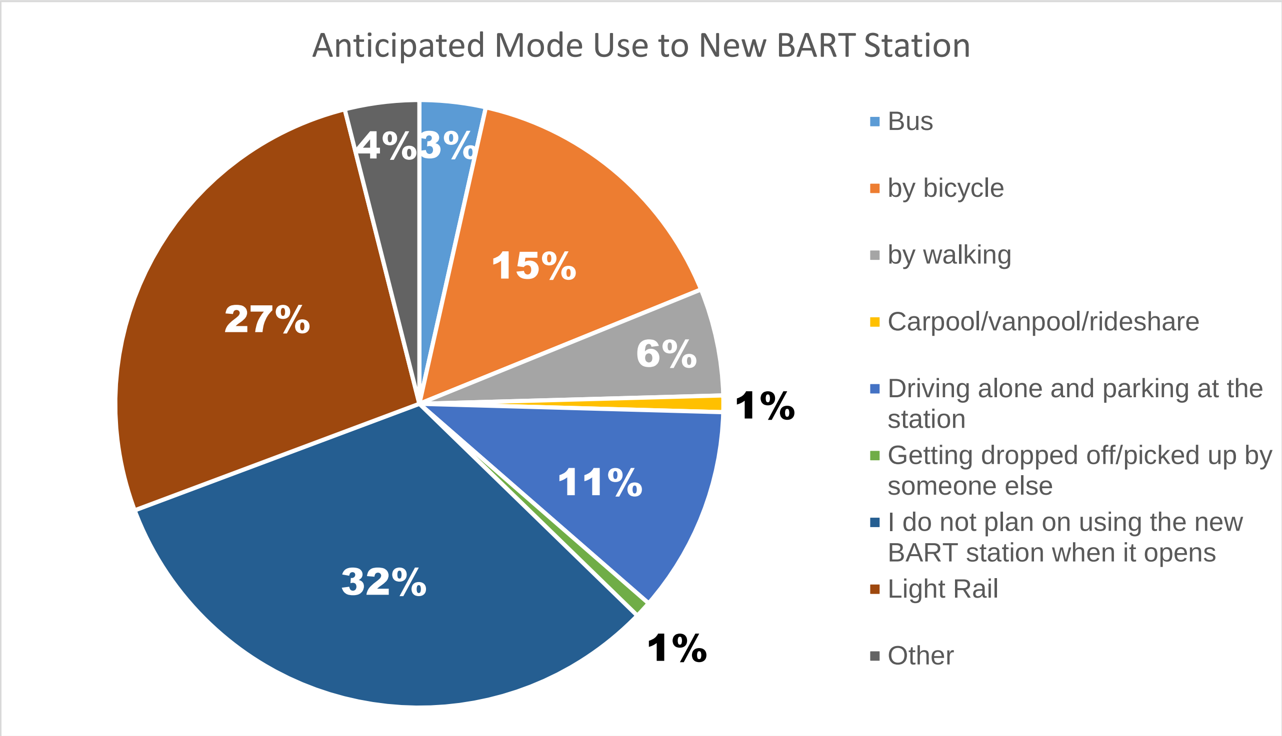
Ranking needs of Tasman Drive/Great Mall Parkway Corridor	Point Tally
Add bicycle detection at intersections	62
Better access to bus stops	7
Better access to light rail stations	35
Better amenities at bus stops (e.g., signs, benches, shelters)	9

Ranking needs of Tasman Drive/Great Mall Parkway Corridor	Point Tally
Better landscaping	16
Better lighting	19
Faster light rail service	182
Faster or more frequent bus service	31
Improvements for people with disabilities	31
More frequent light rail service	72
More signal time to cross the street for pedestrians	19
Reduce vehicle congestion	105
Safer or more comfortable bike facilities and completing missing bike facilities	233
Safer or more comfortable sidewalks and completing missing sidewalks	289
Safer or shorter crossing at intersections for pedestrians	79
Wayfinding signage to major destinations	15
other	84

The most important need was identified as "safer or more comfortable sidewalks and completing missing sidewalks". The next highest priority was "safer or more comfortable bike facilities and completing missing bike facilities". "Faster rail service" was identified as the third highest identified need.

The results of this ranking question provide valuable insight into the publics' desires for the corridor. Creating better connected infrastructure for active modes of transportation was identified as the greatest need for the corridor.

The fourth question posed to survey takers was to identify if they planned to use the new Milpitas BART station when it opens, and if so, how they plan get to and from the station. Approximately one-third of the responses indicated that that the participants do not plan on using the new Milpitas BART station when it opens. For those that do plan to use the BART station, over a quarter plan to use light rail, and about 20% plan to use active transportation modes (bicycling and walking).



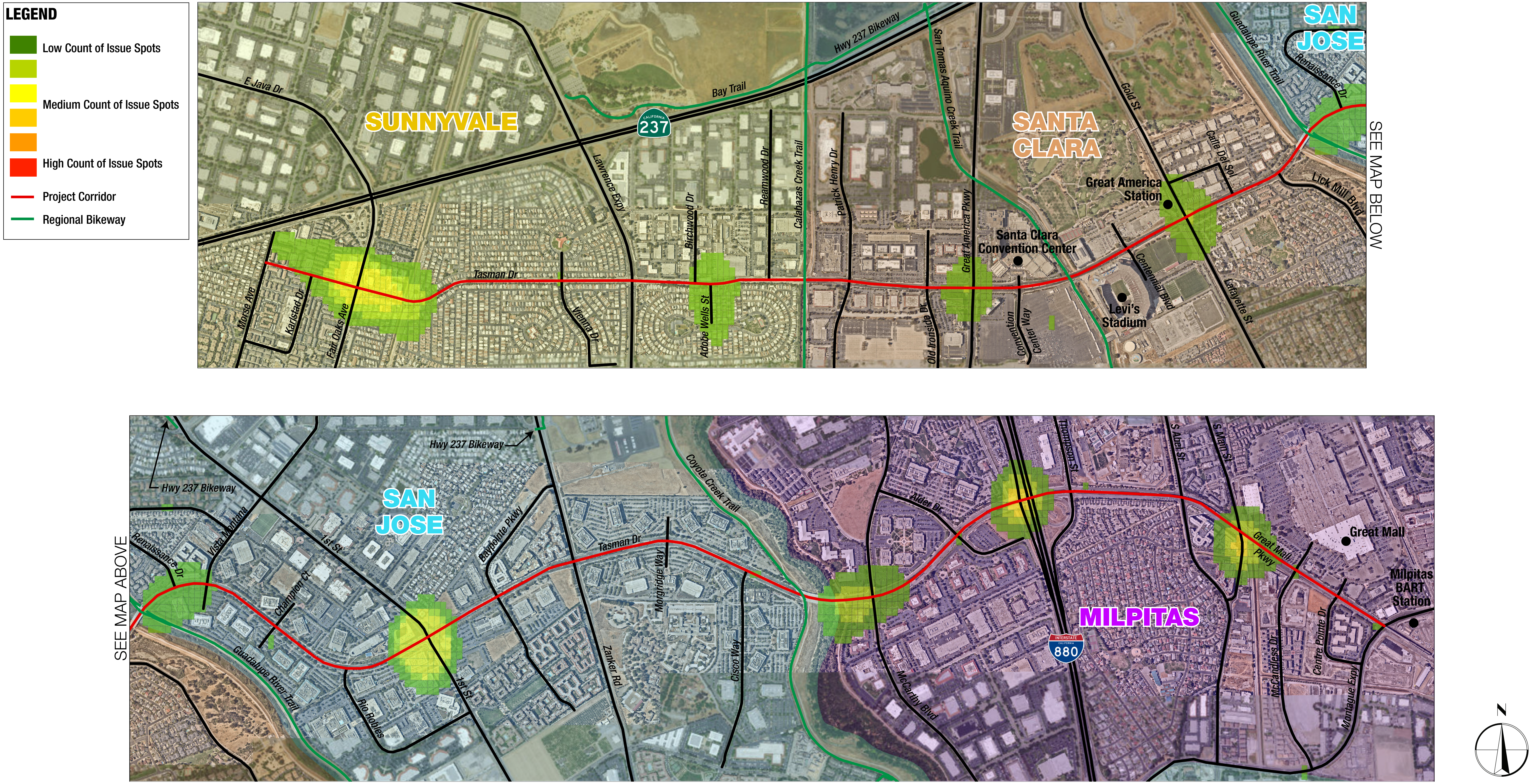
Feedback Received by Type of Issue Noted

With each "spot" location, respondents provided open comment on the challenges they saw, or if there was something about the area they liked. In total, 75 original comments were posted, with additional comments posted to some of these. The longest string of comment discussion included nine (9) comments. For each issue spot, the respondent could indicate the type of issue and provide additional commentary. The following sections summarize the feedback provided for each "spot issue" type.

The concentration for "Car Issue Spots" spread the length of the corridor. The highest concentration of "issue spots" was indicated at the intersection of Tasman Drive and 1st Street (this location includes a turning movement for VTA LRT). **(See Attachment 2: Car Issue Spot Locations from Crowdspot Survey #1)** Congestion was indicated as the highest reason for concern, followed by safety concerns. The majority of "other" concerns regarded signal timing for vehicle/LRT movements at intersections. Two comments were related to parking—repurposing existing lots for enhanced uses.

Tasman Corridor
COMPLETE STREETS STUDY

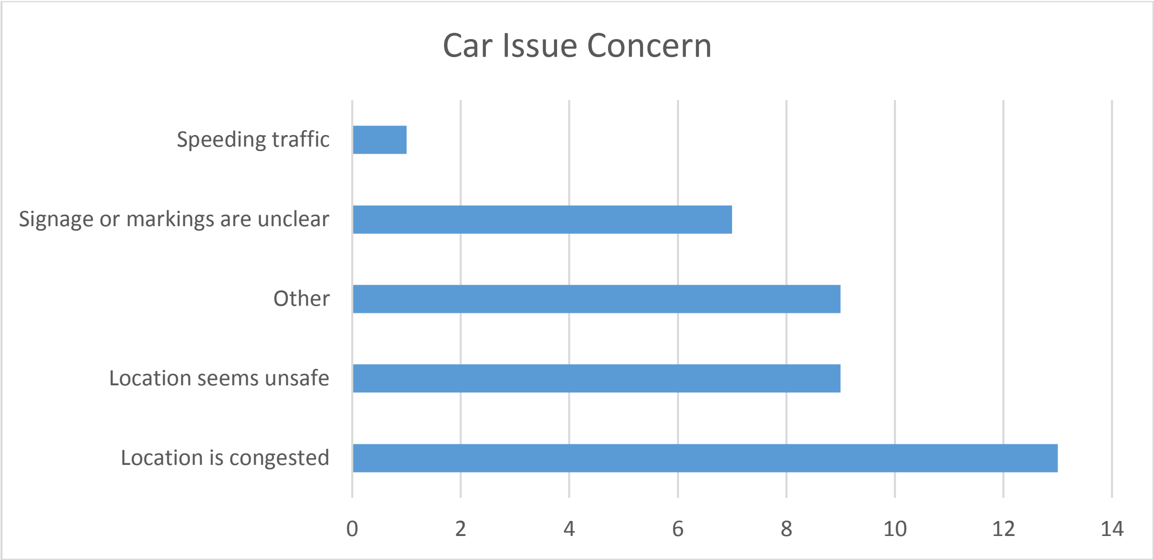
Santa Clara Valley Transportation Authority



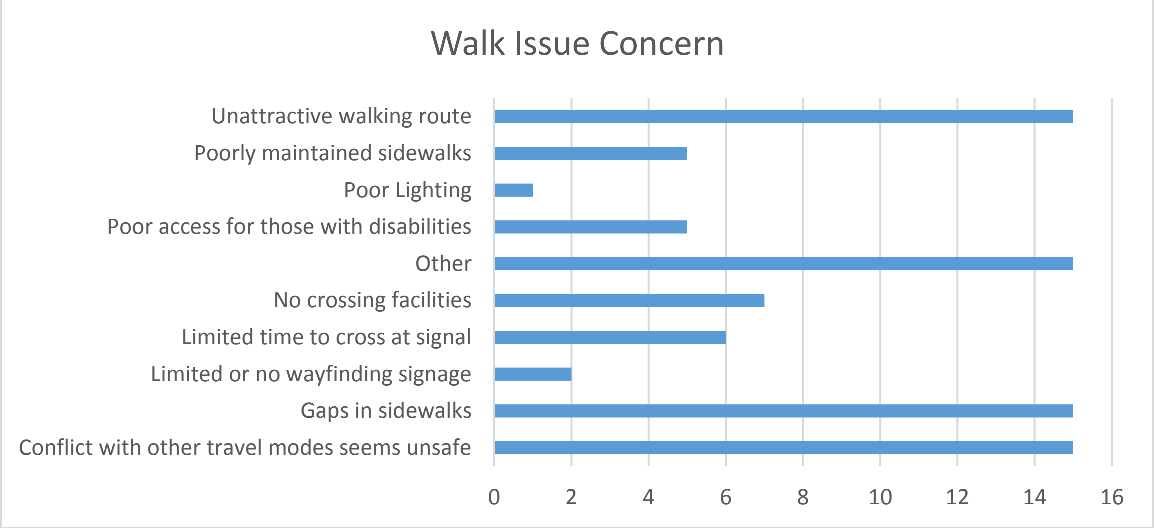
05/2017

Attachment 2: Car Issue Spot Locations from Crowdspot Survey #1

Kimley»Horn



For "Walk Issue Spots," the highest concentration of spot locations is along Tasman Drive between Fair Oaks Avenue and Vienna Drive **(See Attachment 3: Walk Issue Spot Locations from Crowdspot Survey #1)** The types of walk issues noted varied by respondent and location on the corridor.



For those who indicated "other", the comment descriptions were typically variations or combinations of the options list. The predominant comments addressed with "other" mentioned missing sidewalks and the extra difficulty this presents to pedestrians' walking path.

Bike Issues were noted along the corridor (**See Attachment 4: Bicycle Issue Spot Locations from Crowdspot Survey #1)** with a higher concentration of issues indicated near the intersection with I-880, near the Coyote Creek Trail, and Lafayette Street. Slightly outweighing the concern of non-existent bicycle facilities is the perception of high risk of collision and generally unsafe bicycle facilities.

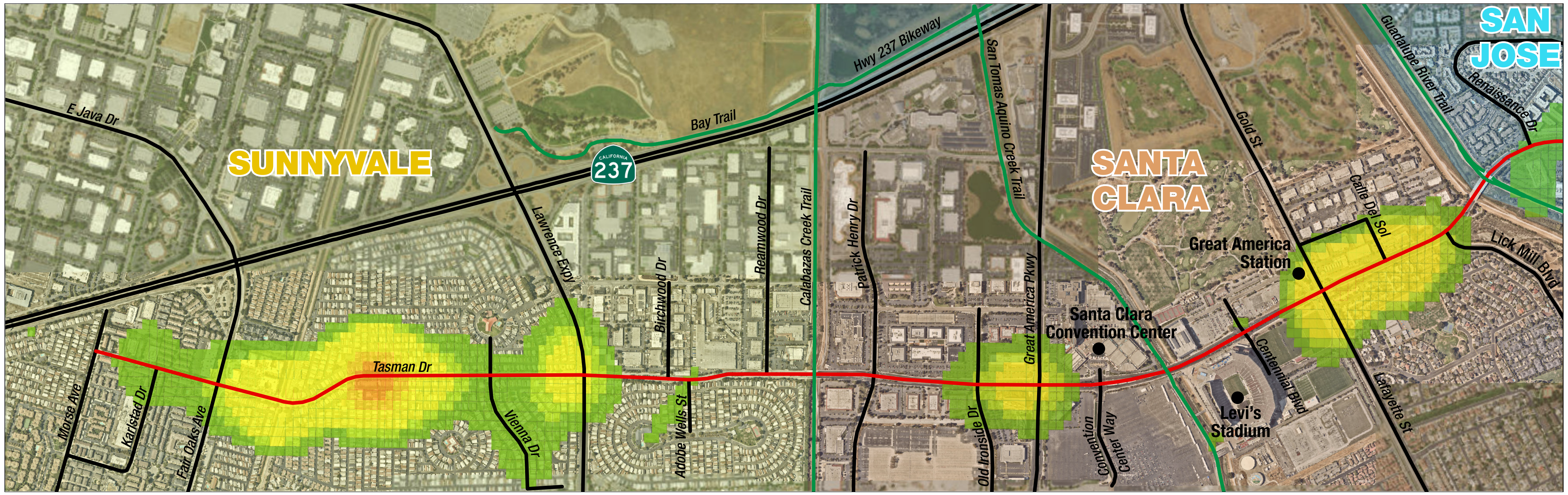
Tasman Corridor
COMPLETE STREETS STUDY

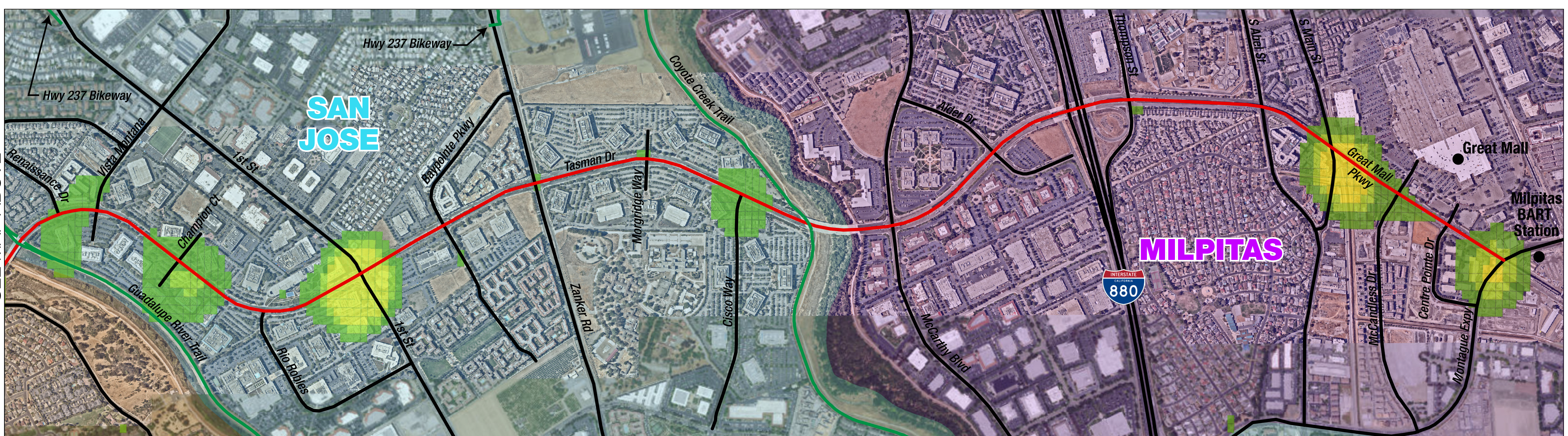
Santa Clara Valley Transportation Authority

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

LEGEND

- Low Count of Issue Spots
- Medium Count of Issue Spots
- High Count of Issue Spots
- Project Corridor
- Regional Bikeway





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Attachment 3: Walk Issue Spot Locations from Crowdspot Survey #1

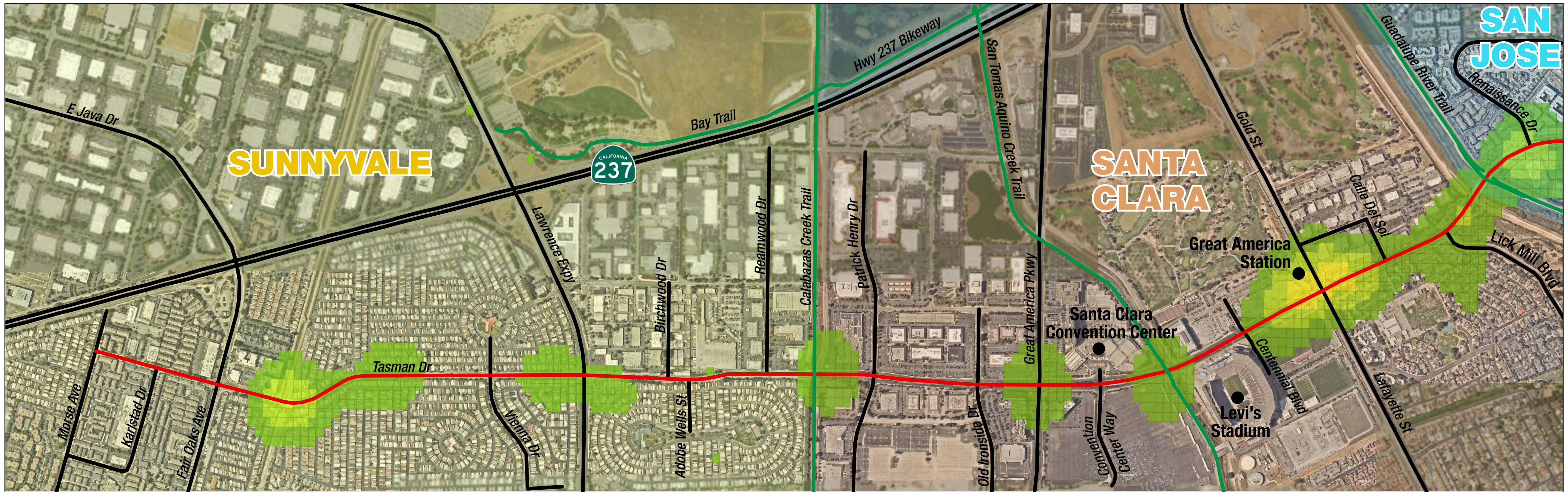
Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

LEGEND

- Low Count of Issue Spots
- Medium Count of Issue Spots
- High Count of Issue Spots
- Project Corridor
- Regional Bikeway



SEE MAP BELOW

SEE MAP ABOVE

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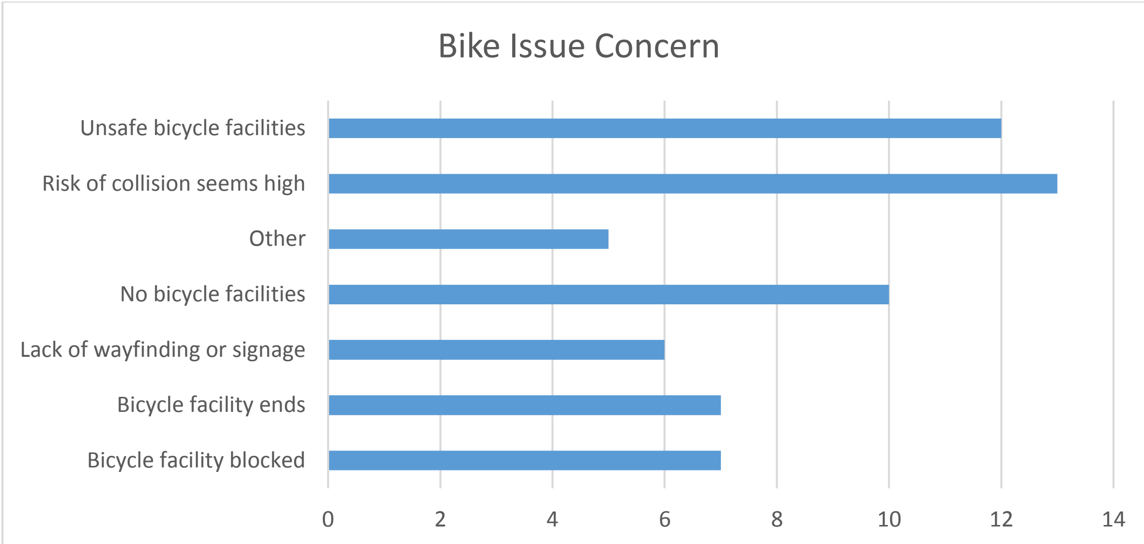
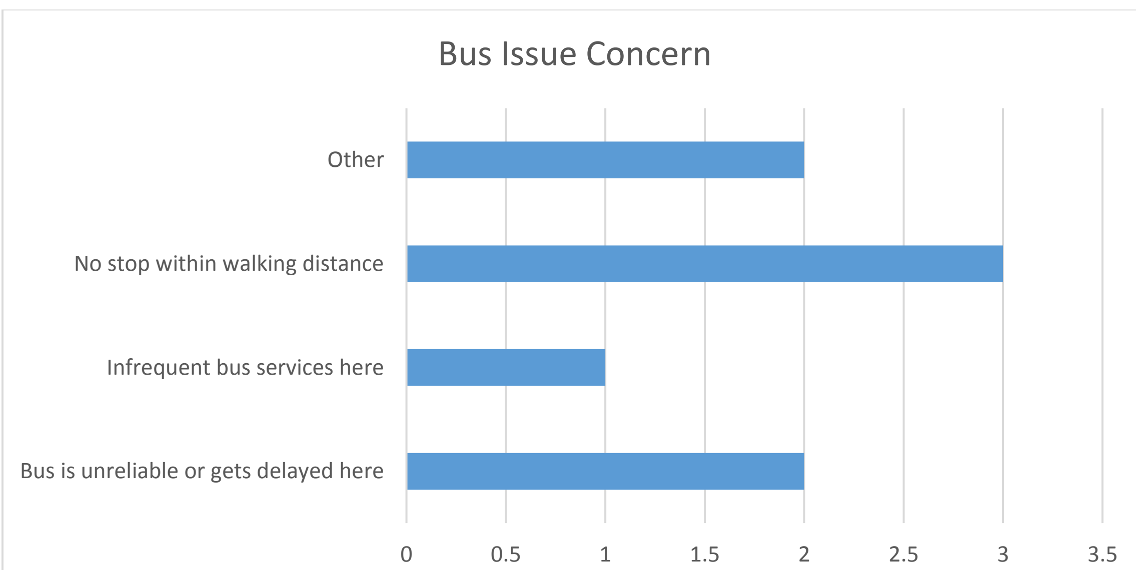
Attachment 4: Bicycle Issue Spot Locations from Crowdspot Survey #1

Kimley»Horn



The “other” responses were focused on bicycle movements at intersections, showing a desire for better signal coordination or signage for bicycles.

Locations with a transit related “issue spot” were most common in Santa Clara. However, the highest density of “spots” were noted at the intersection of Tasman and Fair Oaks Avenue (**See Attachment 5: Bus and LRT Issue Spot Locations from Crowdspot Survey #1)** There were approximately 3.5 times more light rail related comments than bus comments. The bus responses were fairly balanced, with a slightly higher tendency toward “no stop within walking distance.” The “other” comments for bus related issues were also directed toward a lack of service and coordination between bus and light rail service.



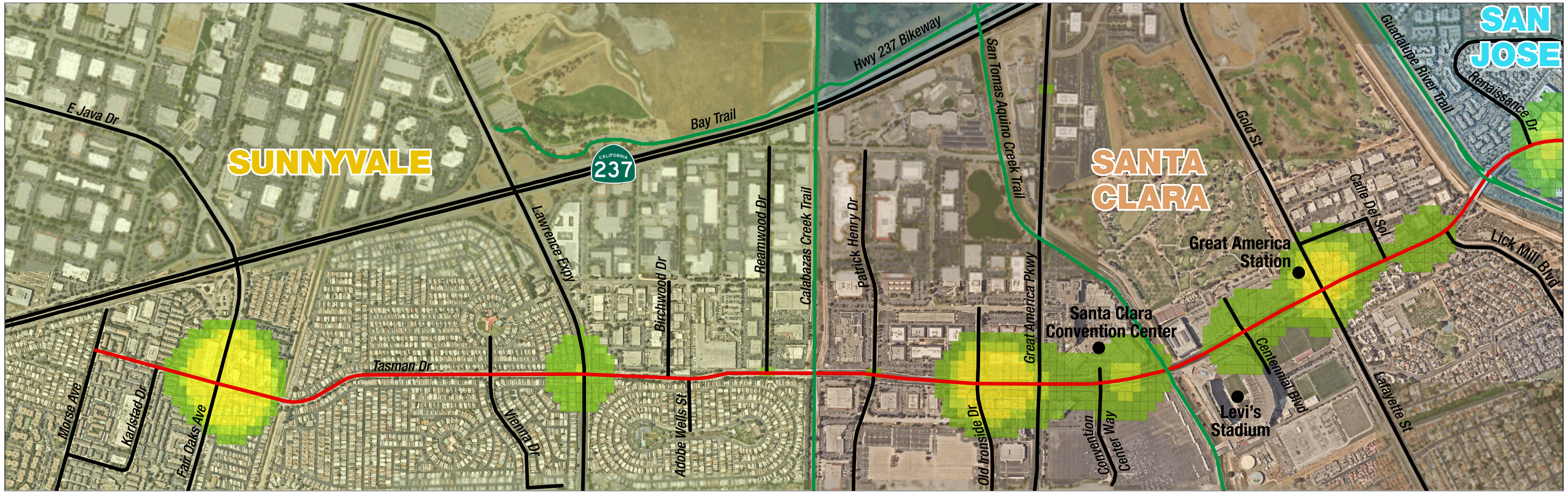
Light Rail “issue spots” showed the highest concern was the unreliability of light rail. The majority of “other” comments indicated “faster light rail service” as the most important need along the corner. However, the suggestions ranged from the enhancement of service to issues

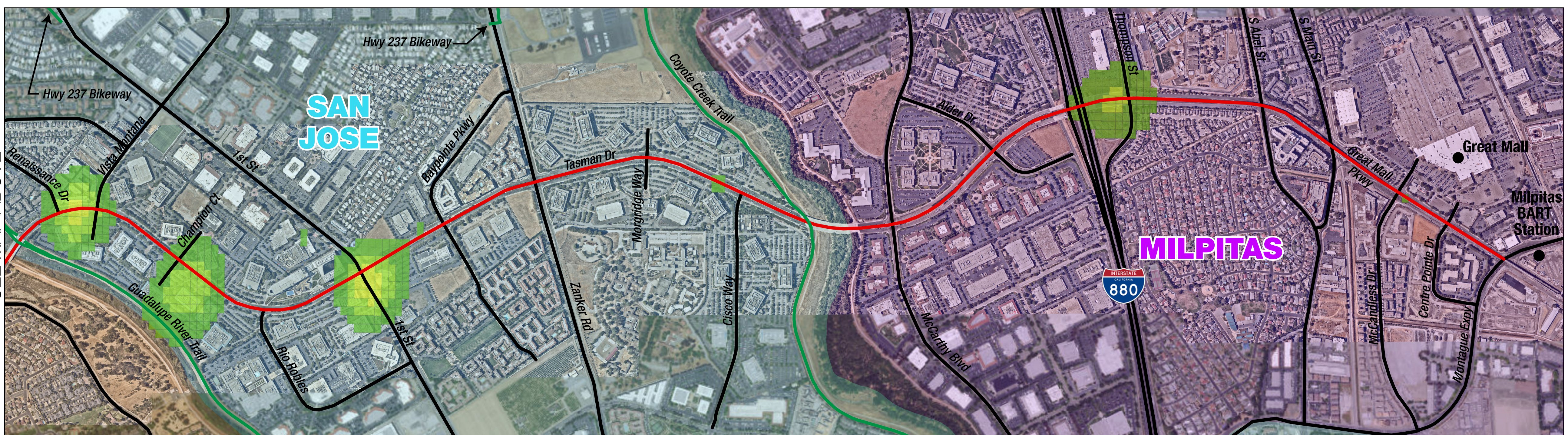
Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

LEGEND

- Low Count of Issue Spots
- Medium Count of Issue Spots
- High Count of Issue Spots
- Project Corridor
- Regional Bikeway





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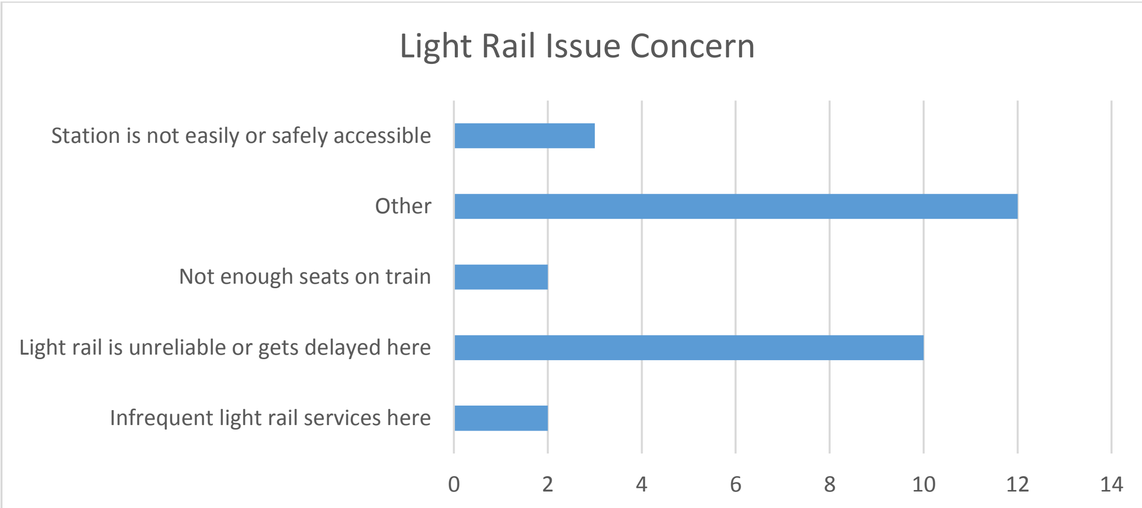
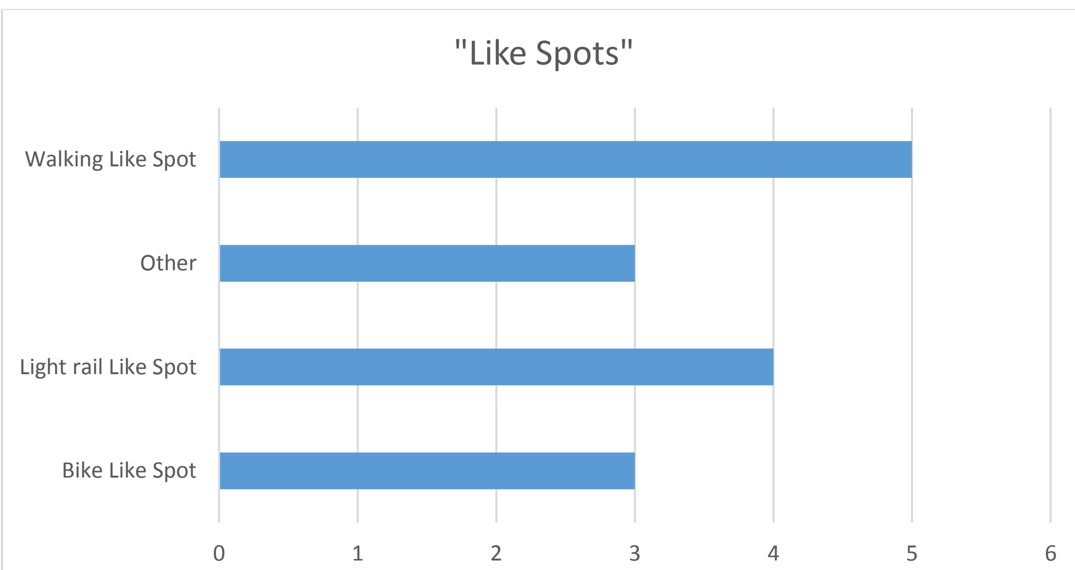
Attachment 5: Bus and LRT Issue Spot Locations from Crowdspot Survey #1

Kimley»Horn

with maintenance of transit facilities. Reponses concerning light rail were made mostly by individuals who “regularly commute along the corridor.”



Additionally, survey takers identified “like spots” and categorized them by modes. Each spot was again given the opportunity to describe the location and its positive characteristics. (**See Attachment 6: Liked Spot Locations from Crowdspot Survey #1)** Bike “like spots” complimented trail areas with good connections (such as the Guadalupe River Trail’s connection to Bay and to Downtown). Light rail “like spots” recognized areas with comfortable and aesthetically pleasing stations for example, the Champion Station. Walking “like spots” noted areas where existing facilities were nice and could potentially be improved upon for greater use.



The comments and survey responses received, as part of the Crowdspot online survey, provide insight into the public perspective of the existing conditions of Tasman. Many of the concerns expressed relate to missing or poor condition of facilities for alternative modes of transportation. Congestion and better coordination (via signal timing and transit schedules) was

Tasman Corridor
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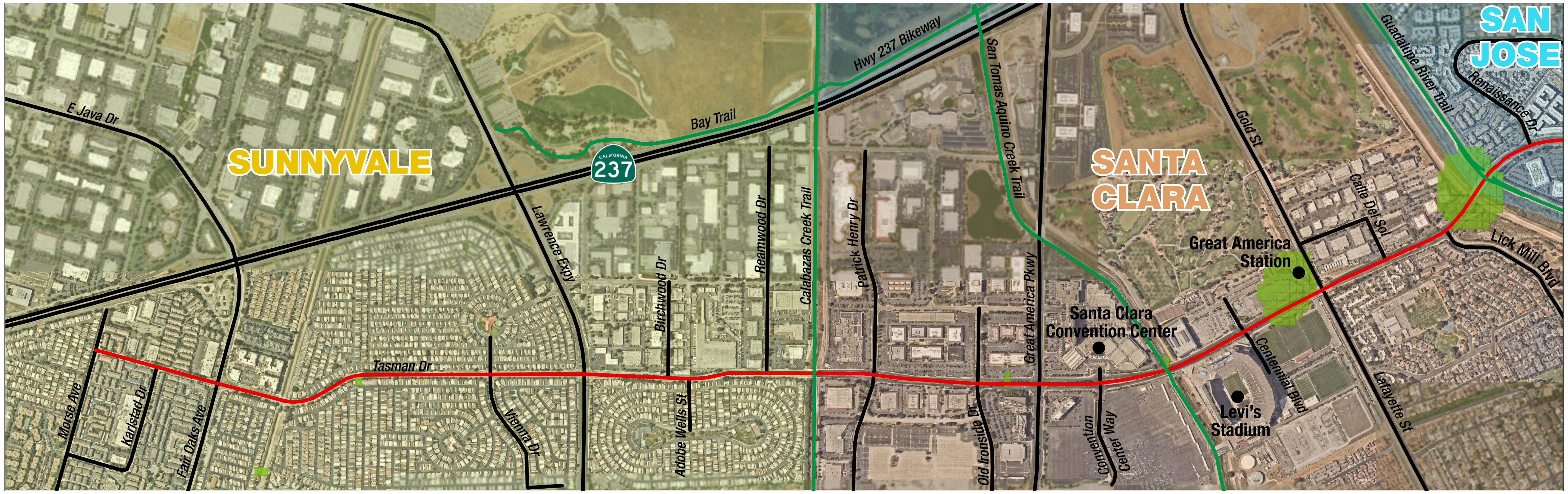
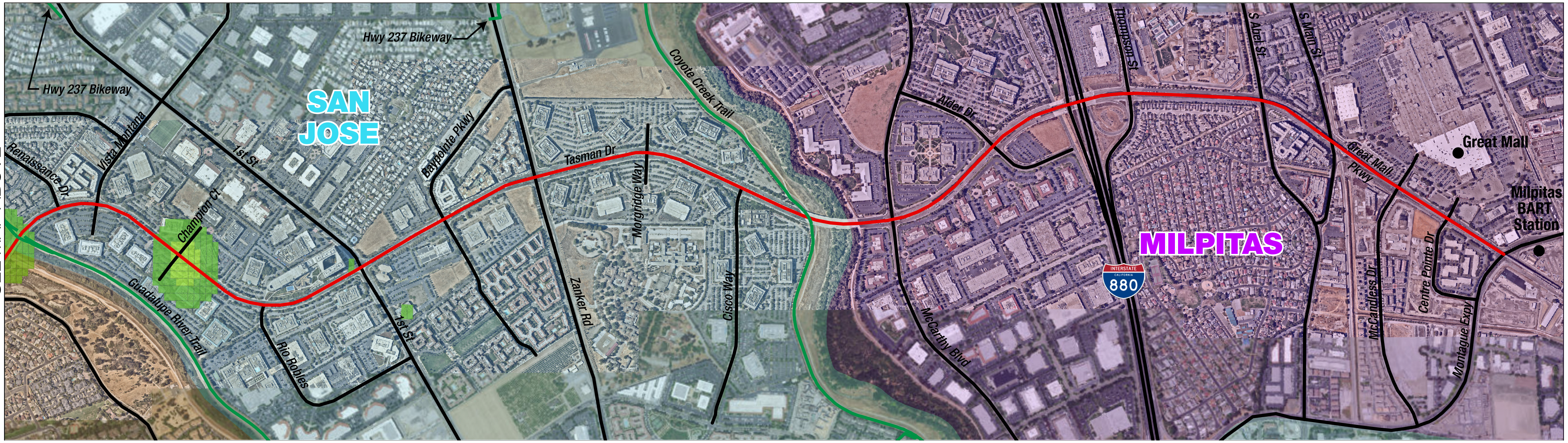
Santa Clara Valley Transportation Authority

LEGEND

- Low Count of Issue Spots
- Medium Count of Issue Spots
- High Count of Issue Spots
- Project Corridor
- Regional Bikeway





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Attachment 6: Liked Spot Locations from Crowdspot Survey #1

Kimley»Horn

also a reoccurring theme in the public feedback. The general thought expressed through the online survey was to enhance the safety and relationships between all modes of transportation.

The results from this first phase of evaluation will be used in the next phase of the project to help understand who are the people using Tasman, and how are they traveling to, from, and along the corridor. This information will influence the set of tools that can potentially be used to develop design improvements in certain segments and along the length of the corridor.

ATTACHMENT 7

(Regularly is defined as once or twice a week.)

How would you describe yourself in relation to the Tasman Drive/Great Mall Parkway corridor? (Choose as many as apply)

- I live along or near the corridor
- I work along or near the corridor
- I regularly commute along the corridor
- I regularly shop, eat, or visit entertainment destinations along the corridor
- I regularly travel across or along the corridor for recreational purposes
- I do not use the corridor regularly, but am interested in seeing it improved

How do you typically travel along the Tasman Drive/Great Mall Parkway corridor? (Choose as many as apply on your regular commute)

- Walk
- Bike
- Drive alone
- Carpool/vanpool/rideshare
- Bus
- Light Rail

Please rank the top three corridor needs in the order you feel are the most important or are most needed, with #1 being the most important: (Respondents are presented with three drop-down lists next to 'most important', '2nd most important', and '3rd most important'. The following options are shown in those drop-down lists)

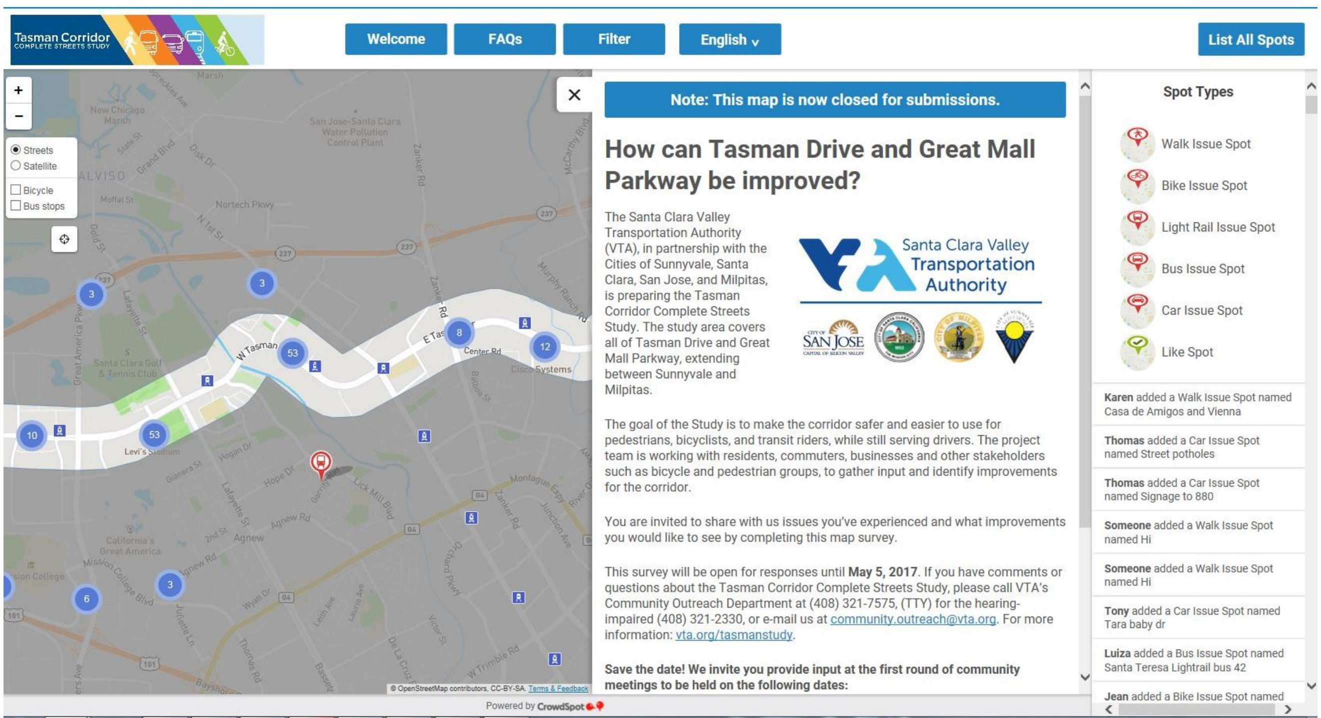
- Safer or more comfortable sidewalks and complete missing sidewalks
- Safer or more comfortable bike lanes and complete missing bike lanes
- Add bicycle detection at intersections
- Safer or shorter crossings of the roadway at intersections for pedestrians
- More signal time to cross the street for pedestrians
- Faster or more frequent light rail service
- Faster or more frequent bus service
- Better access to light rail stations
- Better access to bus stops
- Better amenities at light rail stations (e.g., signs, benches, shelters)
- Better amenities at bus stops (e.g., signs, benches, shelters)
- Reduce vehicle congestion
- Improvements for people with disabilities
- Wayfinding signage to major destinations
- Better landscaping
- Better lighting
- Other (please specify)

When the Milpitas BART Station opens, do you expect to use it? If so, how will you get to and from the station?

- By walking
- By bicycle
- Driving alone and parking at the station
- Getting dropped off/picked up by someone else
- Carpool/vanpool/rideshare
- Bus
- Light Rail
- Other
- I do not plan on using the new BART station when it opens

Would you like to stay informed about this project? (Choose yes/no; if yes, survey prompts for your e-mail address).

Below is an example of the online portal used for the Crowdspot Survey.



TASMAN CORRIDOR COMPLETE STREETS STUDY
ROUND 2 PROJECT OUTREACH SUMMARY

Summary of May 2018 Community Outreach Meeting

May 23rd, 2018

The Santa Clara Valley Transportation Authority (VTA) hosted a corridor-wide community outreach meeting on May 23rd, 2018 from 6:00-7:30 p.m. to discuss and present options to improve mobility along the Tasman Corridor. The meeting was held at the Lakewood Elementary School (750 Lakechime Drive) in Sunnyvale. The Study limits are from the Great Mall area of Milpitas to the Fair Oaks Avenue area of Sunnyvale. The Tasman Corridor Complete Streets Study has three objectives:

- to identify a list of projects which enhance the safety, comfort, and reliability of sustainable transportation modes, while still accommodating drivers;
- to be community supported; and
- to be implementable.

A dozen community members attended the meeting: five community members from Sunnyvale, four from San Jose, one from the City of Santa Clara, and one from the City of Palo Alto. An additional attendee arrived after the poll was conducted.

Three attendees indicated they had attended the first round of community meetings held in April of 2017. When asked how the attendees heard about the meeting, the top responses were as follows:

- Mailed Notices
- NextDoor
- E-blast lists from VTA's GovDelivery system
- HOA e-blasts
- Word of Mouth

Sunnyvale Vice Mayor Larry Klein attended the meeting, supported by city staff, Lillian Tsang, Transportation Engineer/Planner. Additional City staff in attendance included Ramses Madou, Transportation Planning Manager from City of San Jose Department of Transportation, and Pratyush Bhatia represented the City of Santa Clara Department of Public Works.

VTA Project Manager John Sighamony began the presentation, supported by David Lovato, VTA's Outreach Lead. Adam Dankberg, Kimley-Horn Project Manager, was supported by fellow Kimley-Horn employees Robert Paderna and Chelsey Cooper. Eileen Goodwin (Apex Strategies) acted as Meeting Facilitator.

This meeting acted as the second round of community outreach with members of the public. The purpose of the meeting was to provide contextual information about the Study, briefly review existing conditions along the corridor, explain proposed project concepts, and to answer questions and gather feedback on those concepts.

Meeting Summary:

The formal meeting and presentation started slightly past 6:00 p.m. due to a last-minute meeting location relocation from the original Lakewood Park Building to the adjacent Lakewood Elementary School. After a brief introduction by the facilitator, VTA's Project Manager thanked the attendees for coming and explained the purpose and objectives of the Study. The Kimley-Horn Project Manager then used a PowerPoint presentation to review existing conditions and explain the proposed project improvements along the Tasman Corridor. The Project Manager discussed the schedule of the Study as well as opportunities for additional input from the public, which include an on-line survey. (This survey was available to meeting attendees on tablets provided at the meeting).

A Q&A session was held at the conclusion of the presentation. The conversations and opinions offered during this time are documented below in the Table 1 – Q&A Feedback in the order they were provided.

At the conclusion of the Q&A session, attendees were asked to visit four stations to provide input regarding suggested improvements on maps (divided by City boundaries) along the Tasman Corridor.

Comment/Question	Response
When would changes be made?	This study is currently in the planning phase; Funding has not been identified to do these suggested improvements. These types of improvements would be eligible for the Measure B sales tax funds. It is likely that these projects are about 3-5 years away from construction at the earliest.
One of my big issues is at the intersection of Fair Oaks and Tasman Drive due to Google/Facebook employees. It is very congested. Is there interface with the City on this area?	Comment noted. Yes, VTA is working specifically with the City to make sure improvements are looked at holistically.
Between Fair Oaks and Lawrence on Tasman, who is that new sidewalk intended to serve?	There is no way to walk along Tasman at this location today. Residents along the corridor could choose to use this connection to walk to shops, walk for exercise, etc. The need for a sidewalk in this area was identified by many residents in previous outreach activities for this project. This study and planning effort is not just about accessing the LRT.
How many people live within a ¼ mile of the corridor? VTA needs to work on outreach. We didn't get a mailer and we should have. The survey response of 236 seems small.	Comments noted. Please make sure to sign in and meet with the VTA Outreach representative to discuss other ideas for reaching out to your neighbors.
I see shuttles waiting at Fair Oaks and Tasman, and Java and Tasman, that should be considered.	Comment noted.
San Francisco has marked areas for shuttles. That should be a model here (Cisco representative).	Comment noted.
What are the options to separate the bike lane? How would that work?	There could be flexible posts, islands, planters, or small dome-like separations. There are installation and maintenance cost differences between these types of barriers that the Cities will provide guidance on. There are between 10 and 15 different types of barriers under consideration.
On Tasman between Java and Lawrence, use of the train should be	Comment noted.

Comment/Question	Response
free to get people from one end to the other instead of putting in the sidewalk.	
The alternative bike route that is proposed has me worried that if it is not convenient no one will use it. Can't lanes be made 10' wide instead of 11' or 12', to fit in a bike lane?	There is not enough width to safely add a lane on the portion of Tasman between Fair Oaks and Lawrence Expy. There are no shoulders, curves in the road, and drainage gutter pans that make the provision of a bike lane here unsafe.
Are you just looking to enhance existing infrastructure?	For the most part yes. Intersection treatments are a key set of options under consideration.
When does this set of improvements go to the VTA board?	The project team hopes to bring the study recommendations to the VTA Board before the end of 2018.

Feedback Received at Stations

During the break-out session, attendees used the time to ask direct questions to members of the project team. A limited number of comments/questions were added to the station maps. These include:

Sunnyvale

- At infospot #1 (intersection of Tasman and Fair Oaks Ave)
    - 2 supports
    - Comment: "Taking away left-turn onto Fair Oaks could be problematic; need space to make this turn"
- General comment: "Be aware of future growth in Sunnyvale due to Google and other entities"
- At infospot #2 (Fair Oaks and Vienna Station)
    - 2 supports
    - Comment: "Lose a car lane for space so people can walk or ride)
- At infospot #4 (intersection of Tasman and Lawrence Expy)
    - 1 support
    - Comment: "Good to have a sidewalk here"
- At infospot #5 (intersection of Tasman and Lawrence Expy)
    - 1 support
- At infospot #6 (along Tasman Drive between Lawrence Expy and Reamwood Station)
    - 1 support
- At infospot #7 (intersection of Tasman and Birchwood Dr and Reamwood Dr)
    - 2 supports
- At infospot #8 (along Tasman, west of Calabazas Creek Trail)
    - 1 support
- At infospot #10 (Reamwood Station)
    - 2 supports

- At infospot #11 (Calabazas Creek Trail)
    - 1 support

Santa Clara

- At infospot #16 (along Tasman, in front of Levi's Stadium)
    - 2 supports
- At infospot #20 (along Tasman, leading up to Lick Mill Station)
    - 1 support
- At infospot #21 (Lick Mill Station)
    - 1 support

San Jose

- At infospot #23 (Guadalupe River Trail connection)
    - 1 support
- At infospot #24 (Guadalupe River Trail connection)
    - 1 support
- At infospot #25 (along Tasman between Renaissance and Vista Montana)
    - 3 supports
- At infospot #26 (intersection of Tasman and Champion Ct)
    - 2 supports
    - "Needs either signal phase – no right turn, or setback of 2-way cycle track from right-turn lane to avoid right hook accidents."
- At infospot #27 (intersection of Tasman and Vista Montana)
    - 1 support
- At infospot #28 (along Tasman between Vista Montana and Baypointe Pkwy)
    - 1 support
- At infospot #31 (intersection of Tasman and N 1st St)
    - 3 supports
    - Comment: "Cisco Daycare/Healthcare becomes an island"
    - Comment: "Need VTA sponsored bike share facilities installed"
    - Comment: "Reduction of lanes does not serve Cisco employees; will create more traffic than our campus"
- At infospot #33 (intersection of Tasman and Zanker Rd)
    - Comment: "Trail crossing at intersection should be green as long as the green for cars on Tasman)
- At infospot #35 (bridge crossing Coyote Creek Trail)
    - 1 support
- At infospot #37 (trail connection of Coyote Creek Trail)
    - 1 support

Milpitas

- At infospot #39 (intersection of Tasman and McCarthy Blvd)
    - 2 supports
- At infospot #41 (along Tasman between McCarthy Blvd and Alder Dr)
    - 2 supports

- At infospot #42 (I-880/Milpitas Station)
  - 1 support
- At infospot #43 (intersection of Tasman and Alder Dr)
  - 1 support
- At infospot #44 (along Tasman from Alder Dr to I-880)
  - 2 supports
- At infospot #45 (along Tasman from Alder Dr to I-880)
  - 1 support
- At infospot #46 (Tasman bridge across I-880)
  - 2 supports
- At infospot #47 (intersection of Great Mall Pkwy and Thompson St)
  - 2 supports
- At infospot #48 (along Great Mall Pkwy between Thompson St and Abel St)
  - 4 supports
- At infospot #49 (intersection of Tasman and Abel St)
  - 2 supports
- At infospot #50 (intersection of Tasman and Main St)
  - 1 support
- At infospot #51 (along Great Mall Pkwy between Mustang Dr and Centre Pointe Dr)
  - 1 support
- At infospot #52 (intersection of Great Mall Pkwy and Montague Expy)
  - 2 supports

Outreach Efforts

The following provides a summary of the outreach efforts through different forms of meetings and outreach avenues during the second round of outreach.

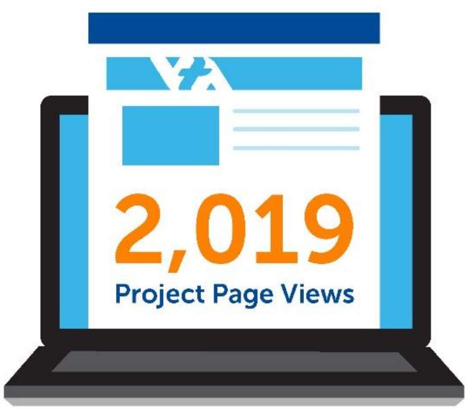
Consolidated Summary	# of Engagements
Blog Post views	1,177
Community Meeting attendees	184
Facebook Post views	61,340
Twitter Post views	72,160
Nextdoor Post views	98,675
Gov Delivery views	2,024
Mass Mailings	8,355
Partner Post views (Facebook)	31,766
Project Page views	2,019
Online Survey responses	8,154


61,340
Facebook Post Views


98,675
Nextdoor Post Views


31,766
Partner Post views


8,355
Mass Mailings


2,019
Project Page Views


72,160
Twitter Post Views

Online Survey Results Summary

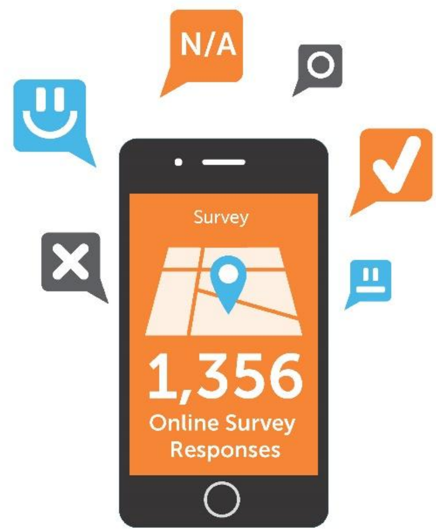
Summary of Responses

The Online Survey for the second round of public outreach took a different form than the first round. For this round, the online survey tool, Crowdspot, displayed the proposed improvements at locations along the corridors. Survey respondents were allowed to "Support" the improvements, as well as provide direct feedback in the form of comments on each "infospot" (the location of each improvement). These comments were available for all to see, and allowed other participants to add on comments if they agreed/disagreed. Respondents could provide their name or reply anonymously. In total, there were 8,154 unique visitors to the online survey with 334 comments and 1,132 "supports" for proposed improvements.

The following briefly summarizes the responses for each info spot by jurisdiction.

Sunnyvale

Fair Oaks/Tasman Intersection (22 comments, 14 supports):



Fair Oaks Station (11 comments, 17 supports)

- Worried about the westbound U-turn movement
- Diagonal crosswalk to LRT from SW corner?
- Stronger transit signal priority
- Provide protected intersection at SW corner (John Brazil)
- Provide LPI
- Worried about loss of second westbound left-turn
- Pedestrian bridge!!!
- Quite a few comments for road diet/protected bike lanes
- Need two left-turn lanes from Fair Oaks to Tasman
- Buses should have signal priority also
- Are we adding fences to prevent Jay-walking?

New sidewalk along south side (28 comments, 21 supports):

- Worried about removal of trees
- Would rather see road diet and protected bike lane
- Lower speed limits
- Do we have a traffic study to justify no road diet?
- Absolutely need a sidewalk
- Generally all in favor

Vienna Station (14 comments, 22 supports)

- "Really starting to look like the world class transit systems I experienced in Europe"
- Opposed to removing trees, remove traffic lane instead and provide bike lanes
- Add bike lanes by buying the units along Tasman

- Worries about traffic speeds, cycling around blind curves

New sidewalk north side east of Lawrence (12 comments, 23 supports)

- 5' is narrow
- Excellent decision, needed
- Add bicycle accommodations
- Where are the environmental studies? (noise, light, air pollutions)

Proposed Median Sidewalk (6 comments, 13 supports)

- Excellent idea
- People already walk on the tracks or in the street

Reamwood Station (3 comments, 12 supports)

- Consider adding a station at Lawrence/Tasman and closing Vienna and Reamwood

Near and Long-Term Alternatives (east of Adobe Wells) (5 comments, 9 supports)

- How far away is "long-term"?
- Losing bike lane feels like a step back
- Shared use is a good interim solution

High visibility crosswalks (5 comments, 30 supports)

Locations: Vienna, Birchwood, Adobe Wells, Reamwood

- Yes!

Pedestrian Adaptive Signal (9 comments, 19 supports)

Location: Lawrence @ Tasman

- Like having the ability to have more walk time

Tighten curb radii (7 comments, 45 supports)

Locations: Lawrence, Birchwood

- Yes!
- Add bike boxes too?

Trail Wayfinding at Calabazas Creek Trail (3 comments, 10 supports)

- Wayfinding will help
- Add map too

Trail Undercrossing at Calabazas Creek Trail (7 comments, 14 supports)

- Needed

- Long overdue
- Sometimes gets too wet in the water for walking under there

Santa Clara

Old Ironside Station (2 comments, 14 supports)

- Important to make pedestrian crossing more visible
- There is proposed new development; VTA should work to make sure the new traffic doesn't negatively impact LRT service

Great America Station (4 comments, 13 supports)

- Support these improvements
- Please consider synchronizing the signals from Great America Parkway till Lick Mill
- Can you have more trains passing by till 12:30am?

Lick Mill Station (4 comments, 23 supports)

- Would prefer to have a dedicated signal phase for pedestrians and bikes crossing at this signal, but a Leading Pedestrian Interval is better than nothing
- All station improvements are excellent!
- Would love to see EB left turn lane removed at Lick Mill and sidewalk south of the station extended all the way to Lick Mill
- Please improve access to the Southbound platform from the Lick Mill end of the station
- Please allow for earlier announcements of closing the Lick Mill station after Stadium events

CityPlace Improvements

Location: Tasman and Marie P. DeBartolo Way (5 comments, 14 supports)

- Thumbs up
- Awesome idea
- Will there be any additional bus/transit stations? A crowded entry way onto City Place will clog up Tasman?
- From Great America Parkway to Lick Mill, signals are not synchronized between 4:30 and 6:30 pm
- The roads are new and smooth but there are "potholes" in the center to expose the drain openings. This is ok with cars but for motorcyclists, it is very dangerous. Please consider fixing this issue.

Location: Tasman and Lafayette Street (4 comments, 23 supports)

- Great Idea!
- I like the landscape – please use drought tolerant plants
- Move the LRT station on top of the Amtrak Station or plan for this in the future

Location: Tasman and Lick Mill Drive (3 comments, 18 supports)

- Left-turning cars on Lick Mill do not yield to pedestrians

- Blinking pedestrian lights on Lick Mill should be converted to stop and go lights; many drivers to not see the blinking lights
- Please incorporate specific bike facilities

<u>Pedestrian Connection (3 comments, 25 supports)</u>

Location: Tasman and Lafayette

- Yes Please!! We need faster connection between Lick Mill and Amtrak Station!
- This is a good idea. Would there be two bike lanes for west and eastbound traffic?
- What happened to the plan to relocate the Lick Mill station directly above the Amtrak station on the overpass?

<u>Widen Sidewalk (2 comments, 12 supports)</u>

Location: Tasman and Convention Center Way

- Great Idea!

<u>High Visibility Crosswalk (2 comments, 10 supports)</u>

Location: Tasman and Convention Center Way

- "Thumbs up"
- Please do these in paint and not thermoplastic because they get very slick on rainy days

<u>Tighter Curb Radii (0 comments, 20 likes)</u>

Location: Tasman and north side of intersection with Old Ironsides Drive

<u>Trail Wayfinding</u>

Location: North trail connection at San Tomas Aquino Creek Trail (2 comments, 12 supports)

- "Thumbs up"
- Tell Santa Clara to stop allowing the Levi Stadium owners to close the trail

Location: South trail connection at San Tomas Aquino Creek Trail (4 comments, 14 supports)

- "Thumbs up"
- Prioritize a better connection instead of the current detour during stadium events
- The Stadium should have to pay for a remediation that would allow the trail to be used regardless of activity at the stadium (moving it or building walkways over the trail from the parking lot to the stadium)
- Agree with above and please improve access to the trail for bikes.

<u>Vertical Separation</u>

Location: Along Tasman, in front of Levi's Stadium (5 comments, 18 supports)

- "Thumbs up"
- Love it! This should be the situation across the entire corridor
- This is a good idea
- Agreed, should provide as much visibility and safety for bicyclists as possible
- Best thing is to get rid of the Stadium

Location: Along Tasman between Lafayette Street and Calle del Sol (3 comments, 27 supports)

- All great things proposed here
- Vertical separation may further deteriorate the slow-moving traffic; best to improve right lane traffic and make road as straight as possible
- Love it! Extremely valuable for pedestrian and cyclist safety

Location: Along Tasman from Calle del Sol to Lick Mill Boulevard (3 comments, 22 supports)

- Excellent!
- Vertical separation may further deteriorate the slow-moving traffic; best to improve right lane traffic and make road as straight as possible
- Please add raise lane marker instead of vertical dividers

San Jose

Baypointe Station (2 comments, 16 Supports)

- Description says nothing about reconfiguring LRT station. Is station going to be removed and replaced with 2 track station?
- Maybe this is covered elsewhere, but why is the 1st street station being expanded in favor of this much nicer (and shadier) station?

Cisco Way Station (1 comment, 13 supports)

- If the plan is to have distinctive crosswalks at each light rail station there could consideration in having artistic, themed ones like in Downtown SJ - Cisco Way could be tech themed, River Oaks river themed, Metro/Airport aerial themed, etc.

Champion Station Enhancements (2 comments, 12 supports)

- "Kewl!!"
- A 2-way bike path is appealing if there's a significant divider with the car lanes; I'd rather have a bike lane moving in the same direction as the rest of the traffic.

Tasman and N 1st Enhancements (21 comments, 14 supports)

- This is a busy intersection, removing left-turns would be a major disruption; not the solution needed here; please do not remove
- A major problem is cars wanting to turn right on red get impatient waiting behind cyclists
- The light sequence needs to be reviewed
- The station should be underground or elevated

- I like the improvements, it will take a while for everyone to adjust
- Can signalization be improved for pedestrians waiting to cross?
- This looks like an excellent intersection design
- Will these require the removal of mature trees?
- How can we improve safety for peds/bikes from right-turning vehicles?
- Support removing automobile left turn lanes if it improves light rail speeds and reliability

Tasman and Zanker Intersection Improvements (9 comments, 12 supports)

- Remove a lane in each direction will make things unbearable; do not reduce eastbound travel lanes
- I like the proposal to remove the porkchop islands and make the curb into a corner
- Very bad idea to reduce the number of lanes
- Can we improve signalization for bikes?
- Great ideas to eliminate pork chop island, tighter turn radii, and elimination of the traffic lanes
- Traffic lanes on Zanker need to be remarked so cars going east/west can separate early
- I like the general proposal, not sure about eliminating the eastbound lane
- I agree we should maintain the number of car lanes

Bridge Cross-Section Changes (4 comments, 8 supports)

- “Thumbs up”
- These improvements are great ideas
- Consider making the bridge south side 3 lanes for cars

Bike Tie-in to Trail (7 comments, 18 supports)

- The right turn mixing zone is dangerous
- Put bikes on the sidewalks
- I like the two-way bike path and way-finding
- Lower speed limits here
- Expand the elevated side walk and put bike trail there
- Need bike lanes (1-way)

Pedestrian Adaptive Signal

Location: Tasman Drive and Zanker Road (1 comment, 11 supports)

- Sounds like a good idea

Location: Tasman Drive and North 1st Street (1 comment, 12 supports)

- Yes!

Location: Tasman Drive and Cisco Way (1 comment, 13 supports)

- I like the sensor, so people don't have to press a button

Tighter Curb Radii (3 comments, 10 supports)

- Making driving more difficult does not make it safer
- People parking on the side of the road with the apartment and it becomes very unsafe
- Vista Montana is the channel to Highway 237, slowing this intersection means more back-ups on Tasman Drive; please disallow parking towards the Cisco side of Vista Montana, add two left turn lanes on Tasman turning onto Vista Montana

Trail Wayfinding

Location: Guadalupe River Trail connection (0 comments, 16 supports)

Location: Coyote Creek Trail north side (2 comments, 8 supports)

- "Thumbs up"
- Yes, add more trail signage!

Location: Coyote Creek Trail south side (3 comments, 8 supports)

- "Thumbs up"
- Yes Please!
- Make the Coyote Creek Trail access on the East side a bit more welcoming

Two-Stage Turn Box Bike

Location: Tasman Drive and Renaissance Drive (4 comments, 16 supports)

- This is just confusing for drivers
- Add a bus stop
- This is a good idea, but could use additional signage to make its purpose clear
- Also needs to be pedestrian crossing at this intersection
- Confused by the recommendation

Location: Tasman Drive and Vista Montana (5 comments, 12 supports)

- Over complex treatments confuse drives; just put a sharrow
- Tasman's main problem is the total absence of a bike lane in parts of it
- This is a good idea, but it could use additional signage to make its purpose clear
- This is a high traffic area; keep it simple and really visible
- Entrance to the parking lot should not be directly through a major traffic light intersection

High Visibility Crosswalks

Location: Tasman Drive and Champion Court (2 comments, 8 supports)

- I like the bike signal
- Need a route for eastbound bikes turning left to Champion Ct. (blocked by raised curb)

Location: Tasman Drive and Rio Robles Drive (0comments, 9 supports)

Location: Tasman Drive and Cisco building 4/5 entrance (1 comment, 11 supports)

- High visibility crosswalks are good. But, do not put in a two-way bike path on South side of street

<u>Widen Sidewalk</u>

Location: East of Guadalupe River Trail (2 comments, 14 supports)

- Yes we need to widen this road; vertical dividers won't help
- Bigger sidewalks and better bike lanes between Vista Montana and Great America

Location: East of Vista Montana (1 comment, 10 supports)

- Why? Put the landscaping between cars and bikes instead of a buffer zone with plots. Add some between pedestrians and bike lanes; have bikes and pedestrians on the same sidewalk level

Location: East of Rio Robles (0 comments, 6 supports)

Location: West of Baypointe Parkway (0 comments, 10 supports)

Location: West of entrance to Cisco Campus (1 comment, 6 supports)

- Widening the sidewalk and shifting it away from the traffic would be a nice improvement

Location: East of entrance to Cisco Campus (0 comments, 7 supports)

<u>Class IV Bikeway</u>

Location: Along Tasman (2 comments, 10 supports)

- Don't force bicyclists to change to sidewalks; if you put a 2way bike lane, do it on the whole length of the road
- Do not put in a 2-way path; it will take away from travel lanes

Location: Along Tasman (1 comment, 8 supports)

- Do not put in a 2-way path; it will take away from travel lanes

Location: Along Tasman (2 comments, 8 supports)

- Do not put in a 2-way path; it will take away from travel lanes
- I agree with the comment on 2-way bike path; I'd rather see 1-way bike lanes one each side

Location: Along Tasman (1 comment, 11 supports)

- Do not put in a 2-way path; it will take away from travel lanes

Location: Along Tasman (2 comments, 9 supports)

- The trees on both side of the street need to be persevered
- Do not put in a 2-way path; it will take away from travel lanes

Location: Along Tasman (2 comments, 7 supports)

- Do not put in a 2-way path; it will take away from travel lanes
- I want to bring attention to the very poor choice of paint that was used on Tasman during construction of the current bike lane. The green paint is fracturing and peeling so badly that it's actually hazardous to ride on and when I travel on Tasman on my road bike I end up just riding in the car lane to avoid all of the incredibly rough bike lane sections.

Location: Along Tasman (1 comment, 8 supports)

- Do not put in a 2-way path; it will take away from travel lanes

Location: Along Tasman (4 comments, 17 supports)

- Put bike lanes on the sidewalk, it is safer and uses less space
- Is the 2-way bike lane to avoid going under the bridge where the homeless live? Can't imagine how this makes sense anywhere else
- This is a fantastic idea
- 1-way bike lanes in each direction are fine
- For whoever suggested bikes should use the sidewalk – that is a bad idea

Location: Along Tasman (4 comments, 9 supports)

- Don't remove travel lanes
- I'm all for bike paths, but traffic is heavy enough that I'm not sure removing a traffic lane is a good idea
- Do not remove travel lanes
- Removing a lane is irresponsible

Milpitas

I-880 Station (1 comment, 13 supports)

- This picture has a sidewalk on Tasmans south side that does not exist but is needed. If you work in any building just south of lightrail station like I do, we have no side walk to use to get to the corner of Tasman and alder to cross legally and safely to the station. I along with others walk the parking lot to get to Tasman and we have a choice use the bike lane dangerously close to flying cars or use the parking lot and traverse the 4-foot hill grassy and slippery in business attire and risk breaking an ankle...I take the 5am lightrail from Santa Teresa station and use it to get to i880 station then walk to work 775 sycamore Drive and reverse in the pm. I challenge you to walk from that station using just sidewalks, crosswalks and parking lots, but not walking on any grass or dirt area or actual street

Tasman and McCarthy Intersection (2 comments, 7 supports)

- This will significantly improve safety!
- Please note the sidewalk on south side of Tasman does not exist but needs too. The north side of Tasman has paved but south side does not

Tasman and Alder Intersection Improvement (2 comments, 8 supports)

- The bicycle improvements sound good to me
- Can we highlight the actual need for south side of Tasman pedestrian walkway or sidewalk; many use the parking lot and climb a grassy hill to get to the station

Barber Connection (1 comment, 9 supports)

- “Thumbs up”

Tasman/Thompson/I-880 NB Ramps Intersection Improvements (11 comments, 8 supports)

- Do not remove dedicated right-turn lane on to the freeway- will cause major backups
- The bollard-buffer treatments next to bike lanes should be raised curbs instead
- This will make this area much safer for pedestrians and cyclists
- East/west traffic would benefit from underpasses or tunnels with express lanes
- There is not much space for a dedicated right-only lane for northbound I-880; backups cause congestion
- I hate it; Please consider putting in separated bike lanes unless the 2-way bike path is separated and then I love it
- This, or something like it, is essential!
- This is great
- Do not put in a 2-way path; it will take away from travel lanes
- Removing the free right turn without installing a right turn lane will cause traffic to backup

Class IV Bikeway (2 comments, 7 supports)

- How about reconfiguring the south side lanes to be consistent from three lanes
- Do not put in a 2-way path; it will take away from travel lanes

Tasman and Abel Intersection Improvements (6 comments, 18 supports)

- No right-turn on red makes sense for Able but not for Great Mall
- Prefer protected intersection design
- Nice to have test rides when improvements are done, so the public is aware of them
- Great call on eliminating the pork chop island and adding the two-stage turn boxes
- Love the idea of the bike lane buffer with vertical separation
- Protected right turn makes sense but at the same time there should be a dedicated lane for right turn only cars

Great Mall Parkway and Main Intersection Improvements (5 comments, 18 supports)

- Need public education on proper driving methods
- Please add bike markings through the intersection
- Work on signal coordination first
- Could use a pedestrian overpass across the south lanes of Great Mall Parkway

Bike and Pedestrian Bridge (5 comments, 1 supports)

- A buffered bike lane would be nice
- Tasman is a rough street to ride on
- Continue elevated sections of light rail toward Mountain View
- This is essential!
- Physical separation between bicyclists and cars is really needed here

New Cross Section (2 comments, 9 supports)

Location: Tasman between Alder Drive and I-880

- Every single day, there is a charter bus which drop off/pick ups passengers from the Tasman/Alder corner near the park n ride lot. The bus drives along the right only lane, cuts across the bicycle lane and forces its way into the travel lane. It is miracle that no bicyclist or motorist has lost their lives. Any change to improve the bicycle lane is welcome.
- The North side of Tasman would have 3 bicycle lanes, 1 protected one-way bike lane and a shared use 2-way path? I guess if there are a lot of pedestrians, it's nice to have the optional bikes only lane. But I'm not sure why have a mixed use path AND a bike lane.

New Cross Section (3 comments, 16 supports)

Location: Tasman Drive between I-880 and South Abel Street

- Buffers and bollards are good but raised curb and shared use path are better
- I like the protected bike lane idea
- I don't support the change only because I don't think it's needed; need more cops here

Cross Section Improvements (1 comment, 9 supports)

Location: Tasman Drive, east of McCarthy Boulevard

- Can we highlight the actual need for south side of Tasman pedestrian walkway or sidewalk? If you work in any building just south of lightrail station like I do, we have no side walk to use to get to the order of Tasman and alder to cross legally and safely to the station. I along with others walk the parking lot to get to Tasman and we have a choice use the bike lane dangerously close to flying cars or use the parking lot and traverse the 4-foot hill grassy and slippery in business attire and risk breaking an ankle...

Sidewalk and Crosswalk Improvements (5 comments, 15 supports)

Location: Great Mall Parkway and Montague Expressway

- Would like to what a better diagram of what this would look like
- Should eliminate the pork chop islands entirely
- Needs better and clearly marked and separated bike lanes
- Study should include Montague Expressway in its scope

Class I Bikeway

Location: Great Mall Parkway between Fairlane Drive and Centre Pointe Drive (5 comments, 13 supports)

- Terrible idea and unnecessary
- Perfect place to start building a good east-west bike route
- Very important spot for bike lanes to connect with Bart and greater regional transit
- This, or something like it, is essential!
- Wider sidewalks (12 feet) would be ideal

Location: Great Mall Parkway between South Main Street and Fairlane Drive (3 comments, 14 supports)

- I like buffer bike lanes
- This, or something like it, is essential!
- I like the 2-way off-street bike lane idea

Future Sidewalk

Location: Great Mall Parkway between Centre Point Drive and Montague Expressway (4 comments, 12 supports)

- I can't see it being very safe for pedestrians
- Please retain shade trees
- Yes sidewalks need to be added on the South side of Great Mall between Montague and Centre pointe all the way across to Main
- BART station area should prioritize safe and comfortable walking and biking over traffic flow

Location: Great Mall Parkway between McCandless Drive and Centre Pointe Drive (2 comments, 16 supports)

- "Thumbs up"
- That would be helpful, since Great Mall Parkway is a wide road to cross by foot

Pedestrian Adaptive Signal (1 comment, 10 supports)

Location: Tasman Drive and McCarthy Boulevard

- Can we add a pedestrian walkway or sidewalk on the south side of Tasman between alder and McCarthy to prevent being forged to walk in the bike lane right next to moving traffic, which is dangerous?

Tighter Curb Radii

Location: Great Mall Parkway and McCandless Drive (2 comments, 10 supports)

- Pedestrians arriving from the south side of great mall parkway would benefit from having a pedestrian overpass available also increasing safety. It would relieve congestion on Great Mall Pkwy as less pedestrians would have to use the ground level crossings which likely lead to increased signal delays for vehicle traffic at ground level.
- There might be lot of congestions with the new shops scheduled to open in McCandless Dr. The road joining McCandless Dr to Great Mall Pkwy are to be made more wider. otherwise U turn on McCandless Dr will be difficult.

Location: Great Mall Parkway and Centre Pointe Drive (1 comment, 12 supports)

- I agree. The curbs could be improved for pedestrians. Let's make sure all the crosswalk request buttons work along Tasman. There are intersections where nothing happens when you press the button.

River Oaks Neighborhood Association Meeting

May 2nd, 2018

The project team attended the River Oaks Neighborhood Association meeting held on Wednesday, May 2, 2018, at the Elan Apartments Community Room (345 Village Center Drive, San Jose, CA). Approximately fifty (50) community members attended the meeting.

David Lovato (VTA Community Outreach) assisted with the facilitation of the meetings. VTA Project Manager John Sighamony was supported by Consultant staff (Robert Paderna, Kimley-Horn). John led a powerpoint presentation highlighting the project background, existing conditions, brief summary of community feedback from the first round of community outreach, preliminary project improvements, and project next steps. Following the presentation, John opened it up to questions from the attendees.

Comment/Question	Response
I was not aware of the first round of public outreach meetings.	VTA led outreach efforts leading up to the first round of community outreach meetings held in April 2017. Outreach efforts included flyers which were mailed to residences along the project corridor, and notices were posted on NextDoor. It is not too late to provide input on proposed project improvements as there is an online survey that is live. Refer to the project fact sheet with link to the project website.
Has the project team worked with the various neighborhood associations over the course of the project?	Yes, the project team has met with several neighborhood associations and major employers along the corridor such as Cisco to discuss the goals and objectives of the project and seek input on potential improvement opportunities. Outreach efforts are still ongoing.
The project should account for the planned movie theatre along the Tasman Dr corridor.	Comment noted. The project team has met with each of the partner agencies at the onset of the project and has obtained information on approved new developments in the immediate vicinity of the project corridor.
The project should account for the planned new development adjacent to the Seely Ave/River Oaks Pkwy intersection.	Comment noted. The project team has met with each of the partner agencies at the onset of the project and has obtained information on approved new developments in the immediate vicinity of the project corridor.

Comment/Question	Response
Accessibility to the LRT station at Great Mall Pkwy/Montague Expwy is unsafe.	The project team has developed preliminary improvements aimed to improve pedestrian safety and accessibility to the Great Mall/Main St LRT station.
Litter and dog waste is a big issue along Tasman Dr, and the problem will worsen with increased foot traffic in the future. Suggest consideration of additional trash cans along the corridor.	Comment noted.
Has the project team accounted for planned developments along the corridor including City Place and the Cisco redevelopment?	Yes, the project team has met with each of the partner agencies and has obtained information on approved new developments in the immediate vicinity of the project corridor. These developments have been accounted for in our evaluation of corridor improvements and traffic operations analysis.
There are concerns with increased traffic diversion onto River Oaks Parkway and other nearby local streets as traffic increases.	Comment noted. The traffic operations analysis will account for future traffic growth projections based on VTA's countywide travel demand model.
Suggest looking into pedestrian overcrossings to improve safety.	Pedestrian and bicycle overcrossings are being considered. These improvements, however, are very costly and will likely present funding challenges.
Suggest considering of Uber and Lyft designated pick-up/drop-off zones along the corridor. People currently use bus stops and other non-designated areas along the corridor.	Comment noted. VTA is having preliminary conversations with various local agencies about the feasibility of designated areas for Transportation Network Companies (TNC).
Elimination of left-turns at Tasman Dr/N 1st St will be problematic. There will be opposition these turn restrictions and any modifications which reduce vehicle capacity.	Comment noted. VTA has been working closely with the City of San Jose as part of a separate project to evaluate the left-turn restrictions at Tasman Dr/N 1st St. The traffic operations analysis will account for the diverted traffic along adjacent roadway network due to these turn restrictions.

Sunnyvale Mobile Home Park Alliance (SMHPA) Meeting

June 14th, 2018

The project team attended the Sunnyvale Mobile Home Park Alliance (SMHPA) meeting held on Thursday, June 14, 2018, at the Adobe Wells Community Room (1220 Tasman Drive, Sunnyvale, CA). Approximately thirty (30) community members attended the meeting.

Karen Gauss (VTA Community Outreach) assisted with the facilitation of the meetings. VTA Project Manager John Sighamony was supported by Consultant staff (Adam Dankberg and Robert Paderna, Kimley-Horn). John and Adam led a PowerPoint presentation highlighting the project background, existing conditions, brief summary of community feedback from the first round of community outreach, preliminary project improvements, and project next steps. Following the presentation, John opened it up to questions from the attendees.

Comment/Question	Response
Access to the Grocery Outlet on Tasman Dr/Fair Oaks Ave is challenging for vehicles.	Comment noted. The existing driveways providing access to Grocery Outlet shopping center are proposed to remain as-is.
Has the project team accounted for increased traffic due to planned developments along the corridor such as City Place? Providing sufficient roadway capacity for vehicles should be prioritized.	Yes, the project team has met with each of the partner agencies and has obtained information on approved new developments in the immediate vicinity of the project corridor including City Place. These developments have been accounted for in our evaluation of corridor improvements and traffic operations analysis. The goal of the project is to identify improvements which would allow for a more “complete street”, so proposed improvements are more bicycle and pedestrian focused.
The project should identify ways to divert traffic off of Tasman Dr.	Comment noted. VTA cannot dictate private development which would result in less vehicle traffic demand. The project team has met with the partner agencies and City Place developer to incorporate the improvements associated with that development into the proposed improvements as part of this study.
The LRT crossing blankout sign at a few locations including Vienna and Fair Oaks Ave are sometimes activated even when there is no LRT present.	Comment noted. The local agencies, not VTA, operate and maintain the LRT crossing blankout signs. VTA will notify the local agencies of this issue.

Comment/Question	Response
I am concerned with impacts during construction of these improvements.	The project is currently in the planning phase so design and construction will occur later as funding opportunities arise. At that time, construction activities and impacts would be addressed.
I am concerned with removal of the existing trees along Tasman Dr.	The project team has met with the City's arborist and identified opportunities to replace trees which would be removed due to construction of a new sidewalk on the south side of Tasman Dr. There is very limited right of way within the Sunnyvale segment of Tasman Dr and there is not adequate space on the north side of the street to construct a new sidewalk connection.
There are concerns with removal of a left-turn lane at the westbound approach to Tasman Dr/Fair Oaks Ave intersection. The westbound left-turn movement is very heavy.	The proposed improvements along the westbound approach include reducing a lane (4 lanes to 3 lanes). However, the number the left-turn lanes would remain at two, the same number as existing.
Improving pedestrian access along Tasman Dr would result in more pedestrian traffic. It is better to have pedestrians continue to use the adjacent residential streets in mobile home park.	Comment noted. The goal of the project is to improve safety and mobility for all users of Tasman Dr, including pedestrians.
Noise generated by the UPS site is a major concern.	VTA has referred members of the SMHPA Board to an independent noise consultant.

Appendix B

Conceptual Layout of Recommended Improvements

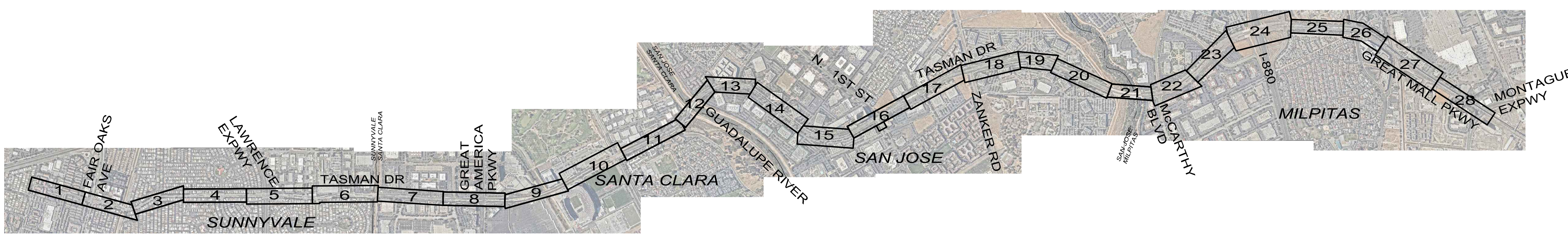
Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

TASMAN CORRIDOR COMPLETE STREETS STUDY

REVISED CONCEPTUAL IMPROVEMENT DESIGN PLANS

APRIL 2020



KEY MAP
NOT TO SCALE

Kimley»Horn

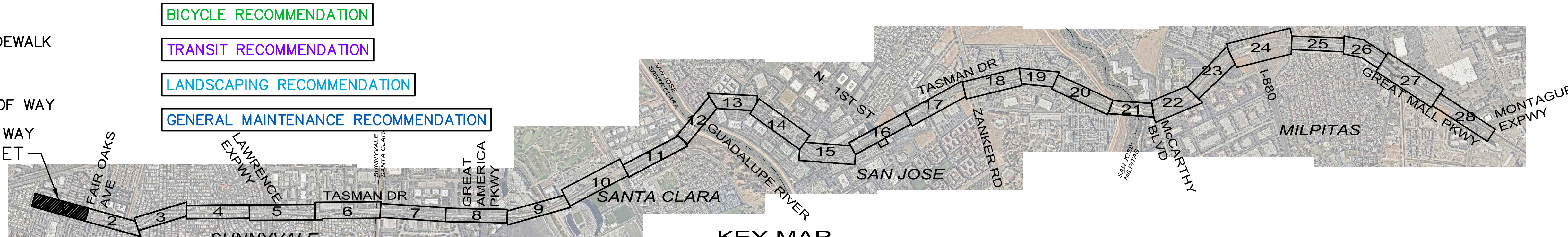
Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

LEGEND

EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

SEE APPENDIX C FOR ALTERNATIVE BIKE ROUTE OPTIONS



KEY MAP
NOT TO SCALE

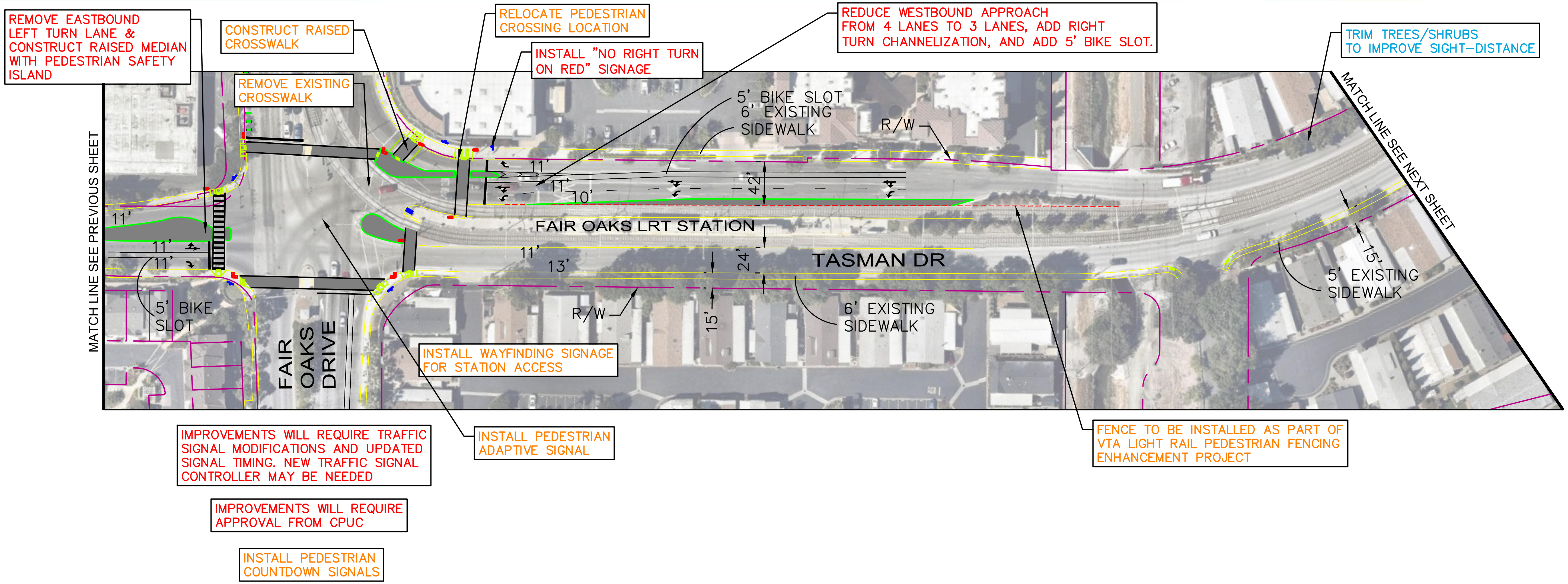
CONCEPT PLANS
April 2020
SHEET 1 OF 28

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

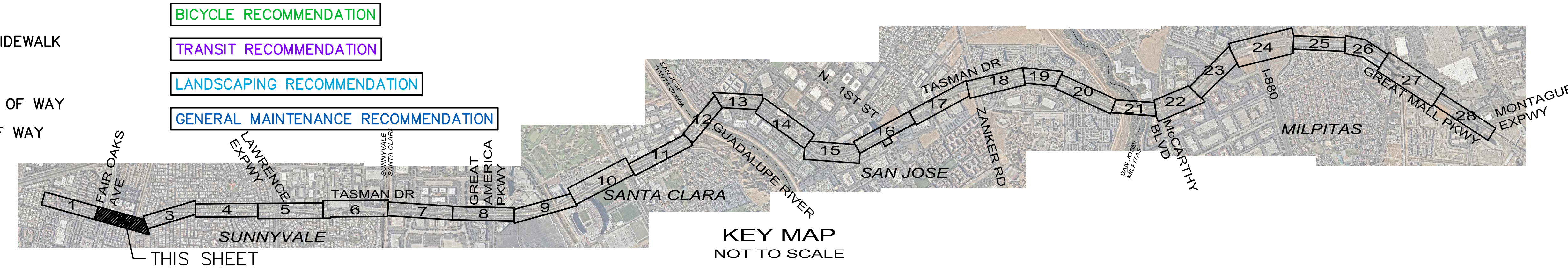
Santa Clara Valley Transportation Authority



LEGEND

EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS
SEE APPENDIX C FOR ALTERNATIVE BIKE ROUTE OPTIONS

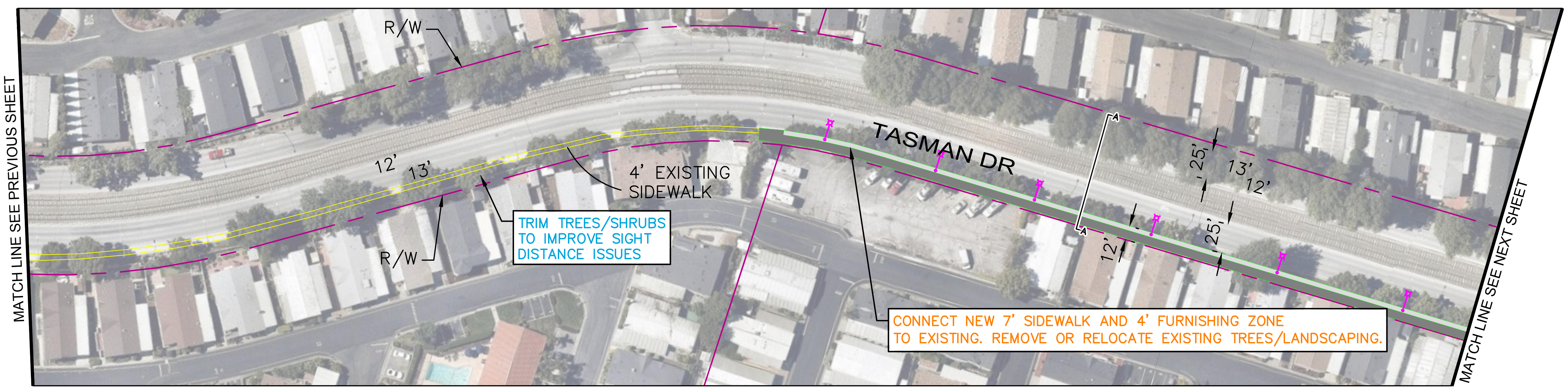


KEY MAP
NOT TO SCALE

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

CONCEPT PLANS
April 2020
SHEET 2 OF 28

Kimley»Horn



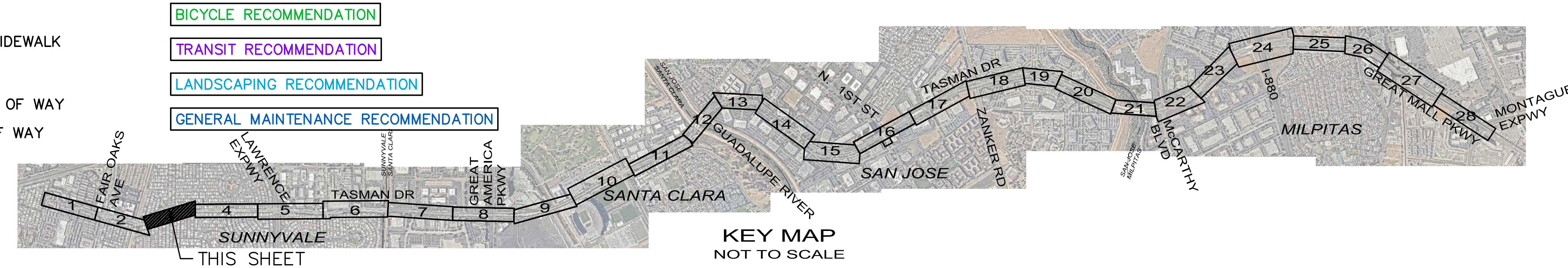
TOTAL TREE REMOVAL (SHEETS 3 &4)
CELTIS SINSENSIS – CHINESE HACKBERRY: 30 EA
PLATANUS ACERIFOLIA – PLANE TREE STREET TREES: 5 EA

LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR–TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

- VEHICLE/ROADWAY RECOMMENDATION
- PEDESTRIAN RECOMMENDATION
- BICYCLE RECOMMENDATION
- TRANSIT RECOMMENDATION
- LANDSCAPING RECOMMENDATION
- GENERAL MAINTENANCE RECOMMENDATION

SEE APPENDIX B FOR TYPICAL CROSS SECTIONS
SEE APPENDIX C FOR ALTERNATIVE BIKE ROUTE OPTIONS



KEY MAP
NOT TO SCALE

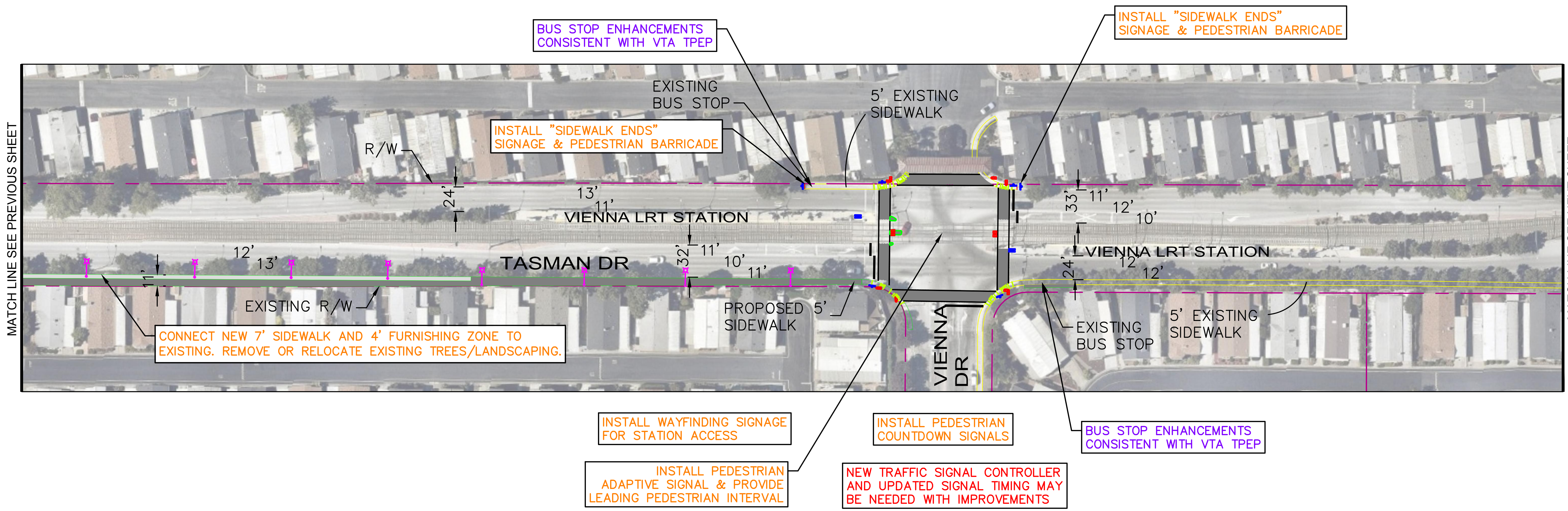
GRAPHIC SCALE
0 25 50 100
(IN FEET)
1 inch = 100 ft.

CONCEPT PLANS
April 2020
SHEET 3 OF 28

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



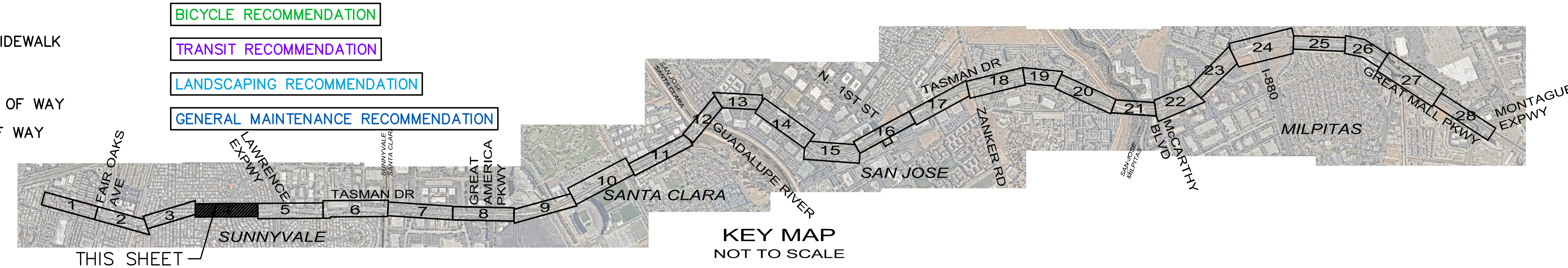
TOTAL TREE REMOVAL (SHEETS 3 &4)
CELTIS SINSENSIS – CHINESE HACKBERRY: 30 EA
PLATANUS ACERIFOLIA – PLANE TREE STREET TREES: 5 EA

LEGEND

EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS
SEE APPENDIX C FOR ALTERNATIVE BIKE ROUTE OPTIONS

CONCEPT PLANS
April 2020
SHEET 4 OF 28



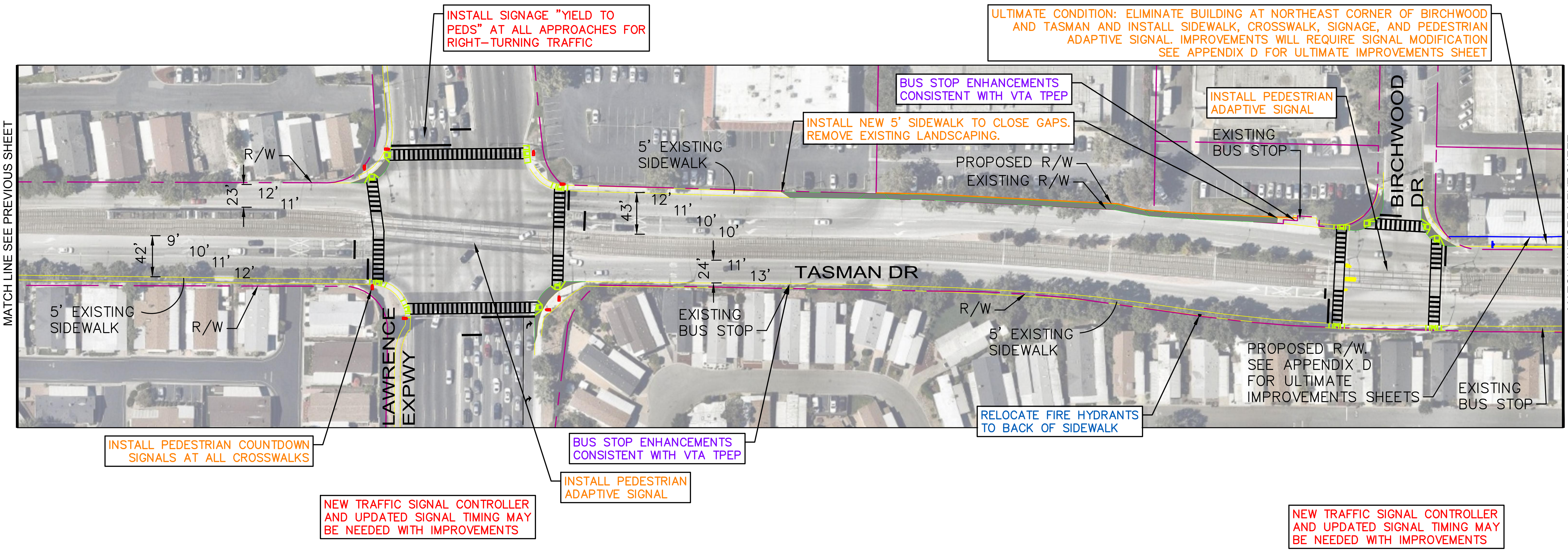
KEY MAP
NOT TO SCALE

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



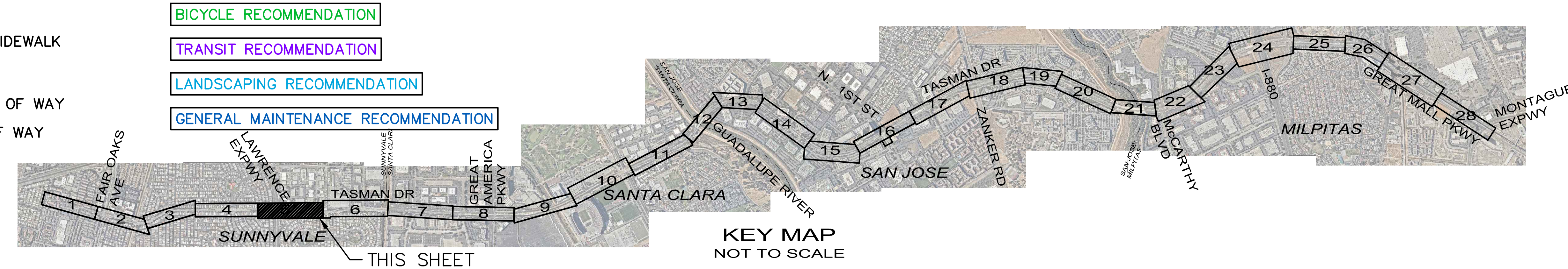
LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

SEE APPENDIX C FOR ALTERNATIVE BIKE ROUTE OPTIONS
SEE APPENDIX D FOR ULTIMATE IMPROVEMENTS SHEETS

CONCEPT PLANS
April 2020
SHEET 5 OF 28



KEY MAP
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GRAPHIC SCALE
(IN FEET)
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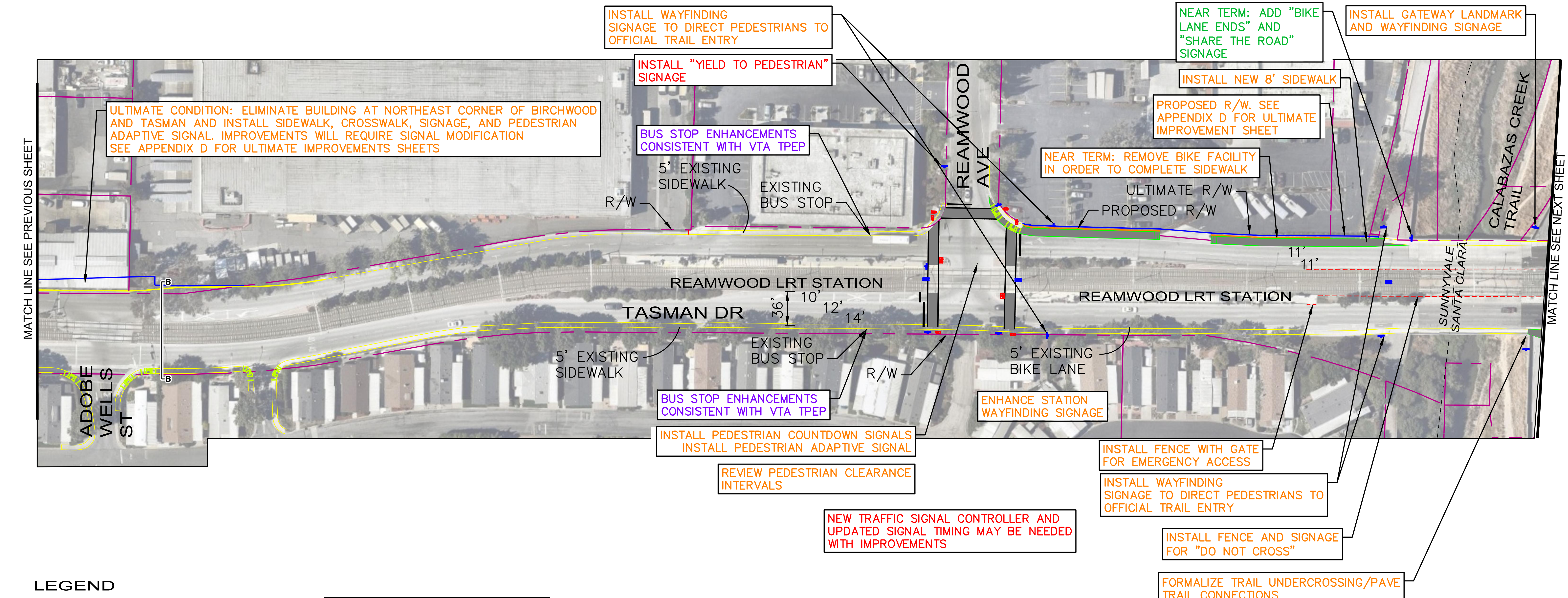
Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



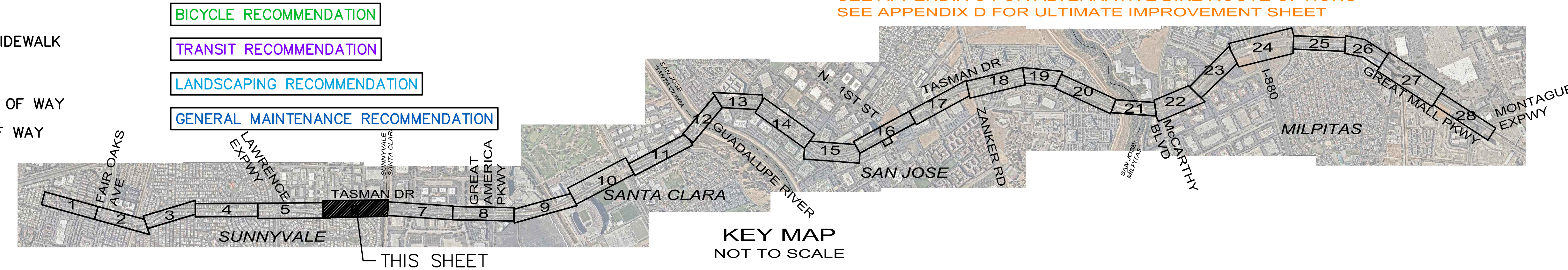
LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS
SEE APPENDIX B FOR TYPICAL CROSS SECTIONS
SEE APPENDIX C FOR ALTERNATIVE BIKE ROUTE OPTIONS
SEE APPENDIX D FOR ULTIMATE IMPROVEMENT SHEET

CONCEPT PLANS
April 2020
SHEET 6 OF 28



KEY MAP
NOT TO SCALE

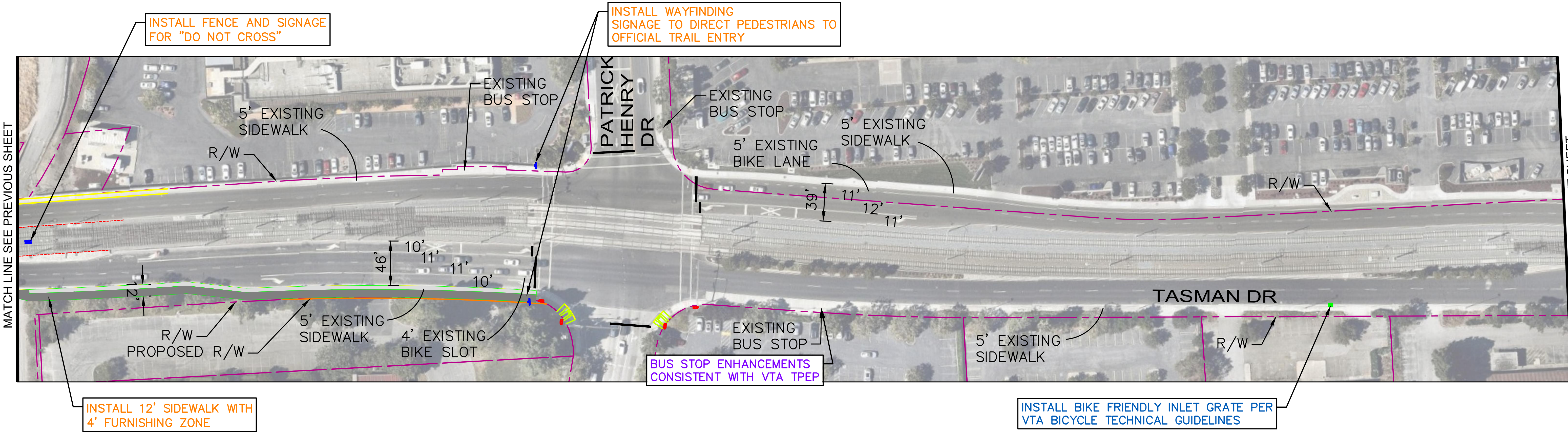
GRAPHIC SCALE
0 25 50 100
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY · Sunnyvale

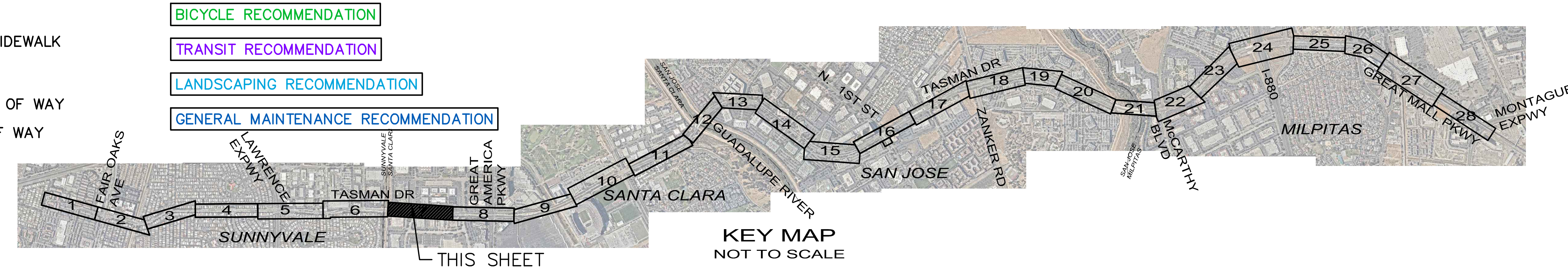


LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

CONCEPT PLANS
April 2020
SHEET 7 OF 28



KEY MAP
NOT TO SCALE

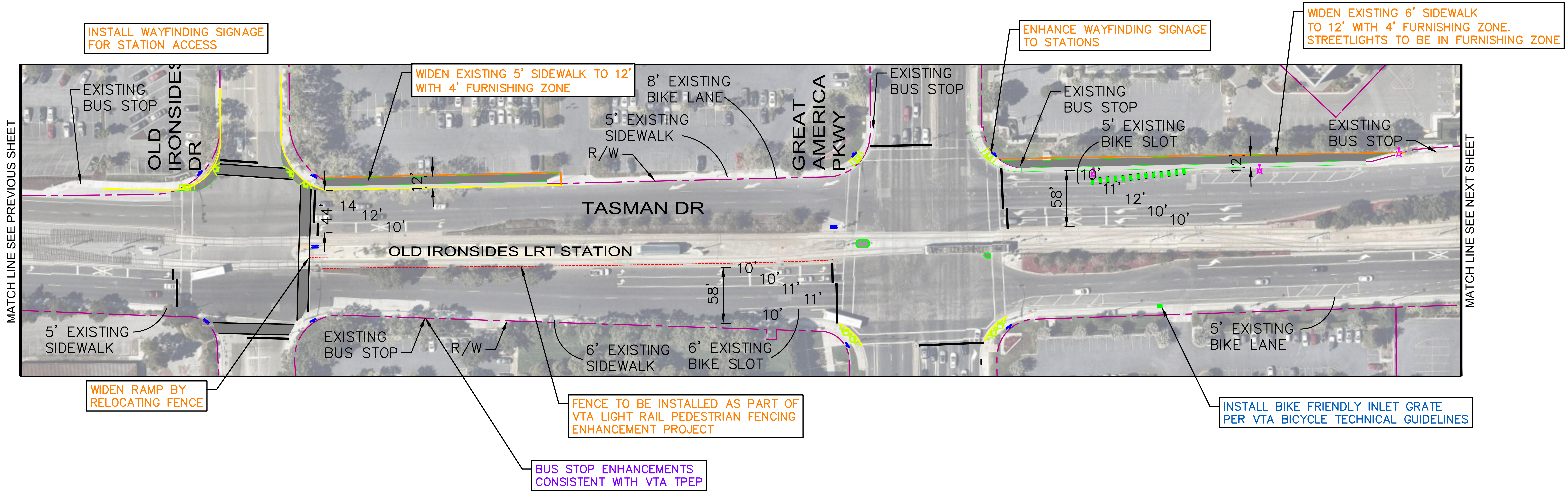
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

San José · Santa Clara · Milpitas · Sunnyvale

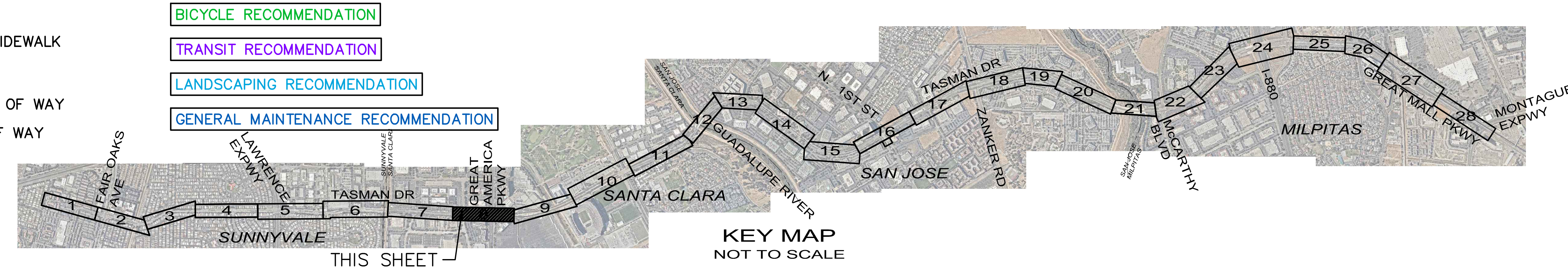


LEGEND

EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION	
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION	
CITY BOUNDARY	BICYCLE RECOMMENDATION	
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION	
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION	
NEAR–TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION	
ULTIMATE RIGHT OF WAY		

SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS

CONCEPT PLANS
April 2020
SHEET 8 OF 28



KEY MAP
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GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Sunnyvale

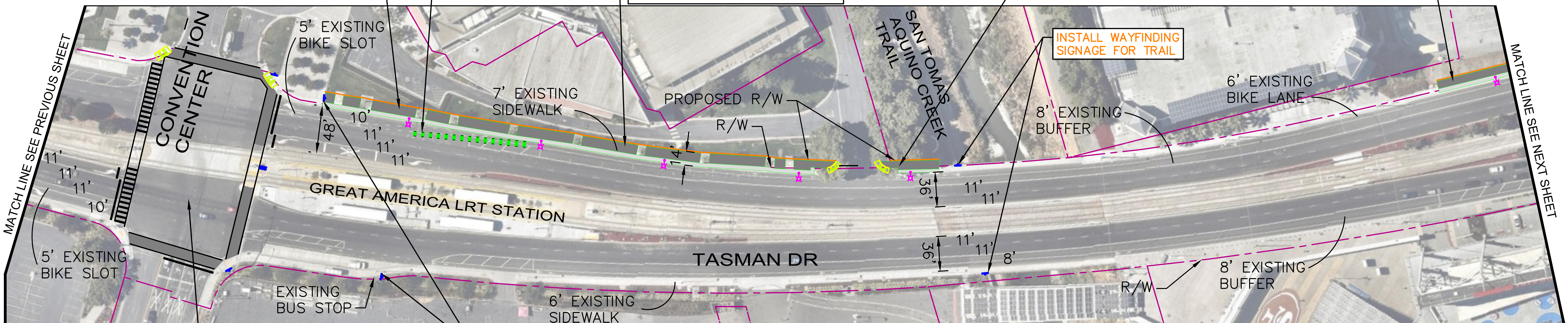
WIDEN EXISTING 7' SIDEWALK
TO 14' WITH 4' FURNISHING ZONE.
REMOVE, RELOCATE, OR REPLACE PALM TREES (8)

APPLY GREEN STRIPING
WITHIN CONFLICT ZONE

WIDEN EXISTING 7' SIDEWALK
TO 14' WITH 4' FURNISHING ZONE.
RELOCATE STREET LIGHTS TO
FURNISHING ZONE.

WIDEN EXISTING 5'
SIDEWALK TO 12'
WITH 4' FURNISHING

WIDEN EXISTING 7' SIDEWALK TO 12'
WITH 4' FURNISHING ZONE



INSTALL ACCESSIBLE PEDESTRIAN
SIGNAL (APS)

INSTALL WAYFINDING SIGNAGE
FOR STATION ACCESS

INSTALL WAYFINDING SIGNAGE
FOR TRAIL

TOTAL TREES REMOVED, RELOCATED, OR REPLACED (SHEET 9 ONLY)
PALM TREE: 8 EA

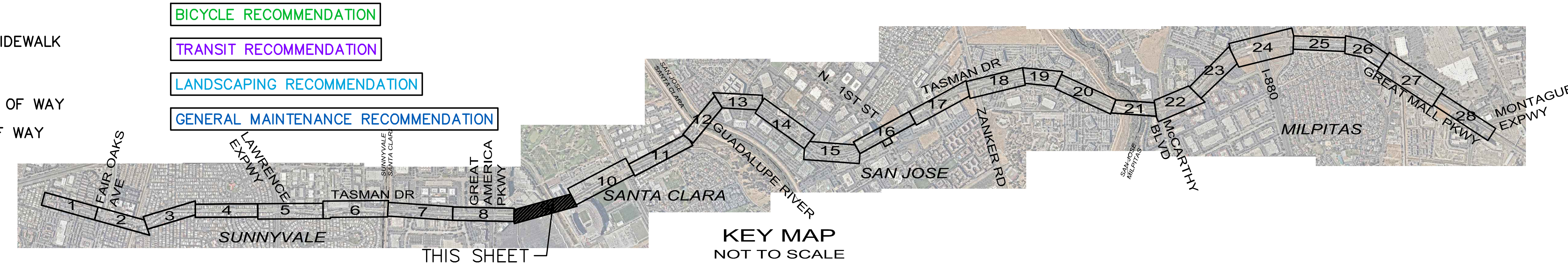
LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS

CONCEPT PLANS
April 2020
SHEET 9 OF 28



THIS SHEET

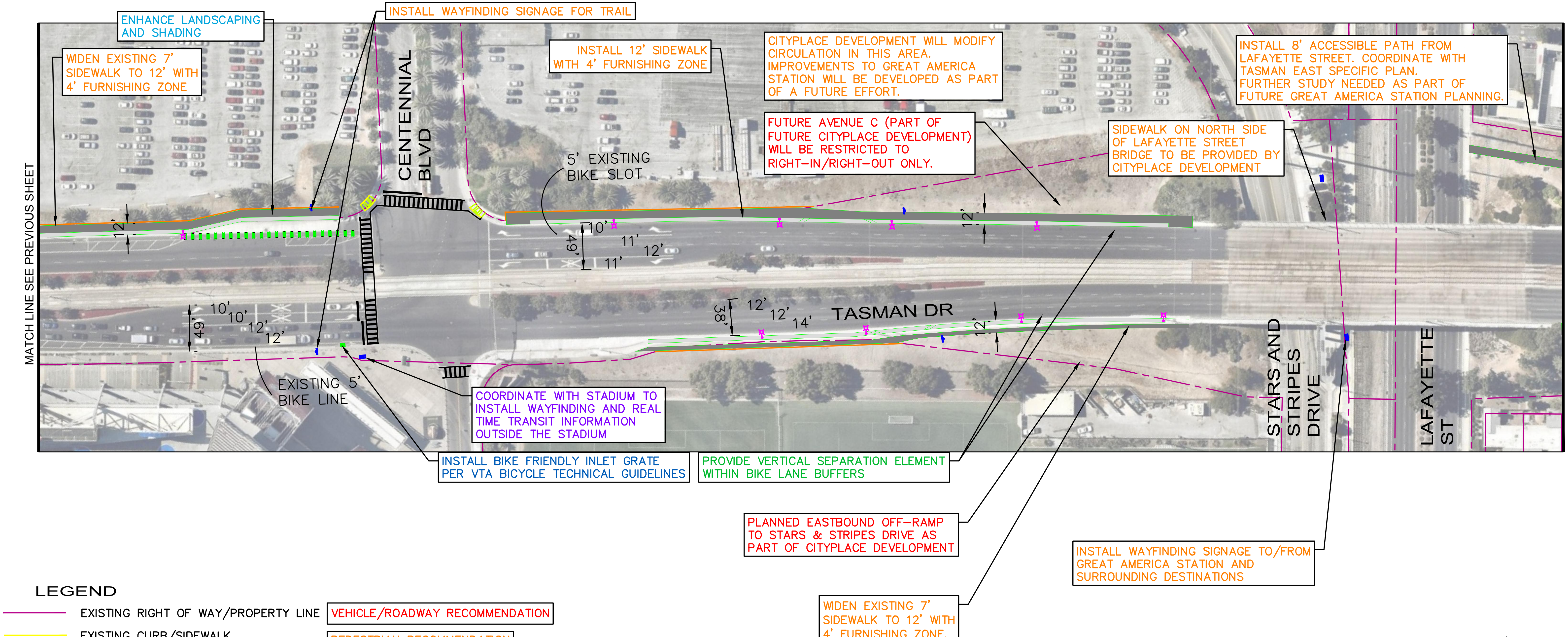
KEY MAP
NOT TO SCALE

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

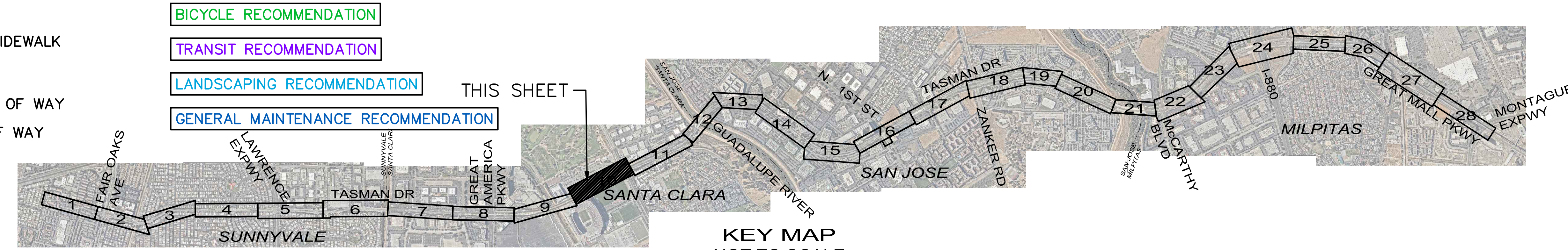
Santa Clara Valley Transportation Authority



LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

- VEHICLE/ROADWAY RECOMMENDATION
- PEDESTRIAN RECOMMENDATION
- BICYCLE RECOMMENDATION
- TRANSIT RECOMMENDATION
- LANDSCAPING RECOMMENDATION
- GENERAL MAINTENANCE RECOMMENDATION



KEY MAP
NOT TO SCALE

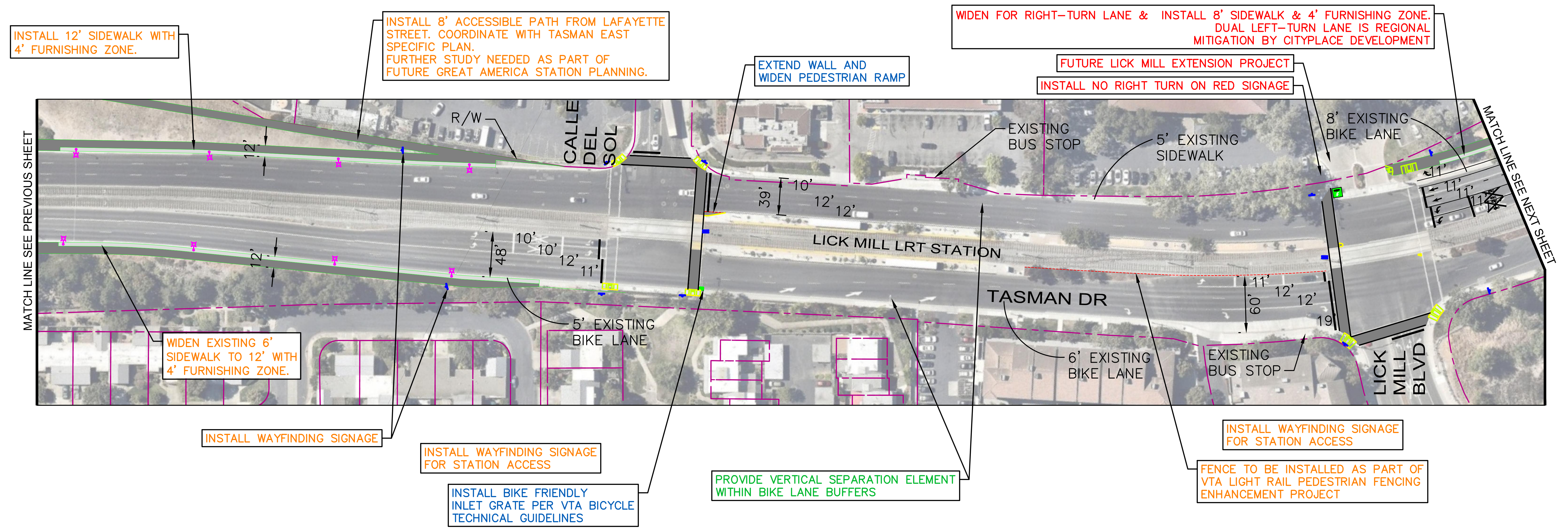
CONCEPT PLANS
April 2020
SHEET 10 OF 28

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



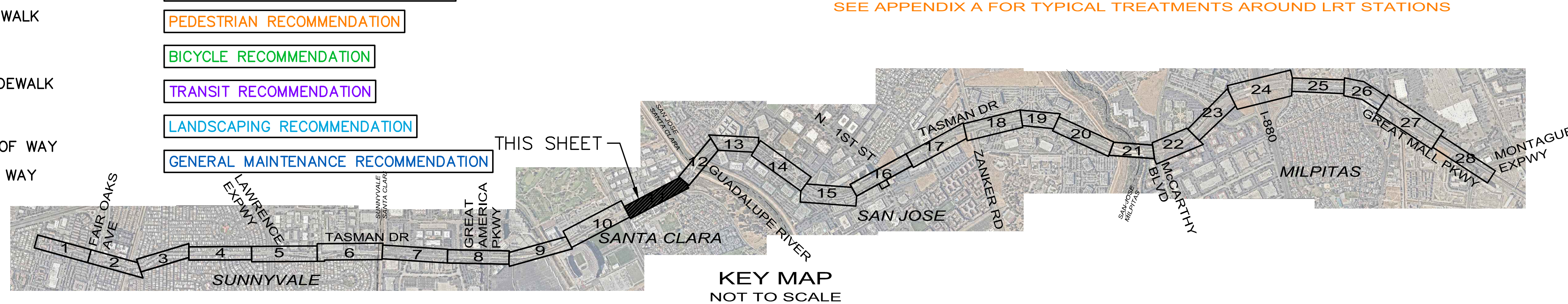
LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS

CONCEPT PLANS
April 2020
SHEET 11 OF 28



KEY MAP
NOT TO SCALE

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

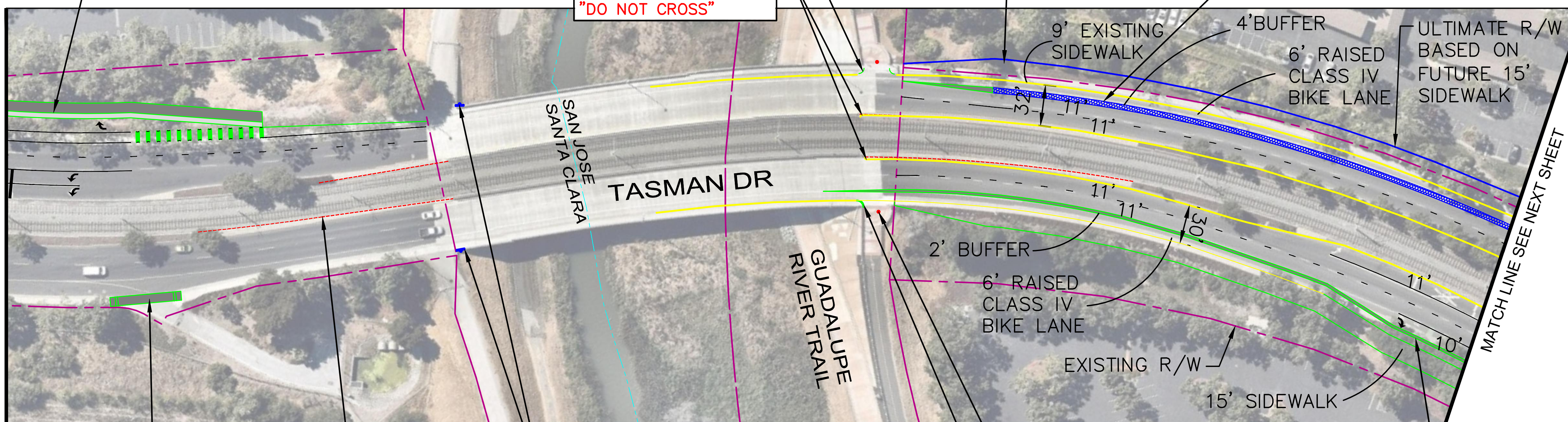
WIDEN FOR RIGHT–TURN LANE & INSTALL 8' SIDEWALK & 4' FURNISHING ZONE. DUAL LEFT–TURN LANE IS REGIONAL MITIGATION BY CITYPLACE DEVELOPMENT

FIX ALL LIPS AND INSTALL BIKE RAMPS ON BOTH SIDES FOR EASIER CYCLIST ACCESS

EXTEND FENCING ALONG TRACKS WITH SIGNAGE "DO NOT CROSS"

TRIM TREE BLOCKING TRAIL SIGN

INSTALL RAIN GARDEN



RECONSTRUCT TRAIL MAINTENANCE ACCESS AS A CITY STANDARD "INDUSTRIAL" OR "COMMERCIAL" DRIVEWAY

FENCE TO BE INSTALLED AS PART OF VTA LIGHT RAIL PEDESTRIAN FENCING ENHANCEMENT PROJECT

INSTALL WAYFINDING SIGNAGE TO DIRECT PEDESTRIANS TO DESIGNATED TRAIL ENTRY

INSTALL HARDSCAPE BUFFER

INSTALL BOLLARD AT TRAIL ENTRY (BOTH SIDES)

FIX ALL LIPS AND INSTALL BIKE RAMPS ON BOTH SIDES FOR EASIER CYCLIST ACCESS

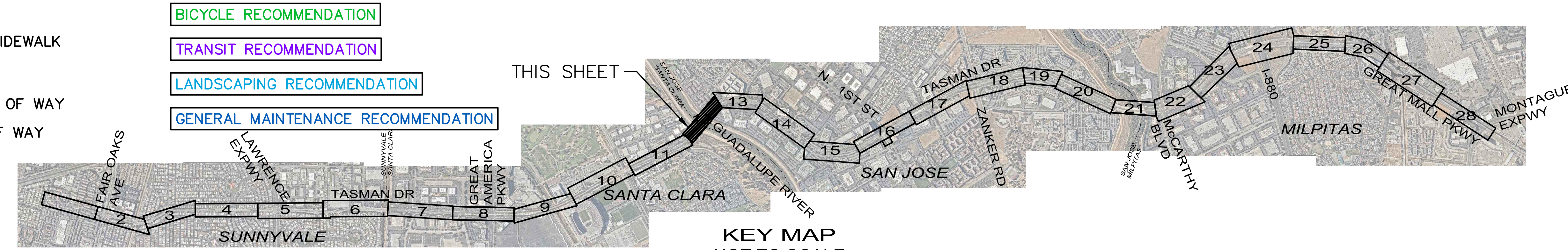
LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR–TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

CONCEPT PLANS
April 2020
SHEET 12 OF 28

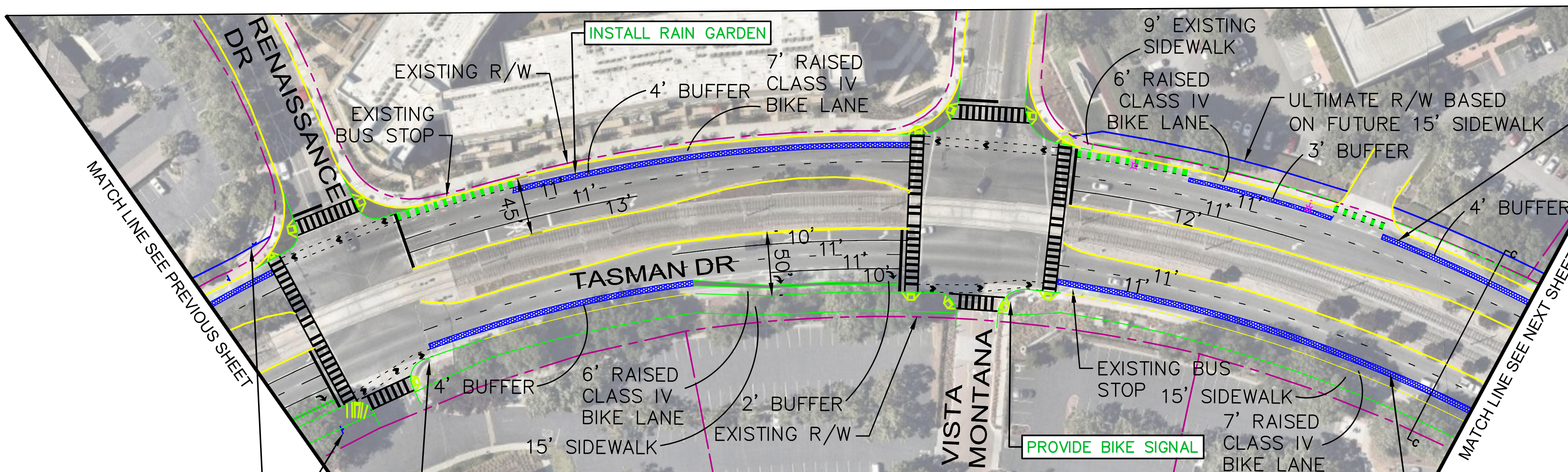
THIS SHEET



KEY MAP
NOT TO SCALE

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn



INSTALL RAIN GARDEN

PROVIDE BIKE SIGNAL

IMPROVEMENTS WILL REQUIRE TRAFFIC SIGNAL MODIFICATION

IMPROVEMENTS WILL REQUIRE TRAFFIC SIGNAL MODIFICATION

INSTALL RAIN GARDEN

INSTALL WAYFINDING SIGNAGE TO DIRECT PEDESTRIANS TO DESIGNATED TRAIL ENTRY

LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION

PEDESTRIAN RECOMMENDATION

BICYCLE RECOMMENDATION

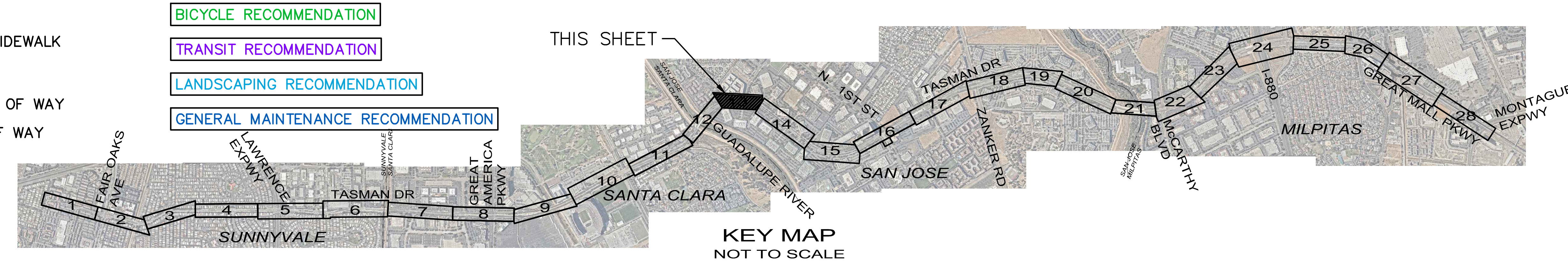
TRANSIT RECOMMENDATION

LANDSCAPING RECOMMENDATION

GENERAL MAINTENANCE RECOMMENDATION

SEE APPENDIX B FOR FOR TYPICAL CROSS SECTIONS

THIS SHEET



KEY MAP
NOT TO SCALE

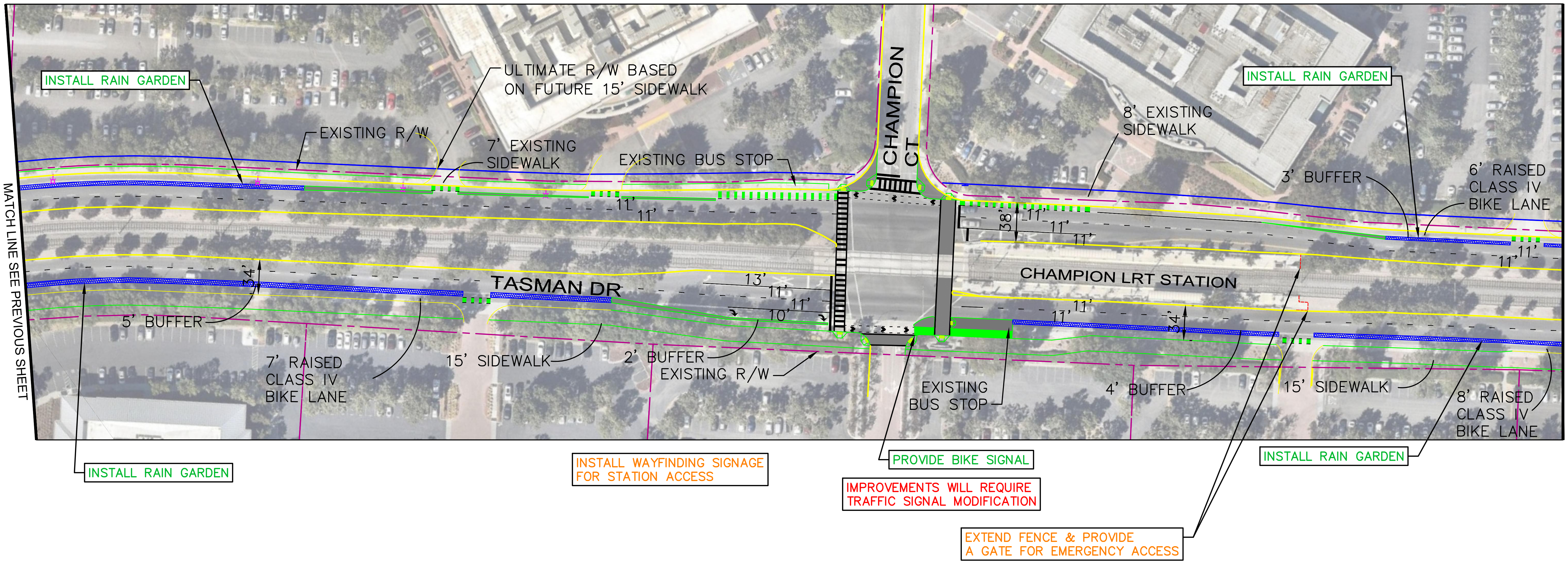
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

CONCEPT PLANS
April 2020
SHEET 13 OF 28

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

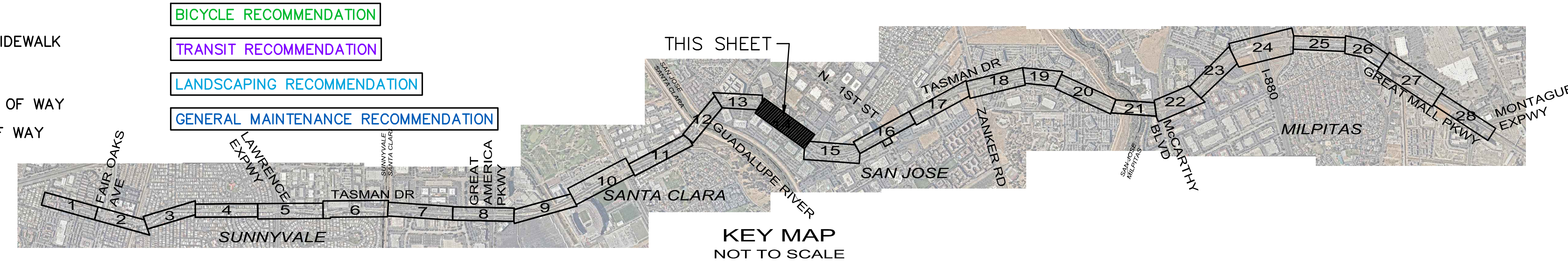


LEGEND

EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS

CONCEPT PLANS
April 2020
SHEET 14 OF 28



KEY MAP
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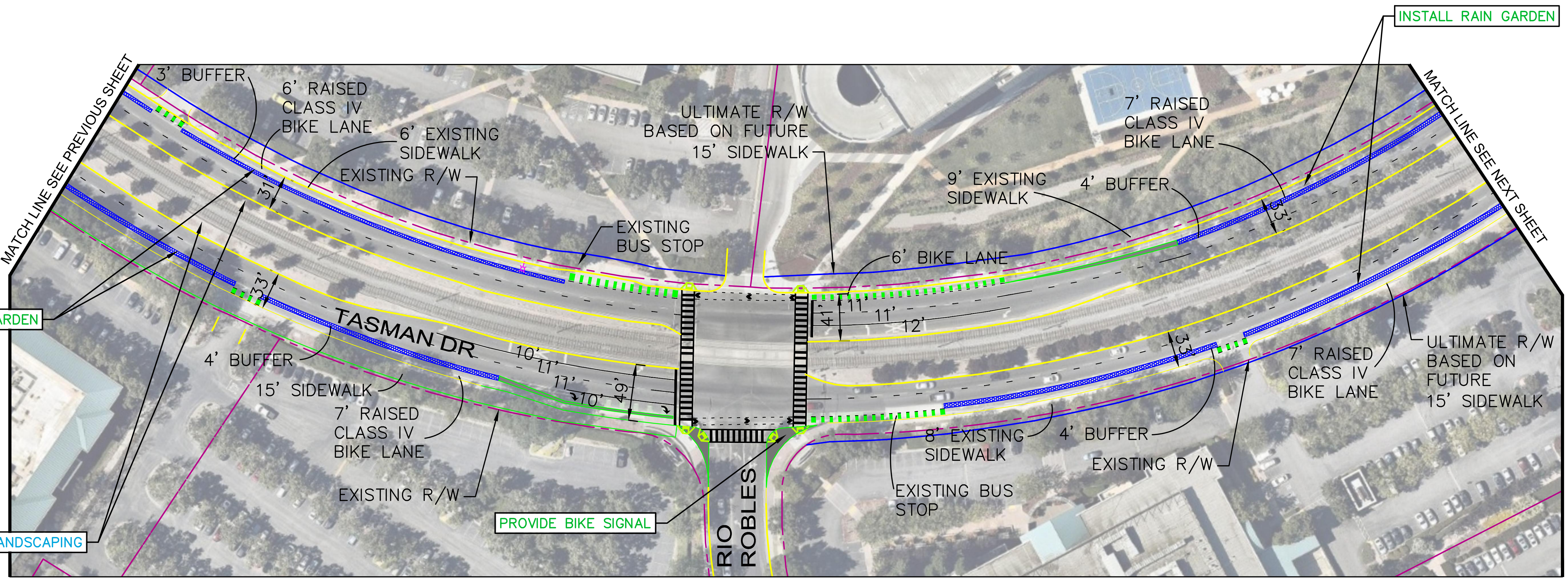
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



IMPROVEMENTS WILL REQUIRE TRAFFIC SIGNAL MODIFICATION

SIGNAL WILL BE CONVERTED TO SPLIT PHASE OPERATION WITH CITYPLACE DEVELOPMENT

LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION

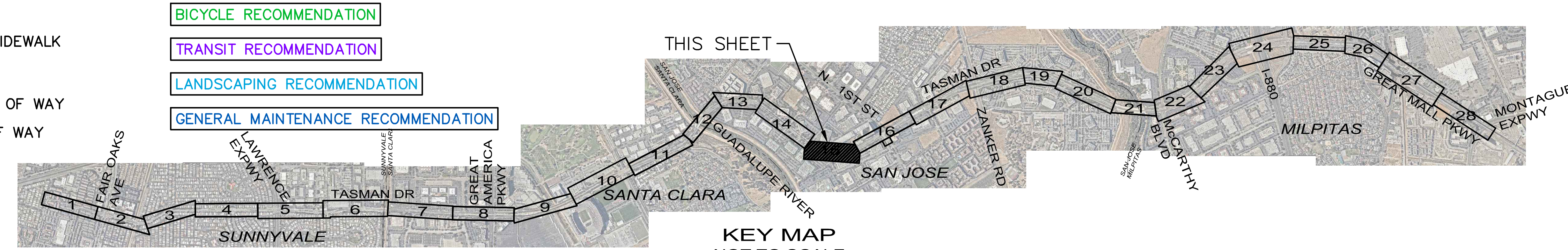
PEDESTRIAN RECOMMENDATION

BICYCLE RECOMMENDATION

TRANSIT RECOMMENDATION

LANDSCAPING RECOMMENDATION

GENERAL MAINTENANCE RECOMMENDATION



KEY MAP
NOT TO SCALE

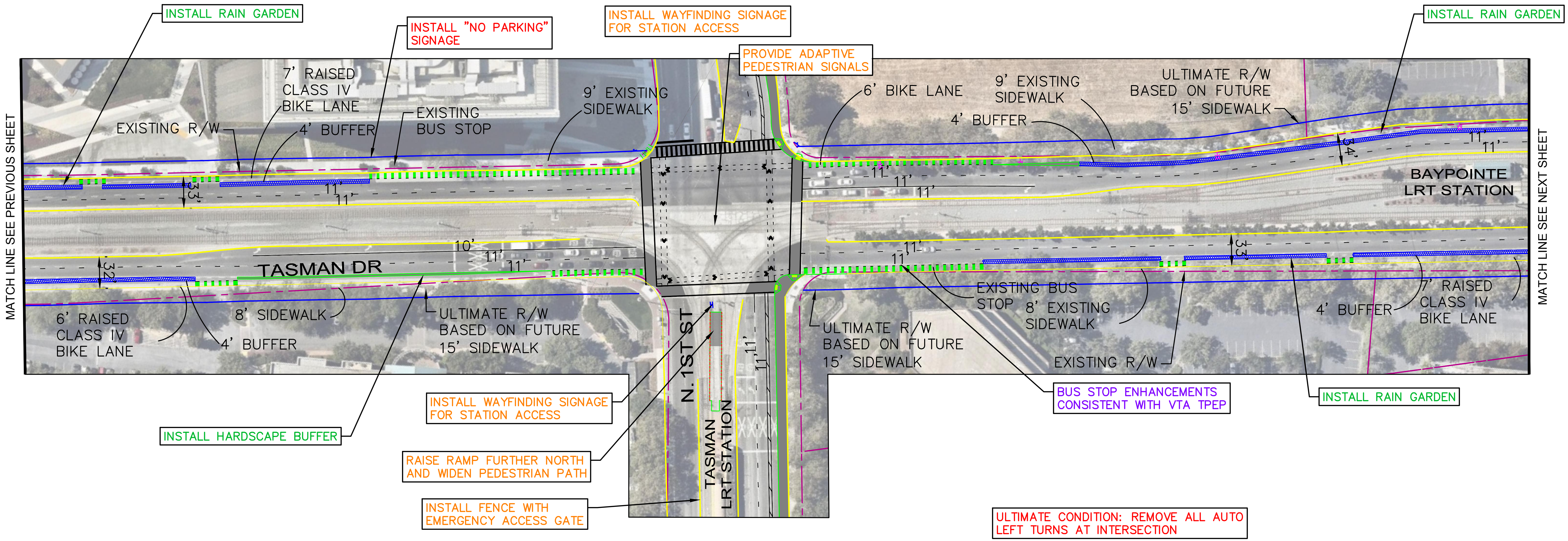
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

CONCEPT PLANS
April 2020
SHEET 15 OF 28

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
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- VEHICLE/ROADWAY RECOMMENDATION
- PEDESTRIAN RECOMMENDATION
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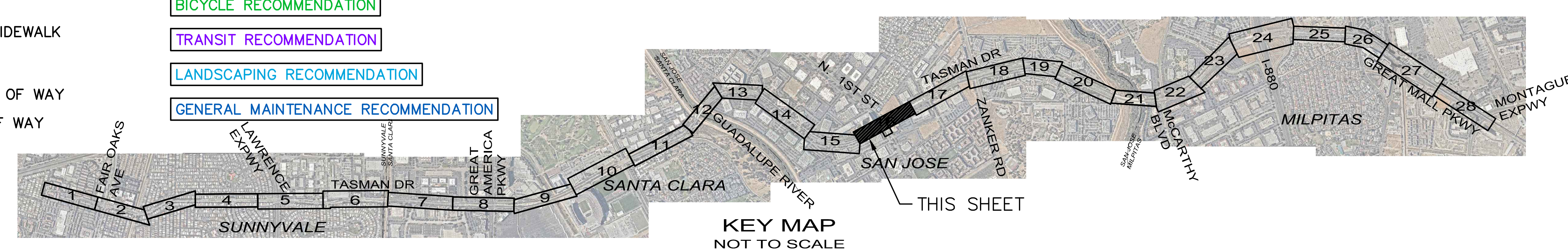
- LANDSCAPING RECOMMENDATION
- GENERAL MAINTENANCE RECOMMENDATION

SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS
SEE APPENDIX D FOR ULTIMATE IMPROVEMENT SHEET



KEY MAP
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GRAPHIC SCALE
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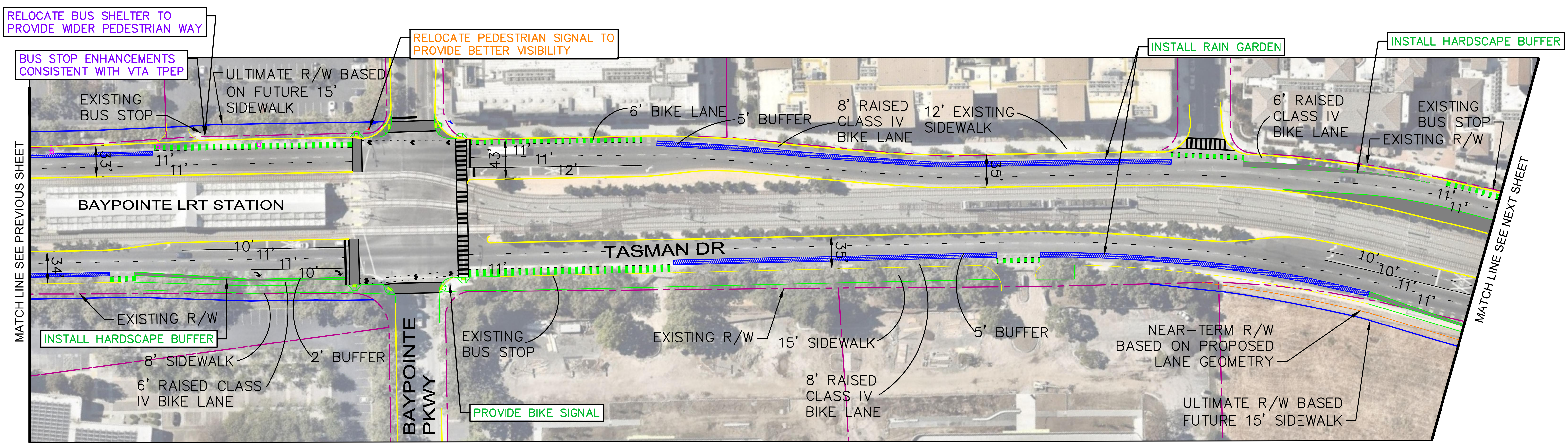
1 inch = 100 ft.

CONCEPT PLANS
April 2020

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



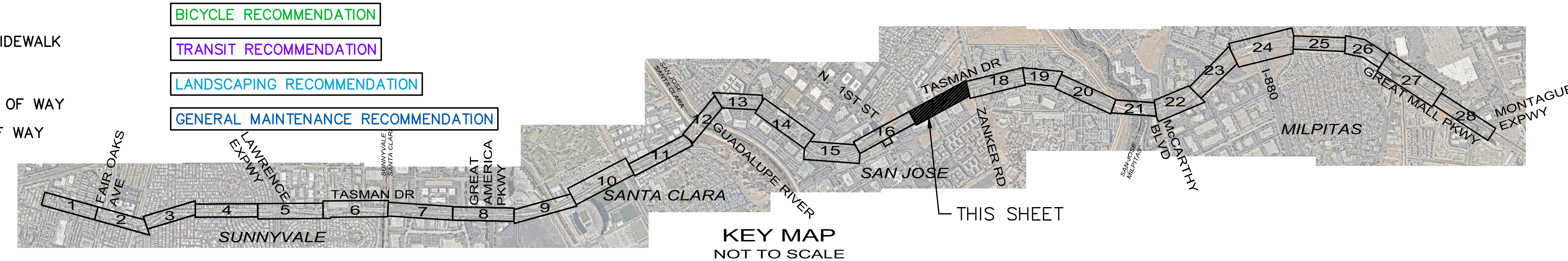
INSTALL WAYFINDING SIGNAGE FOR STATION ACCESS

IMPROVEMENTS WILL REQUIRE TRAFFIC SIGNAL MODIFICATION

LEGEND

EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS



KEY MAP
NOT TO SCALE

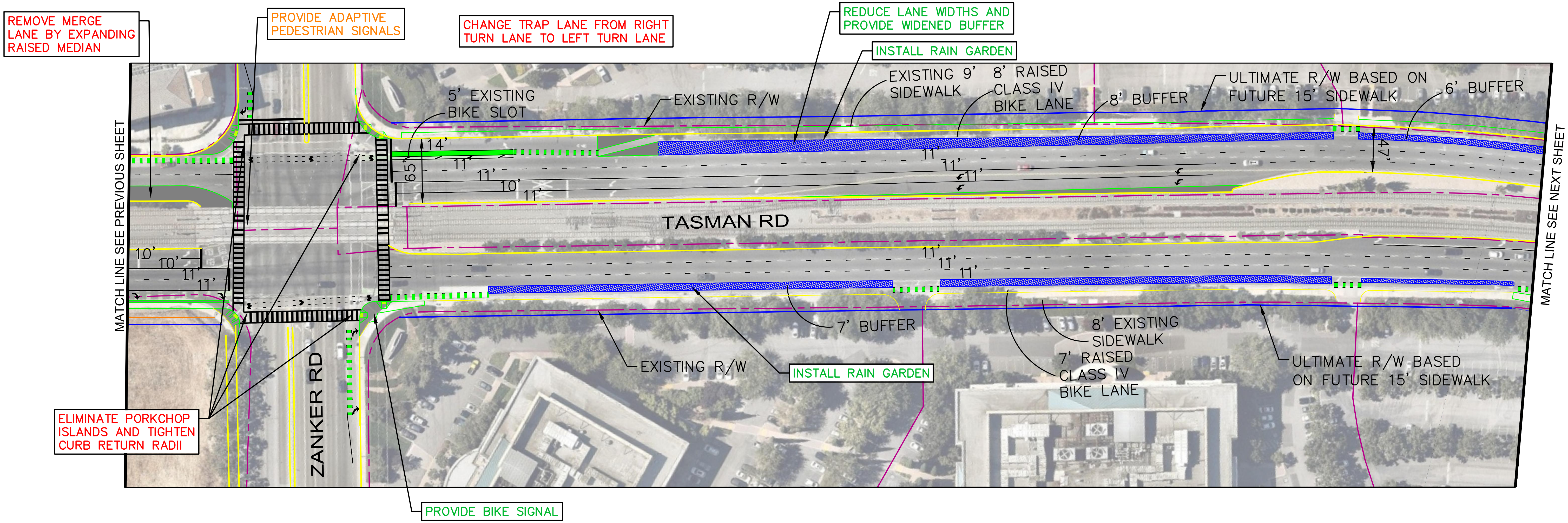
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

CONCEPT PLANS
April 2020
SHEET 17 OF 28

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

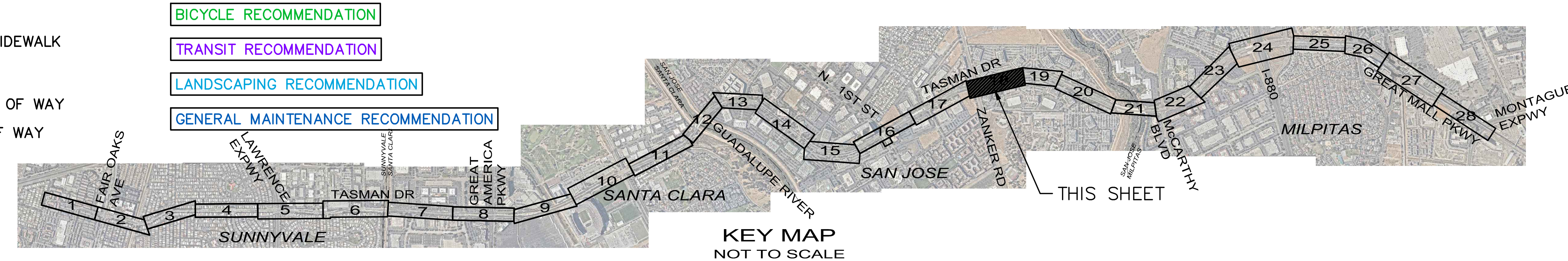


IMPROVEMENTS WILL REQUIRE TRAFFIC SIGNAL MODIFICATION

LEGEND

EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

CONCEPT PLANS
April 2020
SHEET 18 OF 28



KEY MAP
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GRAPHIC SCALE
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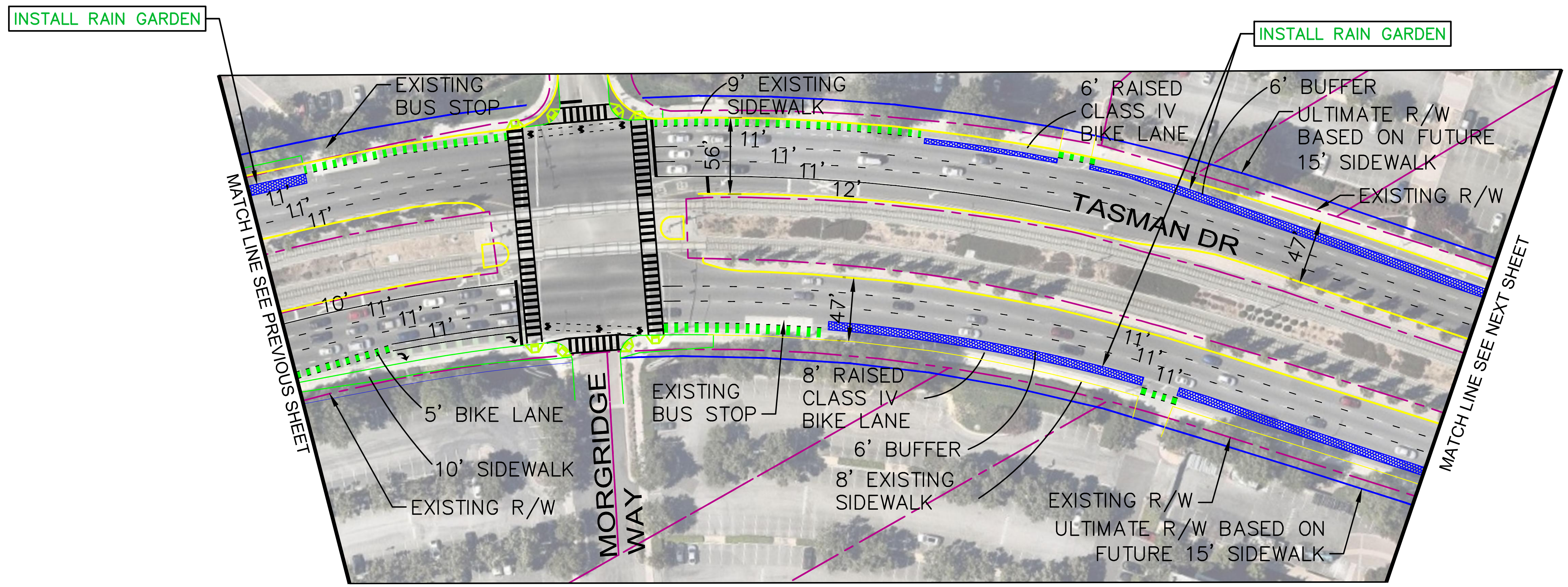
Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

Sunnyvale

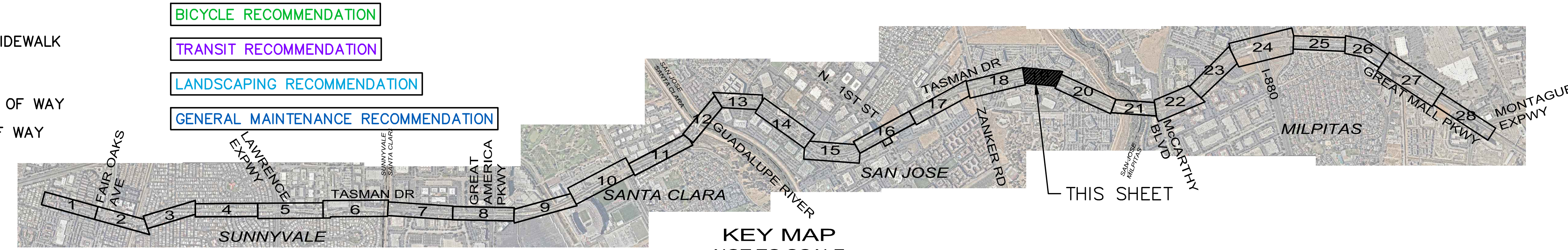


LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

CONCEPT PLANS
April 2020
SHEET 19 OF 28



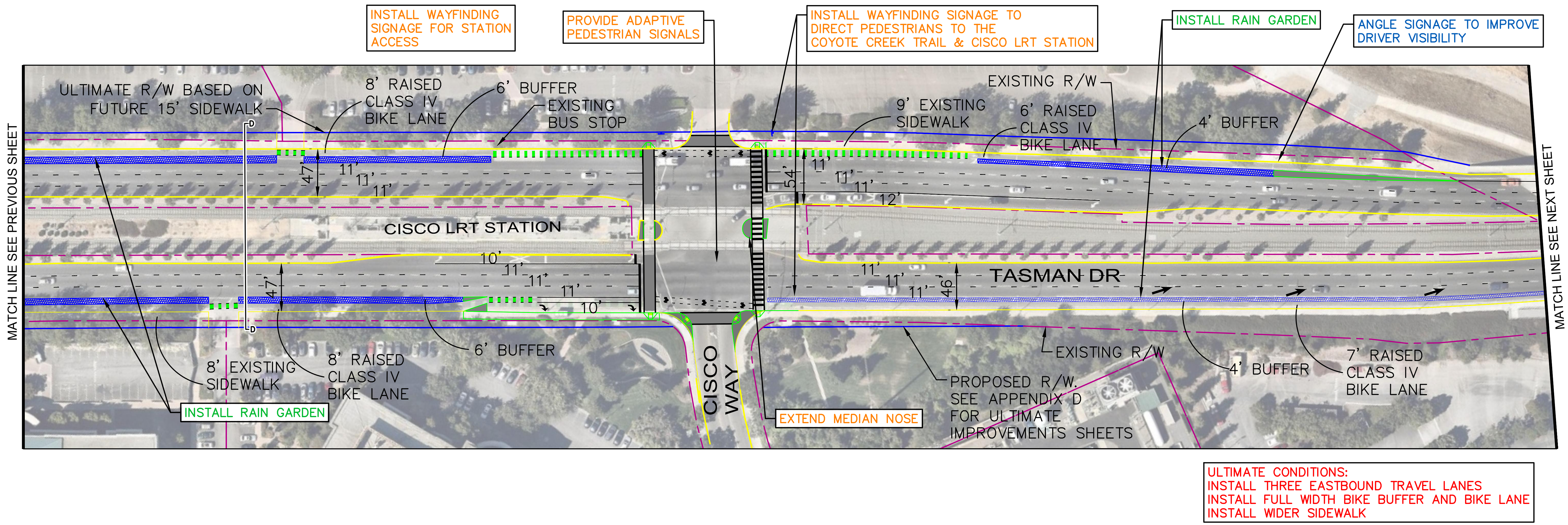
KEY MAP
NOT TO SCALE

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

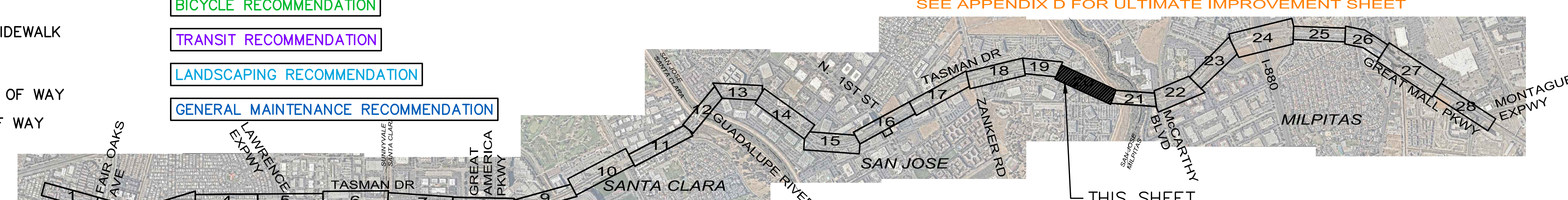


LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS
SEE APPENDIX B FOR FOR TYPICAL CROSS SECTIONS
SEE APPENDIX D FOR ULTIMATE IMPROVEMENT SHEET



KEY MAP
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GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

CONCEPT PLANS
April 2020

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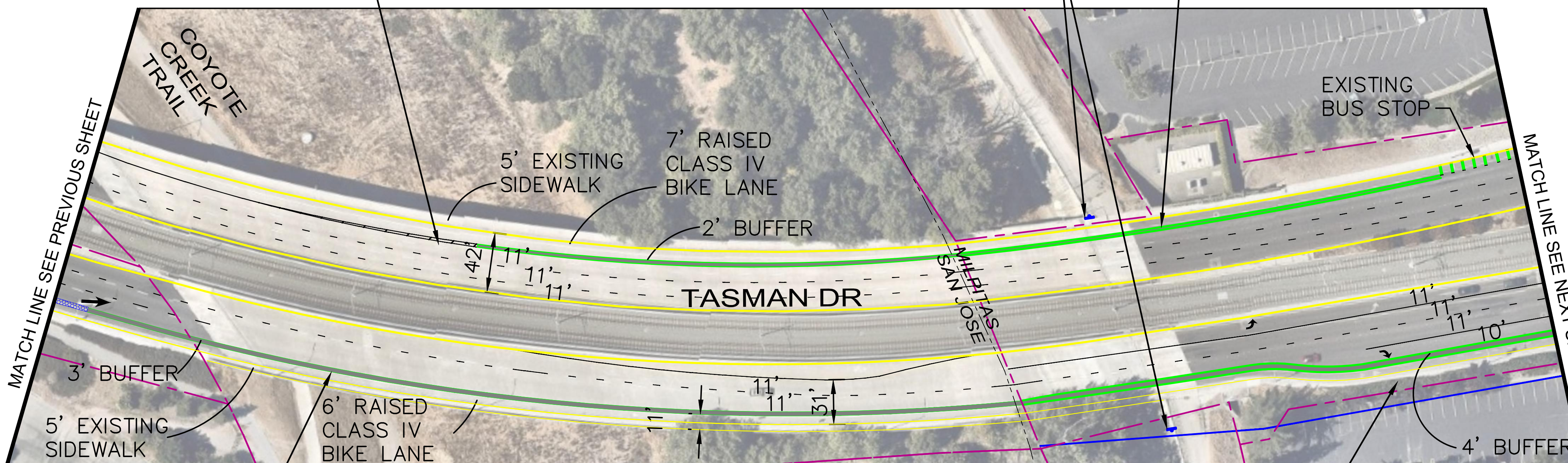
Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

REDUCE LANE WIDTHS AND PROVIDE BIKE LANE BUFFER

INSTALL WAYFINDING SIGNAGE TO DIRECT PEDESTRIANS TO THE TRAIL

INSTALL HARDSCAPED BUFFER



INSTALL HARDSCAPED BUFFER

ULTIMATE CONDITIONS:
INSTALL THREE EASTBOUND TRAVEL LANES
INSTALL FULL WIDTH BIKE BUFFER AND BIKE LANE
INSTALL WIDER SIDEWALK

TRIM LANDSCAPING & OVERGROWN FOLIAGE

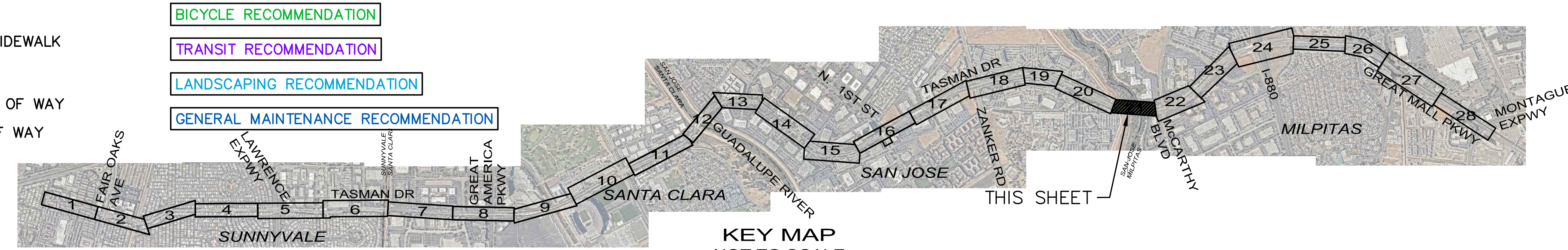
LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR–TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

SEE APPENDIX D FOR ULTIMATE IMPROVEMENT SHEET

CONCEPT PLANS
April 2020
SHEET 21 OF 28



KEY MAP
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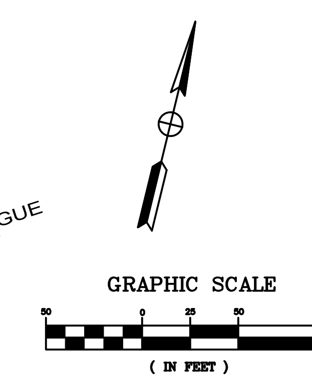

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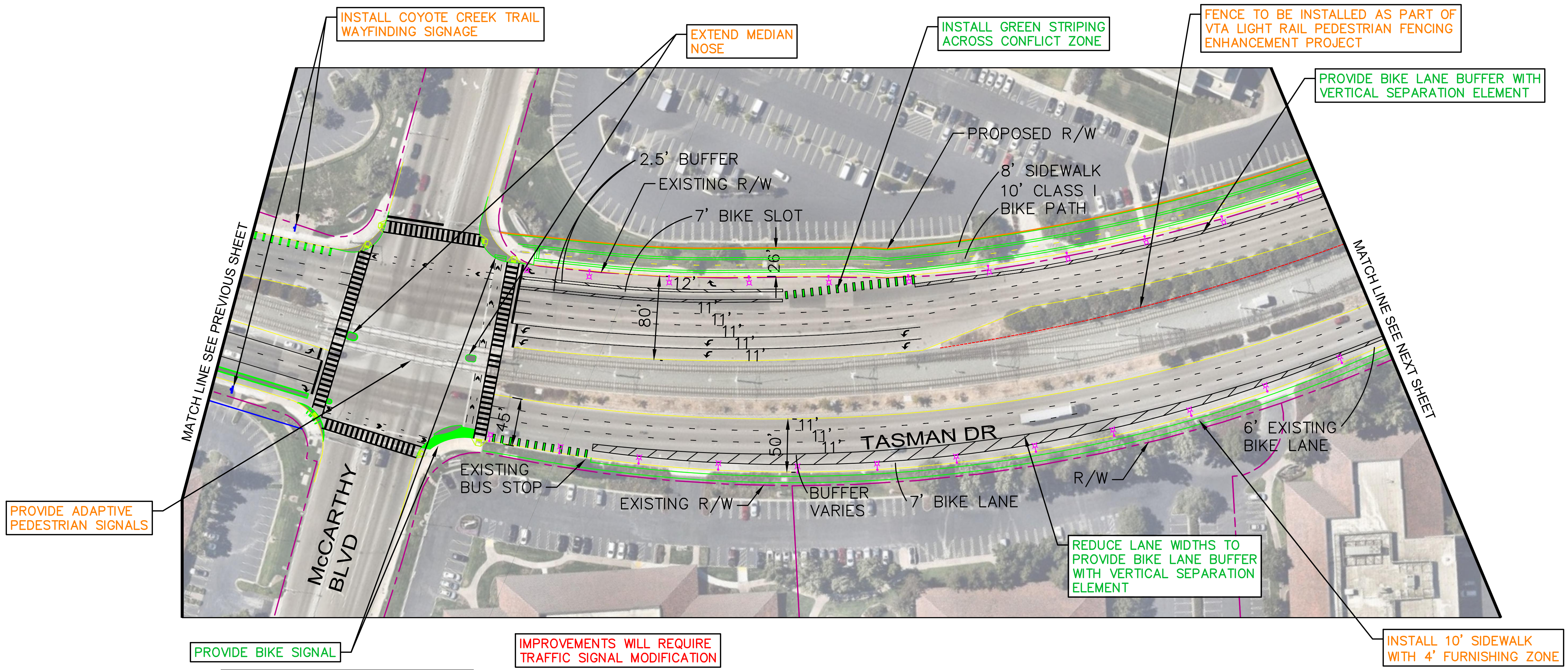
Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION

PEDESTRIAN RECOMMENDATION

BICYCLE RECOMMENDATION

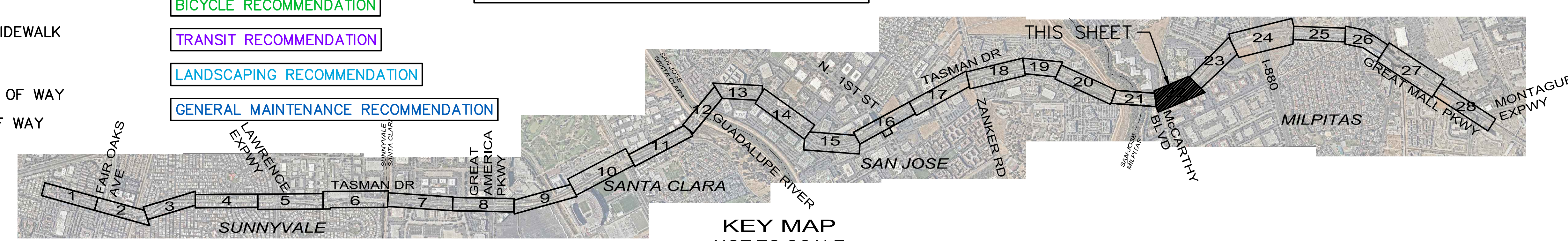
TRANSIT RECOMMENDATION

LANDSCAPING RECOMMENDATION

GENERAL MAINTENANCE RECOMMENDATION

ULTIMATE CONDITIONS:
INSTALL THREE EASTBOUND TRAVEL LANES
INSTALL FULL WIDTH BIKE BUFFER AND BIKE LANE
INSTALL WIDER SIDEWALK

SEE APPENDIX D FOR ULTIMATE IMPROVEMENT SHEET



KEY MAP
NOT TO SCALE

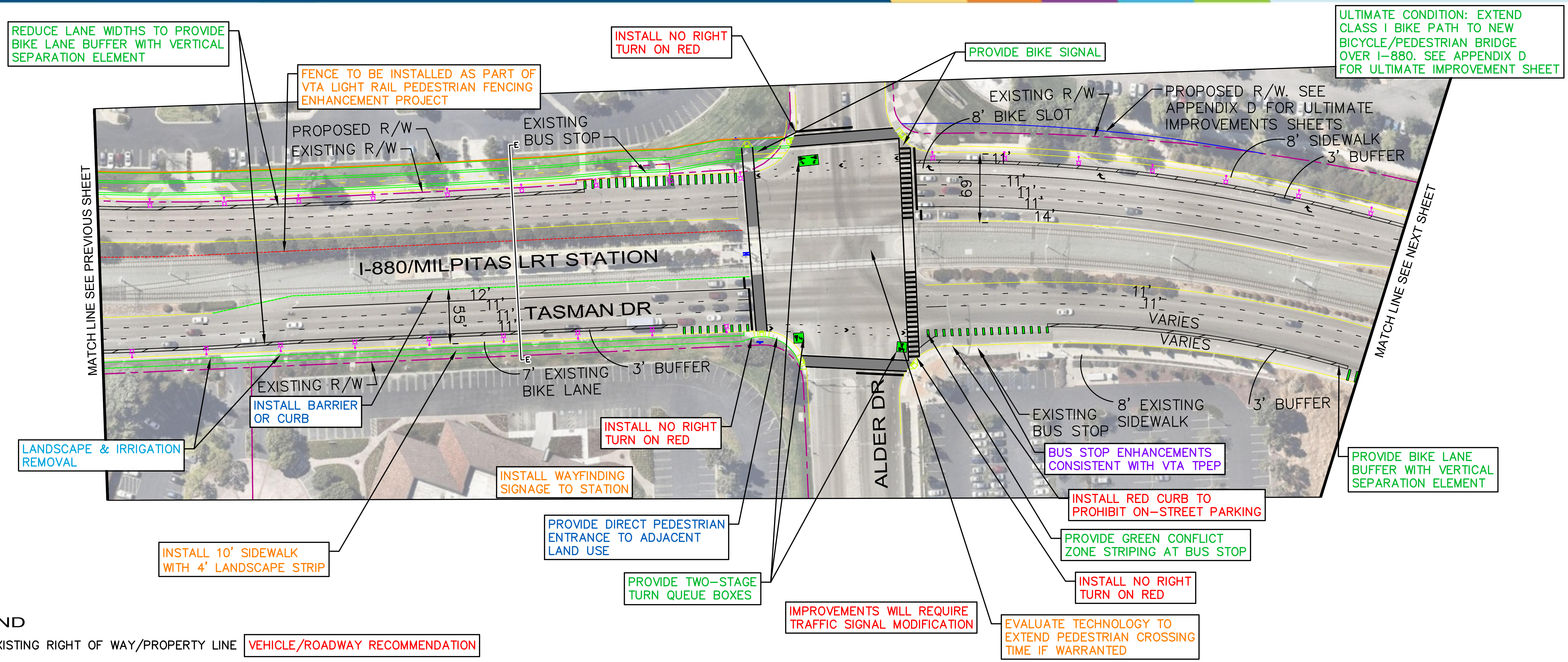
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

CONCEPT PLANS
April 2020
SHEET 22 OF 28

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS
SEE APPENDIX B FOR TYPICAL CROSS SECTIONS
SEE APPENDIX D FOR ULTIMATE IMPROVEMENT SHEET

LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

- VEHICLE/ROADWAY RECOMMENDATION
- PEDESTRIAN RECOMMENDATION
- BICYCLE RECOMMENDATION
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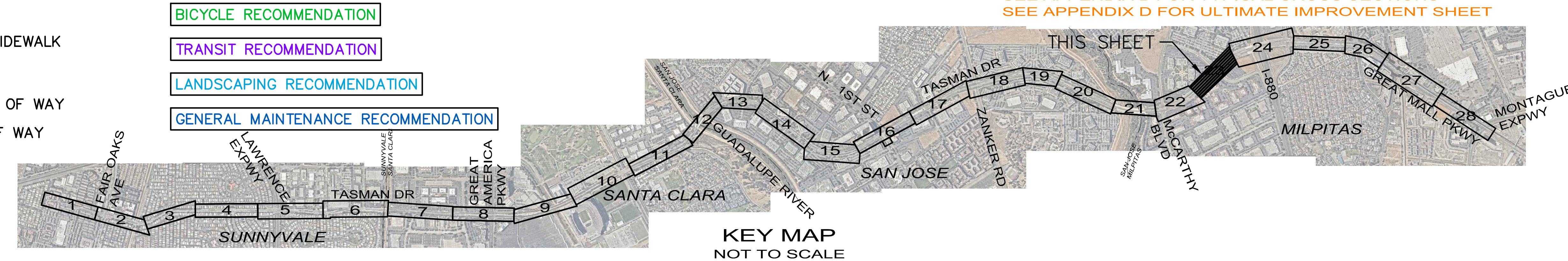
- LANDSCAPING RECOMMENDATION
- GENERAL MAINTENANCE RECOMMENDATION



KEY MAP
NOT TO SCALE

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

CONCEPT PLANS
April 2020
SHEET 23 OF 28

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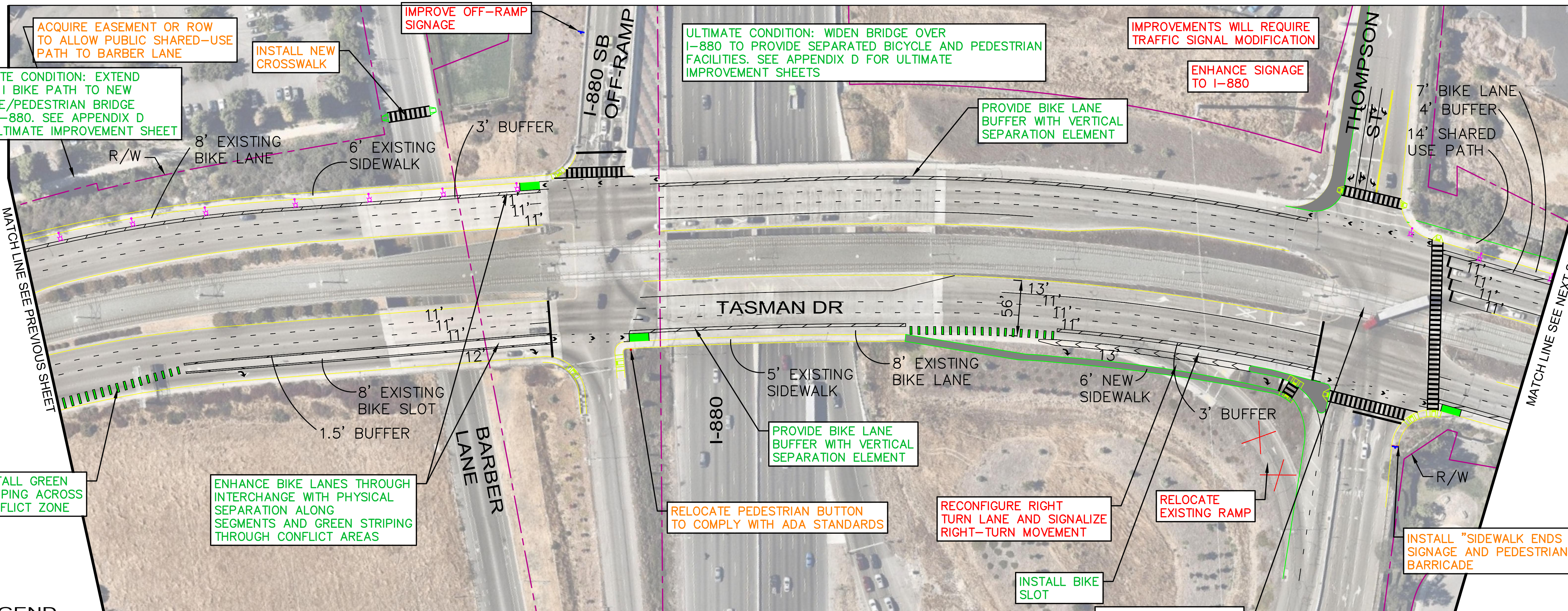
Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

SAN JOSE CAPITAL OF SILICON VALLEY

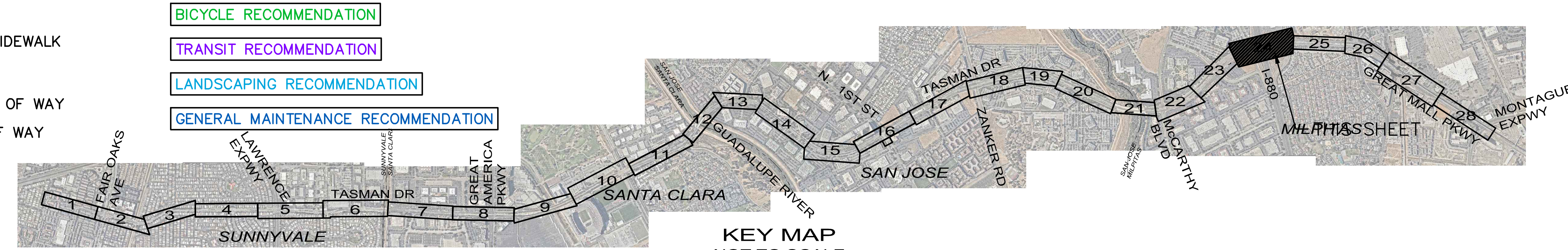
Sunnyvale



LEGEND

EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION	
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION	
CITY BOUNDARY	BICYCLE RECOMMENDATION	
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION	
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION	
NEAR–TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION	
ULTIMATE RIGHT OF WAY		

SEE APPENDIX D FOR ULTIMATE IMPROVEMENT SHEET



KEY MAP
NOT TO SCALE

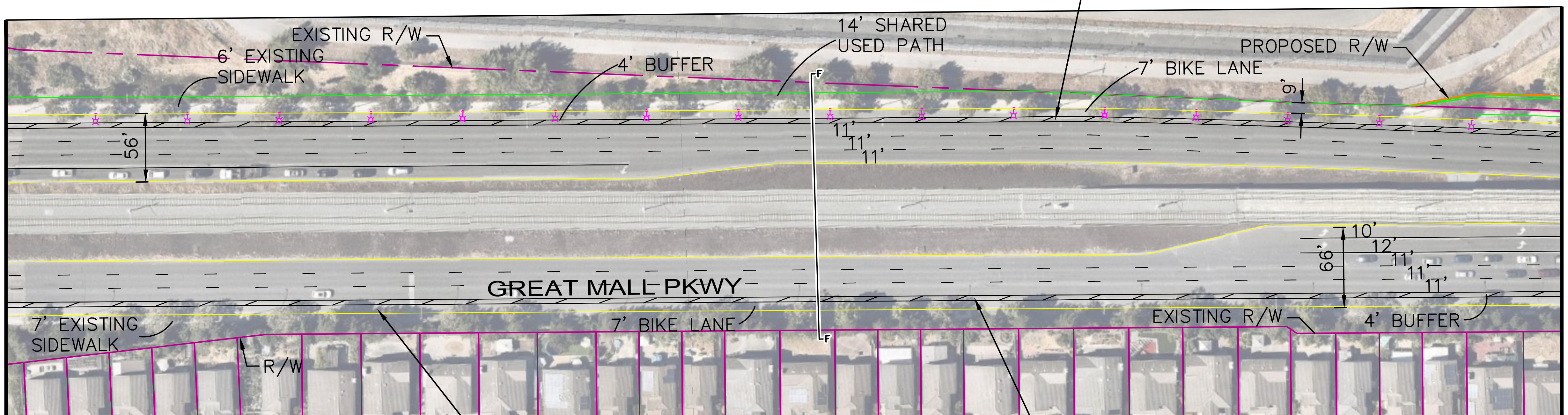
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

CONCEPT PLANS
April 2020
SHEET 24 OF 28

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
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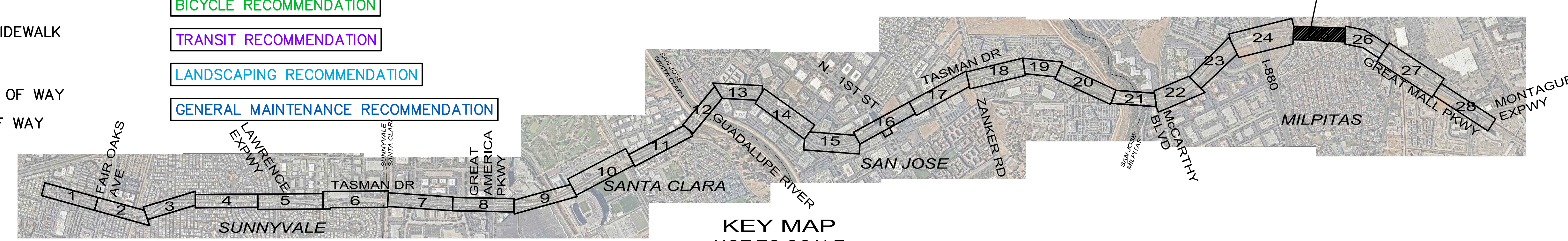
- BICYCLE RECOMMENDATION
- TRANSIT RECOMMENDATION
- LANDSCAPING RECOMMENDATION
- GENERAL MAINTENANCE RECOMMENDATION

SEE APPENDIX B FOR FOR TYPICAL CROSS SECTIONS
SEE APPENDIX D FOR ULTIMATE IMPROVEMENT SHEET



KEY MAP
NOT TO SCALE

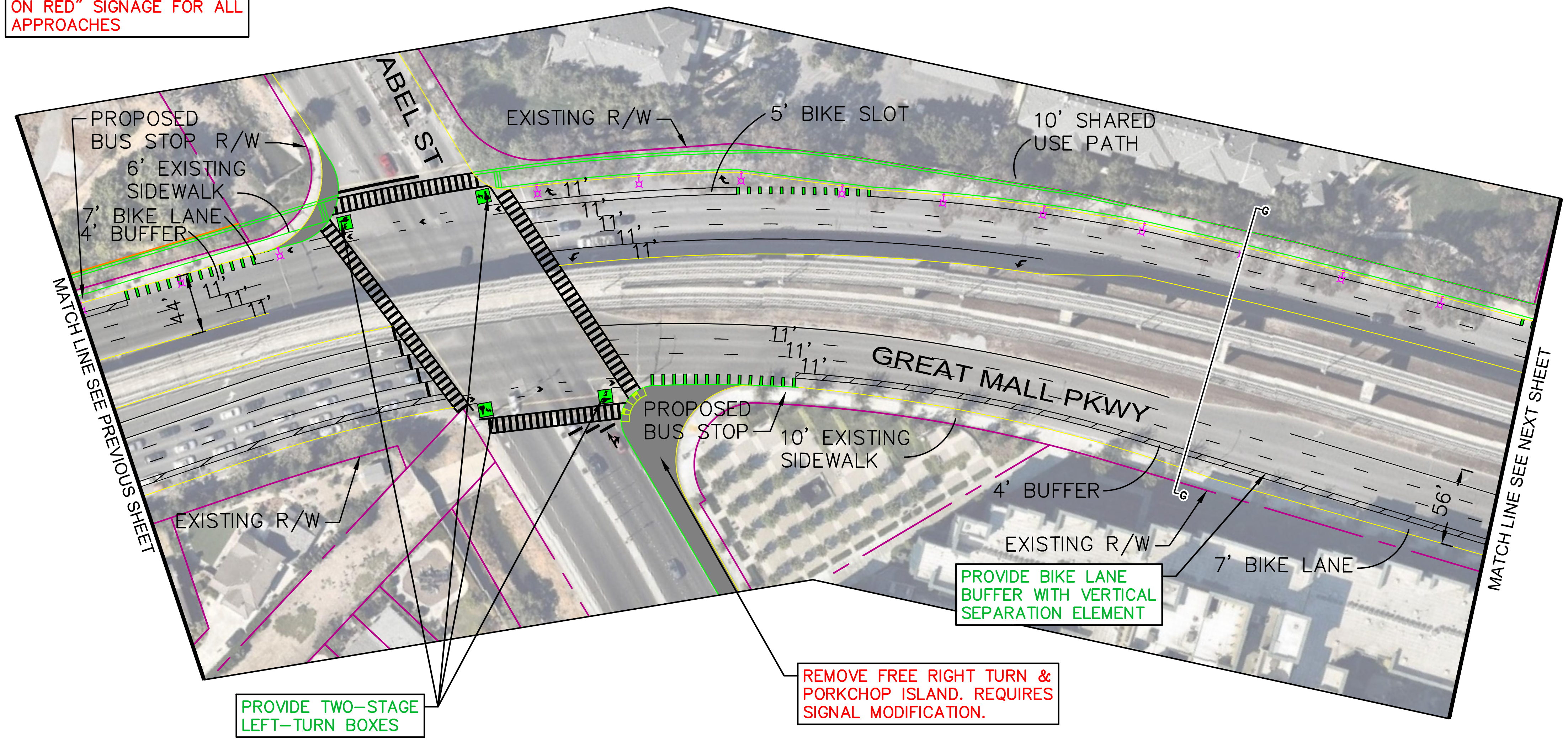
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

CONCEPT PLANS
April 2020
SHEET 25 OF 28

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

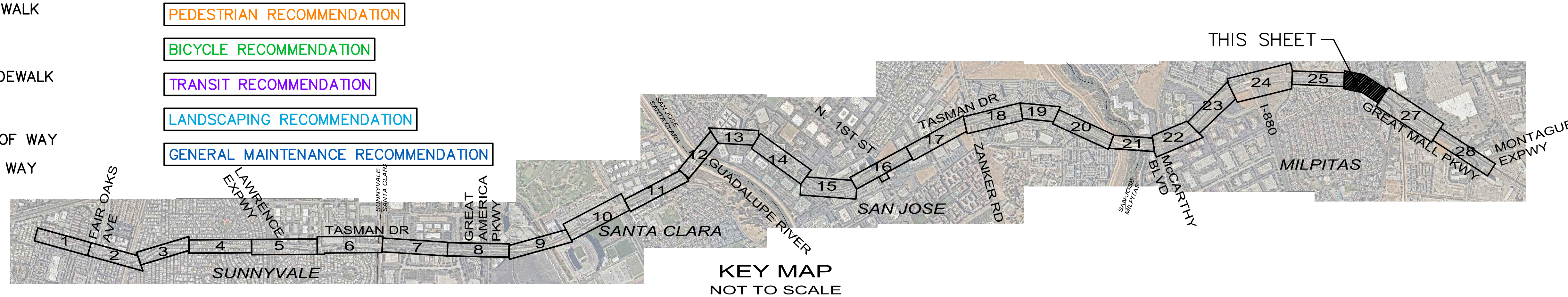
Santa Clara Valley Transportation Authority

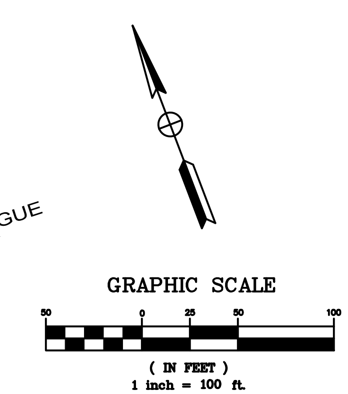


LEGEND

EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

SEE APPENDIX B FOR TYPICAL CROSS SECTIONS



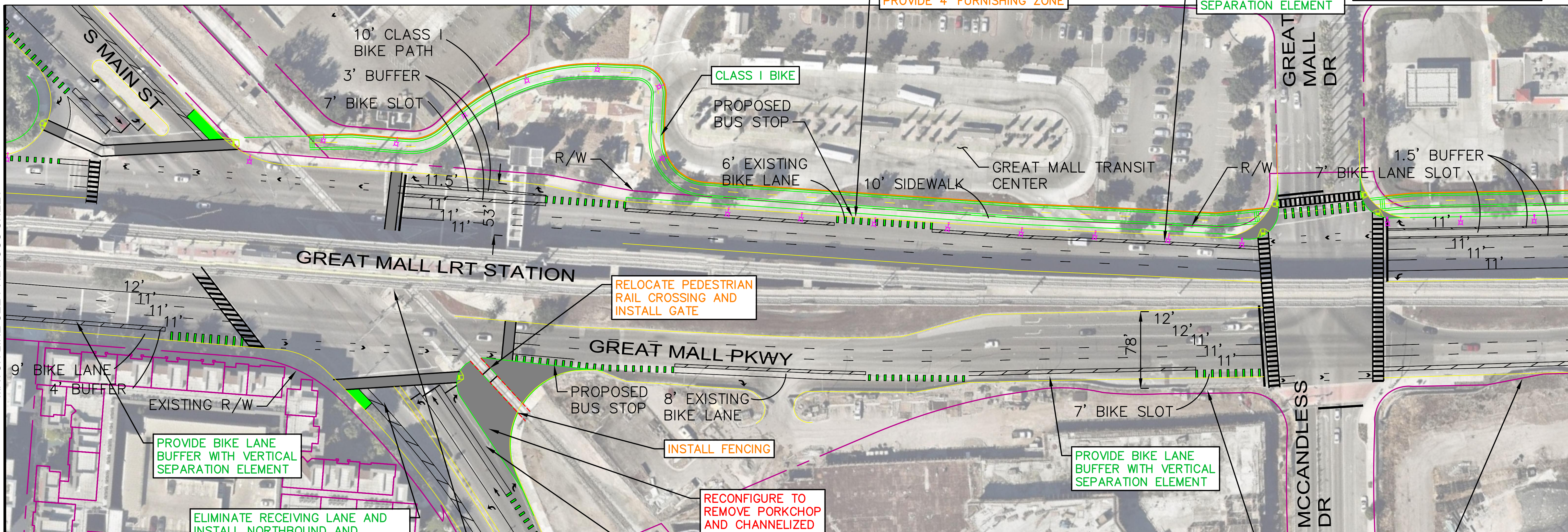


CONCEPT PLANS
April 2020
SHEET 26 OF 28

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

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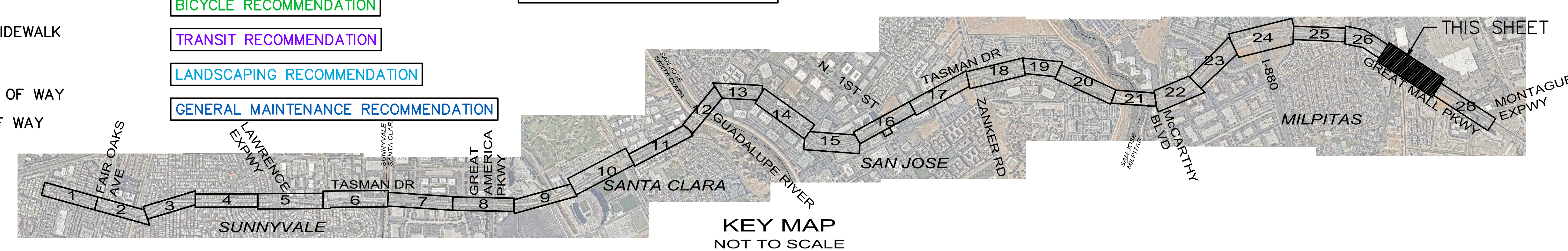
VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

ULTIMATE CONDITION: INSTALL ELEVATED PEDESTRIAN WALKWAY ACROSS EB TASMAN TO GREAT MALL LRT STATION

SEE APPENDIX A FOR TYPICAL TREATMENTS AROUND LRT STATIONS
SEE APPENDIX D FOR ULTIMATE IMPROVEMENT SHEET



KEY MAP
NOT TO SCALE

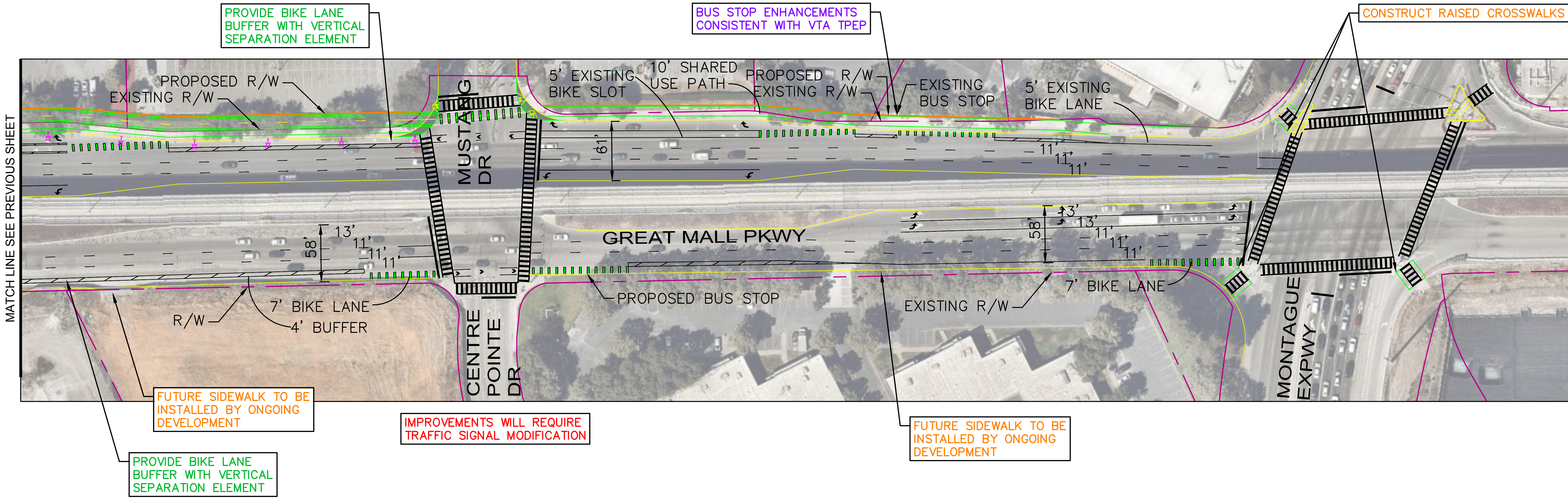
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

CONCEPT PLANS
April 2020
SHEET 27 OF 28

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

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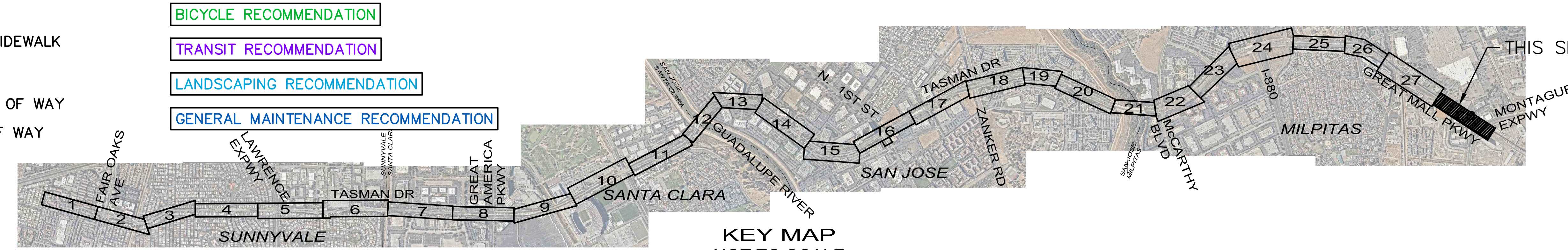
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

CONCEPT PLANS
April 2020
SHEET 28 OF 28



KEY MAP
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GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

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APPENDIX SHEETS

APPENDIX A

TREATMENTS AROUND LRT STATIONS

Typical Treatments of LRT Stations

APPENDIX B

TYPICAL CROSS SECTIONS

Tasman Corridor
COMPLETE STREETS STUDY
Appendix B: Typical Cross Sections (Near Term Improvements)

Santa Clara Valley Transportation Authority

Section A-A: East of Fair Oaks Avenue

Section B-B: East of Adobe Wells Street

Section C-C: East of Vista Montana

Planting strips separating the bike lanes function as rain gardens and would collect surface run-off.

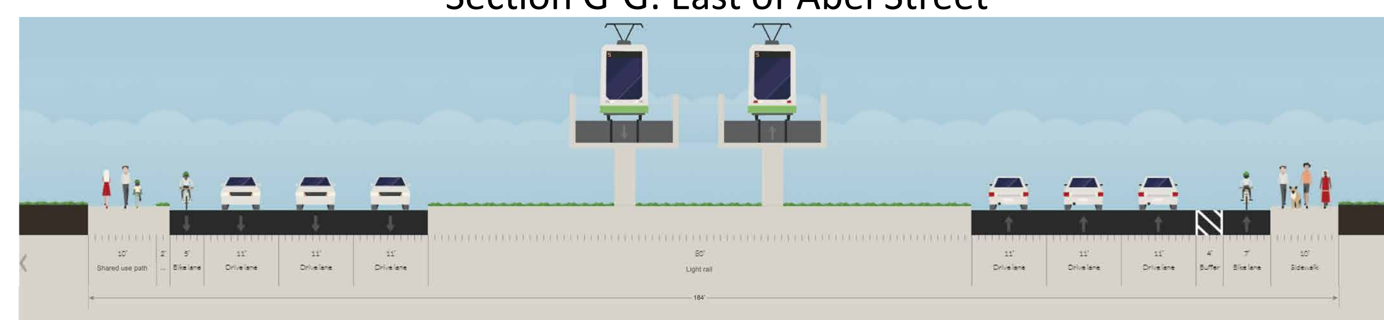
Section D-D: West of Cisco Way

Planting strips separating the bike lanes function as rain gardens and would collect surface run-off.

Section E-E: West of Alder Drive

Section F-F: East of I-880

Section G-G: East of Abel Street

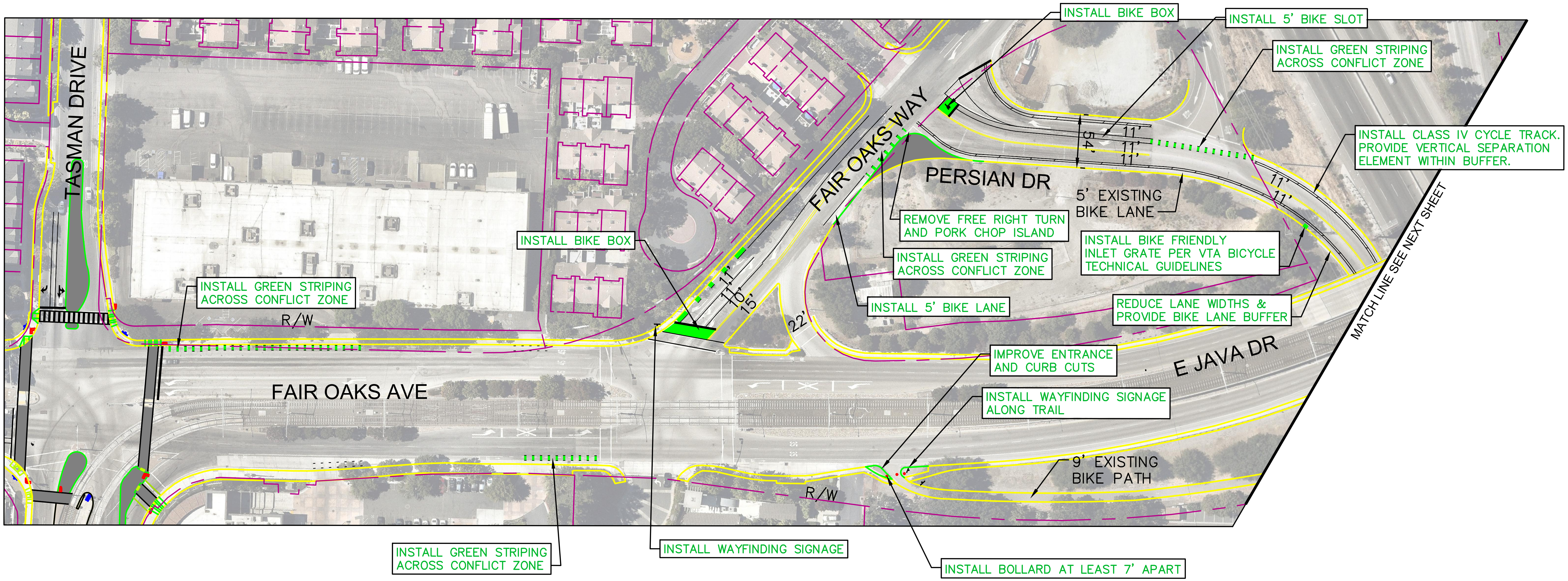


APPENDIX C

ALTERNATIVE BIKE ROUTE OPTIONS

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

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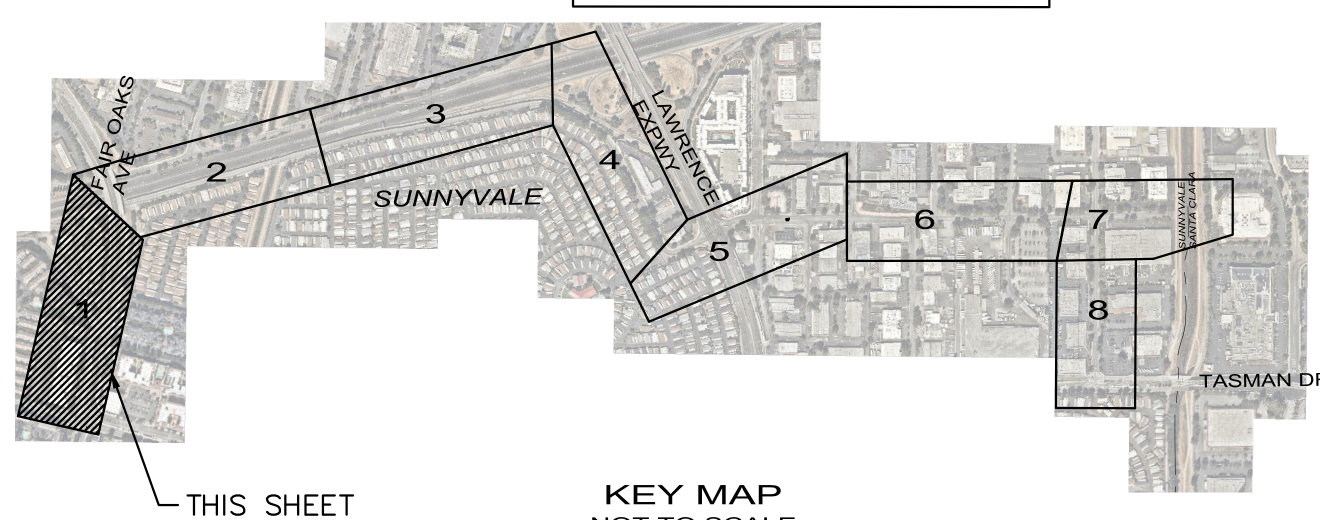

KEY MAP
NOT TO SCALE

GRAPHIC SCALE
(IN FEET)
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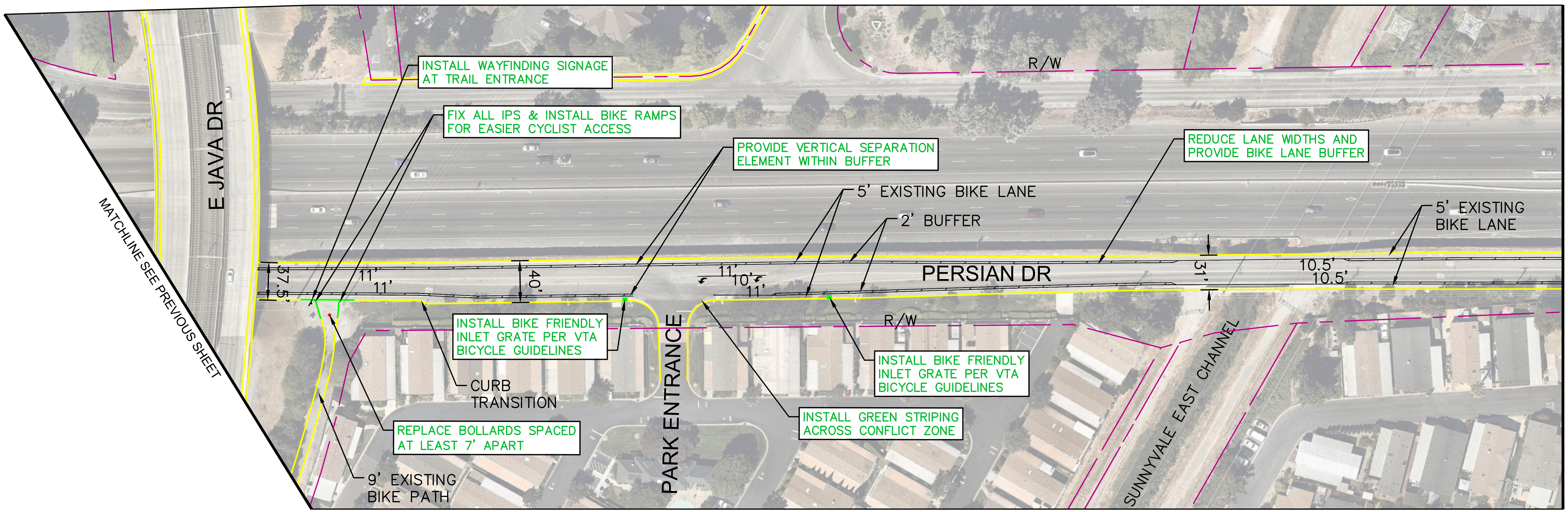
SUNNYVALE
BIKE ALTERNATIVES -
NORTH OPTION
June 2019
SHEET 1 OF 8

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



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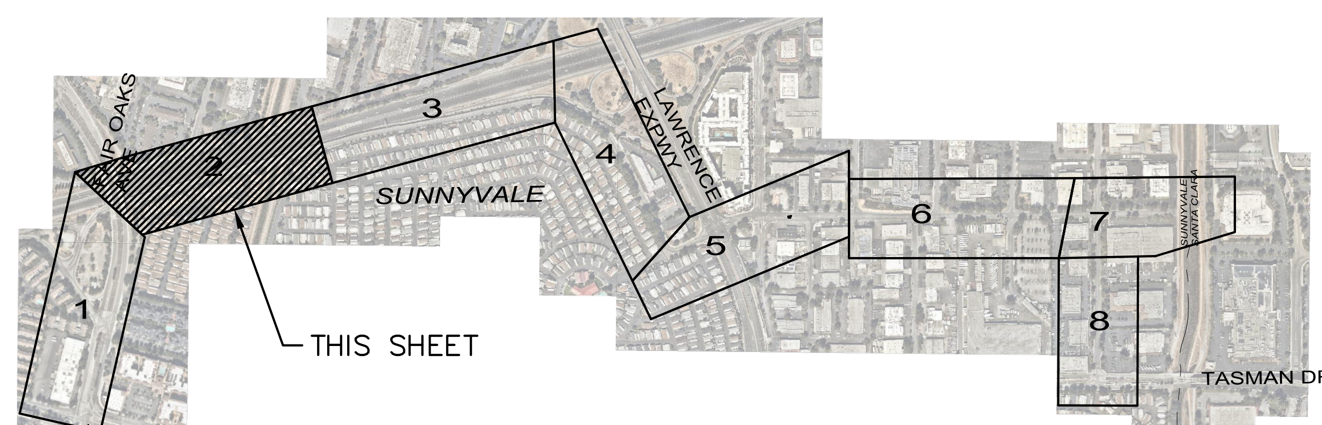

KEY MAP
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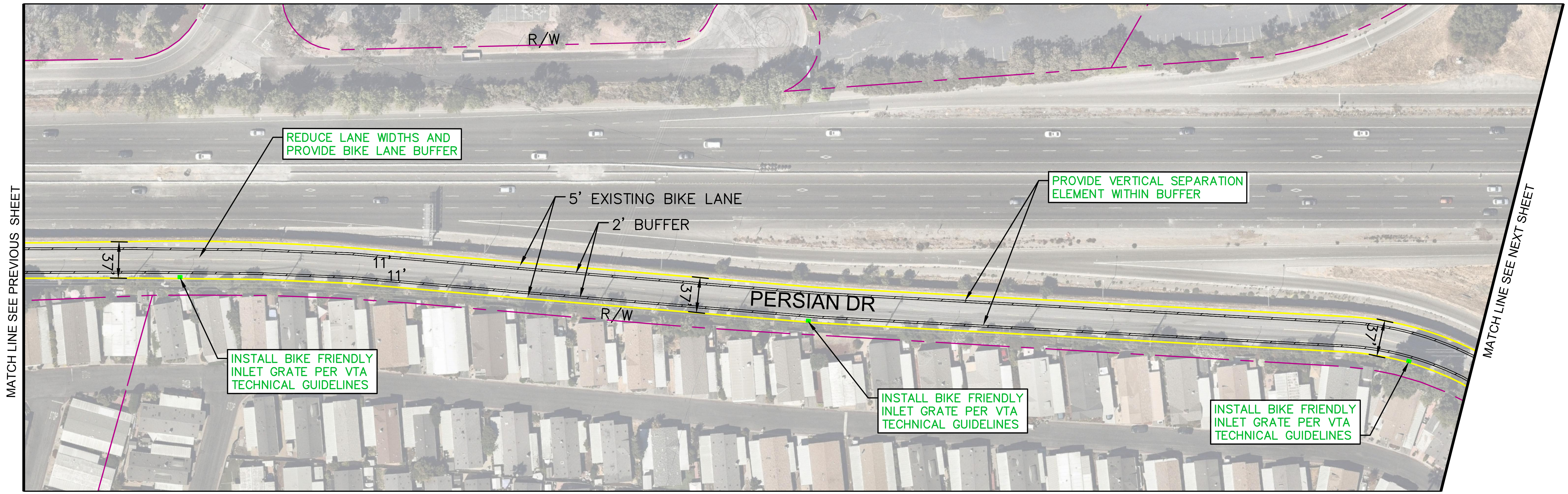
SUNNYVALE
BIKE ALTERNATIVES -
NORTH OPTION
June 2019
SHEET 2 OF 8

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

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TRANSIT RECOMMENDATION
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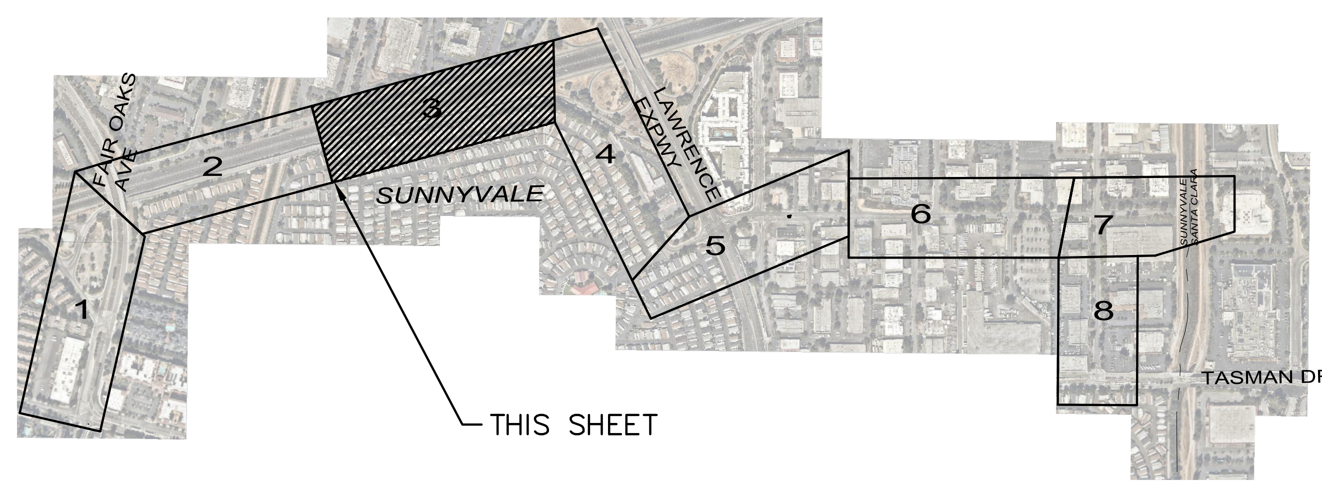
GENERAL MAINTENANCE RECOMMENDATION



KEY MAP
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GRAPHIC SCALE
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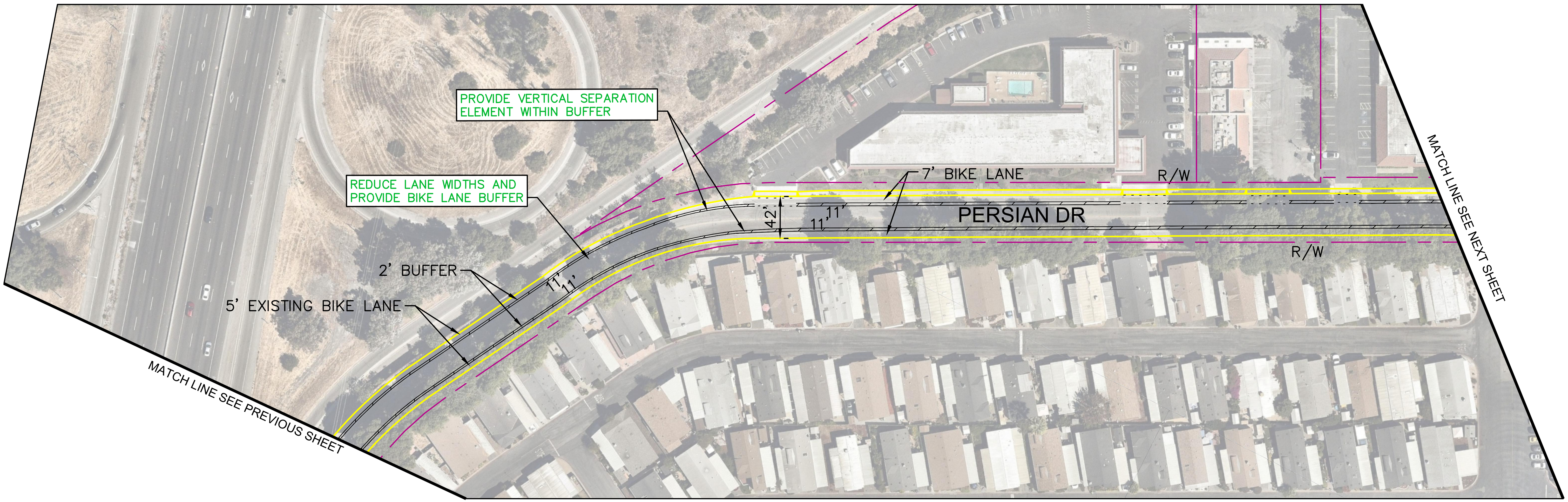
SUNNYVALE
BIKE ALTERNATIVES - NORTH OPTION
June 2019
SHEET 3 OF 8

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

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TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
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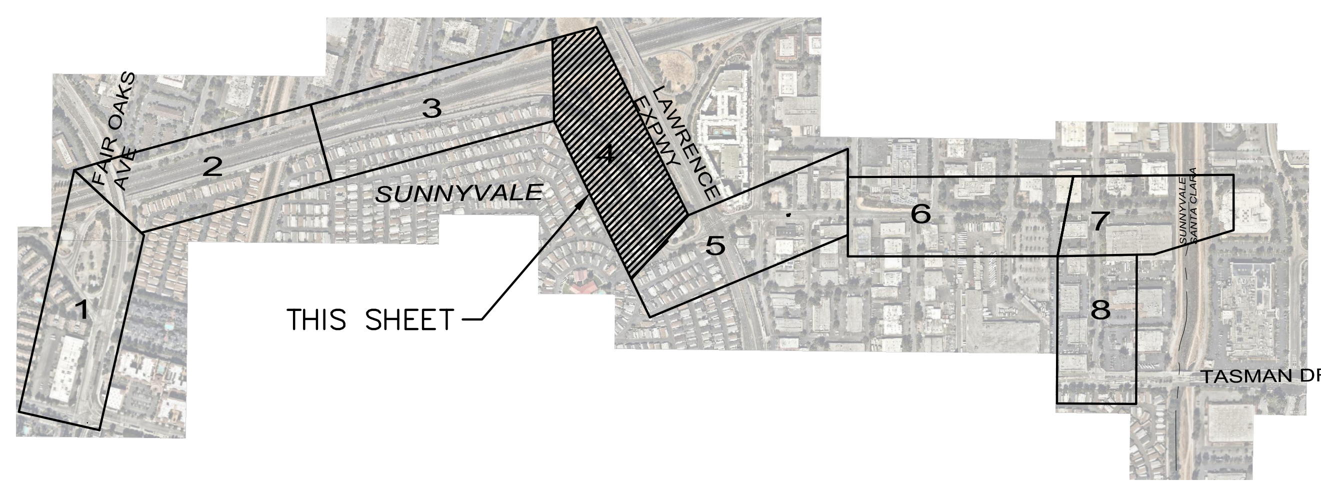

KEY MAP
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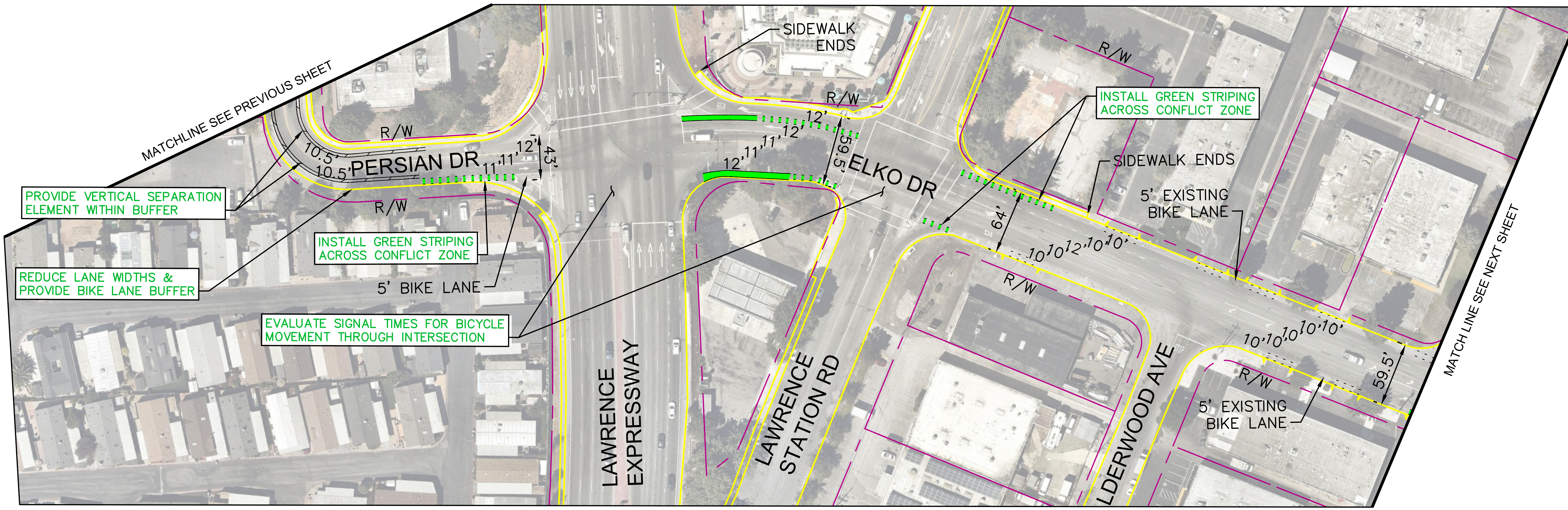
SUNNYVALE
BIKE ALTERNATIVES -
NORTH OPTION
June 2019
SHEET 4 OF 8

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

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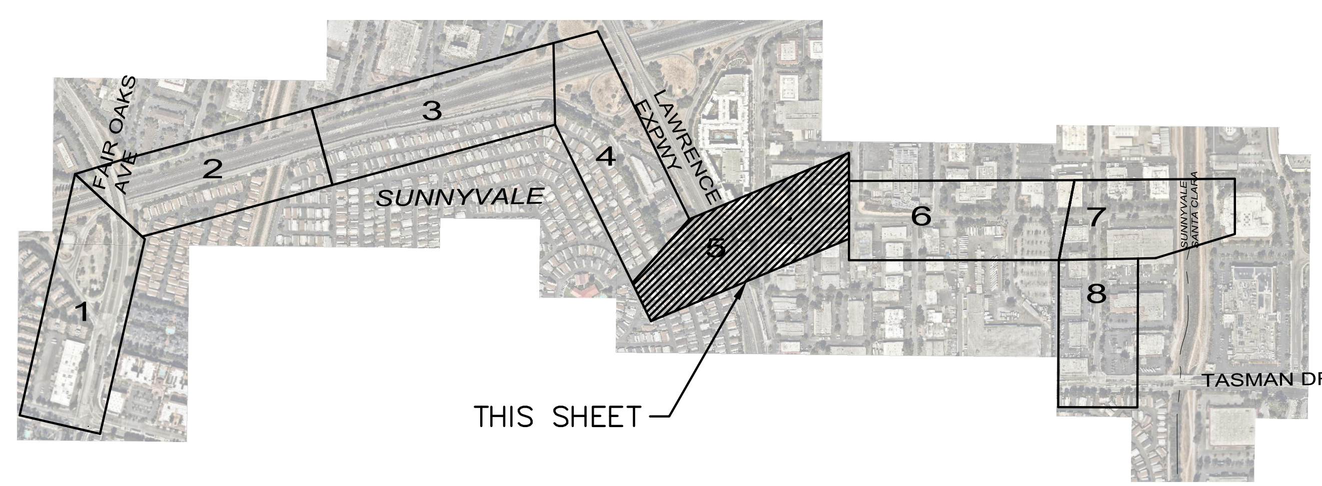
SUNNYVALE
BIKE ALTERNATIVES - NORTH OPTION
June 2019
SHEET 5 OF 8



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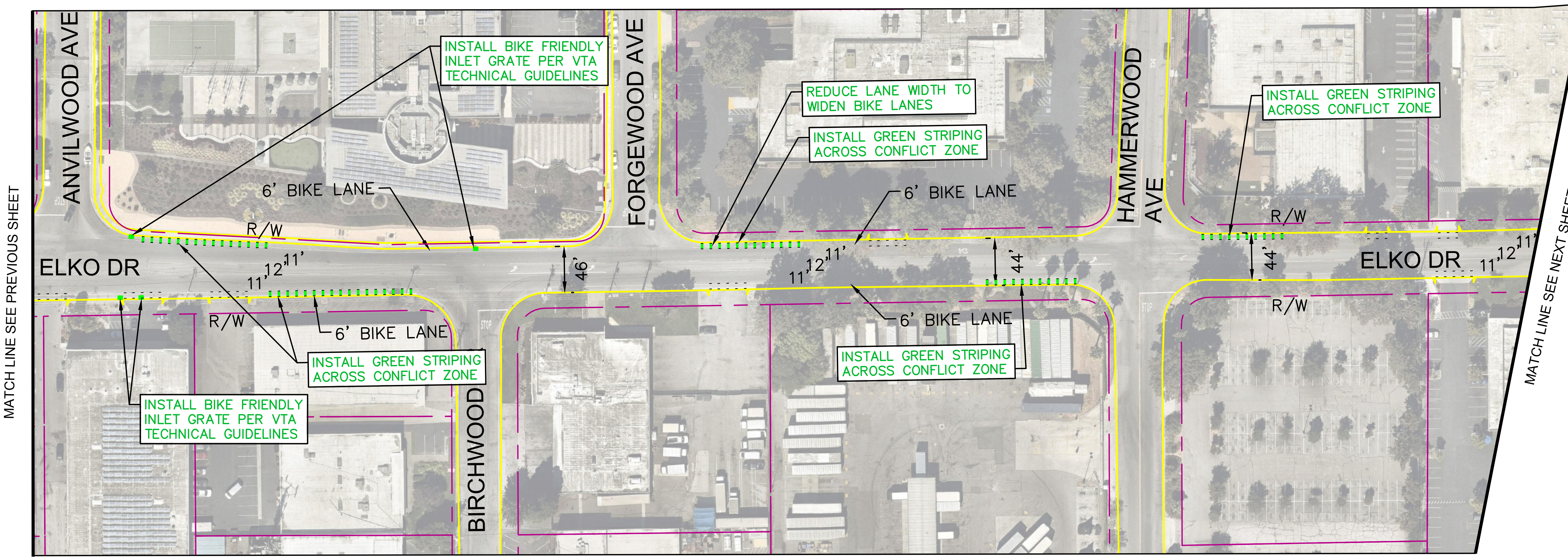
Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



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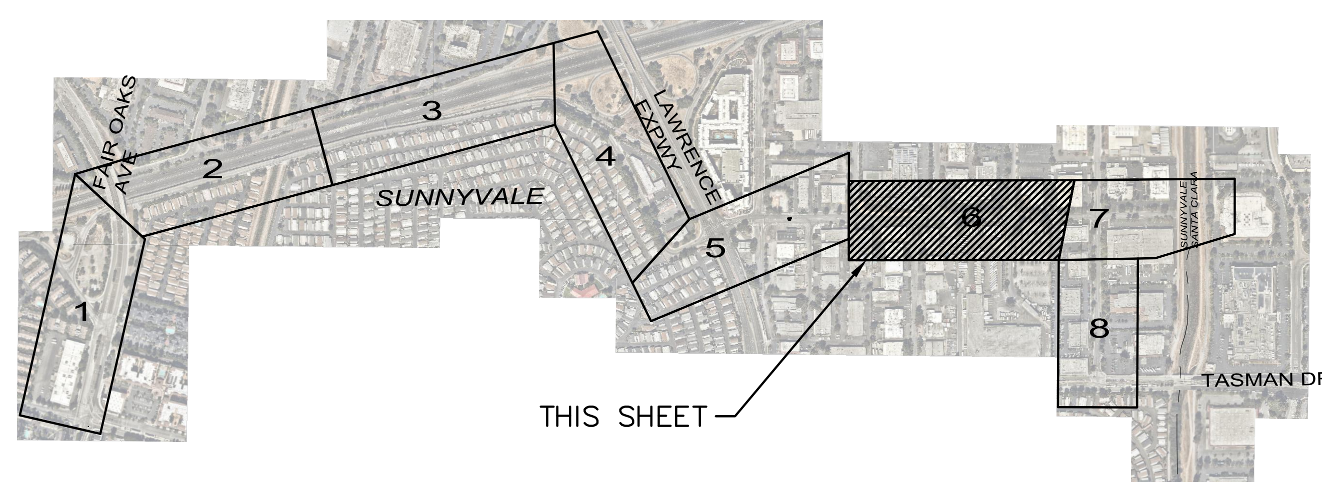
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

SUNNYVALE
BIKE ALTERNATIVES - NORTH OPTION
June 2019
SHEET 6 OF 8



KEY MAP
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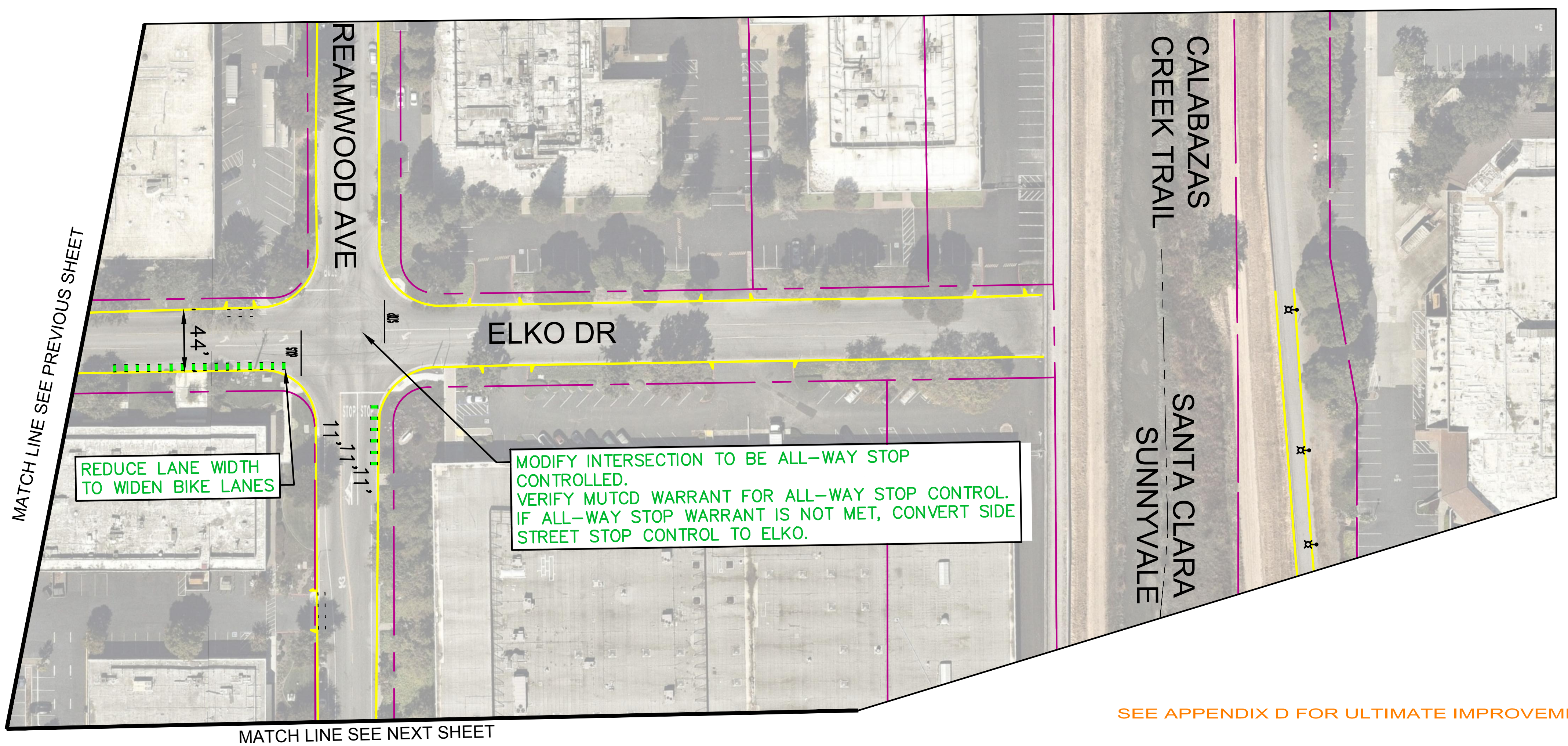
Kimley»Horn



SEE APPENDIX D FOR ULTIMATE IMPROVEMENT SHEETS

LEGEND

- RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
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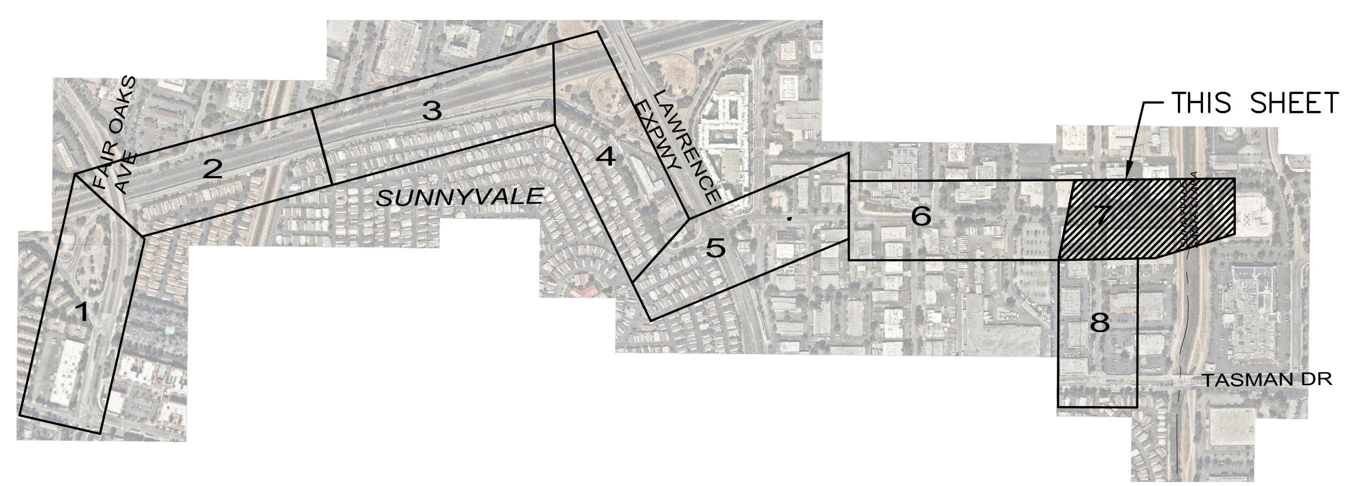
- LANDSCAPING RECOMMENDATION
- GENERAL MAINTENANCE RECOMMENDATION



KEY MAP
NOT TO SCALE

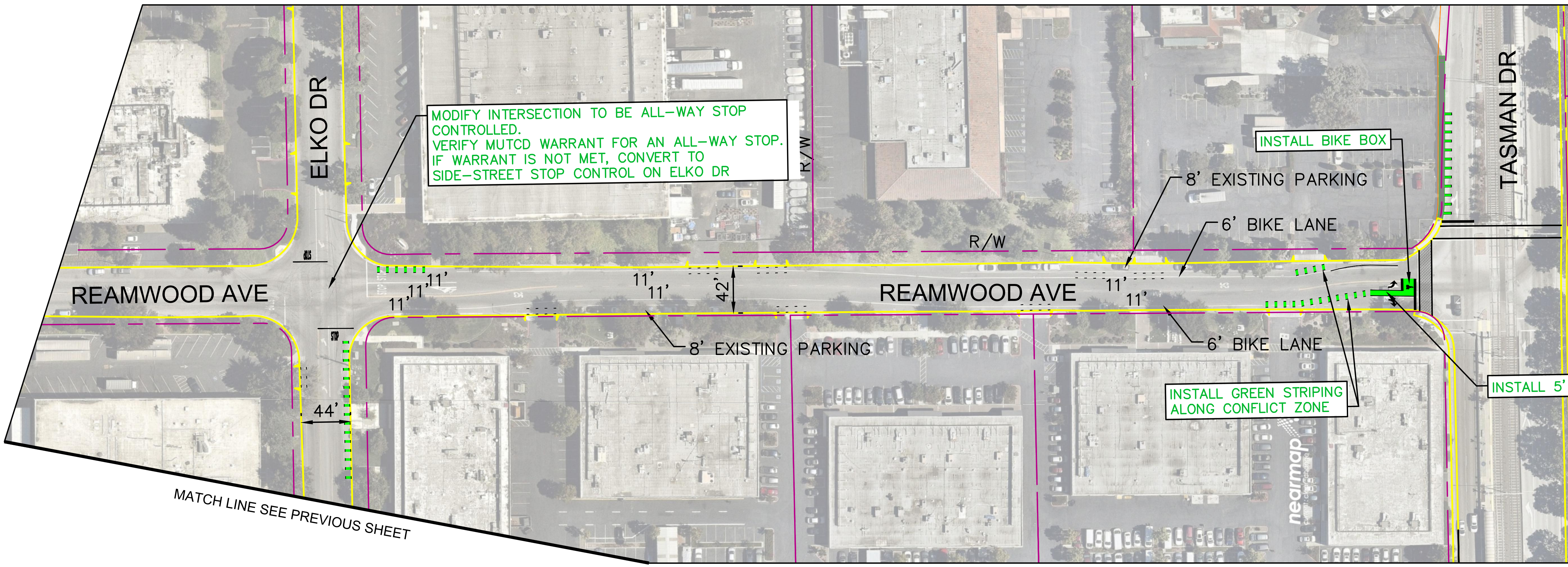
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

SUNNYVALE
BIKE ALTERNATIVES - NORTH OPTION
June 2019
SHEET 7 (NEAR TERM) OF 8

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

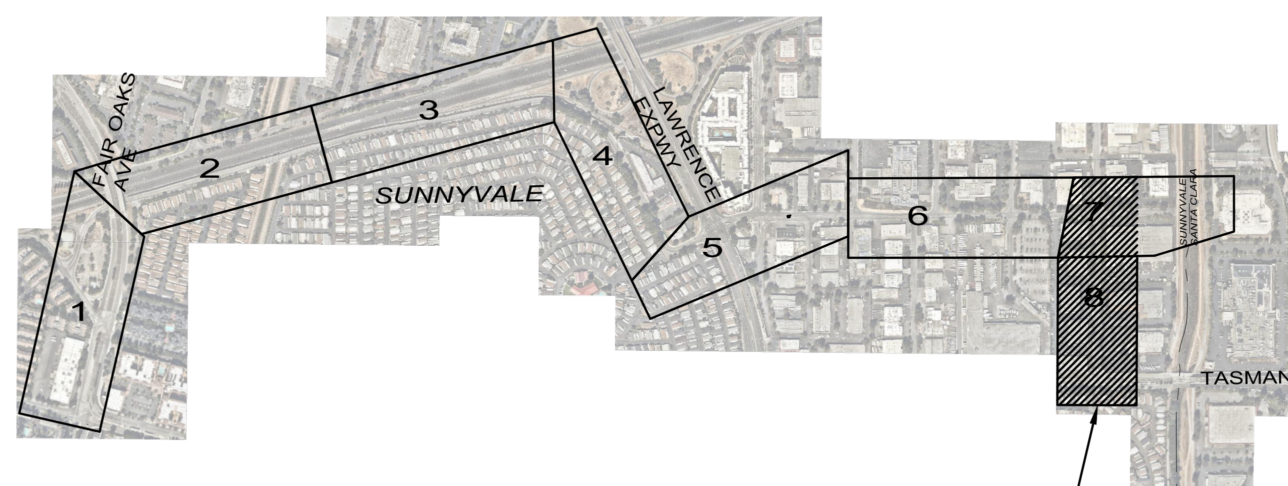


LEGEND

- RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

SUNNYVALE
BIKE ALTERNATIVES - NORTH OPTION
June 2019
SHEET 8 (NEAR TERM) OF 8



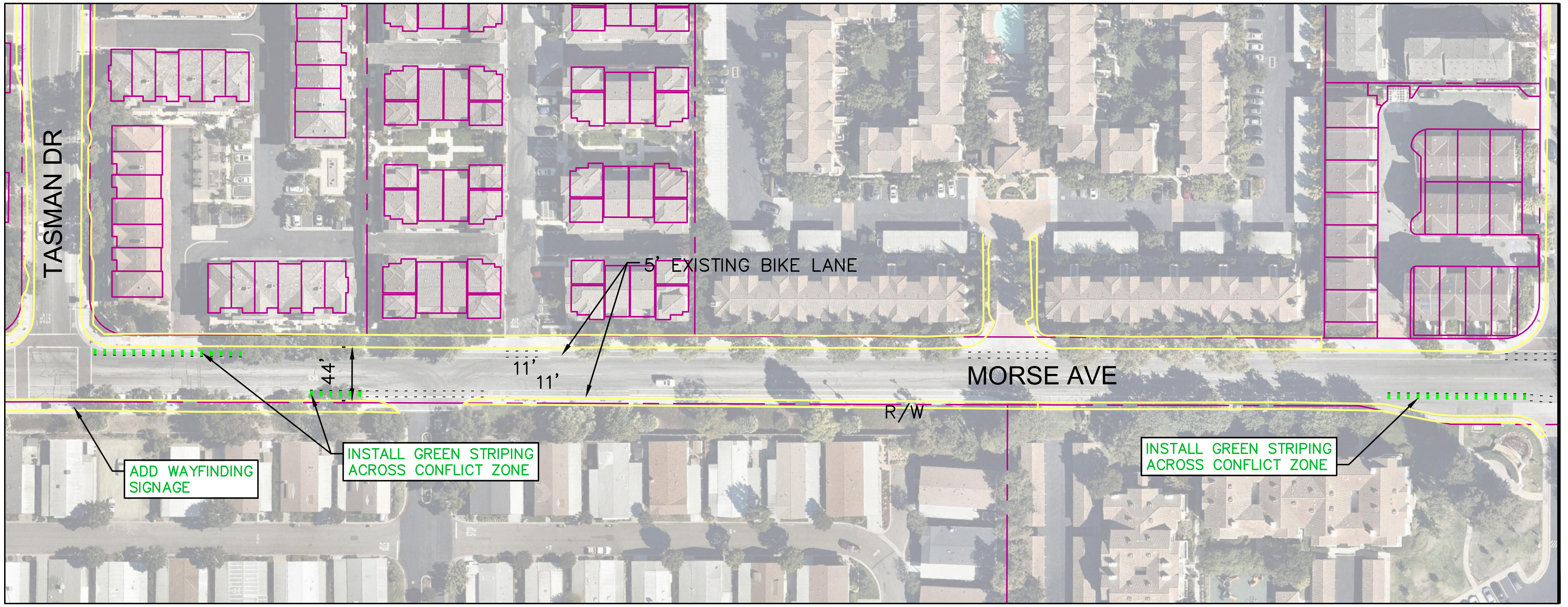
KEY MAP
NOT TO SCALE

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

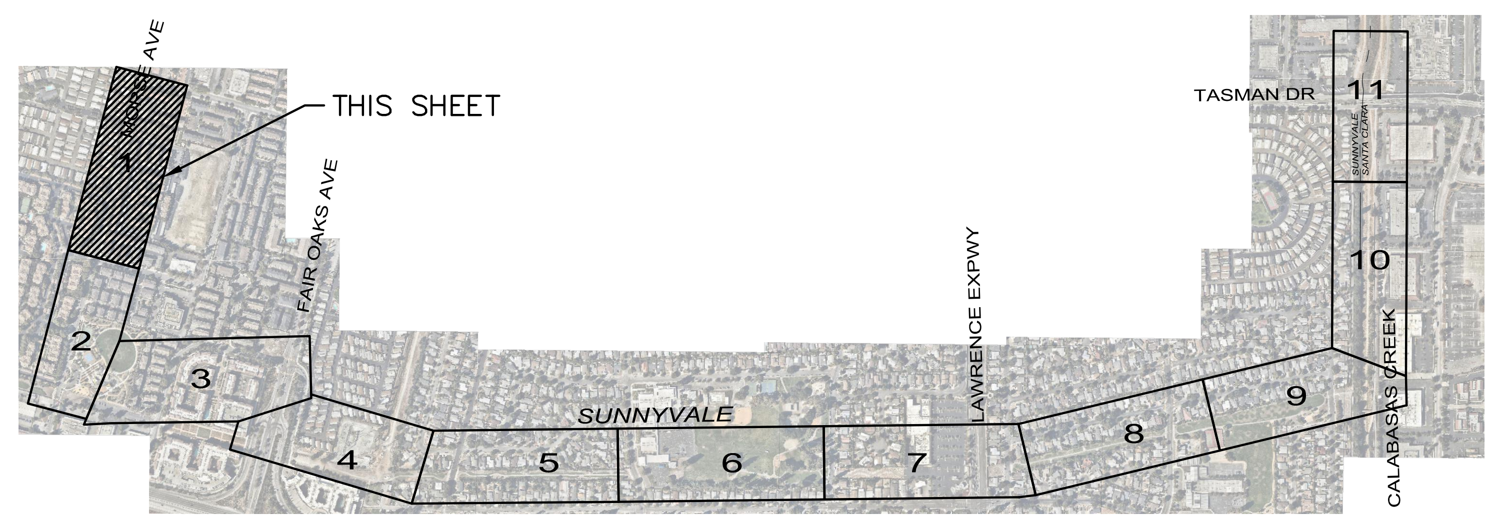
Santa Clara Valley Transportation Authority



LEGEND

- RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

- VEHICLE/ROADWAY RECOMMENDATION
- PEDESTRIAN RECOMMENDATION
- BICYCLE RECOMMENDATION
- TRANSIT RECOMMENDATION
- LANDSCAPING RECOMMENDATION
- GENERAL MAINTENANCE RECOMMENDATION



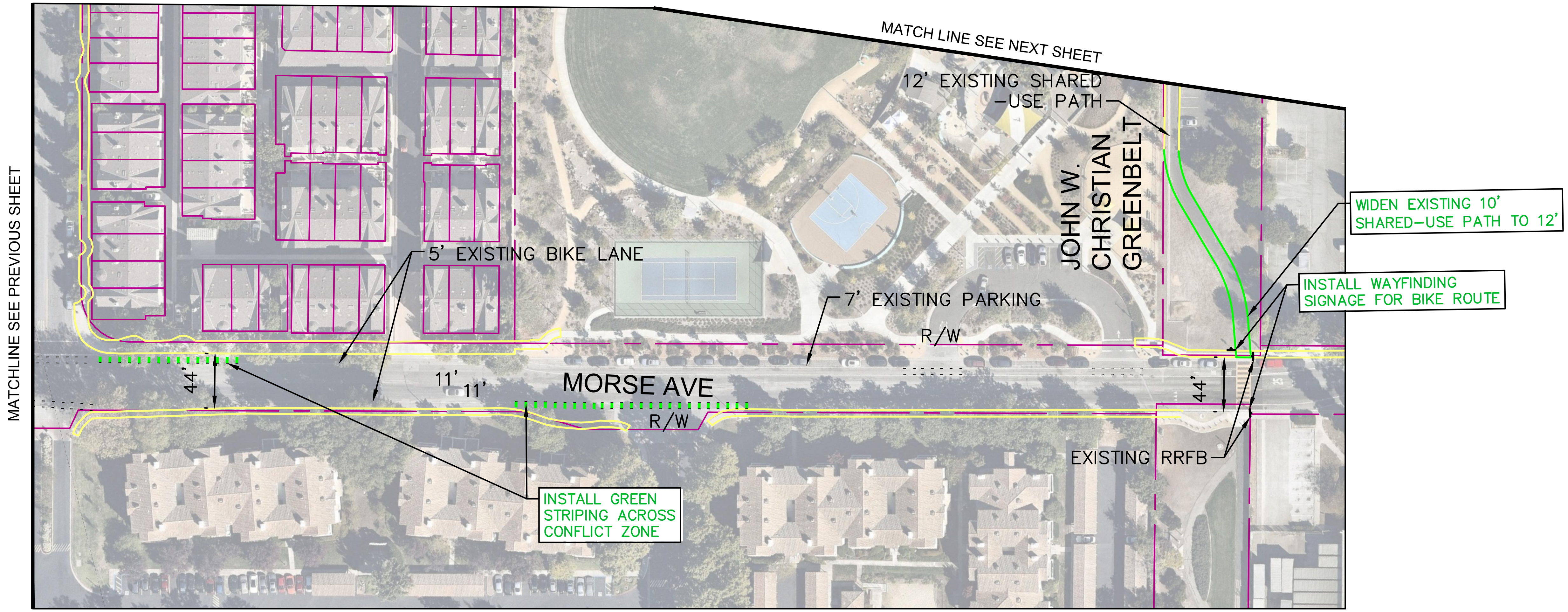
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

SUNNYVALE
BIKE ALTERNATIVES -
SOUTH OPTION
May 2019
SHEET 1 OF 11

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

- RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
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VEHICLE/ROADWAY RECOMMENDATION
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TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
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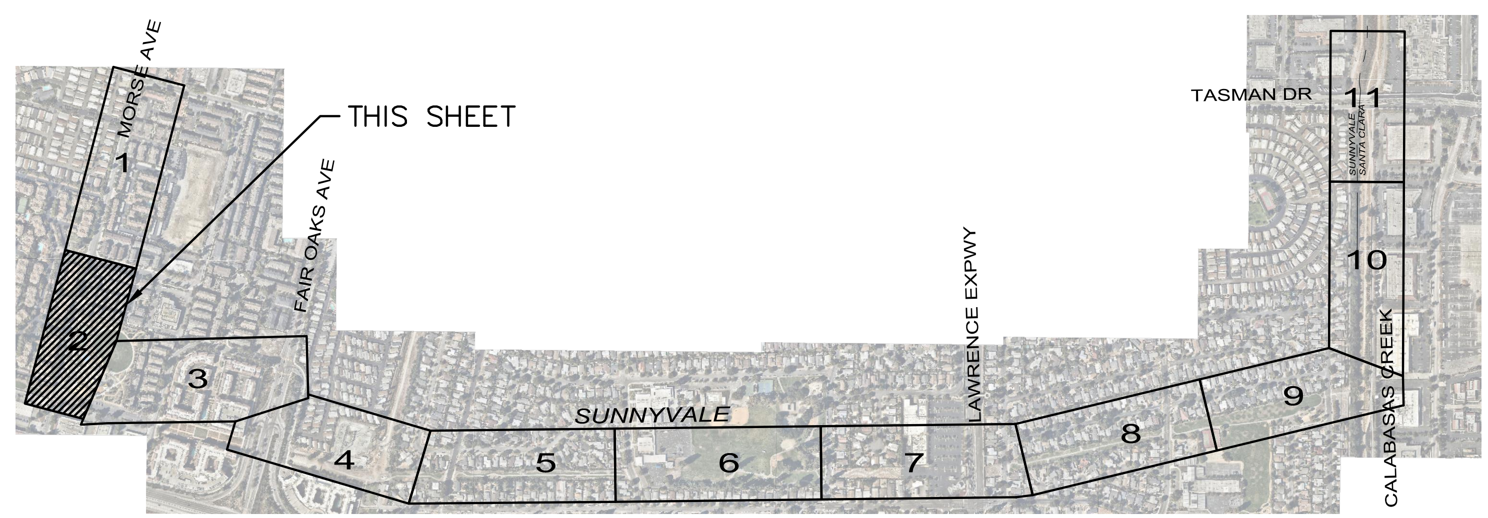
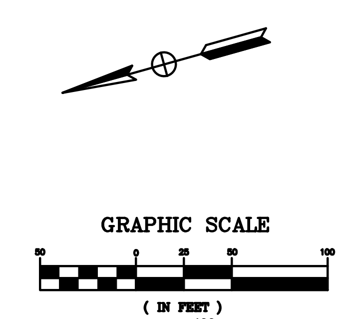


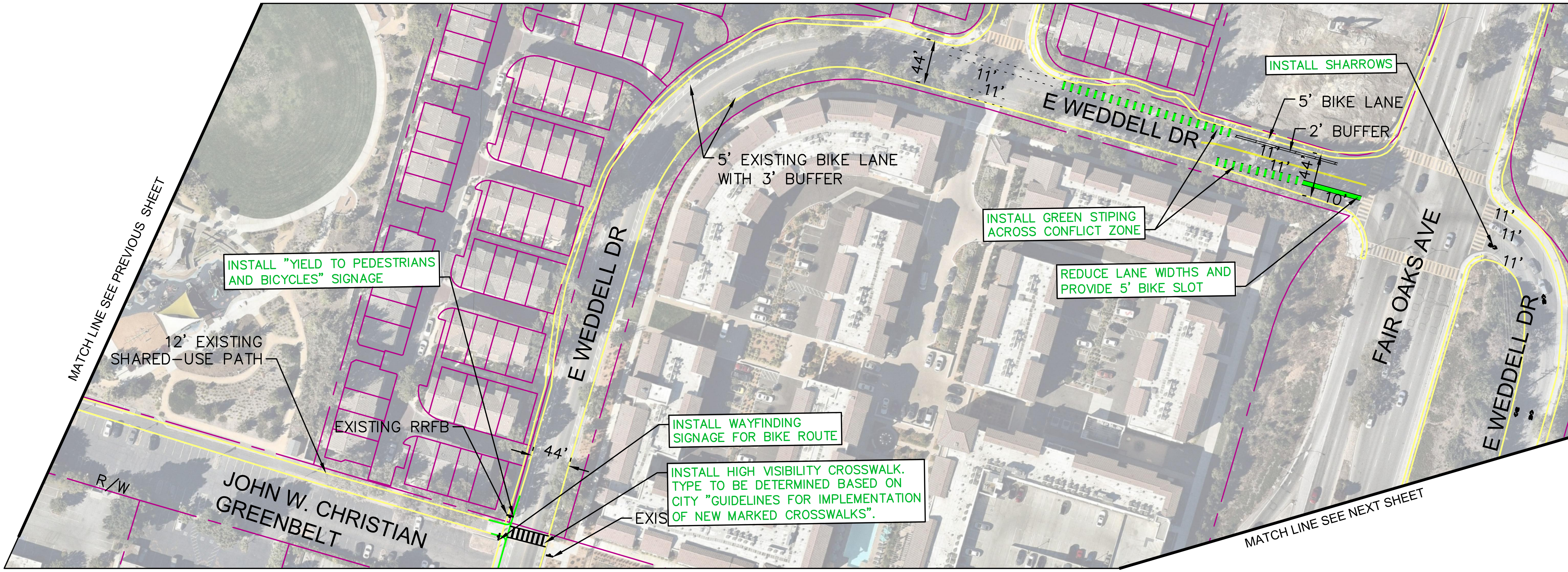


SUNNYVALE
BIKE ALTERNATIVES -
SOUTH OPTION
June 2019
SHEET 2 OF 11

Kimley»Horn

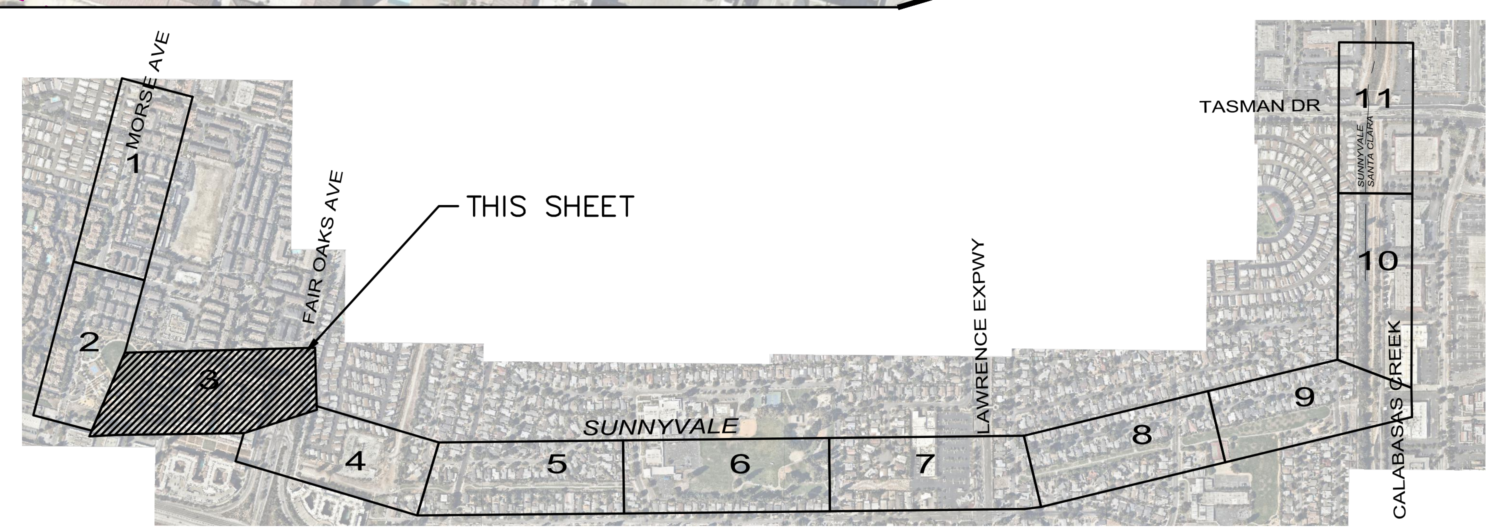
Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	



GRAPHIC SCALE
(IN FEET)
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SUNNYVALE
BIKE ALTERNATIVES -
SOUTH OPTION
June 2019
SHEET 3 OF 11

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

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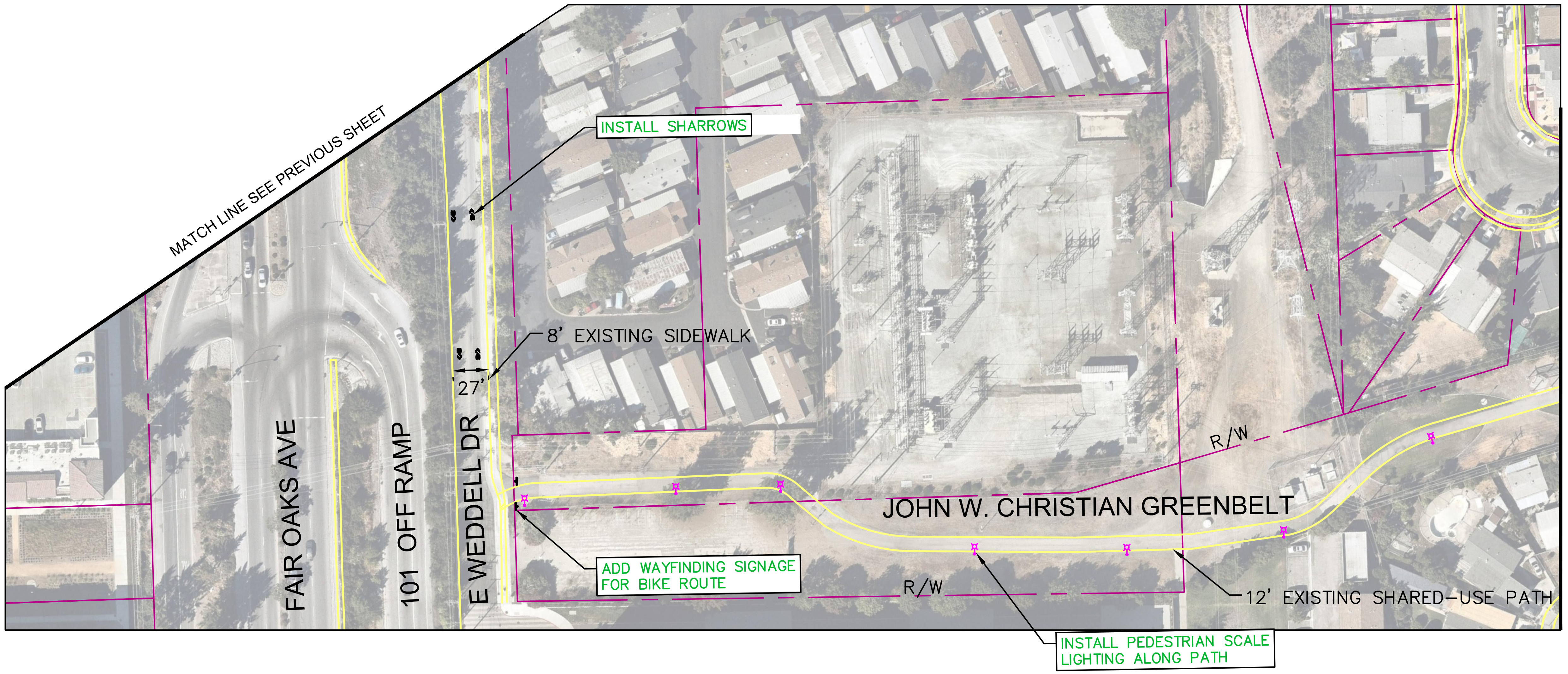
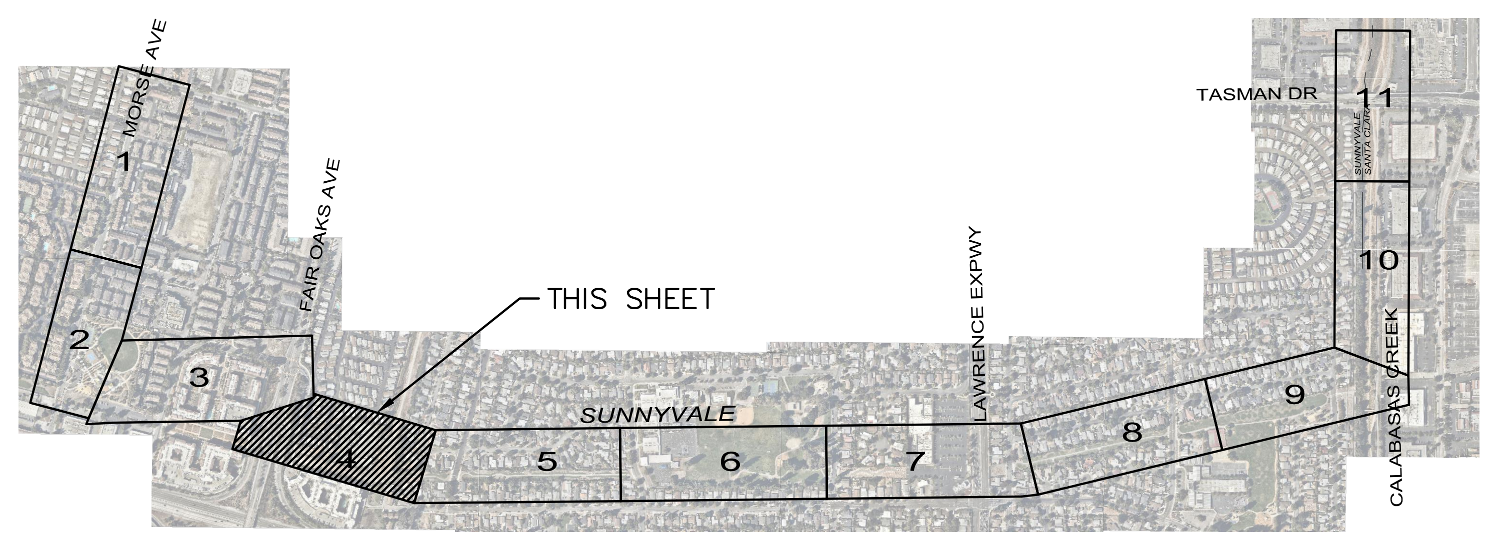


LEGEND

RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

SUNNYVALE
BIKE ALTERNATIVES - SOUTH OPTION
June 2019
SHEET 4 OF 11



GRAPHIC SCALE
(IN FEET)
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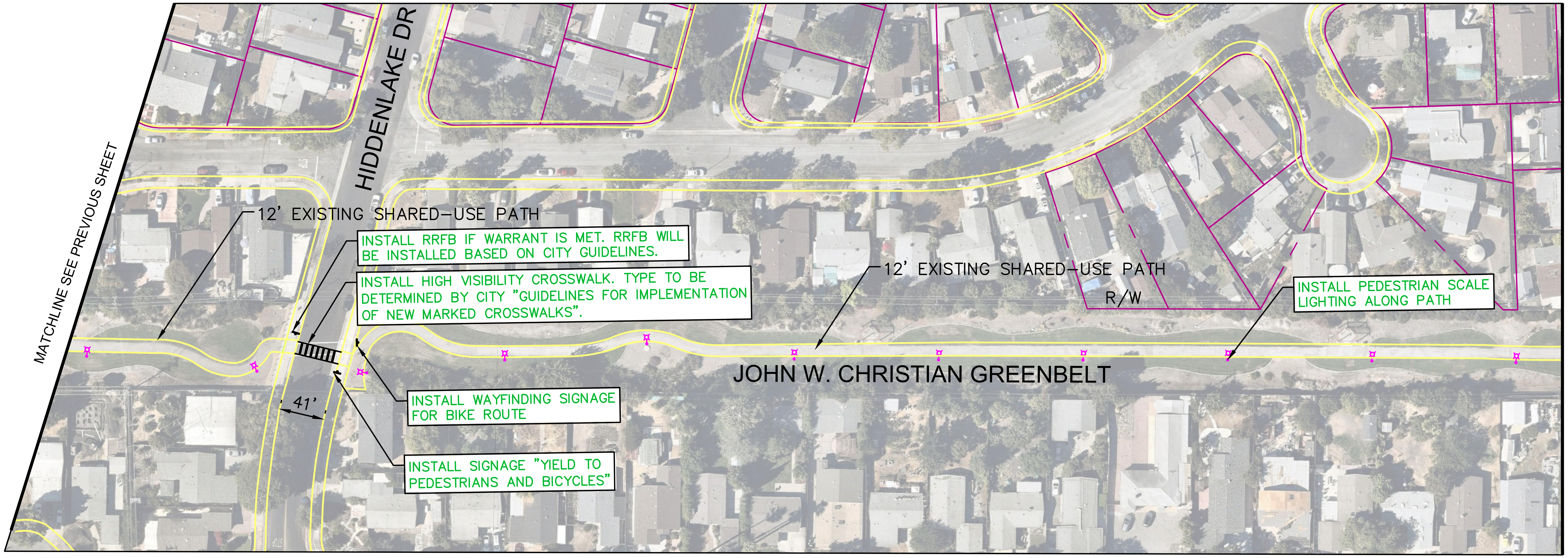
Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

- RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
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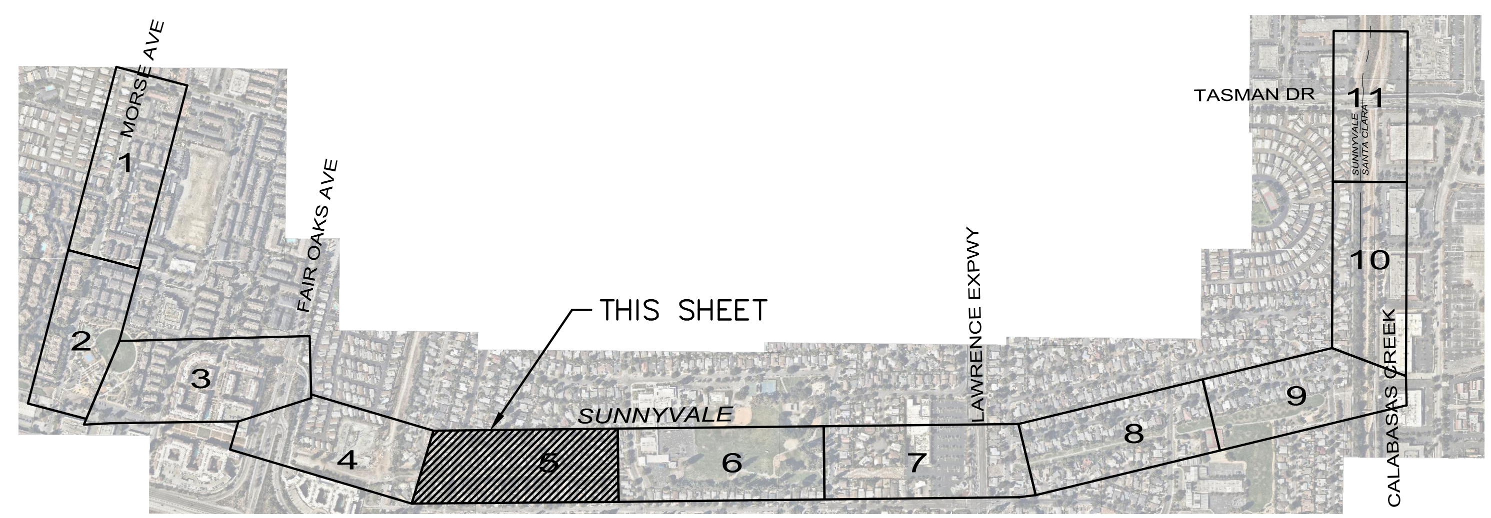

GRAPHIC SCALE
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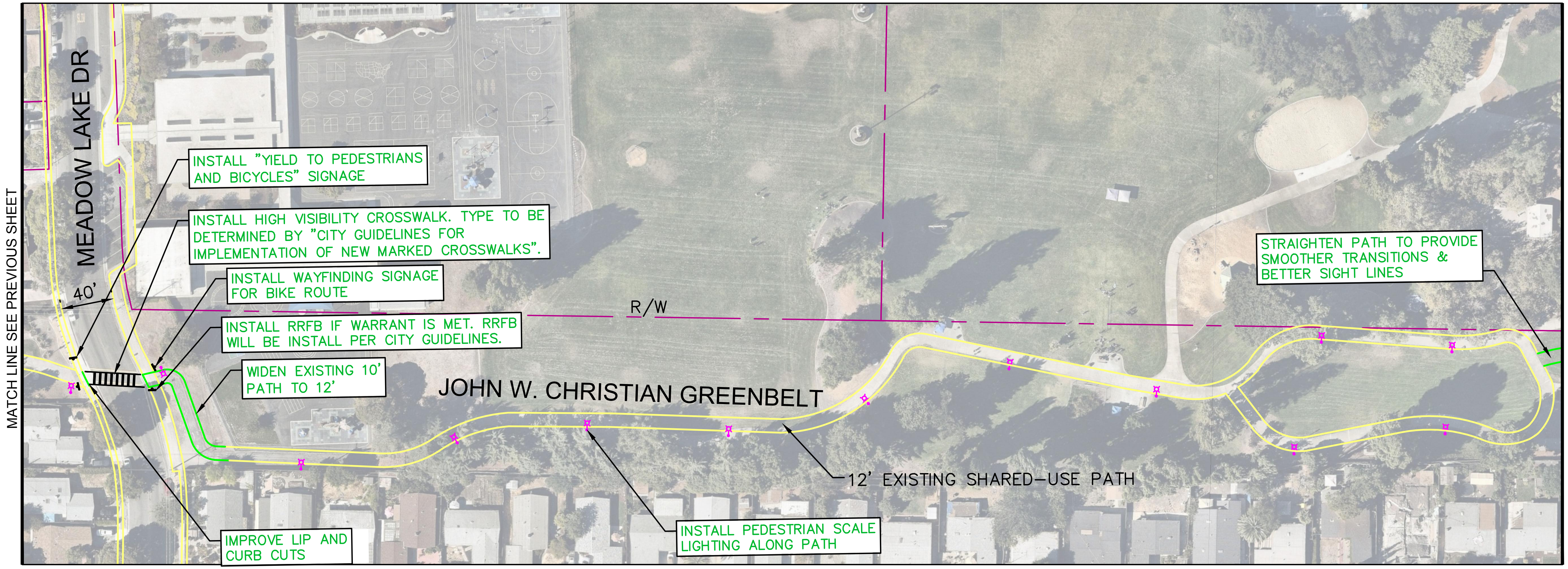
SUNNYVALE
BIKE ALTERNATIVES -
SOUTH OPTION
June 2019
SHEET 5 OF 11

Kimley»Horn



LEGEND

- RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
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- NEAR-TERM RIGHT OF WAY
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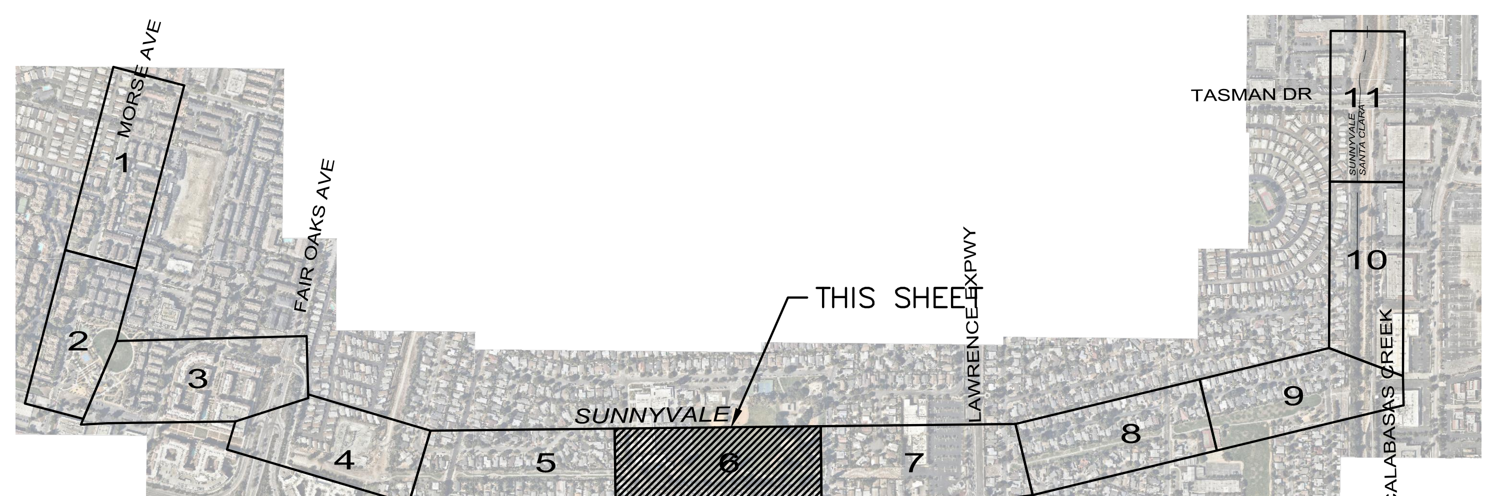

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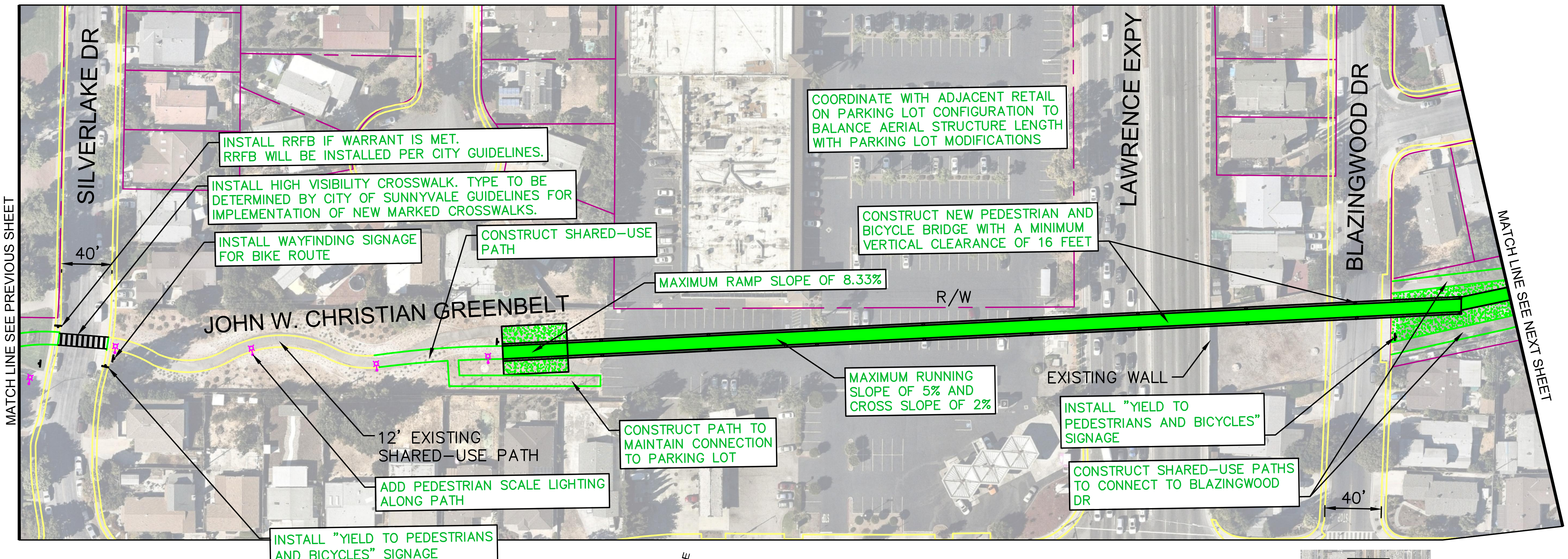
SUNNYVALE
BIKE ALTERNATIVES -
SOUTH OPTION
June 2019
SHEET 6 OF 11

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

RIGHT OF WAY/PROPERTY LINE
EXISTING CURB/SIDEWALK
CITY BOUNDARY
PROPOSED CURB/SIDEWALK
ACCESSIBLE RAMP
NEAR-TERM RIGHT OF WAY
ULTIMATE RIGHT OF WAY

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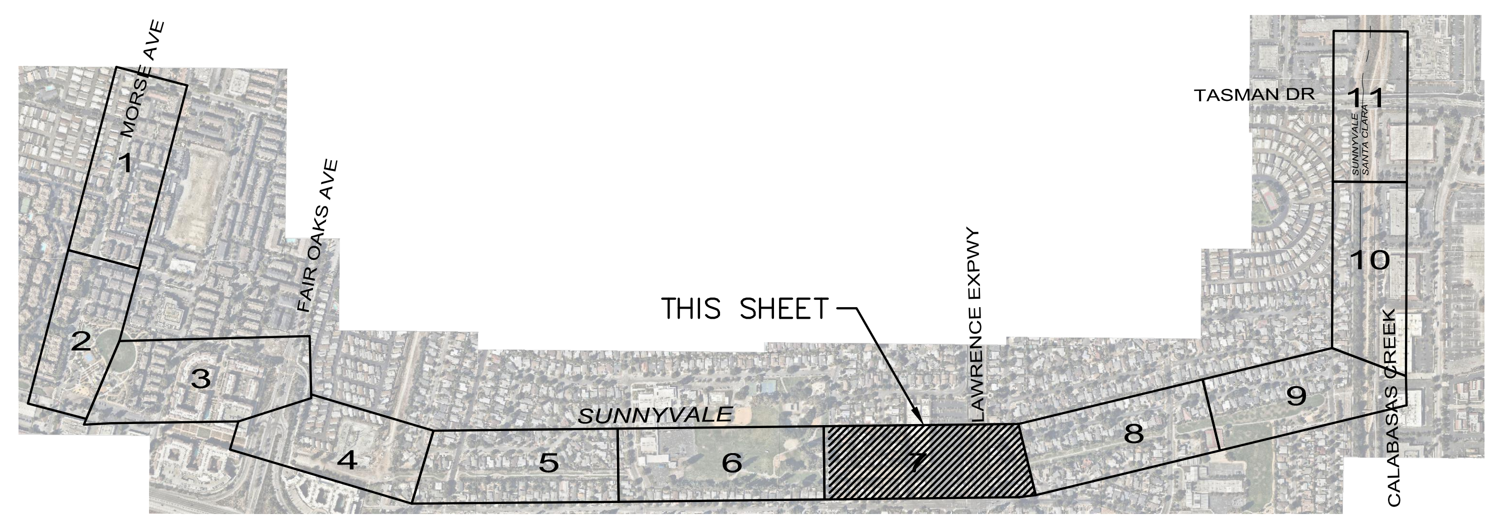

GRAPHIC SCALE
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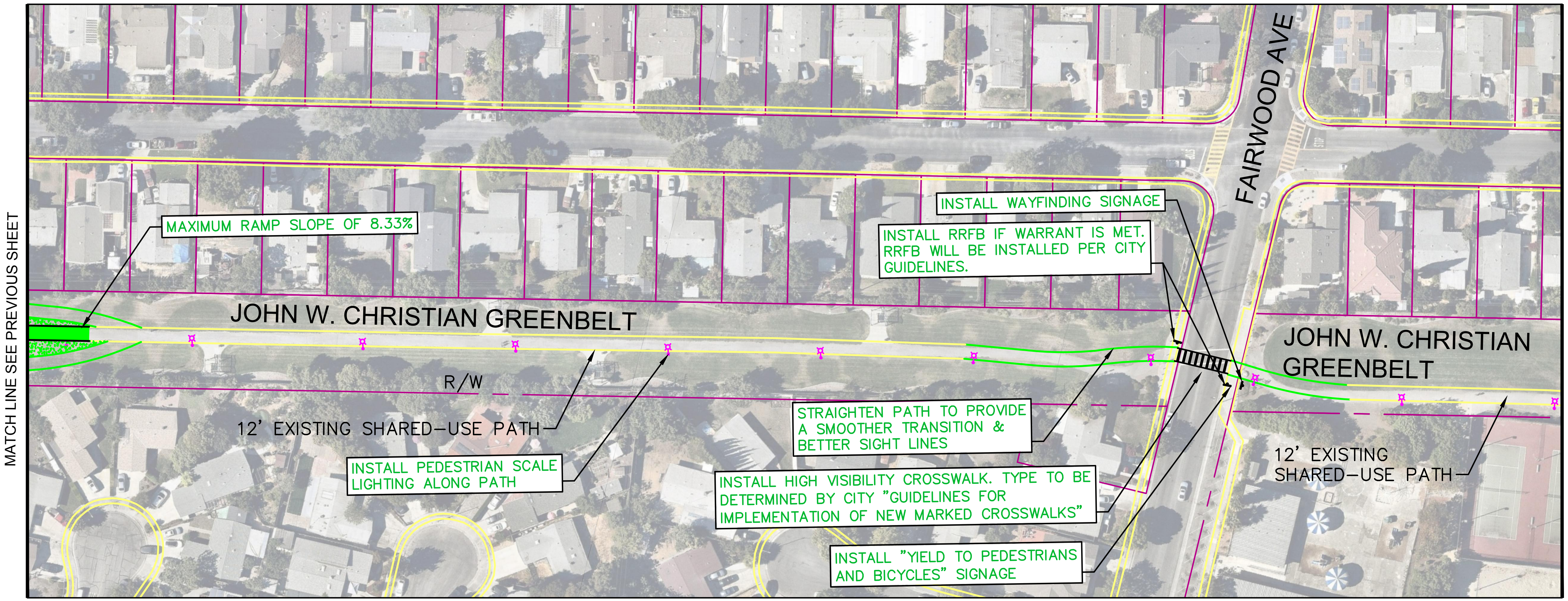
SUNNYVALE
BIKE ALTERNATIVES -
SOUTH OPTION
June 2019
SHEET 7 OF 11

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

- RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
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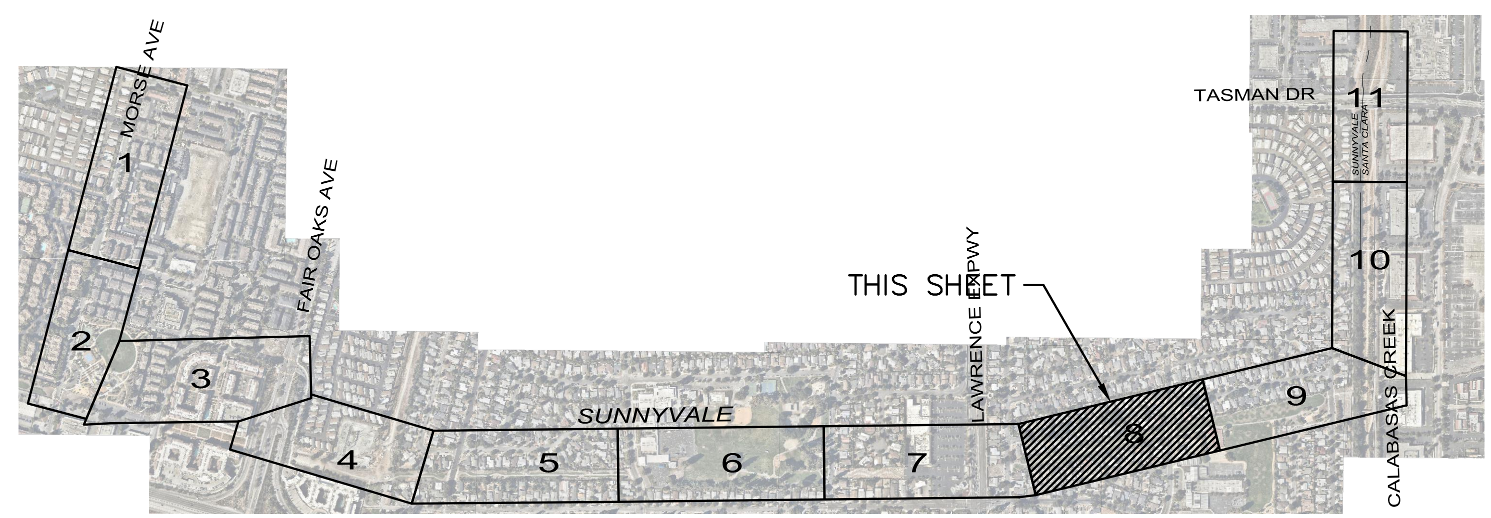


GRAPHIC SCALE

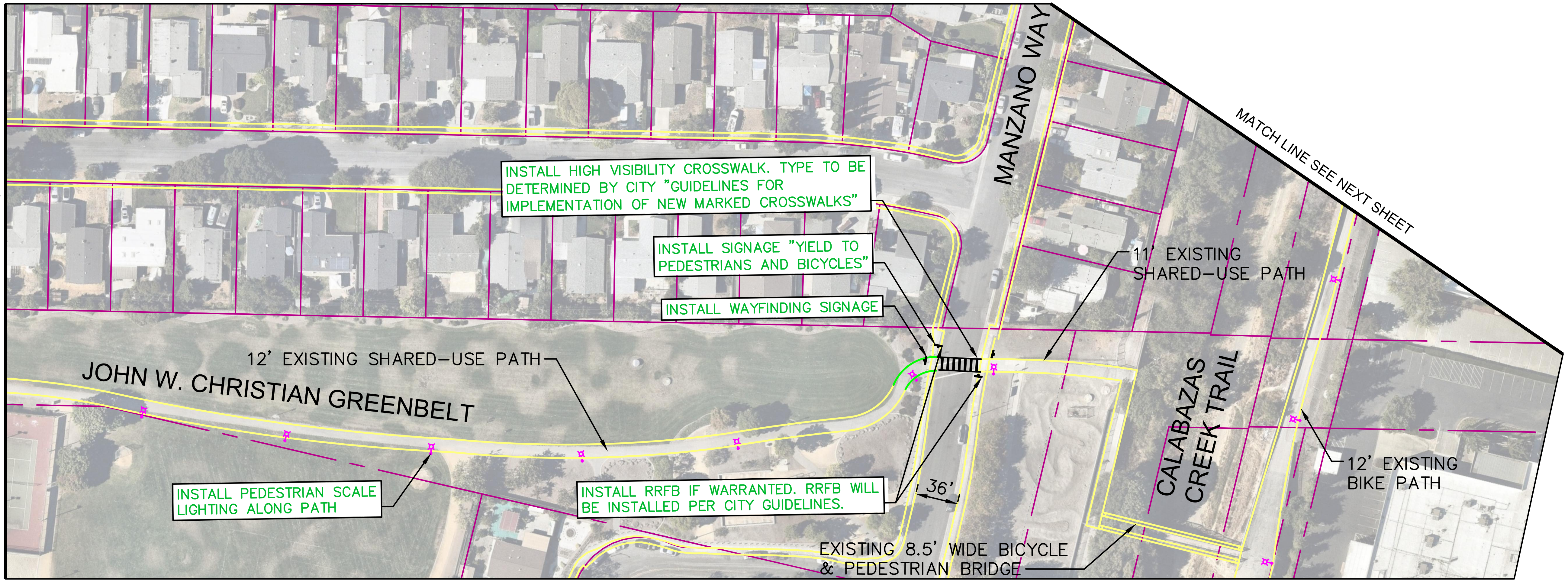
(IN FEET)
1 inch = 100 ft.

SUNNYVALE
BIKE ALTERNATIVES -
SOUTH OPTION
June 2019
SHEET 8 OF 11

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

- RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR–TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

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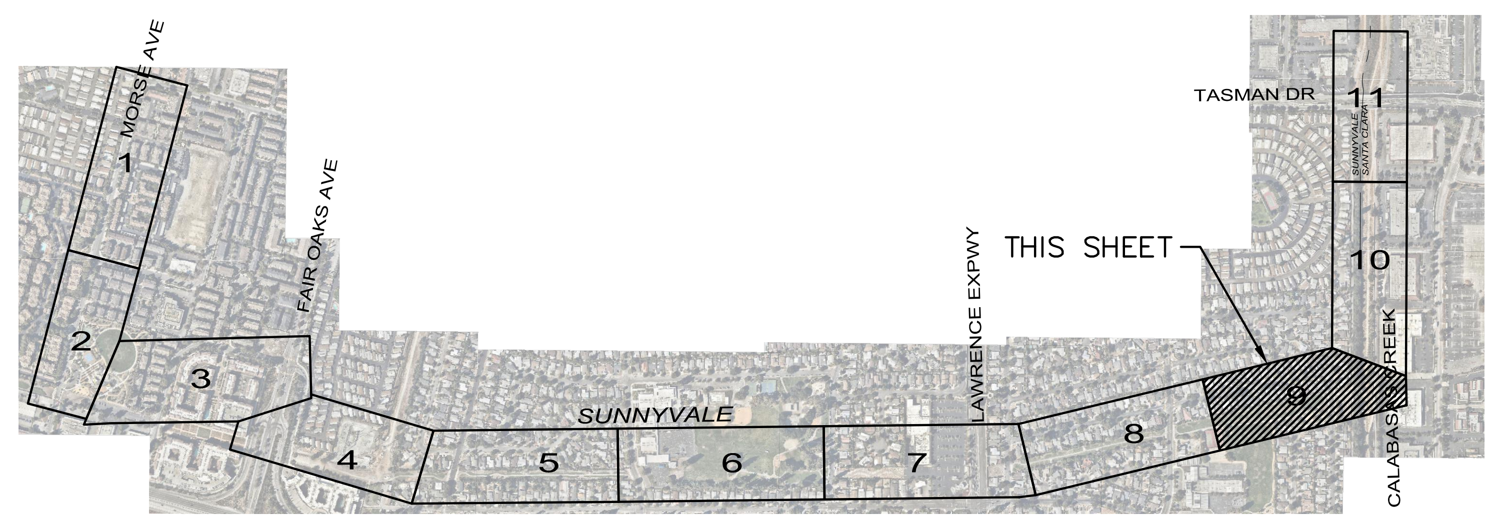

GRAPHIC SCALE
(IN FEET)
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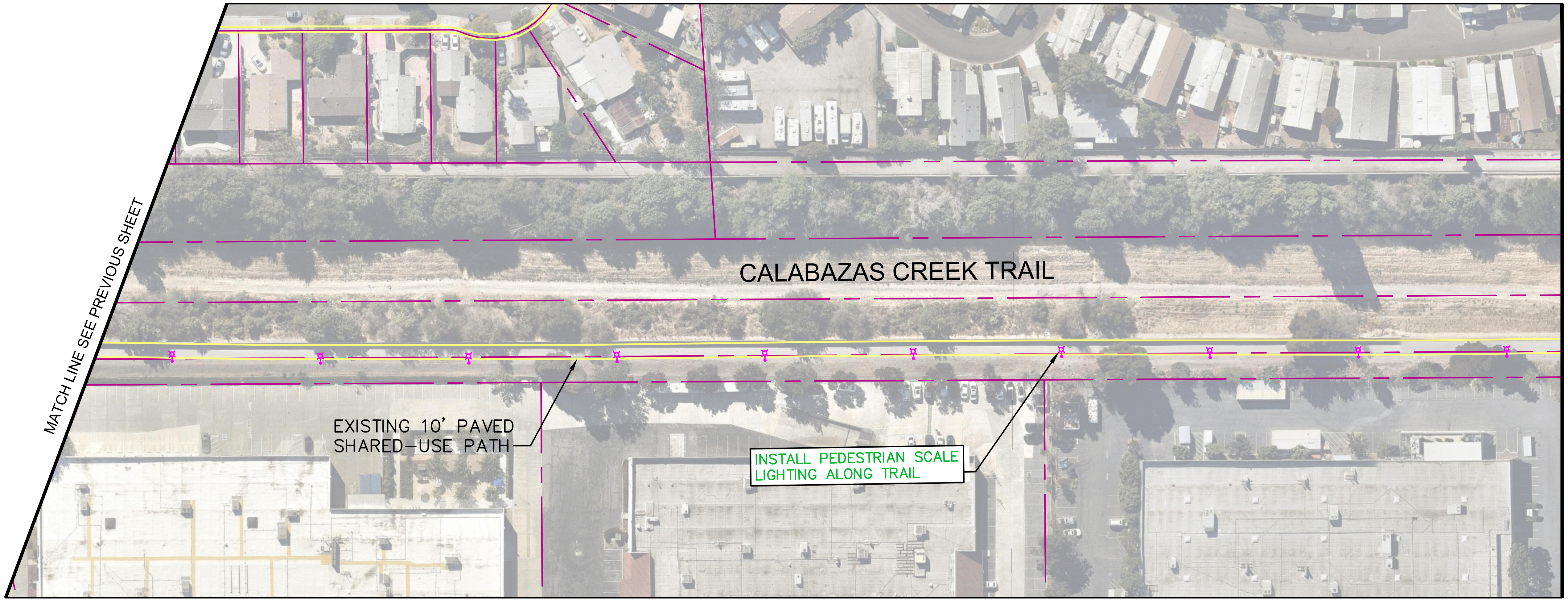
SUNNYVALE
BIKE ALTERNATIVES -
SOUTH OPTION
June 2019
SHEET 9 OF 11

Kimley»Horn

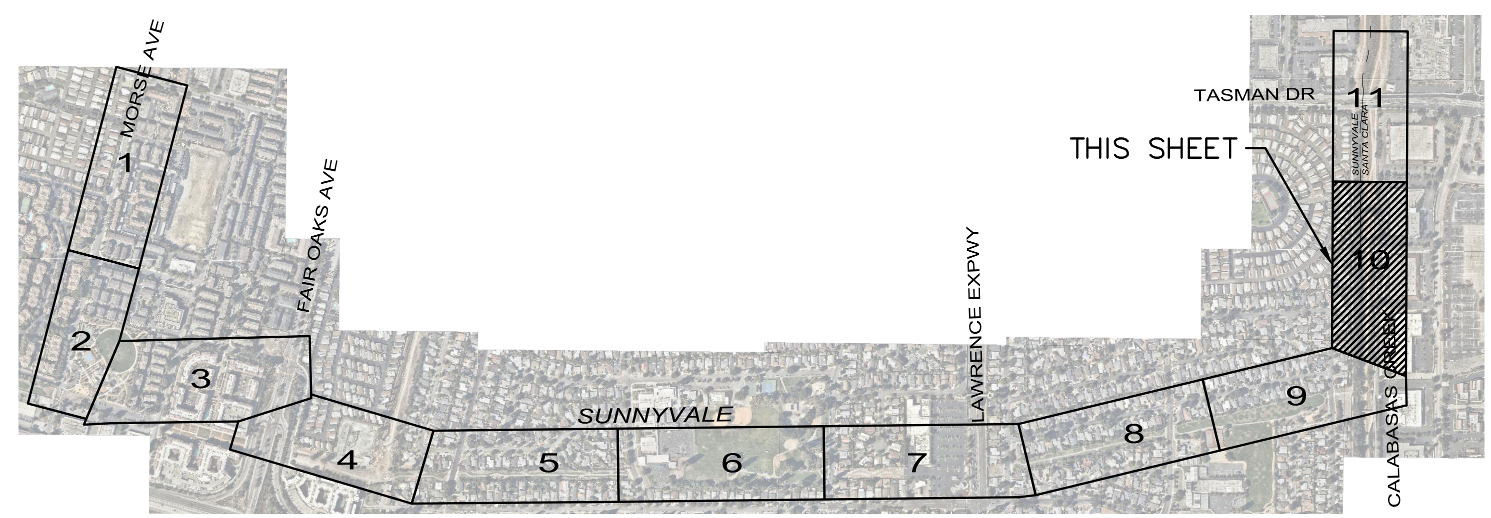
Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	



GRAPHIC SCALE
(IN FEET)
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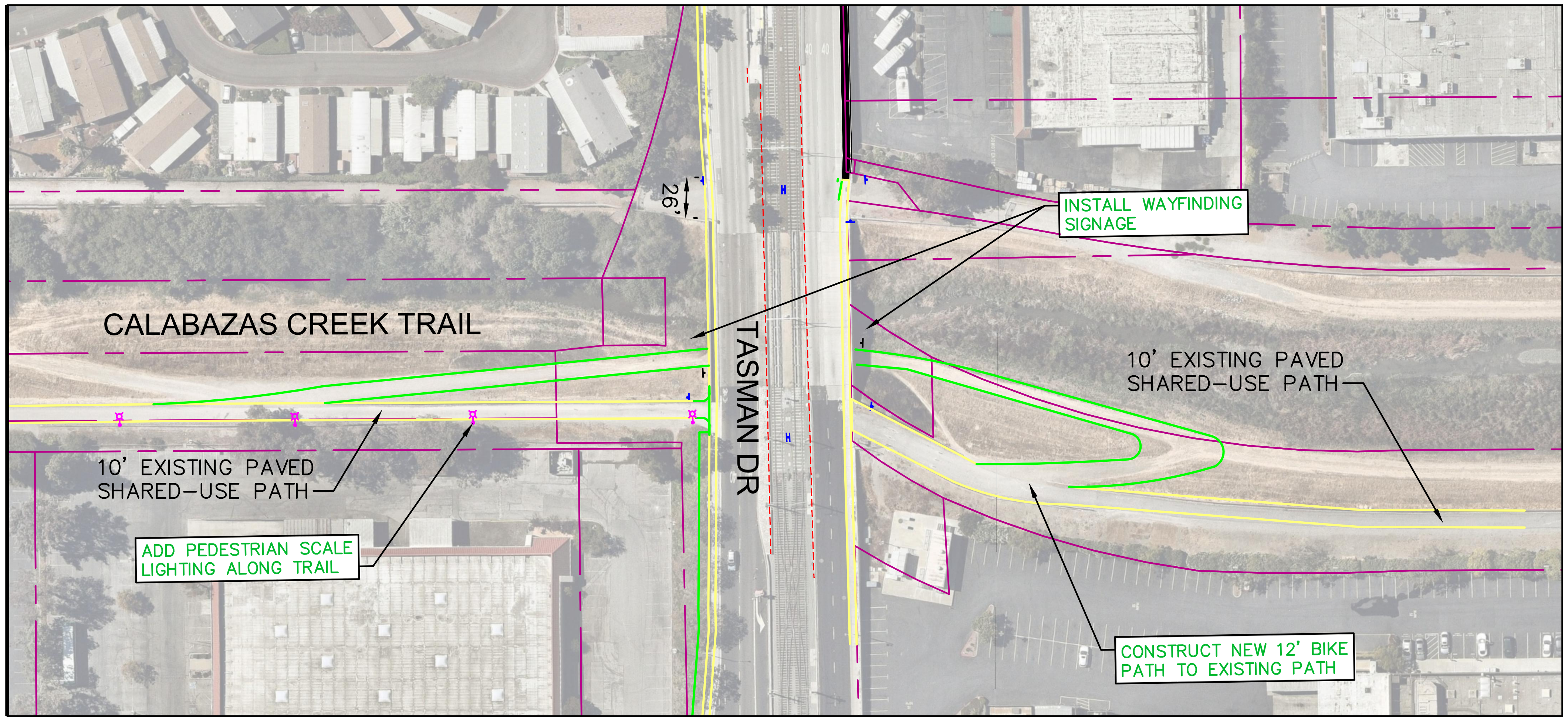
SUNNYVALE
BIKE ALTERNATIVES - SOUTH OPTION
June 2019
SHEET 10 OF 11

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

- RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
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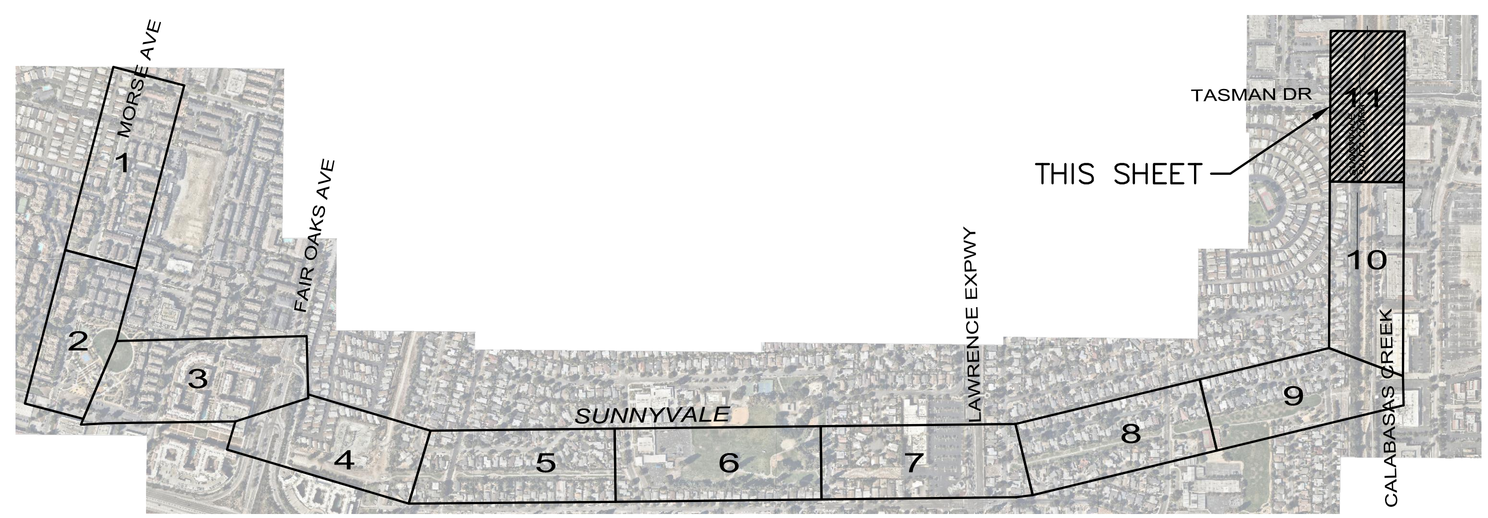

GRAPHIC SCALE
(IN FEET)
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SUNNYVALE
BIKE ALTERNATIVES - SOUTH OPTION
June 2019
SHEET 11 OF 11

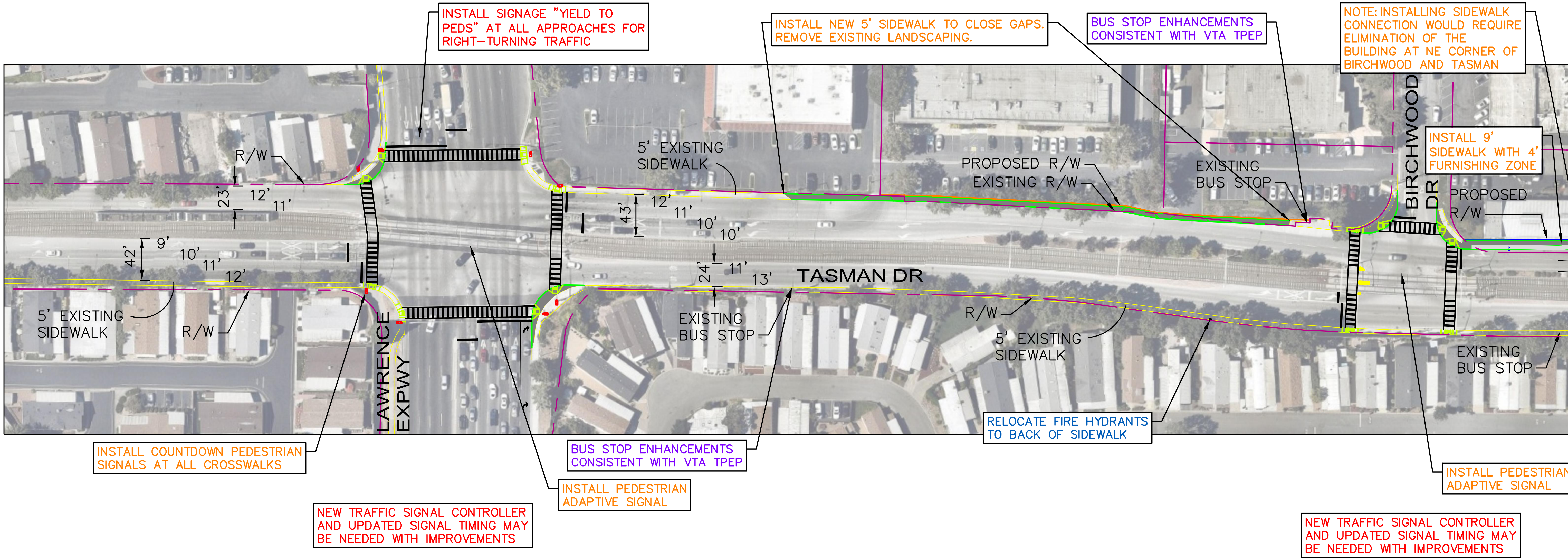
Kimley»Horn

APPENDIX D

ULTIMATE IMPROVEMENT SHEETS

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
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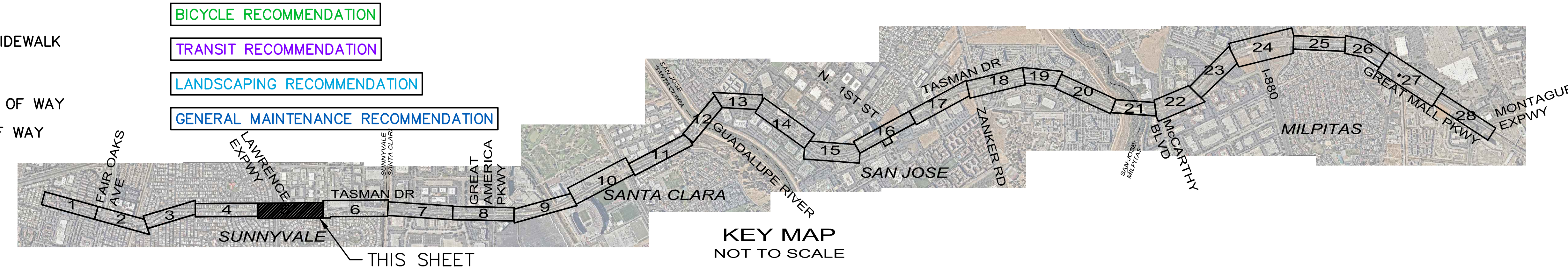
VEHICLE/ROADWAY RECOMMENDATION
PEDESTRIAN RECOMMENDATION
BICYCLE RECOMMENDATION
TRANSIT RECOMMENDATION
LANDSCAPING RECOMMENDATION
GENERAL MAINTENANCE RECOMMENDATION

ULTIMATE CONCEPT PLANS
April 2020
APPENDIX D



KEY MAP
NOT TO SCALE

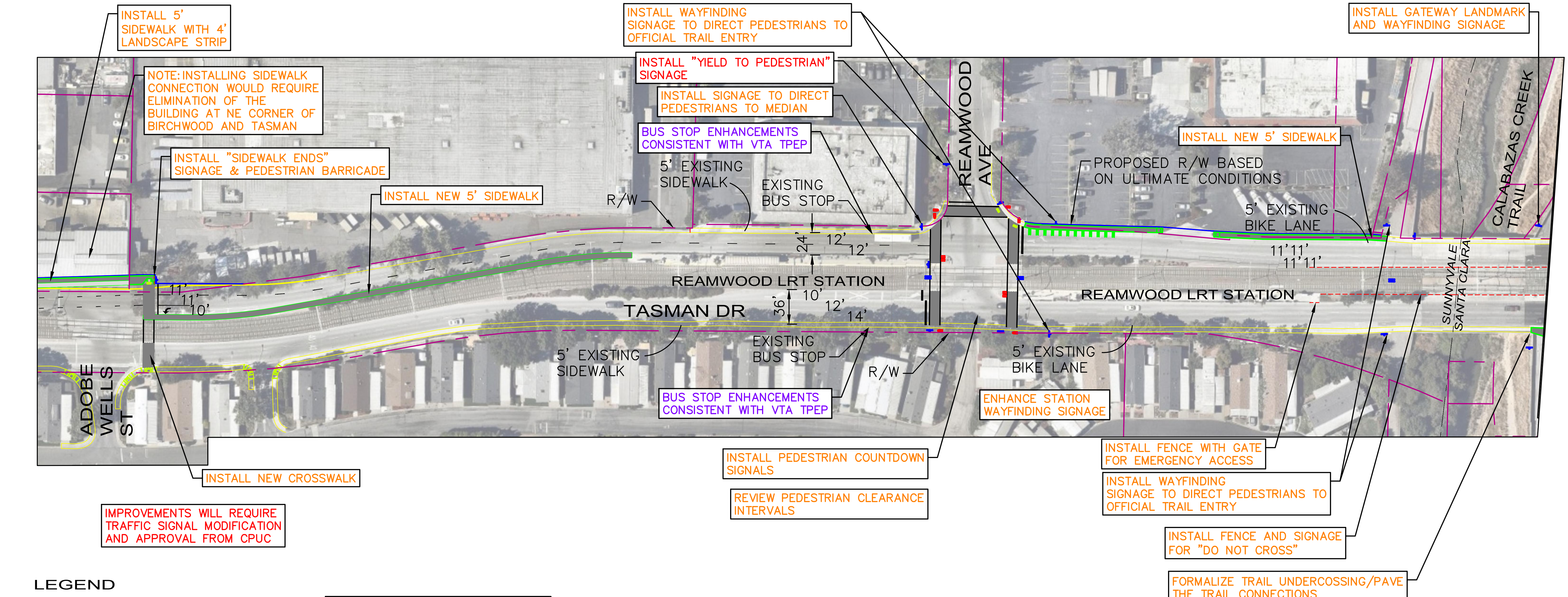
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

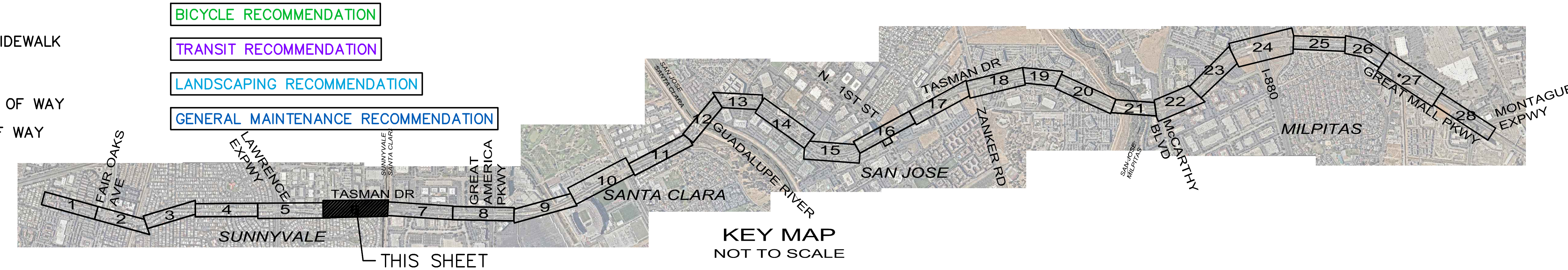
San Jose · Sunnyvale



LEGEND

Line type	Recommendation type
EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

ULTIMATE CONCEPT PLANS
April 2020
APPENDIX D



KEY MAP
NOT TO SCALE

GRAPHIC SCALE
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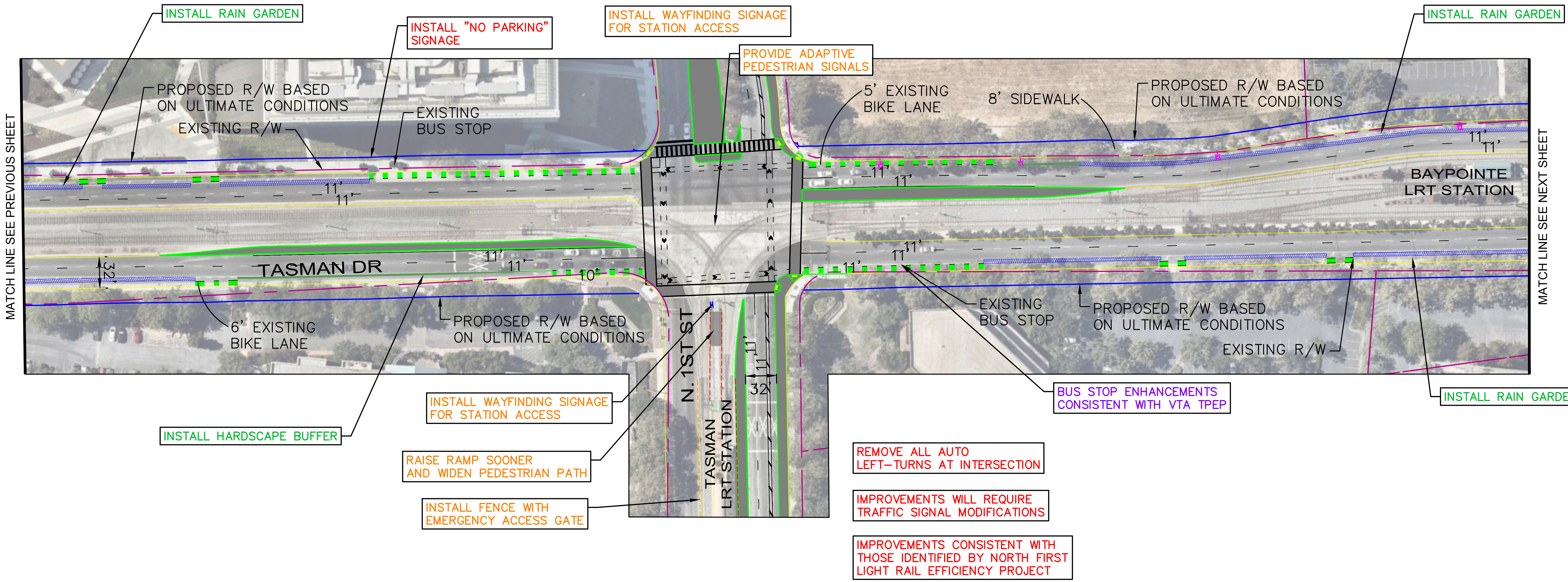
Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
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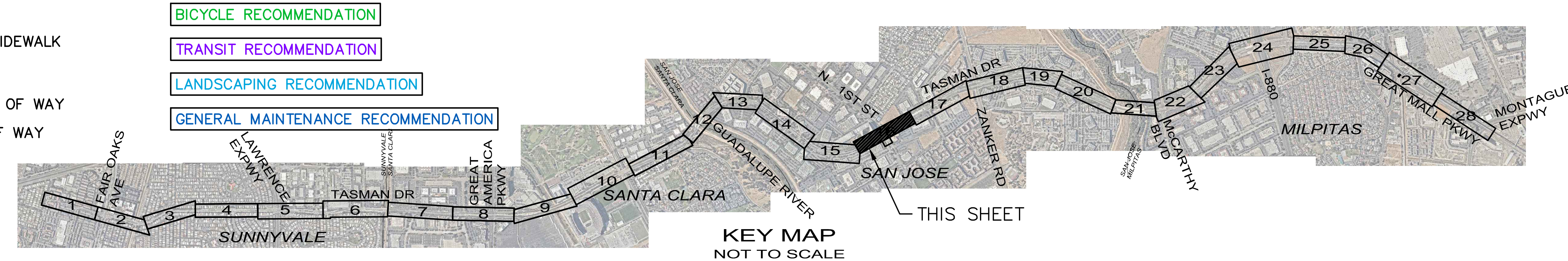
NEAR–TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

ULTIMATE CONCEPT PLANS
April 2020
APPENDIX D



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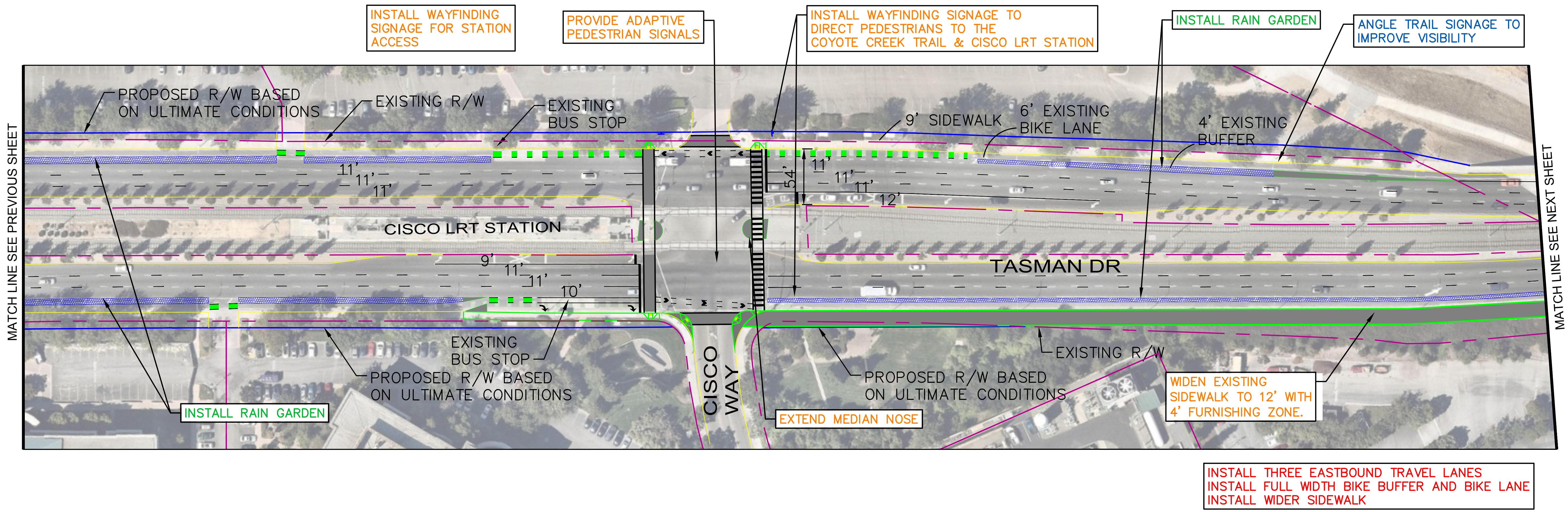
Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority



LEGEND

EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
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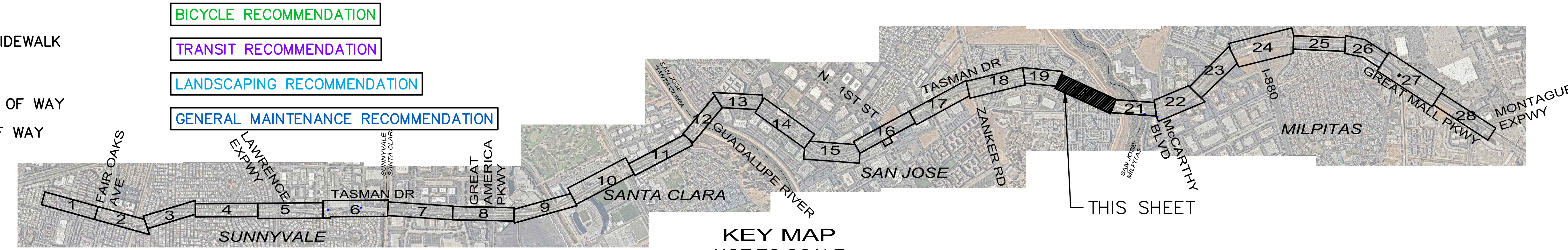
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

ULTIMATE CONCEPT PLANS
April 2020
APPENDIX D



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Tasman Corridor
COMPLETE STREETS STUDY

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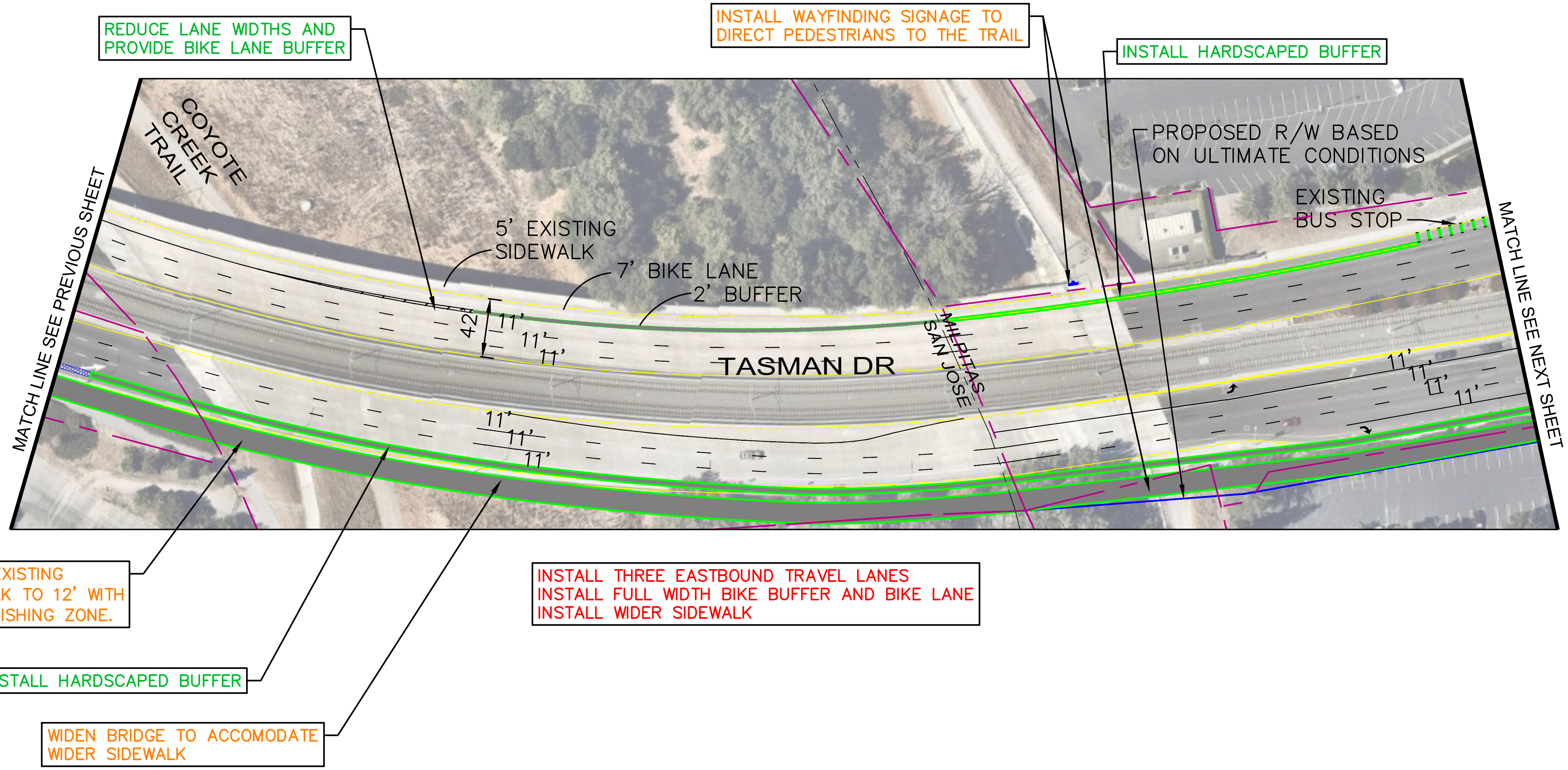

LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
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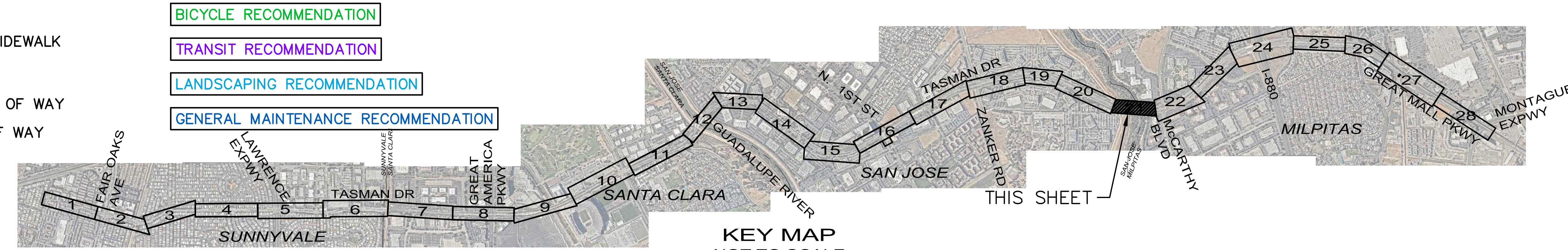
ULTIMATE CONCEPT PLANS
April 2020
APPENDIX D



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Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

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INSTALL COYOTE CREEK TRAIL WAYFINDING SIGNAGE

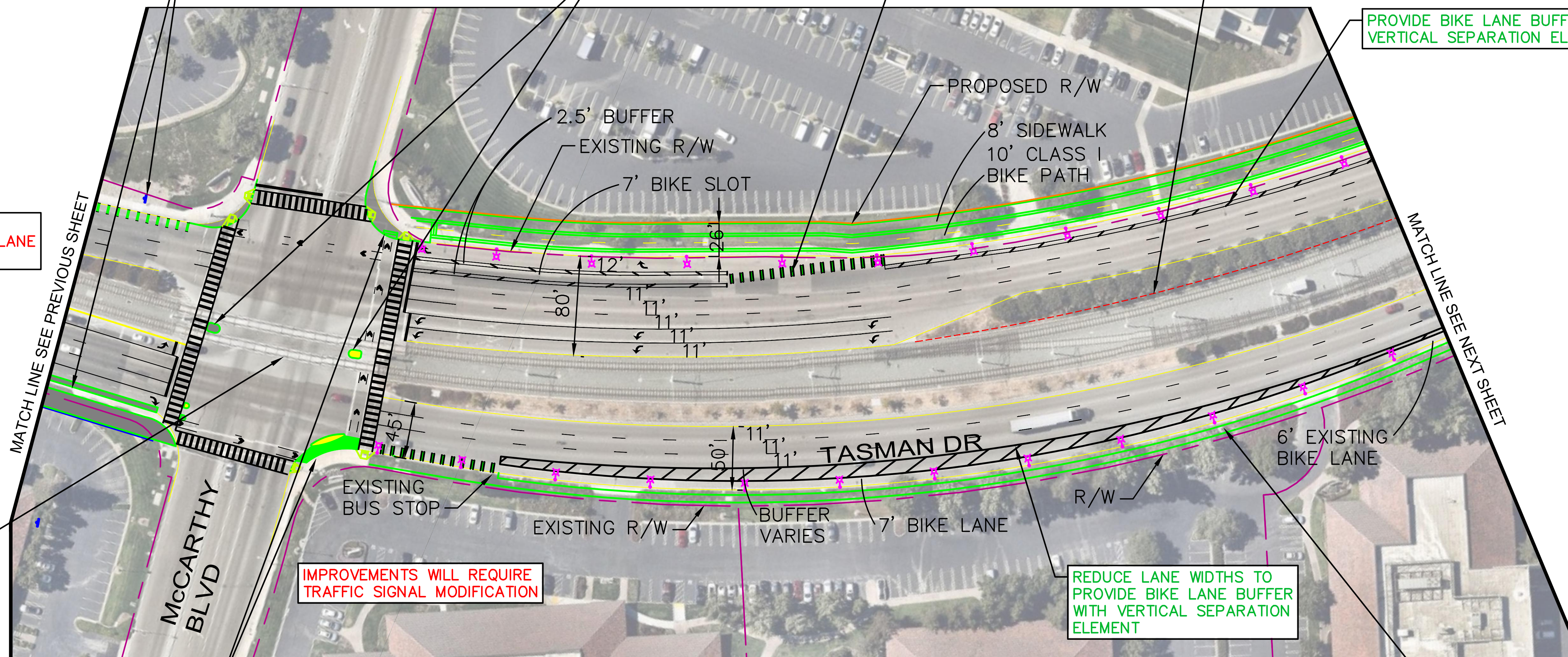
EXTEND MEDIAN NOSE

INSTALL GREEN STRIPING ACROSS CONFLICT ZONE

FENCE TO BE INSTALLED AS PART OF VTA LIGHT RAIL PEDESTRIAN FENCING ENHANCEMENT PROJECT

PROVIDE BIKE LANE BUFFER WITH VERTICAL SEPARATION ELEMENT

INSTALL THREE EASTBOUND TRAVEL LANES
INSTALL FULL WIDTH BIKE BUFFER AND BIKE LANE
INSTALL WIDER SIDEWALK



PROVIDE ADAPTIVE PEDESTRIAN SIGNALS

IMPROVEMENTS WILL REQUIRE TRAFFIC SIGNAL MODIFICATION

REDUCE LANE WIDTHS TO PROVIDE BIKE LANE BUFFER WITH VERTICAL SEPARATION ELEMENT

PROVIDE BIKE SIGNAL

INSTALL 10' SIDEWALK WITH 4' FURNISHING ZONE

LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

VEHICLE/ROADWAY RECOMMENDATION

PEDESTRIAN RECOMMENDATION

BICYCLE RECOMMENDATION

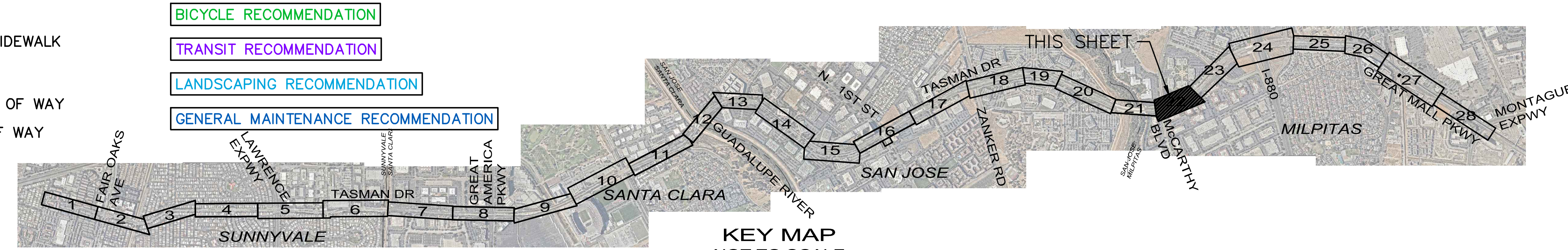
TRANSIT RECOMMENDATION

LANDSCAPING RECOMMENDATION

GENERAL MAINTENANCE RECOMMENDATION

SEE APPENDIX D FOR ULTIMATE IMPROVEMENT SHEETS

ULTIMATE CONCEPT PLANS
April 2020
APPENDIX D



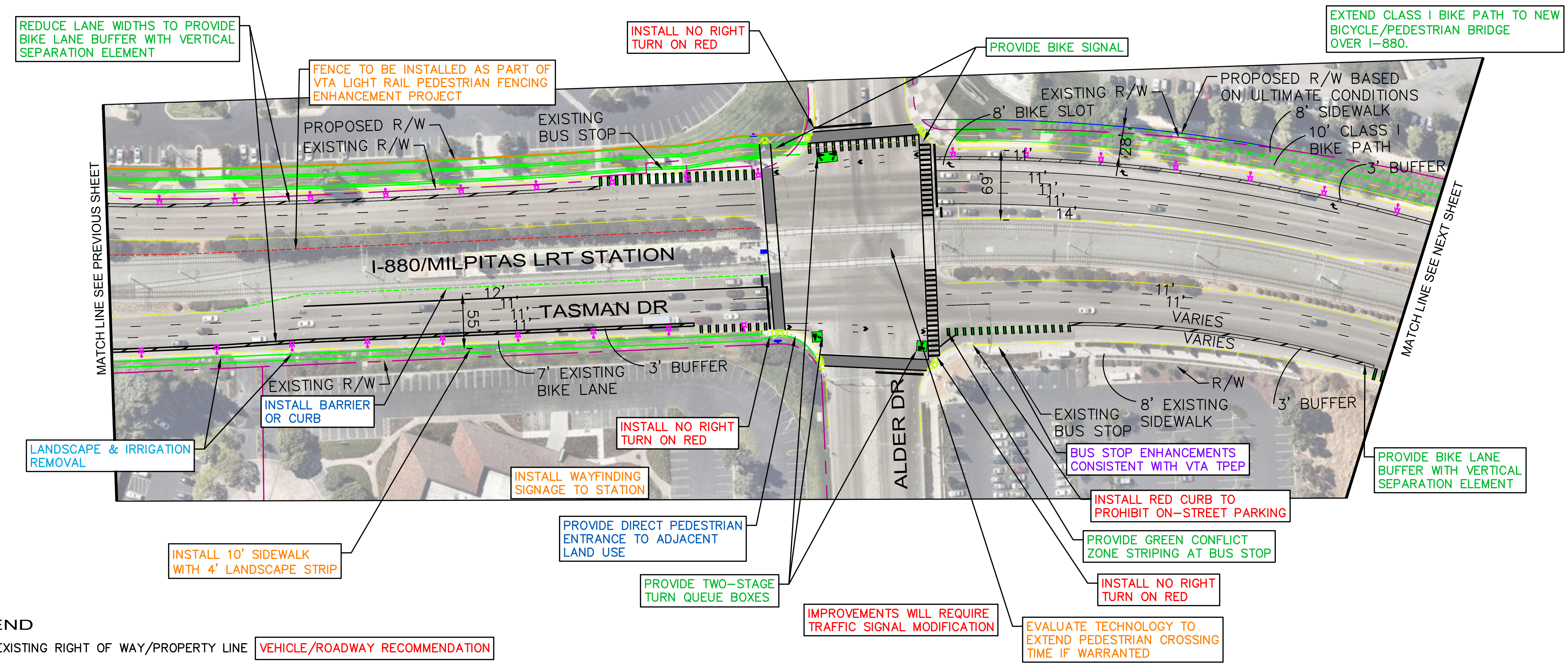
KEY MAP
NOT TO SCALE

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

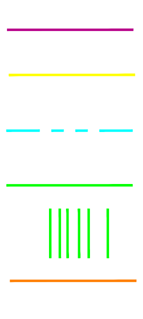
Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

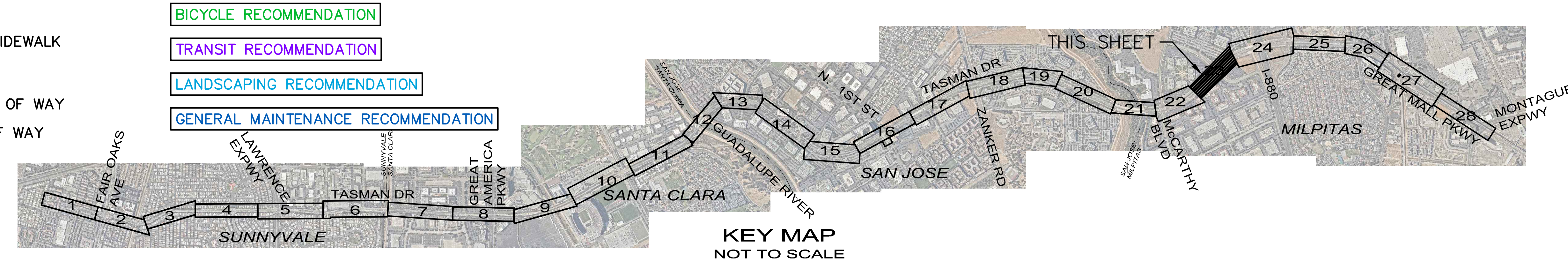


LEGEND



EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

ULTIMATE CONCEPT PLANS
April 2020
APPENDIX D



KEY MAP
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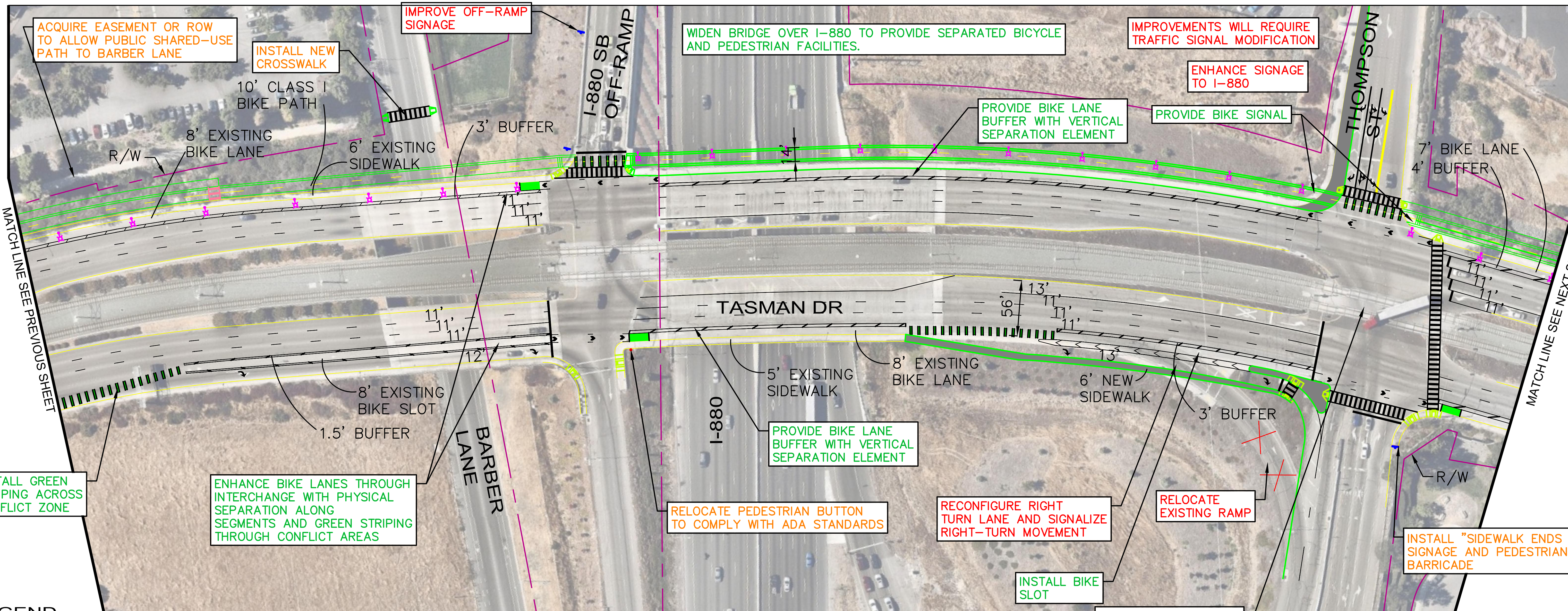
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

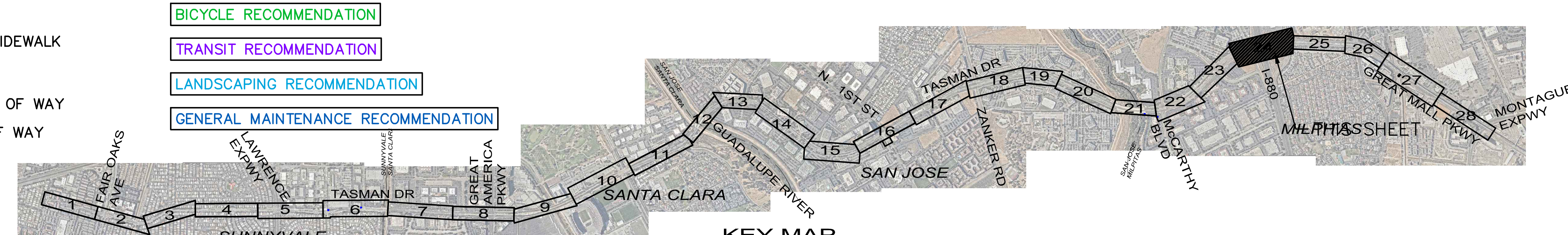
Santa Clara Valley Transportation Authority



LEGEND

Line type	Recommendation type
EXISTING RIGHT OF WAY/PROPERTY LINE	VEHICLE/ROADWAY RECOMMENDATION
EXISTING CURB/SIDEWALK	PEDESTRIAN RECOMMENDATION
CITY BOUNDARY	BICYCLE RECOMMENDATION
PROPOSED CURB/SIDEWALK	TRANSIT RECOMMENDATION
ACCESSIBLE RAMP	LANDSCAPING RECOMMENDATION
NEAR-TERM RIGHT OF WAY	GENERAL MAINTENANCE RECOMMENDATION
ULTIMATE RIGHT OF WAY	

ULTIMATE CONCEPT PLANS
April 2020
APPENDIX D



KEY MAP
NOT TO SCALE

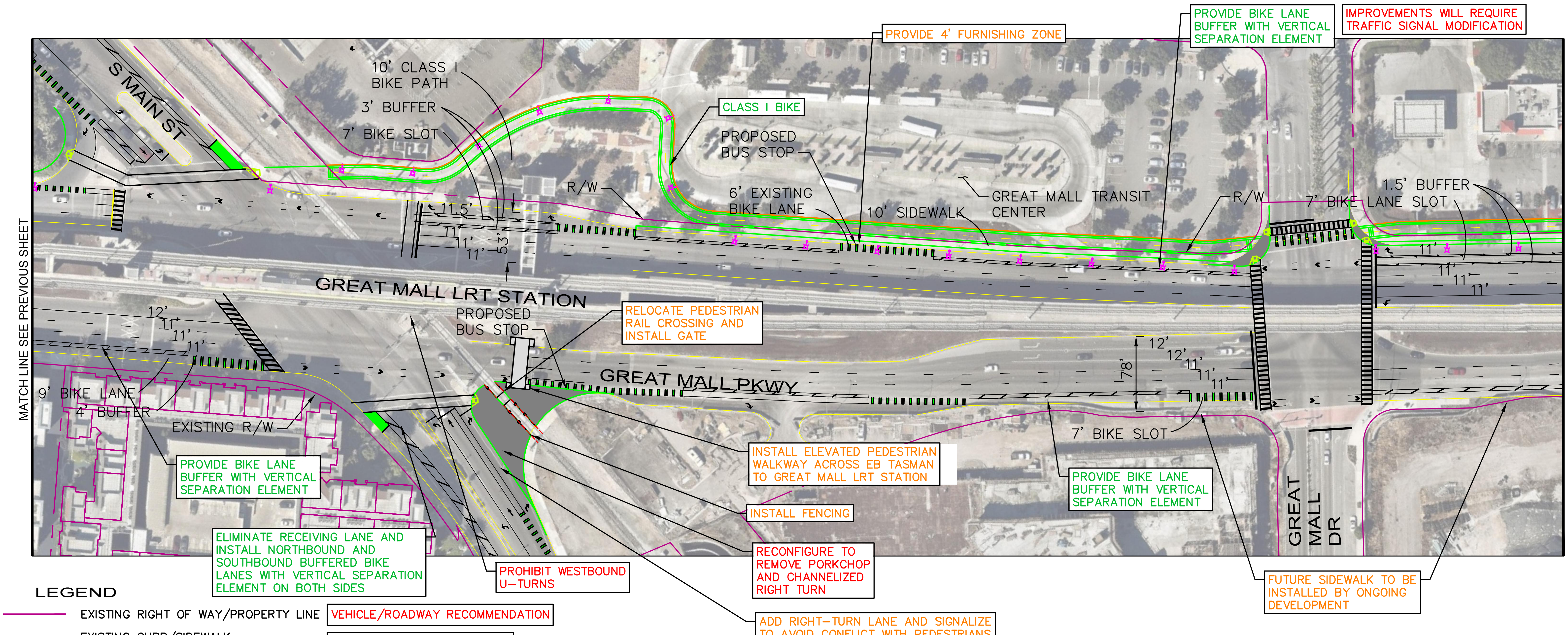
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

SAN JOSE · Sunnyvale

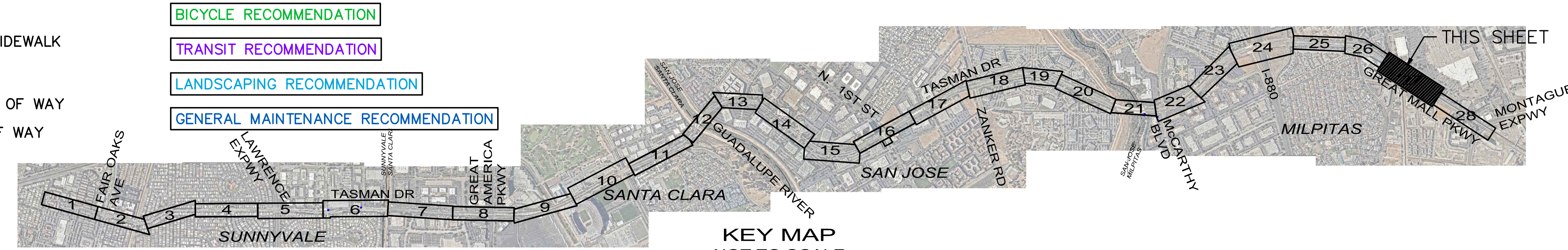


LEGEND

- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

- VEHICLE/ROADWAY RECOMMENDATION
- PEDESTRIAN RECOMMENDATION
- BICYCLE RECOMMENDATION
- TRANSIT RECOMMENDATION
- LANDSCAPING RECOMMENDATION
- GENERAL MAINTENANCE RECOMMENDATION

ULTIMATE CONCEPT PLANS
April 2020
APPENDIX D



KEY MAP
NOT TO SCALE

GRAPHIC SCALE
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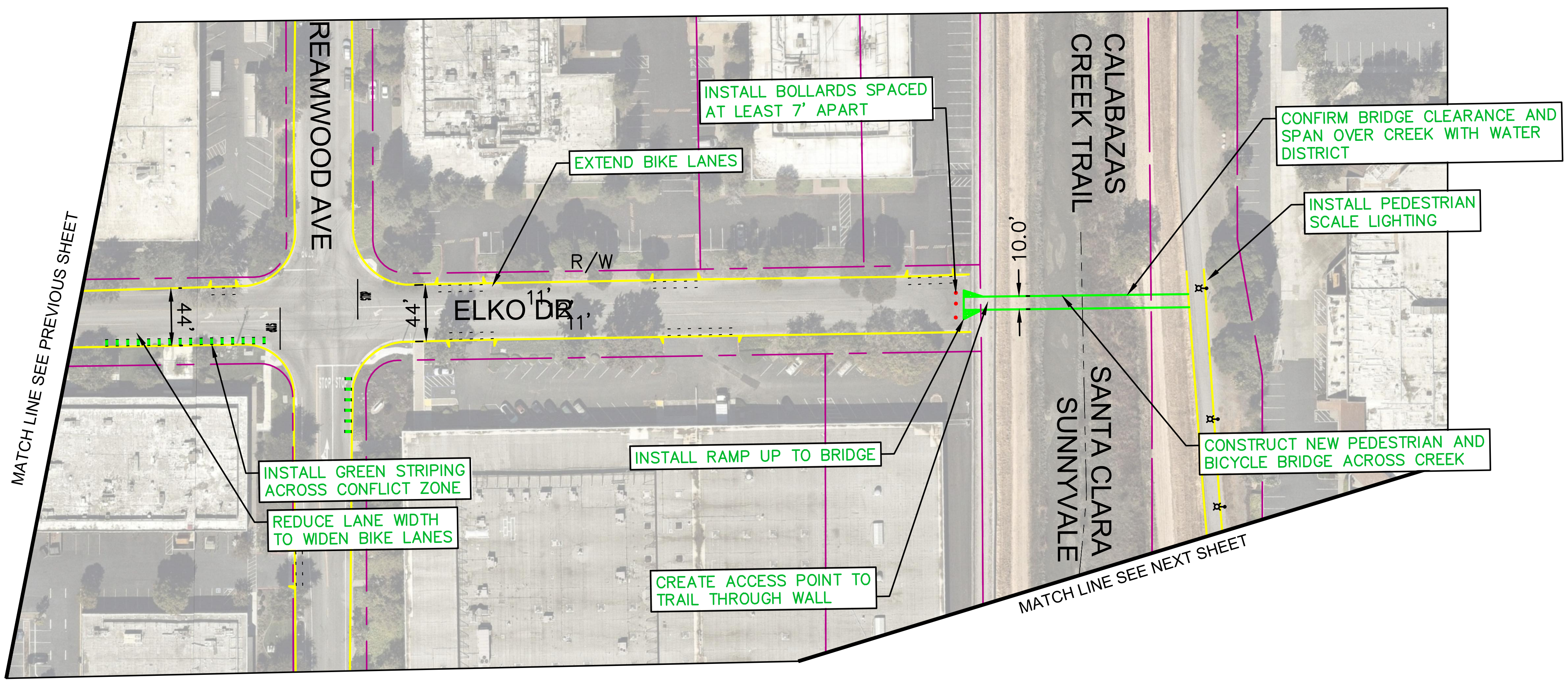
(IN FEET)
1 inch = 100 ft.

Kimley»Horn

Tasman Corridor
COMPLETE STREETS STUDY

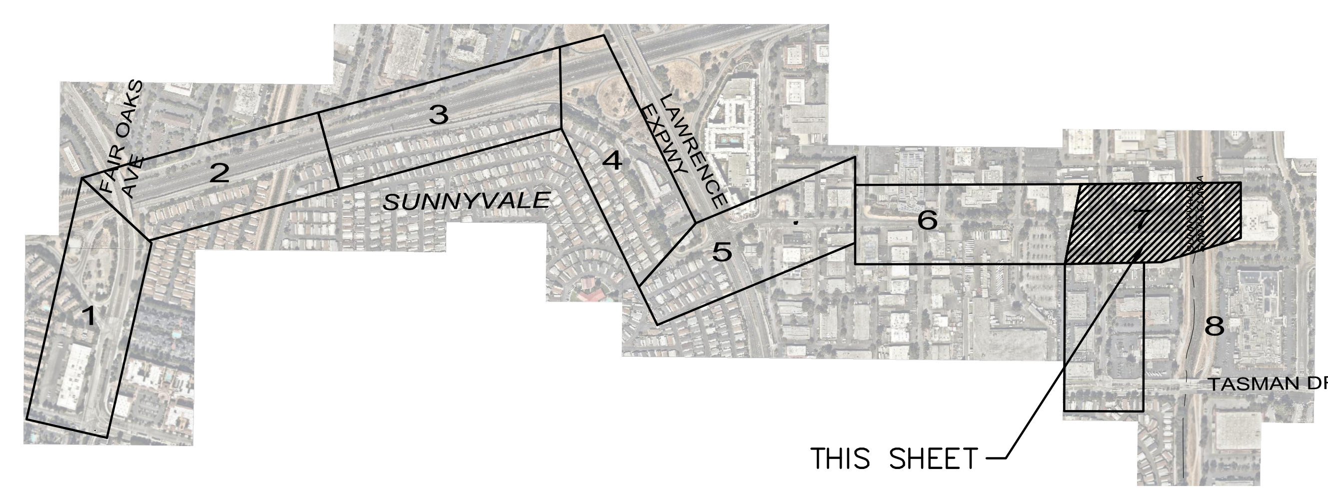
Santa Clara Valley Transportation Authority



LEGEND

- RIGHT OF WAY/PROPERTY LINE
- EXISTING CURB/SIDEWALK
- CITY BOUNDARY
- PROPOSED CURB/SIDEWALK
- ACCESSIBLE RAMP
- NEAR-TERM RIGHT OF WAY
- ULTIMATE RIGHT OF WAY

- VEHICLE/ROADWAY RECOMMENDATION
- PEDESTRIAN RECOMMENDATION
- BICYCLE RECOMMENDATION
- TRANSIT RECOMMENDATION
- LANDSCAPING RECOMMENDATION
- GENERAL MAINTENANCE RECOMMENDATION



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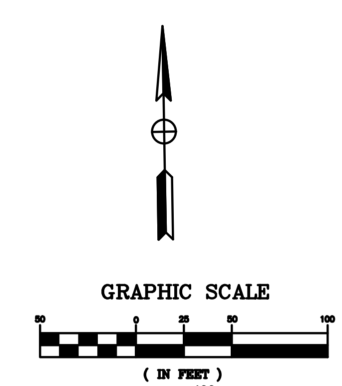

SUNNYVALE
BIKE ALTERNATIVES - NORTH OPTION
June 2019
SHEET 7 (ULTIMATE CONDITIONS)

Kimley»Horn

Appendix C

Cost Estimates

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
Sunnyvale Improvement Projects - Near Term Improvements

Prepared By: Kimley-Horn **April 2020**

Project #	DESCRIPTION	TOTAL COST W/ CONTINGENCY
1	Tasman and Fair Oaks Intersection	$ 1,226,000
2	Sunnyvale LRT Station Improvements	$ 1,381,000
3	Sunnyvale Bus Stop Improvements	$ 535,000
4	Sunnyvale Sidewalk Gap Closure (Fair Oaks to Vienna)	$ 1,784,000
5	Sunnyvale Sidewalk Gap Closure (Lawrence Expressway to Reamwood)	$ 1,258,000
6	Sunnyvale Sidewalk Gap Closure (Reamwood to Clabazas Creek)	$ 231,000
7	Calabazas Creek Trail Connection Improvements	$ 282,000
8	Sunnyvale Bike Alternative Routing North	$ 1,262,000
9	Sunnyvale Bike Alternative Routing South	$ 12,715,000
		$ 20,674,000

Notes:
1. The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
2. This Preliminary Opinion of Probable Cost ("OPC") is based on the DRAFT Tasman Corridor Complete Streets Study Concept Drawings July, 2019.
3. This OPC was prepared without City review and approval, and as such, may be subject to change during the City permitting process.
4. Underground non-pavement utilities such as, but not limited to, water, sanitary sewer, and gas are assumed to be at an adequate depth.

6. Miscellaneous soft costs were applied individually to each project line item above. Soft costs were assumed to be 4% Admin, 4% Environmental, 15% Design, 15% Construction management

7. Cost shown is based on 2019 dollars.
8. The assumed contingency covers items not explored at the current stage. Items include but are not limited to:

• Unknown improvements needed as part of the project (such as drainage improvements, pavement failure repair, landscaping/irrigation replacement, restriping, impacts to lighting/electrical, utility relocations that are not under franchise)
• More costly approach to the design/construction of the improvements than anticipated
• Environmental unknowns (contaminated soil, regulatory-required mitigations, high groundwater)
• Unscoped right-of-way acquisition, including temporary permits
• Federalizing the project and the additional costs of performing NEPA, coordinating with Caltrans

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#1 - Construction/Engineering Tasman and Fair Oaks Intersection - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape					
1	Install Raised Median	6,300	SF	$ 25	$ 157,500
2	Install ADA Curb Ramps	10	EA	$ 8,000	$ 80,000
Signing and Striping					
3	Paint 6" White Stripe	1,850	LF	$ 5	$ 9,250
4	Paint Arow Pavement Marking	183	SF	$ 8	$ 1,464
5	Paint Crosswalk Pavement Marking	1,250	SF	$ 8	$ 10,000
6	Paint Decorative Crosswalk	3,500	SF	$ 15	$ 52,500
Misc Improvements					
7	Modify Existing Traffic Signal	1	EA	$ 180,000	$ 180,000
8	Install Pedestrian Adaptive Signal Equipment	1	LS	$ 40,000	$ 40,000
9	Relocate Existing Utility Vault	1	EA	$ 50,000	$ 50,000
10	Install Countdown Pedestrian Signal	8	EA	$ 1,500	$ 12,000
				Mobilization (10% of Project Items)	$ 59,271
				Subtotal	*$ 651,985*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 247,754
				Contigency (50%)	$ 325,993
				Total	**$ 1,225,733**

Notes:
See Sunnyvale Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#2 - Construction/Engineering for Sunnyvale LRT Station Improvements - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION - FAIR OAKS STATION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
Misc Improvements					
1	Install Wayfinding Signage	1	LS	$ 5,000	$ 5,000
2	Install Enhanced Station Lighting	1	LS	$ 80,000	$ 80,000
3	Install Pedestrian Blankout Sign	4	EA	$ 6,000	$ 24,000
				Mobilization (10% of Project Items)	$ 10,900
				Subtotal	*$ 119,900*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 45,562
				Contigency (50%)	$ 59,950
				Total	**$ 225,412**

#	DESCRIPTION - VIENNA STATION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	7	EA	$ 8,000	$ 56,000
2	Install Raised Median	70	SF	$ 25	$ 1,750
3	Install Sidewalk	200	SF	$ 30	$ 6,000
Signing & Striping Improvements					
4	Paint Crosswalk Pavement Marking	850	SF	$ 8	$ 6,800
5	Paint Decorative Crosswalk	3,500	SF	$ 15	$ 52,500
Misc Improvements					
6	Modify Existing Traffic Signal	1	EA	$ 20,000	$ 20,000
7	Install Pedestrian Blankout Sign	4	EA	$ 6,000	$ 24,000
8	Install Pedestrian Adaptive Signal Equipment	1	LS	$ 40,000	$ 40,000
9	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
10	Install Enhanced Station Lighting	1	LS	$ 80,000	$ 80,000
				Mobilization (10% of Project Items)	$ 29,305
				Subtotal	*$ 322,355*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 122,495
				Contigency (50%)	$ 161,178
				Total	**$ 606,027**

#	DESCRIPTION - REAMWOOD STATION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
1	Paint Crosswalk Pavement Marking	700	SF	$ 8	$ 5,600
2	Paint Decorative Crosswalk	2,400	SF	$ 15	$ 36,000
Misc Improvements					
3	Modify Existing Traffic Signal	1	EA	$ 20,000	$ 20,000
4	Install Pedestrian Blankout Sign	4	EA	$ 6,000	$ 24,000
5	Install Pedestrian Adaptive Signal Equipment	1	LS	$ 40,000	$ 40,000
6	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
7	Install Station Lighting	1	LS	$ 80,000	$ 80,000
				Planning Level Esclation Cost (50% of Project Items)	$ 105,800
				Subtotal	*$ 317,400*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 120,612
				Contigency (35%)	$ 111,090
				Total	**$ 549,102**

Notes:

See Sunnyvale Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#3 - Construction/Engineering for Sunnyvale Bus Stop Improvements - Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
Misc Improvements					
1	VTA TPEP Bus Stop Enhancements (Improvements include Shelter, Bench, Bike Rack,	6	EA	$ 54,000	$ 324,000
	Real Time Messaging Sign, & Trash Receptacles)				
				Mobilization (10% of Project Items)	$ 32,400
				Subtotal	*$ 356,400*
				Contigency (50%)	$ 178,200
				Total	**$ 534,600**

Notes:
See Sunnyvale Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#4 - Construction/Engineering for Sunnyvale Sidewalk Gap Closure (Fair Oaks to Vienna) - Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape					
1	Install Sidewalk w/ Grading	10,200	SF	$ 50	$ 510,000
Signing and Striping					
Misc Improvements					
2	Install Landscape Strip w/ Irrigation	4,300	SF	$ 50	$ 215,000
3	Relocate Street Light	14	EA	$ 4,500	$ 63,000
4	Remove Existing Tree	35	EA	$ 2,000	$ 70,000
5	Install Countdown Pedestrian Signal	8	EA	$ 1,500	$ 12,000
				Mobilization (10% of Project Items)	$ 78,800
				Subtotal	*$ 948,800*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 360,544
				Contigency (50%)	$ 474,400
				Total	**$ 1,783,744**

Notes:
See Sunnyvale Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#5 - Construction/Engineering for Sunnyvale Sidewalk Gap Closure (Lawrence Expressway to Reamwood) - Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	18	EA	$ 8,000	$ 144,000
2	Install Sidewalk w/ Grading (Includes existing street light modifications & tree removal/replacement)	4,100	SF	$ 70	$ 287,000
Signing & Striping Improvements					
3	Paint High Visibility Crosswalk Markings	3,000	SF	$ 12	$ 36,000
Misc Improvements					
4	Relocate Fire Hydrant	1	EA	$ 3,000	$ 3,000
5	Install Pedestrian Adaptive Signal Equipment	1	LS	$ 80,000	$ 80,000
6	Modify Existing Traffic Signal	2	EA	$ 20,000	$ 40,000
7	Install Countdown Pedestrian Signal	12	EA	$ 1,500	$ 18,000
				Mobilization (10% of Project Items)	$ 60,800
				Subtotal	*$ 668,800*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 254,144
				Contigency (50%)	$ 334,400
				Total	**$ 1,257,344**

Notes:
See Sunnyvale Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#6 - Construction/Engineering for Sunnyvale Sidewalk Gap Closure (Reamwood to Clabazas Creek) - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	2	EA	$ 8,000	$ 16,000
2	Install Sidewalk	3,000	SF	$ 30	$ 90,000
Signing & Striping Improvements					
3	Install Sign	2	EA	$ 1,000	$ 2,000
Misc Improvements					
4	Modify Existing Traffic Signal		EA	$ 20,000	$ -
5	Install Pedestrian Adaptive Signal Equipment	1	LS	$ 40,000	$ 40,000
				Mobilization (10% of Project Items)	$ 14,800
				Subtotal	*$ 122,800*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 46,664
				Contigency (50%)	$ 61,400
				Total	**$ 230,864**

Notes:
See Sunnyvale Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
7 - Construction/Engineering for Calabazas Creek Trail Connection Improvements - Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
1	Install Signage	4	EA	$ 350	$ 1,400
Misc Improvements					
2	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
3	Install Fence	700	LF	$ 100	$ 70,000
4	Formalize Trail Connection (HMA)	294	TON	$ 200	$ 58,800
				Mobilization (10% of Project Items)	$ 13,620
				Subtotal	*$ 149,820*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 56,932
				Contigency (50%)	$ 74,910
				Total	**$ 281,662**

Notes:
See Sunnyvale Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
8 - Construction/Engineering for Sunnyvale Bike Alternative Routing North - Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
1	Paint 6" White Stripe	10,200	LF	$ 5	$ 51,000
2	Paint Pavement Marking Arrow Marking	285	SF	$ 8	$ 2,280
3	Paint Green Bike Lane	5,775	SF	$ 12	$ 69,300
4	Install Class II Bike Lane Striping	17,300	LF	$ 25	$ 432,500
Misc Improvements					
5	Install Bicycle Friendly Inlet Grate	10	EA	$ 500	$ 5,000
6	Install Wayfinding Signage	1	LS	$ 50,000	$ 50,000
				Mobilization (10% of Project Items)	$ 61,008
				Subtotal	*$ 671,088*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 255,013
				Contigency (50%)	$ 335,544
				Total	**$ 1,261,645**

Notes:
See Sunnyvale Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#9 - Construction/Engineering for Sunnyvale Bike Alternative Routing South - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Shared Use Path	2,170	LF	$ 60	$ 130,200
Signing & Striping Improvements					
2	Paint 6" White Stripe	5,000	LF	$ 5	$ 25,000
3	Paint Pavement Marking Arrow Marking	92	SF	$ 8	$ 736
4	Paint Green Bike Markings	2,000	SF	$ 12	$ 24,000
5	Paint 6" Yellow Stripe	2,200	LF	$ 6	$ 13,200
6	Paint High Visibility Crosswalk Markings	1,100	SF	$ 12	$ 13,200
Misc Improvements					
7	Install New Bridge	1	LS	$ 5,000,000	$ 5,000,000
8	Install RRFB Assembly	5	EA	$ 35,000	$ 175,000
9	Install New Bollards	7	EA	$ 1,000	$ 7,000
10	Install New Pedestrian Lighting	71	EA	$ 10,000	$ 710,000
11	Install Wayfinding Signage	1	LS	$ 50,000	$ 50,000
				Mobilization (10% of Project Items)	$ 614,834
				Subtotal	*$ 6,763,170*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 2,570,004
				Contigency (50%)	$ 3,381,585
				Total	**$ 12,714,759**

Notes:
See Sunnyvale Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
Santa Clara Improvement Projects - Near Term Improvements

Prepared By: Kimley-Horn **April 2020**

Project #	DESCRIPTION	TOTAL COST W/ CONTINGENCY
10	Santa Clara Sidewalk Improvements	$ 3,174,000
11	Santa Clara Bicycle Improvements	$ 594,000
12	Santa Clara LRT Station Improvements	$ 1,003,000
13	Santa Clara Bus Stop Improvements	$ 179,000
14	Levi's Stadium, Convention Center, and San Tomas Aquino Trail Connection Improvements	$ 541,000
15	Lafayette Connection	$ 115,000
16	Guadalupe River Trail Area Improvements	$ 381,000
		$ 5,987,000

Notes:

1. The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
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3. This OPC was prepared without City review and approval, and as such, may be subject to change during the City permitting process.
4. Underground non-pavement utilities such as, but not limited to, water, sanitary sewer, and gas are assumed to be at an adequate depth.

6. Miscellaneous soft costs were applied individually to each project line item above. Soft costs were assumed to be 4% Admin, 4% Environmental, 15% Design, 15% Construction management

7. Cost shown is based on 2019 dollars.

8. The assumed contingency covers items not explored at the current stage. Items include but are not limited to:

• Unknown improvements needed as part of the project (such as drainage improvements, pavement failure repair, landscaping/irrigation replacement, restriping, impacts to lighting/electrical, utility relocations that are not under franchise)
• More costly approach to the design/construction of the improvements than anticipated
• Environmental unknowns (contaminated soil, regulatory-required mitigations, high groundwater)
• Unscoped right-of-way acquisition, including temporary permits
• Federalizing the project and the additional costs of performing NEPA, coordinating with Caltrans

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#10 - Construction/Engineering for Santa Clara Sidewalk Improvements - Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	10	EA	$ 8,000	$ 80,000
2	Install Sidewalk	38,100	SF	$ 30	$ 1,143,000
Signing & Striping Improvements					
3	Paint High Visibility Crosswalk Markings	1,600	SF	$ 12	$ 19,200
4	Install Sign	1	EA	$ 350	$ 350
Misc Improvements					
5	Remove Existing Palm Trees	8	EA	$ 2,000.00	$ 16,000
6	Install Pedestrian Lighting	16	EA	$ 6,000	$ 96,000
7	Install Landscape Strip w/ Irrigation	3,600	SF	$ 50	$ 180,000
				Mobilization (10% of Project Items)	$ 153,455
				Subtotal	$ 1,688,005
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 641,442
				Contigency (50%)	$ 844,003
				Total	**$ 3,173,449**

Notes:

See Santa Clara Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#11 - Construction/Engineering for Santa Clara Bicycle Improvements - Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Raised Median (Bike Buffer Vertical Seperation)	2,500	LF	$ 100	$ 250,000
Signing & Striping Improvements					
2	Paint 6" White Stripe	500	LF	$ 5	$ 2,500
3	Paint Green Bike Lane	1,100	SF	$ 12	$ 13,200
4	Paint High Visibility Crosswalk Markings	1,600	SF	$ 12	$ 19,200
Misc Improvements					
5	Install Bicycle Friendly Inlet Grate	4	EA	$ 500	$ 2,000
				Mobilization (10% of Project Items)	$ 28,690
				Subtotal	*$ 315,590*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 119,924
				Contigency (50%)	$ 157,795
				Total	**$ 593,309**

Notes:
See Santa Clara Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#12 - Construction/Engineering for Santa Clara LRT Station Improvements - Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION - OLD IRON SIDES STATION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
1	Paint Crosswalk Pavement Marking	750	SF	$ 8	$ 6,000
2	Paint Decorative Crosswalk	2,800	SF	$ 15	$ 42,000
Misc Improvements					
3	Install Wayfinding Signage	1	LS	$ 5,000	$ 5,000
4	Install Enhanced Station Lighting	1	LS	$ 80,000	$ 80,000
5	Install Pedestrian Blankout Sign	4	EA	$ 6,000	$ 24,000
				Mobilization (10% of Project Items)	$ 15,700
				Subtotal	*$ 172,700*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 65,626
				Contigency (50%)	$ 86,350
				Total	**$ 324,676**

#	DESCRIPTION - GREAT AMERICA STATION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
1	Paint Crosswalk Pavement Marking	1,600	SF	$ 8	$ 12,800
2	Paint Decorative Crosswalk	3,600	SF	$ 15	$ 54,000
Misc Improvements					
3	Modify Existing Traffic Signal	1	EA	$ 20,000	$ 20,000
4	Install Pedestrian Blankout Sign	4	EA	$ 6,000	$ 24,000
5	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
6	Install Enhanced Station Lighting	1	LS	$ 80,000	$ 80,000
				Mobilization (10% of Project Items)	$ 19,680
				Subtotal	*$ 216,480*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 82,262
				Contigency (50%)	$ 108,240
				Total	**$ 406,982**

#	DESCRIPTION - LICK MILL STATION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Raised Median	60	SF	$ 25	$ 1,500
2	Extend Station Wall & Widen Pedestrian Ramp	1	LS	$ 8,000	$ 8,000
Signing & Striping Improvements					
3	Paint Crosswalk Pavement Marking	550	SF	$ 8	$ 4,400
4	Paint Decorative Crosswalk	1,800	SF	$ 15	$ 27,000
Misc Improvements					
5	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
6	Install Pedestrian Blankout Sign	4	EA	$ 6,000	$ 24,000
7	Install Enhanced Station Lighting	1	LS	$ 60,000	$ 60,000
				Mobilization (10% of Project Items)	$ 13,090
				Subtotal	*$ 143,990*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 54,716
				Contigency (50%)	$ 71,995
				Total	**$ 270,701**

Notes:

See Santa Clara Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#13 - Construction/Engineering for Santa Clara Bus Stop Improvements - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
Misc Improvements					
1	VTA TPEP Bus Stop Enhancements (Improvements include Shelter, Bench, Bike Rack,	2	EA	$ 54,000	$ 108,000
	Real Time Messaging Sign, & Trash Receptacles)				
				Mobilization (10% of Project Items)	$ 10,800
				Subtotal	*$ 118,800*
				Contigency (50%)	$ 59,400
				Total	**$ 178,200**

Notes:
See Santa Clara Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#14 - Construction/Engineering for Levi's Stadium, Convention Center, and San Tomas Aquino Trail Connection Improvements
Near Term Improvements Only

Prepared By: **Kimley-Horn** | **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	2	EA	$ 8,000	$ 16,000
2	Install Sidewalk	3,700	SF	$ 30	$ 111,000
Signing & Striping Improvements					
3	Paint 6" White Stripe	100	LF	$ 5	$ 500
4	Paint Green Bike Lane	150	SF	$ 12	$ 1,800
Misc Improvements					
5	Install Wayfinding Signage	1	LS	$ 50,000	$ 50,000
6	Install Accessible Pedestrian Signals	1	LS	$ 40,000	$ 40,000
7	Install Pedestrian Lighting	7	EA	$ 6,000	$ 42,000
				Mobilization (10% of Project Items)	$ 26,130
				Subtotal	$ 287,430
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 109,223
				Contigency (50%)	$ 143,715
				Total	**$ 540,368**

Notes:
See Santa Clara Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#15 - Construction/Engineering for Lafayette Connection - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Accessible Path Improvements (HMA)	99	TON	$ 300	$ 29,630
2	Install Accessible Path Improvements (Class II AB)	74	CY	$ 75	$ 5,556
3	Retaining Wall	1	LS	$ 80,000	$ 80,000
Signing & Striping Improvements					
Misc Improvements					
4	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
				Mobilization (10% of Project Items)	$ 12,119
				Subtotal	*$ 133,304*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 50,655
				Contigency (50%)	$ 66,652
				Total	**$ 250,611**

Notes:
See Santa Clara Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#16 - Construction/Engineering for Guadalupe River Trail Area Improvements - Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Sidewalk	4,200	SF	$ 30	$ 126,000
2	Install Raised Median	20	SF	$ 25	$ 500
Signing & Striping Improvements					
3	Paint 6" White Stripe	1,600	LF	$ 5	$ 8,000
4	Paint Pavement Marking Arrow Marking	144	SF	$ 8	$ 1,152
5	Paint Green Bike Lane	308	SF	$ 12	$ 3,696
6	Paint Crosswalk Pavement Marking	500	SF	$ 8	$ 4,000
7	Paint Decorative Crosswalk	2,300	SF	$ 15	$ 34,500
Misc Improvements					
8	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
				Mobilization (10% of Project Items)	$ 18,385
				Subtotal	*$ 202,233*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 76,848
				Contigency (50%)	$ 101,116
				Total	**$ 380,198**

Notes:
See Santa Clara Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
San Jose Improvement Projects - Near Term Improvements

Prepared By: Kimley-Horn **April 2020**

Project #	DESCRIPTION	TOTAL COST W/ CONTINGENCY
17	San Jose Bicycle & Pedestrian Facility	$ 16,788,000
18	San Jose LRT Station Improvements	$ 2,702,000
19	San Jose Bus Stop Improvements	$ 179,000
21	Zanker Improvements	$ 663,000
22	Coyote Creek Trail Improvements	$ 129,000
		$ 20,461,000

Notes:

1. The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
2. This Preliminary Opinion of Probable Cost ("OPC") is based on the DRAFT Tasman Corridor Complete Streets Study Concept Drawings July, 2019.
3. This OPC was prepared without City review and approval, and as such, may be subject to change during the City permitting process.
4. Underground non-pavement utilities such as, but not limited to, water, sanitary sewer, and gas are assumed to be at an adequate depth.

6. Miscellaneous soft costs were applied individually to each project line item above. Soft costs were assumed to be 4% Admin, 4% Environmental, 15% Design, 15% Construction management

7. Cost shown is based on 2019 dollars.

8. The assumed contingency covers items not explored at the current stage. Items include but are not limited to:

• Unknown improvements needed as part of the project (such as drainage improvements, pavement failure repair, landscaping/irrigation replacement, restriping, impacts to lighting/electrical, utility relocations that are not under franchise)
• More costly approach to the design/construction of the improvements than anticipated
• Environmental unknowns (contaminated soil, regulatory-required mitigations, high groundwater)
• Unscoped right-of-way acquisition, including temporary permits
• Federalizing the project and the additional costs of performing NEPA, coordinating with Caltrans

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#17 - Construction/Engineering for San Jose Bicycle & Pedestrian Facility - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	27	EA	$ 8,000	$ 216,000
2	Install Sidewalk	70,000	SF	$ 30	$ 2,100,000
3	Install Raised Median	14,000	SF	$ 25	$ 350,000
4	Install Raised Bike Lane (3" HMA)	2,120	TON	$ 200	$ 424,000
5	Install Bike Curb Ramps	2	EA	$ 8,000	$ 16,000
Signing & Striping Improvements					
6	Paint 6" White Stripe	5,000	LF	$ 5	$ 25,000
7	Paint 6" White Dash Stripe	18,200	LF	$ 5	$ 91,000
8	Paint Pavement Marking Arrow Marking	300	SF	$ 8	$ 2,400
9	Paint Green Bike Lane	11,700	SF	$ 12	$ 140,400
10	Paint High Visibility Crosswalk Markings	6,000	SF	$ 12	$ 72,000
Misc Improvements					
11	Modify Existing Traffic Signal	3	EA	$ 80,000	$ 240,000
12	Install Pedestrian Adaptive Signal Equipment	1	LS	$ 120,000	$ 120,000
13	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
14	Install Rain Garden	59,000	SF	$ 65	$ 3,835,000
15	Enhance Existing Landscaping	12,000	SF	$ 40	$ 480,000
				Mobilization (10% of Project Items)	$ 811,780
				Subtotal	*$ 8,929,580*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 3,393,240
				Contigency (50%)	$ 4,464,790
				Total	**$ 16,787,610**

Notes:
See San Jose Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#18 - Construction/Engineering for San Jose LRT Station Improvements - Near Term Improvements Only

Prepared By: Kimley-Horn | **Date: April 2020**

#	DESCRIPTION - CHAMPION STATION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	8	EA	$ 8,000	$ 64,000
Signing & Striping Improvements					
2	Paint Crosswalk Pavement Marking	1,200	SF	$ 8	$ 9,600
3	Paint Decorative Crosswalk	2,100	SF	$ 15	$ 31,500
4	Paint Intersection Bike Lane Marking	350	LF	$ 5	$ 1,750
Misc Improvements					
5	Modify Existing Traffic Signal	1	EA	$ 50,000	$ 50,000
3	Install Pedestrian Blankout Sign	4	EA	$ 6,000	$ 24,000
6	Install Wayfinding Signage	1	LS	$ 5,000	$ 5,000
7	Install Enhanced Station Lighting	1	LS	$ 80,000	$ 80,000
				Mobilization (10% of Project Items)	$ 26,585
				Subtotal	*$ 292,435*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 111,125
				Contigency (50%)	$ 146,218
				Total	**$ 549,778**
#	**DESCRIPTION - TASMAN STATION**	**QUANTITY**	**UNIT**	**COST / UNIT**	**TOTAL COST**
Hardscape Improvements					
1	Install ADA Curb Ramps	5	EA	$ 8,000	$ 40,000
2	Install Raised Median	420	SF	$ 25	$ 10,500
3	Install Sidewalk	6,800	SF	$ 30	$ 204,000
4	Modfify Existing Ramp	1	EA	$ 6,000	$ 6,000
Signing & Striping Improvements					
5	Paint Crosswalk Pavement Marking	1,400	SF	$ 8	$ 11,200
6	Paint Decorative Crosswalk	2,300	SF	$ 15	$ 34,500
7	Paint Intersection Bike Lane Marking	1,100	LF	$ 5	$ 5,500
8	Paint 6" White Lane Striping	2,000	LF	$ 5	$ 10,000
Misc Improvements					
9	Modify Existing Traffic Signal	1	EA	$ 50,000	$ 50,000
10	Install Pedestrian Blankout Sign	4	EA	$ 6,000	$ 24,000

11	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
12	Install Enhanced Station Lighting	1	LS	$ 80,000	$ 80,000
				Mobilization (10% of Project Items)	$ 48,170
				Subtotal	*$ 529,870*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 201,351
				Contigency (50%)	$ 264,935
				Total	**$ 996,156**

#	DESCRIPTION - BAYPOINTE STATION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	8	EA	$ 8,000	$ 64,000
2	Install Sidewalk	350	SF	$ 30	$ 10,500
Signing & Striping Improvements					
3	Paint Crosswalk Pavement Marking	1,100	SF	$ 8	$ 8,800
4	Paint Decorative Crosswalk	2,000	SF	$ 15	$ 30,000
5	Paint Intersection Bike Lane Marking	500	LF	$ 5	$ 2,500
Misc Improvements					
6	Modify Existing Traffic Signal	1	EA	$ 50,000	$ 50,000
7	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
8	Install Pedestrian Blankout Sign	4	EA	$ 6,000	$ 24,000
9	Install Enhanced Station Lighting	1	LS	$ 80,000	$ 80,000
				Mobilization (10% of Project Items)	$ 27,580
				Subtotal	*$ 303,380*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 115,284
				Contigency (50%)	$ 151,690
				Total	**$ 570,354**

#	DESCRIPTION - CISCO STATION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	6	EA	$ 8,000	$ 48,000
2	Install Raised Median	400	SF	$ 25	$ 10,000
3	Install Sidewalk	600	SF	$ 30	$ 18,000
Signing & Striping Improvements					
4	Paint Crosswalk Pavement Marking	1,300	SF	$ 8	$ 10,400
5	Paint Decorative Crosswalk	2,300	SF	$ 15	$ 34,500
6	Paint Intersection Bike Lane Marking	400	LF	$ 5	$ 2,000

Misc Improvements					
7	Modify Existing Traffic Signal	1	EA	$ 50,000	$ 50,000
8	Install Pedestrian Blankout Sign	4	EA	$ 6,000	$ 24,000
9	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
10	Install Enhanced Station Lighting	1	LS	$ 80,000	$ 80,000
				Mobilization (10% of Project Items)	$ 28,290
				Subtotal	*$ 311,190*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 118,252
				Contigency (50%)	$ 155,595
				Total	**$ 585,037**

Notes:

See San Jose Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#19 - Construction/Engineering for San Jose Bus Stop Improvements - Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
Misc Improvements					
1	VTA TPEP Bus Stop Enhancements (Improvements include Shelter, Bench, Bike Rack,	2	EA	$ 54,000	$ 108,000
	Real Time Messaging Sign, & Trash Receptacles)				
				Mobilization (10% of Project Items)	$ 10,800
				Subtotal	*$ 118,800*
				Contigency (50%)	$ 59,400
				Total	**$ 178,200**

Notes:
See San Jose Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#21 - Construction/Engineering for Zanker Improvements - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	6	EA	$ 8,000	$ 48,000
2	Install Sidewalk	1,600	SF	$ 30	$ 48,000
3	Install Raised Median	4,000	SF	$ 25	$ 100,000
Signing & Striping Improvements					
4	Paint 6" White Stripe	1,200	LF	$ 5	$ 6,000
5	Paint Pavement Marking Arrow Marking	30	SF	$ 8	$ 240
6	Paint Green Bike Lane	540	SF	$ 12	$ 6,480
7	Paint High Visibility Crosswalk Markings	2,600	SF	$ 12	$ 31,200
Misc Improvements					
8	Modify Existing Traffic Signal	1	EA	$ 80,000	$ 80,000
9	Porkchop Demo	1	LS	$ 5,750	$ 5,750
				Mobilization (10% of Project Items)	$ 32,567
				Subtotal	*$ 352,487*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 133,945
				Contigency (50%)	$ 176,244
				Total	**$ 662,676**

Notes:
See San Jose Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#22 - Construction/Engineering for Coyote Creek Trail Improvements - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Raised Median	700	SF	$ 25	$ 17,500
Signing & Striping Improvements					
2	Paint Green Bike Lane	1,200	SF	$ 12	$ 14,400
3	Paint 6" White Stripe	3,000	LF	$ 5	$ 15,000
Misc Improvements					
4	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
5	Install Rain Garden	1,600	SF	$ 65	$ 104,000
				Mobilization (10% of Project Items)	$ 15,690
				Subtotal	*$ 68,590*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 26,064
				Contigency (50%)	$ 34,295
				Total	**$ 128,949**

Notes:
See San Jose Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
Milpitas Improvement Projects - Near Term Improvements

Prepared By: Kimley-Horn **April 2020**

Project #	DESCRIPTION	TOTAL COST W/ CONTINGENCY
23	Coyote Creek to McCarthy Improvements	$ 125,000
24	McCarthy to Alder Gap Closure	$ 1,843,000
25	Shared Use Path From McCarthy to Montague	$ 8,333,000
26	Bike Improvements From McCarthy to Montague	$ 2,331,000
27	Milpitas LRT Station Improvements	$ 692,000
28	Milpitas Bus Stops	$ 20,000
29	I-880 Northbound Interchange	$ 1,026,000
30	Great Mall and Abel	$ 477,000
31	Great Mall Parkway / Main Street Intersection Improvements	$ 617,000
32	Great Mall and Montague Improvements	$ 78,000
		$ 15,542,000

Notes:
1. The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
2. This Preliminary Opinion of Probable Cost ("OPC") is based on the DRAFT Tasman Corridor Complete Streets Study Concept Drawings July, 2019.
3. This OPC was prepared without City review and approval, and as such, may be subject to change during the City permitting process.
4. Underground non-pavement utilities such as, but not limited to, water, sanitary sewer, and gas are assumed to be at an adequate depth.

6. Miscellaneous soft costs were applied individually to each project line item above. Soft costs were assumed to be 4% Admin, 4% Environmental, 15% Design, 15% Construction management

7. Cost shown is based on 2019 dollars.
8. The assumed contingency covers items not explored at the current stage. Items include but are not limited to:

• Unknown improvements needed as part of the project (such as drainage improvements, pavement failure repair, landscaping/irrigation replacement, restriping, impacts to lighting/electrical, utility relocations that are not under franchise)
• More costly approach to the design/construction of the improvements than anticipated
• Environmental unknowns (contaminated soil, regulatory-required mitigations, high groundwater)
• Unscoped right-of-way acquisition, including temporary permits
• Federalizing the project and the additional costs of performing NEPA, coordinating with Caltrans

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#23 - Construction/Engineering for Coyote Creek to McCarthy Improvements- Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	5	EA	$ 8,000	$ 40,000
2	Install Raised Median	600	SF	$ 25	$ 15,000
Misc Improvements					
3	Install Wayfinding Signs	1	LS	$ 5,000	$ 5,000
				Mobilization (10% of Project Items)	$ 6,000
				Subtotal	*$ 66,000*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 25,080
				Contigency (50%)	$ 33,000
				Total	**$ 124,080**

Notes:
See Milpitas Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#24 - Construction/Engineering for McCarthy to Alder Gap Closure - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Sidewalk w/ Grading	9,600	SF	$ 50	$ 480,000
Misc Improvements					
2	Install Landscape Strip w/ Irrigation	5,700	SF	$ 50	$ 285,000
3	Install Lighting	21	EA	$ 6,000	$ 126,000
				Mobilization (10% of Project Items)	$ 89,100
				Subtotal	*$ 980,100*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 372,438
				Contigency (50%)	$ 490,050
				Total	**$ 1,842,588**

Notes:
See Milpitas Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#25 - Construction/Engineering for Shared Use Path From McCarthy to Montague - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Ramp (includes Barber ADA Ramps)	21	EA	$ 8,000	$ 168,000
2	Install Sidewalk (8' Sidewalk)	12,000	SF	$ 30	$ 360,000
3	Install Sidewalk (14' Shared Use Path)	87,150	SF	$ 30	$ 2,614,500
4	Install Sidewalk (Bulbout)	6,500	SF	$ 30	$ 195,000
5	Install Bike Ramps	11	EA	$ 8,000	$ 88,000
Signing & Striping Improvements					
6	Paint Yellow Striping	3,200	LF	$ 6	$ 19,200
7	Paint High Visibility Crosswalk Markings	300	SF	$ 12	$ 3,600
Misc Improvements					
8	Install Lighting	92	EA	$ 6,000	$ 552,000
9	Modify Existing Traffic Signal	4	EA	$ 80,000	$ 320,000
				Mobilization (10% of Project Items)	$ 432,030
				Subtotal	*$ 4,432,330*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 1,684,285
				Contigency (50%)	$ 2,216,165
				Total	**$ 8,332,780**

Notes:

See Milpitas Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#26 - Construction/Engineering for Bike Improvements From McCarthy to Montague - Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Raised Median (Bike Buffer Vertical Seperation)	7,500	LF	$ 100	$ 750,000
Signing & Striping Improvements					
2	Paint White Marking	8,300	LF	$ 5	$ 41,500
3	Paint Yellow Marking	300	LF	$ 6	$ 1,800
4	Paint Green Bike Marking	7,400	SF	$ 12	$ 88,800
5	Paint Pavement Marking Arrow Marking	63	SF	$ 8	$ 504
6	Paint High Visibility Crosswalk Markings	13,600	SF	$ 12	$ 163,200
7	Paint Green Bike Boxes	175	SF	$ 6	$ 1,050
Misc Improvements					
8	Modify Existing Traffic Signal	1	EA	$ 80,000	$ 80,000
				Mobilization (10% of Project Items)	$ 112,685
				Subtotal	*$ 1,239,539*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 471,025
				Contigency (50%)	$ 619,770
				Total	**$ 2,330,334**

Notes:
See Milpitas Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#27 - Construction/Engineering for Milpitas LRT Station Improvements - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION - 880/Milpitas Station	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	3	EA	$ 8,000	$ 24,000
Signing & Striping Improvements					
2	Paint Crosswalk Pavement Marking	1,900	SF	$ 8	$ 15,200
3	Paint Decorative Crosswalk	3,600	SF	$ 15	$ 54,000
Misc Improvements					
4	Modify Existing Traffic Signal	1	EA	$ 50,000	$ 50,000
5	Install Pedestrian Blankout Sign	4	EA	$ 6,000	$ 24,000
6	Install Enhanced Station Lighting	1	LS	$ 80,000	$ 80,000
7	Install Wayfinding Signage	1	LS	$ 5,000	$ 5,000
				Planning Level Esclation Cost (50% of Project Items)	$ 126,100
				Subtotal	*$ 378,300*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 143,754
				Contigency (35%)	$ 132,405
				Total	**$ 654,459**

#	DESCRIPTION - Great Mall Station	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
Misc Improvements					
1	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
2	Install Enhanced Station Lighting	1	LS	$ 80,000	$ 80,000
3	Modify Existing Traffic Signal	1	LS	$ 50,000	$ 50,000
				Mobilization (10% of Project Items)	$ 13,600
				Subtotal	*$ 19,600*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 7,448
				Contigency (50%)	$ 9,800
				Total	**$ 36,848**

Notes:

See Milpitas Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#28 - Construction/Engineering for Milpitas Bus Stops - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
Misc Improvements					
1	Install VTA TPEP Bus Stop Enhancements	2	EA	$ 6,000	$ 12,000
	(Improvements include Bench, Bike Rack, & Real Time Messaging Sign)				
				Mobilization (10% of Project Items)	$ 1,200
				Subtotal	*$ 13,200*
				Contigency (50%)	$ 6,600
				Total	**$ 19,800**

Notes:
See Milpitas Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#29 - Construction/Engineering for I-880 Northbound Interchange - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Sidewalk Improvements w/ Grading	3,400	SF	$ 50	$ 170,000
2	Install ADA Curb Ramps	4	EA	$ 8,000	$ 32,000
3	Demo & Clearing of Existing (NB Slip On-Ramp Area)	1	LS	$ 150,000	$ 150,000
4	Install HMA Pavement	275	TON	$ 200	$ 55,000
Signing & Striping Improvements					
5	Install Wayfinding Signage	1	LS	$ 6,000	$ 6,000
6	Refresh Intersection Striping	1	LS	$ 500	$ 500
7	Enhance Existing Freeway Signage	2	EA	$ 1,000	$ 2,000
8	Install Signage	1	EA	$ 350	$ 350
Misc Improvements					
9	Modify Existing Traffic Signal	1	EA	$ 80,000	$ 80,000
				Mobilization (10% of Project Items)	$ 49,585
				Subtotal	*$ 545,435*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 207,265
				Contigency (50%)	$ 272,718
				Total	**$ 1,025,418**

Notes:
See Milpitas Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#30 - Construction/Engineering for Great Mall and Abel - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Raised Median	5,300	SF	$ 25	$ 132,500
2	Install ADA Curb Ramp	2	EA	$ 8,000	$ 16,000
Signing & Striping Improvements					
3	Install Sign	4	EA	$ 500	$ 2,000
Misc Improvements					
4	Modify Existing Traffic Signal	1	EA	$ 80,000	$ 80,000
				Mobilization (10% of Project Items)	$ 23,050
				Subtotal	*$ 253,550*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 96,349
				Contigency (50%)	$ 126,775
				Total	**$ 476,674**

Notes:
See Milpitas Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#31 - Great Mall Parkway / Main Street Intersection Improvements - Near Term Improvements Only

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION - Great Mall Station	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	2	EA	$ 8,000	$ 16,000
2	Install Raised Median	5,000	SF	$ 30	$ 150,000
Signing & Striping Improvements					
4	Paint Crosswalk Pavement Marking	1,600	SF	$ 8	$ 12,800
5	Paint Decorative Crosswalk	4,000	SF	$ 15	$ 60,000
6	Install Sign	1	EA	$ 350	$ 350
Misc Improvements					
7	Modify Existing Traffic Signal	1	EA	$ 50,000	$ 50,000
8	Modify Existing Railcrossing Infrastructure (Railcrossing Gates, Flashing Light Assembly, etc)	1	LS	$ 100,000	$ 100,000
				Mobilization (10% of Project Items)	$ 38,915
				Subtotal	*$ 328,065*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 124,665
				Contigency (50%)	$ 164,033
				Total	**$ 616,762**

Notes:
See Milpitas Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
#32 - Construction/Engineering for Great Mall and Montague Improvements- Near Term Improvements Only

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Raised Crosswalk	1,500	SF	$ 25	$ 37,500
Signing & Striping Improvements					
Misc Improvements					
				Mobilization (10% of Project Items)	$ 3,750
				Subtotal	*$ 41,250*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 15,675
				Contigency (50%)	$ 20,625
				Total	**$ 77,550**

Notes:
See Milpitas Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study
Ultimate Improvements Only

Prepared By: Kimley-Horn **April 2020**

Project #	DESCRIPTION	TOTAL COST W/ CONTINGENCY
5	Install New Pedestrian Facilities for Reamwood LRT Station Connection	$ 465,000
6	Install New Sidewalk Gap Closure (Reamwood to Clabazas Creek)	$ 260,000
17	Widen Coyote Creek Bridge for Three East-Bound Travel Lanes, Bike Lane w/ Buffer, and Wide Sidewalk	$ 5,774,000
18	Remove All Left-Turn Movements At 1st Street Intersection	$ 957,000
23	Install New Intersection Improvements For Three East-Bound Travel Lanes, Bike Lane w/ Buffer, and Wide Sidewalk	$ 32,000
25	Widen I-880 Bridge & Extend Class I Bike Path (Alder Drive to I-880)	$ 2,844,000
27	Install Elevated Pedestrian Walkway to Great Mall LRT Station	$ 1,034,000
SV North	Construct New Pedestrian & Bicycle Bridge Acroos Calabazas Creek Trail	$ 2,075,000
		$ 13,441,000

Notes:
1. The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.
2. This Preliminary Opinion of Probable Cost ("OPC") is based on the DRAFT Tasman Corridor Complete Streets Study Concept Drawings July, 2019.
3. This OPC was prepared without City review and approval, and as such, may be subject to change during the City permitting process.
4. Underground non-pavement utilities such as, but not limited to, water, sanitary sewer, and gas are assumed to be at an adequate depth.

6. Miscellaneous soft costs were applied individually to each project line item above. Soft costs were assumed to be 4% Admin, 4% Environmental, 15% Design, 15% Construction management

7. Cost shown is based on 2019 dollars.

8. The assumed contingency covers items not explored at the current stage. Items include but are not limited to:

• Unknown improvements needed as part of the project (such as drainage improvements, pavement failure repair, landscaping/irrigation replacement, restriping, impacts to lighting/electrical, utility relocations that are not under franchise)
• More costly approach to the design/construction of the improvements than anticipated
• Environmental unknowns (contaminated soil, regulatory-required mitigations, high groundwater)
• Unscoped right-of-way acquisition, including temporary permits
• Federalizing the project and the additional costs of performing NEPA, coordinating with Caltrans

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study - Ultimate Improvements Only
#5 - Construction/Engineering for Install New Pedestrian Facilities for Reamwood LRT Station Connection

Prepared By: Kimley-Horn

Date: April 2020

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	3	EA	$ 8,000	$ 24,000
2	Install Sidewalk w/ Grading (Includes existing street light modifications & tree removal/replacement)	1,300	SF	$ 70	$ 91,000
3	Install Sidewalk				
Signing & Striping Improvements					
4	Paint Crosswalk Pavement Marking	200	SF	$ 8	$ 1,600
5	Paint Decorative Crosswalk	650	SF	$ 15	$ 9,750
6	Paint 6" White Dashed Stripe	600	LF	$ 5	$ 3,000
7	Install Sign	1	EA	$ 500	$ 500
8	Install Pedestrian Barricade w/ Sign	1	EA	$ 1,500	$ 1,500
Misc Improvements					
9	Install Landscape Strip	900	SF	$ 15	$ 13,500
10	Modify Existing Traffic Signal	1	EA	$ 80,000	$ 80,000
				Mobilization (10% of Project Items)	$ 22,485
				Subtotal	*$ 247,335*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 93,987
				Contigency (50%)	$ 123,668
				Total	**$ 464,990**

Notes:
See Ultimate Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study - Ultimate Improvements Only
#6 - Construction/Engineering for Install New Sidewalk Gap Closure (Reamwood to Clabazas Creek)

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
2	Install Sidewalk (Includes major grading wor, on-site hardscape modification, and landscape removal)	1,700	SF	$ 70	$ 119,000
Signing & Striping Improvements					
3	Paint Green Bike Markings	540	SF	$ 12	$ 6,480
Misc Improvements					
				Mobilization (10% of Project Items)	$ 12,548
				Subtotal	*$ 138,028*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 52,451
				Contigency (50%)	$ 69,014
				Total	**$ 259,493**

Notes:
See Ultimate Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study - Ultimate Improvements Only
#17 - Construction/Engineering for Widen Coyote Creek Bridge for Three East-Bound Travel Lanes, Bike Lane w/ Buffer, and Wide Sidewalk

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Curb Ramps	1	EA	$ 8,000	$ 8,000
2	Install Sidewalk	30,000	SF	$ 30	$ 900,000
3	Install Raised Median	5,000	SF	$ 25	$ 125,000
4	Install Raised Bike Lane (3" HMA)	220	TON	$ 200	$ 44,000
Signing & Striping Improvements					
5	Paint 6" White Stripe	750	LF	$ 5	$ 3,750
6	Paint 6" White Dash Stripe	475	LF	$ 5	$ 2,375
7	Paint Pavement Marking Arrow Marking	60	SF	$ 8	$ 480
Misc Improvements					
8	Install Rain Garden	3,200	SF	$ 65	$ 208,000
9	Widen Existing Coyote Creek Trail Bridge	1	LS	$ 1,500,000	$ 1,500,000
				Mobilization (10% of Project Items)	$ 279,161
				Subtotal	*$ 3,070,766*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 1,166,891
				Contigency (50%)	$ 1,535,383
				Total	**$ 5,773,039**

Notes:

See Ultimate Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study - Ultimate Improvements Only
#18 - Construction/Engineering for Remove All Left-Turn Movements At 1st Street Intersection

Prepared By: Kimley-Horn

Date: April 2020

#	DESCRIPTION - TASMAN STATION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Raised Median	16,500	SF	$ 25	$ 412,500
Signing & Striping Improvements					
Misc Improvements					
2	Modify Existing Traffic Signal	1	EA	$ 50,000	$ 50,000
				Mobilization (10% of Project Items)	$ 46,250
				Subtotal	*$ 508,750*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 193,325
				Contigency (50%)	$ 254,375
				Total	**$ 956,450**

Notes:
See Ultimate Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study - Ultimate Improvements Only
#23 - Construction/Engineering for Install New Intersection Improvements For Three East-Bound Travel Lanes, Bike Lane w/ Buffer, and Wide Sidewalk

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install Raised Median	80	SF	$ 25	$ 2,000
Signing & Striping Improvements					
2	Paint High Visibility Crosswalk Pavement Marking	1,100	SF	$ 12	$ 13,200
3	Paint 6" White Dash Stripe w/ Bike Crossing	100	LF	$ 8	$ 800
				Mobilization (10% of Project Items)	$ 1,600
				Subtotal	*$ 16,800*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 6,384
				Contigency (50%)	$ 8,400
				Total	**$ 31,584**

Notes:
See Ultimate Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study - Ultimate Improvements Only
#25 - Construction/Engineering for Widen I-880 Bridge & Extend Class I Bike Path (Alder Drive to I-880)

Prepared By: Kimley-Horn **Date: April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
1	Install ADA Ramp (includes Barber ADA Ramps)	1	EA	$ 8,000	$ 8,000
2	Install Sidewalk (8' Sidewalk)	11,200	SF	$ 30	$ 336,000
3	Install Sidewalk (14' Shared Use Path)	24,920	SF	$ 30	$ 747,600
4	Install Bike Ramps	4	EA	$ 8,000	$ 32,000
Signing & Striping Improvements					
5	Paint Yellow Striping	1,780	LF	$ 6	$ 10,680
6	Paint High Visibility Crosswalk Pavement Marking	80	SF	$ 12	$ 960
7	Paint Green Bike Lane	300	SF	$ 12	$ 3,600
Misc Improvements					
8	Install Lighting	10	EA	$ 10,000	$ 100,000
9	Widen Existing Bridge over I-880	1	LS	$ 1,500,000	$ 1,500,000
				Mobilization (10% of Project Items)	$ 273,884
				Subtotal	*$ 1,512,724*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 574,835
				Contigency (50%)	$ 756,362
				Total	**$ 2,843,921**

Notes:
See Ultimate Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study - Ultimate Improvements Only
#27 - Construction/Engineering for Install Elevated Pedestrian Walkway to Great Mall LRT Station

Prepared By: Kimley-Horn

Date: April 2020

#	DESCRIPTION - Great Mall Station	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
Misc Improvements					
1	Install Elevated Pedestrian Walkway	1	LS	$ 500,000	$ 500,000
				Mobilization (10% of Project Items)	$ 50,000
				Subtotal	*$ 550,000*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 209,000
				Contigency (50%)	$ 275,000
				Total	**$ 1,034,000**

Notes:
See Ultimate Improvements Cover Sheet

Preliminary Opinion of Probable Construction Cost
for
Tasman Corridor Complete Streets Study - Ultimate Improvements Only
Construction/Engineering for Construct New Pedestrian & Bicycle Bridge Acroos Calabazas Creek Trail

Prepared By: **Kimley-Horn** **Date:** **April 2020**

#	DESCRIPTION	QUANTITY	UNIT	COST / UNIT	TOTAL COST
Hardscape Improvements					
Signing & Striping Improvements					
Misc Improvements					
1	Install New Pedestrian/Bicycle Only Bridge	1	LS	$ 1,000,000	$ 1,000,000
2	Install New Bollards	3	EA	$ 1,000	$ 3,000
				Mobilization (10% of Project Items)	$ 100,300
				Subtotal	*$ 1,103,300*
				Minor Items (4% Admin, 4% Environmental, 15% Design, 15% CM)	$ 419,254
				Contigency (50%)	$ 551,650
				Total	**$ 2,074,204**

Notes:

See Ultimate Improvements Cover Sheet

Appendix D

Analysis of Proposed Improvements Memorandum

MEMORANDUM

To: John Sighamony, VTA

From: Adam Dankberg, P.E. and Robert Paderna, P.E., Kimley-Horn

Date: July 16, 2018

RE: Tasman Corridor Complete Streets Study – Analysis of Proposed Improvements

Introduction and Project Area

The Santa Clara Valley Transportation Authority (VTA) is leading a planning effort to identify complete streets improvements along the Tasman Drive and Great Mall Parkway corridor ("Study corridor"), which serves numerous regional and local transportation needs for the residents, workers, and visitors of Silicon Valley. The limits of the Study corridor is Morse Avenue in Sunnyvale to the west and Montague Expressway in Milpitas to the east. Figure 1 presents the Study area. To provide for the ongoing growth and transportation demands on the Study corridor in a sustainable and community-supportive manner, the Tasman Corridor Complete Streets Study ("Study") is the start of a process to enhance the safety, comfort, and reliability of the Study corridor's transit, bicycle, and pedestrian facilities while still accommodating drivers. The VTA is leading the project effort in close partnership with the Cities of Sunnyvale, Santa Clara, San Jose, and Milpitas ("Partner Agencies"). It is intended that the outcomes of the study will assist VTA and the Partner Agencies in implementing a cohesive set of multimodal improvements along the Study corridor.

The project team received input from the community on issues and constraints identified along the Study corridor in April 2017 at various community workshops held in Sunnyvale, Santa Clara, San Jose, and Milpitas. Additionally, input from the community was received via an online survey. Community feedback from this initial round of outreach indicated that the two most important needs along the Study corridor are (1) safer or more comfortable sidewalks and the completion of missing sidewalks, and (2) safer or more comfortable bike facilities and the completion of gaps/missing bike facilities. Based on community feedback, a preliminary set of improvements were developed throughout the Study corridor to improve the safety and comfort of the roadway for all users. The preliminary improvements were depicted in conceptual improvement plans which were presented to staff from each of the member agencies for review and input.

The purpose of this complete streets analysis memorandum is to document the operations analysis conducted along the Study corridor to assess the impacts associated with the proposed project improvements.

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

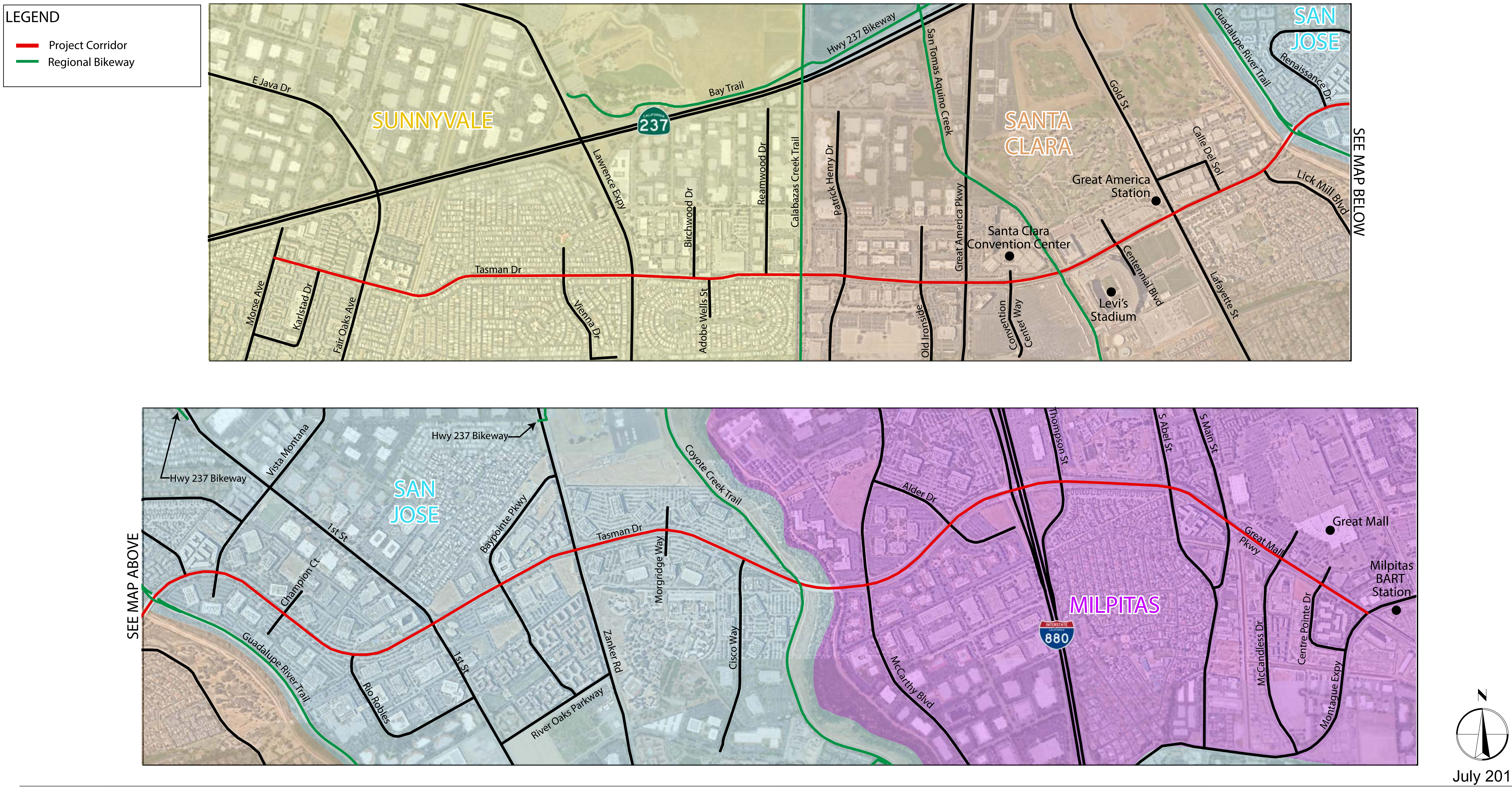


Figure 1 - Study Area

Kimley»Horn

Existing Conditions

Auto

Tasman Drive and Great Mall Parkway is an east-west arterial roadway that parallels State Route 237 to the south. The limits of the Study corridor are from Morse Avenue in Sunnyvale to Montague Expressway in Milpitas. Tasman Drive provides two travel lanes in each direction between Morse Avenue and Zanker Road, and widens to three lanes in each direction for most of the extent between Zanker Road and Montague Expressway.

The posted speed limit along Tasman Drive is 40 mph from the western limits of the Study corridor to Lick Mill Boulevard, 35 mph between Lick Mill Boulevard and Zanker Road, 45 mph between Zanker Road and McCarthy Boulevard, and 40 mph between McCarthy Boulevard and the eastern limits of the Study corridor.

Bike

On-street (Class II) bike lanes are provided along the majority of the Study corridor. There is a significant gap in the bicycle facility between Fair Oaks Avenue in Sunnyvale to Patrick Henry Drive in Santa Clara.

Many regional trails connect to the Study corridor and are integral components of the regional pedestrian and bicycle network. The following trails intersect the Study corridor:

- Calabazas Creek Trail in Sunnyvale/Santa Clara
- San Tomas Aquino Creek Trail in Santa Clara
- Guadalupe River Trail in San Jose
- Coyote Creek Trail in San Jose

Currently, some sections of the Study corridor provide high quality facilities for bicyclists while other areas could benefit from enhancements to improve the safety, comfort, and access for this mode.

Pedestrian

Sidewalks are provided along the majority of the Study corridor. There are gaps in the sidewalk network at several locations including between east of Fair Oaks Avenue and Vienna Drive (both sides of the street); Vienna Drive and Lawrence Expressway (north side); Adobe Wells Street and Reamwood Drive (north side); Centennial Boulevard and Calle Del Sol (north side); McCarthy Boulevard and Alder Drive (south side); and South Main Street and Centre Pointe Drive (south side). Sidewalks in other areas are narrow or have obstructions limiting the width of path of travel.

There are no unsignalized crossings of the Study corridor, although several signalized crossings are missing countdown timers and other crosswalk features.

Transit

VTA provides bus and light rail transit services along the Study corridor. There are approximately 35 routes that operate along the Study corridor or cross the Study corridor at one intersection. Two light rail routes are provided along the Study corridor: Route 901 – Santa Teresa to Alum Rock (Blue), and Route 902 – Mountain View to Winchester (Green).

Route 901 operates on the corridor between North First Street (Tasman Station) and continues east past Montague Expressway (Montague Station) on the Study corridor. The full Route 901 extends from the Alum Rock Station to the Santa Teresa Station, spanning approximately 25 miles. Weekday headways for this route are at 15-minute intervals from 6:00 AM to 8:00 PM. From 8:00 PM to about 12:00 AM (midnight), headways are approximately 30 minutes. Route 902 operates on the Study corridor from Fair Oaks Drive (Fair Oaks Station) to North First Street (Tasman Station). Route 902 extends from the Downtown Mountain View Transit Center to the Winchester Transit Center spanning approximately 21 miles. This route has 15-minute headways from 5:15 AM to 10:00 AM and 3:00 PM to 9:00 PM, and 30-minute headways from 10:00 AM to 3:00PM and 9:00 PM to 12:00 AM (Midnight).

Numerous route changes are planned as part of the VTA Next Network system that will be implemented in conjunction with the opening of the BART Silicon Valley Berryessa Extension project. Route changes include truncating Route 902 at the Old Ironsides Station and introducing a new route that will operate the full length of the corridor, extending between the Downtown Mountain View Transit Center and Alum Rock Station.

An Existing Conditions Report was submitted in August 2017 which further documents the existing conditions of all travel modes along the Study corridor.

Data Collection

Bi-directional 24-hour average daily traffic (ADT) counts were collected for four segments along the Study corridor. Counts were collected in May 2017 along one segment of the Study corridor in each of the four cities as presented in Table 1 below.

Table 1 – Average Daily Traffic (ADT) Volumes

Segment	Eastbound ADT	Westbound ADT	Total ADT
Fair Oaks Avenue to Vienna Drive (Sunnyvale)	6,519	5,588	12,107
Patrick Henry Drive to Old Ironsides Drive (Santa Clara)	5,325	5,710	11,035
North 1st Street to Zanker Road (San Jose)	7,689	8,777	16,466
I-880 NB Ramps to S Abel Street (Milpitas)	16,939	16,660	33,599
Source: Kimley-Horn and Associates, May 2017.			

Weekday peak period intersection turning movement counts, including vehicles, bikes, and pedestrians, were collected at all signalized intersections along the Study corridor. Recent counts (2015 or later) from previous traffic studies were provided by the Partner Agencies and supplemented by new intersection counts collected for the purposes of this Study in May 2017. The peak hour intersection turning movement counts are presented in Attachment A.

During field reconnaissance, lane configurations and speed limits were collected. Storage pocket lengths and lane widths were measured using high resolution aerial imagery and confirmed in the field. Signal timings and coordination plans (where applicable) were obtained from the Partner Agencies.

Intersection Analysis Methodology

Level of service (LOS) is a description of the quality of an intersection's operation, ranging from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing over-saturated conditions where traffic flows exceed design capacity, resulting in long queues and delays). At signalized intersections, the LOS rating is based on the weighted average control delay of all movements measured in seconds per vehicle. Peak hour traffic volumes, lane configurations, and signal timing plans are used as inputs in the LOS calculations.

Table 2 summarizes the relationship between average control delay per vehicle and LOS for signalized intersections.

Table 2 – Level of Service Criteria

Level of Service (LOS)	Signalized Intersection Control Delay (sec/veh)
A	≤ 10
B	> 10 – 20
C	> 20 – 35
D	> 35 – 55
E	> 55 – 80
F	> 80
Source: Highway Capacity Manual, 2010.	

The traffic analysis was conducted using two traffic analysis software packages, *Synchro* and *VISSIM*. *Synchro* was used to analyze the intersections in Sunnyvale, Santa Clara, and Milpitas in which the nature of the proposed improvements consisted of spot intersection improvements where the proposed improvements would change intersection operations. *VISSIM* micro-simulation was used to analyze the segment of the Study corridor in San Jose between Vista Montana and Cisco Way due to the complex nature of the roadway network with the median-running light rail train (LRT) and proposed improvements from the VTA LRT Enhancements Project.

The Study area includes all signalized intersections in which there were improvements proposed that would significantly change the operations or capacity of the intersection. Those intersections are identified in Table 3 and illustrated on Figure 2. Intersections along the primary traffic diversion route identified as part of the VTA LRT Enhancements Project, including those not located along Tasman Drive, are included in the traffic operations analysis and included in the Study. Those intersections were included in the San Jose VISSIM model.

Table 3 – Study Intersections

No.	Study Intersection	Agency	Traffic Analysis Software
1	Tasman Drive/Fair Oaks Avenue	Sunnyvale	Synchro
2	Tasman Drive/Lick Mill Boulevard	Santa Clara	Synchro
3	Tasman Drive/Renaissance Drive	San Jose	VISSIM
4	Tasman Drive/Vista Montana	San Jose	VISSIM
5	Tasman Drive/Champion Court	San Jose	VISSIM
6	Tasman Drive/Rio Robles	San Jose	VISSIM
7	Tasman Drive/N 1st Street	San Jose	VISSIM
8	Tasman Drive/Baypointe Parkway	San Jose	VISSIM
9	Tasman Drive/Zanker Road	San Jose	VISSIM
10	Tasman Drive/Morgridge Way	San Jose	VISSIM
11	Tasman Drive/Cisco Way	San Jose	VISSIM
12	Tasman Drive/McCarthy Boulevard	Milpitas	Synchro
13	Great Mall Parkway/I-880 NB Ramps	Milpitas	Synchro
14	Great Mall Parkway/Abel Street	Milpitas	Synchro
15	Great Mall Parkway/Main Street	Milpitas	Synchro
F1	N 1st Street/Vista Montana	San Jose	VISSIM
F2	N 1st Street/Rio Robles	San Jose	VISSIM
F3	N 1st Street/River Oaks Parkway	San Jose	VISSIM
F4	Zanker Road/River Oaks Parkway	San Jose	VISSIM
F5	Zanker Road/DeSoto Road	San Jose	VISSIM
F6	Vista Montana/Renaissance Drive	San Jose	VISSIM

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority

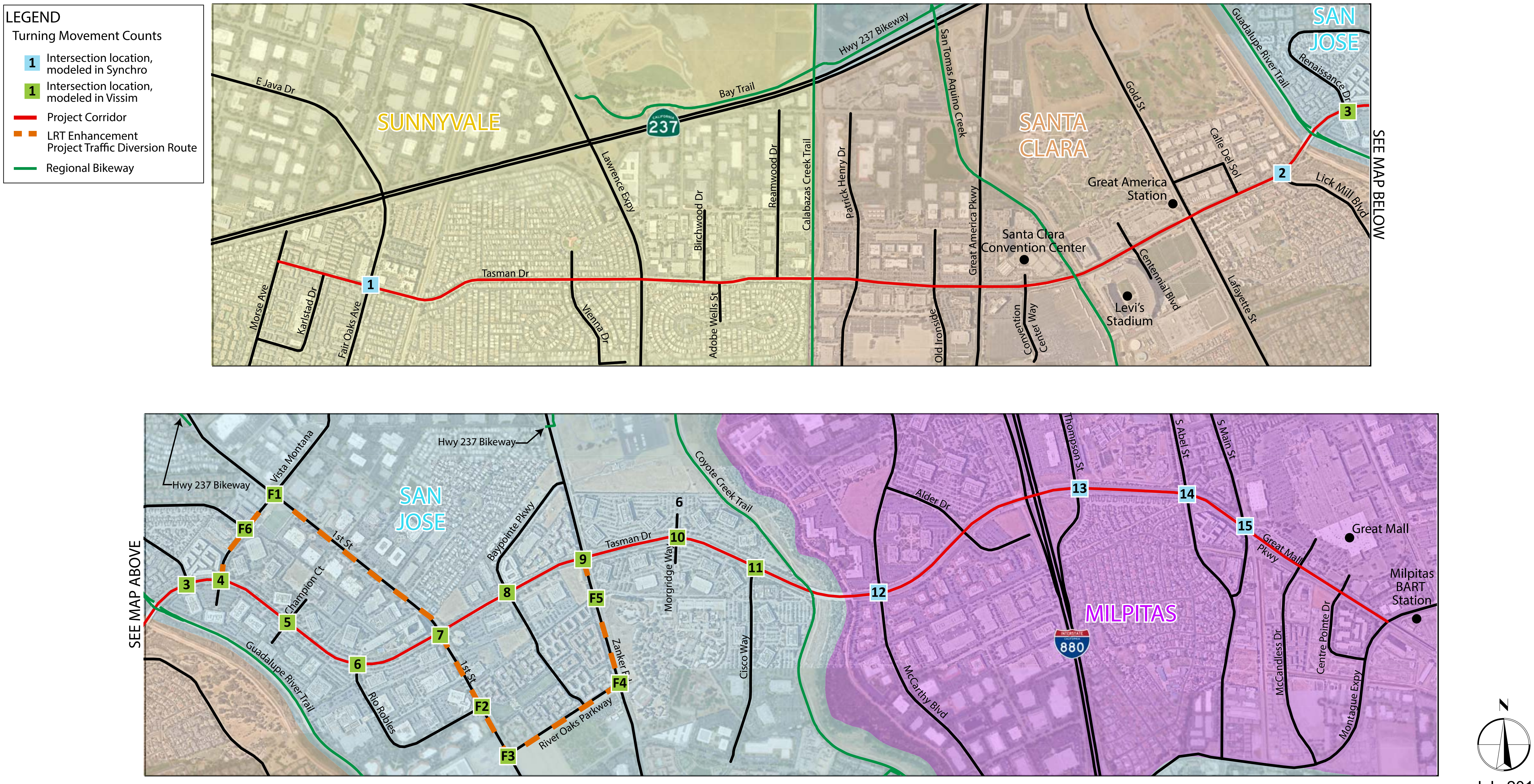


Figure 2 - Study Intersections

Kimley»Horn

Synchro Model Development

Synchro models were developed representing the existing weekday AM and PM peak hour traffic conditions. The *Synchro* models include the study intersections noted in Table 3 and were coded with the peak hour volumes, bicycle and pedestrian volumes, posted speed limits, current signal timings, and coordination plans where applicable. Traffic signal-related information such as phasing and initial timings (minimum green, maximum green, gap, etc.) for the signalized intersections was obtained from the Partner Agencies. Additional detail such as turn pocket lengths and intersection spacing was coded based on field observations and aerial photography.

VISSIM Model Development

VISSIM models were also developed representing the existing weekday AM and PM peak hour traffic conditions where noted in Table 3. The models were coded to include balanced peak-hour volumes[1], bicycle and pedestrian volumes, posted speed limits, current signal timings and coordination plans, and LRT schedules and applicable traffic signal timing parameters. Traffic signal-related information such as phasing and initial timings, coordination parameters, and LRT priority parameters (where applicable) were obtained from the Partner Agencies. Additional detail such as turn pocket lengths and intersection spacing was coded based on field observations and aerial photography.

VISSIM Model Calibration

The existing weekday AM and PM peak hour *VISSIM* models were calibrated based on guidance from FHWA's *Traffic Analysis Toolbox Volume III*: *Guidelines for Applying Traffic Microsimulation Modeling Software*[2]. The models were calibrated according to the following recommended criteria:

- Hourly volume flows (modeled vs. observed) – these include criteria for individual link flows, the sum of all link flows, the GEH statistic[3] for individual link flows, and the GEH statistic for the sum of all link flows. The specific criteria and thresholds are shown in Table 4 and Table 5 for AM and PM volume calibration results, respectively. As shown in the tables, volume calibration targets were met for all four criteria in both the AM and PM.
- Hourly average travel times (modeled vs. observed) – travel times within the model were compared against field-measured travel times along Tasman Drive in both directions between Vista Montana and Cisco Way. FHWA guidance recommends that model travel times be within 15 percent of field-measured travel times. Travel time results are shown in Table 6 and Table 7 for AM and PM, respectively. As shown, modeled travel times in both directions in both hours are within 15 percent of field-measured travel times.

[1] In order to properly calibrate volumes within the VISSIM models, traffic volumes between intersections must be balanced. In several locations, large imbalances between upstream departure volumes and downstream approach volumes existed. In some cases those imbalances were caused by driveways not included in the study area representing major generators or receivers of traffic, such as the parking lots for the Cisco facilities and other office complexes as well as large residential complexes, such as those along N 1st Street or Zanker Road. In other locations where no logical generator or receiver was present to rectify imbalances, imbalances were smoothed between adjacent intersections.
[2] https://ops.fhwa.dot.gov/trafficanalysistools/tat_vol3/vol3_guidelines.pdf
[3] The GEH statistic is used to compare model-estimated versus observed field count volumes. Please refer to the *FHWA Traffic Analysis Toolbox III*, page 64, for further information.

- Visual audits of individual link speeds and bottlenecks – FHWA recommends a visual review of simulation conditions to observe travel speeds and bottlenecks/queuing. Kimley-Horn visually observed the simulations and verified that queue formation was reflective of field-observed conditions.

Table 4 – AM Volume Calibration Summary

Criteria	Target	Simulation Results	Meets?
Individual Link Flows: • Within 100 vph for flow < 700 vph • Within 15% for flow from 700-2700 vph • Within 400 vph for flow > 2700 vph	> 85% of cases	100%	Yes
Sum of All Link Flows	Within 5% of sum of all link counts	-1.05%	Yes
GEH Statistic < 5 for Individual Link Flows	> 85% of cases	98%	Yes
GEH Statistic for Sum of All Link Flows	< 4 for sum of all link counts	1.82	Yes

Table 5 – PM Volume Calibration Summary

Criteria	Target	Simulation Results	Meets?
Individual Link Flows: • Within 100 vph for flow < 700 vph • Within 15% for flow from 700-2700 vph • Within 400 vph for flow > 2700 vph	> 85% of cases	100%	Yes
Sum of All Link Flows	Within 5% of sum of all link counts	-0.69%	Yes
GEH Statistic < 5 for Individual Link Flows	> 85% of cases	100%	Yes
GEH Statistic for Sum of All Link Flows	< 4 for sum of all link counts	1.27	Yes

Table 6 – AM Travel Time Calibration Summary

Direction	VISSIM Segment Travel Time (s)	Field Segment Travel Time (s)	Difference (s)	% Difference
EB	366	388	-22	-5.8%
WB	321	317	4	1.3%

Table 7 – PM Travel Time Calibration Summary

Direction	VISSIM Segment Travel Time (s)	Field Segment Travel Time (s)	Difference (s)	% Difference
EB	336	388	-52	-13.4%
WB	359	317	42	13.3%

Project Improvements

Various project improvements along the Study corridor have been identified to enhance the desirability and comfort of all transportation modes including bicycles, pedestrians, transit, and automobiles. These corridor-wide improvements, which were developed with input from partner agencies and the community, are illustrated in the Tasman Corridor Complete Streets Study Conceptual Improvement Design Plans (dated March 15, 2018) included in Attachment B. The types of improvements include, but are not limited to: two-way separated bike facilities; buffered bike lanes with vertical separation; two-stage bike turn boxes; green striping at conflict zones; bike signals; high-visibility crosswalk treatments; enhanced signage at LRT stations and trail crossings; new and enhanced sidewalk facilities; pedestrian refuge islands; leading pedestrian interval (LPI) signal phasing; intersection-specific improvements to enhance LRT access and pedestrian safety; and curb modifications to tighten curb radii at intersections.

The intersection improvements which have been studied as part of the traffic operations analysis are summarized in the Evaluation Matrix provided in Attachment C. The matrix also provides an evaluation of the projects effects on all travel modes.

Synchro Analysis Summary

Existing and Existing Plus Project Conditions

Table 8 presents the results of the traffic operations analysis for all study intersections analyzed using Synchro under Existing and Existing Plus project conditions. As shown, the following study intersections operate at LOS E or F during one or both peak hours:

- Tasman Drive/Fair Oaks Avenue (AM and PM Peaks)
- Tasman Drive/McCarthy Boulevard (AM and PM Peaks)
- Great Mall Parkway/I-880 NB Ramps/Thompson Street (AM Peak)

Detailed results of the traffic operations analysis, including average delay and queuing by intersection movement, is provided for the San Jose intersections modeled in *VISSIM* in Attachment D.

Table 8 – Existing and Existing Plus Project Conditions LOS Results (Synchro Intersections)

No.	Study Intersection	Agency	AM Peak Hour				PM Peak Hour			
			No Project		With Project		No Project		With Project	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1	Tasman Drive/Fair Oaks Avenue	Sunnyvale	69.1	E	74.4	E	62.8	E	69.6	E
2	Tasman Drive/Lick Mill Boulevard	Santa Clara	34.1	C	24.9	C	43.4	D	43.9	D
3	Tasman Drive/Renaissance Drive	San Jose	18.0	B	26.4	C	10.0	A	11.7	B
12	Tasman Drive/McCarthy Boulevard	Milpitas	78.4	E	74.3	E	85.7	F	58.3	E
13	Great Mall Parkway/I-880 NB Ramps/Thompson Street	Milpitas	92.7	F	56.1	E	36.7	D	45.9	D
14	Great Mall Parkway/Abel Street	Milpitas	45.0	D	66.8	E	39.2	D	40.3	D
15	Great Mall Parkway/Main Street	Milpitas	28.6	C	32.1	C	35.1	D	28.8	C

Under Existing Plus Project conditions, the proposed project improvements are generally not anticipated to result in significant operational impacts for auto users. As shown in Table 8, the project improvements under Existing conditions are anticipated to result in degradation of intersection operations from acceptable level of service (LOS) D or better to unacceptable LOS, or an increase in delay of 4 seconds or more at an intersection already operating at unacceptable LOS at the following study intersection:

- Tasman Drive/Fair Oaks Avenue

  During the AM peak hour, the intersection delay is 69.1 sec/veh (LOS E) and the proposed project improvements result in an increase in delay to 74.4 sec/veh (LOS E). During the PM peak hour, the intersection delay is 62.8 sec/veh (LOS E) and the proposed project improvements result in an increase in delay to 69.6 sec/veh (LOS E). The slight increase in delay is primarily a result of the reduction in travel lanes on the westbound approach from 4 lanes to 3 lanes and the associated implementation of the split phasing. This lane reduction is needed to accommodate the proposed bike slot and modified porkchop island for improved station access for pedestrians.
- Great Mall Parkway/Abel Street

  During the AM peak hour, the intersection delay is 45.0 sec/veh (LOS D) and the proposed project improvements result in an increase in delay to 66.8 sec/veh (LOS E). The increase in delay with the project is primarily attributable to the right-turn on red restrictions at the westbound and northbound approaches. These restrictions are required by the proposed two-stage bike turn boxes at this intersection.

Horizon Year Volume Development

Traffic forecasts were developed for horizon year (year 2035) conditions for use as the basis for the traffic operations analysis for the proposed project. The Countywide Travel Demand Model which is maintained by VTA was obtained for use in this analysis. The traffic volumes generated from the countywide model are based on forecasts of population and employment consistent with each agencies respective General Plans.

Year 2015 and 2040 model forecasts were used to calculate annual growth rates along the Study corridor. The growth rates were used to calculate horizon year (year 2035) AM and PM peak hour link volumes. Kimley-Horn developed weekday AM and PM peak hour intersection turning movement volumes under horizon year (year 2035) conditions using the "furness method" consistent with NCHRP 255, which utilizes the existing turning movement counts at each of the study intersections and the horizon year (year 2035) link volumes derived from the Countywide Travel Demand Model. The weekday AM and PM peak hour intersection turning movement volumes were then input into the *Synchro* and *VISSIM* traffic operations models.

Horizon and Horizon Plus Project Conditions

The Study intersections were analyzed under Horizon and Horizon Plus Project conditions. The project improvements assumed in the models include the multimodal intersection improvements illustrated in the Tasman Corridor Complete Streets Study Conceptual Improvement Design Plans (dated March 15, 2018). Attachment B presents the proposed intersection improvements assumed in the models.

Table 9 presents the results of the traffic operations analysis for the study intersections under Horizon and Horizon Plus Project conditions.

Table 9 – Horizon and Horizon Plus Project Conditions LOS Results

No.	Study Intersection	Agency	AM Peak Hour				PM Peak Hour			
			No Project		With Project		No Project		With Project	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1	Tasman Drive/Fair Oaks Avenue	Sunnyvale	124.3	F	135.7	F	245.3	F	204.7	F
2	Tasman Drive/Lick Mill Boulevard	Santa Clara	136.9	F	137.5	F	217.8	F	212.4	F
3	Tasman Drive/Renaissance Drive	San Jose	32.6	C	54.1	D	35.8	D	37.6	D
12	Tasman Drive/McCarthy Boulevard	Milpitas	227.7	F	192.0	F	112.3	F	182.2	F
13	Great Mall Parkway/I-880 NB Ramps/Thompson Street	Milpitas	148.6	F	153.6	F	61.1	E	84.2	F
14	Great Mall Parkway/Abel Street	Milpitas	110.5	F	108.2	F	79.8	E	57.4	E
15	Great Mall Parkway/Main Street	Milpitas	32.8	C	37.6	D	38.4	D	36.1	D

Under Horizon conditions, the proposed project improvements are anticipated to result in operational impacts at a few signalized intersections. As shown in Table 9, the project improvements under Horizon (Year 2035) conditions are anticipated to result in degradation of intersection operations from acceptable level of service (LOS) D or better to unacceptable LOS, or an increase in delay of 4 seconds or more at an intersection already operating at unacceptable LOS at the following study intersections:

- Tasman Drive/Fair Oaks Avenue

  During the AM peak hour, the intersection delay is 124.3 sec/veh (LOS F) and the proposed project improvements result in an increase in delay to 135.7 sec/veh (LOS F). The slight increase in delay is primarily a result of the reduction in travel lanes on the westbound approach from 4 lanes to 3 lanes and the associated implementation of the split phasing. This lane reduction is needed to accommodate the proposed bike slot and modified porkchop island for improved station access for pedestrians.

  Note that during the PM peak hour, the intersection is anticipated to experience delays of 200 seconds or more under Future No Project and Future Plus Project conditions. This is primarily due to the northbound right-turn volume which is projected to double (from 630 vph to 1,240 vph) based on the growth assumed in the VTA travel demand model. The proposed project improvements include implementation of a northbound right-turn overlap phase (to run concurrent with the westbound phase) in addition to the westbound approach lane reduction and modification of signal phasing for the eastbound and westbound approaches to split phase. These improvements result in a reduction in delay of 40 seconds relative to Baseline conditions, although the intersection would still operate deficiently.

- Tasman Drive/McCarthy Boulevard

  During the PM peak hour, the intersection delay is 112.3 sec/veh (LOS F) and the proposed project improvements result in an increase in delay to 182.2 sec/veh (LOS F). The increase in delay with the project during the PM peak hour is primarily attributable to the reduction in through lane capacity at the eastbound approach with the conversion of the shared through/right-turn lane to a dedicated right-turn lane. This lane modification is required with the addition of the two-way cycle track and the need for a bike signal at the south leg of the intersection. It should also be noted that the storage length for the lane proposed to be eliminated is only 200 feet (only two eastbound lanes are provided across Coyote Creek), which is not accounted for in the HCM-based analysis. Therefore, the effect of the proposed improvement is likely significantly overstated.

- Great Mall Parkway/I-880 NB Ramps/Thompson Street

  During the AM peak hour, the intersection delay is 148.6 sec/veh (LOS F) and the proposed project improvements result in an increase in delay to 153.6 sec/veh (LOS F). During the PM peak hour, the intersection delay is 61.1 sec/veh (LOS E) and the proposed project improvements result in an increase in delay to 84.2 sec/veh (LOS F). The increase in delay with the project is primarily attributable to the right-turn on red restrictions at the southbound approach, reconfiguration of the on-ramp to remove the “free” eastbound right-turn slip lane and signalization of the right-turn movement, which would enhance pedestrian safety across the on-ramp.

VISSIM Auto Analysis Summary

Existing and Existing Plus Project Conditions

Study intersections along the Study corridor in San Jose between Vista Montana and Cisco Way were analyzed in *VISSIM* due to the complex nature of the roadway network with the median-running LRT and the significant modifications at the North First Street & Tasman Drive intersection proposed by the *VTA LRT Enhancements Project*. The traffic operations analysis assumed both the improvements proposed as part of the Study and proposed by the *VTA LRT Enhancements Project*, which consists of elimination of all left-turn movements and signal phases at the Tasman Drive/North First Street intersection and enhanced signal priority along North First Street. Traffic re-distribution associated with that set of improvements was obtained from the *LRT Enhancement Project Zanker Traffic Diversion Analysis Memorandum (August 11, 2017)* prepared by Fehr & Peers. All of the improvements analyzed are depicted in Attachment B. It should be noted that the addition of a two-way Class IV cycle track on the south side of Tasman Drive as proposed by this Study would require the modification of all traffic signals in this stretch to provide a protected bicycle phase. This modification is included in the analysis.

Table 10 presents the results of the traffic operations analysis for the subset of study intersections analyzed using *VISSIM* under Existing and Existing Plus Project conditions. As shown, the operations at the Tasman Drive/N 1st Street improves significantly with the project due to the left-turn restrictions and is projected to operate at LOS C. The number of signal phases at this intersection would be reduced from eight to four, allowing for a shorter cycle length, resulting in shorter queues and lower delay to autos, transit, and pedestrians. All study intersections in San Jose operate at LOC D or better with the proposed project improvements.

Horizon and Horizon Plus Project Conditions

Table 11 presents the results of the traffic operations analysis under Future and Future Plus Project conditions.

As shown, the operations at the Tasman Drive/N 1st Street improves significantly with the project due to the left-turn restrictions and is projected to operate at LOS D or better. The number of signal phases at this intersection would be reduced from eight to four, allowing for a shorter cycle length, resulting in shorter queues and lower delay to autos, transit, and pedestrians. The traffic diversion would result in less trips and improved operations at the Tasman Drive/Baypointe Parkway intersection during the PM peak hour.

The left-turn restrictions would increase left-turning movements at the Tasman Drive/Zanker Road intersection, primarily in the westbound direction, and result in LOS F during both AM and PM peak hours. Queuing from this intersection approach is forecast to extend to the upstream intersections at Tasman Drive/Morgridge Way and Tasman Drive/Cisco Way during the PM peak hour. VISSIM assigns vehicle delay to the nearest downstream intersection; therefore, queuing back from Zanker Road through Morgridge Way and Cisco Way is shown to result in increased delay and reduced level of service at those intersections. Other Study intersections along the diversion routes including Zanker Road at River Oaks Parkway and De Soto Road, and along Vista Montana are expected to experience an increase in delay due to the detoured trips.

The Tasman Drive/Vista Montana intersection is expected to experience an increase in delay during both AM and PM peak hours due to the addition of a bike signal on the south side to reduce right-turn conflicts with bikes traveling on the two-way Class IV bikeway right turn on red restrictions at the eastbound and northbound approaches.

Auto Travel Times

Average auto travel times along the Study corridor between Vista Montana and Cisco Way are presented in Table 12 and Table 13. During the AM peak hour, the westbound direction (morning commute peak direction) is projected to experience a reduction in auto travel time of 23 seconds under Existing conditions with the proposed project improvements. During the PM peak hour, the eastbound direction (afternoon commute peak direction) is projected to experience an increase in total auto travel time of 64 seconds under Existing conditions.

Detailed results of the traffic operations analysis, including average delay by intersection movement, is provided for the intersections modeled in *VISSIM* in Attachment D.

Table 10 – Existing and Existing Plus Project Conditions VISSIM Results

No.	Study Intersection	Agency	AM Peak Hour				PM Peak Hour			
			No Project		With Project		No Project		With Project	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
4	Tasman Drive/Vista Montana	San Jose	22.0	C	22.8	C	27.5	C	34.7	C
5	Tasman Drive/Champion Court	San Jose	4.0	A	4.6	A	9.0	A	8.0	A
6	Tasman Drive/Rio Robles	San Jose	22.3	C	28.2	C	29.8	C	34.0	C
7	Tasman Drive/N 1st Street	San Jose	51.1	D	30.3	C	59.9	E	30.8	C
8	Tasman Drive/Baypointe Parkway	San Jose	18.8	B	28.4	C	33.7	C	31.3	C
9	Tasman Drive/Zanker Road	San Jose	38.2	D	43.7	D	44.5	D	48.0	D
10	Tasman Drive/Morgridge Way	San Jose	10.7	B	13.6	B	10.2	B	27.5	C
11	Tasman Drive/Cisco Way	San Jose	31.5	C	50.1	D	30.1	C	53.8	D
F1	N 1st Street/Vista Montana	San Jose	34.1	C	34.6	C	50.4	D	46.3	D
F2	N 1st Street/Rio Robles	San Jose	35.5	D	35.9	D	44.1	D	48.1	D
F3	N 1st Street/River Oaks Parkway	San Jose	29.6	C	28.4	C	30.1	C	36.8	D

No.	Study Intersection	Agency	AM Peak Hour				PM Peak Hour			
			No Project		With Project		No Project		With Project	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
F4	Zanker Road/River Oaks Parkway	San Jose	22.8	C	22.3	C	25.0	C	25.8	C
F5	Zanker Road/De Soto Road	San Jose	11.0	B	10.3	B	7.0	A	6.8	A
F6	Vista Montana/Renaissance Drive	San Jose	9.6	A	9.7	A	25.2	C	17.4	B

Table 11 – Horizon and Horizon Plus Project Conditions VISSIM Results

No.	Study Intersection	Agency	AM Peak Hour				PM Peak Hour			
			No Project		With Project		No Project		With Project	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
4	Tasman Drive/Vista Montana	San Jose	42.7	D	60.8	E	27.9	C	44.1	D
5	Tasman Drive/Champion Court	San Jose	9.7	A	16.1	B	13.1	B	10.2	B
6	Tasman Drive/Rio Robles	San Jose	22.0	C	28.4	C	42.6	D	34.2	C
7	Tasman Drive/N 1st Street	San Jose	56.4	E	32.0	C	96.4	F	40.6	D
8	Tasman Drive/Baypointe Parkway	San Jose	19.7	B	33.0	C	82.5	F	40.7	D
9	Tasman Drive/Zanker Road	San Jose	58.2	E	84.6	F	107.4	F	116.0	F
10	Tasman Drive/Morgridge Way	San Jose	9.9	A	16.9	B	15.1	B	110.6	F
11	Tasman Drive/Cisco Way	San Jose	38.3	D	49.2	D	50.9	D	72.7	E
F1	N 1st Street/Vista Montana	San Jose	45.1	D	45.9	D	45.2	D	48.2	D
F2	N 1st Street/Rio Robles	San Jose	38.0	D	40.3	D	47.1	D	52.5	D
F3	N 1st Street/River Oaks Parkway	San Jose	37.9	D	37.7	D	38.2	D	45.2	D

No.	Study Intersection	Agency	AM Peak Hour				PM Peak Hour			
			No Project		With Project		No Project		With Project	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
F4	Zanker Road/River Oaks Parkway	San Jose	40.7	D	106.8	F	84.1	F	103.4	F
F5	Zanker Road/De Soto Road	San Jose	9.5	A	76.6	E	56.2	E	64.9	E
F6	Vista Montana/Renaissance Drive	San Jose	46.5	D	60.8	E	12.8	B	18.1	B

Table 12 – Average Auto Travel Time Summary (AM Peak)

	AM Peak Hour Average Travel Time					
	Existing Conditions			Horizon Conditions		
Segment	No Project (s)	With Project (s)	Difference (s)	No Project (s)	With Project (s)	Difference (s)
Tasman EB from Vista Montana to Cisco	364	360	-4	459	384	-75
Tasman WB from Cisco to Vista Montana	317	293	-23	409	420	11

Table 13 – Average Auto Travel Time Summary (PM Peak)

	PM Peak Hour Average Travel Time					
	Existing Conditions			Horizon Conditions		
Segment	No Project (s)	With Project (s)	Difference (s)	No Project (s)	With Project (s)	Difference (s)
Tasman EB from Vista Montana to Cisco	334	398	64	616	686	70
Tasman WB from Cisco to Vista Montana	373	362	-11	713	619	-94

Discussion

Bicycle

Bicycle service quality is based on the freedom to maneuver around other bicyclists and environmental factors. Environmental factors include the volume and speed of adjacent vehicles, the presence of heavy vehicles, the presence of on-street parking, the quality of the pavement, and the frequency and quality of street sweeping activities. Bicycle LOS improves with greater perceived separation from motorized vehicle traffic, lower motorized vehicle volumes, shorter cross-street widths, and reduced on-street parking conflicts. The concepts proposed in the Tasman Corridor Complete Streets Study Conceptual Improvement Design Plans (dated March 15, 2018) improve the separation from motorized vehicle traffic with proposed buffers and vertical separation elements and therefore will improve bicycle LOS. Additionally, the implementation of bike signal phasing at the Study intersections in San Jose would reduce conflicts with right-turning vehicles crossing the two-way Class IV bike facility on the south side of Tasman Drive.

The proposed two-stage left-turn bicycle boxes offer bicyclists a safer way to make left turns at intersections without having to maneuver across multilane roadways. Two-stage left-turn bicycle boxes require a No Turn on Red (NTOR) restriction since bicyclists will be queuing in front of the right-turn lane. While this affects vehicular operations, safety of bicyclists is improved as the two-stage left-turn boxes allow a protected area for bicyclists to wait for a protected vehicle phase to cross a multilane roadway along the Study corridor.

Pedestrian

There are several pedestrian focused improvements proposed along the Study corridor as illustrated in the Tasman Corridor Complete Streets Study Conceptual Improvement Design Plans (dated March 15, 2018). High-visibility crosswalks are recommended throughout the Study corridor which increases pedestrian visibility and comfort. The proposed sidewalks close the existing sidewalk gaps and creates a connected network of safe and convenient pedestrian facilities.

Geometry changes regarding crossing distances were updated in the traffic analysis model. The volume of motorists making turns across a crosswalk at an intersection also affects a pedestrian's delay and perception of the intersection's quality of service. Large intersection corner turning radii increases pedestrian exposure as well as the length of the pedestrian clearance interval for the affected crosswalks. There are multiple locations where the corner radii are proposed to be reduced which decreases the crossing distance and time required to cross the intersection, thereby also reducing the time pedestrians are exposed to potential conflicts with vehicles.

Leading pedestrian intervals (LPIs) are a 3-5 second head start that is given to pedestrians before the vehicular phase turns green. This allows pedestrians to access the crosswalk before vehicles which increases pedestrian visibility and comfort. LPIs were included in the analysis for all pedestrian movements accessing the light-rail stations.

Transit

Transit quality of service is influenced by the quality of the pedestrian environment along the streets with transit service, since most transit trips include at least one portion where the traveler is a pedestrian, as well as travel time on board the vehicle. The light-rail station improvements include wayfinding, high-visibility crosswalks, leading pedestrian intervals, and landscape strips to improve the pedestrian comfort and ultimately station access.

As vehicular operations continue to reach capacity, mode choice may shift to alternative modes such as bicycling and transit. With BART's Phase I extension opening in the near future, transit ridership is projected to significantly increase along the Study corridor.

An analysis of LRT travel times was conducted in *VISSIM* for all analysis scenarios. This analysis was conducted to assess the impacts of the VTA LRT Enhancements Project in concert with the proposed project improvements. The VTA LRT Enhancements Project includes the elimination of left-turn phases at the Tasman Drive/N 1st Street intersection. Table 14 and Table 15 presents the LRT travel times along the segment analyzed under AM and PM peak hours, respectively. As shown, the proposed project improvements are anticipated to result in a reduction in LRT travel time of up to 47 seconds under Existing Plus Project peak conditions and up to 97 seconds under Horizon Plus Project peak conditions.

Table 14 – LRT Travel Times Summary (AM Peak Hour)

	Average VISSIM Travel Time (s)					
Travel Time Segment	Existing AM	Existing Plus Project AM	Difference	Future (2035) AM	Future (2035) Plus Project AM	Difference
901 NB/EB: Santa Teresa - Alum Rock	669	637	-32	677	614	-63
902 NB/WB: Winchester - Mountain View	499	459	-40	519	520	1
901 WB/SB: Alum Rock - Santa Teresa	661	614	-47	718	707	-11
902 EB/SB: Mountain View - Winchester	550	538	-12	554	557	3

Table 15 – LRT Travel Times Summary (PM Peak Hour)

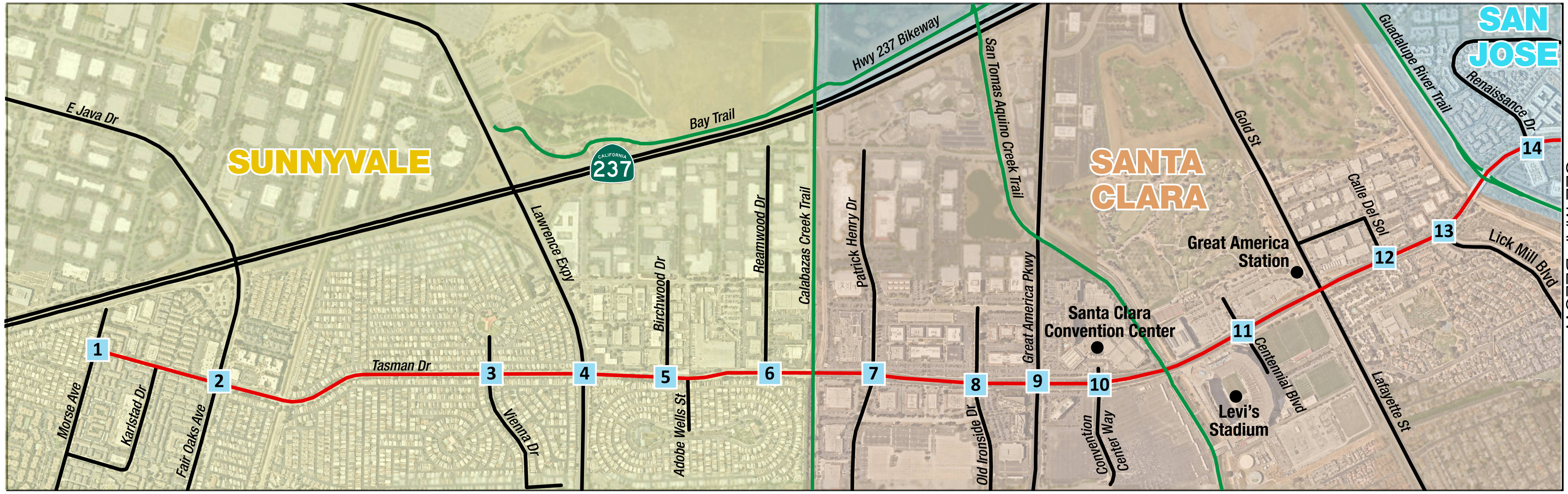
	Average VISSIM Travel Time (s)					
Travel Time Segment	Existing PM	Existing Plus Project PM	Difference	Future (2035) PM	Future (2035) Plus Project PM	Difference
901 NB/EB: Santa Teresa - Alum Rock	686	643	-43	729	656	-73
902 NB/WB: Winchester - Mountain View	539	520	-19	527	526	-1
901 WB/SB: Alum Rock - Santa Teresa	632	637	5	785	691	-94
902 EB/SB: Mountain View - Winchester	551	527	-24	648	554	-94

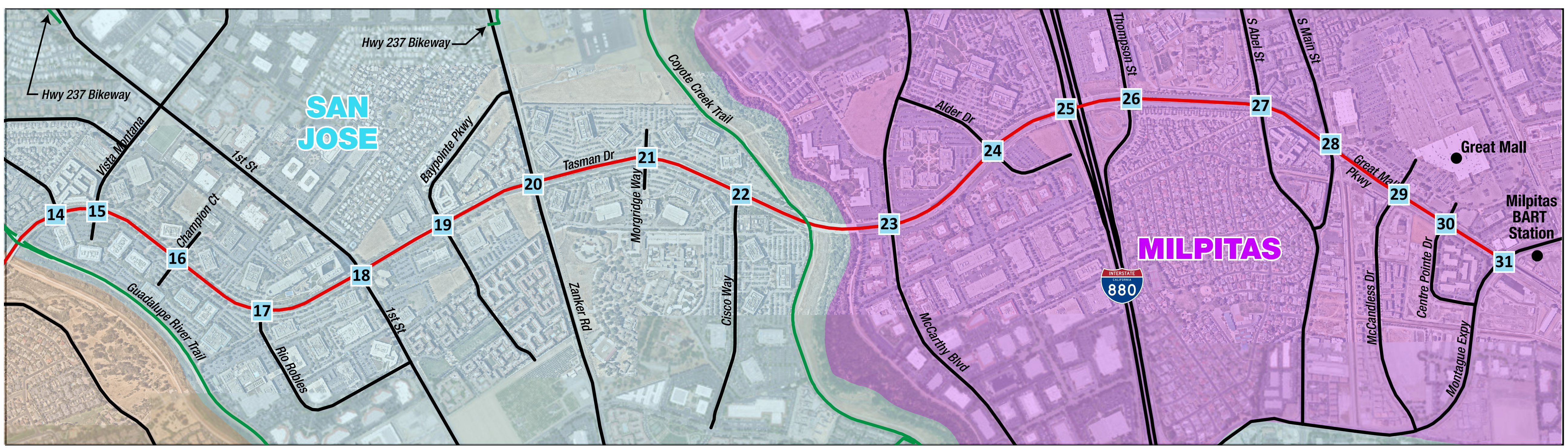
ATTACHMENTS

ATTACHMENT A:
INTERSECTION TURNING MOVEMENT COUNTS

Tasman Corridor
COMPLETE STREETS STUDY

Santa Clara Valley Transportation Authority





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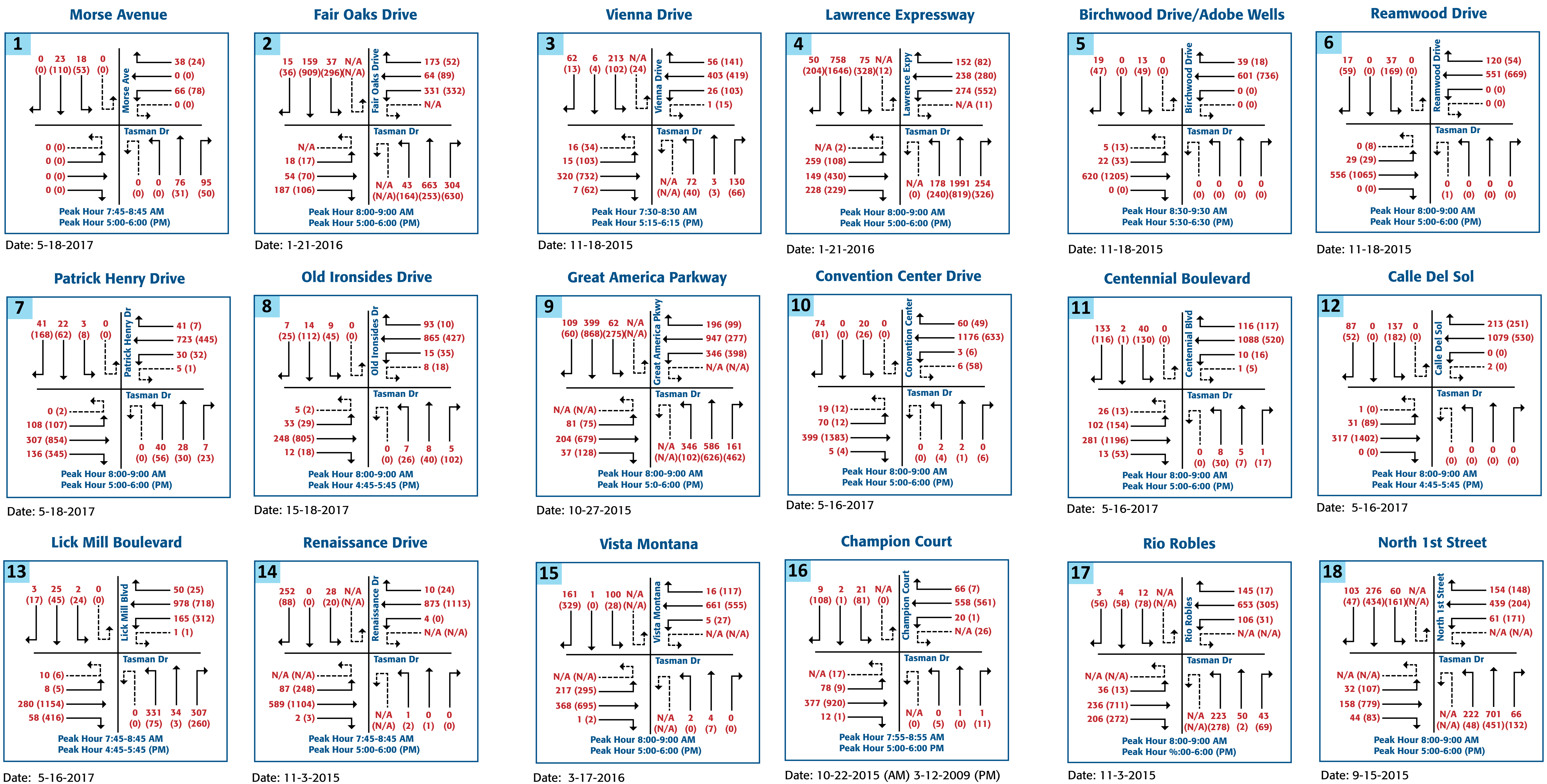
06/01/2017

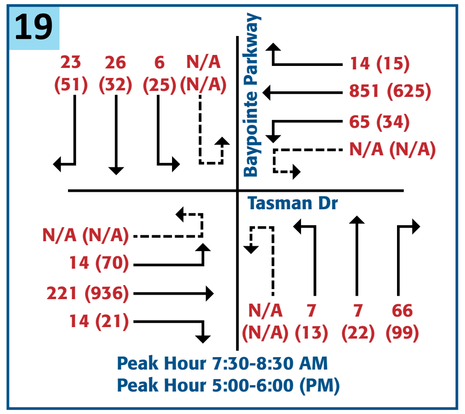
2015-2016 Intersection Turning Movement Volumes Map

Kimley»Horn



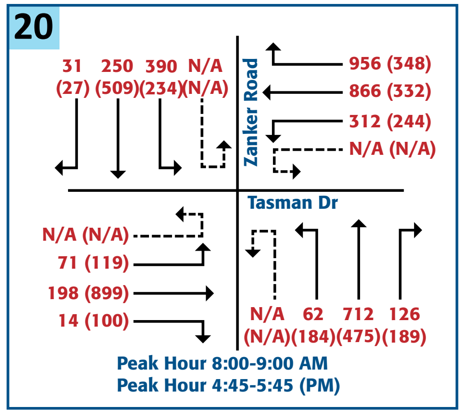
2015-2016 Intersection Turning Movement Volumes

Baypointe Parkway



Date: 11-3-2015

Zanker Road



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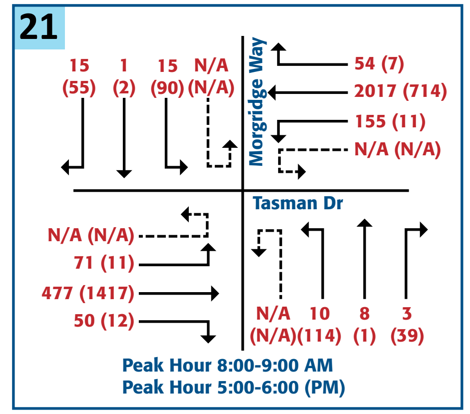
Morgridge Way



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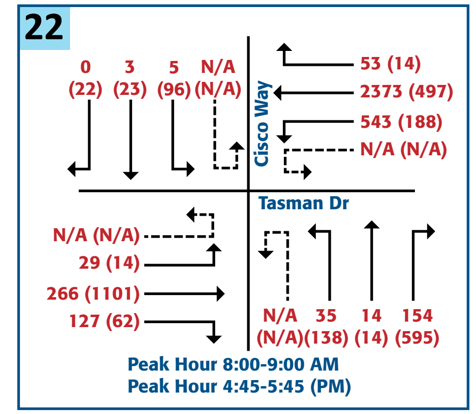
Cisco Way



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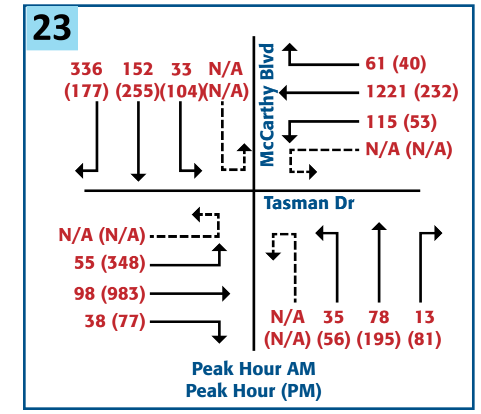
McCarthy Boulevard



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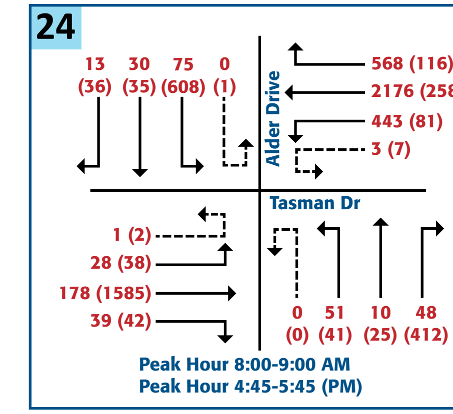
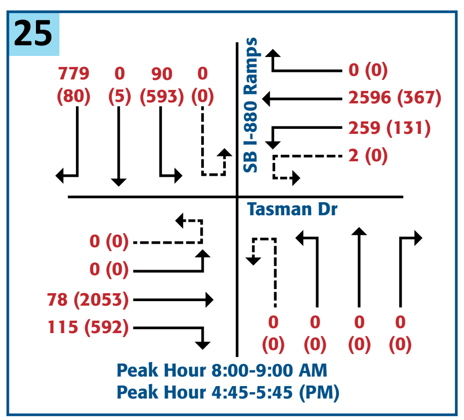
Alder Drive

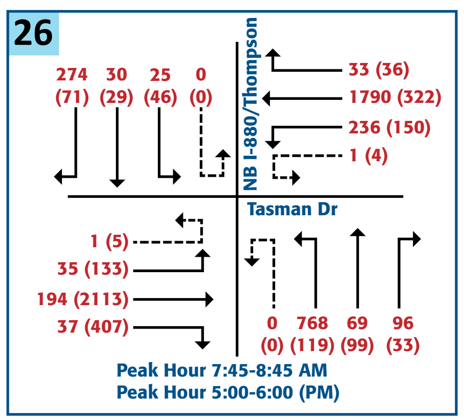


Date: 5-16-2017

SB I-880 Ramps

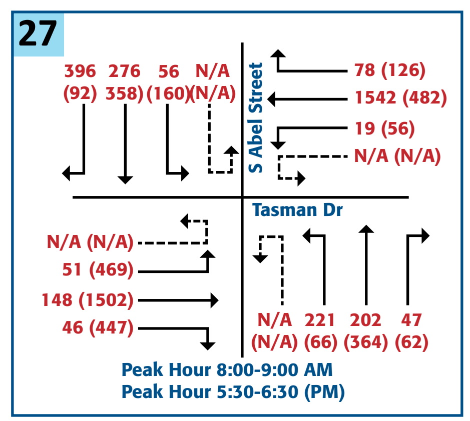


NB I-880 Ramps/Thompson Street



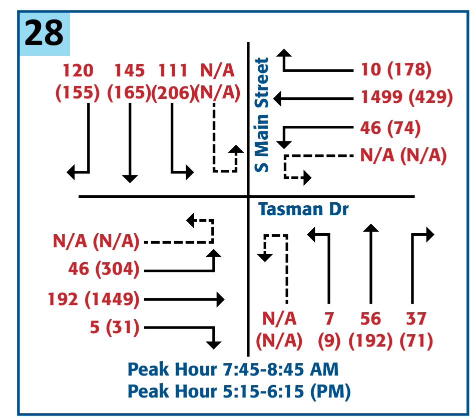
Date: 5-16-2017

South Abel Street



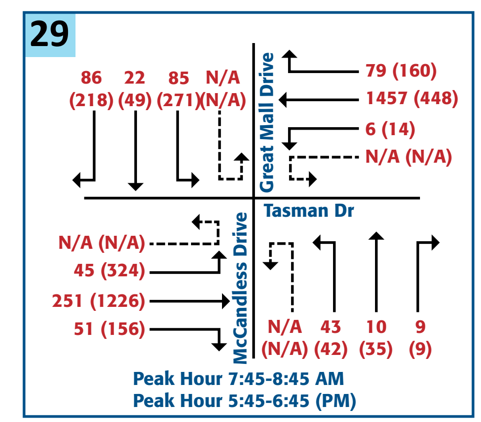
Date: 7-15-2015

S Main Street



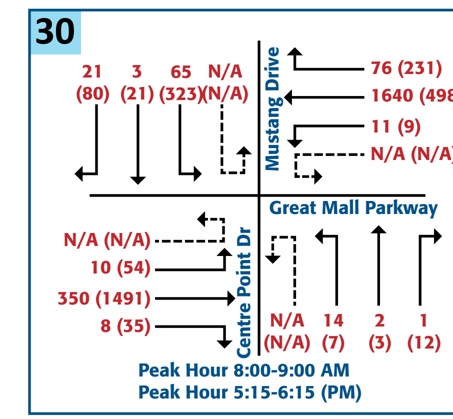
Date: 7-15-2015

McCandless Drive and Great Mall Drive



Date: 7-15-2015

Centre Point and Mustang Drive



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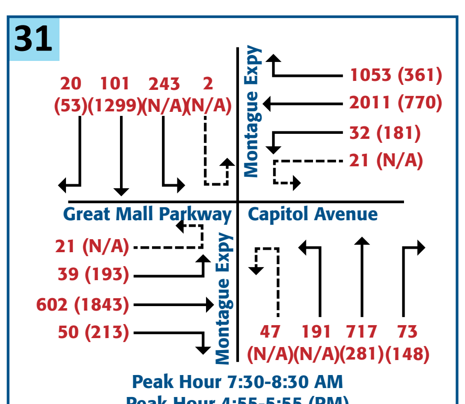
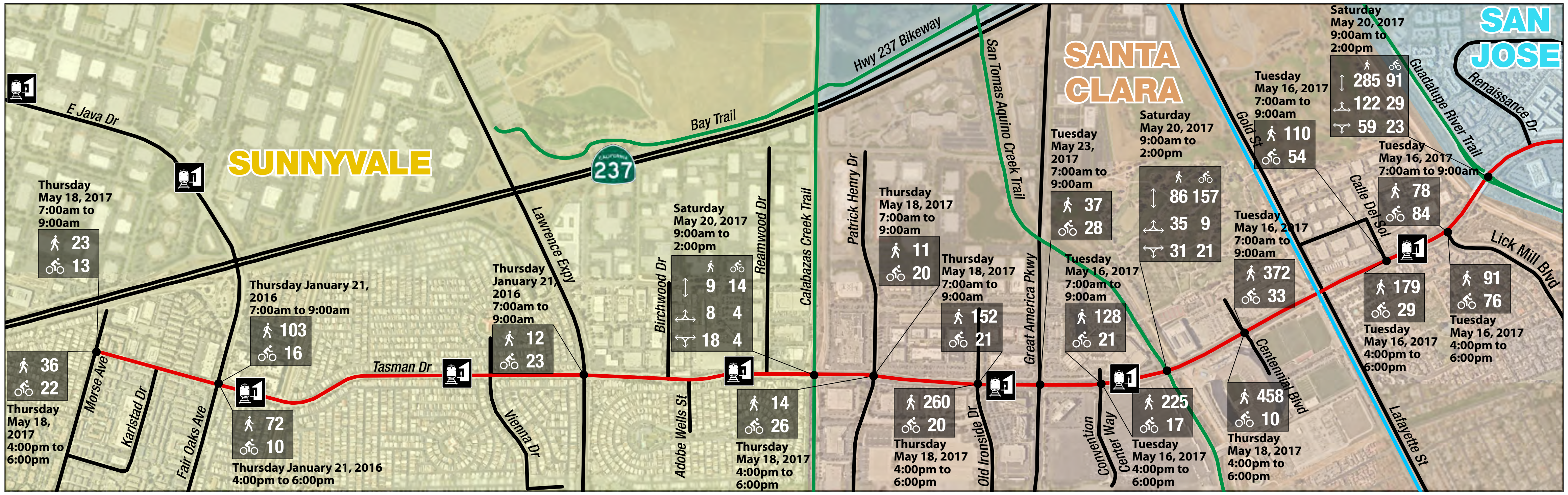
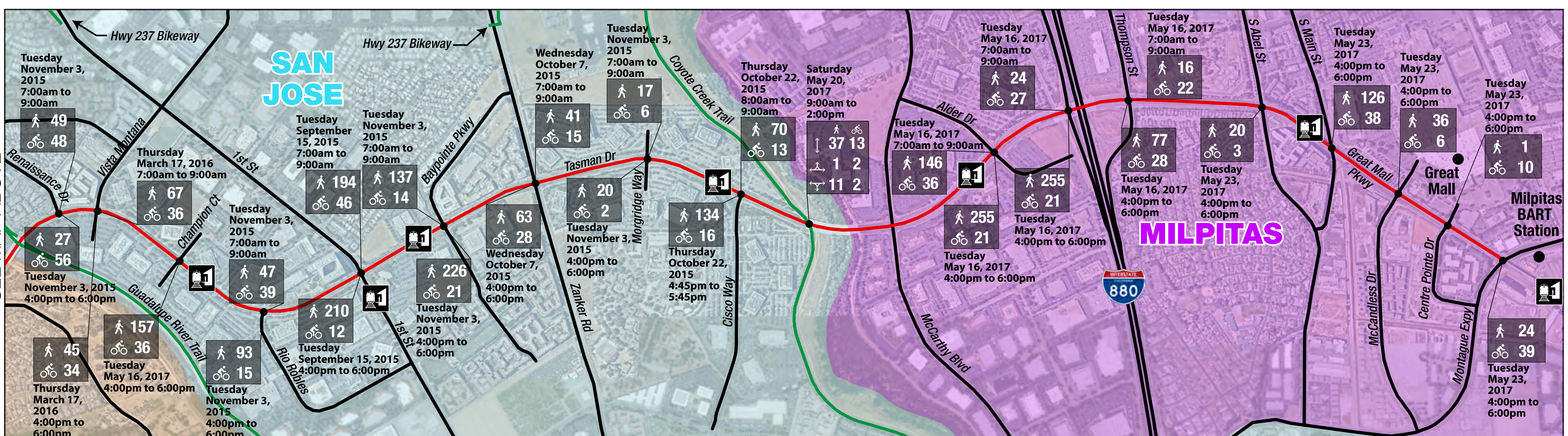
Montague Expressway



Date: 8-22-2015 - AM Counts
Date: 10-04-2016 - PM Counts

2015-2016 Intersection Turning Movement Volumes





06/23/2017

Bicyclist/Pedestrian Counts

ATTACHMENT C: EVALUATION MATRIX

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
1	Tasman Drive/Fair Oaks Avenue	Reduce westbound approach from 4 lanes to 3 lanes, add right-turn channelization, and add 5' bike slot	Bike slot reduces conflicts between motorists and bicyclists	Reconfigured approach allows easier station access and reduces crossing distance	Reconfigured approach allows easier station access and reduces crossing distance	Improvements result in increases in intersection delay under Existing AM and PM peak hours and Horizon AM peak hour. However, under these scenarios, it does not result in degradation of Level of Service (LOS). The slight increase in delay is primarily a result of the reduction in travel lanes on the westbound approach from 4 lanes to 3 lanes and the associated implementation of the split phasing. Refer to discussion in "Synchro Analysis Summary".
		Remove eastbound left-turn lane and constructed raised median with pedestrian refuge	Bike slot maintained which reduces conflicts between motorists and bicyclists	Pedestrian refuge provides a protected space and more pedestrian comfort	N/A	
		Implement leading pedestrian interval (LPI) signal phase.	N/A	LPI provides pedestrians a head start to access the crosswalk before vehicles which increases pedestrian visibility and comfort.	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	
2	Tasman Drive/Lick Mill Boulevard	Widen for right-turn lane & install 8' sidewalk & 4' landscape strip. Dual left-turn lane is regional mitigation by CityPlace development.	Bike slot maintained as part of Santa Clara bike lane extension project which reduces conflicts between motorists and bicyclists	Connected, continuous, and safe pedestrian environment	N/A	Improvements result in increased intersection delay of less than 1 sec/veh under Existing PM peak hour and Horizon AM peak hour.

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Implement leading pedestrian interval (LPI) signal phase.	N/A	LPI provides pedestrians a head start to access the crosswalk before vehicles which increases pedestrian visibility and comfort.	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	
3	Tasman Drive/Renaissance Drive	Widen existing 5' sidewalk to 15' and provide 5' landscape strip. Relocate street lights to back of sidewalk	Landscape strip provides pedestrian separation from bicycle lane	Connected, continuous, and safe pedestrian environment	Bus stops provided	Improvements result in increased intersection delay during all analysis scenarios. The increase in delay is primarily a result of the right-turn on red restrictions at the northbound and eastbound approaches.
		Provide two-way Class I facility along south side of Tasman Drive	Two-way Class I bikeway provides safe and comfortable bicycle facility. Bike signal phasing reduces conflicts with right-turning vehicles.	Sidewalk separated from roadway provides more pedestrian comfort	N/A	
		Provide two-stage turn box and signage for westbound through bicyclists	Safer travel and turning movements for bicyclists at intersections	N/A	N/A	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Provide bike lane buffer with vertical separation element for westbound bike lane	By providing physical separation from motor traffic, Class IV bikeways can reduce level of stress and improve comfort	N/A	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	
4	Tasman Drive/Vista Montana	Widen existing 5' sidewalk to 15' and provide 5' landscape strip. Relocate street lights to back of sidewalk	Landscape strip provides pedestrian separation from bicycle lane	Connected, continuous, and safe pedestrian environment	N/A	Improvements result in increased intersection delay during all analysis scenarios. The increase in delay is primarily a result of the right-turn on red restrictions at the northbound and eastbound approaches.
		Provide two-way Class I facility along south side of Tasman Drive	Two-way Class I bikeway provides safe and comfortable bicycle facility. Bike signal phasing reduces conflicts with right-turning vehicles.	Sidewalk separated from roadway provides more pedestrian comfort	Floating bus stops provided which enables in-lane stops	
		Provide two-stage turn box and signage for westbound through bicyclists	Safer travel and turning movements for bicyclists at intersections	N/A	N/A	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Provide bike lane buffer with vertical separation element for westbound bike lane	By providing physical separation from motor traffic, Class IV bikeways can reduce level of stress and improve comfort	N/A	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	
5	Tasman Drive/Champion Court	Widen existing 5' sidewalk to 15' and provide 5' landscape strip. Relocate street lights to back of sidewalk	Landscape strip provides pedestrian separation from bicycle lane	Connected, continuous, and safe pedestrian environment	N/A	Improvements result in increased intersection delay under Existing AM peak hour and Horizon AM peak hour.
		Provide two-way Class I facility along south side of Tasman Drive	Two-way Class I bikeway provides safe and comfortable bicycle facility. Bike signal phasing reduces conflicts with right-turning vehicles.	Sidewalk separated from roadway provides more pedestrian comfort	Floating bus stops provided which enables in-lane stops	
		Provide bike lane buffer with vertical separation element for westbound bike lane	By providing physical separation from motor traffic, Class IV bikeways can reduce level of stress and improve comfort	N/A	N/A	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Implement leading pedestrian interval (LPI) signal phase.	N/A	LPI provides pedestrians a head start to access the crosswalk before vehicles which increases pedestrian visibility and comfort.	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	
6	Tasman Drive/Rio Robles	Widen existing 5' sidewalk to 15' and provide 5' landscape strip. Relocate street lights to back of sidewalk	Landscape strip provides pedestrian separation from bicycle lane	Connected, continuous, and safe pedestrian environment	N/A	Improvements result in increased intersection delay under Existing AM and PM peak hours and Horizon AM peak hour. However, under these scenarios, it does not result in degradation of Level of Service (LOS).
		Provide two-way Class I facility along south side of Tasman Drive	Two-way Class I bikeway provides safe and comfortable bicycle facility. Bike signal phasing reduces conflicts with right-turning vehicles.	Sidewalk separated from roadway provides more pedestrian comfort	Floating bus stops provided which enables in-lane stops	
		Provide bike lane buffer with vertical separation element for westbound bike lane	By providing physical separation from motor traffic, Class IV bikeways can reduce level of stress and improve comfort	N/A	N/A	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	
7	Tasman Drive/N 1st Street	Widen existing 5' sidewalk to 15' and provide 5' landscape strip. Relocate street lights to back of sidewalk	Landscape strip provides pedestrian separation from bicycle lane	Connected, continuous, and safe pedestrian environment	N/A	Improvements including removal of left-turns result in decreased intersection delay under all analysis scenarios.
		Provide two-way Class I facility along south side of Tasman Drive	Two-way Class I bikeway provides safe and comfortable bicycle facility. Bike signal phasing reduces conflicts with right-turning vehicles.	Sidewalk separated from roadway provides more pedestrian comfort	Floating bus stops provided which enables in-lane stops	
		North First Light Rail Efficiency Project	Provides protected intersection	Provides larger pedestrian refuges, reduces crossing distance	Allows for more efficient transit operations	
		Provide bike lane buffer with vertical separation element for westbound bike lane	By providing physical separation from motor traffic, Class IV bikeways can reduce level of stress and improve comfort	N/A	N/A	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Provide Adaptive Pedestrian Signal	N/A	Microwave sensor designed to detect pedestrians in crosswalk and can provide extension of the pedestrian clearance time for slower pedestrians.	N/A	
		Implement leading pedestrian interval (LPI) signal phase.	N/A	LPI provides pedestrians a head start to access the crosswalk before vehicles which increases pedestrian visibility and comfort.	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	
8	Tasman Drive/Baypointe Parkway	Widen existing 5' sidewalk to 15' and provide 5' landscape strip. Relocate street lights to back of sidewalk	Landscape strip provides pedestrian separation from bicycle lane	Connected, continuous, and safe pedestrian environment	N/A	Improvements result in increased intersection delay under Existing AM peak hour and Horizon AM peak hour.
		Provide two-way Class I facility along south side of Tasman Drive	Two-way Class I bikeway provides safe and comfortable bicycle facility. Bike signal phasing reduces conflicts with right-turning vehicles.	Sidewalk separated from roadway provides more pedestrian comfort	Floating bus stops provided which enables in-lane stops	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Provide bike lane buffer with vertical separation element for westbound bike lane	By providing physical separation from motor traffic, Class IV bikeways can reduce level of stress and improve comfort	N/A	N/A	
		Implement leading pedestrian interval (LPI) signal phase.	N/A	LPI provides pedestrians a head start to access the crosswalk before vehicles which increases pedestrian visibility and comfort.	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	
9	Tasman Drive/Zanker Road	Widen existing 5' sidewalk to 15' and provide 5' landscape strip. Relocate street lights to back of sidewalk	Landscape strip provides pedestrian separation from bicycle lane	Connected, continuous, and safe pedestrian environment	N/A	Improvements result in increased intersection delay under all analysis scenarios. This is primarily a result of traffic diversion associated with the Tasman Dr/N 1st St improvements.
		Eliminate porkchop islands and tighten curb return radii	Removal of porkchop islands reduces conflict points with bicyclists	Reduced over-all intersection crossing distance. Tighter curb return radii reduces vehicle turning speeds.	N/A	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Remove one eastbound travel lane between Zanker Road and McCarthy Boulevard	Reduction in travel lane provides space for two-way Class I facility along south side of Tasman Drive	Reduced intersection crossing distance.	N/A	
		Provide two-way Class I facility along south side of Tasman Drive	Two-way Class I bikeway provides safe and comfortable bicycle facility. Bike signal phasing reduces conflicts with right-turning vehicles.	Sidewalk separated from roadway provides more pedestrian comfort	Floating bus stops provided which enables in-lane stops	
		Provide Adaptive Pedestrian Signal	N/A	Microwave sensor designed to detect pedestrians in crosswalk and can provide extension of the pedestrian clearance time for slower pedestrians.	N/A	
		Provide bike lane buffer with vertical separation element for westbound bike lane	By providing physical separation from motor traffic, Class IV bikeways can reduce level of stress and improve comfort	N/A	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
10	Tasman Drive/Morgridge Way	Widen existing 5' sidewalk to 15' and provide 5' landscape strip. Relocate street lights to back of sidewalk	Landscape strip provides pedestrian separation from bicycle lane	Connected, continuous, and safe pedestrian environment	N/A	Improvements result in increased intersection delay under all analysis scenarios. This is primarily a result of traffic diversion associated with the Tasman Dr/N 1st St improvements.
		Remove one eastbound travel lane between Zanker Road and McCarthy Boulevard	Reduction in travel lane provides space for two-way Class I facility along south side of Tasman Drive	Reduced intersection crossing distance.	Floating bus stops provided which enables in-lane stops	
		Provide two-way Class I facility along south side of Tasman Drive	Two-way Class I bikeway provides safe and comfortable bicycle facility. Bike signal phasing reduces conflicts with right-turning vehicles.	Sidewalk separated from roadway provides more pedestrian comfort	Floating bus stops provided which enables in-lane stops	
		Provide bike lane buffer with vertical separation element for westbound bike lane	By providing physical separation from motor traffic, Class IV bikeways can reduce level of stress and improve comfort	N/A	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
11	Tasman Drive/Cisco Way	Widen existing 5' sidewalk to 15' and provide 5' landscape strip. Relocate street lights to back of sidewalk	Landscape strip provides pedestrian separation from bicycle lane	Connected, continuous, and safe pedestrian environment	N/A	Improvements result in increased intersection delay under all analysis scenarios. This is primarily a result of traffic diversion associated with the Tasman Dr/N 1st St improvements.
		Remove one eastbound travel lane between Zanker Road and McCarthy Boulevard	Reduction in travel lane provides space for two-way Class I facility along south side of Tasman Drive	Reduced intersection crossing distance.	Floating bus stops provided which enables in-lane stops	
		Provide two-way Class I facility along south side of Tasman Drive	Two-way Class I bikeway provides safe and comfortable bicycle facility. Bike signal phasing reduces conflicts with right-turning vehicles.	Sidewalk separated from roadway provides more pedestrian comfort	Floating bus stops provided which enables in-lane stops	
		Provide bike lane buffer with vertical separation element for westbound bike lane	By providing physical separation from motor traffic, Class IV bikeways can reduce level of stress and improve comfort	N/A	N/A	
		Implement leading pedestrian interval (LPI) signal phase.	N/A	LPI provides pedestrians a head start to access the crosswalk before vehicles which increases pedestrian visibility and comfort.	N/A	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	
12	Tasman Drive/McCarthy Boulevard	Widen existing 5' sidewalk to 15' and provide 5' landscape strip. Relocate street lights to back of sidewalk	Landscape strip provides pedestrian separation from bicycle lane	Connected, continuous, and safe pedestrian environment	N/A	Improvements result in increased intersection delay under Horizon PM peak hour. However, under this scenario, it does not result in degradation of Level of Service (LOS). The increase in delay is primarily attributable to the reduction in through lane capacity at the eastbound approach with the conversion of the shared through/right-turn lane to a dedicated right-turn lane. Refer to discussion in "Synchro Analysis Summary".
		Remove one eastbound travel lane between Zanker Road and McCarthy Boulevard	Reduction in travel lane provides space for two-way Class I facility along south side of Tasman Drive	Reduced intersection crossing distance.	Floating bus stops provided which enables in-lane stops	
		Provide two-way Class I facility along south side of Tasman Drive	Two-way Class I bikeway provides safe and comfortable bicycle facility. Bike signal phasing reduces conflicts with right-turning vehicles.	Sidewalk separated from roadway provides more pedestrian comfort	N/A	
		Provide bicycle intersection crossing markings to connect south and north Class I facilities	Bicycle intersection markings provide a clear boundary between the paths of bicyclists and pedestrians	Bicycle intersection markings provide a clear boundary between the paths of bicyclists and pedestrians		

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Provide two-way Class I facility along north side of Tasman Drive	Two-way Class I facility provides safe and comfortable bike facility. Class IV on-street facility provides options for different types of bicyclists.	Sidewalk separated from roadway provides more pedestrian comfort	N/A	
		Provide Adaptive Pedestrian Signal	N/A	Microwave sensor designed to detect pedestrians in crosswalk and can provide extension of the pedestrian clearance time for slower pedestrians.	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
13	Great Mall Parkway/I-880 NB Ramps/Thompson Street	Provide two-way Class I facility along north side of Tasman Drive	Two-way Class I facility provides safe and comfortable bike facility. Class IV on-street facility provides options for different types of bicyclists.	Sidewalk separated from roadway provides more pedestrian comfort	N/A	Improvements result in increased intersection delay under Existing PM peak hour and Horizon AM and PM peak hours. The increase in delay is primarily attributable to the right-turn on red restrictions at the southbound approach, reconfiguration of the on-ramp to remove the "free" eastbound right-turn slip lane and signalization of the right-turn movement. Refer to discussion in "Synchro Analysis Summary".
		Reconfigure eastbound right-turn lane and signalize right-turn movement	Bike slot maintained and buffers provided which reduces conflicts between motorists and bicyclists	Signalized pedestrian crossing	N/A	
		Provide bulbout on the west side of Thompson Street	N/A	Reduced intersection crossing width	N/A	

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Provide bike lane buffer with vertical separation element for east- and westbound bike lanes	By providing physical separation from motor traffic, Class IV bikeways can reduce level of stress and improve comfort	N/A	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	
14	Great Mall Parkway/Abel Street	Remove northbound free right-turn and porkchop island.	N/A	Reduced intersection crossing distance	Bus stop can be closer to intersection	Improvements result in increased intersection delay under Existing AM and PM peak hours. The increase in delay is primarily attributable to the right-turn on red restrictions at the westbound and northbound approaches. Refer to discussion in "Synchro Analysis Summary".
		Provide two-stage left-turn boxes.	Safer travel and turning movements for bicyclists at intersections	N/A	N/A	
		Provide bike lane buffer with vertical separation element.	Reduces Level of Traffic Stress	N/A	Bus stops provided.	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	
15	Great Mall Parkway/Main Street	Reconfigure to remove porkchop and northbound right-turn lane	Class IV bikeways provided	Reduced intersection crossing distance	Bus stop can be closer to intersection	Improvements result in increased intersection delay under Existing AM peak hour.

No.	Study Intersection	Improvement	Effect on Bicycles	Effect on Pedestrians	Effect on Transit	Effect on Autos
		Relocate pedestrian rail crossing and run pedestrian phase with westbound left-turn phase	N/A	Signalized pedestrian phase maintained	N/A	
		Provide bike lane buffer with vertical separation element.	By providing physical separation from motor traffic, Class IV bikeways can reduce level of stress and improve comfort	N/A	N/A	
		Install elevated pedestrian walkway	N/A	Reduces conflicts between pedestrians and motorists. Provides direct station access.	N/A	
		Provide high-visibility crosswalk	N/A	High-visibility crosswalk improves visibility of crosswalk and pedestrian comfort	N/A	

ATTACHMENT D:
TRAFFIC OPERATIONS SUMMARY SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	54	187	331	64	173	43	663	304	37	159	15
Future Volume (vph)	18	54	187	331	64	173	43	663	304	37	159	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	6.9	6.9	6.5	6.4	6.4	4.0	5.9	5.9	4.7	6.5	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.91	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1551	3433	1863	1504	1770	3539	1503	3433	5011	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.63	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1551	3433	1863	1504	1167	3539	1503	3433	5011	
Peak-hour factor, PHF	0.82	0.82	0.82	0.90	0.90	0.90	0.89	0.89	0.89	0.91	0.91	0.91
Adj. Flow (vph)	22	66	228	368	71	192	48	745	342	41	175	16
RTOR Reduction (vph)	0	0	199	0	0	146	0	0	138	0	4	0
Lane Group Flow (vph)	22	66	29	368	71	46	48	745	204	41	187	0
Confl. Peds. (#/hr)			2			20			22			2
Confl. Bikes (#/hr)			3			3			6			
Turn Type	Prot	NA	Perm	Prot	NA	Perm	custom	NA	Perm	Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases			8			4	13 15		2		13 15	
Actuated Green, G (s)	6.9	25.3	25.3	27.6	47.8	47.8	64.8	53.8	53.8	6.6	110.1	
Effective Green, g (s)	6.9	25.3	25.3	27.6	47.8	47.8	64.8	53.8	53.8	6.6	110.1	
Actuated g/C Ratio	0.03	0.13	0.13	0.14	0.24	0.24	0.33	0.27	0.27	0.03	0.55	
Clearance Time (s)	5.2	6.9	6.9	6.5	6.4	6.4	4.0	5.9	5.9	4.7	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.5	4.0	4.0	3.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)	61	236	197	476	447	361	403	956	406	113	2772	
v/s Ratio Prot	0.01	c0.04		c0.11	0.04		0.00	c0.21		c0.01	0.02	
v/s Ratio Perm			0.02			0.03	c0.03		0.14		0.02	
v/c Ratio	0.36	0.28	0.15	0.77	0.16	0.13	0.12	0.78	0.50	0.36	0.07	
Uniform Delay, d1	93.9	78.6	77.3	82.7	59.7	59.3	47.2	67.1	61.3	94.1	20.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.6	0.7	0.3	7.9	0.2	0.2	0.1	5.1	2.7	2.0	0.0	
Delay (s)	97.5	79.3	77.6	90.6	59.9	59.5	47.3	72.3	64.0	96.1	20.7	
Level of Service	F	E	E	F	E	E	D	E	E	F	C	
Approach Delay (s)		79.3			77.7			68.7			34.0	
Approach LOS		E			E			E			C	

Intersection Summary			
HCM 2000 Control Delay	69.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	199.0	Sum of lost time (s)	28.5
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	589	2	4	873	10	1	0	0	28	0	252
Future Volume (vph)	87	589	2	4	873	10	1	0	0	28	0	252
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.0	6.0	5.0	6.0	6.0	5.0			5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00			1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00			1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95			0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1548	1770			1770	1546	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.33			0.76	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1548	621			1410	1546	
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.90	0.25	0.25	0.25	0.77	0.77	0.77
Adj. Flow (vph)	93	627	2	4	970	11	4	0	0	36	0	327
RTOR Reduction (vph)	0	0	0	0	0	4	0	0	0	0	250	0
Lane Group Flow (vph)	93	627	2	4	970	7	4	0	0	36	77	0
Confl. Peds. (#/hr)						1			15			4
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm			Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases			6			2	4			8		
Actuated Green, G (s)	11.6	90.7	90.7	1.3	79.9	79.9	12.0			12.0	12.0	
Effective Green, g (s)	11.6	90.7	90.7	1.3	79.9	79.9	12.0			12.0	12.0	
Actuated g/C Ratio	0.10	0.76	0.76	0.01	0.67	0.67	0.10			0.10	0.10	
Clearance Time (s)	5.5	6.0	6.0	5.0	6.0	6.0	5.0			5.0	5.0	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	171	2674	1196	19	2356	1030	62			141	154	
v/s Ratio Prot	c0.05	0.18		0.00	c0.27						c0.05	
v/s Ratio Perm			0.00			0.00	0.01			0.03		
v/c Ratio	0.54	0.23	0.00	0.21	0.41	0.01	0.06			0.26	0.50	
Uniform Delay, d1	51.7	4.3	3.6	58.8	9.2	6.7	48.9			49.9	51.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	3.5	0.2	0.0	5.5	0.5	0.0	0.4			1.0	2.5	
Delay (s)	55.2	4.6	3.6	64.3	9.8	6.7	49.4			50.8	53.7	
Level of Service	E	A	A	E	A	A	D			D	D	
Approach Delay (s)		11.1			10.0			49.4			53.4	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	173	63	177	1811	78	54	157	24	30	241	500
Future Volume (vph)	152	173	63	177	1811	78	54	157	24	30	241	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	5.0	5.0	6.0	5.0	5.0	4.5	6.0		4.5	5.0	5.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1562	3433	5085	1583	3433	3463		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1562	3433	5085	1583	3433	3463		3433	1863	1583
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.82	0.82	0.82	0.80	0.80	0.80
Adj. Flow (vph)	192	219	80	224	2292	99	66	191	29	38	301	625
RTOR Reduction (vph)	0	0	55	0	0	58	0	7	0	0	0	258
Lane Group Flow (vph)	192	219	25	224	2292	41	66	213	0	38	301	367
Confl. Peds. (#/hr)			1						1			
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2						8
Actuated Green, G (s)	22.0	46.3	46.3	37.5	61.8	61.8	7.2	39.4		6.1	39.3	39.3
Effective Green, g (s)	22.0	46.3	46.3	37.5	61.8	61.8	7.2	39.4		6.1	39.3	39.3
Actuated g/C Ratio	0.15	0.31	0.31	0.25	0.41	0.41	0.05	0.26		0.04	0.26	0.26
Clearance Time (s)	6.0	5.0	5.0	6.0	5.0	5.0	4.5	6.0		4.5	5.0	5.0
Vehicle Extension (s)	4.5	5.0	5.0	4.0	5.0	5.0	3.5	2.5		3.5	2.5	2.5
Lane Grp Cap (vph)	258	1561	479	853	2083	648	163	904		138	485	412
v/s Ratio Prot	c0.11	0.04		0.07	c0.45		c0.02	0.06		0.01	0.16	
v/s Ratio Perm			0.02			0.03						c0.23
v/c Ratio	0.74	0.14	0.05	0.26	1.10	0.06	0.40	0.24		0.28	0.62	0.89
Uniform Delay, d1	61.7	37.8	36.8	45.5	44.5	27.0	69.7	43.9		70.2	49.2	53.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.4	0.2	0.2	0.2	53.2	0.2	1.9	0.1		1.3	2.1	20.6
Delay (s)	74.1	38.0	37.0	45.8	97.7	27.1	71.7	43.9		71.5	51.3	74.3
Level of Service	E	D	D	D	F	C	E	D		E	D	E
Approach Delay (s)		52.0			90.6			50.3			67.0	
Approach LOS		D			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	78.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	150.8	Sum of lost time (s)	21.5
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	194	0	236	1790	33	768	69	96	25	30	275
Future Volume (vph)	36	194	0	236	1790	33	768	69	96	25	30	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5		4.5	5.5	5.5	5.0	5.0	5.0	4.6	4.6	4.6
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085		1770	5085	1522	1681	1699	1560	1681	1763	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085		1770	5085	1522	1681	1699	1560	1681	1763	1583
Peak-hour factor, PHF	0.88	0.88	0.88	0.98	0.98	0.98	0.91	0.91	0.91	0.63	0.63	0.63
Adj. Flow (vph)	41	220	0	241	1827	34	844	76	105	40	48	437
RTOR Reduction (vph)	0	0	0	0	0	23	0	0	75	0	0	148
Lane Group Flow (vph)	41	220	0	241	1827	11	456	464	30	36	52	289
Confl. Peds. (#/hr)			5			2			3			
Confl. Bikes (#/hr)						12						
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6			8			7
Actuated Green, G (s)	7.5	13.8		37.8	44.1	44.1	39.5	39.5	39.5	29.3	29.3	29.3
Effective Green, g (s)	7.5	13.8		37.8	44.1	44.1	39.5	39.5	39.5	29.3	29.3	29.3
Actuated g/C Ratio	0.05	0.10		0.27	0.32	0.32	0.28	0.28	0.28	0.21	0.21	0.21
Clearance Time (s)	4.5	5.5		4.5	5.5	5.5	5.0	5.0	5.0	4.6	4.6	4.6
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	2.5	2.5	2.5	4.5	4.5	4.5
Lane Grp Cap (vph)	94	501		477	1601	479	474	479	440	351	368	331
v/s Ratio Prot	0.02	0.04		c0.14	c0.36		0.27	c0.27		0.02	0.03	
v/s Ratio Perm						0.01			0.02			c0.18
v/c Ratio	0.44	0.44		0.51	1.14	0.02	0.96	0.97	0.07	0.10	0.14	0.87
Uniform Delay, d1	64.2	59.5		43.2	48.0	33.1	49.5	49.6	36.8	44.7	45.1	53.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	1.7		0.8	71.6	0.1	31.6	32.7	0.0	0.2	0.3	22.7
Delay (s)	67.4	61.2		44.0	119.5	33.2	81.1	82.4	36.8	44.9	45.4	76.2
Level of Service	E	E		D	F	C	F	F	D	D	D	E
Approach Delay (s)		62.2			109.5			77.1			71.0	
Approach LOS		E			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	92.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	151	64	29	1558	90	263	280	59	58	362	384
Future Volume (vph)	55	151	64	29	1558	90	263	280	59	58	362	384
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1561	1770	5085	1549	1770	3539	1557	1770	3539	1549
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1561	1770	5085	1549	1770	3539	1557	1770	3539	1549
Peak-hour factor, PHF	0.83	0.83	0.83	0.91	0.91	0.91	0.78	0.78	0.78	0.88	0.88	0.88
Adj. Flow (vph)	66	182	77	32	1712	99	337	359	76	66	411	436
RTOR Reduction (vph)	0	0	46	0	0	60	0	0	52	0	0	110
Lane Group Flow (vph)	66	182	31	32	1712	39	337	359	24	66	411	326
Confl. Peds. (#/hr)			1			7			6			2
Confl. Bikes (#/hr)			2			6			1			7
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	5.6	49.0	49.0	4.2	47.6	47.6	24.0	37.4	37.4	9.4	22.8	22.8
Effective Green, g (s)	5.6	49.0	49.0	4.2	47.6	47.6	24.0	37.4	37.4	9.4	22.8	22.8
Actuated g/C Ratio	0.05	0.41	0.41	0.04	0.40	0.40	0.20	0.31	0.31	0.08	0.19	0.19
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	5.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0
Lane Grp Cap (vph)	160	2076	637	61	2017	614	354	1102	485	138	672	294
v/s Ratio Prot	c0.02	0.04		0.02	c0.34		c0.19	0.10		0.04	0.12	
v/s Ratio Perm			0.02			0.03			0.02			c0.21
v/c Ratio	0.41	0.09	0.05	0.52	0.85	0.06	0.95	0.33	0.05	0.48	0.61	1.11
Uniform Delay, d1	55.6	21.8	21.4	56.9	32.9	22.4	47.4	31.6	28.9	53.0	44.5	48.6
Progression Factor	1.00	1.00	1.00	1.36	0.54	0.78	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.6	0.1	0.1	8.4	3.4	0.1	35.5	0.2	0.1	3.5	2.9	84.8
Delay (s)	59.2	21.9	21.6	85.8	21.3	17.6	82.9	31.9	28.9	56.5	47.4	133.4
Level of Service	E	C	C	F	C	B	F	C	C	E	D	F
Approach Delay (s)		29.4			22.2			53.9			89.1	
Approach LOS		C			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	45.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	192	5	46	1499	103	7	56	37	111	145	120
Future Volume (vph)	46	192	5	46	1499	103	7	56	37	111	145	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.5	5.0	5.0	7.5	5.0		7.5	5.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	1.00	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1520	1770	5085	1583	1770	3295		1770	3241	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1520	1770	5085	1583	1770	3295		1770	3241	
Peak-hour factor, PHF	0.81	0.81	0.81	0.88	0.88	0.88	0.76	0.76	0.76	0.87	0.87	0.87
Adj. Flow (vph)	57	237	6	52	1703	117	9	74	49	128	167	138
RTOR Reduction (vph)	0	0	3	0	0	59	0	42	0	0	105	0
Lane Group Flow (vph)	57	237	3	52	1703	58	9	81	0	128	200	0
Confl. Peds. (#/hr)			20						6			16
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	8.1	59.9	59.9	7.8	59.6	59.6	2.0	17.2		13.1	28.3	
Effective Green, g (s)	8.1	59.9	59.9	7.8	59.6	59.6	2.0	17.2		13.1	28.3	
Actuated g/C Ratio	0.07	0.50	0.50	0.06	0.50	0.50	0.02	0.14		0.11	0.24	
Clearance Time (s)	4.5	5.0	5.0	4.5	5.0	5.0	7.5	5.0		7.5	5.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	4.0	4.5		6.0	5.0	
Lane Grp Cap (vph)	119	2538	758	115	2525	786	29	472		193	764	
v/s Ratio Prot	c0.03	0.05		0.03	c0.33		0.01	0.02		c0.07	c0.06	
v/s Ratio Perm			0.00			0.04						
v/c Ratio	0.48	0.09	0.00	0.45	0.67	0.07	0.31	0.17		0.66	0.26	
Uniform Delay, d1	53.9	15.8	15.1	54.0	22.9	15.8	58.3	45.1		51.3	37.3	
Progression Factor	0.91	0.96	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	0.1	0.0	2.8	1.1	0.1	8.2	0.3		12.7	0.4	
Delay (s)	52.0	15.3	15.1	56.9	24.0	15.9	66.5	45.4		64.1	37.7	
Level of Service	D	B	B	E	C	B	E	D		E	D	
Approach Delay (s)		22.3			24.4			46.9			45.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	280	58	166	978	50	331	34	307	2	25	3
Future Volume (vph)	18	280	58	166	978	50	331	34	307	2	25	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.95	1.00	1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00		1.00	
Satd. Flow (prot)	1770	3539	1514	1770	3539	1504	1681	1701	1559		1824	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00		1.00	
Satd. Flow (perm)	1770	3539	1514	1770	3539	1504	1681	1701	1559		1824	
Peak-hour factor, PHF	0.85	0.85	0.85	0.98	0.98	0.98	0.88	0.88	0.88	0.75	0.75	0.75
Adj. Flow (vph)	21	329	68	169	998	51	376	39	349	3	33	4
RTOR Reduction (vph)	0	0	36	0	0	21	0	0	294	0	4	0
Lane Group Flow (vph)	21	329	32	169	998	30	207	208	55	0	36	0
Confl. Peds. (#/hr)			12			8			2			12
Confl. Bikes (#/hr)			29			16			1			3
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			
Actuated Green, G (s)	4.8	61.4	61.4	18.7	75.3	75.3	20.4	20.4	20.4		7.0	
Effective Green, g (s)	4.8	61.4	61.4	18.7	75.3	75.3	20.4	20.4	20.4		7.0	
Actuated g/C Ratio	0.04	0.47	0.47	0.14	0.58	0.58	0.16	0.16	0.16		0.05	
Clearance Time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.5	1.5	1.5		3.0	
Lane Grp Cap (vph)	65	1671	715	254	2049	871	263	266	244		98	
v/s Ratio Prot	0.01	0.09		c0.10	c0.28		c0.12	0.12			c0.02	
v/s Ratio Perm			0.02			0.02			0.04			
v/c Ratio	0.32	0.20	0.04	0.67	0.49	0.03	0.79	0.78	0.22		0.37	
Uniform Delay, d1	61.0	20.0	18.5	52.7	16.0	11.7	52.7	52.7	47.9		59.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	2.9	0.3	0.1	6.4	0.8	0.1	13.3	12.9	0.2		2.3	
Delay (s)	63.9	20.2	18.6	59.1	16.9	11.8	66.0	65.5	48.1		61.7	
Level of Service	E	C	B	E	B	B	E	E	D		E	
Approach Delay (s)		22.2			22.5			57.7			61.7	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	70	106	332	89	52	164	253	630	296	909	36
Future Volume (vph)	17	70	106	332	89	52	164	253	630	296	909	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	6.9	6.9	6.5	6.4	6.4	4.0	5.9	5.9	4.7	6.5	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.91	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.93	1.00	1.00	0.95	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1544	3433	1863	1466	1770	3539	1509	3433	5046	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.26	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1544	3433	1863	1466	491	3539	1509	3433	5046	
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.94	0.94	0.94	0.91	0.91	0.91
Adj. Flow (vph)	19	80	120	365	98	57	174	269	670	325	999	40
RTOR Reduction (vph)	0	0	104	0	0	42	0	0	559	0	1	0
Lane Group Flow (vph)	19	80	16	365	98	15	174	269	111	325	1038	0
Confl. Peds. (#/hr)			4			35			22			11
Confl. Bikes (#/hr)			4			1			1			2
Turn Type	Prot	NA	Perm	Prot	NA	Perm	custom	NA	Perm	Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases			8			4	13 15		2		13 15	
Actuated Green, G (s)	4.9	26.7	26.7	27.1	50.7	50.7	70.2	32.4	32.4	24.4	101.1	
Effective Green, g (s)	4.9	26.7	26.7	27.1	50.7	50.7	70.2	32.4	32.4	24.4	101.1	
Actuated g/C Ratio	0.02	0.14	0.14	0.14	0.26	0.26	0.36	0.17	0.17	0.12	0.52	
Clearance Time (s)	5.2	6.9	6.9	6.5	6.4	6.4	4.0	5.9	5.9	4.7	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.5	4.0	4.0	3.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)	44	253	210	473	481	378	260	584	249	426	2598	
v/s Ratio Prot	0.01	c0.04		c0.11	0.05		0.04	c0.08		c0.09	0.09	
v/s Ratio Perm			0.01			0.01	c0.19		0.07		0.12	
v/c Ratio	0.43	0.32	0.08	0.77	0.20	0.04	0.67	0.46	0.44	0.76	0.40	
Uniform Delay, d1	94.3	76.6	74.0	81.6	57.0	54.5	59.2	74.1	73.8	83.2	29.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.7	0.7	0.2	7.9	0.3	0.1	6.4	1.6	3.5	7.9	0.3	
Delay (s)	101.0	77.3	74.2	89.5	57.3	54.6	65.5	75.7	77.4	91.1	29.3	
Level of Service	F	E	E	F	E	D	E	E	E	F	C	
Approach Delay (s)		77.7			79.6			75.1			44.0	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	62.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	196.3	Sum of lost time (s)	28.5
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	70	106	0	1113	24	2	1	0	20	0	88
Future Volume (vph)	17	70	106	0	1113	24	2	1	0	20	0	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.0	6.0		6.0	6.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00	1.00	1.00		1.00	0.92	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1593	3185	1392		3185	1425	1593	1676		1593	1312	
Flt Permitted	0.95	1.00	1.00		1.00	1.00	0.52	1.00		0.76	1.00	
Satd. Flow (perm)	1593	3185	1392		3185	1425	871	1676		1269	1312	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.75	0.75	0.75	0.84	0.84	0.84
Adj. Flow (vph)	18	75	114	0	1197	26	3	1	0	24	0	105
RTOR Reduction (vph)	0	0	18	0	0	6	0	0	0	0	98	0
Lane Group Flow (vph)	18	75	96	0	1197	20	3	1	0	24	7	0
Confl. Peds. (#/hr)			1						11			15
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases			6			2	4			8		
Actuated Green, G (s)	3.3	101.1	101.1		92.3	92.3	7.9	7.9		7.9	7.9	
Effective Green, g (s)	3.3	101.1	101.1		92.3	92.3	7.9	7.9		7.9	7.9	
Actuated g/C Ratio	0.03	0.84	0.84		0.77	0.77	0.07	0.07		0.07	0.07	
Clearance Time (s)	5.5	6.0	6.0		6.0	6.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	4.0	4.0		4.0	4.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	43	2683	1172		2449	1096	57	110		83	86	
v/s Ratio Prot	c0.01	0.02			c0.38			0.00			0.01	
v/s Ratio Perm			0.07			0.01	0.00			c0.02		
v/c Ratio	0.42	0.03	0.08		0.49	0.02	0.05	0.01		0.29	0.08	
Uniform Delay, d1	57.4	1.5	1.6		5.1	3.2	52.5	52.4		53.4	52.6	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.5	0.0	0.1		0.7	0.0	0.4	0.0		1.9	0.4	
Delay (s)	63.9	1.5	1.7		5.8	3.3	52.9	52.4		55.3	53.0	
Level of Service	E	A	A		A	A	D	D		E	D	
Approach Delay (s)		7.1			5.8			52.8			53.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	457	1423	131	70	308	32	98	210	165	127	356	341
Future Volume (vph)	457	1423	131	70	308	32	98	210	165	127	356	341
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	5.0	5.0	6.0	5.0	5.0	4.5	6.0		4.5	5.0	5.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	3433	3305		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	5085	1583	3433	3305		3433	1863	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.88	0.88	0.88	0.89	0.89	0.89
Adj. Flow (vph)	476	1482	136	73	321	33	111	239	188	143	400	383
RTOR Reduction (vph)	0	0	88	0	0	20	0	85	0	0	0	238
Lane Group Flow (vph)	476	1482	48	73	321	13	111	342	0	143	400	145
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2						8
Actuated Green, G (s)	27.5	55.7	55.7	32.1	60.3	60.3	10.8	36.6		12.4	39.2	39.2
Effective Green, g (s)	27.5	55.7	55.7	32.1	60.3	60.3	10.8	36.6		12.4	39.2	39.2
Actuated g/C Ratio	0.17	0.35	0.35	0.20	0.38	0.38	0.07	0.23		0.08	0.25	0.25
Clearance Time (s)	6.0	5.0	5.0	6.0	5.0	5.0	4.5	6.0		4.5	5.0	5.0
Vehicle Extension (s)	4.5	5.0	5.0	4.0	5.0	5.0	3.5	2.5		3.5	2.5	2.5
Lane Grp Cap (vph)	307	1789	557	696	1936	603	234	764		268	461	392
v/s Ratio Prot	c0.27	c0.29		c0.02	0.06		0.03	0.10		c0.04	c0.21	
v/s Ratio Perm			0.03			0.01						0.09
v/c Ratio	1.55	0.83	0.09	0.10	0.17	0.02	0.47	0.45		0.53	0.87	0.37
Uniform Delay, d1	65.4	46.9	34.3	51.4	32.4	30.6	71.0	52.2		70.2	57.1	49.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	263.3	4.6	0.3	0.1	0.2	0.1	1.8	0.3		2.3	15.6	0.4
Delay (s)	328.7	51.5	34.6	51.5	32.6	30.6	72.8	52.5		72.5	72.6	49.8
Level of Service	F	D	C	D	C	C	E	D		E	E	D
Approach Delay (s)		113.4			35.7			56.7			63.2	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	85.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	158.3	Sum of lost time (s)	21.5
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	2113	0	154	322	26	119	99	333	46	29	71
Future Volume (vph)	138	2113	0	154	322	26	119	99	333	46	29	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5		4.5	5.5	5.5	5.0	5.0	5.0	4.6	4.6	4.6
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.96	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1770	5085		1770	5085	1525	1681	1760	1515	1681	1748	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1770	5085		1770	5085	1525	1681	1760	1515	1681	1748	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	1.00	1.00	1.00	0.79	0.79	0.79
Adj. Flow (vph)	142	2178	0	167	350	28	119	99	333	58	37	90
RTOR Reduction (vph)	0	0	0	0	0	17	0	0	299	0	0	83
Lane Group Flow (vph)	142	2178	0	167	350	11	107	111	34	46	49	7
Confl. Peds. (#/hr)						6			36			
Confl. Bikes (#/hr)			13			4						
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6			8			7
Actuated Green, G (s)	42.5	77.0		18.4	52.9	52.9	14.2	14.2	14.2	10.8	10.8	10.8
Effective Green, g (s)	42.5	77.0		18.4	52.9	52.9	14.2	14.2	14.2	10.8	10.8	10.8
Actuated g/C Ratio	0.30	0.55		0.13	0.38	0.38	0.10	0.10	0.10	0.08	0.08	0.08
Clearance Time (s)	4.5	5.5		4.5	5.5	5.5	5.0	5.0	5.0	4.6	4.6	4.6
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	2.5	2.5	2.5	4.5	4.5	4.5
Lane Grp Cap (vph)	537	2796		232	1921	576	170	178	153	129	134	122
v/s Ratio Prot	0.08	c0.43		c0.09	0.07		c0.06	0.06		0.03	c0.03	
v/s Ratio Perm						0.01			0.02			0.00
v/c Ratio	0.26	0.78		0.72	0.18	0.02	0.63	0.62	0.22	0.36	0.37	0.06
Uniform Delay, d1	36.9	24.8		58.3	29.1	27.3	60.4	60.3	57.8	61.3	61.3	59.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	2.2		10.2	0.1	0.0	6.2	5.8	0.5	2.9	2.9	0.3
Delay (s)	37.2	27.0		68.5	29.2	27.3	66.5	66.1	58.3	64.2	64.3	60.2
Level of Service	D	C		E	C	C	E	E	E	E	E	E
Approach Delay (s)		27.6			41.2			61.5			62.3	
Approach LOS		C			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	36.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	469	1502	447	56	482	126	66	364	62	160	358	92
Future Volume (vph)	469	1502	447	56	482	126	66	364	62	160	358	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1548	1770	3539	1561	1770	3539	1558
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1548	1770	3539	1561	1770	3539	1558
Peak-hour factor, PHF	0.97	0.97	0.97	0.93	0.93	0.93	0.87	0.87	0.87	0.88	0.88	0.88
Adj. Flow (vph)	484	1548	461	60	518	135	76	418	71	182	407	105
RTOR Reduction (vph)	0	0	118	0	0	79	0	0	61	0	0	87
Lane Group Flow (vph)	484	1548	343	60	518	56	76	418	10	182	407	18
Confl. Peds. (#/hr)						11			3			6
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	19.8	60.9	60.9	8.3	49.4	49.4	9.7	16.8	16.8	14.0	21.1	21.1
Effective Green, g (s)	19.8	60.9	60.9	8.3	49.4	49.4	9.7	16.8	16.8	14.0	21.1	21.1
Actuated g/C Ratio	0.17	0.51	0.51	0.07	0.41	0.41	0.08	0.14	0.14	0.12	0.18	0.18
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	5.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0
Lane Grp Cap (vph)	566	2580	803	122	2093	637	143	495	218	206	622	273
v/s Ratio Prot	c0.14	c0.30		0.03	0.10		0.04	c0.12		c0.10	0.11	
v/s Ratio Perm			0.22			0.04			0.01			0.01
v/c Ratio	0.86	0.60	0.43	0.49	0.25	0.09	0.53	0.84	0.05	0.88	0.65	0.07
Uniform Delay, d1	48.7	20.9	18.6	53.8	23.1	21.5	53.0	50.3	44.7	52.2	46.1	41.2
Progression Factor	1.00	1.00	1.00	0.90	1.18	3.23	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.1	1.0	1.7	4.1	0.2	0.2	4.8	12.9	0.1	33.6	5.3	0.5
Delay (s)	61.8	22.0	20.2	52.8	27.5	69.8	57.7	63.3	44.8	85.8	51.4	41.7
Level of Service	E	C	C	D	C	E	E	E	D	F	D	D
Approach Delay (s)		29.4			37.6			60.2			58.9	
Approach LOS		C			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	39.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	304	1449	31	74	429	178	9	192	71	206	165	155
Future Volume (vph)	304	1449	31	74	429	178	9	192	71	206	165	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.5	5.0	5.0	7.5	5.0		7.5	5.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.99	1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1493	1770	5085	1562	1770	3373		1770	3179	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1493	1770	5085	1562	1770	3373		1770	3179	
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93
Adj. Flow (vph)	317	1509	32	80	466	193	10	218	81	222	177	167
RTOR Reduction (vph)	0	0	19	0	0	141	0	31	0	0	113	0
Lane Group Flow (vph)	317	1509	13	80	466	52	10	268	0	222	231	0
Confl. Peds. (#/hr)			32			1			6			31
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	24.9	48.0	48.0	9.1	32.2	32.2	2.0	22.0		18.9	38.9	
Effective Green, g (s)	24.9	48.0	48.0	9.1	32.2	32.2	2.0	22.0		18.9	38.9	
Actuated g/C Ratio	0.21	0.40	0.40	0.08	0.27	0.27	0.02	0.18		0.16	0.32	
Clearance Time (s)	4.5	5.0	5.0	4.5	5.0	5.0	7.5	5.0		7.5	5.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	4.0	4.5		6.0	5.0	
Lane Grp Cap (vph)	367	2034	597	134	1364	419	29	618		278	1030	
v/s Ratio Prot	c0.18	c0.30		0.05	0.09		0.01	c0.08		c0.13	0.07	
v/s Ratio Perm			0.01			0.03						
v/c Ratio	0.86	0.74	0.02	0.60	0.34	0.12	0.34	0.43		0.80	0.22	
Uniform Delay, d1	45.9	30.7	21.8	53.7	35.4	33.2	58.4	43.5		48.7	29.6	
Progression Factor	1.52	0.52	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.7	2.0	0.1	7.0	0.4	0.4	9.5	0.8		17.6	0.2	
Delay (s)	85.6	17.9	21.8	60.7	35.8	33.6	67.8	44.3		66.3	29.8	
Level of Service	F	B	C	E	D	C	E	D		E	C	
Approach Delay (s)		29.5			37.9			45.1			44.1	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1154	416	313	718	25	75	3	260	24	45	17
Future Volume (vph)	11	1154	416	313	718	25	75	3	260	24	45	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.92	1.00	1.00	0.99		0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1523	1770	3539	1463	1681	1692	1560		1778	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00		0.99	
Satd. Flow (perm)	1770	3539	1523	1770	3539	1463	1681	1692	1560		1778	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	12	1254	452	348	798	28	100	4	347	32	60	23
RTOR Reduction (vph)	0	0	168	0	0	10	0	0	322	0	9	0
Lane Group Flow (vph)	12	1254	284	348	798	18	52	52	25	0	106	0
Confl. Peds. (#/hr)			13			16			3			14
Confl. Bikes (#/hr)			11			27						
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			
Actuated Green, G (s)	3.0	47.4	47.4	37.8	82.2	82.2	9.2	9.2	9.2		13.1	
Effective Green, g (s)	3.0	47.4	47.4	37.8	82.2	82.2	9.2	9.2	9.2		13.1	
Actuated g/C Ratio	0.02	0.36	0.36	0.29	0.63	0.63	0.07	0.07	0.07		0.10	
Clearance Time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.5	1.5	1.5		3.0	
Lane Grp Cap (vph)	40	1290	555	514	2237	925	118	119	110		179	
v/s Ratio Prot	0.01	c0.35		c0.20	0.23		c0.03	0.03			c0.06	
v/s Ratio Perm			0.19			0.01			0.02			
v/c Ratio	0.30	0.97	0.51	0.68	0.36	0.02	0.44	0.44	0.22		0.59	
Uniform Delay, d1	62.5	40.6	32.3	40.7	11.3	8.9	57.9	57.9	57.0		55.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	4.2	19.2	3.3	3.5	0.4	0.0	1.0	0.9	0.4		5.2	
Delay (s)	66.7	59.9	35.6	44.2	11.8	8.9	58.9	58.9	57.4		61.1	
Level of Service	E	E	D	D	B	A	E	E	E		E	
Approach Delay (s)		53.5			21.3			57.7			61.1	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	22.5
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	54	187	331	64	173	43	663	304	37	159	15
Future Volume (vph)	18	54	187	331	64	173	43	663	304	37	159	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9	4.0	6.4	6.4	6.4	4.0	5.9	6.4	4.7	6.5	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.91	
Frpb, ped/bikes		1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1840	1573	1681	1711	1583	1770	3539	1528	3433	5010	
Flt Permitted		0.99	1.00	0.95	0.97	1.00	0.63	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1840	1573	1681	1711	1583	1167	3539	1528	3433	5010	
Peak-hour factor, PHF	0.82	0.82	0.82	0.90	0.90	0.90	0.89	0.89	0.89	0.91	0.91	0.91
Adj. Flow (vph)	22	66	228	368	71	192	48	745	342	41	175	16
RTOR Reduction (vph)	0	0	141	0	0	0	0	0	149	0	5	0
Lane Group Flow (vph)	0	88	87	217	222	192	48	745	193	41	186	0
Confl. Peds. (#/hr)			2			20			22			2
Confl. Bikes (#/hr)			3			3			6			
Turn Type	Split	NA	pm+ov	Split	NA	Prot	custom	NA	pm+ov	Prot	NA	
Protected Phases	8	8	5	4	4	4	5	2	4	1	6	
Permitted Phases			8				13 15		2		13 15	
Actuated Green, G (s)		29.0	78.9	36.2	36.2	36.2	107.5	56.0	92.2	6.1	74.1	
Effective Green, g (s)		29.0	78.9	36.2	36.2	36.2	107.5	56.0	92.2	6.1	74.1	
Actuated g/C Ratio		0.13	0.36	0.17	0.17	0.17	0.49	0.26	0.42	0.03	0.34	
Clearance Time (s)		6.9	4.0	6.4	6.4	6.4	4.0	5.9	6.4	4.7	6.5	
Vehicle Extension (s)		3.0	3.0	4.0	4.0	4.0	3.0	6.0	4.0	3.0	6.0	
Lane Grp Cap (vph)		245	570	279	284	263	715	911	647	96	1706	
v/s Ratio Prot		c0.05	0.03	0.13	c0.13	0.12	0.02	c0.21	0.05	c0.01	c0.01	
v/s Ratio Perm			0.02				0.02		0.08		0.03	
v/c Ratio		0.36	0.15	0.78	0.78	0.73	0.07	0.82	0.30	0.43	0.11	
Uniform Delay, d1		85.8	46.7	86.8	86.9	86.0	29.0	76.0	41.3	104.0	49.1	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.9	0.1	13.5	13.8	10.6	0.0	6.8	0.4	3.0	0.1	
Delay (s)		86.7	46.9	100.3	100.6	96.6	29.0	82.8	41.7	107.0	49.2	
Level of Service		F	D	F	F	F	C	F	D	F	D	
Approach Delay (s)		58.0			99.3			68.1			59.4	
Approach LOS		E			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	74.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	217.5	Sum of lost time (s)	30.4
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	589	2	4	873	10	1	0	0	28	0	252
Future Volume (vph)	87	589	2	4	873	10	1	0	0	28	0	252
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.0	6.0	5.0	6.0	6.0	5.0			5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00			1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00			1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95			0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1548	1770			1770	1556	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.25			0.76	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1548	471			1410	1556	
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.90	0.25	0.25	0.25	0.77	0.77	0.77
Adj. Flow (vph)	93	627	2	4	970	11	4	0	0	36	0	327
RTOR Reduction (vph)	0	0	1	0	0	5	0	0	0	0	0	0
Lane Group Flow (vph)	93	627	1	4	970	6	4	0	0	36	327	0
Confl. Peds. (#/hr)						1			15			4
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm			Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases			6			2	4			8		
Actuated Green, G (s)	11.3	74.7	74.7	1.3	64.2	64.2	28.0			28.0	28.0	
Effective Green, g (s)	11.3	74.7	74.7	1.3	64.2	64.2	28.0			28.0	28.0	
Actuated g/C Ratio	0.09	0.62	0.62	0.01	0.54	0.54	0.23			0.23	0.23	
Clearance Time (s)	5.5	6.0	6.0	5.0	6.0	6.0	5.0			5.0	5.0	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	166	2203	985	19	1893	828	109			329	363	
v/s Ratio Prot	c0.05	0.18		0.00	c0.27						c0.21	
v/s Ratio Perm			0.00			0.00	0.01			0.03		
v/c Ratio	0.56	0.28	0.00	0.21	0.51	0.01	0.04			0.11	0.90	
Uniform Delay, d1	52.0	10.4	8.6	58.8	17.9	13.0	35.6			36.2	44.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	4.3	0.3	0.0	5.5	1.0	0.0	0.1			0.1	24.4	
Delay (s)	56.2	10.7	8.6	64.3	18.9	13.0	35.7			36.3	69.1	
Level of Service	E	B	A	E	B	B	D			D	E	
Approach Delay (s)		16.6			19.0			35.7			65.8	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	173	63	177	1811	78	54	157	24	30	241	500
Future Volume (vph)	152	173	63	177	1811	78	54	157	24	30	241	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	5.0	4.5	6.0	5.0	4.5	4.5	6.0		4.5	5.0	6.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	5085	1583	3433	3463		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	5085	1583	3433	3463		3433	1863	1583
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.82	0.82	0.82	0.80	0.80	0.80
Adj. Flow (vph)	192	219	80	224	2292	99	66	191	29	38	301	625
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	33
Lane Group Flow (vph)	192	219	80	224	2292	99	66	220	0	38	301	592
Confl. Peds. (#/hr)			1						1			
Turn Type	Prot	NA	Over	Prot	NA	Over	Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4		3	8	1
Permitted Phases												8
Actuated Green, G (s)	13.1	51.4	9.4	15.2	53.5	7.6	9.4	27.6		7.6	26.8	39.9
Effective Green, g (s)	13.1	51.4	9.4	15.2	53.5	7.6	9.4	27.6		7.6	26.8	39.9
Actuated g/C Ratio	0.11	0.42	0.08	0.12	0.43	0.06	0.08	0.22		0.06	0.22	0.32
Clearance Time (s)	6.0	5.0	4.5	6.0	5.0	4.5	4.5	6.0		4.5	5.0	6.0
Vehicle Extension (s)	4.5	5.0	3.5	4.0	5.0	3.5	3.5	2.5		3.5	2.5	4.5
Lane Grp Cap (vph)	188	1475	120	423	2206	97	261	775		211	404	512
v/s Ratio Prot	0.11	0.06	0.05	0.07	c0.45	c0.06	0.02	0.06		0.01	0.16	c0.12
v/s Ratio Perm												0.25
v/c Ratio	1.02	0.15	0.67	0.53	1.04	1.02	0.25	0.28		0.18	0.75	1.16
Uniform Delay, d1	55.1	22.3	55.4	50.7	34.9	57.9	53.6	39.7		54.9	45.1	41.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	71.3	0.2	13.6	1.6	30.2	97.1	0.6	0.1		0.5	6.9	90.4
Delay (s)	126.4	22.6	69.1	52.3	65.1	154.9	54.2	39.8		55.4	52.0	132.1
Level of Service	F	C	E	D	E	F	D	D		E	D	F
Approach Delay (s)		70.7			67.4			43.1			104.1	
Approach LOS		E			E			D			F	

Intersection Summary			
HCM 2000 Control Delay	74.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	123.3	Sum of lost time (s)	21.5
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	194	37	236	1790	33	768	69	96	25	30	275
Future Volume (vph)	36	194	37	236	1790	33	768	69	96	25	30	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5	4.5	5.5	4.6	5.0	5.0		4.6	4.6	4.6
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1686		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	3433	1686		1770	1863	1583
Peak-hour factor, PHF	0.88	0.88	0.88	0.98	0.98	0.98	0.91	0.91	0.91	0.63	0.63	0.63
Adj. Flow (vph)	41	220	42	241	1827	34	844	76	105	40	48	437
RTOR Reduction (vph)	0	0	18	0	0	0	0	30	0	0	0	0
Lane Group Flow (vph)	41	220	24	241	1827	34	844	151	0	40	48	437
Confl. Peds. (#/hr)			5			2			3			
Confl. Bikes (#/hr)						12						
Turn Type	Prot	NA	custom	Prot	NA	Over	Prot	NA		Prot	NA	pt+ov
Protected Phases	5	2	2 7 8!	1	6	7	3	8		7	4!	4 5
Permitted Phases												
Actuated Green, G (s)	6.0	13.6	91.5	43.5	51.1	7.6	35.0	60.7		7.6	33.3	39.3
Effective Green, g (s)	6.0	13.6	81.9	43.5	51.1	7.6	35.0	60.7		7.6	33.3	39.3
Actuated g/C Ratio	0.04	0.09	0.56	0.30	0.35	0.05	0.24	0.42		0.05	0.23	0.27
Clearance Time (s)	4.5	5.5		4.5	5.5	4.6	5.0	5.0		4.6	4.6	
Vehicle Extension (s)	3.0	6.0		3.0	6.0	3.0	2.5	2.5		3.0	3.0	
Lane Grp Cap (vph)	73	476	894	531	1792	82	828	705		92	427	429
v/s Ratio Prot	0.02	0.04	0.01	0.14	c0.36	0.02	c0.25	0.09		0.02	0.03	c0.28
v/s Ratio Perm												
v/c Ratio	0.56	0.46	0.03	0.45	1.02	0.41	1.02	0.21		0.43	0.11	1.02
Uniform Delay, d1	68.2	62.2	13.9	41.1	47.0	66.5	55.0	26.9		66.6	44.2	52.9
Progression Factor	1.00	1.00	1.00	0.57	0.50	0.83	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.5	2.0	0.0	0.1	12.2	0.3	36.2	0.1		3.3	0.1	48.3
Delay (s)	77.7	64.2	14.0	23.7	35.8	55.5	91.2	27.0		69.9	44.3	101.1
Level of Service	E	E	B	C	D	E	F	C		E	D	F
Approach Delay (s)		59.1			34.7			79.9			93.5	
Approach LOS		E			C			E			F	

Intersection Summary			
HCM 2000 Control Delay	56.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	151	64	29	1558	90	263	280	59	58	362	384
Future Volume (vph)	55	151	64	29	1558	90	263	280	59	58	362	384
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	4.0	5.0	5.0	4.0	4.0	6.0		4.0	6.0	5.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1571	1770	5085	1554	1770	3436		1770	3539	1560
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1571	1770	5085	1554	1770	3436		1770	3539	1560
Peak-hour factor, PHF	0.83	0.83	0.83	0.91	0.91	0.91	0.78	0.78	0.78	0.88	0.88	0.88
Adj. Flow (vph)	66	182	77	32	1712	99	337	359	76	66	411	436
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	66	182	77	32	1712	99	337	435	0	66	411	436
Confl. Peds. (#/hr)			1			7			6			2
Confl. Bikes (#/hr)			2			6			1			7
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	9.8	50.6	91.5	4.1	44.9	55.6	40.9	59.6		10.7	29.4	39.2
Effective Green, g (s)	9.8	50.6	91.5	4.1	44.9	55.6	40.9	59.6		10.7	29.4	39.2
Actuated g/C Ratio	0.07	0.35	0.63	0.03	0.31	0.38	0.28	0.41		0.07	0.20	0.27
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	4.0	6.0		4.0	6.0	5.0
Vehicle Extension (s)	5.0	6.0	4.0	4.0	6.0	4.0	4.0	4.0		4.0	6.0	5.0
Lane Grp Cap (vph)	232	1774	1034	50	1574	595	499	1412		130	717	421
v/s Ratio Prot	0.02	0.04	0.02	0.02	c0.34	0.01	c0.19	0.13		0.04	0.12	c0.07
v/s Ratio Perm			0.03			0.05						0.21
v/c Ratio	0.28	0.10	0.07	0.64	1.09	0.17	0.68	0.31		0.51	0.57	1.04
Uniform Delay, d1	64.3	31.9	10.4	69.7	50.0	29.4	46.2	28.8		64.6	52.1	52.9
Progression Factor	1.16	1.25	1.05	0.65	0.64	0.43	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.4	0.1	0.0	22.7	48.8	0.1	3.9	0.2		4.2	2.2	53.4
Delay (s)	75.8	39.9	11.0	67.8	80.7	12.7	50.1	29.0		68.8	54.3	106.3
Level of Service	E	D	B	E	F	B	D	C		E	D	F
Approach Delay (s)		40.3			76.8			38.2			80.2	
Approach LOS		D			E			D			F	

Intersection Summary			
HCM 2000 Control Delay	66.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	192	5	46	1499	103	7	56	37	111	145	120
Future Volume (vph)	46	192	5	46	1499	103	7	56	37	111	145	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	7.5	7.5	5.0	5.0	7.5	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5057		1770	5085	1583	1770	1863	1541	1770	1701	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5057		1770	5085	1583	1770	1863	1541	1770	1701	
Peak-hour factor, PHF	0.81	0.81	0.81	0.88	0.88	0.88	0.76	0.76	0.76	0.87	0.87	0.87
Adj. Flow (vph)	57	237	6	52	1703	117	9	74	49	128	167	138
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	42	0	21	0
Lane Group Flow (vph)	57	242	0	52	1703	117	9	74	7	128	284	0
Confl. Peds. (#/hr)			20						6			16
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	8.4	76.6		7.7	75.9	93.2	2.0	21.4	21.4	17.3	36.7	
Effective Green, g (s)	8.4	76.6		7.7	75.9	93.2	2.0	21.4	21.4	17.3	36.7	
Actuated g/C Ratio	0.06	0.53		0.05	0.52	0.64	0.01	0.15	0.15	0.12	0.25	
Clearance Time (s)	4.5	5.0		4.5	5.0	7.5	7.5	5.0	5.0	7.5	5.0	
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	4.0	4.5	4.5	6.0	5.0	
Lane Grp Cap (vph)	102	2671		93	2661	1017	24	274	227	211	430	
v/s Ratio Prot	c0.03	0.05		0.03	c0.33	0.01	0.01	0.04		c0.07	c0.17	
v/s Ratio Perm						0.06			0.00			
v/c Ratio	0.56	0.09		0.56	0.64	0.12	0.38	0.27	0.03	0.61	0.66	
Uniform Delay, d1	66.5	16.9		67.0	24.8	10.0	70.9	54.9	52.9	60.6	48.6	
Progression Factor	0.84	0.72		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.4	0.1		7.1	0.9	0.1	12.9	0.9	0.1	8.5	5.0	
Delay (s)	62.2	12.2		74.1	25.6	10.1	83.8	55.8	53.0	69.2	53.6	
Level of Service	E	B		E	C	B	F	E	D	E	D	
Approach Delay (s)		21.7			26.0			56.7			58.2	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	32.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	280	58	166	978	50	331	34	307	2	25	3
Future Volume (vph)	18	280	58	166	978	50	331	34	307	2	25	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.95	1.00	1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00		1.00	
Satd. Flow (prot)	1770	3539	1517	3433	3539	1511	1681	1701	1560		1825	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00		1.00	
Satd. Flow (perm)	1770	3539	1517	3433	3539	1511	1681	1701	1560		1825	
Peak-hour factor, PHF	0.85	0.85	0.85	0.98	0.98	0.98	0.88	0.88	0.88	0.75	0.75	0.75
Adj. Flow (vph)	21	329	68	169	998	51	376	39	349	3	33	4
RTOR Reduction (vph)	0	0	45	0	0	27	0	0	288	0	4	0
Lane Group Flow (vph)	21	329	23	169	998	24	207	208	61	0	36	0
Confl. Peds. (#/hr)			12			8			2			12
Confl. Bikes (#/hr)			29			16			1			3
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			
Actuated Green, G (s)	2.8	28.8	28.8	13.3	39.3	39.3	14.5	14.5	14.5		4.4	
Effective Green, g (s)	2.8	28.8	28.8	13.3	39.3	39.3	14.5	14.5	14.5		4.4	
Actuated g/C Ratio	0.03	0.34	0.34	0.16	0.47	0.47	0.17	0.17	0.17		0.05	
Clearance Time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.5	1.5	1.5		3.0	
Lane Grp Cap (vph)	59	1220	523	546	1665	711	291	295	270		96	
v/s Ratio Prot	0.01	0.09		c0.05	c0.28		c0.12	0.12			c0.02	
v/s Ratio Perm			0.02			0.02			0.04			
v/c Ratio	0.36	0.27	0.04	0.31	0.60	0.03	0.71	0.71	0.22		0.38	
Uniform Delay, d1	39.5	19.8	18.2	31.0	16.3	11.9	32.5	32.5	29.7		38.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	3.7	0.5	0.2	0.3	1.6	0.1	6.7	6.1	0.2		2.5	
Delay (s)	43.1	20.3	18.4	31.4	17.9	12.0	39.2	38.6	29.8		40.7	
Level of Service	D	C	B	C	B	B	D	D	C		D	
Approach Delay (s)		21.1			19.5			34.8			40.7	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	24.5
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	70	106	332	89	52	164	253	630	296	909	36
Future Volume (vph)	17	70	106	332	89	52	164	253	630	296	909	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9	4.0	6.4	6.4	6.4	4.0	5.9	6.4	4.7	6.5	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.91	
Frpb, ped/bikes		1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1845	1568	1681	1720	1583	1770	3539	1541	3433	5046	
Flt Permitted		0.99	1.00	0.95	0.97	1.00	0.26	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1845	1568	1681	1720	1583	491	3539	1541	3433	5046	
Peak-hour factor, PHF	0.88	0.88	0.88	0.91	0.91	0.91	0.94	0.94	0.94	0.91	0.91	0.91
Adj. Flow (vph)	19	80	120	365	98	57	174	269	670	325	999	40
RTOR Reduction (vph)	0	0	64	0	0	0	0	0	447	0	2	0
Lane Group Flow (vph)	0	99	56	230	233	57	174	269	223	325	1037	0
Confl. Peds. (#/hr)			4			35			22			11
Confl. Bikes (#/hr)			4			1			1			2
Turn Type	Split	NA	pm+ov	Split	NA	Prot	custom	NA	pm+ov	Prot	NA	
Protected Phases	8	8	5	4	4	4	5	2	4	1	6	
Permitted Phases			8				13 15		2		13 15	
Actuated Green, G (s)		29.1	66.0	34.2	34.2	34.2	93.4	33.2	67.4	25.1	83.3	
Effective Green, g (s)		29.1	66.0	34.2	34.2	34.2	93.4	33.2	67.4	25.1	83.3	
Actuated g/C Ratio		0.14	0.31	0.16	0.16	0.16	0.44	0.16	0.32	0.12	0.39	
Clearance Time (s)		6.9	4.0	6.4	6.4	6.4	4.0	5.9	6.4	4.7	6.5	
Vehicle Extension (s)		3.0	3.0	4.0	4.0	4.0	3.0	6.0	4.0	3.0	6.0	
Lane Grp Cap (vph)		253	488	271	277	255	439	554	490	406	1984	
v/s Ratio Prot		c0.05	0.02	c0.14	0.14	0.04	0.07	c0.08	0.07	c0.09	c0.07	
v/s Ratio Perm			0.02				0.11		0.07		0.14	
v/c Ratio		0.39	0.11	0.85	0.84	0.22	0.40	0.49	0.45	0.80	0.52	
Uniform Delay, d1		83.3	52.0	86.3	86.2	77.2	49.1	81.5	57.5	90.9	49.1	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.0	0.1	21.9	20.7	0.6	0.6	1.9	0.9	10.8	0.6	
Delay (s)		84.3	52.1	108.2	106.9	77.9	49.7	83.4	58.5	101.7	49.7	
Level of Service		F	D	F	F	E	D	F	E	F	D	
Approach Delay (s)		66.7			104.3			63.1			62.1	
Approach LOS		E			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	69.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	211.8	Sum of lost time (s)	31.4
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	70	106	0	1113	24	2	1	0	20	0	88
Future Volume (vph)	17	70	106	0	1113	24	2	1	0	20	0	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.0	6.0		6.0	6.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00	1.00	1.00		1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1546		3539	1583	1770	1863		1770	1502	
Flt Permitted	0.95	1.00	1.00		1.00	1.00	0.61	1.00		0.76	1.00	
Satd. Flow (perm)	1770	3539	1546		3539	1583	1132	1863		1410	1502	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.75	0.75	0.75	0.84	0.84	0.84
Adj. Flow (vph)	18	75	114	0	1197	26	3	1	0	24	0	105
RTOR Reduction (vph)	0	0	23	0	0	7	0	0	0	0	0	0
Lane Group Flow (vph)	18	75	91	0	1197	19	3	1	0	24	105	0
Confl. Peds. (#/hr)			1						11			15
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases			6			2	4			8		
Actuated Green, G (s)	3.2	95.5	95.5		86.8	86.8	13.5	13.5		13.5	13.5	
Effective Green, g (s)	3.2	95.5	95.5		86.8	86.8	13.5	13.5		13.5	13.5	
Actuated g/C Ratio	0.03	0.80	0.80		0.72	0.72	0.11	0.11		0.11	0.11	
Clearance Time (s)	5.5	6.0	6.0		6.0	6.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	4.0	4.0		4.0	4.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	47	2816	1230		2559	1145	127	209		158	168	
v/s Ratio Prot	c0.01	0.02			c0.34			0.00			c0.07	
v/s Ratio Perm			0.06			0.01	0.00			0.02		
v/c Ratio	0.38	0.03	0.07		0.47	0.02	0.02	0.00		0.15	0.62	
Uniform Delay, d1	57.4	2.6	2.7		6.9	4.6	47.4	47.3		48.1	50.8	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.1	0.0	0.1		0.6	0.0	0.1	0.0		0.4	7.1	
Delay (s)	62.6	2.6	2.8		7.6	4.7	47.5	47.3		48.5	57.9	
Level of Service	E	A	A		A	A	D	D		D	E	
Approach Delay (s)		7.9			7.5			47.4			56.2	
Approach LOS		A			A			D			E	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	457	1423	131	70	308	32	98	210	165	127	356	341
Future Volume (vph)	457	1423	131	70	308	32	98	210	165	127	356	341
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	5.0	4.5	6.0	5.0	4.5	4.5	6.0		4.5	5.0	6.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	5085	1583	3433	3305		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	5085	1583	3433	3305		3433	1863	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.88	0.88	0.88	0.89	0.89	0.89
Adj. Flow (vph)	476	1482	136	73	321	33	111	239	188	143	400	383
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	96
Lane Group Flow (vph)	476	1482	136	73	321	33	111	427	0	143	400	287
Turn Type	Prot	NA	Over	Prot	NA	Over	Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4		3	8	1
Permitted Phases												8
Actuated Green, G (s)	30.4	61.9	10.6	4.7	36.2	8.5	10.6	34.2		8.5	33.1	63.5
Effective Green, g (s)	30.4	61.9	10.6	4.7	36.2	8.5	10.6	34.2		8.5	33.1	63.5
Actuated g/C Ratio	0.23	0.47	0.08	0.04	0.28	0.06	0.08	0.26		0.06	0.25	0.49
Clearance Time (s)	6.0	5.0	4.5	6.0	5.0	4.5	4.5	6.0		4.5	5.0	6.0
Vehicle Extension (s)	4.5	5.0	3.5	4.0	5.0	3.5	3.5	2.5		3.5	2.5	4.5
Lane Grp Cap (vph)	411	1674	128	123	1407	102	278	864		223	471	768
v/s Ratio Prot	c0.27	c0.42	c0.09	0.02	0.06	0.02	0.03	0.13		0.04	c0.21	0.09
v/s Ratio Perm												0.09
v/c Ratio	1.16	0.89	1.06	0.59	0.23	0.32	0.40	0.49		0.64	0.85	0.37
Uniform Delay, d1	50.2	31.2	60.1	62.1	36.5	58.4	57.1	41.0		59.7	46.5	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	95.2	7.3	97.3	8.7	0.4	2.2	1.1	0.3		6.4	13.2	0.5
Delay (s)	145.4	38.5	157.4	70.8	36.9	60.6	58.2	41.3		66.1	59.7	21.7
Level of Service	F	D	F	E	D	E	E	D		E	E	C
Approach Delay (s)		70.5			44.5			44.8			44.9	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	58.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	130.8	Sum of lost time (s)	21.5
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	2113	407	154	322	26	119	99	333	46	29	71
Future Volume (vph)	138	2113	407	154	322	26	119	99	333	46	29	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5	4.5	5.5	4.6	5.0	5.0		4.6	4.6	4.6
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1592		1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	3433	1592		1770	1863	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	1.00	1.00	1.00	0.79	0.79	0.79
Adj. Flow (vph)	142	2178	420	167	350	28	119	99	333	58	37	90
RTOR Reduction (vph)	0	0	23	0	0	0	0	94	0	0	0	0
Lane Group Flow (vph)	142	2178	397	167	350	28	119	338	0	58	37	90
Confl. Peds. (#/hr)						6			36			
Confl. Bikes (#/hr)			13			4						
Turn Type	Prot	NA	custom	Prot	NA	Over	Prot	NA		Prot	NA	pt+ov
Protected Phases	5	2	2 7 8!	1	6	7	3	8		7	4!	4 5
Permitted Phases												
Actuated Green, G (s)	54.0	64.5	116.0	19.5	30.0	6.0	9.9	35.4		6.0	31.5	85.5
Effective Green, g (s)	54.0	64.5	111.4	19.5	30.0	6.0	9.9	35.4		6.0	31.5	85.5
Actuated g/C Ratio	0.37	0.44	0.77	0.13	0.21	0.04	0.07	0.24		0.04	0.22	0.59
Clearance Time (s)	4.5	5.5		4.5	5.5	4.6	5.0	5.0		4.6	4.6	
Vehicle Extension (s)	3.0	6.0		3.0	6.0	3.0	2.5	2.5		3.0	3.0	
Lane Grp Cap (vph)	659	2261	1216	238	1052	65	234	388		73	404	933
v/s Ratio Prot	0.08	c0.43	0.25	c0.09	0.07	0.02	0.03	c0.21		c0.03	0.02	0.06
v/s Ratio Perm												
v/c Ratio	0.22	0.96	0.33	0.70	0.33	0.43	0.51	0.87		0.79	0.09	0.10
Uniform Delay, d1	31.0	39.1	5.2	60.0	49.0	67.8	65.2	52.6		68.9	45.3	12.9
Progression Factor	1.00	1.00	1.00	0.51	0.55	1.23	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	12.1	0.2	8.6	0.5	4.3	1.3	18.2		43.3	0.1	0.0
Delay (s)	31.2	51.2	5.4	39.0	27.6	87.9	66.5	70.8		112.1	45.4	13.0
Level of Service	C	D	A	D	C	F	E	E		F	D	B
Approach Delay (s)		43.1			34.2			69.8			50.6	
Approach LOS		D			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	45.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	469	1502	447	56	482	126	66	364	62	160	358	92
Future Volume (vph)	469	1502	447	56	482	126	66	364	62	160	358	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	4.0	5.0	5.0	4.0	4.0	6.0		4.0	6.0	5.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1565	1770	3455		1770	3539	1563
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1565	1770	3455		1770	3539	1563
Peak-hour factor, PHF	0.97	0.97	0.97	0.93	0.93	0.93	0.87	0.87	0.87	0.88	0.88	0.88
Adj. Flow (vph)	484	1548	461	60	518	135	76	418	71	182	407	105
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	484	1548	461	60	518	135	76	489	0	182	407	105
Confl. Peds. (#/hr)						11			3			6
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	19.0	49.1	60.6	6.0	36.1	75.1	11.5	30.9		39.0	58.4	77.4
Effective Green, g (s)	19.0	49.1	60.6	6.0	36.1	75.1	11.5	30.9		39.0	58.4	77.4
Actuated g/C Ratio	0.13	0.34	0.42	0.04	0.25	0.52	0.08	0.21		0.27	0.40	0.53
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	4.0	6.0		4.0	6.0	5.0
Vehicle Extension (s)	5.0	6.0	4.0	4.0	6.0	4.0	4.0	4.0		4.0	6.0	5.0
Lane Grp Cap (vph)	449	1721	661	73	1265	810	140	736		476	1425	834
v/s Ratio Prot	c0.14	c0.30	0.06	c0.03	0.10	0.04	0.04	c0.14		c0.10	0.11	0.02
v/s Ratio Perm			0.24			0.04						0.05
v/c Ratio	1.08	0.90	0.70	0.82	0.41	0.17	0.54	0.66		0.38	0.29	0.13
Uniform Delay, d1	63.0	45.6	34.7	69.0	45.5	18.4	64.2	52.3		43.2	29.2	16.9
Progression Factor	0.97	0.40	0.42	0.65	0.45	0.36	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	49.5	3.2	1.3	49.1	0.6	0.1	5.3	2.5		0.7	0.5	0.1
Delay (s)	110.6	21.5	15.7	93.9	21.0	6.8	69.5	54.8		43.9	29.7	17.0
Level of Service	F	C	B	F	C	A	E	D		D	C	B
Approach Delay (s)		37.7			24.5			56.8			31.5	
Approach LOS		D			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	37.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	304	1449	31	74	429	178	9	192	71	206	165	155
Future Volume (vph)	304	1449	31	74	429	178	9	192	71	206	165	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	7.5	7.5	5.0	5.0	7.5	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.97	1.00	0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5058		1770	5085	1566	1770	1863	1541	1770	1664	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5058		1770	5085	1566	1770	1863	1541	1770	1664	
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93
Adj. Flow (vph)	317	1509	32	80	466	193	10	218	81	222	177	167
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	65	0	22	0
Lane Group Flow (vph)	317	1540	0	80	466	193	10	218	16	222	322	0
Confl. Peds. (#/hr)			32			1			6			31
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	43.9	57.8		11.2	25.1	50.3	2.0	28.8	28.8	25.2	52.0	
Effective Green, g (s)	43.9	57.8		11.2	25.1	50.3	2.0	28.8	28.8	25.2	52.0	
Actuated g/C Ratio	0.30	0.40		0.08	0.17	0.35	0.01	0.20	0.20	0.17	0.36	
Clearance Time (s)	4.5	5.0		4.5	5.0	7.5	7.5	5.0	5.0	7.5	5.0	
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	4.0	4.5	4.5	6.0	5.0	
Lane Grp Cap (vph)	535	2016		136	880	543	24	370	306	307	596	
v/s Ratio Prot	0.18	c0.30		0.05	c0.09	0.06	0.01	c0.12		c0.13	0.19	
v/s Ratio Perm						0.06			0.01			
v/c Ratio	0.59	0.76		0.59	0.53	0.36	0.42	0.59	0.05	0.72	0.54	
Uniform Delay, d1	43.0	37.7		64.7	54.6	35.3	70.9	52.7	47.1	56.6	37.0	
Progression Factor	0.26	0.16		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	1.7		6.4	1.4	1.1	15.2	3.3	0.1	11.3	1.8	
Delay (s)	12.0	7.8		71.0	56.0	36.4	86.1	56.0	47.2	67.9	38.8	
Level of Service	B	A		E	E	D	F	E	D	E	D	
Approach Delay (s)		8.5			52.5			54.7			50.2	
Approach LOS		A			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1154	416	313	718	25	75	3	260	24	45	17
Future Volume (vph)	11	1154	416	313	718	25	75	3	260	24	45	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.93	1.00	1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1533	3433	3539	1480	1681	1692	1561		1780	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00		0.99	
Satd. Flow (perm)	1770	3539	1533	3433	3539	1480	1681	1692	1561		1780	
Peak-hour factor, PHF	0.92	0.92	0.92	0.90	0.90	0.90	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	12	1254	452	348	798	28	100	4	347	32	60	23
RTOR Reduction (vph)	0	0	155	0	0	14	0	0	317	0	8	0
Lane Group Flow (vph)	12	1254	297	348	798	14	52	52	30	0	107	0
Confl. Peds. (#/hr)			13			16			3			14
Confl. Bikes (#/hr)			11			27						
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			
Actuated Green, G (s)	1.5	27.6	27.6	16.2	42.3	42.3	7.2	7.2	7.2		10.1	
Effective Green, g (s)	1.5	27.6	27.6	16.2	42.3	42.3	7.2	7.2	7.2		10.1	
Actuated g/C Ratio	0.02	0.33	0.33	0.19	0.51	0.51	0.09	0.09	0.09		0.12	
Clearance Time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.5	1.5	1.5		3.0	
Lane Grp Cap (vph)	31	1168	506	665	1790	748	144	145	134		215	
v/s Ratio Prot	0.01	c0.35		c0.10	0.23		c0.03	0.03			c0.06	
v/s Ratio Perm			0.19			0.01			0.02			
v/c Ratio	0.39	1.07	0.59	0.52	0.45	0.02	0.36	0.36	0.22		0.50	
Uniform Delay, d1	40.6	28.0	23.3	30.2	13.2	10.3	36.0	36.0	35.6		34.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	7.8	48.5	4.9	0.7	0.8	0.0	0.6	0.6	0.3		1.8	
Delay (s)	48.4	76.5	28.2	31.0	14.0	10.3	36.6	36.6	35.9		36.2	
Level of Service	D	E	C	C	B	B	D	D	D		D	
Approach Delay (s)		63.6			18.9			36.1			36.2	
Approach LOS		E			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	24.5
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	99	342	606	117	316	79	1213	555	68	291	27
Future Volume (vph)	33	99	342	606	117	316	79	1213	555	68	291	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	6.9	6.9	6.5	6.4	6.4	4.0	5.9	5.9	4.7	6.5	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.91	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.94	1.00	1.00	0.94	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1550	3433	1863	1492	1770	3539	1487	3433	5010	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.54	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1550	3433	1863	1492	1000	3539	1487	3433	5010	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	108	372	659	127	343	86	1318	603	74	316	29
RTOR Reduction (vph)	0	0	245	0	0	250	0	0	138	0	4	0
Lane Group Flow (vph)	36	108	127	659	127	93	86	1318	465	74	341	0
Confl. Peds. (#/hr)			2			20			22			2
Confl. Bikes (#/hr)			3			3			6			
Turn Type	Prot	NA	Perm	Prot	NA	Perm	custom	NA	Perm	Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases			8			4	13 15		2		13 15	
Actuated Green, G (s)	7.9	31.2	31.2	40.6	65.7	65.7	65.6	79.6	79.6	8.0	133.3	
Effective Green, g (s)	7.9	31.2	31.2	40.6	65.7	65.7	65.6	79.6	79.6	8.0	133.3	
Actuated g/C Ratio	0.03	0.13	0.13	0.17	0.27	0.27	0.27	0.33	0.33	0.03	0.55	
Clearance Time (s)	5.2	6.9	6.9	6.5	6.4	6.4	4.0	5.9	5.9	4.7	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.5	4.0	4.0	3.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)	57	238	198	572	502	402	301	1156	486	112	2742	
v/s Ratio Prot	0.02	0.06		c0.19	0.07		0.01	c0.37		c0.02	0.04	
v/s Ratio Perm			c0.08			0.06	c0.07		0.31		0.03	
v/c Ratio	0.63	0.45	0.64	1.15	0.25	0.23	0.29	1.14	0.96	0.66	0.12	
Uniform Delay, d1	116.4	98.3	100.8	101.5	69.7	69.2	71.1	82.0	80.3	116.4	26.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	20.6	1.4	6.9	87.2	0.4	0.4	0.5	73.9	30.8	13.7	0.1	
Delay (s)	137.0	99.6	107.8	188.6	70.0	69.6	71.6	155.8	111.1	130.1	26.8	
Level of Service	F	F	F	F	E	E	E	F	F	F	C	
Approach Delay (s)		108.1			139.1			138.8			45.1	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	125.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	243.5	Sum of lost time (s)	28.5
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	917	2	4	1362	16	1	0	0	44	0	392
Future Volume (vph)	135	917	2	4	1362	16	1	0	0	44	0	392
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.0	6.0	5.0	6.0	6.0	5.0			5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00			1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00			1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95			0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1548	1770			1770	1556	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.14			0.76	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1548	268			1410	1556	
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.90	0.25	0.25	0.25	0.77	0.77	0.77
Adj. Flow (vph)	144	976	2	4	1513	18	4	0	0	57	0	509
RTOR Reduction (vph)	0	0	1	0	0	9	0	0	0	0	175	0
Lane Group Flow (vph)	144	976	1	4	1513	9	4	0	0	57	334	0
Confl. Peds. (#/hr)						1			15			4
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm			Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases			6			2	4			8		
Actuated Green, G (s)	13.2	74.9	74.9	1.3	62.5	62.5	27.8			27.8	27.8	
Effective Green, g (s)	13.2	74.9	74.9	1.3	62.5	62.5	27.8			27.8	27.8	
Actuated g/C Ratio	0.11	0.62	0.62	0.01	0.52	0.52	0.23			0.23	0.23	
Clearance Time (s)	5.5	6.0	6.0	5.0	6.0	6.0	5.0			5.0	5.0	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	194	2208	988	19	1843	806	62			326	360	
v/s Ratio Prot	c0.08	0.28		0.00	c0.43						c0.21	
v/s Ratio Perm			0.00			0.01	0.01			0.04		
v/c Ratio	0.74	0.44	0.00	0.21	0.82	0.01	0.06			0.17	0.93	
Uniform Delay, d1	51.8	11.7	8.5	58.8	24.1	13.9	36.0			36.9	45.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	14.2	0.6	0.0	5.5	4.3	0.0	0.4			0.3	29.3	
Delay (s)	65.9	12.3	8.5	64.3	28.3	13.9	36.4			37.2	74.4	
Level of Service	E	B	A	E	C	B	D			D	E	
Approach Delay (s)		19.2			28.2			36.4			70.7	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	270	98	276	2823	122	84	245	37	47	376	778
Future Volume (vph)	237	270	98	276	2823	122	84	245	37	47	376	778
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	5.0	5.0	6.0	5.0	5.0	4.5	6.0		4.5	5.0	5.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1562	3433	5085	1583	3433	3464		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1562	3433	5085	1583	3433	3464		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	258	293	107	300	3068	133	91	266	40	51	409	846
RTOR Reduction (vph)	0	0	72	0	0	64	0	8	0	0	0	127
Lane Group Flow (vph)	258	293	35	300	3068	69	91	298	0	51	409	719
Confl. Peds. (#/hr)			1						1			
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2						8
Actuated Green, G (s)	12.0	47.5	47.5	19.0	54.5	54.5	6.0	53.1		4.8	52.9	52.9
Effective Green, g (s)	12.0	47.5	47.5	19.0	54.5	54.5	6.0	53.1		4.8	52.9	52.9
Actuated g/C Ratio	0.08	0.33	0.33	0.13	0.37	0.37	0.04	0.36		0.03	0.36	0.36
Clearance Time (s)	6.0	5.0	5.0	6.0	5.0	5.0	4.5	6.0		4.5	5.0	5.0
Vehicle Extension (s)	4.5	5.0	5.0	4.0	5.0	5.0	3.5	2.5		3.5	2.5	2.5
Lane Grp Cap (vph)	145	1655	508	447	1899	591	141	1260		112	675	573
v/s Ratio Prot	c0.15	0.06		0.09	c0.60		c0.03	0.09		0.01	0.22	
v/s Ratio Perm			0.02			0.04						c0.45
v/c Ratio	1.78	0.18	0.07	0.67	1.62	0.12	0.65	0.24		0.46	0.61	1.26
Uniform Delay, d1	67.0	35.2	33.9	60.5	45.7	29.9	68.9	32.3		69.3	38.0	46.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	377.1	0.2	0.3	4.3	279.5	0.4	10.1	0.1		3.4	1.3	128.6
Delay (s)	444.0	35.4	34.2	64.8	325.2	30.3	79.0	32.4		72.7	39.3	175.1
Level of Service	F	D	C	E	F	C	E	C		E	D	F
Approach Delay (s)		195.4			291.7			43.1			128.6	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	227.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.44		
Actuated Cycle Length (s)	145.9	Sum of lost time (s)	21.5
Intersection Capacity Utilization	119.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	241	46	294	2229	41	956	86	120	31	37	343
Future Volume (vph)	45	241	46	294	2229	41	956	86	120	31	37	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	4.0	4.5	5.5	5.5	5.0	5.0	5.0	4.6	4.6	4.6
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1548	1770	5085	1524	1681	1699	1560	1681	1763	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1548	1770	5085	1524	1681	1699	1560	1681	1763	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.91	0.91	0.91	0.63	0.63	0.63
Adj. Flow (vph)	49	262	50	300	2274	42	1051	95	132	49	59	544
RTOR Reduction (vph)	0	0	0	0	0	27	0	0	90	0	0	105
Lane Group Flow (vph)	49	262	50	300	2274	15	568	578	42	44	64	439
Confl. Peds. (#/hr)			5			2			3			
Confl. Bikes (#/hr)						12						
Turn Type	Prot	NA	Free	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			Free			6			8			7
Actuated Green, G (s)	4.8	15.0	150.0	41.9	52.1	52.1	48.0	48.0	48.0	25.5	25.5	25.5
Effective Green, g (s)	4.8	15.0	150.0	41.9	52.1	52.1	48.0	48.0	48.0	25.5	25.5	25.5
Actuated g/C Ratio	0.03	0.10	1.00	0.28	0.35	0.35	0.32	0.32	0.32	0.17	0.17	0.17
Clearance Time (s)	4.5	5.5		4.5	5.5	5.5	5.0	5.0	5.0	4.6	4.6	4.6
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	2.5	2.5	2.5	4.5	4.5	4.5
Lane Grp Cap (vph)	56	508	1548	494	1766	529	537	543	499	285	299	269
v/s Ratio Prot	0.03	0.05		c0.17	c0.45		0.34	c0.34		0.03	0.04	
v/s Ratio Perm			0.03			0.01			0.03			c0.28
v/c Ratio	0.88	0.52	0.03	0.61	1.29	0.03	1.06	1.06	0.08	0.15	0.21	1.63
Uniform Delay, d1	72.3	64.1	0.0	46.9	49.0	32.3	51.0	51.0	35.6	53.1	53.6	62.2
Progression Factor	1.00	1.00	1.00	0.63	0.63	0.22	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	75.9	2.3	0.0	0.2	129.9	0.0	55.0	56.9	0.1	0.4	0.6	300.1
Delay (s)	148.2	66.4	0.0	29.5	160.7	7.2	106.0	107.9	35.7	53.5	54.2	362.3
Level of Service	F	E	A	C	F	A	F	F	D	D	D	F
Approach Delay (s)		68.3			143.2			99.6			311.2	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	148.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	106.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	188	80	36	1940	112	328	349	74	72	451	478
Future Volume (vph)	68	188	80	36	1940	112	328	349	74	72	451	478
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1560	1770	5085	1546	1770	3539	1555	1770	3539	1554
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1560	1770	5085	1546	1770	3539	1555	1770	3539	1554
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	204	87	39	2109	122	357	379	80	78	490	520
RTOR Reduction (vph)	0	0	56	0	0	75	0	0	49	0	0	73
Lane Group Flow (vph)	74	204	31	39	2109	47	357	379	31	78	490	447
Confl. Peds. (#/hr)			1			7			6			2
Confl. Bikes (#/hr)			2			6			1			7
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	6.7	53.8	53.8	6.5	53.6	53.6	20.0	58.1	58.1	11.6	49.7	49.7
Effective Green, g (s)	6.7	53.8	53.8	6.5	53.6	53.6	20.0	58.1	58.1	11.6	49.7	49.7
Actuated g/C Ratio	0.04	0.36	0.36	0.04	0.36	0.36	0.13	0.39	0.39	0.08	0.33	0.33
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	5.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0
Lane Grp Cap (vph)	153	1823	559	76	1817	552	236	1370	602	136	1172	514
v/s Ratio Prot	0.02	0.04		c0.02	c0.41		c0.20	0.11		0.04	0.14	
v/s Ratio Perm			0.02			0.03			0.02			c0.29
v/c Ratio	0.48	0.11	0.06	0.51	1.16	0.09	1.51	0.28	0.05	0.57	0.42	0.87
Uniform Delay, d1	70.0	32.1	31.5	70.2	48.2	32.0	65.0	31.5	28.7	66.8	38.9	47.1
Progression Factor	0.98	1.40	9.61	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.9	0.1	0.1	7.6	78.9	0.3	251.4	0.2	0.0	6.8	0.7	16.3
Delay (s)	73.4	45.2	302.6	77.8	127.1	32.3	316.4	31.7	28.8	73.7	39.6	63.4
Level of Service	E	D	F	E	F	C	F	C	C	E	D	E
Approach Delay (s)		112.3			121.1			155.9			53.4	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	110.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	239	6	57	1867	128	9	70	46	138	181	149
Future Volume (vph)	57	239	6	57	1867	128	9	70	46	138	181	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.5	5.0	5.0	7.5	5.0		7.5	5.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	1.00	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1520	1770	5085	1583	1770	3295		1770	3242	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1520	1770	5085	1583	1770	3295		1770	3242	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.76	0.76	0.76	0.87	0.87	0.87
Adj. Flow (vph)	62	260	7	62	2029	139	12	92	61	159	208	171
RTOR Reduction (vph)	0	0	4	0	0	65	0	52	0	0	109	0
Lane Group Flow (vph)	62	260	3	62	2029	74	12	101	0	159	270	0
Confl. Peds. (#/hr)			20						6			16
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	8.4	58.8	58.8	8.4	58.8	58.8	2.0	17.3		13.5	28.8	
Effective Green, g (s)	8.4	58.8	58.8	8.4	58.8	58.8	2.0	17.3		13.5	28.8	
Actuated g/C Ratio	0.07	0.49	0.49	0.07	0.49	0.49	0.02	0.14		0.11	0.24	
Clearance Time (s)	4.5	5.0	5.0	4.5	5.0	5.0	7.5	5.0		7.5	5.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	4.0	4.5		6.0	5.0	
Lane Grp Cap (vph)	123	2491	744	123	2491	775	29	475		199	778	
v/s Ratio Prot	c0.04	0.05		0.04	c0.40		0.01	0.03		c0.09	c0.08	
v/s Ratio Perm			0.00			0.05						
v/c Ratio	0.50	0.10	0.00	0.50	0.81	0.10	0.41	0.21		0.80	0.35	
Uniform Delay, d1	53.8	16.4	15.6	53.8	26.0	16.4	58.4	45.3		51.9	37.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.2	0.1	0.0	3.2	3.1	0.2	12.5	0.4		23.4	0.6	
Delay (s)	57.0	16.5	15.7	57.0	29.0	16.6	71.0	45.7		75.3	38.4	
Level of Service	E	B	B	E	C	B	E	D		E	D	
Approach Delay (s)		24.1			29.0			47.6			49.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	340	1793	135	149	1220	420	66	280	124	60	60	60
Future Volume (vph)	340	1793	135	149	1220	420	66	280	124	60	60	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	5.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.95	1.00	1.00	0.99		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	1770	3539	1515	3433	3539	1497	1681	1768	1560		1817	1540
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	1770	3539	1515	3433	3539	1497	1681	1768	1560		1817	1540
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	1949	147	152	1245	429	72	304	135	65	65	65
RTOR Reduction (vph)	0	0	56	0	0	95	0	0	106	0	0	57
Lane Group Flow (vph)	370	1949	91	152	1245	334	65	311	29	0	130	8
Confl. Peds. (#/hr)			12			8			2			12
Confl. Bikes (#/hr)			29			16			1			3
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	13.7	44.4	44.4	5.6	36.3	36.3	23.2	23.2	23.2		13.5	13.5
Effective Green, g (s)	13.7	44.4	44.4	5.6	36.3	36.3	23.2	23.2	23.2		13.5	13.5
Actuated g/C Ratio	0.13	0.41	0.41	0.05	0.33	0.33	0.21	0.21	0.21		0.12	0.12
Clearance Time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.5	1.5	1.5		3.0	3.0
Lane Grp Cap (vph)	222	1438	615	176	1176	497	357	375	331		224	190
v/s Ratio Prot	c0.21	c0.55		0.04	0.35		0.04	c0.18			c0.07	
v/s Ratio Perm			0.06			0.22			0.02			0.01
v/c Ratio	1.67	1.36	0.15	0.86	1.06	0.67	0.18	0.83	0.09		0.58	0.04
Uniform Delay, d1	47.8	32.4	20.5	51.4	36.5	31.3	35.2	41.1	34.5		45.2	42.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	319.1	164.5	0.5	32.8	43.3	7.1	0.1	13.4	0.0		3.8	0.1
Delay (s)	366.8	196.9	21.0	84.2	79.7	38.4	35.3	54.5	34.5		49.0	42.2
Level of Service	F	F	C	F	E	D	D	D	C		D	D
Approach Delay (s)		211.9			70.4			46.8			46.7	
Approach LOS		F			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	136.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	109.2	Sum of lost time (s)	22.5
Intersection Capacity Utilization	103.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	137	210	659	173	100	325	497	1240	573	1804	68
Future Volume (vph)	33	137	210	659	173	100	325	497	1240	573	1804	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	6.9	6.9	6.5	6.4	6.4	4.0	5.9	5.9	4.7	6.5	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.91	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1541	3433	1863	1442	1770	3539	1497	3433	5047	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.09	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1541	3433	1863	1442	170	3539	1497	3433	5047	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Adj. Flow (vph)	36	149	228	716	188	109	346	529	1319	623	1961	74
RTOR Reduction (vph)	0	0	109	0	0	83	0	0	500	0	2	0
Lane Group Flow (vph)	36	149	119	716	188	26	346	529	819	623	2033	0
Confl. Peds. (#/hr)			4			35			22			11
Confl. Bikes (#/hr)			4			1			1			2
Turn Type	Prot	NA	Perm	Prot	NA	Perm	custom	NA	Perm	Prot	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases			8			4	13 15		2		13 15	
Actuated Green, G (s)	9.0	32.2	32.2	33.5	58.5	58.5	86.6	64.2	64.2	30.3	119.2	
Effective Green, g (s)	9.0	32.2	32.2	33.5	58.5	58.5	86.6	64.2	64.2	30.3	119.2	
Actuated g/C Ratio	0.04	0.13	0.13	0.14	0.24	0.24	0.35	0.26	0.26	0.12	0.49	
Clearance Time (s)	5.2	6.9	6.9	6.5	6.4	6.4	4.0	5.9	5.9	4.7	6.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.5	4.0	4.0	3.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)	65	245	203	470	446	345	263	930	393	425	2462	
v/s Ratio Prot	0.02	c0.08		c0.21	0.10		0.17	0.15		c0.18	0.21	
v/s Ratio Perm			0.08			0.02	c0.30		c0.55		0.19	
v/c Ratio	0.55	0.61	0.59	1.52	0.42	0.08	1.32	0.57	2.08	1.47	0.83	
Uniform Delay, d1	115.7	100.1	99.8	105.4	78.6	72.0	80.2	78.1	90.1	107.0	53.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.8	4.2	4.3	246.2	0.9	0.1	166.4	1.7	496.6	222.2	2.8	
Delay (s)	125.5	104.3	104.1	351.6	79.5	72.1	246.6	79.7	586.7	329.2	56.5	
Level of Service	F	F	F	F	E	E	F	E	F	F	E	
Approach Delay (s)		106.1			271.0			410.8			120.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	245.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.49		
Actuated Cycle Length (s)	244.3	Sum of lost time (s)	28.5
Intersection Capacity Utilization	120.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	381	1697	5	0	1712	37	3	2	0	31	0	135
Future Volume (vph)	381	1697	5	0	1712	37	3	2	0	31	0	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.0	6.0		6.0	6.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00	1.00	1.00		1.00	0.88	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1593	3185	1392		3185	1425	1593	1676		1593	1257	
Flt Permitted	0.95	1.00	1.00		1.00	1.00	0.80	1.00		0.80	1.00	
Satd. Flow (perm)	1593	3185	1392		3185	1425	1341	1676		1341	1257	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.75	0.75	0.75	0.84	0.84	0.84
Adj. Flow (vph)	410	1825	5	0	1841	40	4	3	0	37	0	161
RTOR Reduction (vph)	0	0	1	0	0	17	0	0	0	0	154	0
Lane Group Flow (vph)	410	1825	4	0	1841	23	4	3	0	37	7	0
Confl. Peds. (#/hr)			1						11			15
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases			6			2	4			8		
Actuated Green, G (s)	30.5	104.0	104.0		68.0	68.0	5.0	5.0		5.0	5.0	
Effective Green, g (s)	30.5	104.0	104.0		68.0	68.0	5.0	5.0		5.0	5.0	
Actuated g/C Ratio	0.25	0.87	0.87		0.57	0.57	0.04	0.04		0.04	0.04	
Clearance Time (s)	5.5	6.0	6.0		6.0	6.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	4.0	4.0		4.0	4.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	404	2760	1206		1804	807	55	69		55	52	
v/s Ratio Prot	c0.26	0.57			c0.58			0.00			0.01	
v/s Ratio Perm			0.00			0.02	0.00			c0.03		
v/c Ratio	1.01	0.66	0.00		1.02	0.03	0.07	0.04		0.67	0.13	
Uniform Delay, d1	44.8	2.5	1.1		26.0	11.4	55.3	55.2		56.7	55.4	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	48.6	1.3	0.0		26.5	0.1	0.6	0.3		27.8	1.1	
Delay (s)	93.3	3.8	1.1		52.5	11.5	55.8	55.5		84.5	56.5	
Level of Service	F	A	A		D	B	E	E		F	E	
Approach Delay (s)		20.1			51.6			55.7			61.8	
Approach LOS		C			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	35.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	703	2189	203	109	473	49	152	323	253	194	552	524
Future Volume (vph)	703	2189	203	109	473	49	152	323	253	194	552	524
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	5.0	5.0	6.0	5.0	5.0	4.5	6.0		4.5	5.0	5.0
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	3433	5085	1583	3433	3306		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	3433	5085	1583	3433	3306		3433	1863	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	732	2280	211	114	493	51	165	351	275	211	600	570
RTOR Reduction (vph)	0	0	77	0	0	39	0	61	0	0	0	253
Lane Group Flow (vph)	732	2280	134	114	493	12	165	565	0	211	600	317
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2						8
Actuated Green, G (s)	34.0	64.0	64.0	6.0	36.0	36.0	8.2	49.4		7.5	49.7	49.7
Effective Green, g (s)	34.0	64.0	64.0	6.0	36.0	36.0	8.2	49.4		7.5	49.7	49.7
Actuated g/C Ratio	0.23	0.43	0.43	0.04	0.24	0.24	0.06	0.33		0.05	0.33	0.33
Clearance Time (s)	6.0	5.0	5.0	6.0	5.0	5.0	4.5	6.0		4.5	5.0	5.0
Vehicle Extension (s)	4.5	5.0	5.0	4.0	5.0	5.0	3.5	2.5		3.5	2.5	2.5
Lane Grp Cap (vph)	405	2192	682	138	1233	384	189	1100		173	623	530
v/s Ratio Prot	c0.41	c0.45		c0.03	0.10		c0.05	0.17		0.06	c0.32	
v/s Ratio Perm			0.08			0.01						0.20
v/c Ratio	1.81	1.04	0.20	0.83	0.40	0.03	0.87	0.51		1.22	0.96	0.60
Uniform Delay, d1	57.2	42.2	26.2	70.7	47.1	42.9	69.6	39.8		70.5	48.4	41.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	373.0	30.6	0.3	32.7	0.4	0.1	33.5	0.3		139.7	26.9	1.5
Delay (s)	430.2	72.8	26.5	103.4	47.6	43.0	103.1	40.1		210.2	75.4	42.5
Level of Service	F	E	C	F	D	D	F	D		F	E	D
Approach Delay (s)		151.0			56.9			53.3			82.4	
Approach LOS		F			E			D			F	

Intersection Summary			
HCM 2000 Control Delay	112.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	148.4	Sum of lost time (s)	21.5
Intersection Capacity Utilization	99.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	2721	525	198	415	34	153	128	429	59	37	91
Future Volume (vph)	177	2721	525	198	415	34	153	128	429	59	37	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	4.0	4.5	5.5	4.6	5.0	5.0	4.5	4.6	4.6	4.6
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1770	5085	1544	1770	5085	1537	1681	1760	1537	1681	1748	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1770	5085	1544	1770	5085	1537	1681	1760	1537	1681	1748	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	1.00	1.00	1.00	0.79	0.79	0.79
Adj. Flow (vph)	182	2805	541	215	451	37	153	128	429	75	47	115
RTOR Reduction (vph)	0	0	0	0	0	23	0	0	76	0	0	105
Lane Group Flow (vph)	182	2805	541	215	451	14	138	143	353	60	62	10
Confl. Peds. (#/hr)						6			36			
Confl. Bikes (#/hr)			13			4						
Turn Type	Prot	NA	Free	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	Perm
Protected Phases	5	2		1	6	7	8	8	1	7	7	
Permitted Phases			Free			6			8			7
Actuated Green, G (s)	56.9	90.1	150.0	9.5	42.7	56.2	17.3	17.3	26.8	13.5	13.5	13.5
Effective Green, g (s)	56.9	90.1	150.0	9.5	42.7	56.2	17.3	17.3	26.8	13.5	13.5	13.5
Actuated g/C Ratio	0.38	0.60	1.00	0.06	0.28	0.37	0.12	0.12	0.18	0.09	0.09	0.09
Clearance Time (s)	4.5	5.5		4.5	5.5	4.6	5.0	5.0	4.5	4.6	4.6	4.6
Vehicle Extension (s)	3.0	6.0		3.0	6.0	4.5	2.5	2.5	3.0	4.5	4.5	4.5
Lane Grp Cap (vph)	671	3054	1544	112	1447	622	193	202	320	151	157	142
v/s Ratio Prot	0.10	c0.55		c0.12	0.09	0.00	0.08	0.08	c0.07	0.04	0.04	
v/s Ratio Perm			c0.35			0.01			0.16			0.01
v/c Ratio	0.27	0.92	0.35	1.92	0.31	0.02	0.72	0.71	1.10	0.40	0.39	0.07
Uniform Delay, d1	32.2	26.7	0.0	70.2	42.1	29.6	64.0	63.9	61.6	64.4	64.4	62.5
Progression Factor	1.00	1.00	1.00	1.25	0.34	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	5.7	0.6	442.1	0.3	0.0	11.1	10.0	81.4	3.0	2.8	0.4
Delay (s)	32.4	32.4	0.6	530.1	14.6	29.6	75.1	73.9	143.0	67.4	67.2	62.9
Level of Service	C	C	A	F	B	C	E	E	F	E	E	E
Approach Delay (s)		27.5			173.1			115.9			65.2	
Approach LOS		C			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	61.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	108.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	604	1934	576	72	620	162	84	469	80	206	461	119
Future Volume (vph)	604	1934	576	72	620	162	84	469	80	206	461	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1544	1770	3539	1560	1770	3539	1557
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1544	1770	3539	1560	1770	3539	1557
Peak-hour factor, PHF	0.97	0.97	0.97	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	623	1994	594	77	667	174	91	510	87	224	501	129
RTOR Reduction (vph)	0	0	98	0	0	129	0	0	57	0	0	81
Lane Group Flow (vph)	623	1994	496	77	667	45	91	510	30	224	501	48
Confl. Peds. (#/hr)						11			3			6
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	23.0	56.0	56.0	6.0	39.0	39.0	12.6	52.0	52.0	16.0	55.4	55.4
Effective Green, g (s)	23.0	56.0	56.0	6.0	39.0	39.0	12.6	52.0	52.0	16.0	55.4	55.4
Actuated g/C Ratio	0.15	0.37	0.37	0.04	0.26	0.26	0.08	0.35	0.35	0.11	0.37	0.37
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	5.0	6.0	6.0	4.0	6.0	6.0	4.0	4.0	4.0	4.0	6.0	6.0
Lane Grp Cap (vph)	526	1898	590	70	1322	401	148	1226	540	188	1307	575
v/s Ratio Prot	c0.18	c0.39		0.04	0.13		0.05	c0.14		c0.13	c0.14	
v/s Ratio Perm			0.31			0.03			0.02			0.03
v/c Ratio	1.18	1.05	0.84	1.10	0.50	0.11	0.61	0.42	0.06	1.19	0.38	0.08
Uniform Delay, d1	63.5	47.0	42.9	72.0	47.3	42.3	66.4	37.4	32.6	67.0	34.8	30.8
Progression Factor	0.84	0.83	0.74	0.85	1.61	6.42	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	89.8	28.1	5.1	134.5	0.8	0.3	8.4	0.3	0.1	126.7	0.9	0.3
Delay (s)	143.2	67.1	36.8	195.4	77.0	271.8	74.8	37.7	32.7	193.7	35.6	31.1
Level of Service	F	E	D	F	E	F	E	D	C	F	D	C
Approach Delay (s)		76.2			123.8			42.0			76.4	
Approach LOS		E			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	79.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	392	1867	40	95	553	229	12	247	91	265	213	199
Future Volume (vph)	392	1867	40	95	553	229	12	247	91	265	213	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0	5.0	4.5	5.0	5.0	7.5	5.0		7.5	5.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.99	1.00	0.99		1.00	0.96	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1475	1770	5085	1562	1770	3372		1770	3160	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1475	1770	5085	1562	1770	3372		1770	3160	
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93
Adj. Flow (vph)	408	1945	42	103	601	249	14	281	103	285	229	214
RTOR Reduction (vph)	0	0	24	0	0	166	0	24	0	0	105	0
Lane Group Flow (vph)	408	1945	18	103	601	83	14	360	0	285	338	0
Confl. Peds. (#/hr)			32			1			6			31
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	38.6	64.5	64.5	11.8	37.7	37.7	4.0	22.9		28.8	47.7	
Effective Green, g (s)	38.6	64.5	64.5	11.8	37.7	37.7	4.0	22.9		28.8	47.7	
Actuated g/C Ratio	0.26	0.43	0.43	0.08	0.25	0.25	0.03	0.15		0.19	0.32	
Clearance Time (s)	4.5	5.0	5.0	4.5	5.0	5.0	7.5	5.0		7.5	5.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	4.0	4.5		6.0	5.0	
Lane Grp Cap (vph)	455	2186	634	139	1278	392	47	514		339	1004	
v/s Ratio Prot	c0.23	c0.38		0.06	0.12		0.01	c0.11		c0.16	0.11	
v/s Ratio Perm			0.01			0.05						
v/c Ratio	0.90	0.89	0.03	0.74	0.47	0.21	0.30	0.70		0.84	0.34	
Uniform Delay, d1	53.8	39.5	24.7	67.6	47.7	44.4	71.6	60.3		58.4	39.1	
Progression Factor	1.43	0.25	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.1	1.6	0.0	19.0	0.8	0.8	4.8	4.9		19.2	0.4	
Delay (s)	83.0	11.3	24.7	86.6	48.4	45.2	76.4	65.2		77.6	39.5	
Level of Service	F	B	C	F	D	D	E	E		E	D	
Approach Delay (s)		23.8			51.7			65.6			54.4	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	38.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	1260	331	657	972	130	70	80	507	320	300	660
Future Volume (vph)	230	1260	331	657	972	130	70	80	507	320	300	660
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5	5.0	5.5	6.5	5.5	5.0	5.0	5.5		5.5	5.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.99		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1770	3539	1547	3433	3539	1541	1681	1762	1572		1816	1551
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00
Satd. Flow (perm)	1770	3539	1547	3433	3539	1541	1681	1762	1572		1816	1551
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	1370	360	714	1057	141	76	87	551	348	326	717
RTOR Reduction (vph)	0	0	117	0	0	27	0	0	103	0	0	244
Lane Group Flow (vph)	250	1370	243	714	1057	114	68	95	448	0	674	473
Confl. Peds. (#/hr)			13			16			3			14
Confl. Bikes (#/hr)			11			27						
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6	7	5	2	8	7	7	5	8	8	1
Permitted Phases			6			2			7			8
Actuated Green, G (s)	7.5	31.5	41.8	10.5	34.5	76.0	10.3	10.3	20.8		41.5	49.0
Effective Green, g (s)	7.5	31.5	41.8	10.5	34.5	76.0	10.3	10.3	20.8		41.5	49.0
Actuated g/C Ratio	0.06	0.27	0.36	0.09	0.30	0.65	0.09	0.09	0.18		0.36	0.42
Clearance Time (s)	5.5	6.5	5.0	5.5	6.5	5.5	5.0	5.0	5.5		5.5	5.5
Vehicle Extension (s)	3.0	3.0	1.5	3.0	3.0	3.0	1.5	1.5	3.0		3.0	3.0
Lane Grp Cap (vph)	114	958	556	309	1049	1007	148	156	281		648	726
v/s Ratio Prot	0.14	c0.39	0.04	c0.21	c0.30	0.04	0.04	0.05	c0.14		c0.37	0.04
v/s Ratio Perm			0.12			0.03			0.14			0.26
v/c Ratio	2.19	1.43	0.44	2.31	1.01	0.11	0.46	0.61	1.59		1.04	0.65
Uniform Delay, d1	54.4	42.4	28.3	52.9	40.9	7.5	50.4	51.1	47.8		37.4	26.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	564.4	199.6	0.2	599.9	29.7	0.1	0.8	4.6	282.9		46.2	2.1
Delay (s)	618.8	242.0	28.5	652.8	70.6	7.6	51.2	55.6	330.7		83.6	28.9
Level of Service	F	F	C	F	E	A	D	E	F		F	C
Approach Delay (s)		250.8			283.3			267.5			55.4	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	217.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	116.3	Sum of lost time (s)	22.5
Intersection Capacity Utilization	114.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	99	342	606	117	316	79	1213	555	68	291	27
Future Volume (vph)	33	99	342	606	117	316	79	1213	555	68	291	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9	4.0	6.4	6.4	6.4	4.0	5.9	6.4	4.7	6.5	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.91	
Frpb, ped/bikes		1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1840	1575	1681	1711	1583	1770	3539	1521	3433	5010	
Flt Permitted		0.99	1.00	0.95	0.97	1.00	0.54	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1840	1575	1681	1711	1583	1000	3539	1521	3433	5010	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	108	372	659	127	343	86	1318	603	74	316	29
RTOR Reduction (vph)	0	0	143	0	0	0	0	0	131	0	6	0
Lane Group Flow (vph)	0	144	229	389	397	343	86	1318	472	74	339	0
Confl. Peds. (#/hr)			2			20			22			2
Confl. Bikes (#/hr)			3			3			6			
Turn Type	Split	NA	pm+ov	Split	NA	Prot	custom	NA	pm+ov	Prot	NA	
Protected Phases	8	8	5	4	4	4	5	2	4	1	6	
Permitted Phases			8				13 15		2		13 15	
Actuated Green, G (s)		31.1	103.1	50.6	50.6	50.6	127.5	80.6	131.2	8.0	72.2	
Effective Green, g (s)		31.1	103.1	50.6	50.6	50.6	127.5	80.6	131.2	8.0	72.2	
Actuated g/C Ratio		0.12	0.41	0.20	0.20	0.20	0.50	0.32	0.52	0.03	0.28	
Clearance Time (s)		6.9	4.0	6.4	6.4	6.4	4.0	5.9	6.4	4.7	6.5	
Vehicle Extension (s)		3.0	3.0	4.0	4.0	4.0	3.0	6.0	4.0	3.0	6.0	
Lane Grp Cap (vph)		225	638	334	340	315	719	1122	785	108	1422	
v/s Ratio Prot		c0.08	0.10	0.23	c0.23	0.22	0.03	c0.37	0.12	c0.02	c0.02	
v/s Ratio Perm			0.04				0.03		0.19		0.05	
v/c Ratio		0.64	0.36	1.16	1.17	1.09	0.12	1.17	0.60	0.69	0.24	
Uniform Delay, d1		106.2	52.6	101.8	101.8	101.8	34.5	86.8	43.2	121.9	69.9	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		6.1	0.3	101.8	102.6	76.6	0.1	88.2	1.5	16.5	0.2	
Delay (s)		112.3	52.9	203.6	204.4	178.4	34.6	175.0	44.7	138.4	70.1	
Level of Service		F	D	F	F	F	C	F	D	F	E	
Approach Delay (s)		69.5			196.2			129.8			82.2	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	135.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	254.2	Sum of lost time (s)	28.4
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	917	2	4	1362	16	1	0	0	44	0	392
Future Volume (vph)	135	917	2	4	1362	16	1	0	0	44	0	392
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.0	6.0	5.0	6.0	6.0	5.0			5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00			1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00			1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00			1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95			0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1548	1770			1770	1557	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.13			0.76	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1548	248			1410	1557	
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.25	0.25	0.25	0.77	0.77	0.77
Adj. Flow (vph)	144	976	2	4	1480	17	4	0	0	57	0	509
RTOR Reduction (vph)	0	0	1	0	0	8	0	0	0	0	0	0
Lane Group Flow (vph)	144	976	1	4	1480	9	4	0	0	57	509	0
Confl. Peds. (#/hr)						1			15			4
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm			Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases			6			2	4			8		
Actuated Green, G (s)	13.2	72.7	72.7	1.3	60.3	60.3	30.0			30.0	30.0	
Effective Green, g (s)	13.2	72.7	72.7	1.3	60.3	60.3	30.0			30.0	30.0	
Actuated g/C Ratio	0.11	0.61	0.61	0.01	0.50	0.50	0.25			0.25	0.25	
Clearance Time (s)	5.5	6.0	6.0	5.0	6.0	6.0	5.0			5.0	5.0	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0			3.0	3.0	
Lane Grp Cap (vph)	194	2144	959	19	1778	777	62			352	389	
v/s Ratio Prot	c0.08	0.28		0.00	c0.42						c0.33	
v/s Ratio Perm			0.00			0.01	0.02			0.04		
v/c Ratio	0.74	0.46	0.00	0.21	0.83	0.01	0.06			0.16	1.31	
Uniform Delay, d1	51.8	12.9	9.3	58.8	25.5	14.9	34.3			35.2	45.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	14.2	0.7	0.0	5.5	4.7	0.0	0.4			0.2	156.3	
Delay (s)	65.9	13.6	9.3	64.3	30.3	15.0	34.7			35.4	201.3	
Level of Service	E	B	A	E	C	B	C			D	F	
Approach Delay (s)		20.3			30.2			34.7			184.6	
Approach LOS		C			C			C			F	

Intersection Summary			
HCM 2000 Control Delay	54.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	270	98	276	2823	122	84	245	37	47	376	778
Future Volume (vph)	237	270	98	276	2823	122	84	245	37	47	376	778
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	5.0	4.5	6.0	5.0	4.5	4.5	6.0		4.5	5.0	6.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	5085	1583	3433	3464		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	5085	1583	3433	3464		3433	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	258	293	107	300	3068	133	91	266	40	51	409	846
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	56
Lane Group Flow (vph)	258	293	107	300	3068	133	91	306	0	51	409	790
Confl. Peds. (#/hr)			1						1			
Turn Type	Prot	NA	Over	Prot	NA	Over	Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4		3	8	1
Permitted Phases												8
Actuated Green, G (s)	12.1	46.3	7.5	19.1	53.3	7.5	7.5	32.3		7.5	33.3	45.4
Effective Green, g (s)	12.1	46.3	7.5	19.1	53.3	7.5	7.5	32.3		7.5	33.3	45.4
Actuated g/C Ratio	0.10	0.37	0.06	0.15	0.42	0.06	0.06	0.25		0.06	0.26	0.36
Clearance Time (s)	6.0	5.0	4.5	6.0	5.0	4.5	4.5	6.0		4.5	5.0	6.0
Vehicle Extension (s)	4.5	5.0	3.5	4.0	5.0	3.5	3.5	2.5		3.5	2.5	4.5
Lane Grp Cap (vph)	169	1293	93	517	2139	93	203	883		203	489	567
v/s Ratio Prot	c0.15	0.08	0.07	0.09	c0.60	c0.08	0.03	0.09		0.01	0.22	c0.13
v/s Ratio Perm												0.37
v/c Ratio	1.53	0.23	1.15	0.58	1.43	1.43	0.45	0.35		0.25	0.84	1.39
Uniform Delay, d1	57.3	27.8	59.6	50.1	36.7	59.6	57.6	38.6		56.9	44.1	40.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	264.6	0.4	139.5	2.0	198.2	244.5	1.9	0.2		0.8	11.6	187.7
Delay (s)	321.9	28.2	199.1	52.0	234.9	304.1	59.5	38.7		57.7	55.7	228.4
Level of Service	F	C	F	D	F	F	E	D		E	E	F
Approach Delay (s)		171.2			221.8			43.5			167.6	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	192.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.44		
Actuated Cycle Length (s)	126.7	Sum of lost time (s)	21.5
Intersection Capacity Utilization	120.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	241	46	294	2229	41	956	86	120	31	37	343
Future Volume (vph)	45	241	46	294	2229	41	956	86	120	31	37	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.5	4.5	5.5	4.6	5.0	5.0	5.0	4.6	4.6	4.5
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1681	1699	1560	1681	1763	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1681	1699	1560	1681	1763	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.91	0.91	0.91	0.63	0.63	0.63
Adj. Flow (vph)	49	262	50	300	2274	42	1051	95	132	49	59	544
RTOR Reduction (vph)	0	0	29	0	0	0	0	0	90	0	0	0
Lane Group Flow (vph)	49	262	21	300	2274	42	568	578	42	44	64	544
Confl. Peds. (#/hr)			5			2			3			
Confl. Bikes (#/hr)						12						
Turn Type	Prot	NA	pt+ov	Prot	NA	Over	Split	NA	Perm	Split	NA	pm+ov
Protected Phases	5	2	2 8	1	6	7	8	8		7	7	5
Permitted Phases									8			7
Actuated Green, G (s)	25.5	15.9	63.9	60.5	50.9	6.0	48.0	48.0	48.0	6.0	6.0	31.5
Effective Green, g (s)	25.5	15.9	63.9	60.5	50.9	6.0	48.0	48.0	48.0	6.0	6.0	31.5
Actuated g/C Ratio	0.17	0.11	0.43	0.40	0.34	0.04	0.32	0.32	0.32	0.04	0.04	0.21
Clearance Time (s)	4.5	5.5		4.5	5.5	4.6	5.0	5.0	5.0	4.6	4.6	4.5
Vehicle Extension (s)	3.0	6.0		3.0	6.0	3.0	2.5	2.5	2.5	3.0	3.0	3.0
Lane Grp Cap (vph)	300	539	674	713	1725	63	537	543	499	67	70	332
v/s Ratio Prot	0.03	0.05	0.01	0.17	c0.45	0.03	0.34	c0.34		0.03	0.04	c0.28
v/s Ratio Perm									0.03			0.07
v/c Ratio	0.16	0.49	0.03	0.42	1.32	0.67	1.06	1.06	0.08	0.66	0.91	1.64
Uniform Delay, d1	53.1	63.2	25.0	32.2	49.5	71.0	51.0	51.0	35.6	71.0	71.7	59.2
Progression Factor	1.00	1.00	1.00	0.62	0.53	1.31	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.9	0.1	0.0	143.6	2.4	55.0	56.9	0.1	20.8	77.8	300.6
Delay (s)	53.4	65.1	25.1	20.0	169.7	95.7	106.0	107.9	35.7	91.8	149.6	359.9
Level of Service	D	E	C	C	F	F	F	F	D	F	F	F
Approach Delay (s)		58.0			151.4			99.6			321.2	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	153.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	106.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	188	80	36	1940	112	328	349	74	72	451	478
Future Volume (vph)	68	188	80	36	1940	112	328	349	74	72	451	478
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	4.0	5.0	5.0	4.0	4.0	6.0		4.0	6.0	5.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1571	1770	5085	1553	1770	3436		1770	3539	1556
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1571	1770	5085	1553	1770	3436		1770	3539	1556
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.78	0.78	0.78	0.88	0.88	0.88
Adj. Flow (vph)	74	204	87	39	2109	122	421	447	95	82	512	543
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	74	204	87	39	2109	122	421	542	0	82	513	543
Confl. Peds. (#/hr)			1			7			6			2
Confl. Bikes (#/hr)			2			6			1			7
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	5.0	49.6	90.1	6.4	51.0	62.8	40.5	62.2		11.8	33.5	38.5
Effective Green, g (s)	5.0	49.6	90.1	6.4	51.0	62.8	40.5	62.2		11.8	33.5	38.5
Actuated g/C Ratio	0.03	0.33	0.60	0.04	0.34	0.42	0.27	0.41		0.08	0.22	0.26
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	4.0	6.0		4.0	6.0	5.0
Vehicle Extension (s)	5.0	6.0	4.0	4.0	6.0	4.0	4.0	4.0		4.0	6.0	5.0
Lane Grp Cap (vph)	114	1681	943	75	1728	650	477	1424		139	790	399
v/s Ratio Prot	0.02	0.04	0.02	0.02	c0.41	0.01	c0.24	0.16		0.05	0.14	c0.05
v/s Ratio Perm			0.03			0.06						0.30
v/c Ratio	0.65	0.12	0.09	0.52	1.22	0.19	0.88	0.38		0.59	0.65	1.36
Uniform Delay, d1	71.6	35.0	12.7	70.3	49.5	27.5	52.5	30.5		66.8	52.9	55.8
Progression Factor	0.95	1.77	2.06	1.18	0.58	0.49	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	15.8	0.1	0.1	5.8	103.1	0.1	17.7	0.2		7.4	3.0	177.9
Delay (s)	83.6	61.9	26.1	89.1	131.9	13.6	70.2	30.7		74.1	55.9	233.7
Level of Service	F	E	C	F	F	B	E	C		E	E	F
Approach Delay (s)		57.8			124.8			48.0			142.1	
Approach LOS		E			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	108.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	239	6	57	1867	128	9	70	46	138	181	149
Future Volume (vph)	57	239	6	57	1867	128	9	70	46	138	181	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	7.5	7.5	5.0	5.0	7.5	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5055		1770	5085	1583	1770	1863	1540	1770	1701	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5055		1770	5085	1583	1770	1863	1540	1770	1701	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.76	0.76	0.76	0.87	0.87	0.87
Adj. Flow (vph)	62	260	7	62	2029	139	12	92	61	159	208	171
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	52	0	20	0
Lane Group Flow (vph)	62	266	0	62	2029	139	12	92	9	159	359	0
Confl. Peds. (#/hr)			20						6			16
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	7.5	77.0		8.6	78.1	98.3	4.0	22.2	22.2	20.2	38.4	
Effective Green, g (s)	7.5	77.0		8.6	78.1	98.3	4.0	22.2	22.2	20.2	38.4	
Actuated g/C Ratio	0.05	0.51		0.06	0.52	0.66	0.03	0.15	0.15	0.13	0.26	
Clearance Time (s)	4.5	5.0		4.5	5.0	7.5	7.5	5.0	5.0	7.5	5.0	
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	4.0	4.5	4.5	6.0	5.0	
Lane Grp Cap (vph)	88	2594		101	2647	1037	47	275	227	238	435	
v/s Ratio Prot	c0.04	0.05		0.04	c0.40	0.02	0.01	c0.05		0.09	c0.21	
v/s Ratio Perm						0.07			0.01			
v/c Ratio	0.70	0.10		0.61	0.77	0.13	0.26	0.33	0.04	0.67	0.83	
Uniform Delay, d1	70.2	18.7		69.1	28.7	9.8	71.5	57.3	54.8	61.7	52.6	
Progression Factor	0.71	0.60		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	22.0	0.0		10.6	2.2	0.2	3.9	1.2	0.1	10.7	13.4	
Delay (s)	72.1	11.3		79.7	30.9	9.9	75.4	58.5	54.9	72.4	66.0	
Level of Service	E	B		E	C	A	E	E	D	E	E	
Approach Delay (s)		22.7			30.9			58.4			67.9	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	158	44	61	439	154	222	701	66	60	276	103
Future Volume (vph)	32	158	44	61	439	154	222	701	66	60	276	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		4.0	5.0		5.0	5.5		5.0	5.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		0.97	0.91	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3423		1770	3401		3433	3493		3433	4878	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3423		1770	3401		3433	3493		3433	4878	
Peak-hour factor, PHF	0.75	0.75	0.75	0.85	0.85	0.85	0.85	0.85	0.85	0.91	0.91	0.91
Adj. Flow (vph)	43	211	59	72	516	181	261	825	78	66	303	113
RTOR Reduction (vph)	0	13	0	0	19	0	0	4	0	0	37	0
Lane Group Flow (vph)	43	257	0	72	678	0	261	899	0	66	379	0
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	6.7	29.8		8.3	30.4		15.2	39.8		5.1	29.7	
Effective Green, g (s)	6.7	29.8		8.3	30.4		15.2	39.8		5.1	29.7	
Actuated g/C Ratio	0.07	0.29		0.08	0.30		0.15	0.39		0.05	0.29	
Clearance Time (s)	5.0	5.0		4.0	5.0		5.0	5.5		5.0	5.5	
Vehicle Extension (s)	3.0	4.0		3.0	3.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	115	995		143	1008		509	1356		170	1413	
v/s Ratio Prot	0.02	0.07		c0.04	c0.20		c0.08	c0.26		0.02	0.08	
v/s Ratio Perm												
v/c Ratio	0.37	0.26		0.50	0.67		0.51	0.66		0.39	0.27	
Uniform Delay, d1	45.9	27.9		45.1	31.7		40.2	25.8		47.2	28.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.2		2.8	1.8		0.9	1.4		1.5	0.1	
Delay (s)	47.9	28.1		47.9	33.5		41.1	27.2		48.7	28.2	
Level of Service	D	C		D	C		D	C		D	C	
Approach Delay (s)		30.8			34.8			30.3			31.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	102.5	Sum of lost time (s)	24.5
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	340	1793	135	149	1220	420	66	280	124	60	60	60
Future Volume (vph)	340	1793	135	149	1220	420	66	280	124	60	60	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	5.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.95	1.00	1.00	0.99		1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	1770	3539	1515	3433	3539	1497	1681	1768	1560		1817	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	1770	3539	1515	3433	3539	1497	1681	1768	1560		1817	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	1949	147	152	1245	429	72	304	135	65	65	65
RTOR Reduction (vph)	0	0	63	0	0	101	0	0	106	0	0	57
Lane Group Flow (vph)	370	1949	84	152	1245	328	65	311	29	0	130	8
Confl. Peds. (#/hr)			12			8			2			12
Confl. Bikes (#/hr)			29			16			1			3
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	1	6		5	2		7	7		8	8	
Permitted Phases			6			2			7			8
Actuated Green, G (s)	13.6	44.4	44.4	5.5	36.3	36.3	23.3	23.3	23.3		13.5	13.5
Effective Green, g (s)	13.6	44.4	44.4	5.5	36.3	36.3	23.3	23.3	23.3		13.5	13.5
Actuated g/C Ratio	0.12	0.41	0.41	0.05	0.33	0.33	0.21	0.21	0.21		0.12	0.12
Clearance Time (s)	5.5	6.5	6.5	5.5	6.5	6.5	5.0	5.0	5.0		5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	1.5	1.5	1.5		3.0	3.0
Lane Grp Cap (vph)	220	1438	615	172	1176	497	358	377	332		224	190
v/s Ratio Prot	c0.21	c0.55		0.04	0.35		0.04	c0.18			c0.07	
v/s Ratio Perm			0.06			0.22			0.02			0.01
v/c Ratio	1.68	1.36	0.14	0.88	1.06	0.66	0.18	0.82	0.09		0.58	0.04
Uniform Delay, d1	47.8	32.4	20.4	51.5	36.5	31.2	35.1	41.0	34.4		45.2	42.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	325.8	164.5	0.5	37.5	43.3	6.7	0.1	13.0	0.0		3.8	0.1
Delay (s)	373.6	196.9	20.8	89.0	79.7	37.9	35.2	54.1	34.5		49.0	42.2
Level of Service	F	F	C	F	E	D	D	D	C		D	D
Approach Delay (s)		213.0			70.7			46.5			46.7	
Approach LOS		F			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	137.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	109.2	Sum of lost time (s)	24.5
Intersection Capacity Utilization	102.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	137	210	659	173	100	325	497	1240	573	1804	68
Future Volume (vph)	33	137	210	659	173	100	325	497	1240	573	1804	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.9	4.0	6.4	6.4	6.4	4.0	5.9	6.4	4.7	6.5	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.91	
Frpb, ped/bikes		1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1845	1567	1681	1719	1583	1770	3539	1526	3433	5047	
Flt Permitted		0.99	1.00	0.95	0.97	1.00	0.09	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1845	1567	1681	1719	1583	170	3539	1526	3433	5047	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Adj. Flow (vph)	36	149	228	716	188	109	346	529	1319	623	1961	74
RTOR Reduction (vph)	0	0	67	0	0	0	0	0	337	0	2	0
Lane Group Flow (vph)	0	185	161	451	453	109	346	529	982	623	2033	0
Confl. Peds. (#/hr)			4			35			22			11
Confl. Bikes (#/hr)			4			1			1			2
Turn Type	Split	NA	pm+ov	Split	NA	Prot	custom	NA	pm+ov	Prot	NA	
Protected Phases	8	8	5	4	4	4	5	2	4	1	6	
Permitted Phases			8				13 15		2		13 15	
Actuated Green, G (s)		32.1	72.1	47.6	47.6	47.6	95.5	66.2	113.8	25.3	107.1	
Effective Green, g (s)		32.1	72.1	47.6	47.6	47.6	95.5	66.2	113.8	25.3	107.1	
Actuated g/C Ratio		0.13	0.28	0.19	0.19	0.19	0.37	0.26	0.45	0.10	0.42	
Clearance Time (s)		6.9	4.0	6.4	6.4	6.4	4.0	5.9	6.4	4.7	6.5	
Vehicle Extension (s)		3.0	3.0	4.0	4.0	4.0	3.0	6.0	4.0	3.0	6.0	
Lane Grp Cap (vph)		232	442	313	320	295	314	918	680	340	2118	
v/s Ratio Prot		c0.10	0.06	0.27	0.26	0.07	0.17	0.15	c0.27	c0.18	0.19	
v/s Ratio Perm			0.05				c0.24		0.37		0.21	
v/c Ratio		0.80	0.36	1.44	1.42	0.37	1.10	0.58	1.44	1.83	0.96	
Uniform Delay, d1		108.3	73.2	103.8	103.8	90.6	81.9	82.2	70.7	114.9	71.9	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		17.1	0.5	215.7	204.5	1.1	81.0	1.7	208.3	385.9	11.9	
Delay (s)		125.5	73.7	319.4	308.3	91.7	162.8	84.0	278.9	500.8	83.8	
Level of Service		F	E	F	F	F	F	F	F	F	F	
Approach Delay (s)		96.9			290.0			213.6			181.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	204.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	255.1	Sum of lost time (s)	31.4
Intersection Capacity Utilization	121.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	381	1697	5	0	1712	37	3	2	0	31	0	135
Future Volume (vph)	381	1697	5	0	1712	37	3	2	0	31	0	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.0	6.0		6.0	6.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	1.00	1.00	1.00		1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1546		3539	1583	1770	1863		1770	1500	
Flt Permitted	0.95	1.00	1.00		1.00	1.00	0.38	1.00		0.76	1.00	
Satd. Flow (perm)	1770	3539	1546		3539	1583	703	1863		1408	1500	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.75	0.75	0.75	0.84	0.84	0.84
Adj. Flow (vph)	410	1825	5	0	1841	40	4	3	0	37	0	161
RTOR Reduction (vph)	0	0	1	0	0	19	0	0	0	0	0	0
Lane Group Flow (vph)	410	1825	4	0	1841	21	4	3	0	37	161	0
Confl. Peds. (#/hr)			1						11			15
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases			6			2	4			8		
Actuated Green, G (s)	28.5	96.0	96.0		62.0	62.0	13.0	13.0		13.0	13.0	
Effective Green, g (s)	28.5	96.0	96.0		62.0	62.0	13.0	13.0		13.0	13.0	
Actuated g/C Ratio	0.24	0.80	0.80		0.52	0.52	0.11	0.11		0.11	0.11	
Clearance Time (s)	5.5	6.0	6.0		6.0	6.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	4.0	4.0		4.0	4.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	420	2831	1236		1828	817	76	201		152	162	
v/s Ratio Prot	c0.23	0.52			c0.52			0.00			c0.11	
v/s Ratio Perm			0.00			0.01	0.01			0.03		
v/c Ratio	0.98	0.64	0.00		1.01	0.03	0.05	0.01		0.24	0.99	
Uniform Delay, d1	45.4	5.0	2.4		29.0	14.2	48.0	47.8		49.0	53.5	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	37.3	1.1	0.0		22.8	0.1	0.3	0.0		0.8	68.6	
Delay (s)	82.7	6.1	2.4		51.8	14.3	48.3	47.8		49.8	122.0	
Level of Service	F	A	A		D	B	D	D		D	F	
Approach Delay (s)		20.1			51.0			48.1			108.5	
Approach LOS		C			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	703	2189	203	109	473	49	152	323	253	194	552	524
Future Volume (vph)	703	2189	203	109	473	49	152	323	253	194	552	524
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	5.0	4.5	6.0	5.0	4.5	4.5	6.0		4.5	5.0	6.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	5085	1583	3433	3306		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	5085	1583	3433	3306		3433	1863	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	732	2280	211	114	493	51	165	351	275	211	600	570
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	33
Lane Group Flow (vph)	732	2280	211	114	493	51	165	626	0	211	600	537
Turn Type	Prot	NA	Over	Prot	NA	Over	Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4		3	8	1
Permitted Phases												8
Actuated Green, G (s)	44.4	62.0	11.5	6.0	23.6	9.5	11.5	50.1		9.5	49.1	93.5
Effective Green, g (s)	44.4	62.0	11.5	6.0	23.6	9.5	11.5	50.1		9.5	49.1	93.5
Actuated g/C Ratio	0.30	0.42	0.08	0.04	0.16	0.06	0.08	0.34		0.06	0.33	0.63
Clearance Time (s)	6.0	5.0	4.5	6.0	5.0	4.5	4.5	6.0		4.5	5.0	6.0
Vehicle Extension (s)	4.5	5.0	3.5	4.0	5.0	3.5	3.5	2.5		3.5	2.5	4.5
Lane Grp Cap (vph)	527	1471	122	138	804	100	264	1110		218	613	992
v/s Ratio Prot	c0.41	c0.64	c0.13	0.03	0.10	0.03	0.05	0.19		0.06	c0.32	0.16
v/s Ratio Perm												0.18
v/c Ratio	1.39	1.55	1.73	0.83	0.61	0.51	0.62	0.56		0.97	0.98	0.54
Uniform Delay, d1	52.3	43.5	68.8	71.0	58.5	67.5	66.7	40.6		69.6	49.5	15.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	186.5	250.9	360.2	32.7	2.0	5.0	4.8	0.5		51.5	30.6	0.9
Delay (s)	238.8	294.4	429.0	103.7	60.5	72.6	71.5	41.1		121.1	80.1	16.6
Level of Service	F	F	F	F	E	E	E	D		F	F	B
Approach Delay (s)		290.6			68.9			47.4			60.2	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	182.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	149.1	Sum of lost time (s)	21.5
Intersection Capacity Utilization	116.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	2721	525	198	415	34	153	128	429	59	37	91
Future Volume (vph)	177	2721	525	198	415	34	153	128	429	59	37	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.5	5.0	4.5	5.5	4.6	5.0	5.0	5.0	4.6	4.6	4.5
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.95	0.95	1.00	0.95	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.99	1.00
Satd. Flow (prot)	1770	5085	1566	1770	5085	1583	1681	1760	1512	1681	1748	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	0.95	0.99	1.00
Satd. Flow (perm)	1770	5085	1566	1770	5085	1583	1681	1760	1512	1681	1748	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	1.00	1.00	1.00	0.79	0.79	0.79
Adj. Flow (vph)	182	2805	541	215	451	37	153	128	429	75	47	115
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	142	0	0	0
Lane Group Flow (vph)	182	2805	514	215	451	37	138	143	287	60	62	115
Confl. Peds. (#/hr)						6			36			
Confl. Bikes (#/hr)			13			4						
Turn Type	Prot	NA	pm+ov	Prot	NA	Over	Split	NA	Perm	Split	NA	pm+ov
Protected Phases	5	2	8	1	6	7	8	8		7	7	5
Permitted Phases			2						8			7
Actuated Green, G (s)	25.6	73.3	107.8	12.5	60.2	10.1	34.5	34.5	34.5	10.1	10.1	35.7
Effective Green, g (s)	25.6	73.3	107.8	12.5	60.2	10.1	34.5	34.5	34.5	10.1	10.1	35.7
Actuated g/C Ratio	0.17	0.49	0.72	0.08	0.40	0.07	0.23	0.23	0.23	0.07	0.07	0.24
Clearance Time (s)	4.5	5.5	5.0	4.5	5.5	4.6	5.0	5.0	5.0	4.6	4.6	4.5
Vehicle Extension (s)	3.0	6.0	2.5	3.0	6.0	3.0	2.5	2.5	2.5	3.0	3.0	3.0
Lane Grp Cap (vph)	302	2484	1125	147	2040	106	386	404	347	113	117	376
v/s Ratio Prot	0.10	c0.55	0.10	c0.12	0.09	0.02	0.08	0.08		c0.04	0.04	0.05
v/s Ratio Perm			0.22						c0.19			0.02
v/c Ratio	0.60	1.13	0.46	1.46	0.22	0.35	0.36	0.35	0.83	0.53	0.53	0.31
Uniform Delay, d1	57.5	38.4	8.8	68.8	29.5	66.8	48.5	48.4	54.9	67.7	67.7	47.0
Progression Factor	1.00	1.00	1.00	1.11	0.36	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	63.9	0.2	238.7	0.2	1.8	0.4	0.4	14.6	4.7	4.3	0.5
Delay (s)	60.9	102.3	9.1	314.9	10.8	72.1	48.9	48.8	69.5	72.4	71.9	47.4
Level of Service	E	F	A	F	B	E	D	D	E	E	E	D
Approach Delay (s)		85.8			107.1			61.3			60.2	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	84.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	108.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	604	1934	576	72	620	162	84	469	80	206	461	119
Future Volume (vph)	604	1934	576	72	620	162	84	469	80	206	461	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	4.0	5.0	5.0	4.0	4.0	6.0		4.0	6.0	5.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	1770	5085	1562	1770	3455		1770	3539	1564
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	1770	5085	1562	1770	3455		1770	3539	1564
Peak-hour factor, PHF	0.97	0.97	0.97	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	623	1994	594	77	667	174	91	510	87	224	501	129
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	623	1994	594	77	667	174	91	597	0	224	501	129
Confl. Peds. (#/hr)						11			3			6
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8		7	4	5
Permitted Phases			2			6						4
Actuated Green, G (s)	23.0	56.0	69.6	6.0	39.0	71.9	13.6	35.1		32.9	54.4	77.4
Effective Green, g (s)	23.0	56.0	69.6	6.0	39.0	71.9	13.6	35.1		32.9	54.4	77.4
Actuated g/C Ratio	0.15	0.37	0.46	0.04	0.26	0.48	0.09	0.23		0.22	0.36	0.52
Clearance Time (s)	5.0	5.0	4.0	5.0	5.0	4.0	4.0	6.0		4.0	6.0	5.0
Vehicle Extension (s)	5.0	6.0	4.0	4.0	6.0	4.0	4.0	4.0		4.0	6.0	5.0
Lane Grp Cap (vph)	526	1898	734	70	1322	748	160	808		388	1283	807
v/s Ratio Prot	c0.18	c0.39	0.07	c0.04	0.13	0.05	0.05	c0.17		c0.13	0.14	0.02
v/s Ratio Perm			0.30			0.06						0.06
v/c Ratio	1.18	1.05	0.81	1.10	0.50	0.23	0.57	0.74		0.58	0.39	0.16
Uniform Delay, d1	63.5	47.0	34.5	72.0	47.3	22.9	65.4	53.2		52.3	35.5	19.1
Progression Factor	0.73	0.73	1.11	0.65	0.45	0.42	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	84.9	24.4	0.7	130.2	0.7	0.2	5.5	3.8		2.5	0.9	0.2
Delay (s)	131.1	58.8	38.8	176.8	21.9	9.9	70.9	57.0		54.8	36.4	19.3
Level of Service	F	E	D	F	C	A	E	E		D	D	B
Approach Delay (s)		69.2			32.6			58.8			38.6	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	57.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	106.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	392	1867	40	95	553	229	12	247	91	265	213	199
Future Volume (vph)	392	1867	40	95	553	229	12	247	91	265	213	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	7.5	7.5	5.0	5.0	7.5	5.0	
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.97	1.00	0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	5057		1770	5085	1566	1770	1863	1540	1770	1663	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	5057		1770	5085	1566	1770	1863	1540	1770	1663	
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93
Adj. Flow (vph)	408	1945	42	103	601	249	14	281	103	285	229	214
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	83	0	20	0
Lane Group Flow (vph)	408	1985	0	103	601	249	14	281	20	285	423	0
Confl. Peds. (#/hr)			32			1			6			31
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	46.2	60.4		11.1	25.3	52.3	4.0	29.5	29.5	27.0	52.5	
Effective Green, g (s)	46.2	60.4		11.1	25.3	52.3	4.0	29.5	29.5	27.0	52.5	
Actuated g/C Ratio	0.31	0.40		0.07	0.17	0.35	0.03	0.20	0.20	0.18	0.35	
Clearance Time (s)	4.5	5.0		4.5	5.0	7.5	7.5	5.0	5.0	7.5	5.0	
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	4.0	4.5	4.5	6.0	5.0	
Lane Grp Cap (vph)	545	2036		130	857	546	47	366	302	318	582	
v/s Ratio Prot	0.23	c0.39		0.06	c0.12	0.08	0.01	0.15		c0.16	c0.25	
v/s Ratio Perm						0.08			0.01			
v/c Ratio	0.75	0.98		0.79	0.70	0.46	0.30	0.77	0.07	0.90	0.73	
Uniform Delay, d1	46.7	44.1		68.3	58.8	37.8	71.6	57.0	49.0	60.1	42.5	
Progression Factor	0.27	0.15		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.9	7.0		27.2	3.8	1.7	4.8	10.4	0.2	28.3	5.5	
Delay (s)	14.5	13.4		95.6	62.6	39.5	76.4	67.4	49.2	88.4	48.0	
Level of Service	B	B		F	E	D	E	E	D	F	D	
Approach Delay (s)		13.6			60.1			63.0			63.8	
Approach LOS		B			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	1260	331	657	972	130	70	80	507	320	300	660
Future Volume (vph)	230	1260	331	657	972	130	70	80	507	320	300	660
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.5	5.0	5.5	6.5	5.5	5.0	5.0	5.5		5.5	5.5
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.99		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1770	3539	1547	3433	3539	1539	1681	1762	1571		1816	1548
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.97	1.00
Satd. Flow (perm)	1770	3539	1547	3433	3539	1539	1681	1762	1571		1816	1548
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	1370	360	714	1057	141	76	87	551	348	326	717
RTOR Reduction (vph)	0	0	143	0	0	25	0	0	129	0	0	241
Lane Group Flow (vph)	250	1370	217	714	1057	116	68	95	422	0	674	476
Confl. Peds. (#/hr)			13			16			3			14
Confl. Bikes (#/hr)			11			27						
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	1	6	7	5	2	8	7	7	5	8	8	1
Permitted Phases			6			2			7			8
Actuated Green, G (s)	7.5	32.5	42.8	9.5	34.5	76.0	10.3	10.3	19.8		41.5	49.0
Effective Green, g (s)	7.5	32.5	42.8	9.5	34.5	76.0	10.3	10.3	19.8		41.5	49.0
Actuated g/C Ratio	0.06	0.28	0.37	0.08	0.30	0.65	0.09	0.09	0.17		0.36	0.42
Clearance Time (s)	5.5	6.5	5.0	5.5	6.5	5.5	5.0	5.0	5.5		5.5	5.5
Vehicle Extension (s)	3.0	3.0	1.5	3.0	3.0	3.0	1.5	1.5	3.0		3.0	3.0
Lane Grp Cap (vph)	114	988	569	280	1049	1078	148	156	341		648	652
v/s Ratio Prot	0.14	c0.39	0.03	c0.21	0.30	0.04	0.04	0.05	c0.10		c0.37	0.05
v/s Ratio Perm			0.11			0.04			0.17			0.26
v/c Ratio	2.19	1.39	0.38	2.55	1.01	0.11	0.46	0.61	1.24		1.04	0.73
Uniform Delay, d1	54.4	41.9	27.0	53.4	40.9	7.5	50.4	51.1	48.2		37.4	28.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	564.4	180.3	0.2	707.9	29.7	0.0	0.8	4.6	129.1		46.2	4.1
Delay (s)	618.8	222.2	27.2	761.3	70.6	7.6	51.2	55.6	177.3		83.6	32.2
Level of Service	F	F	C	F	E	A	D	E	F		F	C
Approach Delay (s)		236.8			323.9			149.1			57.1	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	212.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	116.3	Sum of lost time (s)	24.5
Intersection Capacity Utilization	114.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

INTERSECTION DELAY AND QUEUE LENGTH

AM Peak Hour (8:00 AM - 9:00 AM)

*Results displayed are average microsimulation delay (sec/veh) and the average results across 10 microsimulation runs

AM Peak Hour (8:00 AM - 9:00 AM)			Existing (No Project) AM						Existing Plus Project AM						Future (2035) No-Build AM						Future (2035) Plus Project AM					
Intersection	Approach	Movement	Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)	
Tasman Drive & Vista Montana	SB	LT	116	283	38.5	22.4	25	25	116	283	38.0	22.1	24	24	195	376	39.4	27.6	50	50	204	393	82.2	59.8	306	306
		TH	2		42.6		6		2		49.2		6		1		49.6		8		1		133.5		48	
		RT	165		10.8		7		165		10.7		7		180		14.8		9		188		35.2		49	
	WB	U	0	687	0.0	20.9	1	45	0	633	0.0	20.9	1	41	0	1101	0.0	54.4	1	292	0	941	0.0	72.7	2	401
		LT	4		60.5		1		4		68.1		1		5		77.6		1		4		113.0		2	
		TH	665		20.7		44		601		20.8		39		1065		54.0		288		902		71.5		397	
		RT	18		18.5		45		28		15.2		41		31		63.2		292		35		100.4		401	
	NB	LT	1	8	49.1	34.2	0	2	1	8	48.2	35.6	0	1	0	9	0.0	41.3	0	3	0	9	0.0	76.3	0	3
		TH	7		32.0		1		7		33.8		1		9		41.3		1		9		76.3		2	
		RT	0		0.0		2		0		0.0		1		0		0.0		3		0		0.0		3	
	EB	U	0	649	0.0	22.9	65	65	0	648	0.0	24.8	75	75	0	1272	0.0	37.1	286	286	0	1235	0.0	52.0	455	455
		LT	222		51.5		65		238		54.3		75		361		92.3		286		362		132.3		455	
		TH	425		8.1		11		408		7.7		9		909		15.2		133		871		18.7		127	
		RT	2		2.5		9		2		14.8		0		2		1.6		131		2		1.7		0	
	Intersection		1627	0	22.0		0	0	1572	0	22.8		0	0	2758	0	42.7		0	0	2578	0	60.8		0	0
Tasman Drive & Rio Robles	SB	LT	11	19	57.9	54.9	5	5	11	19	61.6	57.0	11	11	8	13	56.3	51.5	4	4	8	13	56.8	58.0	9	9
		TH	5		47.3		5		5		47.2		5		0		0.0		4		0		0.0		4	
		RT	3		56.2		5		3		56.3		5		5		43.8		4		5		59.8		4	
	WB	U	0	912	0.0	20.1	34	36	0	687	0.0	23.6	33	33	0	1081	0.0	22.6	9	76	0	770	0.0	28.7	8	67
		LT	109		55.5		34		102		57.8		33		33		61.3		9		26		66.9		8	
		TH	661		15.6		36		453		18.3		31		960		21.5		74		669		27.8		67	
		RT	142		14.1		36		132		15.5		31		88		19.9		76		75		23.9		67	
	NB	LT	225	317	38.7	35.7	54	54	238	316	34.9	33.9	52	52	297	338	39.0	37.9	70	70	365	393	35.2	35.2	80	80
		TH	51		38.2		11		50		34.3		14		26		36.6		3		25		35.6		4	
		RT	41		16.1		5		28		24.9		14		15		18.6		1		3		37.6		3	
	EB	U	0	489	0.0	16.5	10	20	0	471	0.0	29.7	10	44	0	863	0.0	14.6	38	38	0	580	0.0	22.7	31	31
		LT	33		57.8		10		33		55.5		10		103		62.2		38		103		52.3		31	
		TH	244		14.7		20		230		18.4		17		489		7.9		16		470		16.5		24	
		RT	212		12.1		19		208		38.2		44		271		8.5		14		7		1.2		0	
	Intersection		1737	0	22.3		0	0	1493	0	28.2		0	0	2295	0	22.0		0	0	1756	0	28.4		0	0
Tasman Drive & N 1st Street	SB	U	5	470	53.0	35.3	20	42	0	402	0.0	22.2	0	31	6	632	62.7	48.8	61	61	0	408	0.0	23.5	0	32
		LT	69		61.7		20		0		0.0		0		229		73.5		61		0		0.0		0	
		TH	277		32.7		42		279		24.5		31		267		37.5		47		277		25.9		32	
		RT	119		25.4		38		123		17.0		27		130		27.8		43		131		18.6		29	
	WB	U	0	761	0.0	63.7	0	123	0	715	0.0	32.0	0	69	0	950	0.0	71.0	0	193	0	836	0.0	36.7	0	97
		LT	66		169.6		0		0		0.0		10		73		196.9		0		0		0.0		10	
		TH	537		55.1		123		573		32.8		69		663		61.6		193		651		37.4		97	
		RT	158		48.8		122		142		28.5		65		214		57.1		193		185		34.2		93	
	NB	U	4	1030	62.9	49.1	73	97	0	770	0.0	28.6	0	71	4	1386	79.2	50.6	86	213	0	1099	0.0	30.0	0	113
		LT	269		80.0		73		0		0.0		17		298		81.4		86		0		0.0		15	
		TH	692		38.6		97		704		28.6		71		857		42.6		213		866		29.0		113	
		RT	65		32.4		87		66		29.3		69		227		39.5		202		233		33.9		112	
	EB	U	1	245	78.7	51.1	14	42	0	211	0.0	46.4	0	30	1	458	102.7	54.2	13	82	0	425	0.0	35.9	0	37
		LT	33		76.5		14		0		0.0		0		29		74.8		13		0		0.0		0	
		TH	167		50.8		34		169		27.2		18		400		53.4		73		398		31.4		37	
		RT	44		32.4		42		42		123.6		30		28		42.4		82		27		102.6		13	
	Intersection		2506	0	51.1		0	0	2098	0	30.3		0	0	3426	0	56.4		0	0	2768	0	32.0		0	0

Intersection	Approach	Movement	Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)	
Tasman Drive and Baypointe Parkway	SB	LT	11	64	70.3	46.0	0	0	11	64	43.7	30.2	0	0	10	71	69.3	41.6	0	0	9	69	73.6	44.9	1	1
		TH	24		62.7		0		24		42.0		0		21		61.8		0		20		65.5		1	
		RT	29		22.8		0		29		15.3		0		40		24.1		0		40		28.1		1	
	WB	U	0	857	0.0	15.2	0	27	0	800	0.0	23.9	0	52	0	950	0.0	12.1	0	23	0	894	0.0	31.9	0	74
		LT	47		85.5		23		41		89.9		20		28		95.3		15		47		129.1		34	
		TH	798		11.2		27		748		20.4		49		918		9.6		23		843		26.5		70	
		RT	12		10.0		26		11		16.9		52		4		3.1		23		4		12.7		74	
	NB	LT	10	92	52.2	23.6	11	11	11	94	97.0	74.4	39	39	19	91	39.2	21.8	10	10	21	95	93.5	78.5	40	41
		TH	17		42.1		11		18		85.2		39		9		38.8		10		10		103.7		40	
		RT	65		14.4		10		65		67.6		39		63		14.1		9		64		69.6		41	
	EB	U	0	305	0.0	21.7	7	17	0	225	0.0	24.5	7	14	0	860	0.0	26.1	14	63	0	592	0.0	26.0	18	41
		LT	18		71.6		7		18		78.3		7		32		83.2		14		31		112.7		18	
		TH	275		18.8		17		207		19.9		14		796		23.9		63		561		21.2		41	
		RT	12		12.5		14		0		0.0		0		32		22.4		61		0		0.0		0	
	Intersection		1318	0	18.8		0	0	1183	0	28.4		0	0	1972	0	19.7		0	0	1650	0	33.0		0	0
Tasman Drive and Zanker Road	SB	U	52	667	37.9	53.7	1	90	55	732	55.7	64.2	47	104	51	1347	123.6	80.2	493	677	40	1187	156.5	119.7	1,423	1,444
		LT	370		67.9		90		422		83.5		104		668		130.1		677		561		176.8		1,444	
		TH	217		39.5		23		226		37.6		24		567		24.6		36		538		64.3		84	
		RT	28		5.9		3		29		5.8		3		61		13.2		19		48		42.5		61	
	WB	U	0	1706	0.0	24.7	37	88	0	1452	0.0	22.3	39	52	0	2049	0.0	39.0	44	150	0	1739	0.0	38.1	64	127
		LT	181		57.3		37		208		55.6		39		203		60.6		44		230		81.6		64	
		TH	836		32.5		88		660		25.3		52		786		59.3		150		608		44.8		127	
		RT	689		6.6		3		584		7.0		3		1060		19.9		72		901		22.6		115	
	NB	U	0	784	0.0	52.5	27	83	0	884	0.0	60.5	68	84	0	1524	0.0	45.7	29	192	0	1303	0.0	106.9	991	1,316
		LT	91		73.2		27		196		102.2		68		114		71.7		29		249		138.0		991	
		TH	653		51.0		83		649		48.8		84		1367		43.9		192		1020		99.6		1,315	
		RT	40		30.1		49		39		44.9		83		43		33.1		150		34		96.2		1,316	
	EB	U	5	261	76.8	44.4	17	26	4	193	70.4	51.3	16	17	5	726	151.1	97.6	148	148	4	580	183.2	102.2	185	185
		LT	46		79.6		17		46		77.5		16		229		163.2		148		218		183.6		185	
		TH	181		40.9		26		123		38.1		17		395		74.7		120		320		51.3		75	
		RT	29		5.1		6		20		68.4		8		97		33.6		90		38		54.5		11	
	Intersection		3418	0	38.2		0	0	3261	0	43.7		0	0	5646	0	58.2		0	0	4809	0	84.6		0	0
Tasman Drive and Morgridge Way	SB	LT	13	30	68.6	42.4	7	7	13	30	67.1	41.8	6	6	39	45	68.5	62.5	15	15	38	44	101.2	93.1	24	24
		TH	1		84.8		7		1		84.8		6		0		0.0		15		0		0.0		24	
		RT	16		18.5		5		16		18.4		6		6		23.4		11		6		41.4		22	
	WB	U	0	2207	0.0	9.8	42	42	0	1865	0.0	12.5	0	46	0	2403	0.0	10.6	46	46	0	2043	0.0	16.6	0	86
		LT	156		49.1		42		133		62.4		46		171		48.2		46		145		95.6		86	
		TH	1997		6.8		22		1688		8.7		27		2144		7.8		25		1824		10.7		27	
		RT	54		5.4		22		44		7.9		27		88		6.4		26		74		7.6		27	
	NB	LT	0	0	0.0	0.0	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0	0	0
		TH	0		0.0		0		0		0.0		0		0		0.0		0		0		0.0		0	
		RT	0		0.0		0		0		0.0		0		0		0.0		0		0		0.0		0	
	EB	U	0	588	0.0	12.5	33	33	0	579	0.0	15.5	34	34	0	1090	0.0	6.2	11	11	0	910	0.0	14.0	15	25
		LT	68		85.0		33		67		88.6		34		25		75.3		11		21		126.6		15	
		TH	473		3.1		2		466		3.8		3		1056		4.6		9		882		11.2		25	
		RT	47		2.6		2		46		26.9		6		9		3.2		8		7		34.9		1	
	Intersection		2825	0	10.7		0	0	2474	0	13.6		0	0	3538	0	9.9		0	0	2997	0	16.9		0	0

Intersection	Approach	Movement	Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)	
Tasman Drive and Cisco Way	SB	LT	5	20	35.0	29.0	3	3	5	20	31.3	25.2	2	2	8	20	31.1	25.1	2	2	8	19	45.9	35.5	3	3
		TH	10		33.9		3		10		28.4		2		6		33.7		2		5		47.0		3	
		RT	5		13.1		1		5		12.7		1		6		8.5		1		6		12.0		1	
	WB	U	0	2751	0.0	33.0	0	298	0	2320	0.0	48.4	0	1,224	0	2875	0.0	35.6	0	380	0	2470	0.0	44.6	0	1,372
		LT	432		76.9		298		355		148.2		1,224		433		79.8		380		368		143.8		1,372	
		TH	2258		24.8		196		1913		30.5		1,041		2398		27.9		281		2065		27.3		1,023	
		RT	61		23.7		198		52		26.7		1,044		44		24.5		289		37		25.0		1,017	
	NB	LT	42	209	34.0	16.1	0	8	42	209	31.1	23.9	0	18	63	563	33.9	19.3	5	38	61	550	65.4	54.3	52	155
		TH	20		29.6		7		19		28.0		18		25		25.4		37		24		53.1		155	
		RT	147		9.2		8		148		21.3		18		475		17.1		38		465		52.9		155	
	EB	U	17	402	95.4	29.2	16	26	17	392	18.6	75.1	2	133	17	1125	98.1	54.8	22	138	15	962	39.8	58.3	10	176
		LT	12		100.3		16		12		86.3		7		27		93.5		22		23		89.2		12	
		TH	235		27.7		23		231		37.1		86		928		53.9		132		795		54.6		176	
		RT	138		17.3		26		132		147.9		133		153		49.2		138		129		77.8		71	
	Intersection		3382	0	31.5		0	0	2941	0	50.1		0	0	4583	0	38.3		0	0	4001	0	49.2		0	0
N 1st Street and Vista Montana	SB	U	0	864	0.0	26.7	49	49	0	865	0.0	27.1	48	48	0	1191	0.0	32.0	48	84	0	1207	0.0	32.9	48	79
		LT	139		60.0		49		138		59.5		48		122		68.2		48		124		68.0		48	
		TH	492		22.0		37		493		22.7		39		774		28.8		84		779		28.4		79	
		RT	233		16.7		36		234		17.3		37		295		25.6		84		304		30.3		78	
	WB	LT	74	260	67.0	53.0	27	54	73	258	67.2	53.6	28	55	81	244	67.1	57.9	31	60	82	251	68.4	59.2	32	55
		TH	153		49.4		54		152		50.4		55		130		57.1		60		135		58.5		55	
		RT	33		38.1		50		33		38.5		51		33		38.9		56		34		39.6		51	
	NB	U	0	775	0.0	29.6	16	46	0	762	0.0	30.3	16	46	0	1645	0.0	37.1	39	131	0	1636	0.0	36.6	35	126
		LT	49		61.1		16		49		59.8		16		87		76.6		39		89		75.7		35	
		TH	657		28.1		46		644		28.9		46		1474		35.1		130		1462		34.5		125	
		RT	69		22.2		45		69		22.5		45		84		31.7		131		85		32.1		126	
	EB	LT	256	421	55.8	46.0	87	87	265	446	56.9	45.5	93	93	427	615	106.4	86.9	449	449	432	615	110.3	90.7	443	443
		TH	108		37.3		27		104		38.0		28		96		56.0		35		95		55.2		35	
		RT	57		18.4		18		77		16.8		18		92		28.5		25		88		32.6		25	
	Intersection		2320	0	34.1		0	0	2331	0	34.6		0	0	3695	0	45.1		0	0	3709	0	45.9		0	0
N 1st Street and Rio Robles	SB	U	28	315	58.4	42.3	15	35	29	313	58.0	39.8	16	32	27	330	58.5	46.1	14	41	29	268	63.1	46.4	17	31
		LT	19		60.2		15		19		58.9		16		16		60.8		14		16		63.9		17	
		TH	240		41.2		35		238		37.9		32		258		46.3		41		195		45.5		31	
		RT	28		23.9		31		27		23.1		27		29		24.9		38		28		25.2		27	
	WB	LT	172	488	55.6	44.5	61	78	173	489	57.1	45.5	64	82	182	521	57.7	45.2	69	86	180	516	57.8	45.3	69	84
		TH	264		39.2		78		263		40.1		82		271		40.0		86		269		39.9		84	
		RT	52		34.5		75		53		34.4		79		68		33.0		83		67		33.5		81	
	NB	U	37	1358	48.5	31.7	216	216	37	1111	44.7	31.7	186	186	37	1492	56.5	34.8	284	284	37	1287	58.8	38.5	374	374
		LT	497		47.7		216		499		46.1		186		451		55.7		284		532		59.7		374	
		TH	800		21.3		102		551		18.6		45		982		24.7		170		696		21.8		147	
		RT	24		20.4		101		24		14.6		43		22		23.1		167		22		18.1		145	
	EB	LT	9	72	66.8	16.7	3	3	9	72	63.5	17.6	3	3	9	74	62.3	15.1	3	3	9	74	69.0	15.5	3	3
		TH	8		40.3		2		8		51.2		2		5		47.6		1		5		43.6		1	
		RT	55		5.1		1		55		5.2		2		60		5.4		2		60		5.1		1	
	Intersection		2233	0	35.5		0	0	1985	0	35.9		0	0	2417	0	38.0		0	0	2145	0	40.3		0	0

Intersection	Approach	Movement	Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)	
N 1st Street & River Oaks Parkway	SB	U	4	506	61.5	28.1	8	40	4	507	55.8	27.2	7	39	4	557	57.5	29.8	9		4	489	73.3	30.0	11	41
		LT	22		60.8		8		21		53.8		7		25		60.2		9		26		61.7		11	
		TH	459		26.6		40		461		26.2		39		500		28.5		48		432		28.3		41	
		RT	21		18.6		38		21		19.1		37		28		23.4		46		27		20.1		39	
	WB	LT	227	547	41.5	25.9	35	35	227	547	40.6	24.9	34	34	200	529	41.3	25.4	32	32	215	544	42.8	26.1	34	34
		TH	74		33.8		13		74		34.3		13		77		37.6		16		79		36.3		15	
		RT	246		9.1		9		246		7.6		6		252		9.1		9		250		8.7		8	
	NB	U	43	1306	55.9	30.4	39	111	43	1050	50.2	28.8	39	74	43	1330	54.3	32.8	44	126	43	1126	56.0	32.0	42	93
		LT	88		53.3		39		88		54.0		39		99		56.6		44		98		51.9		42	
		TH	1069		27.9		111		817		25.5		74		1087		30.3		126		887		29.3		93	
		RT	106		27.0		110		102		24.2		73		101		26.9		125		98		26.6		91	
	EB	LT	52	188	57.2	39.4	16	19	52	188	56.9	39.7	16	20	113	350	113.6	89.2	126	139	112	351	107.4	84.8	110	129
		TH	59		49.3		19		59		50.9		20		103		84.5		139		103		81.1		129	
		RT	77		19.7		17		77		19.5		18		134		72.3		136		136		68.9		129	
	Intersection		2547	0	29.6		0	0	2292	0	28.4		0	0	2766	0	37.9		0	0	2510	0	37.7		0	0
Zanker Road and River Oaks Parkway	SB	U	0	628	0.0	14.8	18	18	0	648	0.0	14.5	18	18	0	1369	0.0	19.1	40	40	0	1272	0.0	18.4	34	35
		LT	72		58.1		18		71		59.1		18		187		60.9		40		164		60.0		34	
		TH	417		11.2		14		435		11.2		15		959		14.4		39		900		14.1		35	
		RT	139		3.1		0		142		2.6		0		223		4.1		1		208		4.2		0	
	WB	U	0	486	0.0	29.8	10	67	0	487	0.0	29.5	10	65	0	900	0.0	43.7	27	276	0	469	0.0	178.6	14	923
		LT	44		47.8		10		44		48.2		10		88		68.7		27		43		151.2		14	
		TH	229		51.2		67		230		50.0		65		351		68.0		276		188		145.4		837	
		RT	213		3.2		1		213		3.5		1		461		20.4		142		238		209.8		923	
	NB	U	7	820	68.6	19.3	49	49	7	918	63.7	19.0	50	50	6	1219	62.2	22.7	56	56	5	1120	148.2	175.8	673	890
		LT	125		64.1		49		124		66.4		50		128		70.5		56		103		144.7		673	
		TH	643		11.4		21		742		11.8		25		1013		18.0		56		954		186.6		890	
		RT	45		1.0		0		45		1.0		0		72		1.7		0		58		54.8		0	
	EB	U	0	170	0.0	49.6	23	23	0	170	0.0	49.4	22	22	0	280	0.0	215.5	388	388	0	330	0.0	111.4	148	148
		LT	74		63.7		23		74		63.7		22		119		281.8		388		141		171.5		148	
		TH	77		47.8		20		77		47.4		19		127		183.5		197		148		79.3		67	
		RT	19		2.1		0		19		1.8		0		34		102.8		213		41		20.8		51	
	Intersection		2104	0	22.8		0	0	2223	0	22.3		0	0	3768	0	40.7		0	0	3191	0	106.8		0	0
Zanker Road & De Soto Road	SB	U	43	574	63.3	11.0	0	7	40	601	61.2	10.5	0	7	41	1327	62.2	10.2	0	19	36	1212	115.5	12.0	1	19
		LT	1		77.0		0		1		74.7		0		0		0.0		0		0		0.0		1	
		TH	514		6.7		7		533		6.8		7		1246		8.5		19		1142		8.9		19	
		RT	16		4.0		5		27		5.6		6		40		7.8		18		34		7.9		18	
	WB	LT	3	4	45.1	35.2	1	1	3	4	45.1	35.2	1	1	4	4	52.7	52.7	1	1	4	4	49.9	49.9	1	1
		TH	0		0.0		0		0		0.0		0		0		0.0		0		0		0.0		0	
		RT	1		5.3		0		1		5.4		0		0		0.0		0		0		0.0		0	
	NB	U	1	924	72.0	7.1	20	20	1	1021	58.2	6.6	21	21	1	1593	60.4	6.3	30	30	1	1310	111.3	140.1	19	1,095
		LT	52		68.6		20		52		71.1		21		77		68.3		30		57		102.4		19	
		TH	868		3.4		7		965		3.1		7		1515		3.1		10		1252		141.8		1,095	
		RT	3		1.6		0		3		1.6		0		0		0.0		0		0		0.0		826	
	EB	LT	94	211	53.8	27.2	29	29	94	211	53.8	27.2	29	29	95	215	55.1	27.9	30	30	94	214	115.3	54.2	37	37
		TH	0		0.0		0		0		0.0		0		0		0.0		0		0		0.0		0	
		RT	117		5.9		3		117		5.9		3		120		6.3		3		120		6.3		3	
	Intersection		1713	0	11.0		0	0	1837	0	10.3		0	0	3139	0	9.5		0	0	2740	0	76.6		0	0

Intersection	Approach	Movement	Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)	
Tasman Drive and Champion Court	SB	LT	0	13	0.0	15.8	0	1	0	13	0.0	8.9	0	0	0	17	0.0	25.0	0	2	0	17	0.0	20.1	0	1
		TH	2		66.4		1		2		29.1		0		6		49.3		2		6		27.0		1	
		RT	11		6.6		0		11		5.3		0		11		11.7		1		11		16.4		1	
	WB	U	0	729	0.0	4.2	0	8	0	669	0.0	4.8	0	7	0	1145	0.0	11.0	0	40	0	967	0.0	22.9	0	79
		LT	0		0.0		0		0		0.0		0		0		0.0		0		0		0.0		0	
		TH	662		3.9		7		605		4.5		6		1125		10.9		38		949		22.9		78	
		RT	67		7.6		8		64		7.9		7		20		12.9		40		18		21.8		79	
	NB	LT	0	0	0.0	0.0	0	0	0	0	0.0	0.0	0	0	0	59	0.0	26.4	0	10	0	59	0.0	23.8	0	7
		TH	0		0.0		0		0		0.0		0		23		48.0		8		23		27.5		6	
		RT	0		0.0		0		0		0.0		0		36		12.6		10		36		21.5		7	
	EB	U	0	451	0.0	3.4	0	4	0	433	0.0	4.0	0	4	0	874	0.0	6.6	0	13	0	859	0.0	7.9	0	16
		LT	0		0.0		0		0		0.0		0		0		0.0		0		0		0.0		0	
		TH	439		3.4		4		421		3.7		4		848		6.7		13		833		7.6		16	
		RT	12		3.1		4		12		15.6		1		26		5.0		13		26		16.6		2	
	Intersection		1193	0	4.0		0	0	1115	0	4.6		0	0	2095	0	9.7		0	0	1902	0	16.1		0	0
Vista Montana & Renaissance Drive	SB	LT	360	435	7.6	7.6	12	12	360	435	7.5	7.5	11	11	348	503	18.0	17.4	66	67	364	524	20.9	19.0	59	59
		RT	75		7.9		11		75		7.6		11		155		16.3		67		160		14.7		58	
	NB	LT	3	213	23.2	5.8	0	5	3	239	23.6	6.5	0	6	43	474	52.3	69.5	8	282	41	475	67.9	86.0	44	462
		RT	210		5.6		5		236		6.3		6		431		71.3		282		434		87.7		462	
	EB	LT	207	229	17.9	16.7	20	20	207	229	18.4	17.1	20	20	188	216	71.6	63.8	62	62	182	209	119.5	108.4	160	160
		RT	22		5.6		0		22		5.3		0		28		11.2		2		27		34.2		1	
	Intersection		877	0	9.6		0	0	903	0	9.7		0	0	1193	0	46.5		0	0	1208	0	60.8		0	0

INTERSECTION DELAY AND QUEUE LENGTH

PM Peak Hour (5:00 PM - 6:00 PM)

*Results displayed are average microsimulation delay (sec/veh) and the average results across 10 microsimulation runs

PM Peak Hour (5:00 PM - 6:00 PM)			Existing (No Project) PM						Existing Plus Project PM						Future (2035) No-Build PM						Future (2035) Plus Project PM					
Intersection	Approach	Movement	Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)	
Tasman Drive & Vista Montana	SB	LT	27	355	60.2	27.1	8	44	128	459	59.0	33.5	46	46	49	510	61.3	39.4	14	121	49	520	39.0	30.1	7	82
		TH	0		0.0		42		0		0.0		38		0		0.0		120		0		0.0		81	
		RT	328		24.4		44		331		23.7		39		461		37.0		121		471		29.2		82	
	WB	U	0	784	0.0	19.4	10	41	0	838	0.0	31.8	11	82	0	1283	0.0	23.8	12	94	0	1324	0.0	54.2	9	374
		LT	29		68.1		10		29		72.8		11		25		88.2		12		27		84.8		9	
		TH	574		14.9		40		574		28.4		79		1044		22.4		92		1078		52.6		369	
		RT	181		26.0		41		235		34.9		82		214		23.2		94		219		57.9		374	
	NB	LT	0	5	0.0	49.3	0	3	0	5	0.0	37.1	0	1	0	5	0.0	48.8	0	3	0	5	0.0	27.1	0	1
		TH	5		49.3		1		5		37.1		1		5		48.8		1		5		27.1		1	
		RT	0		0.0		3		0		0.0		1		0		0.0		3		0		0.0		1	
	EB	U	0	993	0.0	33.9	168	168	0	993	0.0	37.7	192	192	0	1535	0.0	27.4	171	171	0	1501	0.0	40.1	387	387
		LT	295		89.8		168		351		81.6		192		289		79.6		171		371		97.7		387	
		TH	696		10.3		22		640		13.6		31		1246		15.3		79		1130		21.2		219	
		RT	2		10.8		20		2		45.3		0		0		0.0		78		0		0.0		0	
	Intersection		2137	0	27.5		0	0	2295	0	34.7		0	0	3333	0	27.9		0	0	3350	0	44.1		0	0
Tasman Drive & Rio Robles	SB	LT	75	185	61.0	58.0	67	75	76	186	62.0	62.9	93	93	26	194	91.5	47.9	52	61	26	197	42.3	44.9	69	69
		TH	56		62.6		67		56		63.7		73		15		79.3		52		15		46.8		51	
		RT	54		49.0		75		54		63.3		73		153		37.4		61		156		45.2		51	
	WB	U	0	385	0.0	21.8	13	20	0	394	0.0	22.9	13	20	0	530	0.0	25.6	1	42	0	587	0.0	27.9	1	51
		LT	30		75.6		13		32		73.3		13		3		86.0		1		3		70.9		1	
		TH	336		17.4		20		342		18.7		20		519		25.4		42		575		27.8		51	
		RT	19		14.2		19		20		13.8		19		8		21.4		41		9		24.2		50	
	NB	LT	272	341	53.2	48.8	104	104	326	341	51.3	51.2	108	108	364	373	55.7	55.7	137	137	0	10	0.0	21.9	0	0
		TH	1		54.7		1		2		53.3		36		0		0.0		0		0		0.0		0	
		RT	68		31.1		2		13		48.6		36		9		54.0		0		10		21.9		0	
	EB	U	0	1002	0.0	21.2	5	63	0	777	0.0	25.3	5	59	0	1540	0.0	44.7	13	355	0	1124	0.0	35.8	8	151
		LT	13		74.8		5		12		76.0		5		24		109.9		13		25		71.8		8	
		TH	717		20.8		62		764		24.5		59		1177		44.9		349		1098		35.0		151	
		RT	272		19.7		63		1		2.2		0		339		39.2		355		1		1.8		0	
	Intersection		1913	0	29.8		0	0	1698	0	34.0		0	0	2637	0	42.6		0	0	1918	0	34.2		0	0
Tasman Drive & N 1st Street	SB	U	3	642	63.4	48.8	48	60	0	481	0.0	32.0	0	50	4	850	232.2	111.8	410	410	0	868	0.0	35.7	0	102
		LT	171		74.8		48		0		0.0		0		275		240.9		410		0		0.0		0	
		TH	425		40.1		60		437		32.4		50		535		49.4		215		832		36.0		102	
		RT	43		30.8		58		44		28.3		47		36		40.1		213		36		29.2		98	
	WB	U	0	754	0.0	68.4	0	175	0	554	0.0	29.1	0	51	0	1116	0.0	101.9	0	750	0	1053	0.0	49.1	0	221
		LT	250		106.2		175		0		0.0		12		250		220.0		750		0		0.0		12	
		TH	292		53.3		88		344		29.9		51		448		76.2		680		549		48.4		220	
		RT	212		44.5		90		210		28.0		47		418		58.8		684		504		50.0		221	
	NB	U	1	625	121.6	44.3	18	79	0	582	0.0	33.3	0	62	1	560	63.6	50.9	12	88	0	548	0.0	39.1	0	70
		LT	50		85.3		18		0		0.0		15		33		84.9		12		0		0.0		13	
		TH	448		41.9		79		452		33.1		62		365		46.4		88		382		38.0		70	
		RT	126		35.9		70		130		34.1		61		161		54.0		78		166		41.7		69	
	EB	U	0	987	0.0	70.6	50	244	0	961	0.0	29.7	0	75	0	1169	0.0	101.9	48	770	0	1148	0.0	37.3	0	126
		LT	106		85.5		50		0		0.0		0		92		110.9		48		0		0.0		0	
		TH	794		69.2		233		875		27.2		75		1011		101.7		770		1077		35.2		126	
		RT	87		64.9		244		86		55.1		24		66		93.3		770		71		69.5		24	
	Intersection		3008	0	59.9		0	0	2578	0	30.8		0	0	3695	0	96.4		0	0	3617	0	40.6		0	0

Intersection	Approach	Movement	Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)	
Tasman Drive and Baypointe Parkway	SB	LT	26	107	61.3	48.0	3	3	26	107	44.3	32.9	2	2	5	114	59.3	51.7	4	4	4	113	63.6	32.8	3	3
		TH	31		63.0		3		31		43.6		2		15		63.1		4		15		76.3		3	
		RT	50		31.9		3		50		20.4		2		94		49.4		4		94		24.6		3	
	WB	U	0	728	0.0	40.7	0	92	0	533	0.0	29.2	0	43	0	1021	0.0	116.9	0	1,005	0	930	0.0	35.4	0	109
		LT	35		86.3		15		34		80.9		15		23		153.0		13		24		125.5		16	
		TH	679		38.5		88		485		25.8		40		995		116.2		995		902		33.0		104	
		RT	14		33.6		92		14		21.9		43		3		72.9		1,005		4		33.8		109	
	NB	LT	14	134	50.7	28.1	20	20	14	135	109.9	96.4	77	79	50	130	95.7	70.5	49	49	49	128	90.7	84.2	63	63
		TH	23		48.8		20		23		118.5		77		16		76.3		49		16		93.8		63	
		RT	97		19.9		18		98		89.3		79		64		49.4		46		63		76.6		62	
	EB	U	0	1086	0.0	28.4	40	90	0	983	0.0	23.3	37	57	0	1445	0.0	61.7	93	517	0	1308	0.0	40.9	88	169
		LT	72		97.3		40		72		90.5		37		78		135.7		93		82		141.8		88	
		TH	991		23.5		90		911		18.0		57		1330		57.6		517		1226		34.1		169	
		RT	23		24.7		87		0		0.0		0		37		53.2		517		0		0.0		1	
	Intersection		2055	0	33.7		0	0	1758	0	31.3		0	0	2710	0	82.5		0	0	2479	0	40.7		0	0
Tasman Drive and Zanker Road	SB	U	10	665	11.9	43.7	0	47	10	722	21.2	47.3	46	72	8	1541	24.3	110.1	0	864	9	1829	72.5	83.6	597	646
		LT	159		60.9		37		223		65.8		72		230		66.7		53		259		130.6		646	
		TH	446		41.8		47		440		42.4		48		1103		100.4		864		1315		78.1		439	
		RT	50		12.3		23		49		11.5		21		200		216.9		857		246		64.2		409	
	WB	U	20	1014	72.0	37.7	69	69	20	992	70.0	47.6	129	129	15	1136	57.9	117.8	82	454	13	1013	300.8	178.6	961	961
		LT	280		69.8		69		511		74.6		129		410		63.4		82		527		302.7		961	
		TH	453		36.5		51		205		33.8		23		469		221.8		454		238		65.2		90	
		RT	261		2.6		1		256		2.8		0		242		12.1		1		235		8.5		91	
	NB	U	91	1020	170.5	68.4	154	154	96	1073	93.2	55.5	105	105	67	1063	178.1	118.1	1,282	1,282	61	941	204.0	121.5	1,402	1,402
		LT	185		125.1		154		234		83.1		105		326		213.3		1,282		298		198.2		1,402	
		TH	636		44.3		83		636		42.3		93		613		67.4		1,020		533		72.9		1,185	
		RT	108		26.9		46		107		39.6		93		57		49.2		874		49		80.1		1,186	
	EB	U	54	1121	67.6	29.5	37	71	52	1045	70.8	41.2	36	102	46	1347	160.8	87.2	154	488	52	1265	158.8	108.5	434	434
		LT	123		63.9		37		123		63.5		36		282		117.7		154		304		153.5		434	
		TH	836		24.0		71		764		35.3		102		832		79.2		488		786		89.0		396	
		RT	108		14.1		0		106		43.5		19		187		58.7		0		123		100.7		141	
	Intersection		3820	0	44.5		0	0	3832	0	48.0		0	0	5087	0	107.4		0	0	5048	0	116.0		0	0
Tasman Drive and Morgridge Way	SB	LT	84	145	60.6	51.4	43	43	83	144	76.0	62.0	46	46	107	138	66.9	64.2	55	55	109	141	121.1	113.2	66	66
		TH	1		50.1		43		1		49.5		46		0		0.0		55		0		0.0		66	
		RT	60		38.6		41		60		42.8		46		31		54.9		54		32		86.2		66	
	WB	U	0	723	0.0	5.4	4	7	0	707	0.0	6.4	0	8	0	976	0.0	14.4	7	20	0	908	0.0	90.3	0	188
		LT	11		69.3		4		10		59.2		3		16		76.1		7		18		116.2		9	
		TH	704		4.4		7		689		5.7		8		951		13.5		20		881		90.2		188	
		RT	8		3.0		7		8		3.8		8		9		8.8		20		9		45.7		188	
	NB	LT	116	155	58.8	53.8	47	51	114	151	84.6	87.2	76	76	77	138	71.2	58.6	45	49	76	137	185.6	177.2	117	117
		TH	1		61.6		47		1		90.9		76		0		0.0		45		0		0.0		117	
		RT	38		38.2		51		36		95.5		75		61		42.8		49		61		166.6		117	
	EB	U	0	1433	0.0	3.8	4	8	0	1409	0.0	28.1	4	65	0	1440	0.0	6.7	3	15	0	1238	0.0	117.8	2	650
		LT	10		71.2		4		10		77.1		4		5		115.2		3		5		134.5		2	
		TH	1411		3.4		8		1388		27.7		65		1430		6.4		15		1228		117.8		650	
		RT	12		3.1		7		11		39.8		2		5		3.4		15		5		96.4		1	
	Intersection		2456	0	10.2		0	0	2411	0	27.5		0	0	2692	0	15.1		0	0	2424	0	110.6		0	0

Intersection	Approach	Movement	Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)	
Tasman Drive and Cisco Way	SB	LT	172	244	34.1	33.2	49	50	172	245	32.8	31.4	46	47	153	249	30.8	29.8	44	44	153	249	42.5	43.3	64	66
		TH	50		33.4		49		51		30.0		46		73		29.6		44		73		45.8		64	
		RT	22		25.2		50		22		23.4		47		23		24.4		44		23		40.4		66	
	WB	U	0	632	0.0	31.9	0	69	0	631	0.0	41.6	0	110	0	1037	0.0	84.2	0	1,428	0	1095	0.0	73.7	0	1,054
		LT	171		67.2		69		169		101.6		110		332		192.0		1,428		384		155.9		1,054	
		TH	447		18.9		20		448		19.9		22		690		33.4		808		694		29.6		260	
		RT	14		15.9		20		14		12.6		21		15		32.6		811		17		18.5		263	
	NB	LT	111	768	50.5	43.0	62	169	95	652	66.2	63.8	89	214	146	875	48.1	40.1	64	163	114	690	80.6	64.2	88	209
		TH	13		20.7		166		12		24.2		214		19		13.3		161		18		13.8		209	
		RT	644		42.2		169		545		64.3		213		710		39.2		163		558		62.5		208	
	EB	U	12	1589	72.5	22.8	8	78	12	1538	42.0	58.1	44	627	11	1637	100.8	38.8	6	168	11	1381	59.1	81.4	57	922
		LT	10		75.2		8		9		102.2		4		2		103.7		6		2		132.8		1	
		TH	1501		22.2		74		1454		57.1		627		1519		38.4		162		1273		80.6		922	
		RT	66		18.8		78		63		78.0		39		105		36.6		168		95		94.2		149	
	Intersection		3233	0	30.1		0	0	3066	0	53.8		0	0	3798	0	50.9		0	0	3415	0	72.7		0	0
N 1st Street and Vista Montana	SB	U	0	641	0.0	31.3	21	45	0	577	0.0	33.3	22	51	0	1279	0.0	41.4	28	116	0	1281	0.0	41.8	27	118
		LT	56		67.5		21		54		67.4		22		69		71.0		28		70		69.1		27	
		TH	399		29.6		45		242		36.6		51		938		40.5		116		939		41.2		118	
		RT	186		24.2		44		281		23.9		50		272		36.9		116		272		37.0		117	
	WB	LT	113	404	82.7	62.4	59	102	113	404	73.2	54.4	50	85	149	405	73.7	58.2	75	76	149	404	71.6	57.7	69	77
		TH	204		58.4		102		204		50.6		85		177		52.8		76		176		53.7		77	
		RT	87		45.2		100		87		38.7		83		79		41.2		72		79		40.5		73	
	NB	U	0	722	0.0	32.6	36	42	0	663	0.0	41.1	44	50	0	1209	0.0	42.1	91	91	0	1117	0.0	43.7	93	93
		LT	96		67.0		36		96		77.9		44		161		91.9		91		164		93.8		93	
		TH	526		28.2		42		465		36.2		50		911		35.0		85		814		35.7		79	
		RT	100		23.0		40		102		29.2		49		137		30.7		85		139		31.6		79	
	EB	LT	358	698	112.3	79.5	324	324	471	815	73.5	55.6	268	268	368	687	65.3	49.9	165	165	451	767	77.3	60.4	271	271
		TH	273		47.3		87		276		33.0		58		215		36.5		60		213		41.2		63	
		RT	67		35.1		75		68		22.9		48		104		22.9		47		103		26.4		53	
	Intersection		2465	0	50.4		0	0	2459	0	46.3		0	0	3580	0	45.2		0	0	3569	0	48.2		0	0
N 1st Street and Rio Robles	SB	U	34	687	62.9	35.9	35	62	36	454	63.2	35.2	37	37	27	797	77.6	43.7	44	94	32	890	100.8	45.3	66	110
		LT	66		64.3		35		64		64.0		37		71		80.3		44		77		97.7		66	
		TH	579		31.3		62		346		27.4		32		691		38.8		94		772		37.9		110	
		RT	8		24.6		59		8		18.0		29		8		31.0		92		9		36.0		107	
	WB	LT	67	129	63.2	44.8	23	23	67	129	62.1	44.2	23	23	75	122	60.6	44.8	26	26	76	123	60.3	44.7	26	26
		TH	34		36.7		8		34		36.4		8		27		27.8		4		27		27.4		4	
		RT	28		10.6		5		28		10.8		5		20		8.2		2		20		9.1		2	
	NB	U	21	694	67.6	38.3	45	64	21	644	68.0	38.8	46	58	20	818	77.2	58.1	63	130	20	812	90.4	73.1	98	163
		LT	92		68.3		45		91		68.9		46		109		78.1		63		135		88.2		98	
		TH	507		32.9		64		458		33.3		58		586		55.3		130		556		70.3		163	
		RT	74		30.2		61		74		27.3		56		103		49.3		129		101		64.7		161	
	EB	LT	116	737	80.4	56.9	56	369	115	729	86.4	65.2	54	512	82	703	67.1	38.6	29	150	83	704	65.9	39.2	28	153
		TH	171		63.0		363		169		72.9		512		153		44.2		150		153		44.8		153	
		RT	450		48.6		369		445		56.8		511		468		31.8		150		468		32.7		153	
		LT	13		74.8	44.1	5		12		76.0	48.1	5		24		109.9	47.1	13		25		71.8	52.5	8	

Intersection	Approach	Movement	Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)	
N 1st Street & River Oaks Parkway	SB	U	10	1181	52.1	26.6	52	75	11	947	60.0	24.9	54	54	9	1247	68.2	41.8	64	152	9	1330	80.3	53.1	225	225
		LT	137		60.2		52		137		62.8		54		162		62.8		64		339		86.1		225	
		TH	982		22.0		75		746		18.0		46		972		38.7		152		874		41.6		147	
		RT	52		19.7		74		53		15.5		44		104		35.8		152		108		39.5		147	
	WB	LT	241	335	46.9	37.5	40	40	482	576	70.1	62.8	151	151	247	446	41.5	29.3	37	37	374	577	41.8	32.1	54	54
		TH	28		33.5		5		28		55.8		7		55		36.0		10		58		33.0		10	
		RT	66		4.9		1		66		12.4		1		144		5.9		3		145		6.6		3	
	NB	U	65	853	61.2	28.9	43	55	65	815	62.2	29.9	46	53	64	913	63.3	34.7	50	76	64	916	62.7	40.7	50	95
		LT	68		55.9		43		67		59.8		46		79		59.9		50		78		59.9		50	
		TH	631		23.7		55		581		24.5		53		718		30.0		76		721		37.2		95	
		RT	89		21.2		53		102		20.7		51		52		27.1		74		53		32.9		94	
	EB	LT	32	150	72.1	48.8	12	23	30	158	72.2	49.1	11	28	60	181	70.3	53.1	24	25	60	181	69.4	52.2	23	25
		TH	60		57.2		23		72		55.8		28		71		55.9		25		71		55.0		25	
		RT	58		27.2		22		56		28.1		25		50		28.4		23		50		27.7		22	
	Intersection		2519	0	30.1		0	0	2496	0	36.8		0	0	2787	0	38.2		0	0	3004	0	45.2		0	0
Zanker Road and River Oaks Parkway	SB	U	0	889	0.0	16.6	27	27	0	1114	0.0	15.0	27	27	0	1820	0.0	33.7	122	122	0	2016	0.0	34.5	144	144
		LT	123		58.7		27		125		59.4		27		486		77.0		122		502		80.9		144	
		TH	627		11.3		19		617		11.6		20		1056		21.0		55		1119		23.1		67	
		RT	139		3.1		0		372		5.8		1		278		6.4		1		395		8.1		2	
	WB	U	1	511	50.0	37.1	54	54	1	511	57.2	38.1	55	55	1	427	50.0	120.5	13	525	1	354	69.7	184.3	12	762
		LT	148		64.3		54		148		65.3		55		61		93.0		13		51		131.2		12	
		TH	194		45.7		48		194		47.3		49		111		91.9		104		94		138.8		121	
		RT	168		3.3		1		168		3.3		1		254		140.0		525		208		218.5		762	
	NB	U	4	924	60.5	15.4	13	34	4	951	71.7	15.8	13	36	3	936	138.4	150.1	5	603	3	831	145.4	217.0	5	852
		LT	36		61.4		13		36		63.4		13		13		123.3		5		12		151.0		5	
		TH	791		14.8		34		818		15.1		36		844		160.2		603		747		231.6		852	
		RT	93		1.4		0		93		1.4		0		76		43.7		0		69		73.6		0	
	EB	U	0	396	0.0	50.8	4	4	0	416	0.0	62.7	108	108	0	394	0.0	120.0	74	74	0	539	0.0	133.0	339	339
		LT	153		72.5		4		171		85.5		108		198		164.1		74		187		215.3		339	
		TH	164		52.4		4		166		63.6		64		165		82.1		74		249		102.9		188	
		RT	79		5.8		4		79		11.5		27		31		39.2		74		103		56.2		198	
	Intersection		2720	0	25.0		0	0	2992	0	25.8		0	0	3577	0	84.1		0	0	3740	0	103.4		0	0
Zanker Road & De Soto Road	SB	U	12	857	63.3	6.4	0	8	11	1084	67.9	6.2	0	10	8	1741	109.6	9.4	6	33	9	1934	120.0	9.4	7	34
		LT	0		0.0		0		0		0.0		0		0		0.0		6		0		0.0		7	
		TH	805		5.7		8		1033		5.6		10		1700		9.0		33		1891		8.9		34	
		RT	40		3.6		7		40		4.4		9		33		8.2		32		34		8.2		33	
	WB	LT	0	0	0.0	0.0	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0	0	0	0	0	0.0	0.0	0	0
		TH	0		0.0		0		0		0.0		0		0		0.0		0		0		0.0		0	
		RT	0		0.0		0		0		0.0		0		0		0.0		0		0		0.0		0	
	NB	U	0	1103	0.0	6.5	32	32	0	1148	0.0	6.5	34	34	0	1229	0.0	126.7	60	829	0	1080	0.0	169.6	139	1,010
		LT	84		67.9		32		84		69.0		34		106		94.5		60		94		107.1		139	
		TH	1018		1.4		3		1063		1.5		3		1123		129.7		829		986		175.6		1,010	
		RT	1		1.1		0		1		1.3		0		0		0.0		622		0		0.0		774	
	EB	LT	26	106	50.4	16.6	7	7	26	106	49.9	16.4	7	7	24	152	110.3	22.7	8	8	25	153	133.8	27.2	8	8
		TH	0		0.0		0		0		0.0		0		0		0.0		0		0		0.0		0	
		RT	80		5.6		2		80		5.5		2		128		6.3		3		128		6.4		3	
	Intersection		2066	0	7.0		0	0	2338	0	6.8		0	0	3122	0	56.2		0	0	3167	0	64.9		0	0

Intersection	Approach	Movement	Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)		Average Simulated TOTAL Volume (vph)		Average Total Vehicular Delay (sec/veh)		Average Queue Length (feet)	
Tasman Drive and Champion Court	SB	LT	66	149	61.3	36.3	24	24	67	150	21.0	13.9	3	3	63	156	71.7	36.8	27	27	65	158	24.5	17.1	4	5
		TH	9		59.9		6		9		23.2		2		4		73.2		4		4		19.9		3	
		RT	74		11.2		6		74		6.4		2		89		10.5		5		89		11.6		5	
	WB	U	0	690	0.0	4.8	9	9	0	753	0.0	7.1	4	11	0	1138	0.0	3.8	12	12	0	1218	0.0	10.7	4	25
		LT	23		72.4		9		24		31.4		4		24		89.6		12		26		36.6		4	
		TH	659		2.4		4		721		6.3		10		1109		1.9		4		1187		10.1		24	
		RT	8		5.8		4		8		8.0		11		5		5.1		4		5		10.0		25	
	NB	LT	39	60	57.9	40.8	13	13	40	61	20.7	19.8	4	4	41	57	72.8	57.4	17	17	41	57	27.1	25.2	5	5
		TH	1		57.4		0		1		26.2		1		0		0.0		0		0		0.0		1	
		RT	20		6.5		1		20		17.6		2		16		17.8		2		16		20.2		2	
	EB	U	0	850	0.0	5.3	7	8	0	894	0.0	6.9	3	13	0	1496	0.0	16.1	8	62	0	1405	0.0	8.4	4	27
		LT	19		68.0		7		20		29.7		3		20		75.3		8		20		37.5		4	
		TH	827		3.9		8		869		6.4		13		1471		15.3		62		1380		7.9		27	
		RT	4		6.5		8		5		13.6		0		5		12.3		62		5		21.6		0	
	Intersection		1749	0	9.0		0	0	1858	0	8.0		0	0	2847	0	13.1		0	0	2838	0	10.2		0	0
Vista Montana & Renaissance Drive	SB	LT	308	485	14.0	13.8	26	28	406	582	8.2	7.6	18	18	441	612	14.3	14.2	35	38	440	612	9.6	9.1	24	24
		RT	177		13.4		28		176		6.3		18		171		14.1		38		172		7.7		23	
	NB	LT	32	633	39.3	31.2	6	148	34	750	36.4	22.4	5	120	45	641	31.4	9.4	7	17	45	722	35.5	23.3	7	103
		RT	601		30.8		148		716		21.8		120		596		7.7		17		677		22.5		103	
	EB	LT	96	105	44.9	41.5	20	20	96	105	37.8	35.1	17	17	84	99	29.9	26.5	11	11	84	99	41.6	36.4	17	17
		RT	9		5.4		0		9		6.0		0		15		7.5		0		15		7.0		0	
	Intersection		1223	0	25.2		0	0	1437	0	17.4		0	0	1352	0	12.8		0	0	1433	0	18.1		0	0