Appendix A

PAGE MILL ROAD EXPRESSWAY CONCEPTUAL PLAN — TECHNICAL MEMORANDUM AND PLAN LINE (HMH, 2015)

MEMORANDUM

To:	Dawn Cameron	**Date:**	March 26, 2015
From:	Steve Loupe, PE	**Job No.:**	4469.00

RE: Page Mill Road Expressway Conceptual Plan - Technical Memorandum

HMH was retained by the County of Santa Clara Roads and Airports Department and the City of Palo Alto to develop a design analysis to relieve traffic congestion and improve bicycle and pedestrian connectivity along Page Mill Road Expressway between Interstate 280 and Birch Street.

This project memorandum addresses design parameters and technical challenges of the project area. HMH has developed the conceptual plan in accordance with current design manuals and standards listed in the Design Standards section.

Project Background

Page Mill Road is a County owned expressway running northeast - southwest in the northwest part of Santa Clara County. This Expressway serves as a primary thoroughfare to both the City of Palo Alto and Stanford University, providing connection with US 101 to the northeast and I-280 to the southwest. This plan line study aims to provide a basis for future assessment and implementation of alternatives which may provide the greatest benefit to this highly congested region.

For the purposes of this memo, the approximately 1.3 mile segment along Page Mill Road from Caltrans Right-of-Way at Interstate 280 to the intersection of Page Mill Road with Foothill Expressway / Junipero Serra Boulevard will be considered "PM WEST". Similarly, the approximately 1.6 mile segment of Page Mill Road from its intersection with Foothill Expressway / Junipero Serra Boulevard to Birch Street will be considered "PM EAST". While Page Mill Road is officially considered part of the County's Expressway system, the roadway operates as two substantially different roadway types as defined by Caltrans Highway Design Manual section 62.3 - Highway Types. PM WEST operates with relatively high speeds and limited access control through a rural area similar to a *Throughway.* Conversely, PM EAST operates with a high intersection density, frequent property access and developed adjacent properties similar to a *Major Street.*

Sidewalks exist on one or both sides of PM EAST. A Class I multi-use trail exists on the south side of Page Mill Road from Deer Creek Road to Foothill Expressway.

Per the Santa Clara County's Expressway Plan 2040, PM WEST currently operates at Level of Service (LOS) F and PM East operates at LOS E. Similarly, the intersection of Page Mill Road and Foothill Expressway currently operates at a LOS F.

Description of Improvements

Along PM WEST, the plan line study aims to improve existing congestion by adding a single lane to eastbound and westbound roadways for a total of 3 lanes each direction. In order to add an additional lane in each direction, existing landscaped medians were reduced or converted to concrete barriers and existing lane widths were reduced from 12' to 11'. These modifications allowed roadway improvements to remain largely within existing curb alignments. A class I multi-use trail was added along the south side of Page Mill Road between I-680 and Deer Creek Road.

Along PM EAST, the existing four lane roadway configuration was maintained with isolated modifications to medians and curb returns at particularly impacted intersections including Hanover Street, Hansen Way, and El Camino Real. These modifications aim to increase turning lane storage, raise intersection LOS, and improve bicycle and pedestrian safety.

At the Page Mill Road intersection with Foothill Expressway / Junipero Serra Boulevard, both near-term and long-term solutions were proposed. Near-term improvements include transitioning from 3 lanes west of Foothill Expressway to 2 lanes east of Foothill Expressway and extending a Class I multi-use trail from Old Page Mill Road to the future Stanford Perimeter Trail. Long-term improvements will grade separate this intersection allowing Page Mill Road through traffic to cross without obstruction. A signal will be added to facilitate Foothill Expressway through traffic and all turning movements.

Design Standards

- American Association of State Highway & Transportation Officials (AASHTO) Standards
- ADA & Pedestrian Facilities Standards
- Caltrans Highway Design Manual
- Caltrans Standard Plans & Specifications
- County of Santa Clara Expressway Bicycle Accommodation Guidelines
- County of Santa Clara Standard Details and Specifications Manual
- City of Palo Alto Bicycle & Pedestrian Transportation Plan

Basis of Design

The recommended improvements along Page Mill Road were developed based on numerous design constraints and criteria including:

PM WEST

- Minimize grading impacts to hillsides
- Limit additional right of way needs
- Maintain a continuous Class I multi-use trail from I-280 to Foothill Expressway

PM EAST

- Minimize utility conflicts with proposed improvements
- Limit additional right of way needs
- Maintain aesthetic value

PAGE MILL ROAD / FOOTHILL EXPRESSWAY GRADE SEPARATION ALTERNATIVES

- Separate and eliminate signal for Page Mill Road through traffic
- Minimize utility conflicts with proposed improvements
- Limit additional right of way needs
- Maintain aesthetic value
- Accommodate bicycles and pedestrians approaching and through the intersection

Due to the difference of roadway functions, a design speed of 50 mph was used for PM WEST while a design speed of 35 mph was used for PM EAST. These assignments are consistent with posted speed limits in the project area.

For alternative analysis studies, the Page Mill Road / Foothill Expressway grade separation through traffic was given a design speed of 50 mph while other movements were assigned a 35 mph design speed.

Horizontal Alignment

The horizontal geometry was developed in accordance with the latest Caltrans Highway Design Manual.

Curve Radii

As PM EAST is generally a straight alignment, the only horizontal curves in the project exist on PM WEST. Proposed alignments match existing curve radii and superelevation rates.

For alternative analysis design, a conservative -2.0% crown was assumed for new roadway approaches to the Page Mill Road / Foothill Expressway grade separation. Per

Caltrans HDM Figure 202.2 - Maximum Comfortable Speed on Horizontal Curves for a -2.0% crown at 50 mph, a minimum curve radius of 1395 ft is allowable. In these instances, a curve radius of 1500 ft was used.

Stopping Site Distance

Per Caltrans HDM Table 201.1 - Sight Distance Standards, PM WEST was assigned a stopping sight distance of 430'.

Due to the scope of improvements for PM EAST, no additional sight distance analysis was performed.

Cross Section

The roadway cross section was developed based on County preferred lane configurations including:

- 11' minimum through lanes
- 10' minimum turning lanes
- 6' minimum roadway shoulders

Vertical Alignment

The existing vertical alignment was not analyzed as part of this project. As further detailed in the Grade Separation Alternatives section, vertical curves, grades and clearances were determined for preliminary design of grade separated structures.

Crest Vertical Curves

Crest vertical curves were designed in accordance with Caltrans HDM Figure 201.4 - Stopping Sight Distance on Crest Vertical Curves yielding a K_{min} = 139 at 50 mph and K_{min} = 47 at 35 mph.

Sag Vertical Curves

Sag vertical curves were designed in accordance with Caltrans HDM Figure 201.5 - Stopping Sight Distance on Sag Vertical Curves yielding a K_{min} = 97 at 50 mph and K_{min} = 49 at 35 mph.

Grade

As advised for level terrain, and in order to maintain ADA standards, substantial changes to existing grade with connected pedestrian facilities maintained a maximum longitudinal grade of 5.0%.

Roadways detached from the pedestrian path of travel attained grades up to 5.9% in order to reduce earthwork volumes and conform lengths.

Structure Depth

Structure depths for Page Mill Road grade separation options are based on Caltrans HDM Section 214.8-1(b) as follows:

Structures with single spans of 100' or less, use d/s=0.06

- "Page Mill Under" Alternative
  Span = 34'; therefore Minimum Structure Depth = 2'-1/2"

- "Page Mill Split" Alternative
  Span = 34'; therefore Minimum Structure Depth = 2'-1/2"

Continuous structures with multiple spans of more than 100 feet, use d/s=0.04

- "Page Mill Over" Alternative
  Span = 150'; therefore Minimum Structure Depth = 6'-0"

Vertical Clearance

An ultimate vertical clearance of 16.5' along Page Mill Road was held in conformance with Caltrans HDM Section 309.2-1(a). Said clearance is the governing factor for the profiles of both "Page Mill Under" and "Page Mill Split" options discussed below.

Because the "Page Mill Over" option is assumed to be constructed over active traffic lanes, the grade line of the overcrossing structure is based upon assumed falsework depths during construction. Four 11' vehicular lanes are expected to be operational during construction with two adjoining 8' shoulders. Using the structure depth found above for "Page Mill Over", Caltrans HDM Table 204.8 - Falsework Span and Depth Requirements for a 61' traffic opening yields a falsework depth of 3'-4".

Superelevation

Visual inspection of the existing roadway concluded that PM EAST exists with a standard crown, assumed to be -2.0%. PM WEST has a series of positively superelevated horizontal curves.

Class I Bike Lanes

Bicycle facilities proposed are consistent with Caltrans HDM Chapter 1000 - Bicycle Transportation Design. The plan line improvements assume an 8' paved pathway with 2' shoulders on each side of a Class I trail.

Future study should pay particular attention to Caltrans HDM Section 1003.1(6) mandatory design criteria: "The minimum separation between the edge of pavement of

a one-way or a two-way bicycle path and the edge of traveled way of a parallel road or street shall be 5 feet plus the standard shoulder widths."

The proposed Class I trail alignment complies with this criteria and provides a 3' landscape strip for aesthetic improvements between the bicycle shoulder and the roadway curb as recommended by the City of Palo Alto. However, value engineering analysis should evaluate the benefit of this landscape strip versus the cost of additional retaining walls necessary to retain the hilly terrain adjacent to the pathway.

Alternatives Along Page Mill Road

The project evaluated the potential widening of PM EAST to 6 lanes through Birch Ave. After a conceptual layout was provided to the County, discussions with the County and the City of Palo Alto determined that the impacts to right of way and aesthetic value outweighed the benefits of a roadway widening. Alternatively, the plan line study recommends localized intersection improvements to modify turn pockets and medians with particular focus at El Camino Real, Hanover Street and Hansen Way.

Additional efforts should address maintenance of access to Old Page Mill Road at its eastern termini on Page Mill Road. The road currently serves approximately 15 residences near the western limit of the road by Christopher Lane. The eastern access to Page Mill Road allows vehicles to enter either eastbound or westbound traffic at a dedicated through intersection. Due to the proximity to the Foothill Expressway / Junipero Serra Blvd intersection and the speed of oncoming vehicles, this cross-traffic can be dangerous and should be evaluated further.

Additional traffic studies are suggested to determine the need for a free flow right turn from Page Mill Road onto Deer Creek Road. While eliminating the pork chop would better accommodate the Class I multi-use trail, it's removal will impact the flow of right turning vehicles.

Alternatives at Foothill Expressway / Junipero Serra Intersection

As part of the project study, a variety of improvement concepts were evaluated to address congestion issues at the intersection of Page Mill Road and Foothill Expressway / Junipero Serra Blvd. These options were considered and rejected based upon numerous factors including right of way needs, ultimate reduction in roadway congestion, and efficiency of bicycle and pedestrian movements.

Alternatives considered but rejected include:

- Grade separation of Foothill Expressway / Junipero Serra Blvd crossing over an at-grade Page Mill Expressway

- Grade separation of Foothill Expressway / Junipero Serra Blvd crossing under an at-grade Page Mill Expressway

- Grade separation of Foothill Expressway / Junipero Serra Blvd crossing under a partially depressed Page Mill Expressway

- Grade separation of Page Mill Road crossing over an at-grade Foothill Expressway / Junipero Serra Blvd with all turning movements (right and left) occurring inside, and under, two elevated through-traffic structures

- Grade separation of Page Mill Road crossing under an at-grade Foothill Expressway / Junipero Serra Blvd with all turning movements (right and left) occurring inside, and over, two depressed through-traffic trenches.

- Grade separation of Page Mill Road crossing under a raised Foothill Expressway / Junipero Serra Blvd with all turning movements (right and left) occurring inside, and over, two depressed through-traffic trenches.

- Multi-lane roundabout

The preferred alternatives, as selected by the project team, which were progressed to conceptual design are:

- "Page Mill Over"
- "Page Mill Under"
- "Page Mill Split"

Appendix A contains a brief description and evaluation of each option with regard to the following:

- Right of Way Acquisition
- Visual Impacts
- Pedestrians and Bicycles Accommodations
- Utility Impacts
- Impact to Adjacent Intersections
- Construction Staging
- Cost

Community Outreach

The project team held three community outreach meetings with public participation in both the City of Palo Alto and the Town of Los Altos Hills. These meetings, which included discussion of the County's overall expressway system, introduced the concepts and alternatives to the public and received community input. Exhibits of each project were displayed alongside County staff and consultants who were available to discuss the intricacies of design and alternative considerations. Members of the public were

given an avenue to formally record comments and concerns of the various design concepts.

With regard to this project, two particular concerns were received consistently throughout the public outreach process. First, the need for improved bicycle facilities both along and across Page Mill Road with particular attention at the intersection of Page Mill Road and Hanover Street. Secondly, the aesthetic concerns associated with a grade separation structure at the intersection of Page Mill Road and Foothill Expressway / Junipero Serra Blvd.

Stakeholder Coordination

Throughout the plan line study the County of Santa Clara held multiple meetings with agency stakeholders for information and input regarding design progression. A Page Mill Road Concept Study Technical Working Group Meeting was held on Wednesday December 17, 2014 with attendance from Caltrans, the City of Palo Alto, the Town of Los Altos Hills, and numerous County sub-consultants including HMH and Kimley-Horn.

Additional focused discussions were held between the City of Palo Alto and the County of Santa Clara regarding specifics of lane configurations and intersection improvements on January 22, 2015.

Preliminary Cost Estimates

In coordination of the plan line alignments, HMH performed planning-level preliminary estimates of project improvements divided into several categories as directed by the city. Preliminary estimates quantified major items based on conceptual layouts including:

- Earthwork
- Structural Section & Concrete
- Drainage
- Specialty Items
- Traffic Items
- Structures
- Right of Way Acquisition

Construction allowances of 15% were applied to capture undetermined costs associated with minor items, mobilizations and roadway additions. A contingency of 15% was added to cover unknown cost items.

Additionally, an allowance of approximately 35% was added to the construction cost to estimate design and administrative costs associated with additional planning, environmental studies, plan development and construction.

At the County of Santa Clara's direction separate estimates were performed for the following project subsets:

- Page Mill Expressway - West of Foothill Expressway - Roadway
- Page Mill Expressway - West of Foothill Expressway - Trail
- Page Mill Expressway - East of Foothill Expressway to El Camino Real
- Page Mill Expressway at El Camino Real
- "Page Mill At-Grade" Option
- "Page Mill Over" Option
- "Page Mill Under" Option
- "Page Mill Split" Option

Conclusion

Page Mill Road experiences significant congestion in both the AM and PM peak periods. While construction of a grade separation is necessary to obtain a target level of service rating, interim improvements to widen PM WEST to six lanes in parallel with intersection improvements along PM EAST should help facilitate the flow of traffic to and from Foothill Expressway / Junipero Serra Blvd.

Please feel free to contact me if you have any questions or comments regarding the criteria, alternative analysis, or project history discussed in this memorandum.

Sincerely,

Steve Loupe, PE
Civil Engineering Manager

APPENDIX A

PAGE MILL ROAD GRADE SEPARATION ALTERNATIVE ANALYSIS								
Option	**Description**	**Right-of-Way Acquisition**	**Visual Impacts**	**Pedestrians and Bicycles**	**Impact to Utilities**	**Impact to Adjacent Intersections**	**Construction Staging**	**Preliminary Cost Estimate**
"Page Mill Over"	Page Mill Road through traffic will be raised to cross above Foothill Expressway. Page Mill Road turning movements and Foothill Expwy will remain at existing grade.	Minimal.	Significant.	Class I facility west of Foothill Expwy / Junipero Serra Blvd with standard sidewalks east of Foothill Expwy / Junipero Serra Blvd	Minimal	Coyote Hill Road will be converted to a right-in, right-out movements only. Porter Drive can be maintained as a signalized intersection with all movements	Maintains through traffic under bridge construction.	$48 M
"Page Mill Under"	Page Mill Road thru traffic will be lowered to cross underneath Foothill Expressway. Page Mill Road turning movements and Foothill Expwy will be at existing grade.	More than minimal.	Minimal.	Class I facility west of Foothill Expwy / Junipero Serra Blvd with standard sidewalks east of Foothill Expwy / Junipero Serra Blvd	Requires relocation of PG&E gas transmission main and Hetch-Hetchy water lines.	Porter Drive and Coyote Hill Road can be maintained as signalized intersections with all movements	Maintains through traffic around bridge construction.	$44 M
"Page Mill Split"	Page Mill Road thru traffic will be lowered to cross underneath Foothill Expressway. Page Mill Road turning movements and Foothill Expwy will be raised at intersection.	More than minimal.	Moderate.	Class I facility west of Foothill Expwy / Junipero Serra Blvd with standard sidewalks east of Foothill Expwy / Junipero Serra Blvd	Requires PG&E gas main relocation. Hetch-Hetchy water lines may be protected in place.	Porter Drive and Coyote Hill Road can be maintained as signalized intersections with all movements	Maintains through traffic around bridge construction.	$49 M

PAGE MILL ROAD EXPRESSWAY

FINAL PLAN LINE

CITY OF PALO ALTO, CALIFORNIA

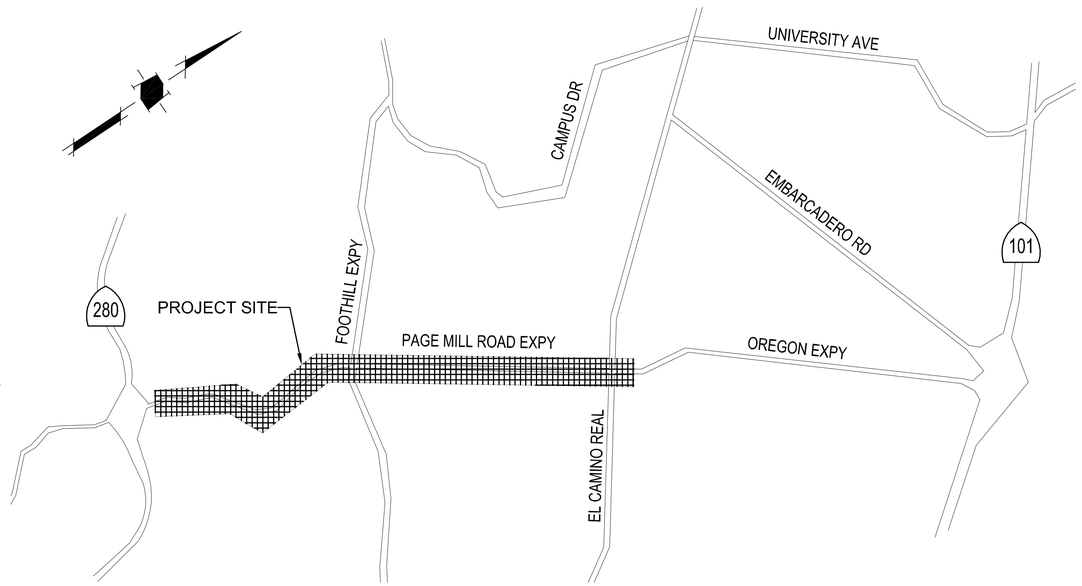
SHEET INDEX

NOTES

1. THIS PLAN LINE CONFORMS TO THE REQUIREMENTS AND DETAILS OF THE COUNTY OF SANTA CLARA ROADS & AIRPORTS DEPARTMENT.

2. THIS PLAN LINE CONFORMS TO THE REQUIREMENTS AND DETAILS OF THE CITY OF PALO ALTO.

3. THE ULTIMATE LANE GEOMETRICS WILL BE AS APPROVED BY THE COUNTY OF SANTA CLARA AND THE CITY OF PALO ALTO DURING THE REVIEW AND PROCESSING OF CONSTRUCTION DESIGN DOCUMENTS.



SITE MAP
NOT TO SCALE

ABBREVIATIONS

EX	EXISTING
ESMT	EASEMENT
F/C	FACE OF CURB
PED	PEDESTRIAN
PROP	PROPOSED
R/W	RIGHT-OF-WAY
SWK	SIDEWALK

CITY OF PALO ALTO:

RECOMMEND APPROVAL: _____
APPROVED: _____
ADOPTED: _____

COUNTY OF SANTA CLARA:

RECOMMEND APPROVAL: _____
APPROVED: _____
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WORK ORDER
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TRANSIT BOOK

SUBMITTED:
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APPROVAL:
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REGISTERED PROFESSIONAL ENGINEER — ROY CABALTERA — No. C53981 Exp. 12-31-15 — CIVIL — STATE OF CALIFORNIA

PAGE MILL ROAD EXPRESSWAY

TITLE SHEET

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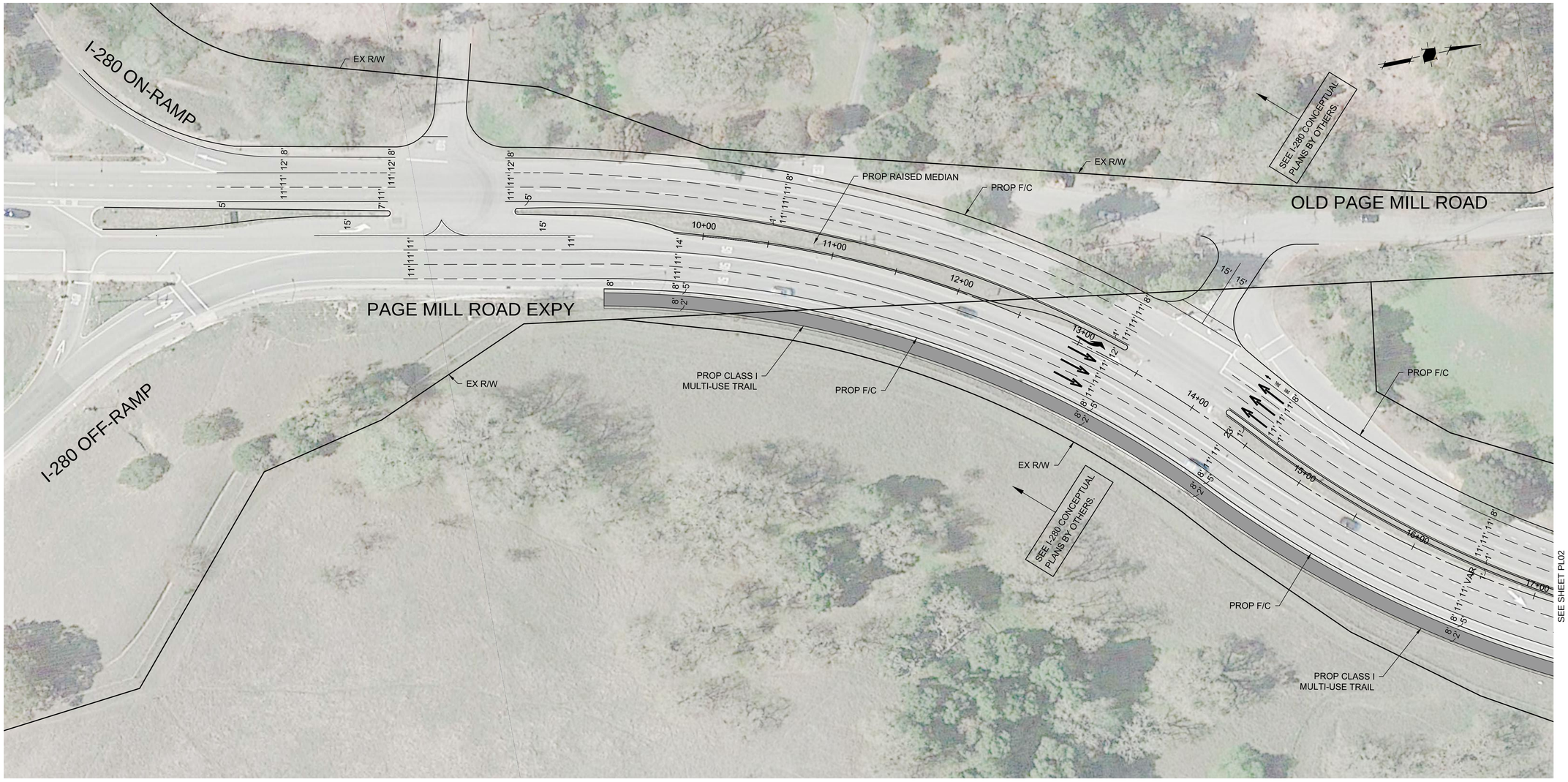

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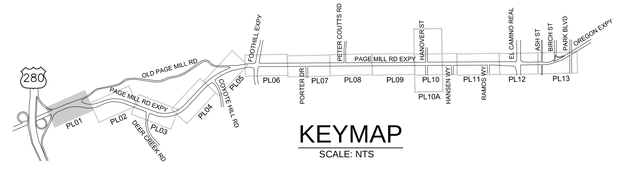

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PAGE MILL ROAD EXPRESSWAY

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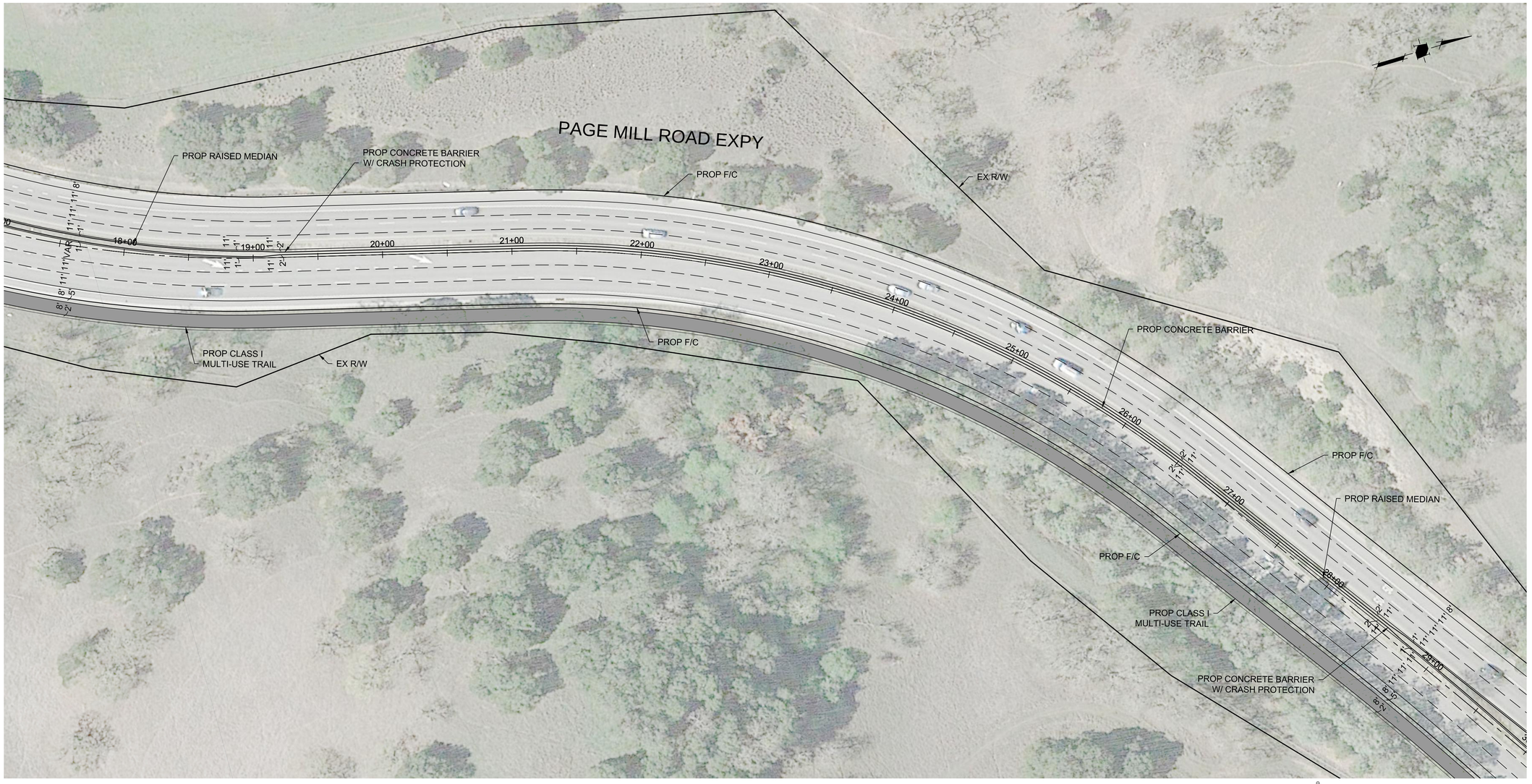

NOTE: INSTALL RADAR SPEED SIGNS FOR BOTH WESTBOUND AND EASTBOUND MOTORISTS.
LOCATION TO BE COORDINATED WITH TRAFFIC ENGINEER.

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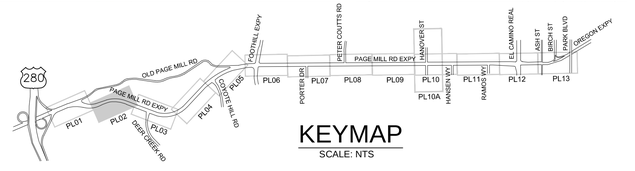

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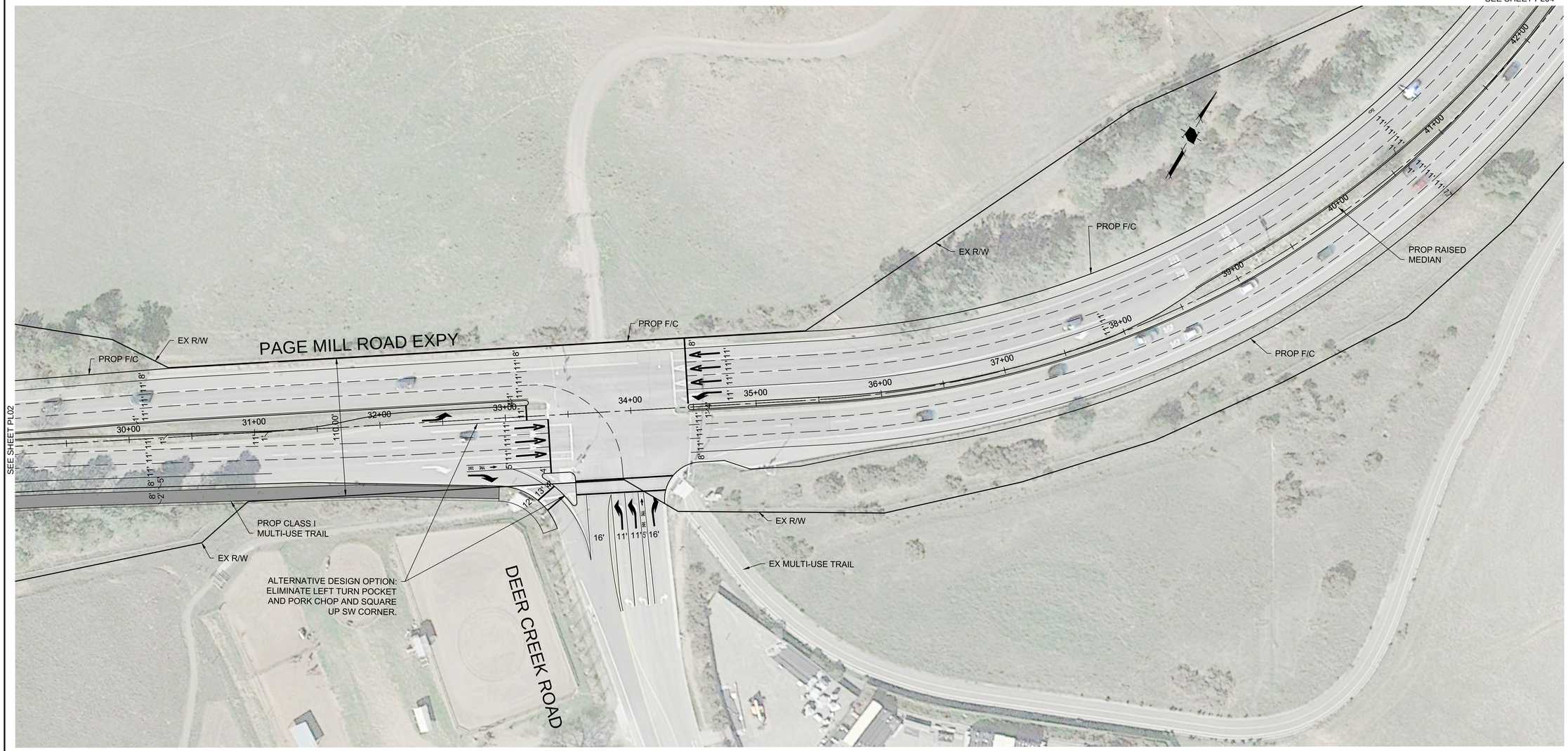

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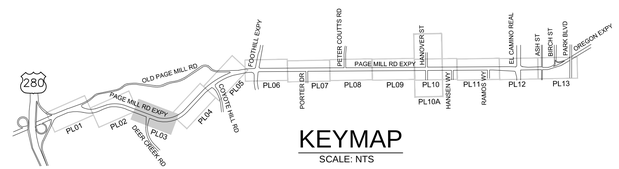

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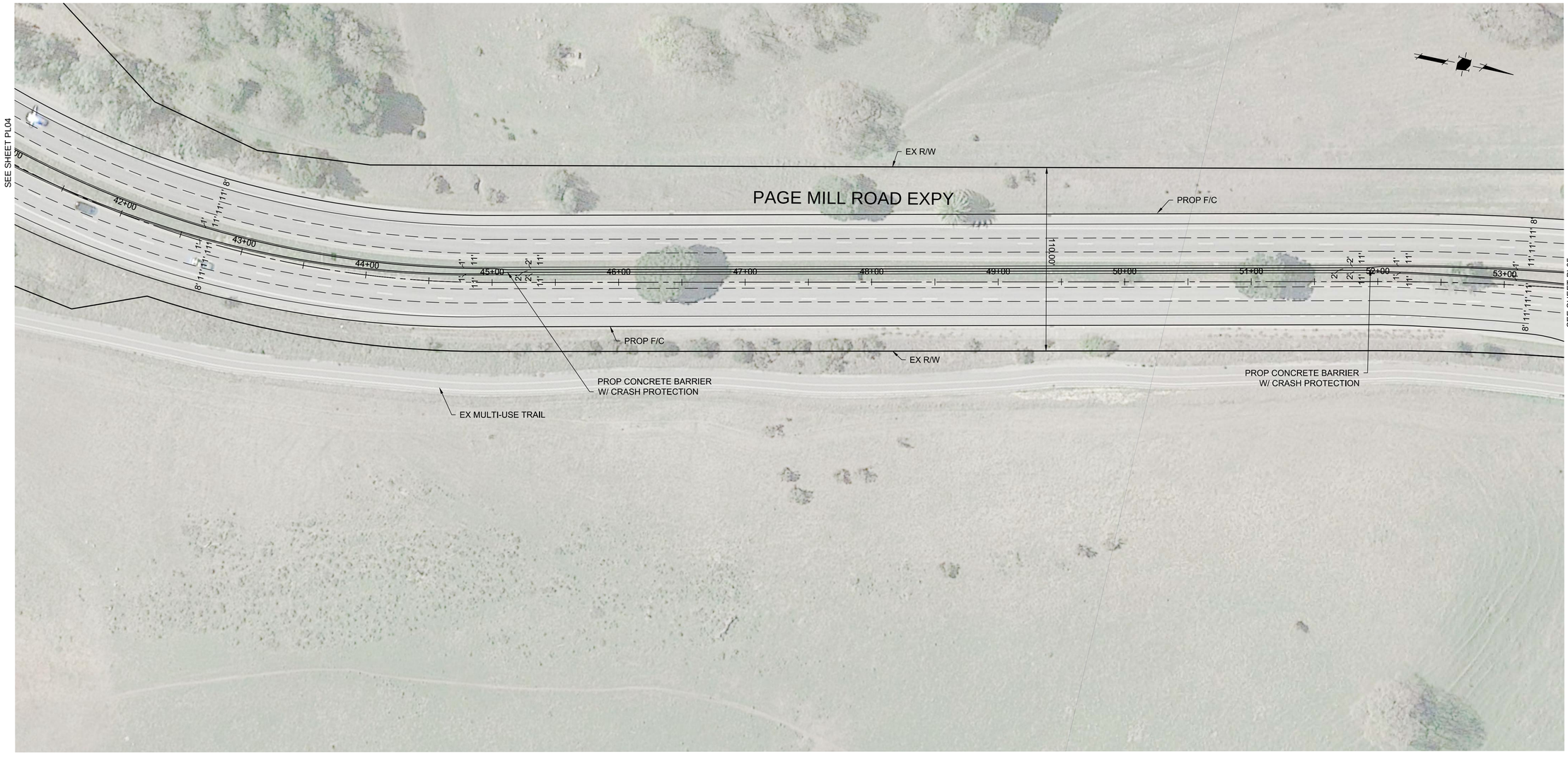

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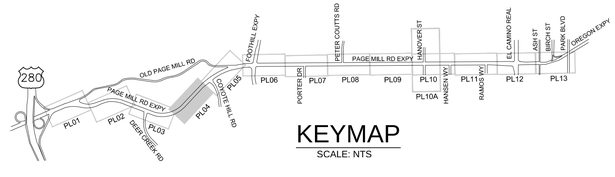

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PAGE MILL ROAD EXPRESSWAY

PLAN LINE

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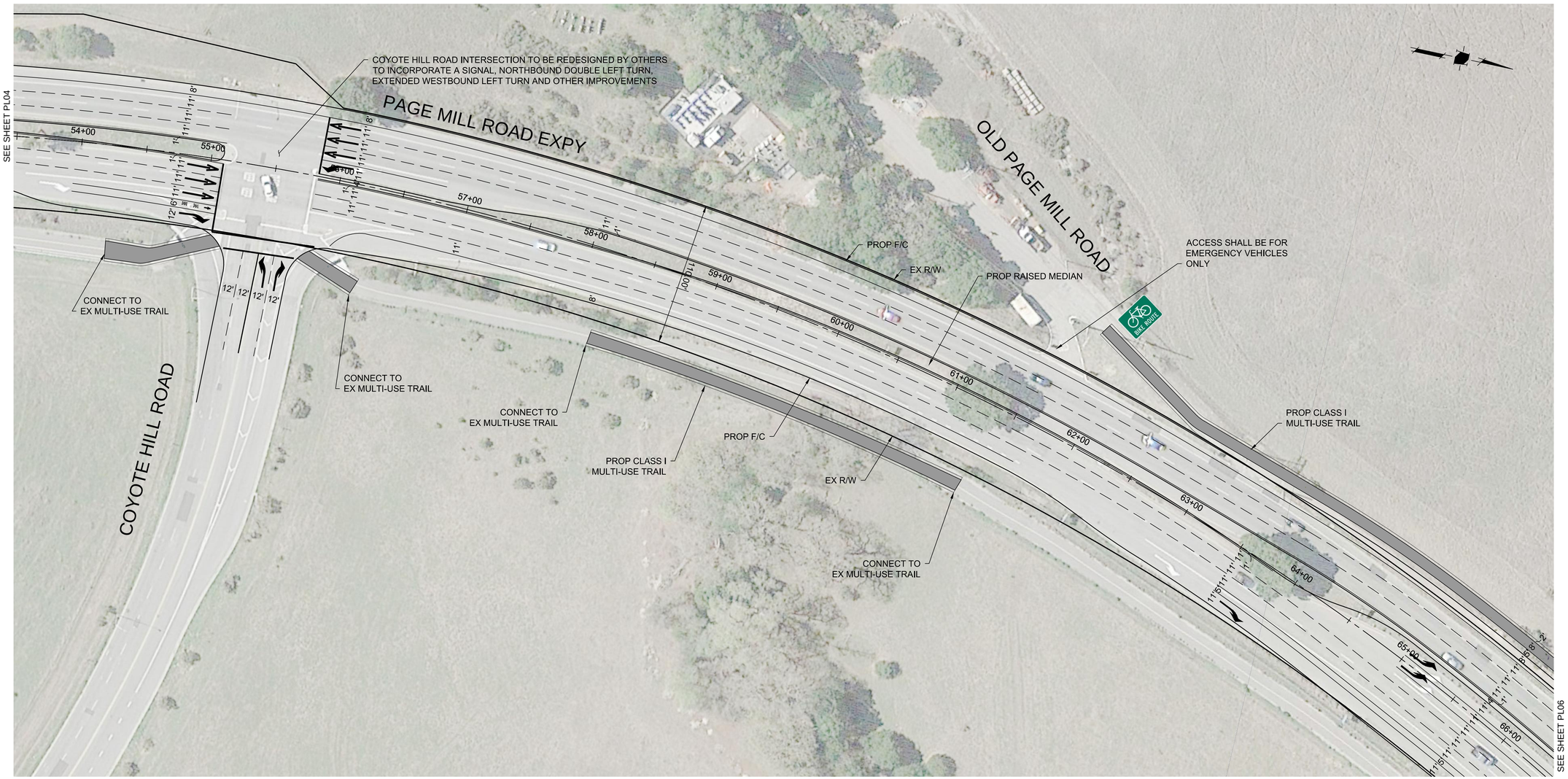

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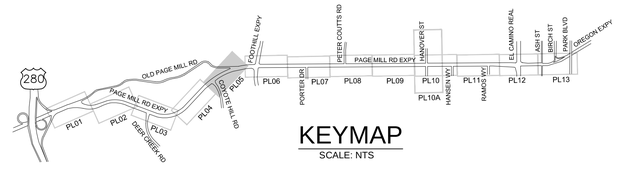

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NO.	REVISIONS	BY	DATE	APP'D

THE COUNTY OF SANTA CLARA 1850

COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

DESIGNED	SL	03-26-15 DATE
DRAWN	JC / BB	03-26-15 DATE
CHECKED	WJW / SK	03-26-15 DATE

WORK ORDER
LEVEL BOOK
TRANSIT BOOK

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER STEPHEN N. CLARK No. 63575 CIVIL STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ROY CABALTERA No. C53981 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

PAGE MILL ROAD EXPRESSWAY

PLAN LINE

DRAWING NO. PL05

SHT NO. 6 OF 19

PROJECT NO.	CONTRACT NO.	DATE.	SCALE
		03/26/15	

WIDEN ROADWAY TO EXTEND (2) THRU LANES AND DEDICATED RIGHT-HAND TURN LANE.

GEOMETRY SHOWN IS FOR THE AT-GRADE ALTERNATIVE. GRADE-SEPARATION ALTERNATIVES BEGIN AFTER SHEET TX01.

CONNECT TO STANFORD PERIMETER TRAIL

PROP CLASS I MULTI-USE TRAIL

PROP F/C

EX R/W

(STANFORD TRAIL)

JUNIPERO SERRA BLVD

CONFORM TO EX CURB

PED IMPROVEMENTS BETWEEN PETER COUTTS ROAD AND FOOTHILL EXPY TO BE DETERMINED AT A FUTURE TIME

PAGE MILL ROAD EXPY

EX R/W

PROP F/C

CONFORM TO EX F/C

FOOTHILL EXPY

SEE SHEET PL05

SEE SHEET PL07

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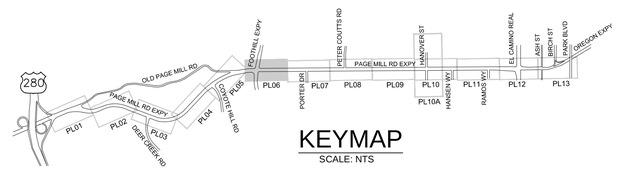
1 INCH = 40 FEET



KEYMAP

SCALE: NTS

Land Planning
Landscape Architecture
Civil Engineering
Utility Design
Land Surveying
Stormwater Compliance

1570 Oakland Road
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(408) 487-2200

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NO.	REVISIONS	BY	DATE	APP'D

COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

SL	03-26-15	DATE
DESIGNED JC / BB	03-26-15	DATE
DRAWN WJW / SK	03-26-15	DATE
CHECKED		DATE

WORK ORDER

LEVEL BOOK

TRANSIT BOOK

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER STEPHEN R. LOUPE No. 63575 CIVIL STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ROY CABALTERA No. C53981 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

PAGE MILL ROAD EXPRESSWAY

PLAN LINE

DRAWING NO. PL06

SHT NO. 7 OF 19

PROJECT NO.

CONTRACT NO.

DATE. 03/26/15

SCALE

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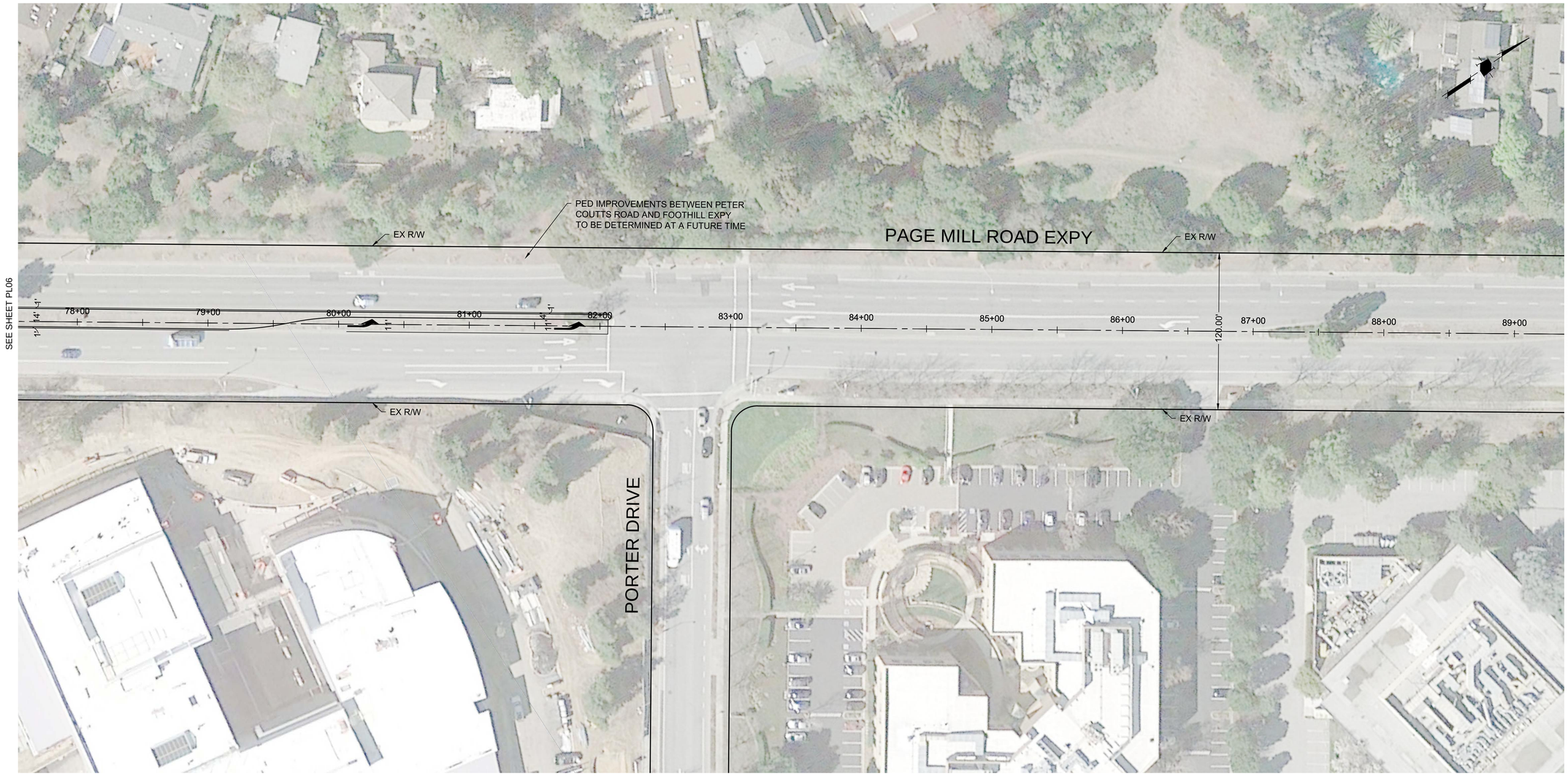

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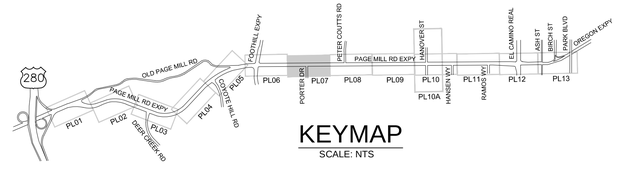

KEYMAP

SCALE: NTS

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NO.	REVISIONS	BY	DATE	APP'D

THE COUNTY OF SANTA CLARA 1850

COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

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WJW / SK	03-26-15	CHECKED / DATE

WORK ORDER

LEVEL BOOK

TRANSIT BOOK

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER STEPHEN R. KERR No. 63575 CIVIL STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ROY CABALTERA No. C53981 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

PAGE MILL ROAD EXPRESSWAY

PLAN LINE

PROJECT NO.

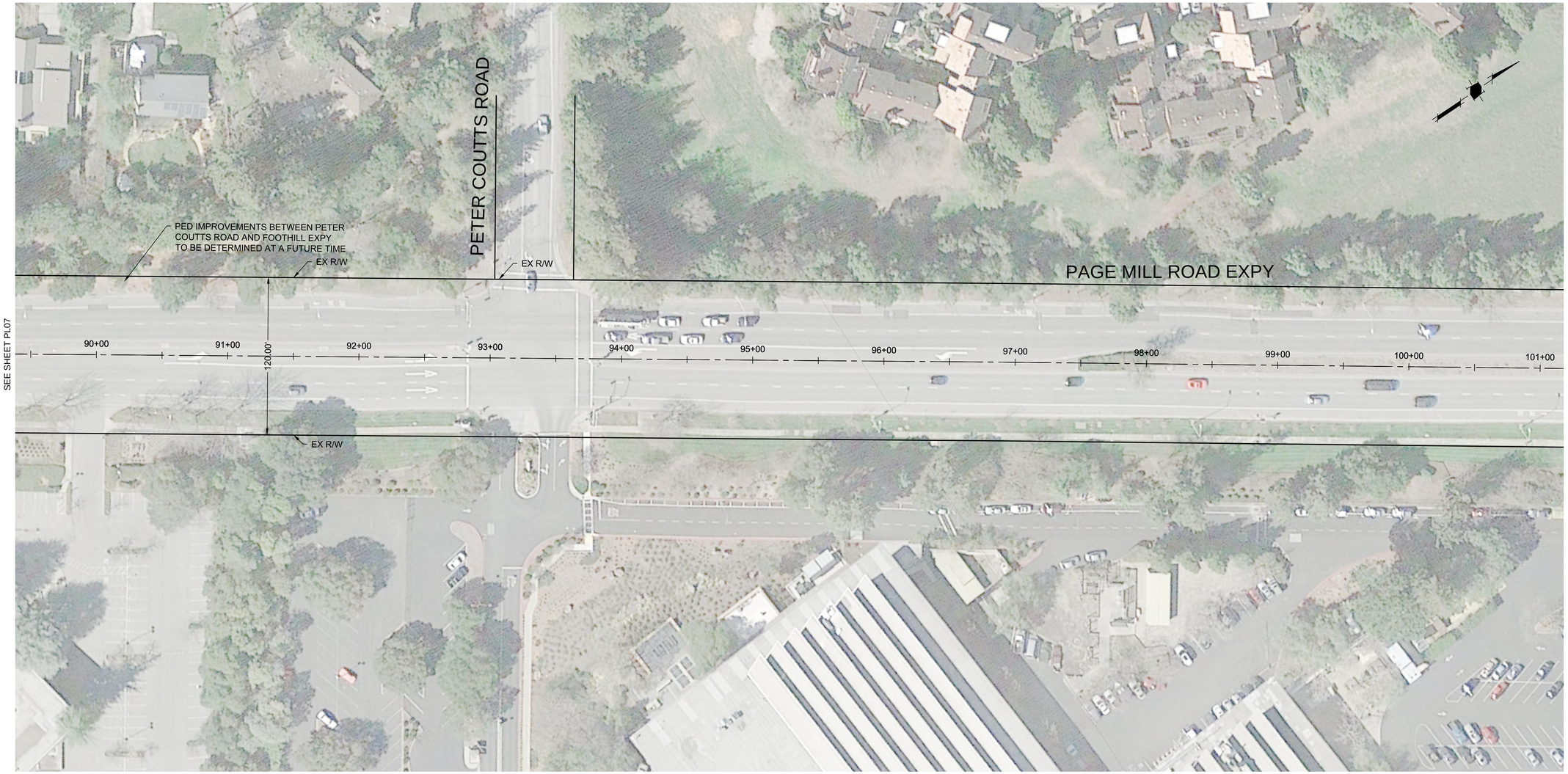
CONTRACT NO.

DATE. 03/26/15

DRAWING NO. PL07

SHT NO. 8 OF 19

SCALE



NO IMPROVEMENTS, FOR INFORMATION ONLY

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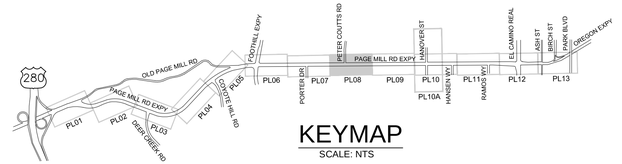

KEYMAP
SCALE: NTS

Land Planning
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NO.	REVISIONS	BY	DATE	APP'D

COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

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JC / BB	03-26-15		
DRAWN	DATE	LEVEL BOOK	
WJW / SK	03-26-15		
CHECKED	DATE	TRANSIT BOOK	

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER STEPHEN R. LOPER No. 63575 CIVIL STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ROY CABALTERA No. C53981 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

PAGE MILL ROAD EXPRESSWAY

PLAN LINE

DRAWING NO. PL08

SHT NO. 9 OF 19

PROJECT NO. | CONTRACT NO. | DATE. 03/26/15 | SCALE

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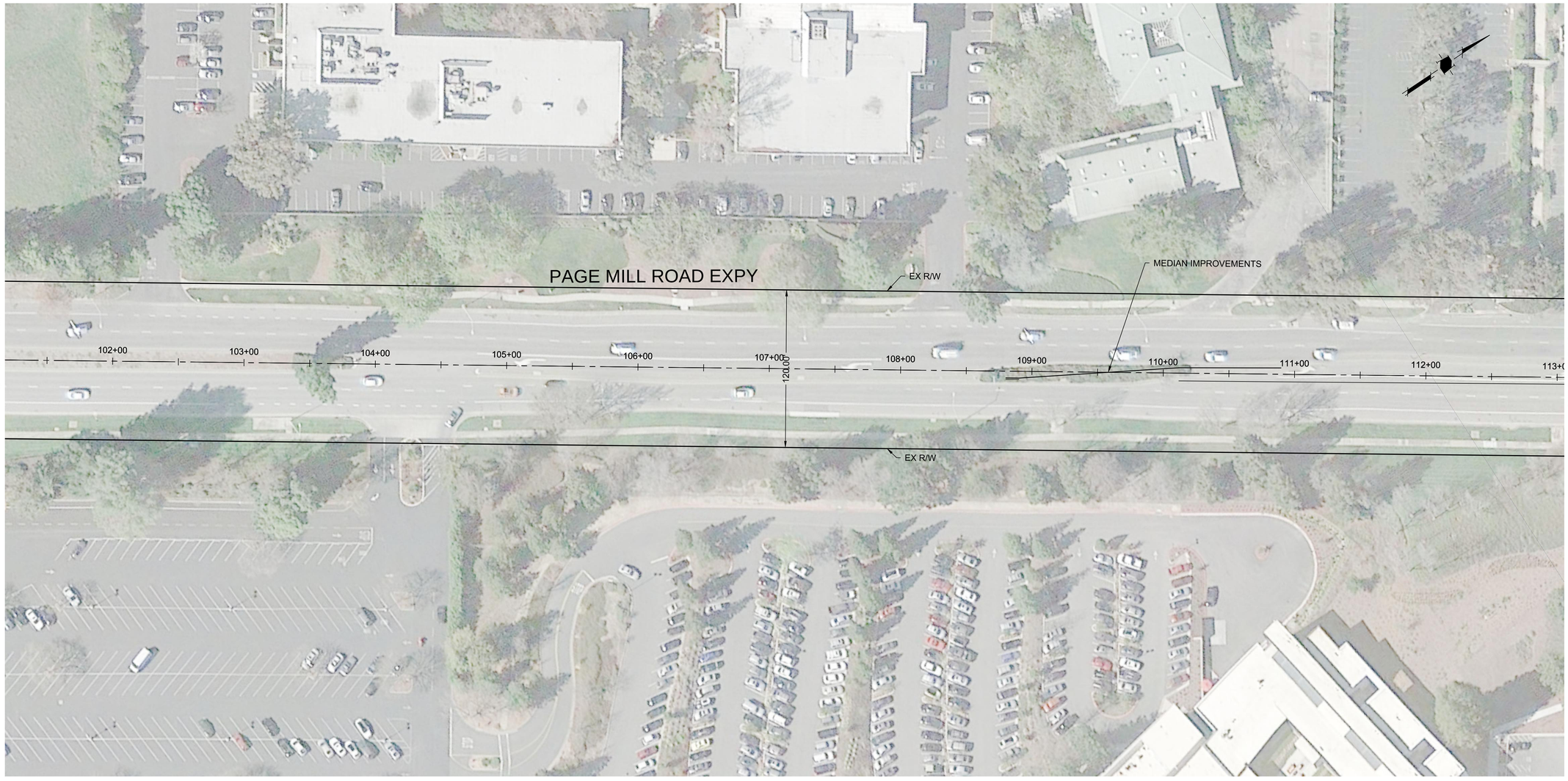

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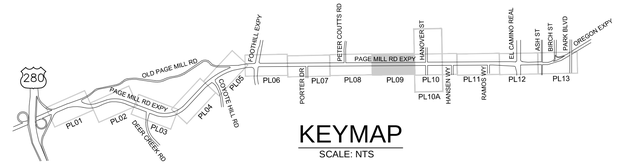

KEYMAP
SCALE: NTS

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NO.	REVISIONS	BY	DATE	APP'D

THE COUNTY OF SANTA CLARA 1850

COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

SL	03-26-15		
DESIGNED	DATE	WORK ORDER	
JC / BB	03-26-15		
DRAWN	DATE	LEVEL BOOK	
WJW / SK	03-26-15		
CHECKED	DATE	TRANSIT BOOK	

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER — STEPHEN R. CLAPP — No. 63575 — CIVIL — STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER — ROY CABALTERA — No. C53981 Exp. 12-31-15 — CIVIL — STATE OF CALIFORNIA

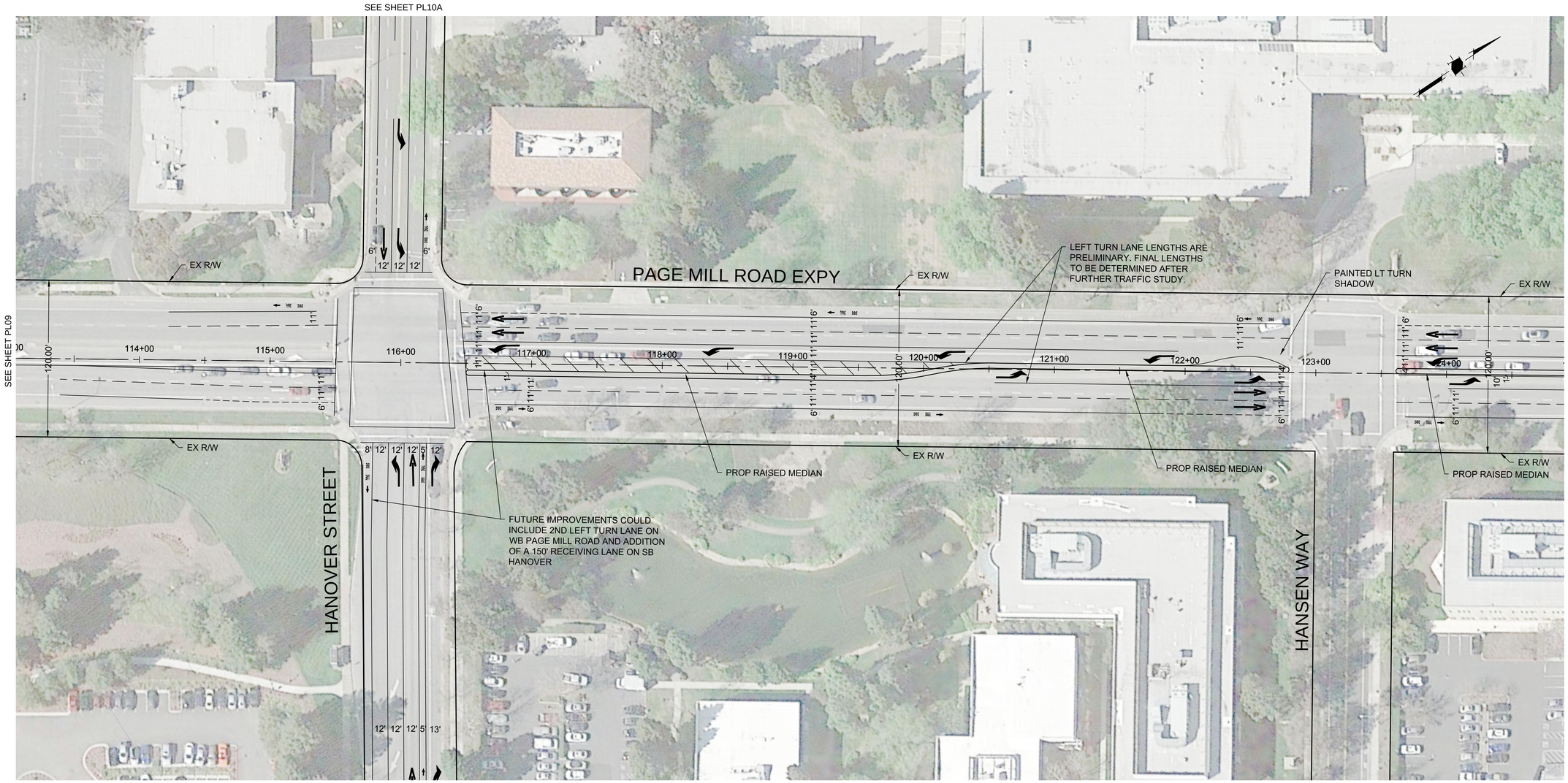
PAGE MILL ROAD EXPRESSWAY

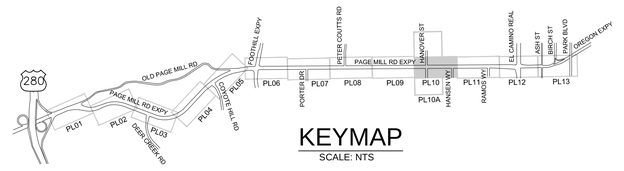
PLAN LINE

DRAWING NO. PL09

SHT NO. 10 OF 19

PROJECT NO.	CONTRACT NO.	DATE.	SCALE
		03/26/15	





KEYMAP
SCALE: NTS

0 20 40 80
1 INCH = 40 FEET

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COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

SL	03-26-15	WORK ORDER
DESIGNED	DATE	
JC / BB	03-26-15	LEVEL BOOK
DRAWN	DATE	
WJW / SK	03-26-15	TRANSIT BOOK
CHECKED	DATE	

SUBMITTED:
STEVE LOUPE
Civil Engineer
REGISTERED PROFESSIONAL ENGINEER STEPHEN R. LOUPE No. 63575 CIVIL STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer
REGISTERED PROFESSIONAL ENGINEER ROY CABALTERA No. C53981 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

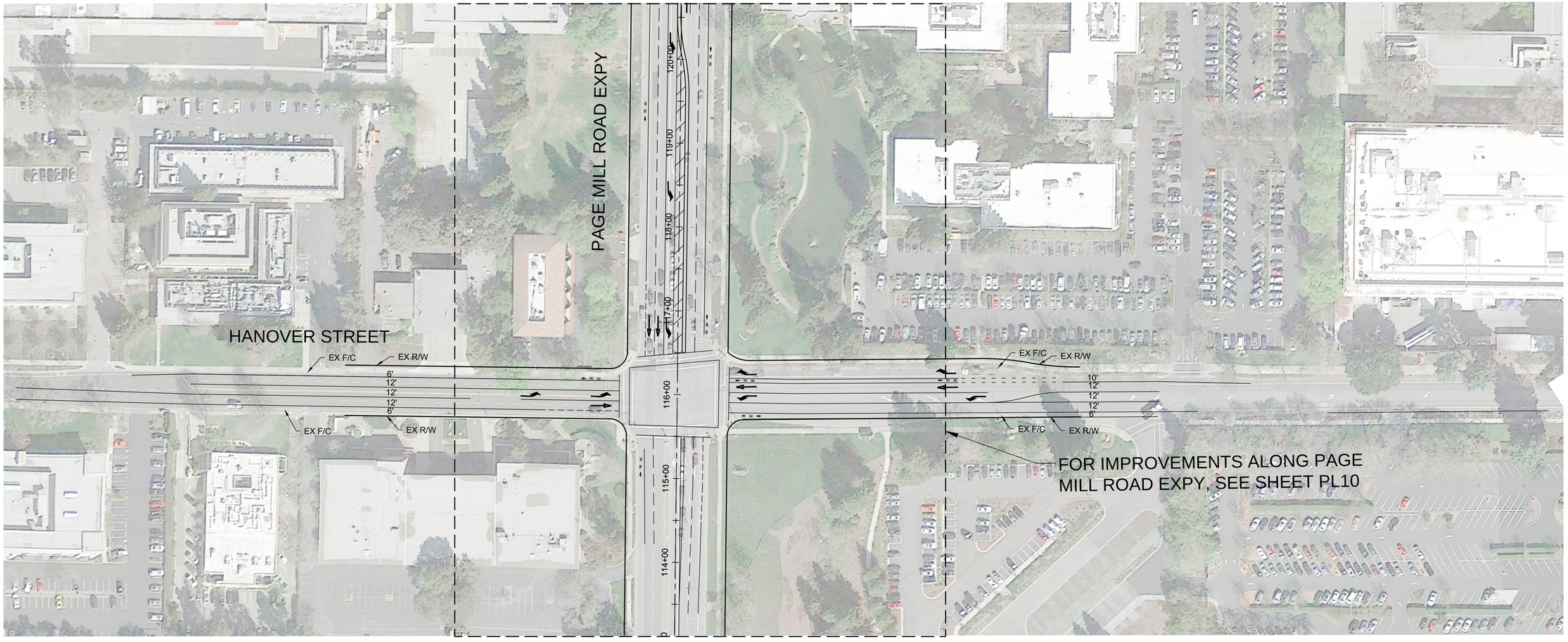
PAGE MILL ROAD EXPRESSWAY

PLAN LINE

DRAWING NO. PL10

SHT NO. 11 OF 19

PROJECT NO.	CONTRACT NO.	DATE.	SCALE
		03/26/15	



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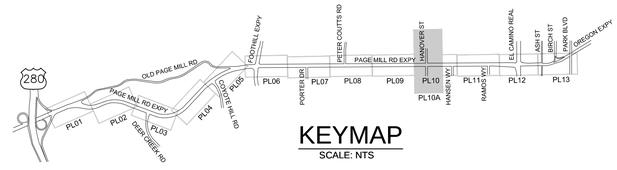

KEYMAP
SCALE: NTS

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NO.	REVISIONS	BY	DATE	APP'D

COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

SL	03-26-15	DESIGNED
JC / BB	03-26-15	DRAWN
WJW / SK	03-26-15	CHECKED

WORK ORDER
LEVEL BOOK
TRANSIT BOOK

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER — STEPHEN R. LOUPE — No. 63575 — CIVIL — STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER — ROY CABALTERA — No. C53981 Exp. 12-31-15 CIVIL — STATE OF CALIFORNIA

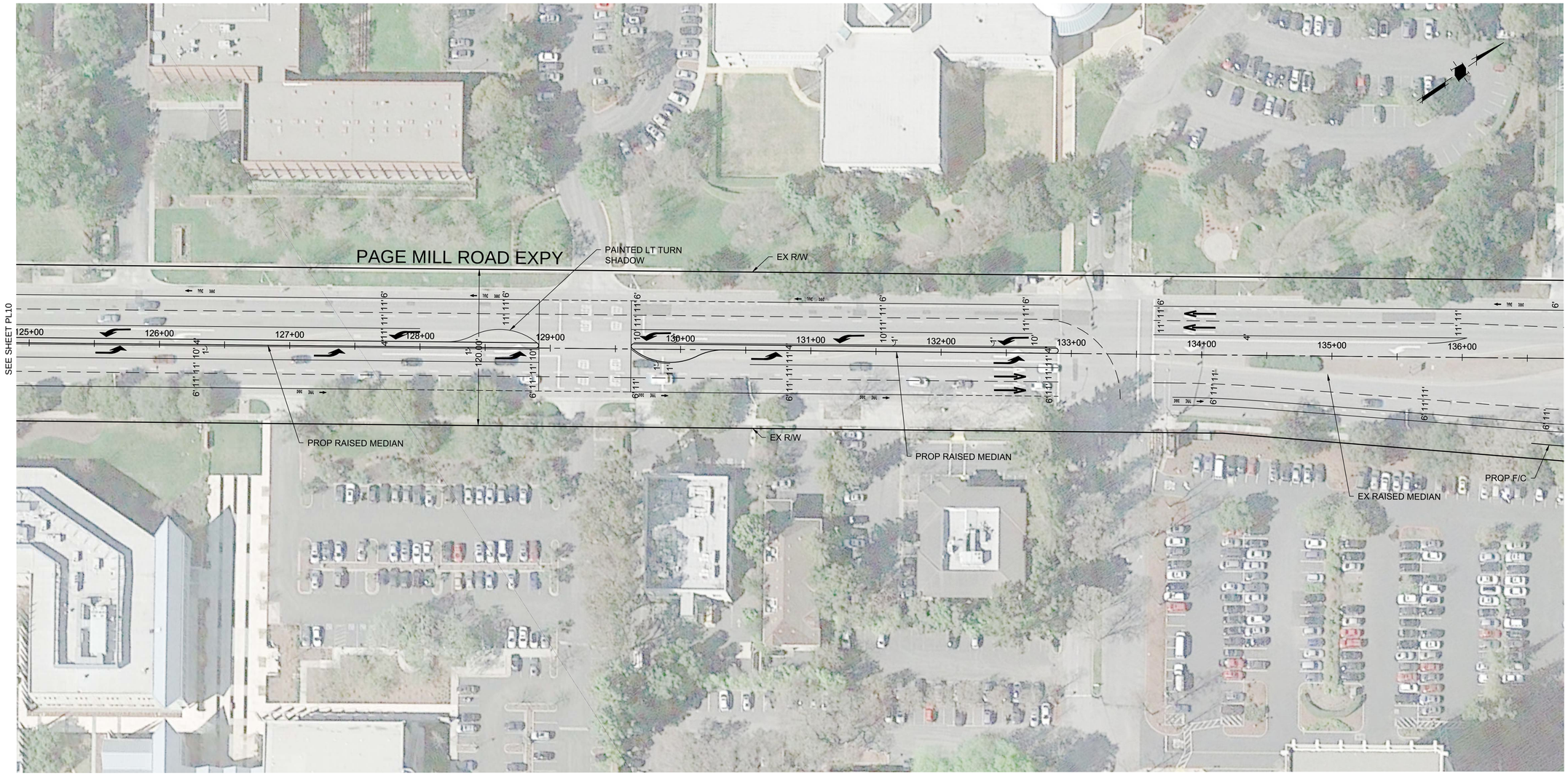
PAGE MILL ROAD EXPRESSWAY

PLAN LINE

DRAWING NO. PL10A

SHT NO. 12 OF 19

PROJECT NO. | CONTRACT NO. | DATE. 03/26/15 | SCALE



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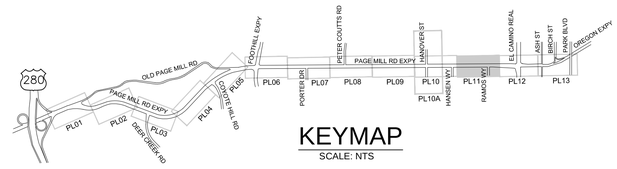

KEYMAP
SCALE: NTS

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NO.	REVISIONS	BY	DATE	APP'D

COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

SL	03-26-15	DESIGNED / DATE
JC / BB	03-26-15	DRAWN / DATE
WJW / SK	03-26-15	CHECKED / DATE

WORK ORDER
LEVEL BOOK
TRANSIT BOOK

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER STEPHEN R. LOUPE No. 63575 CIVIL STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ROY CABALTERA No. C53981 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

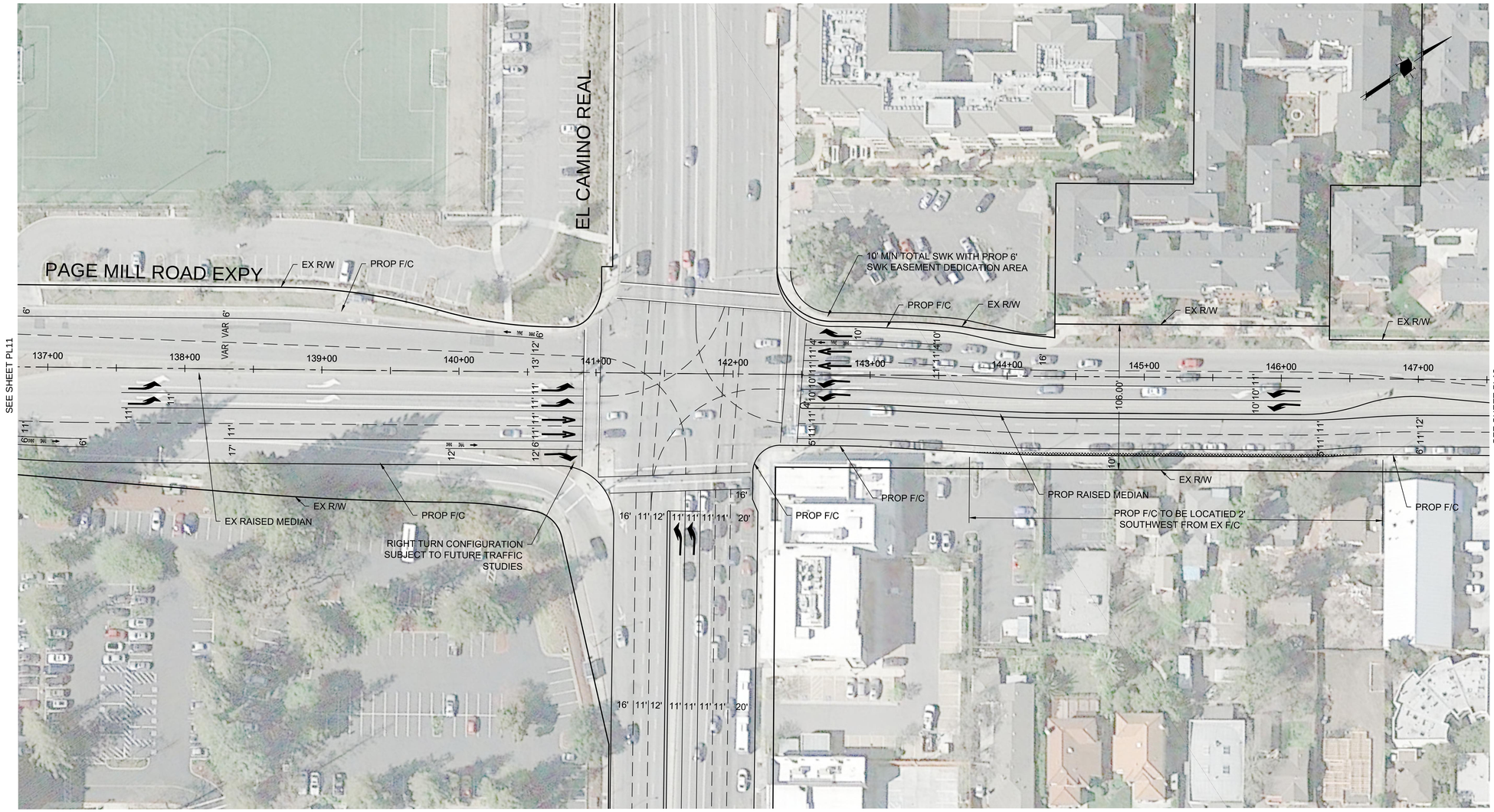
PAGE MILL ROAD EXPRESSWAY

PLAN LINE

PROJECT NO.	CONTRACT NO.	DATE.	SCALE
		03/26/15	

DRAWING NO.
PL11

SHT NO.
13 OF 19



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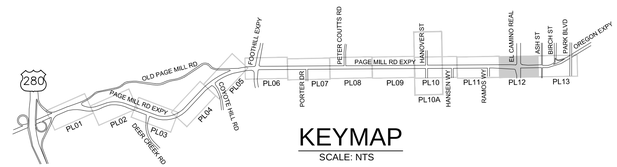

KEYMAP
SCALE: NTS

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NO.	REVISIONS	BY	DATE	APP'D

COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

DESIGNED SL 03-26-15	DRAWN WJW / SK 03-26-15	CHECKED
DESIGNED JC / BB 03-26-15	DRAWN	CHECKED

WORK ORDER | LEVEL BOOK | TRANSIT BOOK

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER STEPHEN N. CLARK No. 63575 CIVIL STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ROY CABALTERA No. C53981 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

PAGE MILL ROAD EXPRESSWAY

PLAN LINE

DRAWING NO. PL12

SHT NO. 14 OF 19

PROJECT NO. | CONTRACT NO. | DATE. 03/26/15 | SCALE

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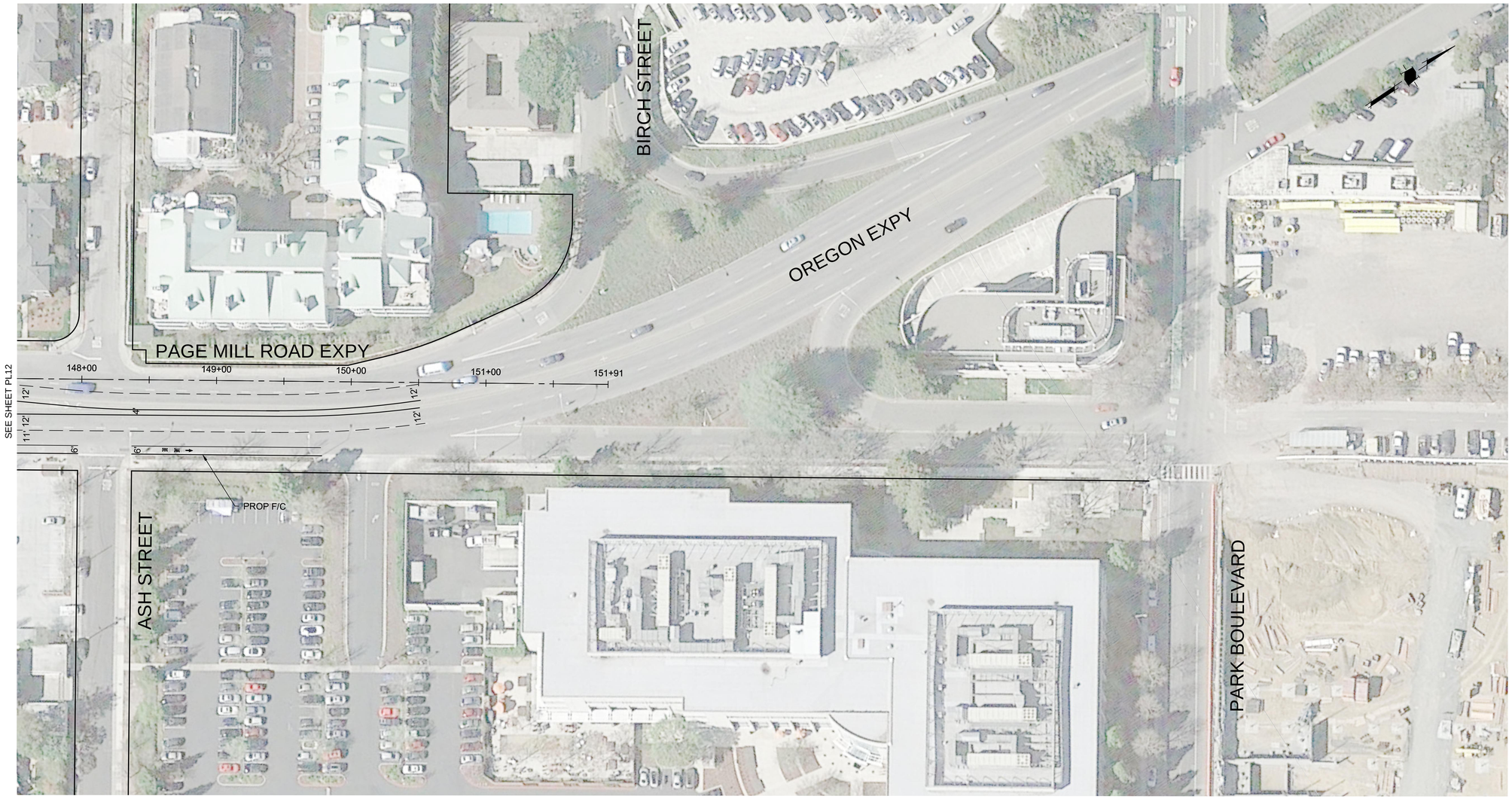

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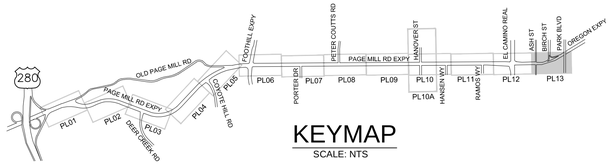

KEYMAP
SCALE: NTS

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NO.	REVISIONS	BY	DATE	APP'D

COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

SL	03-26-15		
DESIGNED	DATE	WORK ORDER	
JC / BB	03-26-15		
DRAWN	DATE	LEVEL BOOK	
WJW / SK	03-26-15		
CHECKED	DATE	TRANSIT BOOK	

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER STEPHEN R. LOUPE No. 63575 CIVIL STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ROY CABALTERA No. C53981 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

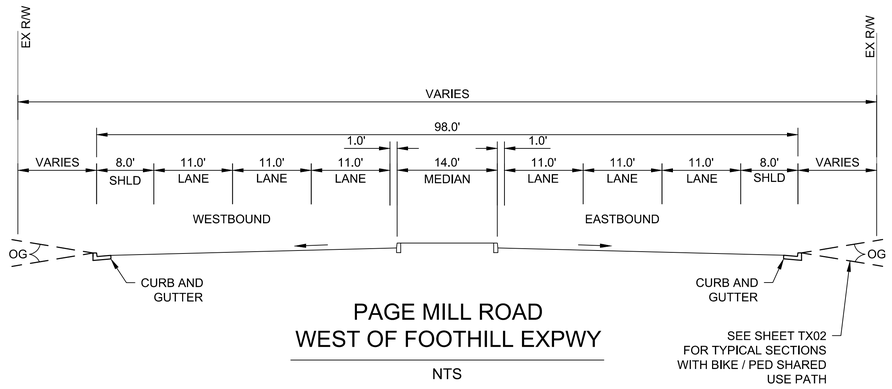
PAGE MILL ROAD EXPRESSWAY

PLAN LINE

DRAWING NO. PL13

SHT NO. 15 OF 19

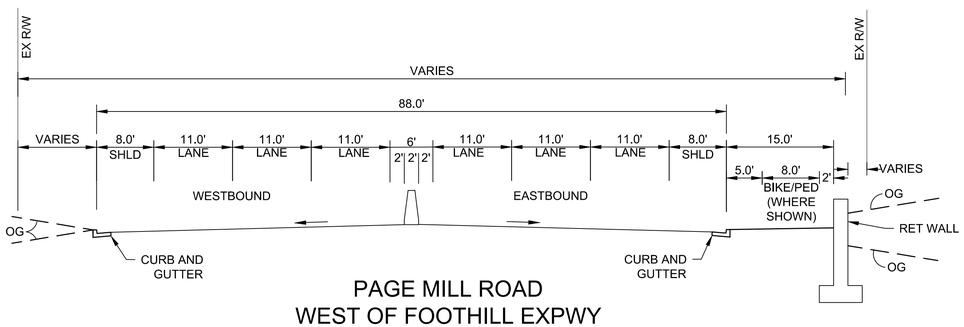
PROJECT NO.	CONTRACT NO.	DATE.	SCALE
		03/26/15	



PAGE MILL ROAD
WEST OF FOOTHILL EXPWY

NTS

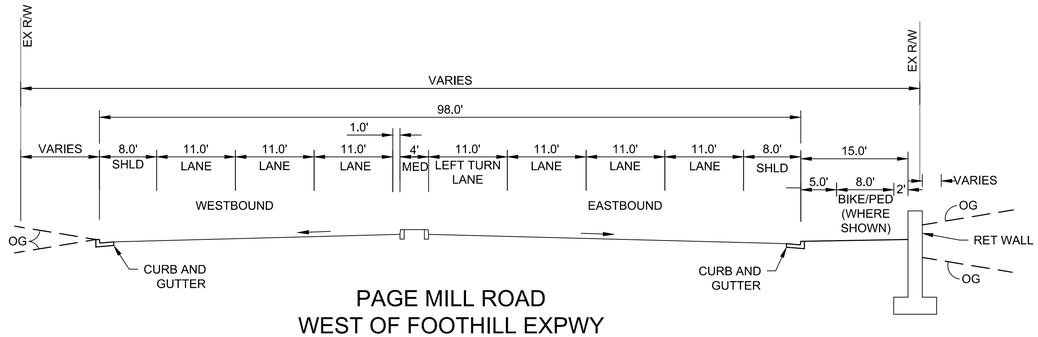
TYPICAL CURBED MEDIAN



PAGE MILL ROAD
WEST OF FOOTHILL EXPWY

NTS

TYPICAL MEDIAN BARRIER



PAGE MILL ROAD
WEST OF FOOTHILL EXPWY

NTS

TYPICAL LEFT TURN POCKET

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COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

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WJW / SK	03-26-15	TRANSIT BOOK
CHECKED	DATE	

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER STEPHEN R. LOUPE No. 63575 CIVIL STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ROY CABALTERA No. C53981 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

PAGE MILL ROAD EXPRESSWAY

TYPICAL SECTIONS

DRAWING NO. TX01

SHT NO. 16 OF 19

PROJECT NO.	CONTRACT NO.	DATE.	SCALE
		03/26/15	

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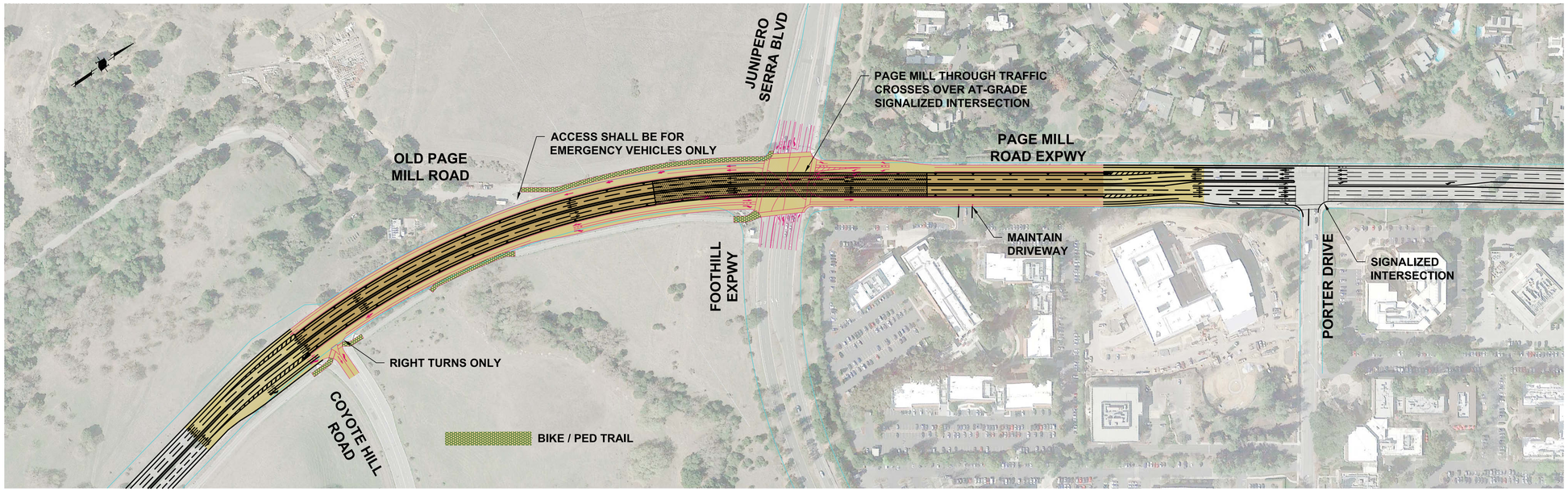
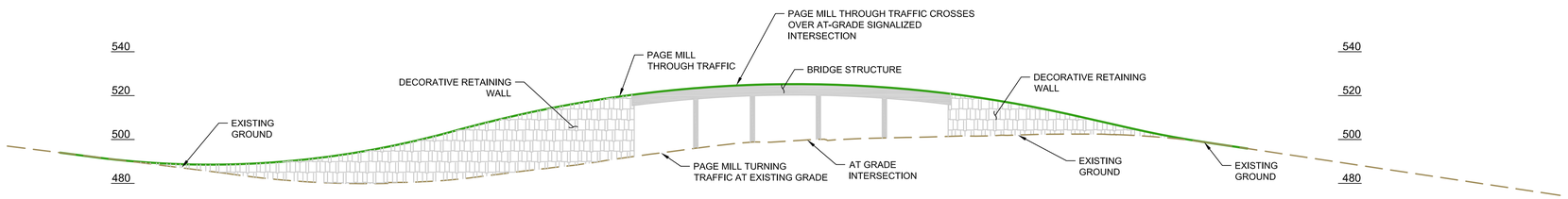
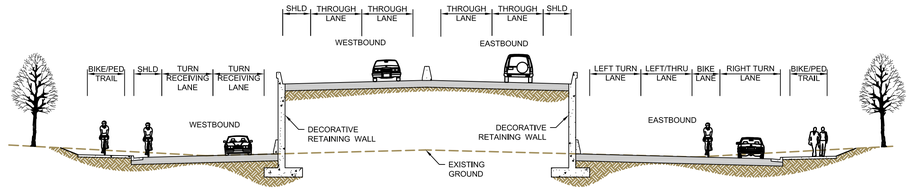


PLAN



PROFILE



CROSS SECTION

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DRAWN	DATE	LEVEL BOOK
WJW / SK	03-26-15	
CHECKED	DATE	TRANSIT BOOK

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER STEPHEN R. LOPEZ No. 63575 CIVIL STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ROY CABALTERA No. C53981 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

PAGE MILL ROAD EXPRESSWAY

"PAGE MILL OVER" OPTION

PROJECT NO.	CONTRACT NO.	DATE.
		03/26/15

DRAWING NO. ALT1

SHT NO. 17 OF 19

SCALE

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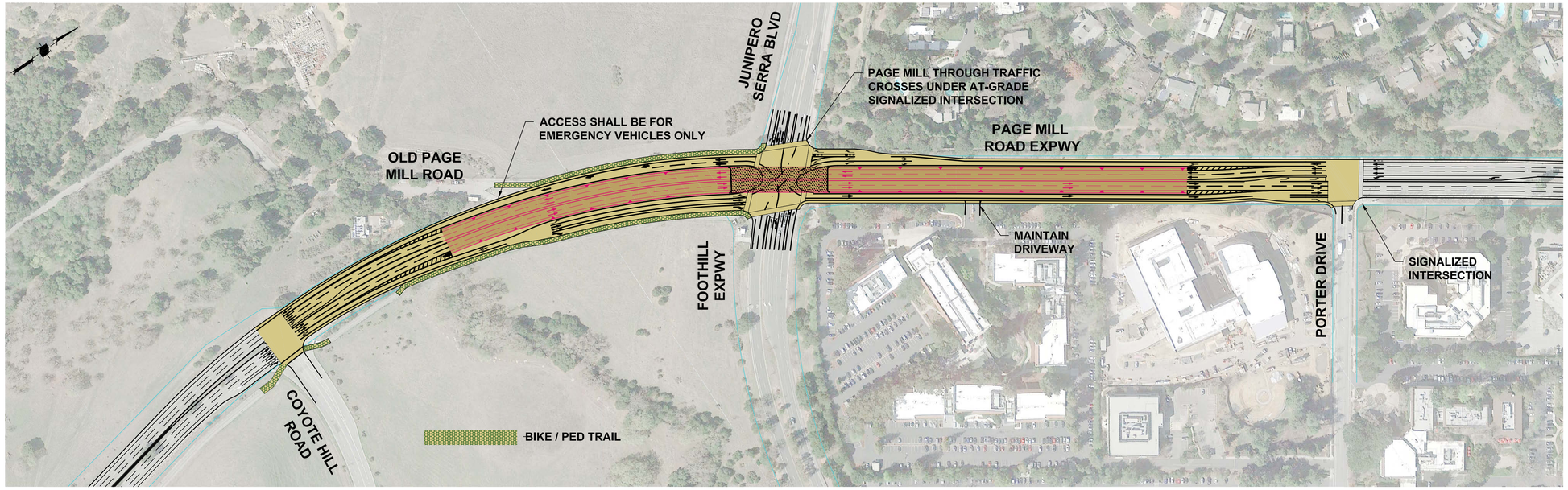
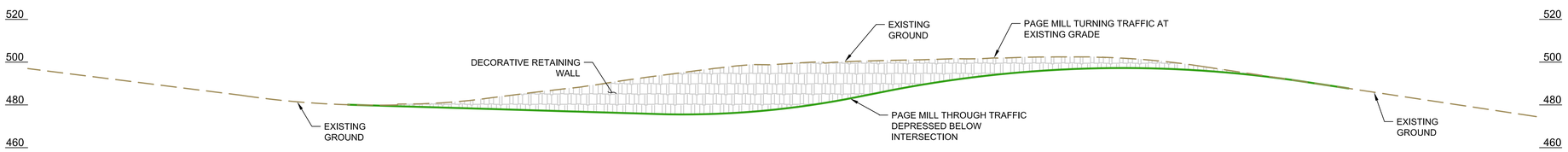


PLAN



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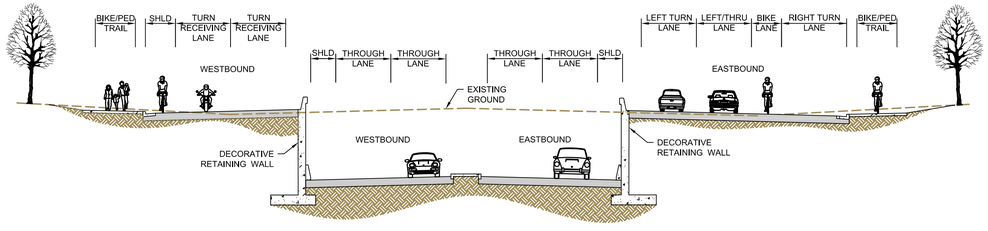

CROSS SECTION

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NO.	REVISIONS	BY	DATE	APP'D

COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

SL	03-26-15		
DESIGNED	DATE	WORK ORDER	
JC / BB	03-26-15		
DRAWN	DATE	LEVEL BOOK	
WJW / SK	03-26-15		
CHECKED	DATE	TRANSIT BOOK	

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER — STEPHEN R. LOUPE — No. 63575 — CIVIL — STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER — ROY CABALTERA — No. C53981 Exp. 12-31-15 — CIVIL — STATE OF CALIFORNIA

PAGE MILL ROAD EXPRESSWAY

"PAGE MILL UNDER" OPTION

PROJECT NO. | CONTRACT NO. | DATE. 03/26/15

DRAWING NO. ALT2

SHT NO. 18 OF 19

SCALE

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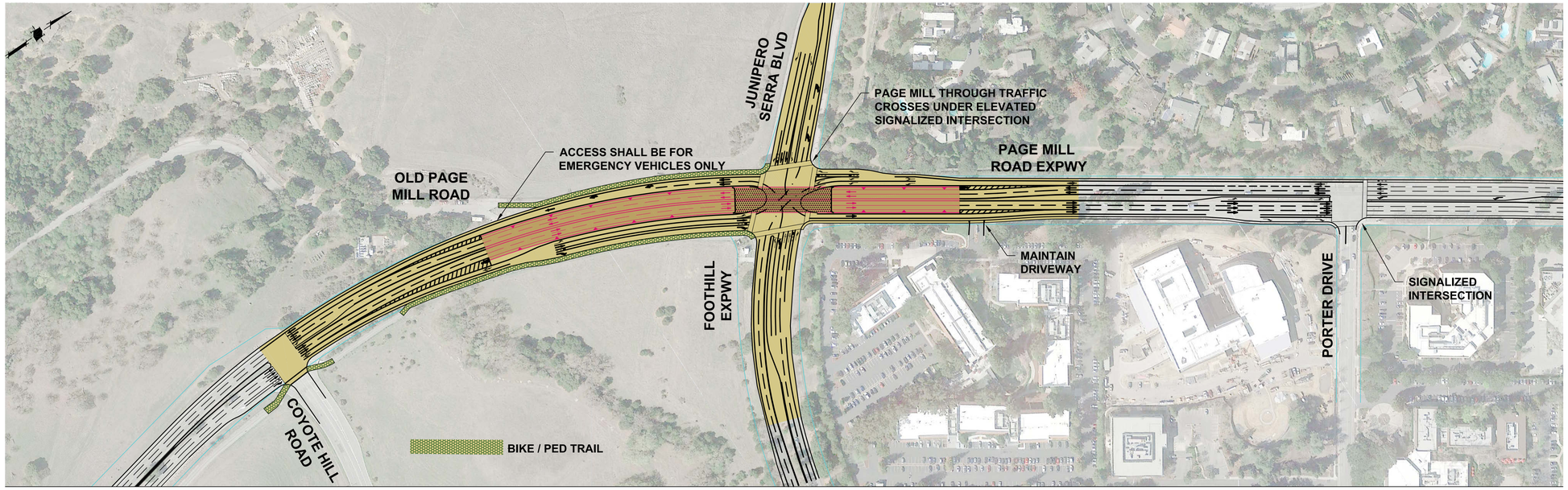

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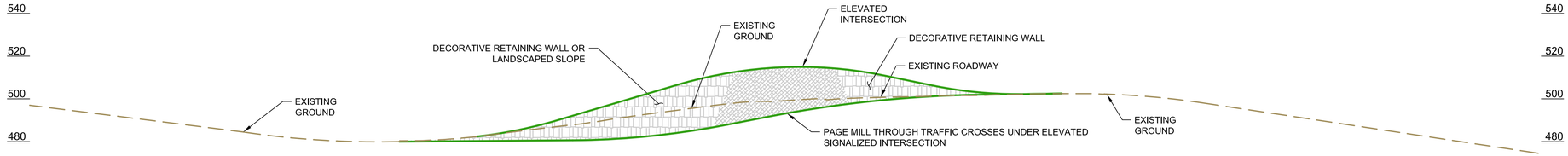

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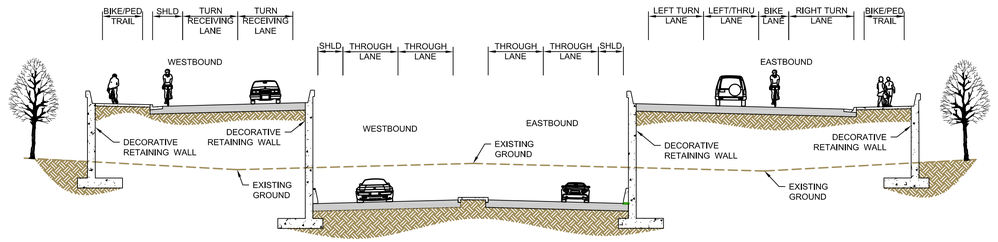

CROSS SECTION

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NO.	REVISIONS	BY	DATE	APP'D

COUNTY OF SANTA CLARA ROADS AND AIRPORTS DEPARTMENT

SL	03-26-15	WORK ORDER
DESIGNED	DATE	
JC / BB	03-26-15	LEVEL BOOK
DRAWN	DATE	
WJW / SK	03-26-15	TRANSIT BOOK
CHECKED	DATE	

SUBMITTED:
STEVE LOUPE
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER STEPHEN R. LOPEZ No. 63575 CIVIL STATE OF CALIFORNIA

APPROVAL:
ROY CABALTERA
Civil Engineer

REGISTERED PROFESSIONAL ENGINEER ROY CABALTERA No. C53981 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

PAGE MILL ROAD EXPRESSWAY

"PAGE MILL SPLIT" OPTION

DRAWING NO. ALT3

SHT NO. 19 OF 19

PROJECT NO.	CONTRACT NO.	DATE.	SCALE
		03/26/15	

Appendix B

I-280 INTERCHANGE IMPROVEMENT CONCEPT EVALUATION SUMMARY GRAPHICS

Page Mill Road and Interstate 280
Improvements Study

VISSIM Modeling Findings

Kimley»Horn

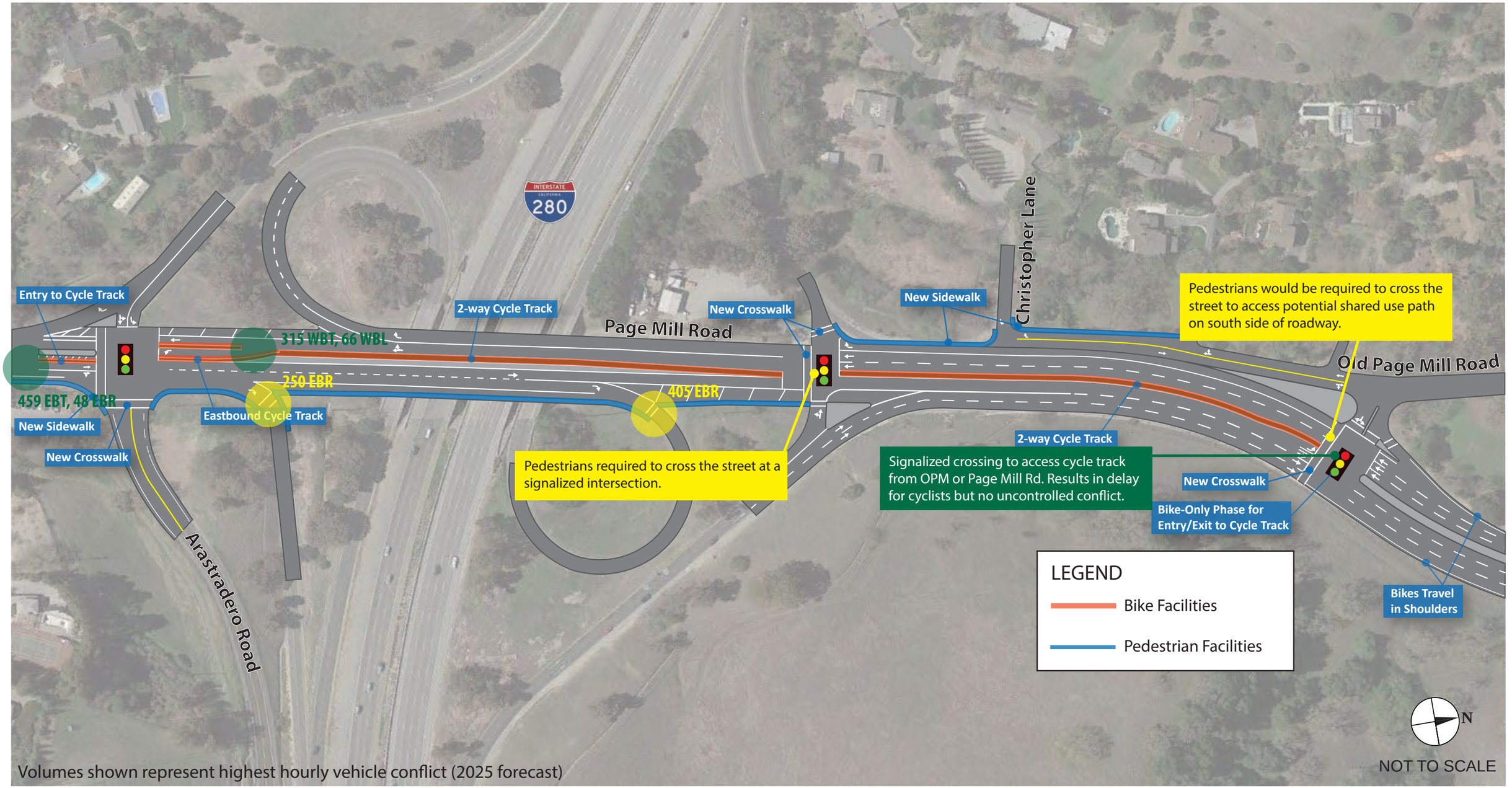
Concept 1 - Signalization

November 2014

VTA · Caltrans · City of Palo Alto · Los Altos Hills California · The County of Santa Clara

Page Mill Road and Interstate 280
Improvements Study

Bicycle-Pedestrian Facility Evaluation



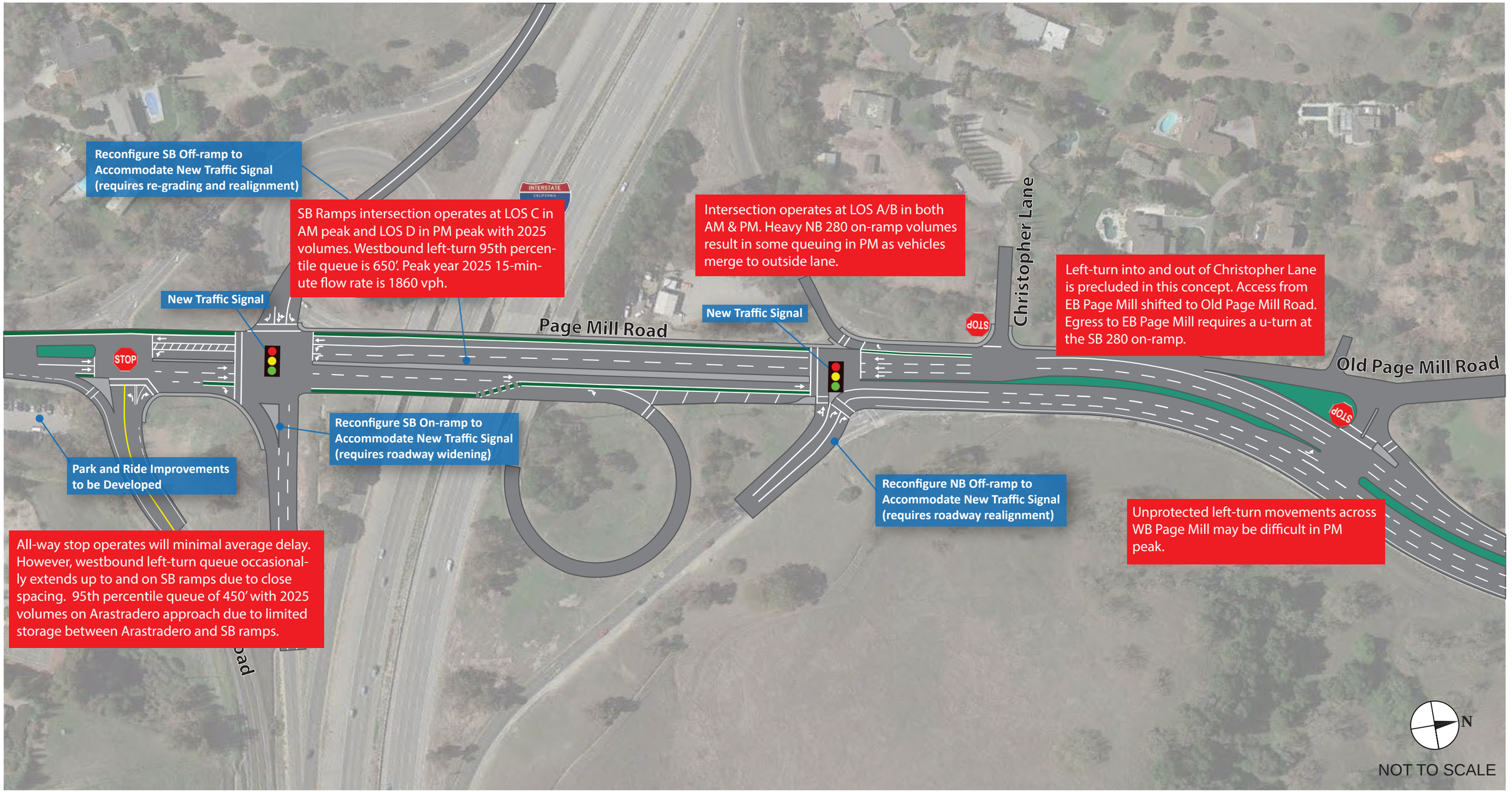
Kimley»Horn

Concept 1 - Signalization
Bike and Pedestrian Facilities

November 2014

Page Mill Road and Interstate 280
Improvements Study

Preliminary VISSIM Modeling Findings



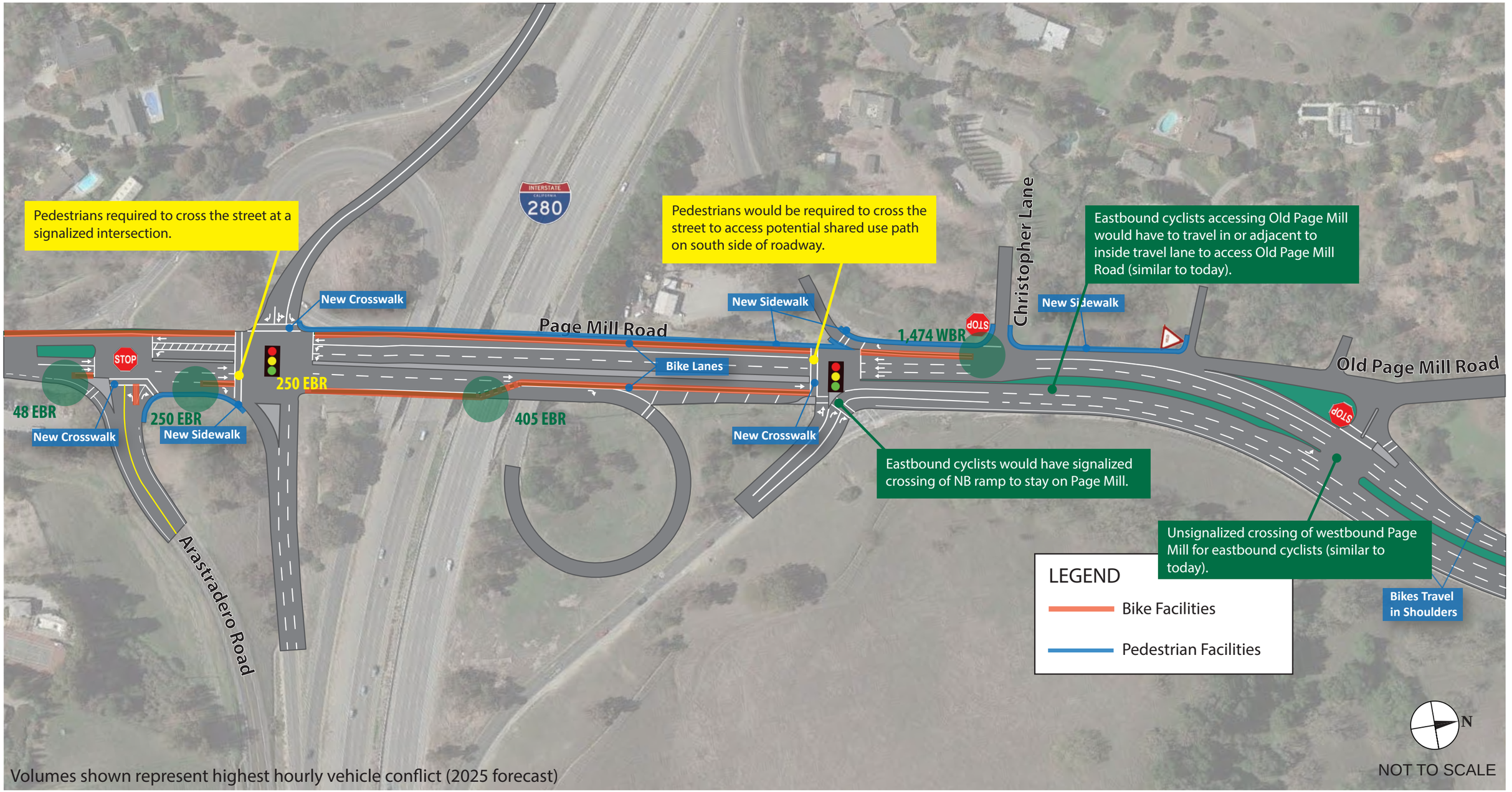
Kimley»Horn

Concept 2 - Southbound Ramp Realignment

November 2014

Page Mill Road and Interstate 280
Improvements Study

Bicycle-Pedestrian Facility Evaluation



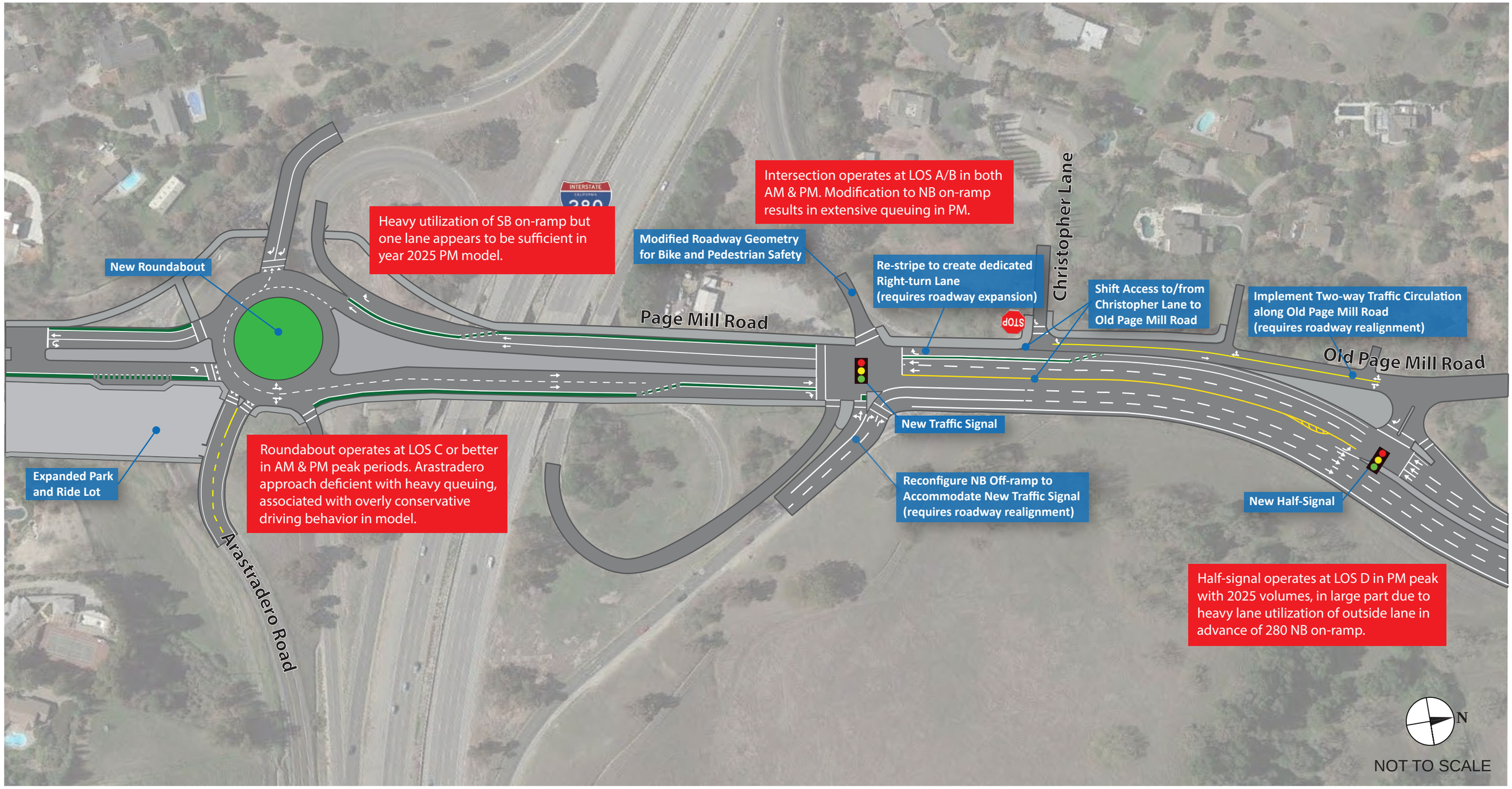
Kimley»Horn

Concept 2 - Southbound Ramp Realignment
Bike and Pedestrian Facilities

November 2014

Page Mill Road and Interstate 280
Improvements Study

Preliminary VISSIM Modeling Findings



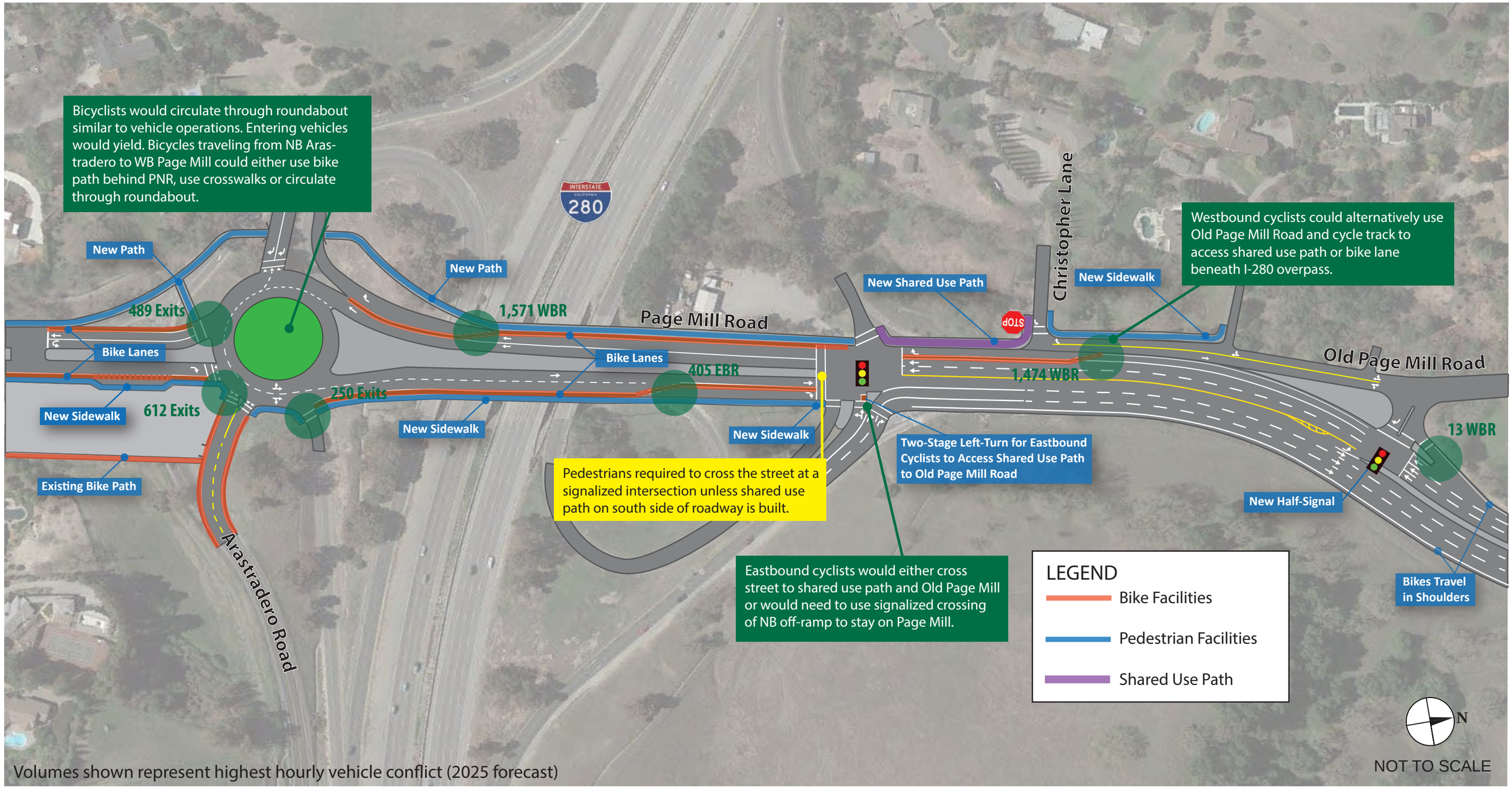
Kimley»Horn

Concept 3 - Roundabout Concept

November 2014

Page Mill Road and Interstate 280
Improvements Study

Bicycle-Pedestrian Facility Evaluation



Kimley»Horn

Concept 3 - Roundabout Concept
Bike and Pedestrian Facilities

November 2014

Appendix C

COYOTE HILL ROAD & PAGE MILL ROAD INTERSECTION ANALYSIS (KIMLEY-HORN, 2015)

Technical Memorandum

To: Ms. Dawn Cameron
County of Santa Clara
Roads and Airports Department

From: Adam Dankberg, P.E.
Luke Schwartz, P.E.
Kimley-Horn and Associates, Inc.

Date: March 11, 2015

RE: ***Coyote Hill Road & Page Mill Road Intersection Analysis***

EXECUTIVE SUMMARY

This technical memorandum documents the traffic analysis assumptions, methodology and findings comparing two potential improvement alternatives for the Page Mill Road/Coyote Hill Road intersection. The improvement options currently being considered by the County include closure of the median gap along Page Mill Road, effectively allowing right-in/right-out access only to/from Coyote Hill Road, or signalization of this intersection.

This analysis finds that the signalization improvement option results in acceptable level of service (LOS) for the Page Mill Road/Coyote Hill Road intersection during the AM and PM peak hours. Under the median closure improvement alternative, the elimination of the existing left-turn access to/from Coyote Hill Road is anticipated to cause left-turning traffic to shift to Foothill Expressway and Deer Creek Road, which will worsen operations at the intersections of those streets with Page Mill Road. With the median closure improvement alternative, the Page Mill Road/Coyote Hill Road and Page Mill Road/Deer Creek Road intersections are projected to operate at LOS E for the AM peak hour period, which is below the County's established level of service target of LOS D or better. The intersection of Page Mill Road/Foothill Expressway/Junipero Serra Boulevard is currently functioning at LOS F and will continue to do so under either the signalization or median closure alternative.

The signalization improvement option is projected to result in acceptable LOS C or better at the Page Mill Road/Coyote Hill Road intersection during the AM and PM peak hours. While the intersection would operate well in terms of average control delay, the westbound left-turn queues (westbound Page Mill Road to Coyote Hill Road) in the AM and the northbound left-turn queues (northbound Coyote Hill Road to Page Mill Road) in the PM are projected to extend beyond the provided storage area. Additionally, the northbound left-turn movement in the PM peak hour would operate at LOS F. The addition of a second northbound left-turn lane at the Page Mill Road/Coyote Hill Road intersection would improve the side-street delays, LOS and queuing considerably. Furthermore, there appears to be adequate width in the existing median to extend the existing westbound left-turn pocket to about 280 feet, which would reduce the likelihood of queues spilling back and impeding westbound

through traffic. Incorporating those modifications, the signalization of the Page Mill Road/Coyote Hill Road intersection results in an estimated increase in peak directional corridor travel time of approximately 12 seconds during the AM peak (eastbound) and a decrease of about one second during the PM peak (westbound) compared to baseline conditions.

INTRODUCTION

As a supplementary task to the ongoing work being performed for the Page Mill Road & Interstate 280 (I-280) Improvements Analysis study, Kimley-Horn and Associates, Inc. was retained by the County of Santa Clara to provide traffic engineering support to evaluate improvement alternatives under consideration for the Page Mill Road/Coyote Hill Road intersection, located in unincorporated Santa Clara County, CA.

Coyote Hill Road provides access to the Stanford Research Park, just south of Foothill Expressway. Coyote Hill Road is currently a four-lane, undivided roadway extending from Page Mill Road east to Hillview Avenue. The Page Mill Road/Coyote Hill Road intersection is currently configured with side-street stop-control (SSSC) and drivers are known to experience considerable delays waiting at the Coyote Hill Road side-street approach due to heavy congestion along Page Mill Road, particularly during the AM and PM commute periods. Traffic volumes, and thus intersection delays, along Coyote Hill Road are anticipated to increase with the planned implementation of on-street parking and with the occupancy of planned and approved development sites within the Stanford Research Park along Hillview Avenue. The Page Mill Road/Coyote Hill Road intersection is one of only a handful of locations throughout the entire Countywide expressway system that has an uncontrolled median opening. Due to the additional demand anticipated with the addition of on-street parking and nearby development projects, the County is considering improvement options to improve traffic operations at this intersection.

The purpose of this technical memorandum is to document the traffic analysis assumptions, methodology and findings comparing the improvement alternatives for the Page Mill Road/Coyote Hill Road intersection and potential impacts to peak period Page Mill Road corridor operations.

Figure 1 shows the study area vicinity for this analysis.

Proposed Coyote Hill Road Improvements

Geometric and striping improvements have been proposed for Coyote Hill Road to convert the four-lane road to a two-lane configuration in order to provide bike lanes and on-street parking. The addition of parallel parking on this street is intended to provide additional parking to access nearby recreational trail facilities. The new on-street parking on Coyote Hill Road will serve as replacement parking for spaces lost along Stanford Avenue as part of the Stanford Perimeter Trail project. Current plans include the addition of 33 parallel parking spaces extending approximately 700 feet east of Page Mill Road with sidewalks connecting the on-street parking to the Matadero Trail at Page Mill Road. **Figure 2** shows a conceptual design of the proposed Coyote Hill Road configuration.

A traffic analysis study[1] was performed for the proposed Coyote Hill Road improvements and is referred to herein as the *"Coyote Hill Road – Road Diet Study*". The configuration for the Page Mill Road/Coyote Hill Road intersection and traffic growth assumptions for Coyote Hill Road were referenced from this recently prepared traffic study for use in this analysis.

METHODOLOGY

Intersection Improvement Alternatives

The following improvement alternatives are being considered for the existing Page Mill Road/Coyote Hill Road SSSC intersection:

- **Median Closure** – The existing raised median along Page Mill Road will be extended through the Coyote Hill Road intersection, effectively eliminating left-turn access from the major street (Page Mill Road) and side-street (Coyote Hill Road); and
- **Signalization** – Installation of a traffic signal that would allow all vehicle movements at the intersection. No pedestrian crossing of Page Mill Road would be provided.

Traffic Volumes

The traffic operations analysis performed for the intersection improvement alternatives includes analysis of weekday AM and PM peak hour conditions. Traffic volumes used for this analysis reflect near-term conditions, which include existing traffic volumes plus additional traffic projected to be generated by new recreational trail parking provided along Coyote Hill Road and traffic generated by occupancy of planned and approved development projects along Hillview Avenue. The assumptions and procedures used to develop these near-term traffic volumes are discussed briefly below, while additional traffic volume details and calculations are provided in **Attachment A**.

Figure 3 shows the near-term AM and PM peak hour intersection turning movement volumes used in this analysis.

Existing Traffic Volumes

Existing AM (6:30 AM to 10:00 AM) and PM (3:00 PM to 6:00 PM) intersection turning movement count volumes were collected for the Page Mill Road & I-280 Improvements Analysis study at the Page Mill Road/Deer Creek Road and the Page Mill Road/Foothill Expressway/Junipero Serra Boulevard intersections on September 30, 2014. The peak hour volumes from this dataset were referenced for these intersections for this analysis. Page Mill Road experiences strong directionality in traffic flows during the AM (78% eastbound) and PM (71% westbound) peak hour periods.

The Page Mill Road/Foothill Expressway/Junipero Serra Boulevard has been identified as one of the most congested intersections in the County, with significant delays and queuing during peak traffic periods. During the AM peak period, eastbound traffic demand along Page Mill Road exceeds the

[1] Robert H. Eckols, P.E., Fehr & Peers. *Stanford Perimeter Trail – Coyote Hill Road Parking* [Technical Memorandum]. November 3, 2014. Jim Inglis, Stanford Real Estate.

throughput capacity at this intersection, resulting in oversaturated conditions and long queues extending to the west along Page Mill Road. In oversaturated conditions, observed traffic count volumes reflect intersection throughput capacity, not actual vehicle demand. The full peak hour demand at this intersection approach would include the observed traffic throughput at the intersection plus those vehicles that would be served during the peak hour if the intersection had sufficient capacity, measured as the change in the approach vehicle queue during the peak hour period. In order to account for this unserved demand that is not reflected in the AM peak hour traffic count data, turning movement count data was reviewed to compare the eastbound Page Mill Road traffic flows departing the I-280 interchange and approaching the Foothill Expressway/Junipero Serra Boulevard intersection. Based on this review, it was determined that there is an imbalance of approximately 180 vehicles in the eastbound direction between the interchange and Foothill Expressway, which is consistent with the observed queue approaching Foothill Expressway during the peak hour. The Deer Creek Road intersection had an underserved volume of 70 vehicles in the eastbound direction. These are vehicles that would have passed through the intersection were it not for downstream congestion at the Foothill Expressway/Junipero Serra Boulevard. To more accurately reflect the full demand at the intersection approaches in oversaturated conditions, the unserved demand was added to the existing AM peak hour volumes along eastbound Page Mill Road between Deer Creek Road and Foothill Expressway.

Turning movement counts at Page Mill Road/Coyote Hill Road were not collected by either the Page Mill Road & I-280 Improvements Analysis study or the *Coyote Hill Road – Road Diet Study*. Therefore, the eastbound and westbound Page Mill Road segment volumes at this intersection were estimated based on the 2014 volumes from the adjacent Page Mill Road/Deer Creek Road and Page Mill Road/Foothill Expressway/Junipero Serra intersections. Turning movement volumes to/from Coyote Hill Road were estimated based on 2013 peak hour roadway segment count volumes presented in the *Coyote Hill Road – Road Diet Study*. The volumes presented in the *Coyote Hill Road – Road Diet Study* reflect an average over three consecutive weekdays. The average daily traffic volume along Coyote Hill Road (1,652 vehicles) includes a significant imbalance in the daily directional traffic flow, with a 67% / 33% split in the southbound/northbound traffic flow. The imbalance in the daily flow on Coyote Hill Road is primarily due to the SSSC at the Coyote Hill Road / Page Mill Road intersection. The stop sign control and heavy peak period volumes on Page Mill Road make it difficult for northbound vehicles on Coyote Hill Road to turn left onto westbound Page Mill Road during the morning and evening peak periods.

For the purposes of evaluating corridor-wide traffic progression along Page Mill Road under each of the potential intersection improvement alternatives, additional traffic data was referenced from AM and PM peak hour traffic analysis models prepared for the 2011/12 cycle of the Metropolitan Transportation Commission's (MTC) *Program for Arterial System Synchronization* (PASS), which included development of corridor timing improvements for Page Mill Road.

Traffic Generated by Proposed Parking and Development Projects

Traffic from On-Street Parking

The traffic anticipated to be added to Coyote Hill Road by the proposed addition of on-street parking was referenced from the *Coyote Hill Road – Road Diet Study*. The proposed addition of parking is estimated to add approximately 490 to 735 daily trips and roughly 22 to 55 peak hour trips to Coyote Hill Road, depending on parking space turnover rates. These estimates include net new trips generated by the additional recreational trail parking, trips diverted from the previous trail parking located on Stanford Avenue, and an additional 10 to 15 percent increase in trips due to vehicles circulating while attempting to locate available parking spaces. To provide a conservative analysis, this study assumes that peak hour trip generation for the recreational trail parking will coincide with the AM and PM peak hour periods at the Page Mill Road/Coyote Hill Road intersection. A total 55 peak hour trips are assumed to be added to Coyote Hill Road, with 75 percent of these trips distributed to Page Mill Road to the west and 25 percent of these trips distributed to Hillview Avenue to the east.

Traffic from Development Projects

As documented in the *Coyote Hill Road – Road Diet Study*, there are two unoccupied or approved but not yet built developments within the Stanford Research Park that are anticipated to contribute traffic to Coyote Hill Road in the near future. These sites are both located along Hillview Avenue, south of Coyote Hill Road, and are identified as follows:

- 3406 Hillview Avenue: 61,320 square feet office (currently unoccupied)
- 3431 Hillview Avenue: 500,000 square feet office (ongoing construction at the VMWare campus)

The additional traffic anticipated to be added to Coyote Hill Road by these proposed developments was referenced from the *Coyote Hill Road – Road Diet Study*. The total trip generation estimated for these two projects includes approximately 6,767 daily, 1,053 AM and 1,012 PM peak hour trips. Per the *Coyote Hill Road – Road Diet Study*, approximately 45 percent of the inbound traffic generated by these development projects is assumed to use Coyote Hill Road. The remaining trips would use Page Mill Road, Junipero Serra Boulevard, Foothill Expressway, and Arastradero/Charleston Road. Since fewer outbound trips from these developments would be expected to use Coyote Hill Road due to the long delays at the SSSC intersection at Page Mill Road, only 15 percent of the outbound trips from these developments are assumed to use Coyote Hill Road.

Traffic Volume Adjustments for Intersection Improvement Alternatives

Median Closure Improvement Alternative

With closure of the median at the Page Mill Road/Coyote Hill Road intersection, left turn access to/from Coyote Hill Road will be eliminated. For this improvement alternative, the traffic operations analysis includes the following adjustments to near-term traffic volumes (existing volumes plus traffic generated by planned development and added on-street parking):

- Westbound left-turn traffic from Page Mill Road to Coyote Hill Road will divert to Foothill Expressway (60%) and Deer Creek Road (40%);

- Northbound left-turn traffic from Coyote Hill Road to Page Mill Road will divert to the northbound right-turn movement (75%), to Deer Creek Road (15%) and Foothill Expressway (10%).

Signalization Improvement Alternative

With signalization of the Page Mill Road/Coyote Hill Road intersection, vehicle delays at the Coyote Hill Road side-street approach would likely be reduced and the northbound traffic demand at this intersection would be expected to increase. With signalization of this intersection, it is assumed that the existing traffic volumes at the northbound approach would increase by approximately 25 percent. In addition, it is assumed that the percent of outbound trips generated by the proposed Hillview Avenue development projects using Coyote Hill Road would increase from 15 percent to 35 percent. With signalization, the northbound left- and right-turning movement volumes at this intersection are assumed to be distributed proportionately to the existing AM and PM peak hour directional distribution of traffic flows along Page Mill Road.

Analysis Parameters and Performance Metrics

For this study, analysis of traffic operations at the intersection level is focused on performance metrics such as Level of Service (LOS), delays and queueing. At the corridor level, the intent of this study is to evaluate traffic progression along Page Mill Road in terms of average travel time, speeds, and overall corridor control delay. Signalized intersections along Page Mill Road are currently very closely coordinated. This study will evaluate whether the addition of a new signalized intersection will reduce the effectiveness of the existing coordination.

Analysis of traffic operations at intersections is based on the concept of LOS. The LOS of an intersection is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating with significant congestion. For SSSC intersections, LOS is defined as a function of average control delay for each minor street approach movement. For signalized intersections, LOS is defined as a function of average control delay for the intersection as a whole. **Table 1** relates the operational characteristics associated with each LOS category for signalized and unsignalized intersections.

Table 1: Intersection Level of Service Definitions

Level of Service	Description	Signalized (Avg. control delay per vehicle sec/veh.)	Unsignalized (Avg. control delay per vehicle sec/veh.)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	≤ 10	≤ 10
B	Stable traffic. Traffic flows smoothly with few delays.	> 10 – 20	> 10 – 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	> 20 – 35	> 15 – 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	> 35 – 55	> 25 – 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	> 55 – 80	> 35 – 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	> 80	> 50
Sources: Transportation Research Board, *Highway Capacity Manual 2000*, National Research Council, 2000.			

Levels of Service, intersection delays and queueing for this study were determined using methods defined in the *Highway Capacity Manual* (HCM) as calculated using Synchro traffic analysis software. Analysis of corridor performance was performed using SimTraffic microsimulation analysis software. Existing signal timing inputs are based on current timing sheets provided by the County of Santa Clara.

Synchro and SimTraffic output worksheets for all analysis scenarios are contained in **Attachment B**.

ANALYSIS RESULTS

Intersection Levels of Service

Intersection traffic operations were evaluated for baseline conditions (existing intersection geometrics and traffic control), as well as for the median closure and signalization improvement alternatives for the Page Mill Road/Coyote Hill Road intersection based on the near-term AM and PM peak hour volumes presented in **Figure 3**. The median closure improvement option is anticipated to shift some traffic from Coyote Hill Road to parallel streets and ultimately to the adjacent signalized intersections along Page Mill Road; therefore, the intersection analysis results include the Page Mill Road/Foothill Expressway and Page Mill Road/Deer Creek Road intersections. For the signalization improvement alternative, it was assumed that signal timing offsets along Page Mill Road at Foothill Expressway, Coyote Hill Road and Deer Creek Road would be optimized to maintain corridor traffic progression with the addition of the new signalized intersection. Results of this analysis are presented in **Table 2**.

Table 2: Intersection Levels of Service

#	Location	Traffic Control	AM Peak		PM Peak	
			Delay	LOS	Delay	LOS
Baseline Conditions						
1	Page Mill Rd & Foothill Expwy	Signal	81.5	F	101.6	F
2	Page Mill Rd & Coyote Hill Rd	SSSC	**ECL**	**F**	**ECL**	**F**
3	Page Mill Rd & Deer Creek Rd	Signal	46.8	D	17.1	B
Median Closure Improvement Alternative						
1	Page Mill Rd & Foothill Expwy	Signal	93.5	F	102.3	F
2	Page Mill Rd & Coyote Hill Rd	SSSC	**38.6**	**E**	17.5	C
3	Page Mill Rd & Deer Creek Rd	Signal	**64.2**	**E**	18.5	B
Signalization Improvement Alternative						
1	Page Mill Rd & Foothill Expwy	Signal	80.6	F	86.6	F
2	Page Mill Rd & Coyote Hill Rd	Signal	8.8	A	23.0	C
3	Page Mill Rd & Deer Creek Rd	Signal	42.9	D	9.7	A

Notes:
1. SSSC = Side-Street Stop-Control; Signal = Signalized;
2. ECL = Delay exceeds calculable limit (>180 seconds/vehicle).
3. Delay based on worst minor street approach movement for SSSC intersections. Delay based on average intersection delay for signalized intersections.
4. Intersections operating below the established LOS targets are shown in **bold**. The County target of LOS D applies to the intersections of Page Mill Rd/Coyote Hill Rd and Page Mill Rd/Deer Creek Rd. The VTA Congestion Management Program (CMP) identifies LOS F as the target for the Page Mill Rd/Foothill Expwy intersection, as this intersection was operating at LOS F for the baseline year of the CMP.

As shown in **Table 2**, the signalization improvement option generally results in better operational performance in terms of delay and LOS compared to the median closure improvement option. With closure of the median, the intersections of Page Mill Road/Coyote Hill Road and Page Mill Road//Deer Creek Road are projected to operate at LOS E during the AM peak hour, which is below the County LOS target of LOS D. At Page Mill Road/Coyote Hill Road, the LOS E is associated with the northbound right-turn movement, which would be required to wait for a gap in eastbound Page Mill Road traffic in order to complete its turning movement.

Also shown in **Table 2**, the delay, and in some cases the LOS, is actually slightly worse at the Page Mill Road/Foothill Expressway and Page Mill Road/Deer Creek Road intersections with the median closure alternative compared to baseline conditions and the signalization alternative because the median closure alternative is likely to shift some left-turn traffic from the Coyote Hill Road intersection to these adjacent streets.

While the Page Mill Road/Coyote Hill Road intersection as a whole operates at LOS C during the PM peak hour with the signalization improvement alternative, the northbound approach would operate at LOS F with an average control delay for the left-turn movement of about 114 seconds/vehicle. With the addition of a second northbound left-turn lane, the average control delay during the PM peak hour for the northbound left-turn movement would be reduced by about 14 seconds (13%).

Vehicle Queuing

As congestion increases, it is common for traffic at signals and stop signs to form lines of stopped (or queued) vehicles. The 95th percentile queue[2] is used as the benchmark for queuing impacts as a standard transportation engineering practice. For the purposes of this study, a potential queuing issue is identified at an intersection where the estimated 95th percentile queue length in a dedicated turn lane is projected to exceed the storage limits of the existing turn pocket, assuming a typical vehicle length and spacing from the adjacent vehicle of a total of 25 feet.

As mentioned previously, Synchro analysis software was used to calculate vehicle queues at the intersection of Page Mill Road & Coyote Hill Road. Key findings of the intersection queuing analysis are summarized as follows:

- *Median Closure Improvement Alternative*
  - No queueing concerns identified.
- *Signalization Improvement Alternative*
  - AM Peak – Westbound left-turn queues will extend to 287 feet, exceeding the available turn pocket storage by about 187 feet (approximately 7-8 car lengths).
  - PM Peak – Westbound left-turn queues will extend to 146 feet, exceeding the available turn pocket storage by about 46 feet (approximately 1-2 car lengths).
  - PM Peak – Northbound right-turn queues will extend to 177 feet, exceeding the available turn pocket storage by about 27 feet (approximately 1 car length). In addition, average left-turn queues at this approach are projected to extend to 380 feet (16 car lengths), with 95th percentile queues extending to over 530 feet at times during the PM peak hour.

As noted above in the Intersection Levels of Service section, the addition of a second northbound left-turn lane would provide substantial benefit in the signalization improvement alternative. With the addition of a second northbound left-turn lane, average queues for that movement would be reduced by about 180 feet (7-8 vehicle lengths) and 95th percentile queues would be reduced by about 280 feet (11 vehicle lengths).

[2] The 95th percentile queue is calculated as occurring with 95th percentile traffic volumes, allowing for consideration of fluctuations in traffic. This represents a condition where for 95 percent of the time during the peak period traffic volumes and related queuing will be at, or less than, the queue length indicated.

Page Mill Road Corridor Performance

SimTraffic microsimulation analysis software was utilized to evaluate corridor performance along Page Mill Road for baseline conditions and for each of the two intersection improvement alternatives. The AM and PM peak hour SimTraffic models used for this evaluation include the extended 2.7-mile segment of the Page Mill Road corridor from I-280 to El Camino Real; however, for the purposes of this study, the corridor performance evaluation is focused on the segment of Page Mill Road from west of Deer Creek Road to Foothill Expressway/Junipero Serra Boulevard. For the signalization improvement alternative, it was assumed that signal timing offsets along Page Mill Road at Foothill Expressway, Coyote Hill Road and Deer Creek Road would be optimized to maintain corridor traffic progression with the addition of the new signal. In addition, two northbound left-turn lanes are assumed at Page Mill Road/Coyote Hill Road for the signalization alternative.

Table 3 below summarizes the projected average corridor travel time, speeds, and delay along the Page Mill Road between Deer Creek Road and Foothill Expressway under each intersection improvement alternative.

Table 3: Page Mill Road Corridor Operations

Metric	AM Peak		PM Peak	
	Eastbound	Westbound	Eastbound	Westbound
Baseline Conditions				
Average Travel Time (sec)	957	115	170	76
Average Delay (sec)	431	40	41	27
Average Speed (mph)	6.8	20.5	38.3	31.1
Median Closure Improvement Alternative				
Average Travel Time (sec)	1,091	52	174	72
Average Delay (sec)	459	6	47	24
Average Speed (mph)	6.0	44.9	37.4	32.6
Signalization Improvement Alternative				
Average Travel Time (sec)	969	59	172	75
Average Delay (sec)	428	13	45	26
Average Speed (mph)	6.7	39.9	38.0	31.4

Notes:
(a) Corridor travel times, delay and speeds estimated using SimTraffic software.
(b) Eastbound results reflect Page Mill Road from I-280 to Foothill Expressway. Because no control points exist west of Deer Creek Road, westbound results reflect Page Mill Road from Foothill Expressway to Deer Creek Road.

As shown in **Table 2**, compared to baseline conditions, the average peak directional travel time along Page Mill Road with signalization is approximately 12 seconds longer during the AM peak hour (peak direction is eastbound), and approximately the same during the PM peak hour (peak direction is westbound). Both the signalization and median closure alternatives provide considerable travel time improvement in the AM off-peak direction (westbound) compared to baseline conditions by reducing forecast delays associated with westbound left-turn queues spilling back beyond the turn pocket and impeding through traffic at Page Mill Road/Coyote Hill Road. It should be noted that the spillback of the westbound left-turn queues at this location does not necessarily occur currently, but is projected to become an issue under baseline conditions with the additional traffic generated by the future on-street parking on Coyote Hill Road and development planned at Stanford Business Park.

Bicycle Circulation

With the existing Matadero Creek Trail located just east of Page Mill Road and planned addition of bike lanes along Coyote Hill Road, there is likely to be additional demand for access between these bicycle facilities and Page Mill Road. While Page Mill Road does not have marked bike lanes, the shoulders are designed to allow bike travel. With the signalization improvement option at the Page Mill Road/Coyote Hill Road intersection, cyclists will have a protected phase to cross from Coyote Hill Road to westbound Page Mill Road. With the median closure improvement alternative, cyclists traveling along eastbound Page Mill Road will not have a conflict with left-turning vehicle movements, but cyclists traveling on northbound Coyote Hill Road will not have the opportunity to cross the intersection to westbound Page Mill Road.

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this technical memorandum is to document the traffic analysis assumptions, methodology and findings comparing two potential improvement alternatives for the Page Mill Road/Coyote Hill Road intersection. The improvement options currently being considered by the County include closure of the median gap along Page Mill Road, effectively allowing right-in/right-out access only to/from Coyote Hill Road, or signalization of this intersection. The pertinent findings of this analysis are summarized as follows:

- The median closure improvement alternative is projected to result in acceptable operations for the Page Mill Road/Coyote Hill Road intersection during the PM peak hour, but the intersection is anticipated to operate at LOS E during the AM peak period, which is below the County's established level of service target of LOS D or better. In addition, with the elimination of left-turn access to/from Coyote Hill Road, some left-turning traffic is anticipated to shift to Foothill Expressway and Deer Creek Road, which will worsen operations at the intersection of those streets with Page Mill Road. With the median closure alternative, the Page Mill Road/Deer Creek Road intersection is projected to worsen from acceptable LOS D under baseline conditions to unacceptable LOS E during the AM peak hour.
- The signalization improvement option is projected to result in acceptable LOS C or better at the Page Mill Road/Coyote Hill Road intersection during the AM and PM peak hours. While this location is anticipated to operate acceptably based on the average intersection control delay and LOS, the Coyote Hill Road intersection approach is projected to operate at LOS F

with average delay of approximately 114 seconds per vehicle for the left-turn movement and queues that regularly extend back 380 to 530 feet from the intersection during the PM peak hour. The addition of a second northbound left-turn lane at the Page Mill Road/Coyote Hill Road intersection would improve the side-street delays, LOS and queuing considerably. Relative to conditions under the signalization improvement option with a single northbound left-turn lane, with a second northbound left-turn lane the average control delay during the PM peak hour for the northbound left-turn movement would be reduced by about 14 seconds (13%), average queues would be reduced by about 180 feet (7-8 vehicle lengths) and 95th percentile queues would be reduced by about 280 feet (11 vehicle lengths).

- With the signalization improvement option at Page Mill Road/Coyote Hill Road, the AM peak hour vehicle queues at the westbound left-turn lane are projected to spill back beyond the existing turn pocket by about four to seven (4-8) vehicles. During the PM peak hour, these queues are projected to spill back beyond the turn pocket occasionally by one to two (1-2) vehicles. Modification of the existing median would allow for extension of the existing left-turn pocket for this movement.
- With the signalization improvement alternative, the average peak directional corridor travel time along Page Mill Road between Deer Creek Road and Coyote Hill Road is anticipated to increase by approximately 12 seconds for the AM peak hour (eastbound is peak direction) compared to baseline conditions. During the PM peak hour, the average peak directional (westbound is peak direction) travel time remains roughly the same.

FIGURES:

Figure 1 – Study Area Vicinity

Figure 2 – Conceptual Design of Proposed Coyote Hill Road Improvements

Figure 3 – Intersection Turning Movement Volumes

ATTACHMENTS:

Attachment A – Traffic Volume Assumptions

Attachment B – Synchro Analysis Worksheets

Page Mill Road and Interstate 280 Improvements Study

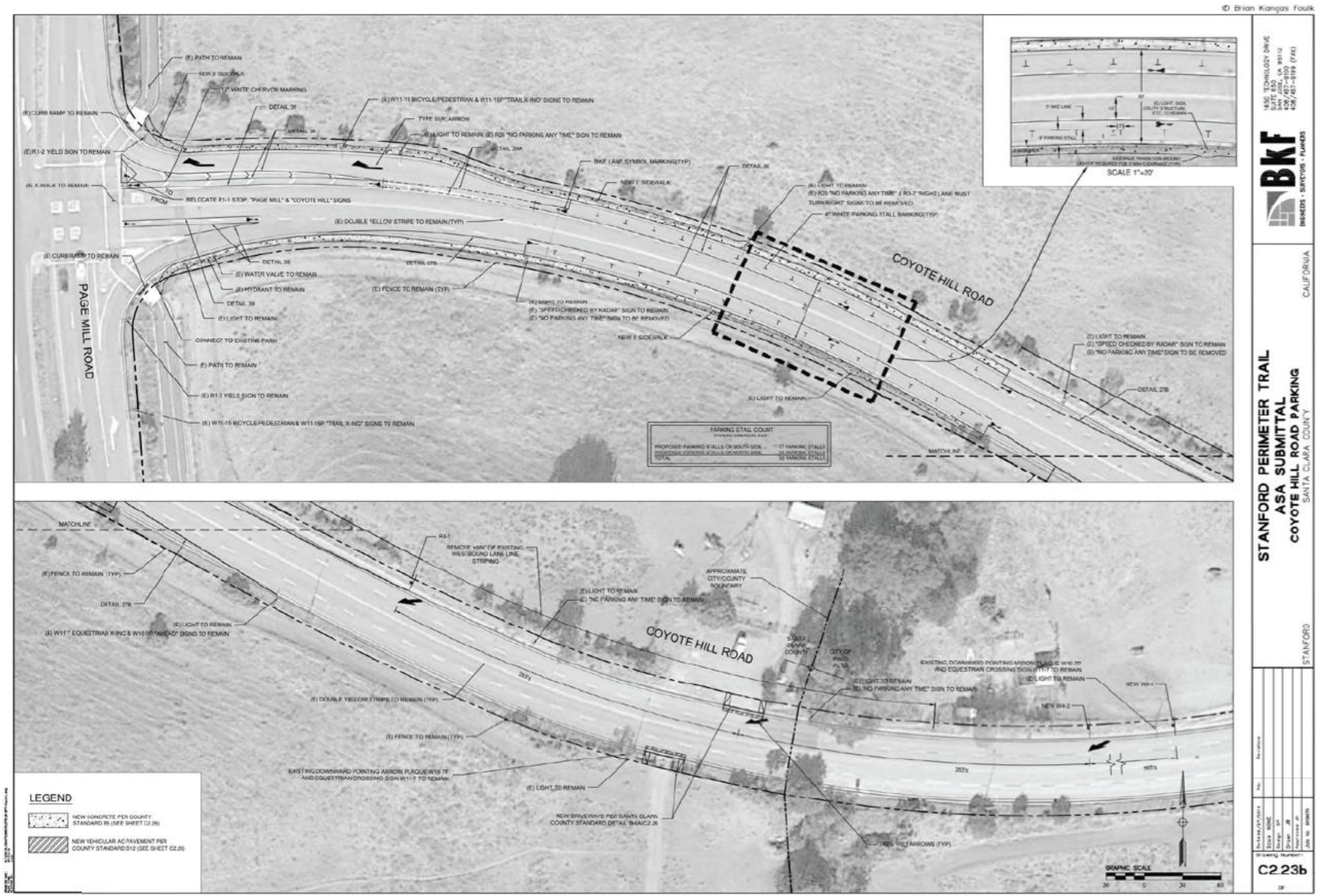
Coyote Hill Road & Page Mill Road Intersection Analysis

Kimley»Horn

Figure 1: Study Area Vicinity

Page Mill Road and Interstate 280 Improvements Study

Coyote Hill Road & Page Mill Road Intersection Analysis

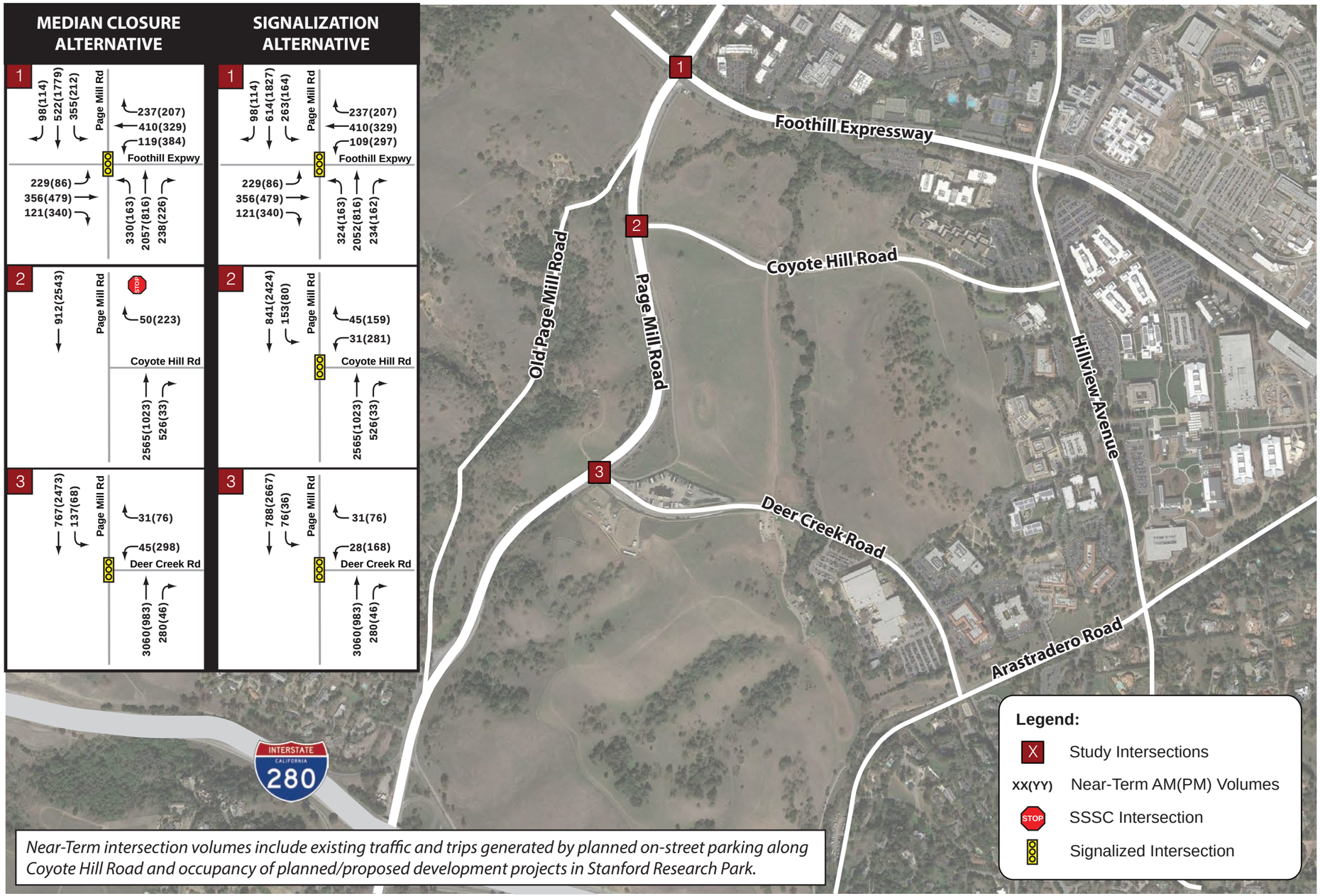


Source: Robert H. Eckols, P.E., Fehr & Peers. *Stanford Perimeter Trail – Coyote Hill Road Parking* [Technical Memorandum]. November 3, 2014. Jim Inglis, Stanford Real Estate.

Figure 2: Conceptual Design of Proposed Coyote Hill Road Improvements

Page Mill Road and Interstate 280 Improvements Study

Coyote Hill Road & Page Mill Road Intersection Analysis



Near-Term intersection volumes include existing traffic and trips generated by planned on-street parking along Coyote Hill Road and occupancy of planned/proposed development projects in Stanford Research Park.

Figure 3: Intersection Turning Movement Volumes

Attachment A: Traffic Volume Assumptions

Coyote Hill Road Volume Assumptions

Coyote Hill Road Volumes (East of Page Mill Rd)	Page Mill Rd/Coyote Hill Rd - Unsignalized			Page Mill Rd/Coyote Hill Rd - Signalized		
	Existing Volume	Added Trips (Parking)	Added Trips (Development)	Existing Volume	Added Trips (Parking)	Added Trips (Development)
Daily Volume	1,652	551	2,031	1,788	551	2,707
Eastbound	1,108	276	1,523	1,108	276	1,523
Westbound	544	276	508	680	276	1,184
AM Peak Hour Volume	249	41	439	252	41	462
Eastbound	237	21	421	237	21	421
Westbound	12	20	18	15	20	41
PM Peak Hour Volume	118	41	199	142	41	370
Eastbound	21	21	71	21	21	71
Westbound	97	20	128	121	20	299

Notes:

Traffic Volumes

- Existing Daily volume for Coyote Hill Road referenced from *Stanford Perimeter Trail-Coyote Hill Road Parking Analysis Memorandum* (Fehr & Peers, July 9, 2014). Existing Daily volume represents 3-day average for counts collected in May 2013.

- Existing AM peak hour volume based on highest hourly volume between 6:00AM-10:00AM. PM peak hour volume based on highest hourly volume between 3:00PM-7:00PM.

- With signalization of the Page Mill Rd/Coyote Hill Rd intersection, the baseline westbound volume on Coyote Hill Rd is assumed to increase by 25% due to reduction in approach delays compared to the side-street stop-controlled configuration.

- Due to oversaturated conditions during the AM peak period where the EB traffic demand exceeds the available capacity, the EB traffic flow recorded at the Page Mill Rd/Foothill Expwy intersection does not reflect the full demand. The full AM peak hour demand should include the recorded traffic flow plus unserved queue at the EB approach. To estimate the unserved demand, the EB departure volumes along Page Mill Rd departing the I-280 interchange were compared to the approach volumes at Deer Creek Road and at Foothill Expwy. Based on this review, it was estimated that the unserved demand along EB Page Mill is approximately 68 vehicles at Deer Creek Rd and 182 vehicles at Coyote Hill Rd. The unserved demand was added to the existing EB volumes at these intersections to reflect the full traffic demand.

Trip Generation for Proposed Coyote Hill Road Parking

- Trips generated by planned parking spaces referenced from *Stanford-Coyote Hill Road* traffic study (Daily = 735, Peak Hour = 55). Trips generated by the planned addition of on-street parking along Coyote Hill Road include net new trips generated by additional parking, trips diverted from previous parking supply on Stanford Avenue, and an additional 10-15% increase due to vehicles circulating while attempting to locate available parking.

- For the purposes of providing a conservative analysis, it is assumed that the peak hourly trips generated by the addition of on-street parking (55 trips) occurs during the AM and PM peak hour traffic period at the Page Mill Road/Coyote Hill Road intersection.

- Assumed directional distribution for trips generated by planned on-street parking: 50% in / 50% out

- Assumed geographic distribution for trips generated by planned on-street parking:
    - 75% from Page Mill Road;
    - 25% from the east (Hillview Ave)

Trip Generation for Nearby Planned/Approved Development

- Per the *Stanford-Coyote Hill Road* traffic study, there will be additional traffic added to Coyote Hill Road due to planned or approved but not yet occupied development in the nearby Stanford Research Park. Per the traffic study, approximately 45% of the Daily inbound (1,523) trips generated by planned nearby development will utilize Coyote Hill Road eastbound. Due to challenges with crossing Page Mill Road from the stop-controlled intersection at Coyote Hill Road, only 15% of these outbound trips (508) are anticipated to use Coyote Hill Road westbound. For the purposes of this analysis, these same distribution percentages are assumed for AM and PM peak hour directional trips generated by development projects.

- With signalization of the Page Mill Rd/Coyote Hill Rd intersection, the % of outbound trips from planned development projects using Coyote Hill Road is estimated to increase from 15% to 35%.

- The increase in volume at the NB approach at the Page Mill Rd/Coyote Hill Rd intersection with signalization is anticipated to be applied to the NB left-turn movement. This increase represents a shift to this intersection from Page Mill Rd/Foothill Expwy (40%) and Page Mill Rd/Deer Creek Rd (60%).

Intersection Volume Assumptions

- Peak Hour Factor (PHF) for Coyote Hill Rd approach assumed to be consistent with existing PHF at Deer Creek Rd.

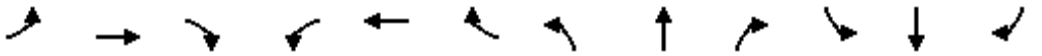
- NB & SB through volumes at Page Mill Rd/Coyote Hill Rd estimated based on volumes at adjacent intersection of Page Mill Rd/Deer Creek Rd

- For existing unsignalized intersection configuration, the following turning movement distribution to/from Coyote HIll Rd is assumed:
  - From Page Mill Road to Coyote Hill Rd = Match existing NB/SB distribution % along Page Mill Rd
  - From Coyote Hill Rd to Page Mill Rd = WB to SB is 50% of SB distribution on Page Mill Rd; WB to NB is equal to existing Page Mill Rd distribution + 50% of SB
- For scenario with closure of median, the following turning movement distribution is assumed to/from Coyote HIll Rd:
  - From Page Mill Road to Coyote Hill Rd = EB right turns remain same. WB lefts divert to Foothill Expwy (60%) and Deer Creek (40%)
  - From Coyote Hill Rd to Page Mill Rd = 75% of previous left-turns make right turn to EB Page Mill Rd (before making a right-turn on Foothill). Other 25% divert to Foothill Expwy (10%) and Deer Creek (15%)

- For scenario with installation of a traffic signal, the following turning movement distribution to/from Coyote HIll Rd is assumed:
  - From Page Mill Road to Coyote Hill Rd = Match existing NB/SB distribution % along Page Mill Rd
  - From Coyote Hill Rd to Page Mill Rd = Background traffic increase with signalization is applied to NB left-turn.

Attachment B: Synchro Analysis Worksheets

Baseline Conditions (AM Peak)



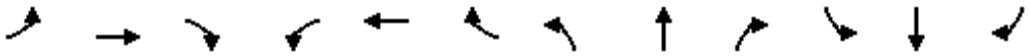
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	324	2052	234	263	614	98	119	410	237	229	356	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.6	5.3	5.3	4.3	5.3	5.3
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	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	0.95	1.00	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	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)	3150	3800	1750	3150	3800	1750	3150	3800	1750	875	1900	1750
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	3539	1750	3433	3539	1750	3433	3539	1750	1770	3539	1750
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	324	2052	234	263	614	98	119	410	237	229	356	121
RTOR Reduction (vph)	0	0	86	0	0	54	0	0	128	0	0	96
Lane Group Flow (vph)	324	2052	148	263	614	44	119	410	109	229	356	25
Confl. Peds. (#/hr)									2	2		
Confl. Bikes (#/hr)			4			7			20			23
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1 9	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	29.2	102.3	102.3	15.8	84.7	84.7	12.5	27.7	27.7	24.7	39.6	39.6
Effective Green, g (s)	29.2	102.3	102.3	15.8	84.7	84.7	12.5	27.7	27.7	24.7	39.6	39.6
Actuated g/C Ratio	0.15	0.54	0.54	0.08	0.45	0.45	0.07	0.15	0.15	0.13	0.21	0.21
Clearance Time (s)		5.7	5.7	4.2	5.7	5.7	4.6	5.3	5.3	4.3	5.3	5.3
Vehicle Extension (s)		4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	484	2046	942	261	1694	780	207	554	255	113	396	364
v/s Ratio Prot	0.10	c0.54		c0.08	0.16		0.04	0.11		c0.26	c0.19	
v/s Ratio Perm			0.08			0.02			0.06			0.01
v/c Ratio	0.67	1.00	0.16	1.01	0.36	0.06	0.57	0.74	0.43	2.03	0.90	0.07
Uniform Delay, d1	75.8	43.9	22.1	87.1	34.8	29.9	86.2	77.7	73.9	82.7	73.3	60.4
Progression Factor	1.17	0.82	0.92	1.26	0.50	0.02	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	6.7	0.0	57.5	0.6	0.1	3.8	5.6	1.6	491.5	22.8	0.1
Delay (s)	89.0	42.7	20.3	167.2	17.9	0.7	90.0	83.3	75.5	574.2	96.0	60.5
Level of Service	F	D	C	F	B	A	F	F	E	F	F	E
Approach Delay (s)		46.5			56.4			81.9			245.0	
Approach LOS		D			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	81.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	190.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	2565	526	153	851	5	45
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2565	526	153	851	5	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			2565		3296	1282
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2565		3296	1282
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			9		0	71
cM capacity (veh/h)			169		1	156

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	1282	1282	526	153	426	426	50
Volume Left	0	0	0	153	0	0	5
Volume Right	0	0	526	0	0	0	45
cSH	1700	1700	1700	169	1700	1700	6
Volume to Capacity	0.75	0.75	0.31	0.91	0.25	0.25	8.19
Queue Length 95th (ft)	0	0	0	166	0	0	Err
Control Delay (s)	0.0	0.0	0.0	100.5	0.0	0.0	Err
Lane LOS				F			F
Approach Delay (s)	0.0			15.3			Err
Approach LOS							F

Intersection Summary			
Average Delay	124.3		
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	3060	280	76	776	0	44	0	31	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7	5.7	4.0	5.7		4.0		4.0			
Lane Util. Factor		0.95	1.00	1.00	0.95		0.97		1.00			
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1563	1770	3539		3433		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1563	1770	3539		3433		1583			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	3060	280	76	776	0	44	0	31	0	0	0
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	29	0	0	0
Lane Group Flow (vph)	0	3060	270	76	776	0	44	0	2	0	0	0
Confl. Bikes (#/hr)			3			2						
Turn Type	Prot	NA	Perm	Prot	NA		Prot		Perm			
Protected Phases	1	6		5	2		4					
Permitted Phases			6						4			
Actuated Green, G (s)		152.7	152.7	13.5	170.2		10.1		10.1			
Effective Green, g (s)		152.7	152.7	13.5	170.2		10.1		10.1			
Actuated g/C Ratio		0.80	0.80	0.07	0.90		0.05		0.05			
Clearance Time (s)		5.7	5.7	4.0	5.7		4.0		4.0			
Vehicle Extension (s)		4.0	4.0	3.0	4.0		3.0		3.0			
Lane Grp Cap (vph)		2844	1256	125	3170		182		84			
v/s Ratio Prot		c0.86		c0.04	0.22		c0.01					
v/s Ratio Perm			0.17						0.00			
v/c Ratio		1.08	0.21	0.61	0.24		0.24		0.02			
Uniform Delay, d1		18.7	4.4	85.7	1.3		86.3		85.3			
Progression Factor		1.00	1.00	0.83	1.69		1.00		1.00			
Incremental Delay, d2		41.6	0.4	7.9	0.2		0.7		0.1			
Delay (s)		60.2	4.8	78.7	2.4		87.0		85.4			
Level of Service		E	A	E	A		F		F			
Approach Delay (s)		55.6			9.2			86.3			0.0	
Approach LOS		E			A			F			A	

Intersection Summary			
HCM 2000 Control Delay	46.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	190.0	Sum of lost time (s)	17.7
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

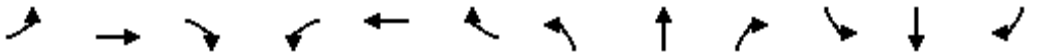
Arterial Level of Service: EB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Deer Creek	3	337.1	811.1	1.2	10
Coyote Hill Rd	2	29.9	58.6	0.4	25
Foothill Expressway	1	64.1	87.1	0.3	11
Porter Dr	5123	12.9	36.7	0.3	26
Peter Coutts Rd	5122	7.8	25.2	0.2	30
Hanover	5120	27.2	62.9	0.4	24
Hansen Way	5117	5.3	19.5	0.1	25
Ramos	5115	3.2	23.2	0.2	33
El Camino Real	1104	70.6	84.9	0.1	6
Total		558.1	1209.2	3.2	14

Arterial Level of Service: WB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
El Camino Real	1104	281.2	431.5	1.6	14
Ramos	5115	7.5	22.1	0.1	23
Hansen Way	5117	42.3	63.9	0.2	12
Hanover	5120	41.0	54.6	0.1	9
Peter Coutts Rd	5122	11.7	46.2	0.4	33
Porter Dr	5123	3.6	22.4	0.2	33
Foothill Expressway	1	22.9	43.0	0.3	22
Coyote Hill Rd	2	36.5	82.8	0.3	17
Deer Creek	3	3.7	32.2	0.4	45
Total		450.5	798.6	3.7	17

Baseline Conditions (PM Peak)



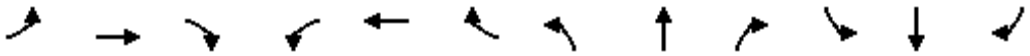
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	163	816	162	164	1827	114	375	329	207	86	479	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.94
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)	3150	3800	1750	3150	3800	1750	3150	3800	1750	875	1900	1750
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	3539	1750	3433	3539	1750	3433	3539	1750	1770	3539	1750
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	163	816	162	164	1827	114	375	329	207	86	479	340
RTOR Reduction (vph)	0	0	69	0	0	33	0	0	168	0	0	109
Lane Group Flow (vph)	163	816	93	164	1827	81	375	329	39	86	479	231
Confl. Peds. (#/hr)	1		3	3		1	3		1	1		3
Confl. Bikes (#/hr)			2			7			14			22
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	14.7	118.8	118.8	16.3	120.4	120.4	28.5	33.8	33.8	21.6	26.6	26.6
Effective Green, g (s)	14.9	120.5	120.5	16.5	122.1	122.1	29.1	35.1	35.1	21.9	27.9	27.9
Actuated g/C Ratio	0.07	0.57	0.57	0.08	0.58	0.58	0.14	0.17	0.17	0.10	0.13	0.13
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.6	5.3	5.3	4.3	5.3	5.3
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	223	2180	1004	247	2209	1017	436	635	292	91	252	232
v/s Ratio Prot	0.05	0.21		c0.05	c0.48		c0.12	0.09		c0.10	c0.25	
v/s Ratio Perm			0.05			0.05			0.02			0.13
v/c Ratio	0.73	0.37	0.09	0.66	0.83	0.08	0.86	0.52	0.13	0.95	1.90	0.99
Uniform Delay, d1	95.6	24.3	20.1	94.1	35.4	19.3	88.5	79.7	74.5	93.5	91.0	91.0
Progression Factor	0.95	0.99	0.94	1.10	0.91	0.55	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.3	0.5	0.2	5.5	3.1	0.1	15.8	1.0	0.3	75.7	419.9	57.3
Delay (s)	102.2	24.4	19.0	109.0	35.4	10.7	104.2	80.7	74.8	169.2	511.0	148.3
Level of Service	F	C	B	F	D	B	F	F	E	F	F	F
Approach Delay (s)		34.8			39.8			89.0			342.2	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	101.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1023	33	80	2502	86	159
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1023	33	80	2502	86	159
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						8
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1023		2434	512
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1023		2434	512
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		0	69
cM capacity (veh/h)			674		23	507

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	512	512	33	80	1251	1251	245
Volume Left	0	0	0	80	0	0	86
Volume Right	0	0	33	0	0	0	159
cSH	1700	1700	1700	674	1700	1700	62
Volume to Capacity	0.30	0.30	0.02	0.12	0.74	0.74	3.95
Queue Length 95th (ft)	0	0	0	10	0	0	Err
Control Delay (s)	0.0	0.0	0.0	11.1	0.0	0.0	Err
Lane LOS				B			F
Approach Delay (s)	0.0			0.3			Err
Approach LOS							F

Intersection Summary			
Average Delay	631.1		
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	983	46	36	2552	0	285	0	76	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Util. Factor		0.95	1.00	1.00	0.95		0.97		1.00			
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00		0.98			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1563	1770	3539		3433		1558			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1563	1770	3539		3433		1558			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	983	46	36	2552	0	285	0	76	0	0	0
RTOR Reduction (vph)	0	0	9	0	0	0	0	0	68	0	0	0
Lane Group Flow (vph)	0	983	37	36	2552	0	285	0	8	0	0	0
Confl. Bikes (#/hr)			3			2			2			
Turn Type	Prot	NA	Perm	Prot	NA		Prot		Perm			
Protected Phases	1	6		5	2		4					
Permitted Phases			6						4			
Actuated Green, G (s)		165.1	165.1	8.5	177.6		22.7		22.7			
Effective Green, g (s)		166.8	166.8	8.5	179.3		22.7		22.7			
Actuated g/C Ratio		0.79	0.79	0.04	0.85		0.11		0.11			
Clearance Time (s)		5.7	5.7	4.0	5.7		4.0		4.0			
Vehicle Extension (s)		4.0	4.0	3.0	4.0		3.0		3.0			
Lane Grp Cap (vph)		2810	1241	71	3021		371		168			
v/s Ratio Prot		0.28		0.02	c0.72		c0.08					
v/s Ratio Perm			0.02						0.01			
v/c Ratio		0.35	0.03	0.51	0.84		0.77		0.05			
Uniform Delay, d1		6.2	4.5	98.7	8.1		91.1		84.0			
Progression Factor		1.00	1.00	1.01	0.89		1.00		1.00			
Incremental Delay, d2		0.3	0.0	3.2	1.8		9.2		0.1			
Delay (s)		6.5	4.6	103.2	8.9		100.3		84.1			
Level of Service		A	A	F	A		F		F			
Approach Delay (s)		6.4			10.2			96.9			0.0	
Approach LOS		A			B			F			A	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Arterial Level of Service: EB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Deer Creek	3	11.3	93.6	1.2	46
Coyote Hill Rd	2	4.7	33.4	0.4	43
Foothill Expressway	1	25.4	43.3	0.3	22
Porter Dr	5123	4.8	30.5	0.3	31
Peter Coutts Rd	5122	9.1	29.7	0.2	25
Hanover	5120	66.1	108.0	0.4	14
Hansen Way	5117	27.0	41.7	0.1	12
Ramos	5115	95.3	135.5	0.2	7
El Camino Real	1104	85.3	99.7	0.1	5
Total		328.9	615.3	3.2	20

Arterial Level of Service: WB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
El Camino Real	1104	79.1	241.9	1.7	25
Ramos	5115	19.6	34.4	0.1	15
Hansen Way	5117	9.2	29.9	0.2	25
Hanover	5120	19.0	32.4	0.1	15
Peter Coutts Rd	5122	17.0	58.4	0.4	26
Porter Dr	5123	15.7	36.8	0.2	20
Foothill Expressway	1	82.4	121.1	0.3	9
Coyote Hill Rd	2	12.1	32.4	0.3	29
Deer Creek	3	15.0	43.3	0.4	33
Total		269.1	630.6	3.8	22

Median Closure Improvement Alternative (AM Peak)

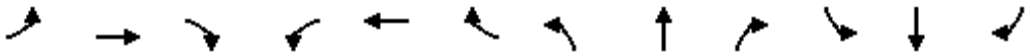
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	2057	238	355	522	98	119	410	237	229	356	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.6	5.3	5.3	4.3	5.3	5.3
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	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	0.95	1.00	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	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)	3150	3800	1750	3150	3800	1750	3150	3800	1750	875	1900	1750
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	3539	1750	3433	3539	1750	3433	3539	1750	1770	3539	1750
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	330	2057	238	355	522	98	119	410	237	229	356	121
RTOR Reduction (vph)	0	0	87	0	0	54	0	0	128	0	0	96
Lane Group Flow (vph)	330	2057	151	355	522	44	119	410	109	229	356	25
Confl. Peds. (#/hr)									2	2		
Confl. Bikes (#/hr)			4			7			20			23
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1 9	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	29.3	102.3	102.3	15.8	84.6	84.6	12.5	27.7	27.7	24.7	39.6	39.6
Effective Green, g (s)	29.3	102.3	102.3	15.8	84.6	84.6	12.5	27.7	27.7	24.7	39.6	39.6
Actuated g/C Ratio	0.15	0.54	0.54	0.08	0.45	0.45	0.07	0.15	0.15	0.13	0.21	0.21
Clearance Time (s)		5.7	5.7	4.2	5.7	5.7	4.6	5.3	5.3	4.3	5.3	5.3
Vehicle Extension (s)		4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	485	2046	942	261	1692	779	207	554	255	113	396	364
v/s Ratio Prot	0.10	c0.54		c0.11	0.14		0.04	0.11		c0.26	c0.19	
v/s Ratio Perm			0.09			0.02			0.06			0.01
v/c Ratio	0.68	1.01	0.16	1.36	0.31	0.06	0.57	0.74	0.43	2.03	0.90	0.07
Uniform Delay, d1	75.9	43.9	22.1	87.1	33.9	30.0	86.2	77.7	73.9	82.7	73.3	60.4
Progression Factor	1.05	0.85	1.34	1.24	0.50	0.02	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	7.3	0.0	184.8	0.5	0.1	3.8	5.6	1.6	491.5	22.8	0.1
Delay (s)	80.4	44.4	29.8	293.0	17.5	0.7	90.0	83.3	75.5	574.2	96.0	60.5
Level of Service	F	D	C	F	B	A	F	F	E	F	F	E
Approach Delay (s)		47.6			116.1			81.9			245.0	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	93.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	190.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	108.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	2565	526	0	912	0	50
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2565	526	0	912	0	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			2565		3021	1282
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			2565		3021	1282
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	68
cM capacity (veh/h)			169		10	156

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	1282	1282	526	456	456	50
Volume Left	0	0	0	0	0	0
Volume Right	0	0	526	0	0	50
cSH	1700	1700	1700	1700	1700	156
Volume to Capacity	0.75	0.75	0.31	0.27	0.27	0.32
Queue Length 95th (ft)	0	0	0	0	0	32
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	38.6
Lane LOS						E
Approach Delay (s)	0.0			0.0		38.6
Approach LOS						E

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	3060	280	137	767	0	45	0	31	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.7	5.7	4.0	5.7		4.0		4.0			
Lane Util. Factor		0.95	1.00	1.00	0.95		0.97		1.00			
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1563	1770	3539		3433		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1563	1770	3539		3433		1583			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	3060	280	137	767	0	45	0	31	0	0	0
RTOR Reduction (vph)	0	0	12	0	0	0	0	0	29	0	0	0
Lane Group Flow (vph)	0	3060	268	137	767	0	45	0	2	0	0	0
Confl. Bikes (#/hr)			3			2						
Turn Type	Prot	NA	Perm	Prot	NA		Prot		Perm			
Protected Phases	1	6		5	2		4					
Permitted Phases			6						4			
Actuated Green, G (s)		146.1	146.1	20.1	170.2		10.1		10.1			
Effective Green, g (s)		146.1	146.1	20.1	170.2		10.1		10.1			
Actuated g/C Ratio		0.77	0.77	0.11	0.90		0.05		0.05			
Clearance Time (s)		5.7	5.7	4.0	5.7		4.0		4.0			
Vehicle Extension (s)		4.0	4.0	3.0	4.0		3.0		3.0			
Lane Grp Cap (vph)		2721	1201	187	3170		182		84			
v/s Ratio Prot		c0.86		c0.08	0.22		c0.01					
v/s Ratio Perm			0.17						0.00			
v/c Ratio		1.12	0.22	0.73	0.24		0.25		0.02			
Uniform Delay, d1		22.0	6.1	82.3	1.3		86.3		85.3			
Progression Factor		1.00	1.00	0.88	1.62		1.00		1.00			
Incremental Delay, d2		61.5	0.4	13.5	0.2		0.7		0.1			
Delay (s)		83.5	6.6	86.0	2.3		87.0		85.4			
Level of Service		F	A	F	A		F		F			
Approach Delay (s)		77.0			15.0			86.3			0.0	
Approach LOS		E			B			F			A	

Intersection Summary			
HCM 2000 Control Delay	64.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	190.0	Sum of lost time (s)	17.7
Intersection Capacity Utilization	106.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

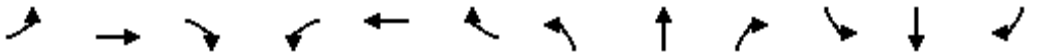
Arterial Level of Service: EB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Deer Creek	3	377.7	951.5	1.2	9
Coyote Hill Rd	2	18.6	54.6	0.4	26
Foothill Expressway	1	62.3	85.2	0.3	11
Porter Dr	5123	13.1	37.1	0.3	26
Peter Coutts Rd	5122	7.1	24.5	0.2	30
Hanover	5120	25.7	61.4	0.4	25
Hansen Way	5117	4.7	19.0	0.1	26
Ramos	5115	2.7	22.8	0.2	33
El Camino Real	1104	76.7	91.3	0.1	6
Total		588.6	1347.3	3.2	14

Arterial Level of Service: WB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
El Camino Real	1104	184.9	314.6	1.4	16
Ramos	5115	5.7	20.2	0.1	26
Hansen Way	5117	31.9	53.5	0.2	14
Hanover	5120	44.4	57.9	0.1	8
Peter Coutts Rd	5122	13.8	48.3	0.4	32
Porter Dr	5123	3.6	22.6	0.2	33
Foothill Expressway	1	24.8	45.1	0.3	21
Coyote Hill Rd	2	2.5	20.5	0.3	46
Deer Creek	3	3.6	31.9	0.4	45
Total		315.2	614.5	3.4	20

Median Closure Improvement Alternative (PM Peak)



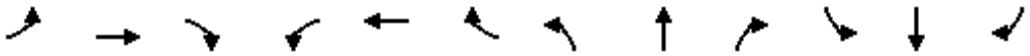
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	163	816	226	212	1779	114	384	329	207	86	479	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.94
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)	3150	3800	1750	3150	3800	1750	3150	3800	1750	875	1900	1750
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	3539	1750	3433	3539	1750	3433	3539	1750	1770	3539	1750
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	163	816	226	212	1779	114	384	329	207	86	479	340
RTOR Reduction (vph)	0	0	100	0	0	33	0	0	168	0	0	110
Lane Group Flow (vph)	163	816	126	212	1779	81	384	329	39	86	479	230
Confl. Peds. (#/hr)	1		3	3		1	3		1	1		3
Confl. Bikes (#/hr)			2			7			14			22
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	14.7	115.7	115.7	19.4	120.4	120.4	28.8	33.8	33.8	21.6	26.3	26.3
Effective Green, g (s)	14.9	117.4	117.4	19.6	122.1	122.1	29.4	35.1	35.1	21.9	27.6	27.6
Actuated g/C Ratio	0.07	0.56	0.56	0.09	0.58	0.58	0.14	0.17	0.17	0.10	0.13	0.13
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.6	5.3	5.3	4.3	5.3	5.3
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	223	2124	978	294	2209	1017	441	635	292	91	249	230
v/s Ratio Prot	0.05	0.21		c0.07	c0.47		c0.12	0.09		c0.10	c0.25	
v/s Ratio Perm			0.07			0.05			0.02			0.13
v/c Ratio	0.73	0.38	0.13	0.72	0.81	0.08	0.87	0.52	0.13	0.95	1.92	1.00
Uniform Delay, d1	95.6	26.0	22.0	92.5	34.6	19.3	88.4	79.7	74.5	93.5	91.2	91.2
Progression Factor	0.94	0.98	0.91	1.13	0.91	0.55	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.3	0.5	0.3	7.1	2.7	0.1	16.9	1.0	0.3	75.7	430.2	58.6
Delay (s)	100.9	26.0	20.3	112.0	34.1	10.7	105.3	80.7	74.8	169.2	521.4	149.8
Level of Service	F	C	C	F	C	B	F	F	E	F	F	F
Approach Delay (s)		35.1			40.6			89.6			348.3	
Approach LOS		D			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	102.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1023	33	0	2543	0	223
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1023	33	0	2543	0	223
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1023		2294	512
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1023		2294	512
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	56
cM capacity (veh/h)			674		33	507

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	512	512	33	1272	1272	223
Volume Left	0	0	0	0	0	0
Volume Right	0	0	33	0	0	223
cSH	1700	1700	1700	1700	1700	507
Volume to Capacity	0.30	0.30	0.02	0.75	0.75	0.44
Queue Length 95th (ft)	0	0	0	0	0	55
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	17.5
Lane LOS						C
Approach Delay (s)	0.0			0.0		17.5
Approach LOS						C

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	983	46	68	2473	0	298	0	76	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Util. Factor		0.95	1.00	1.00	0.95		0.97		1.00			
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00		0.98			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1563	1770	3539		3433		1558			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1563	1770	3539		3433		1558			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	983	46	68	2473	0	298	0	76	0	0	0
RTOR Reduction (vph)	0	0	11	0	0	0	0	0	67	0	0	0
Lane Group Flow (vph)	0	983	35	68	2473	0	298	0	9	0	0	0
Confl. Bikes (#/hr)			3			2			2			
Turn Type	Prot	NA	Perm	Prot	NA		Prot		Perm			
Protected Phases	1	6		5	2		4					
Permitted Phases			6						4			
Actuated Green, G (s)		159.4	159.4	13.4	176.8		23.5		23.5			
Effective Green, g (s)		161.1	161.1	13.4	178.5		23.5		23.5			
Actuated g/C Ratio		0.77	0.77	0.06	0.85		0.11		0.11			
Clearance Time (s)		5.7	5.7	4.0	5.7		4.0		4.0			
Vehicle Extension (s)		4.0	4.0	3.0	4.0		3.0		3.0			
Lane Grp Cap (vph)		2714	1199	112	3008		384		174			
v/s Ratio Prot		0.28		0.04	c0.70		c0.09					
v/s Ratio Perm			0.02						0.01			
v/c Ratio		0.36	0.03	0.61	0.82		0.78		0.05			
Uniform Delay, d1		7.9	5.8	95.7	7.8		90.7		83.3			
Progression Factor		1.00	1.00	1.03	0.91		1.00		1.00			
Incremental Delay, d2		0.4	0.0	5.0	1.5		9.5		0.1			
Delay (s)		8.3	5.9	103.3	8.6		100.2		83.4			
Level of Service		A	A	F	A		F		F			
Approach Delay (s)		8.2			11.1			96.8			0.0	
Approach LOS		A			B			F			A	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Arterial Level of Service: EB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Deer Creek	3	13.6	94.2	1.1	44
Coyote Hill Rd	2	5.4	34.0	0.4	42
Foothill Expressway	1	28.4	46.1	0.3	20
Porter Dr	5123	5.6	31.4	0.3	30
Peter Coutts Rd	5122	9.6	30.3	0.2	25
Hanover	5120	45.8	88.0	0.4	17
Hansen Way	5117	35.3	49.5	0.1	10
Ramos	5115	118.6	166.2	0.2	5
El Camino Real	1104	89.1	103.4	0.1	5
Total		351.4	643.0	3.2	19

Arterial Level of Service: WB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
El Camino Real	1104	62.5	211.2	1.5	26
Ramos	5115	19.8	34.4	0.1	15
Hansen Way	5117	9.3	30.2	0.2	25
Hanover	5120	17.8	31.3	0.1	16
Peter Coutts Rd	5122	17.5	58.6	0.4	26
Porter Dr	5123	15.1	36.4	0.2	20
Foothill Expressway	1	78.1	127.5	0.3	9
Coyote Hill Rd	2	10.4	30.7	0.3	31
Deer Creek	3	13.2	41.4	0.4	35
Total		243.7	601.8	3.6	22

Signalization Improvement Alternative (AM Peak)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	324	2052	234	263	614	98	109	410	237	229	356	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.6	5.3	5.3	5.3	6.3	6.3
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	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	0.95	1.00	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	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)	3150	3800	1750	3150	3800	1750	3150	3800	1750	875	1900	1750
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	3539	1750	3433	3539	1750	3433	3539	1750	1770	3539	1750
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	324	2052	234	263	614	98	109	410	237	229	356	121
RTOR Reduction (vph)	0	0	86	0	0	54	0	0	120	0	0	96
Lane Group Flow (vph)	324	2052	148	263	614	44	109	410	117	229	356	25
Confl. Peds. (#/hr)									2	2		
Confl. Bikes (#/hr)			4			7			20			23
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1 9	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	29.0	103.3	103.3	14.8	84.9	84.9	11.9	27.7	27.7	24.7	40.2	40.2
Effective Green, g (s)	29.0	103.3	103.3	14.8	84.9	84.9	11.9	27.7	27.7	23.7	39.2	39.2
Actuated g/C Ratio	0.15	0.54	0.54	0.08	0.45	0.45	0.06	0.15	0.15	0.12	0.21	0.21
Clearance Time (s)		5.7	5.7	4.2	5.7	5.7	4.6	5.3	5.3	4.3	5.3	5.3
Vehicle Extension (s)		4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	480	2066	951	245	1698	781	197	554	255	109	392	361
v/s Ratio Prot	0.10	c0.54		c0.08	0.16		0.03	0.11		c0.26	c0.19	
v/s Ratio Perm			0.08			0.03			0.07			0.01
v/c Ratio	0.68	0.99	0.16	1.07	0.36	0.06	0.55	0.74	0.46	2.10	0.91	0.07
Uniform Delay, d1	76.0	43.0	21.6	87.6	34.7	29.8	86.5	77.7	74.3	83.2	73.6	60.7
Progression Factor	1.06	0.57	0.53	1.33	0.44	0.03	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	10.7	0.1	78.2	0.6	0.1	3.3	5.6	1.8	525.1	24.5	0.1
Delay (s)	82.2	35.4	11.5	194.8	16.0	1.1	89.8	83.3	76.0	608.3	98.2	60.8
Level of Service	F	D	B	F	B	A	F	F	E	F	F	E
Approach Delay (s)		39.1			62.7			82.0			257.2	
Approach LOS		D			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	80.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	190.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	106.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	2565	526	153	841	31	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	4.0	5.7	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2565	526	153	841	31	45
RTOR Reduction (vph)	0	45	0	0	0	43
Lane Group Flow (vph)	2565	481	153	841	31	2
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6				4
Actuated Green, G (s)	147.0	147.0	21.5	172.5	7.8	7.8
Effective Green, g (s)	147.0	147.0	21.5	172.5	7.8	7.8
Actuated g/C Ratio	0.77	0.77	0.11	0.91	0.04	0.04
Clearance Time (s)	5.7	5.7	4.0	5.7	4.0	4.0
Vehicle Extension (s)	4.0	4.0	3.0	4.0	3.0	3.0
Lane Grp Cap (vph)	2738	1224	200	3213	72	64
v/s Ratio Prot	c0.72		c0.09	0.24	c0.02	
v/s Ratio Perm		0.30				0.00
v/c Ratio	0.94	0.39	0.77	0.26	0.43	0.03
Uniform Delay, d1	17.7	7.0	81.8	1.1	88.9	87.5
Progression Factor	0.27	0.06	0.93	1.06	1.00	1.00
Incremental Delay, d2	0.9	0.1	15.5	0.2	4.1	0.2
Delay (s)	5.7	0.5	91.2	1.3	93.0	87.6
Level of Service	A	A	F	A	F	F
Approach Delay (s)	4.8			15.2	89.8	
Approach LOS	A			B	F	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	190.0	Sum of lost time (s)	13.7
Intersection Capacity Utilization	97.5%	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												
Volume (vph)	0	3060	280	76	788	0	28	0	31	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Util. Factor		0.95	1.00	1.00	0.95		0.97		1.00			
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00		1.00			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1563	1770	3539		3433		1583			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1563	1770	3539		3433		1583			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	3060	280	76	788	0	28	0	31	0	0	0
RTOR Reduction (vph)	0	0	10	0	0	0	0	0	29	0	0	0
Lane Group Flow (vph)	0	3060	270	76	788	0	28	0	2	0	0	0
Confl. Bikes (#/hr)			3			2						
Turn Type	Prot	NA	Perm	Prot	NA		Prot		Perm			
Protected Phases	1	6		5	2		4					
Permitted Phases			6						4			
Actuated Green, G (s)		152.8	152.8	13.5	170.3		10.0		10.0			
Effective Green, g (s)		154.5	154.5	13.5	172.0		10.0		10.0			
Actuated g/C Ratio		0.81	0.81	0.07	0.91		0.05		0.05			
Clearance Time (s)		5.7	5.7	4.0	5.7		4.0		4.0			
Vehicle Extension (s)		4.0	4.0	3.0	4.0		3.0		3.0			
Lane Grp Cap (vph)		2877	1270	125	3203		180		83			
v/s Ratio Prot		c0.86		c0.04	0.22		c0.01					
v/s Ratio Perm			0.17						0.00			
v/c Ratio		1.06	0.21	0.61	0.25		0.16		0.02			
Uniform Delay, d1		17.8	4.0	85.7	1.1		86.0		85.4			
Progression Factor		1.00	1.00	0.79	4.59		1.00		1.00			
Incremental Delay, d2		36.8	0.4	8.0	0.2		0.4		0.1			
Delay (s)		54.5	4.4	75.9	5.2		86.4		85.4			
Level of Service		D	A	E	A		F		F			
Approach Delay (s)		50.3			11.4			85.9			0.0	
Approach LOS		D			B			F			A	

Intersection Summary			
HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	190.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Arterial Level of Service: EB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Deer Creek	3	344.7	834.6	1.1	10
Coyote Hill Rd	2	33.3	61.8	0.4	23
Foothill Expressway	1	49.6	72.8	0.3	13
Porter Dr	5123	18.3	42.2	0.3	23
Peter Coutts Rd	5122	7.9	25.3	0.2	29
Hanover	5120	27.7	63.3	0.4	24
Hansen Way	5117	4.6	18.7	0.1	26
Ramos	5115	2.4	22.5	0.2	34
El Camino Real	1104	89.8	104.6	0.1	5
Total		578.3	1245.9	3.2	14

Arterial Level of Service: WB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
El Camino Real	1104	146.2	242.8	1.0	15
Ramos	5115	16.1	30.3	0.1	17
Hansen Way	5117	76.7	97.9	0.2	8
Hanover	5120	44.9	58.4	0.1	8
Peter Coutts Rd	5122	12.7	47.1	0.4	32
Porter Dr	5123	3.6	22.5	0.2	33
Foothill Expressway	1	18.5	38.4	0.3	25
Coyote Hill Rd	2	7.4	25.2	0.3	37
Deer Creek	3	5.1	33.7	0.4	43
Total		331.1	596.3	3.1	19

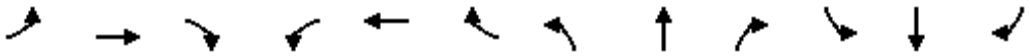
Signalization Improvement Alternative (PM Peak)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	163	816	162	164	1827	114	297	329	207	86	479	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	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	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)	3150	3800	1750	3150	3800	1750	3150	3800	1750	875	1900	1750
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	3539	1750	3433	3539	1750	3433	3539	1750	1770	3539	1750
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	163	816	162	164	1827	114	297	329	207	86	479	340
RTOR Reduction (vph)	0	0	69	0	0	33	0	0	168	0	0	113
Lane Group Flow (vph)	163	816	93	164	1827	81	297	329	39	86	479	227
Confl. Peds. (#/hr)	1		3	3		1	3		1	1		3
Confl. Bikes (#/hr)			2			7			14			22
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	14.7	118.8	118.8	16.3	120.4	120.4	24.9	33.8	33.8	21.6	30.2	30.2
Effective Green, g (s)	14.9	120.5	120.5	16.5	122.1	122.1	25.5	35.1	35.1	21.9	31.5	31.5
Actuated g/C Ratio	0.07	0.57	0.57	0.08	0.58	0.58	0.12	0.17	0.17	0.10	0.15	0.15
Clearance Time (s)	4.2	5.7	5.7	4.2	5.7	5.7	4.6	5.3	5.3	4.3	5.3	5.3
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	223	2180	1004	247	2209	1017	382	635	292	91	285	262
v/s Ratio Prot	0.05	0.21		c0.05	c0.48		0.09	c0.09		c0.10	c0.25	
v/s Ratio Perm			0.05			0.05			0.02			0.13
v/c Ratio	0.73	0.37	0.09	0.66	0.83	0.08	0.78	0.52	0.13	0.95	1.68	0.87
Uniform Delay, d1	95.6	24.3	20.1	94.1	35.4	19.3	89.5	79.7	74.5	93.5	89.2	87.2
Progression Factor	1.03	0.79	0.42	1.10	0.91	0.55	1.03	0.73	0.84	1.00	1.00	1.00
Incremental Delay, d2	10.8	0.5	0.2	5.5	3.1	0.1	9.4	0.9	0.3	75.7	321.2	25.2
Delay (s)	109.5	19.7	8.6	109.0	35.4	10.7	102.0	59.4	63.1	169.2	410.4	112.4
Level of Service	F	B	A	F	D	B	F	E	E	F	F	F
Approach Delay (s)		30.9			39.8			75.5			275.5	
Approach LOS		C			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	86.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1023	33	80	2424	281	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	4.0	5.7	4.0	4.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3539	1583	1770	3539	1770	1583
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1023	33	80	2424	281	159
RTOR Reduction (vph)	0	7	0	0	0	69
Lane Group Flow (vph)	1023	26	80	2424	281	90
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	6		5	2	4	
Permitted Phases		6				4
Actuated Green, G (s)	145.3	145.3	14.3	163.6	36.7	36.7
Effective Green, g (s)	145.3	145.3	14.3	163.6	36.7	36.7
Actuated g/C Ratio	0.69	0.69	0.07	0.78	0.17	0.17
Clearance Time (s)	5.7	5.7	4.0	5.7	4.0	4.0
Vehicle Extension (s)	4.0	4.0	3.0	4.0	3.0	3.0
Lane Grp Cap (vph)	2448	1095	120	2757	309	276
v/s Ratio Prot	0.29		0.05	c0.68	c0.16	
v/s Ratio Perm		0.02				0.06
v/c Ratio	0.42	0.02	0.67	0.88	0.91	0.32
Uniform Delay, d1	14.0	10.1	95.5	16.3	85.0	75.8
Progression Factor	0.86	0.96	1.27	0.46	1.00	1.00
Incremental Delay, d2	0.5	0.0	7.7	2.6	28.8	0.7
Delay (s)	12.6	9.8	128.6	10.0	113.8	76.5
Level of Service	B	A	F	B	F	E
Approach Delay (s)	12.5			13.8	100.3	
Approach LOS	B			B	F	

Intersection Summary			
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	13.7
Intersection Capacity Utilization	90.7%	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												
Volume (vph)	0	983	46	36	2667	0	168	0	76	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0		4.0			
Lane Util. Factor		0.95	1.00	1.00	0.95		0.97		1.00			
Frpb, ped/bikes		1.00	0.99	1.00	1.00		1.00		0.98			
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00		1.00			
Frt		1.00	0.85	1.00	1.00		1.00		0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (prot)		3539	1563	1770	3539		3433		1555			
Flt Permitted		1.00	1.00	0.95	1.00		0.95		1.00			
Satd. Flow (perm)		3539	1563	1770	3539		3433		1555			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	983	46	36	2667	0	168	0	76	0	0	0
RTOR Reduction (vph)	0	0	8	0	0	0	0	0	70	0	0	0
Lane Group Flow (vph)	0	983	38	36	2667	0	168	0	6	0	0	0
Confl. Bikes (#/hr)			3			2			2			
Turn Type	Prot	NA	Perm	Prot	NA		Prot		Perm			
Protected Phases	1	6		5	2		4					
Permitted Phases			6						4			
Actuated Green, G (s)		172.2	172.2	8.5	184.7		15.6		15.6			
Effective Green, g (s)		173.9	173.9	8.5	186.4		15.6		15.6			
Actuated g/C Ratio		0.83	0.83	0.04	0.89		0.07		0.07			
Clearance Time (s)		5.7	5.7	4.0	5.7		4.0		4.0			
Vehicle Extension (s)		4.0	4.0	3.0	4.0		3.0		3.0			
Lane Grp Cap (vph)		2930	1294	71	3141		255		115			
v/s Ratio Prot		0.28		0.02	c0.75		c0.05					
v/s Ratio Perm			0.02						0.00			
v/c Ratio		0.34	0.03	0.51	0.85		0.66		0.05			
Uniform Delay, d1		4.3	3.2	98.7	5.4		94.6		90.3			
Progression Factor		1.00	1.00	1.09	0.17		1.00		1.00			
Incremental Delay, d2		0.3	0.0	2.6	1.4		6.0		0.2			
Delay (s)		4.6	3.2	110.6	2.3		100.6		90.5			
Level of Service		A	A	F	A		F		F			
Approach Delay (s)		4.5			3.8			97.5			0.0	
Approach LOS		A			A			F			A	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	210.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1023	33	80	2424	281	159
v/c Ratio	0.38	0.03	0.65	0.81	0.77	0.51
Control Delay	8.8	3.4	128.9	6.3	104.8	16.5
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	8.8	3.4	128.9	6.6	104.8	16.5
Queue Length 50th (ft)	197	3	115	178	198	3
Queue Length 95th (ft)	234	13	m145	191	250	83
Internal Link Dist (ft)	2016			1295	1321	
Turn Bay Length (ft)		150	100		150	150
Base Capacity (vph)	2679	1204	149	2996	555	387
Starvation Cap Reductn	0	0	0	123	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.03	0.54	0.84	0.51	0.41

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Arterial Level of Service: EB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Deer Creek	3	8.6	89.3	1.1	46
Coyote Hill Rd	2	11.7	40.2	0.4	36
Foothill Expressway	1	24.3	42.4	0.3	22
Porter Dr	5123	4.1	29.9	0.3	32
Peter Coutts Rd	5122	8.1	28.7	0.2	26
Hanover	5120	51.7	93.8	0.4	16
Hansen Way	5117	40.9	55.5	0.1	9
Ramos	5115	127.8	190.3	0.2	5
El Camino Real	1104	92.0	106.4	0.1	5
Total		369.2	676.5	3.2	18

Arterial Level of Service: WB Page Mill Road

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
El Camino Real	1104	63.9	170.2	1.1	23
Ramos	5115	18.2	33.1	0.1	16
Hansen Way	5117	9.2	30.0	0.2	25
Hanover	5120	17.5	31.0	0.1	16
Peter Coutts Rd	5122	17.0	58.1	0.4	26
Porter Dr	5123	10.8	32.0	0.2	23
Foothill Expressway	1	62.3	92.0	0.3	11
Coyote Hill Rd	2	15.8	36.0	0.3	26
Deer Creek	3	10.6	39.0	0.4	37
Total		225.1	521.4	3.1	22

Appendix D

PAGE MILL ROAD EXPRESSWAY CONCEPTUAL PLAN — PRELIMINARY PROJECT COST ESTIMATE SUMMARY (HMH, 2015)

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

Page Mill Expwy Planline Study - PROJECT COST SUMMARY

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

PROJECT DESCRIPTION: Widen Page Mill Expwy to (6) lanes between I-280 and Foothill Expwy with additional Class I Bike/Ped facilities. Transition to (4) lanes East of Foothill Expressway within existing roadway limits with isolated intersection improvements along Page Mill Road through El Camino Real. The project evaluated four alternatives at the intersection of Page Mill Expressway and Foothill Expwy including (3) grade separations and at-grade improvements.

BASE COST ESTIMATE SUMMARY:
(Not Including Page Mill Expwy / Foothill Expwy Instersection Alternatives)

Page Mill Expwy - West of Foothill Expwy - Roadway	$12,200,000	
Page Mill Expwy - West of Foothill Expwy - Trail	$6,000,000	
Page Mill Expwy - East of Foothill Expwy to El Camino Real	$2,700,000	
Page Mill Expwy at El Camino Real	$2,400,000	
SUBTOTAL EAST AND WEST CONSTRUCTION COSTS:		**$23,300,000**

ALTERNATIVES COST ESTIMATE SUMMARY:

"Page Mill At-Grade" Option	$4,800,000	
COMPLETE CONSTRUCTION (EAST, WEST & "AT-GRADE"):		**$28,100,000**
"Page Mill Over" Option	$48,100,000	
COMPLETE CONSTRUCTION (EAST, WEST & "OVER"):		**$71,400,000**
"Page Mill Under" Option	$44,200,000	
COMPLETE CONSTRUCTION (EAST, WEST & "UNDER"):		**$67,500,000**
"Page Mill Split" Option	$49,300,000	
COMPLETE CONSTRUCTION (EAST, WEST & "SPLIT"):		**$72,600,000**

Page Mill Expwy Planline Study -- WEST OF FOOTHILL EXPWY - ROADWAY

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

PROJECT DESCRIPTION: Page Mill Expressway Widening to (6) Lanes from I-280 to Foothill Expressway. Construction of retaining walls necessary to widen the roadway to (6) lanes.

COST ESTIMATE SUMMARY:

TOTAL ROADWAY ITEMS (PART I)	$8,500,000	
TOTAL STRUCTURE ITEMS (PART II)	$0	
SUBTOTAL CONSTRUCTION COSTS		$8,500,000
SUPPORT COSTS:		
PA & ED PHASE - Use Approx 5%	$430,000	
FINAL DESIGN PHASE - Use Approx. 15%	$1,280,000	
CONST. ADMIN. & DSDC - Use Approx. 15%	$1,280,000	
SUBTOTAL SUPPORT COSTS		$2,990,000
TOTAL RIGHT-OF-WAY AND UTILITIES ITEMS (PART III)		$719,500
TOTAL PROJECT COSTS		**$12,200,000**

I. ROADWAY ITEMS

Section 1 - Earthwork	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Roadway Excavation	7,500	CY	$30.00	$225,000	
Imported Borrow	0	CY	$20.00	$0	
Demolitions / Clearing & Grubbing	1	LS	$20,000	$20,000	
				Subtotal Earthwork	**$245,000**
Section 2 - Structural Section & Concrete					
Highway Pavement	0	SF	$12.60	$0	
Ramp & Street Pavement	101,200	SF	$8.20	$829,371	
Maintenance Vehicle Pullout	0	EA	$10,000	$0	
AC Overlay (Depth Varies)	354,100	SF	$2.00	$708,200	
Curb & Gutter	10,200	LF	$40.00	$408,000	
Median Island Curb	6,200	LF	$35.00	$217,000	
Median Island Surfacing (Enhanced)	0	SF	$20.00	$0	
Median Island Surfacing (Gravel)	23,500	SF	$5.00	$117,500	
Sidewalk	0	SF	$9.00	$0	
Retrofit Handicap Ramp	0	EA	$3,000	$0	
Bikepath	0	SF	$5.00	$0	
				Subtotal Structural Section & Concrete	**$2,280,071**
Section 3 - Drainage					
Project Drainage	1	LS	$400,000	$400,000	
Pumping Plants	0	LS	$100,000	$0	
Permanent Treatment BMP's	1	LS	$80,000	$80,000	
				Subtotal Drainage	**$480,000**
Section 4 - Specialty Items					
Retaining Walls	4,220	SF	$125	$527,500	
Noise Walls	0	SF	$75.00	$0	
Type 60 Concrete Barriers	4,700	LF	$100	$470,000	
Metal Beam Guard Railing	1000	LF	$30.00	$30,000	
Chain Link Fence	0	LF	$20.00	$0	
Irrigation Crossover	0	LF	$20.00	$0	
Replacement Landscaping	0	AC	$35,000	$0	
Plant Establishment Work (3-year)	0	AC	$20,000	$0	
Erosion Control	10	AC	$10,000	$100,000	
SWPPP & Water Pollution Control	1	LS	$200,000	$200,000	
				Subtotal Specialty Items	**$1,327,500**

Page Mill Expwy Planline Study -- WEST OF FOOTHILL EXPWY - ROADWAY

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

Section 5 - Traffic Items	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Lighting	1	LS	$450,000	$450,000	
Traffic Signals	1	LS	$600,000	$600,000	
Ramp Metering	0	LS	$65,000	$0	
Overhead and Roadside Signs	0	LS	$20,000	$0	
Traffic Delineation Items	1	LS	$140,000	$140,000	
Traffic Control Systems	1	LS	$100,000	$100,000	
Transportation Management Plan	1	LS	$20,000	$20,000	
Temporary Railing (Type K)	9,200	LF	$15.00	$138,000	
				Subtotal Traffic Items	**$1,448,000**
				SUBTOTAL SECTIONS 1-5	**$5,780,571**

Section 6 - Minor Items						
(Subtotal Sections 1 - 5)	5,780,571	x	5%	$290,000	**Subtotal**	**$290,000**

Section 7 - Roadway Mobilization						
(Subtotal Sections 1 - 6)	6,070,571	x	10%	$610,000	**Subtotal**	**$610,000**

Section 8 - Roadway Additions							
Supplemental Work	(Sect. 1 - 6)	6,070,571	x	5%	$300,000		
Contingencies	(Sect. 1 - 6)	6,070,571	x	25%	$1,520,000		
						Subtotal Roadway Additions	**$1,820,000**
						TOTAL ROADWAY ITEMS (Subtotal of Sections 1-8)	**$8,500,000**

II. STRUCTURE ITEMS

	Type	**S.F (deck)**	**Cost Per S.F.**	**Total Cost**	
No Structure	n/a	0	$225	**$0**	
				TOTAL STRUCTURE ITEMS	**$0**

III. RIGHT-OF-WAY & UTILITIES

Parcel Description	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Miscellaneous Ownership	4,390	SF	$50.00	$219,500	
				Subtotal Right-Of-Way	**$219,500**

Utility Relocation Allowance	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Miscellaneous Utilities	1	LS	$500,000	$500,000	
				Subtotal Utilities	**$500,000**
				TOTAL RIGHT-OF-WAY & UTILITIES	**$719,500**

NOTES:

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PRELIMINARY PROJECT COST ESTIMATE SUMMARY

Page Mill Expwy Planline Study -- WEST OF FOOTHILL EXPWY - TRAIL

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

PROJECT DESCRIPTION: Construction of a Class I, Joint-Use Bike/Ped trail from I-280 to Deer Creek Road on the South side of Page Mill Expwy. Localized improvements to the existing trail where impacted by roadway widening. Construction of retaining walls necessary for the trail.

COST ESTIMATE SUMMARY:

TOTAL ROADWAY ITEMS (PART I)	$4,410,000	
TOTAL STRUCTURE ITEMS (PART II)	$0	
SUBTOTAL CONSTRUCTION COSTS		$4,410,000
SUPPORT COSTS:		
PA & ED PHASE - Use Approx 5%	$220,000	
FINAL DESIGN PHASE - Use Approx. 15%	$660,000	
CONST. ADMIN. & DSDC - Use Approx. 15%	$660,000	
SUBTOTAL SUPPORT COSTS		$1,540,000
TOTAL RIGHT-OF-WAY AND UTILITIES ITEMS (PART III)		$0
TOTAL PROJECT COSTS		**$6,000,000**

I. ROADWAY ITEMS

Section 1 - Earthwork	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Roadway Excavation	1,060	CY	$30.00	$31,800	
Imported Borrow	0	CY	$20.00	$0	
Demolitions / Clearing & Grubbing	1	LS	$200,000	$200,000	
				Subtotal Earthwork	**$231,800**
Section 2 - Structural Section & Concrete					
Highway Pavement	0	SF	$12.60	$0	
Ramp & Street Pavement	0	SF	$8.20	$0	
Maintenance Vehicle Pullout	0	EA	$10,000	$0	
AC Overlay (Depth Varies)	0	SF	$2.00	$0	
Curb & Gutter	0	LF	$40.00	$0	
Median Island Curb	0	LF	$35.00	$0	
Median Island Surfacing (Enhanced)	0	SF	$20.00	$0	
Median Island Surfacing (Gravel)	0	SF	$5.00	$0	
Sidewalk	0	SF	$9.00	$0	
Retrofit Handicap Ramp	0	EA	$3,000	$0	
Bikepath	28,600	SF	$5.00	$143,000	
				Subtotal Structural Section & Concrete	**$143,000**
Section 3 - Drainage					
Project Drainage	1	LS	$15,000	$15,000	
Pumping Plants	0	LS	$100,000	$0	
Permanent Treatment BMP's	1	LS	$20,000	$20,000	
				Subtotal Drainage	**$35,000**
Section 4 - Specialty Items					
Retaining Walls	18,600	SF	$125	$2,325,000	
Noise Walls	0	SF	$75.00	$0	
Type 60 Concrete Barriers	0	LF	$100	$0	
Metal Beam Guard Railing	0	LF	$30.00	$0	
Chain Link Fence	500	LF	$20.00	$10,000	
Irrigation Crossover	0	LF	$20.00	$0	
Replacement Landscaping	1	AC	$35,000	$35,000	
Plant Establishment Work (3-year)	0	AC	$20,000	$0	
Erosion Control	1	AC	$10,000	$10,000	
SWPPP & Water Pollution Control	1	LS	$50,000	$50,000	
				Subtotal Specialty Items	**$2,430,000**

Page Mill Expwy Planline Study -- WEST OF FOOTHILL EXPWY - TRAIL

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

Section 5 - Traffic Items	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Lighting	1	LS	$150,000	$150,000	
Traffic Signals	0	LS	$600,000	$0	
Ramp Metering	0	LS	$65,000	$0	
Overhead and Roadside Signs	0	LS	$20,000	$0	
Traffic Delineation Items	1	LS	$10,000	$10,000	
Traffic Control Systems	0	LS	$100,000	$0	
Transportation Management Plan	0	LS	$20,000	$0	
Temporary Railing (Type K)	0	LF	$15.00	$0	
				Subtotal Traffic Items	**$160,000**
				SUBTOTAL SECTIONS 1-5	**$2,999,800**

Section 6 - Minor Items						
(Subtotal Sections 1 - 5)	2,999,800	x	5%	$150,000	**Subtotal**	**$150,000**

Section 7 - Roadway Mobilization						
(Subtotal Sections 1 - 6)	3,149,800	x	10%	$310,000	**Subtotal**	**$310,000**

Section 8 - Roadway Additions							
Supplemental Work	(Sect. 1 - 6)	3,149,800	x	5%	$160,000		
Contingencies	(Sect. 1 - 6)	3,149,800	x	25%	$790,000		
						Subtotal Roadway Additions	**$950,000**
						TOTAL ROADWAY ITEMS (Subtotal of Sections 1-8)	**$4,410,000**

II. STRUCTURE ITEMS

	Type	**S.F (deck)**	**Cost Per S.F.**	**Total Cost**	
No Structure	n/a	0	$225	**$0**	
				TOTAL STRUCTURE ITEMS	**$0**

III. RIGHT-OF-WAY & UTILITIES

Parcel Description	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Miscellaneous Ownership	0	SF	$50.00	$0	
				Subtotal Right-Of-Way	**$0**

Utility Relocation Allowance	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Miscellaneous Utilities	0	LS	$500,000	$0	
				Subtotal Utilities	**$0**
				TOTAL RIGHT-OF-WAY & UTILITIES	**$0**

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PRELIMINARY PROJECT COST ESTIMATE SUMMARY

Page Mill Expwy Planline Study -- EAST OF FOOTHILL EXPWY to EL CAMINO REAL

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

PROJECT DESCRIPTION: Page Mill Expressway intersection improvements, median reconstruction and pavement construction from Foothill Expwy to Ramos Way. Asphalt overlay of existing pavement from approximately 300' West of Hanover to Ramos Way. Additional overlays for approximately 1500' along Hanover.

COST ESTIMATE SUMMARY:

TOTAL ROADWAY ITEMS (PART I)	$1,950,000	
TOTAL STRUCTURE ITEMS (PART II)	$0	
SUBTOTAL CONSTRUCTION COSTS		$1,950,000
SUPPORT COSTS:		
PA & ED PHASE - Use Approx 5%	$100,000	
FINAL DESIGN PHASE - Use Approx. 15%	$290,000	
CONST. ADMIN. & DSDC - Use Approx. 15%	$290,000	
SUBTOTAL SUPPORT COSTS		$680,000
TOTAL RIGHT-OF-WAY AND UTILITIES ITEMS (PART III)		$100,000
TOTAL PROJECT COSTS		**$2,700,000**

I. ROADWAY ITEMS

Section 1 - Earthwork	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Roadway Excavation	1,650	CY	$30.00	$49,500	
Imported Borrow	0	CY	$20.00	$0	
Demolitions / Clearing & Grubbing	1	LS	$10,000	$10,000	
				Subtotal Earthwork	**$59,500**
Section 2 - Structural Section & Concrete					
Highway Pavement	0	SF	$12.60	$0	
Ramp & Street Pavement	22,500	SF	$8.20	$184,396	
Maintenance Vehicle Pullout	0	EA	$10,000	$0	
AC Overlay (Depth Varies)	205,400	SF	$2.00	$410,800	
Curb & Gutter	0	LF	$40.00	$0	
Median Island Curb	3,600	LF	$35.00	$126,000	
Median Island Surfacing (Enhanced)	10,340	SF	$20.00	$206,800	
Median Island Surfacing (Gravel)	0	SF	$5.00	$0	
Sidewalk	0	SF	$9.00	$0	
Retrofit Handicap Ramp	1	LS	$30,000	$30,000	
Bikepath	0	SF	$5.00	$0	
				Subtotal Structural Section & Concrete	**$957,996**
Section 3 - Drainage					
Project Drainage	1	LS	$65,000	$65,000	
Pumping Plants	0	LS	$100,000	$0	
Permanent Treatment BMP's	0	LS	$100,000	$0	
				Subtotal Drainage	**$65,000**
Section 4 - Specialty Items					
Retaining Walls	0	SF	$125	$0	
Noise Walls	0	SF	$75.00	$0	
Type 60 Concrete Barriers	0	LF	$100	$0	
Metal Beam Guard Railing	0	LF	$30.00	$0	
Chain Link Fence	0	LF	$20.00	$0	
Irrigation Crossover	0	LF	$20.00	$0	
Replacement Landscaping	0	AC	$35,000	$0	
Plant Establishment Work (3-year)	0	AC	$20,000	$0	
Erosion Control	0	AC	$10,000	$0	
SWPPP & Water Pollution Control	1	LS	$50,000	$50,000	
				Subtotal Specialty Items	**$50,000**

Page Mill Expwy Planline Study -- EAST OF FOOTHILL EXPWY to EL CAMINO REAL

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

Section 5 - Traffic Items	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Lighting	0	LS	$150,000	$0	
Traffic Signals	0	LS	$300,000	$0	
Ramp Metering	0	LS	$65,000	$0	
Overhead and Roadside Signs	0	LS	$20,000	$0	
Traffic Delineation Items	1	LS	$60,000	$60,000	
Traffic Control Systems	1	LS	$50,000	$50,000	
Transportation Management Plan	1	LS	$10,000	$10,000	
Temporary Railing (Type K)	4,600	LF	$15.00	$69,000	
				Subtotal Traffic Items	**$189,000**
				SUBTOTAL SECTIONS 1-5	**$1,321,496**

Section 6 - Minor Items						
(Subtotal Sections 1 - 5)	1,321,496	x	5%	$70,000	**Subtotal**	**$70,000**

Section 7 - Roadway Mobilization						
(Subtotal Sections 1 - 6)	1,391,496	x	10%	$140,000	**Subtotal**	**$140,000**

Section 8 - Roadway Additions							
Supplemental Work	(Sect. 1 - 6)	1,391,496	x	5%	$70,000		
Contingencies	(Sect. 1 - 6)	1,391,496	x	25%	$350,000		
						Subtotal Roadway Additions	**$420,000**
						TOTAL ROADWAY ITEMS (Subtotal of Sections 1-8)	**$1,950,000**

II. STRUCTURE ITEMS

	Type	**S.F (deck)**	**Cost Per S.F.**	**Total Cost**	
No Structure	n/a	0	$225	**$0**	
				TOTAL STRUCTURE ITEMS	**$0**

III. RIGHT-OF-WAY & UTILITIES

Parcel Description	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Miscellaneous Ownership	0	SF	$50.00	$0	
				Subtotal Right-Of-Way	**$0**

Utility Relocation Allowance	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Miscellaneous Utilities	1	LS	$100,000	$100,000	
				Subtotal Utilities	**$100,000**
				TOTAL RIGHT-OF-WAY & UTILITIES	**$100,000**

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PRELIMINARY PROJECT COST ESTIMATE SUMMARY

Page Mill Expwy Planline Study -- EL CAMINO REAL

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

PROJECT DESCRIPTION: Improvements at El Camino Real including curb and median realignment, restriping, and asphalt overlay from Ramos Way to Ash Street along Page Mill Expwy and approximately 350' South along El Camino Real from Page Mill Expwy.

COST ESTIMATE SUMMARY:

TOTAL ROADWAY ITEMS (PART I)	$1,670,000	
TOTAL STRUCTURE ITEMS (PART II)	$0	
SUBTOTAL CONSTRUCTION COSTS		$1,670,000
SUPPORT COSTS:		
PA & ED PHASE - Use Approx 5%	$80,000	
FINAL DESIGN PHASE - Use Approx. 15%	$250,000	
CONST. ADMIN. & DSDC - Use Approx. 15%	$250,000	
SUBTOTAL SUPPORT COSTS		$580,000
TOTAL RIGHT-OF-WAY AND UTILITIES ITEMS (PART III)		$100,000
TOTAL PROJECT COSTS		**$2,400,000**

I. ROADWAY ITEMS

Section 1 - Earthwork	Quantity	Unit	Unit Price	Unit Cost	
Roadway Excavation	950	CY	$30.00	$28,500	
Imported Borrow	0	CY	$20.00	$0	
Demolitions / Clearing & Grubbing	1	LS	$20,000	$20,000	
				Subtotal Earthwork	**$48,500**
Section 2 - Structural Section & Concrete					
Highway Pavement	0	SF	$12.60	$0	
Ramp & Street Pavement	13,100	SF	$8.20	$107,359	
Maintenance Vehicle Pullout	0	EA	$10,000	$0	
AC Overlay (Depth Varies)	143,000	SF	$2.00	$286,000	
Curb & Gutter	2,000	LF	$40.00	$80,000	
Median Island Curb	1,400	LF	$35.00	$49,000	
Median Island Surfacing (Enhanced)	2,760	SF	$20.00	$55,200	
Median Island Surfacing (Gravel)	0	SF	$5.00	$0	
Sidewalk	2,100	SF	$9.00	$18,900	
Retrofit Handicap Ramp	1	LS	$20,000	$20,000	
Bikepath	0	SF	$5.00	$0	
				Subtotal Structural Section & Concrete	**$616,459**
Section 3 - Drainage					
Project Drainage	1	LS	$15,000	$15,000	
Pumping Plants	0	LS	$100,000	$0	
Permanent Treatment BMP's	0	LS	$100,000	$0	
				Subtotal Drainage	**$15,000**
Section 4 - Specialty Items					
Retaining Walls	0	SF	$125	$0	
Noise Walls	0	SF	$75.00	$0	
Type 60 Concrete Barriers	0	LF	$100	$0	
Metal Beam Guard Railing	0	LF	$30.00	$0	
Chain Link Fence	0	LF	$20.00	$0	
Irrigation Crossover	0	LF	$20.00	$0	
Replacement Landscaping	0	AC	$35,000	$0	
Plant Establishment Work (3-year)	0	AC	$20,000	$0	
Erosion Control	0	AC	$10,000	$0	
SWPPP & Water Pollution Control	1	LS	$25,000	$25,000	
				Subtotal Specialty Items	**$25,000**

Page Mill Expwy Planline Study -- EL CAMINO REAL

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

Section 5 - Traffic Items	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Lighting	0	LS	$150,000	$0	
Traffic Signals	1	LS	$300,000	$300,000	
Ramp Metering	0	LS	$65,000	$0	
Overhead and Roadside Signs	0	LS	$20,000	$0	
Traffic Delineation Items	1	LS	$40,000	$40,000	
Traffic Control Systems	1	LS	$50,000	$50,000	
Transportation Management Plan	1	LS	$10,000	$10,000	
Temporary Railing (Type K)	2,000	LF	$15.00	$30,000	
				Subtotal Traffic Items	**$430,000**
				SUBTOTAL SECTIONS 1-5	**$1,134,959**

Section 6 - Minor Items						
(Subtotal Sections 1 - 5)	1,134,959	x	5%	$60,000	**Subtotal**	**$60,000**

Section 7 - Roadway Mobilization						
(Subtotal Sections 1 - 6)	1,194,959	x	10%	$120,000	**Subtotal**	**$120,000**

Section 8 - Roadway Additions						
Supplemental Work	(Sect. 1 - 6) 1,194,959	x	5%	$60,000		
Contingencies	(Sect. 1 - 6) 1,194,959	x	25%	$300,000		
					Subtotal Roadway Additions	**$360,000**
					TOTAL ROADWAY ITEMS (Subtotal of Sections 1-8)	**$1,670,000**

II. STRUCTURE ITEMS

	Type	**S.F (deck)**	**Cost Per S.F.**	**Total Cost**	
No Structure	n/a	0	$225	**$0**	
				TOTAL STRUCTURE ITEMS	**$0**

III. RIGHT-OF-WAY & UTILITIES

Parcel Description	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Miscellaneous Ownership	0	SF	$50.00	$0	
				Subtotal Right-Of-Way	**$0**

Utility Relocation Allowance	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Miscellaneous Utilities	1	LS	$100,000	$100,000	
				Subtotal Utilities	**$100,000**
				TOTAL RIGHT-OF-WAY & UTILITIES	**$100,000**

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PRELIMINARY PROJECT COST ESTIMATE SUMMARY

Page Mill Expwy Planline Study -- "PAGE MILL AT GRADE" OPTION

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

PROJECT DESCRIPTION: At grade intersection of Page Mill Expwy and Foothill Expwy including (6) lane widening from Coyote Hill Road to Foothill Expwy and (6) lane to (4) lane transition, median replacement and left turn pocket modifications between Foothill Expressway and Porter Drive. Estimate includes asphalt overlay of all affected roadways including approximately 750' along Foothill Expwy.

COST ESTIMATE SUMMARY:

TOTAL ROADWAY ITEMS (PART I)	$3,190,000	
TOTAL STRUCTURE ITEMS (PART II)	$0	
SUBTOTAL CONSTRUCTION COSTS		$3,190,000
SUPPORT COSTS:		
PA & ED PHASE - Use Approx 5%	$160,000	
FINAL DESIGN PHASE - Use Approx. 15%	$480,000	
CONST. ADMIN. & DSDC - Use Approx. 15%	$480,000	
SUBTOTAL SUPPORT COSTS		$1,120,000
TOTAL RIGHT-OF-WAY AND UTILITIES ITEMS (PART III)		$500,000
TOTAL PROJECT COSTS		**$4,800,000**

I. ROADWAY ITEMS

Section 1 - Earthwork	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Roadway Excavation	1,200	CY	$30.00	$36,000	
Imported Borrow	0	CY	$20.00	$0	
Demolitions / Clearing & Grubbing	1	LS	$50,000	$25,000	
				Subtotal Earthwork	**$61,000**
Section 2 - Structural Section & Concrete					
Highway Pavement	0	SF	$12.60	$0	
Ramp & Street Pavement	16,300	SF	$8.20	$133,585	
Maintenance Vehicle Pullout	0	EA	$10,000	$0	
AC Overlay (Depth Varies)	217,600	SF	$2.00	$435,200	
Curb & Gutter	3,850	LF	$40.00	$154,000	
Median Island Curb	6,250	LF	$35.00	$218,750	
Median Island Surfacing (Enhanced)	12,100	SF	$20.00	$242,000	
Median Island Surfacing (Gravel)	14,000	SF	$5.00	$70,000	
Sidewalk	0	SF	$9.00	$0	
Retrofit Handicap Ramp	0	EA	$3,000	$0	
Bikepath	13,700	SF	$5.00	$68,500	
				Subtotal Structural Section & Concrete	**$1,322,035**
Section 3 - Drainage					
Project Drainage	1	LS	$120,000	$50,000	
Pumping Plants	1	LS	$0	$0	
Permanent Treatment BMP's	1	LS	$50,000	$50,000	
				Subtotal Drainage	**$100,000**
Section 4 - Specialty Items					
Retaining Walls	0	SF	$125	$0	
Noise Walls	0	SF	$75.00	$0	
Type 60 Concrete Barriers	0	LF	$100	$0	
Metal Beam Guard Railing	120	LF	$30.00	$3,600	
Chain Link Fence	0	LF	$20.00	$0	
Irrigation Crossover	0	LF	$20.00	$0	
Replacement Landscaping	0	AC	$35,000	$0	
Plant Establishment Work (3-year)	0	AC	$20,000	$0	
Erosion Control	5	AC	$10,000	$25,000	
SWPPP & Water Pollution Control	1	LS	$120,000	$50,000	
				Subtotal Specialty Items	**$78,600**

Page Mill Expwy Planline Study -- "PAGE MILL AT GRADE" OPTION

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

Section 5 - Traffic Items	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Lighting	1	LS	$100,000	$100,000	
Traffic Signals	1	LS	$300,000	$300,000	
Ramp Metering	0	LS	$65,000	$0	
Overhead and Roadside Signs	0	LS	$20,000	$0	
Traffic Delineation Items	1	LS	$50,000	$50,000	
Traffic Control Systems	1	LS	$50,000	$50,000	
Transportation Management Plan	1	LS	$20,000	$10,000	
Temporary Railing (Type K)	6,500	LF	$15.00	$97,500	
				Subtotal Traffic Items	**$607,500**
				SUBTOTAL SECTIONS 1-5	**$2,169,135**

Section 6 - Minor Items						
(Subtotal Sections 1 - 5)	2,169,135	x	5%	$110,000	**Subtotal**	**$110,000**

Section 7 - Roadway Mobilization						
(Subtotal Sections 1 - 6)	2,279,135	x	10%	$230,000	**Subtotal**	**$230,000**

Section 8 - Roadway Additions						
Supplemental Work	(Sect. 1 - 6) 2,279,135	x	5%	$110,000		
Contingencies	(Sect. 1 - 6) 2,279,135	x	25%	$570,000		
					Subtotal Roadway Additions	**$680,000**
					TOTAL ROADWAY ITEMS (Subtotal of Sections 1-8)	**$3,190,000**

II. STRUCTURE ITEMS

	Type	**S.F (deck)**	**Cost Per S.F.**	**Total Cost**	
No Structure	n/a	0	$225	**$0**	
				TOTAL STRUCTURE ITEMS	**$0**

III. RIGHT-OF-WAY & UTILITIES

Parcel Description	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Miscellaneous Ownership	0	SF	$50.00	$0	
				Subtotal Right-Of-Way	**$0**

Utility Relocation Allowance	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Miscellaneous Utilities	1	LS	$1,000,000	$500,000	
				Subtotal Utilities	**$500,000**
				TOTAL RIGHT-OF-WAY & UTILITIES	**$500,000**

NOTES:

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3. Costs are based upon estimated current prices without provision for inflation.
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5. This estimate should be considered as a Class 5 (Order-of-Magnitude) estimate per the classifications defined by Association for the Advancement of Cost Engineering.

PRELIMINARY PROJECT COST ESTIMATE SUMMARY

Page Mill Expwy Planline Study -- "PAGE MILL OVER" OPTION

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

PROJECT DESCRIPTION: Grade separation of Page Mill Expwy and Foothill Expwy with Page Mill Expwy crossing over at-grade Foothill Expwy. Estimate includes roadway improvements along Page Mill Road between Coyote Hill Road and Porter Drive.

COST ESTIMATE SUMMARY:

TOTAL ROADWAY ITEMS (PART I)	$22,630,000	
TOTAL STRUCTURE ITEMS (PART II)	$10,165,500	
SUBTOTAL CONSTRUCTION COSTS		$32,795,500
SUPPORT COSTS:		
PA & ED PHASE - Use Approx 5%	$1,640,000	
FINAL DESIGN PHASE - Use Approx. 15%	$4,920,000	
CONST. ADMIN. & DSDC - Use Approx. 15%	$4,920,000	
SUBTOTAL SUPPORT COSTS		$11,480,000
TOTAL RIGHT-OF-WAY AND UTILITIES ITEMS (PART III)		$3,852,500
TOTAL PROJECT COSTS		**$48,100,000**

I. ROADWAY ITEMS

Section 1 - Earthwork	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Roadway Excavation	17,000	CY	$30.00	$510,000	
Imported Borrow	85,000	CY	$20.00	$1,700,000	
Demolitions / Clearing & Grubbing	1	LS	$100,000	$100,000	
				Subtotal Earthwork	**$2,310,000**
Section 2 - Structural Section & Concrete					
Highway Pavement	0	SF	$12.60	$0	
Ramp & Street Pavement	320,000	SF	$8.20	$2,622,519	
Maintenance Vehicle Pullout	0	EA	$10,000	$0	
AC Overlay (Depth Varies)	0	SF	$2.00	$0	
Curb & Gutter	3,900	LF	$40.00	$156,000	
Median Island Curb	5,200	LF	$35.00	$182,000	
Median Island Surfacing (Enhanced)	17,400	SF	$20.00	$348,000	
Median Island Surfacing (Gravel)	7,000	SF	$5.00	$35,000	
Sidewalk	8,000	SF	$9.00	$72,000	
Retrofit Handicap Ramp	0	EA	$3,000	$0	
Bikepath	20,000	SF	$5.00	$100,000	
				Subtotal Structural Section & Concrete	**$3,515,519**
Section 3 - Drainage					
Project Drainage	1	LS	$870,000	$870,000	
Pumping Plants	0	LS	$100,000	$0	
Permanent Treatment BMP's	1	LS	$100,000	$100,000	
				Subtotal Drainage	**$970,000**
Section 4 - Specialty Items					
Retaining Walls	52,600	SF	$125	$6,575,000	
Noise Walls	0	SF	$75.00	$0	
Type 60 Concrete Barriers	9,000	LF	$100	$900,000	
Metal Beam Guard Railing	350	LF	$30.00	$10,500	
Chain Link Fence	0	LF	$20.00	$0	
Irrigation Crossover	0	LF	$20.00	$0	
Replacement Landscaping	0	AC	$35,000	$0	
Plant Establishment Work (3-year)	0	AC	$20,000	$0	
Erosion Control	9.5	AC	$10,000	$95,000	
SWPPP & Water Pollution Control	1	LS	$150,000	$150,000	
				Subtotal Specialty Items	**$7,730,500**

Page Mill Expwy Planline Study -- "PAGE MILL OVER" OPTION

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

Section 5 - Traffic Items	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Lighting	1	LS	$300,000	$300,000	
Traffic Signals	1	LS	$300,000	$300,000	
Ramp Metering	0	LS	$65,000	$0	
Overhead and Roadside Signs	0	LS	$20,000	$0	
Traffic Delineation Items	1	LS	$50,000	$50,000	
Traffic Control Systems	1	LS	$100,000	$100,000	
Transportation Management Plan	1	LS	$20,000	$20,000	
Temporary Railing (Type K)	6,500	LF	$15.00	$97,500	
				Subtotal Traffic Items	**$867,500**
				SUBTOTAL SECTIONS 1-5	**$15,393,519**

Section 6 - Minor Items						
(Subtotal Sections 1 - 5)	15,393,519	x	5%	$770,000	**Subtotal**	**$770,000**

Section 7 - Roadway Mobilization						
(Subtotal Sections 1 - 6)	16,163,519	x	10%	$1,620,000	**Subtotal**	**$1,620,000**

Section 8 - Roadway Additions							
Supplemental Work	(Sect. 1 - 6)	16,163,519	x	5%	$810,000		
Contingencies	(Sect. 1 - 6)	16,163,519	x	25%	$4,040,000		
						Subtotal Roadway Additions	**$4,850,000**
						TOTAL ROADWAY ITEMS (Subtotal of Sections 1-8)	**$22,630,000**

II. STRUCTURE ITEMS

	Type	**S.F (deck)**	**Cost Per S.F.**	**Total Cost**	
Page Mill Road Over Structure	CIP P/S Box	45,180	$225	**$10,165,500**	
				TOTAL STRUCTURE ITEMS	**$10,165,500**

III. RIGHT-OF-WAY & UTILITIES

Parcel Description	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Lands of Stanford	17,050	SF	$50.00	$852,500	
				Subtotal Right-Of-Way	**$852,500**

Utility Relocation Allowance	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
PG&E Transmission Gas	1	LS	$2,000,000	$2,000,000	
Other Utilities	1	LS	$1,000,000	$1,000,000	
				Subtotal Utilities	**$3,000,000**
				TOTAL RIGHT-OF-WAY & UTILITIES	**$3,852,500**

NOTES:

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PRELIMINARY PROJECT COST ESTIMATE SUMMARY

Page Mill Expwy Planline Study -- "PAGE MILL UNDER" OPTION

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

PROJECT DESCRIPTION: Grade separation of Page Mill Expwy and Foothill Expwy with Page Mill Expwy crossing under at-grade Foothill Expwy. Estimate includes roadway improvements along Page Mill Road between Coyote Hill Road and Porter Drive.

COST ESTIMATE SUMMARY:

TOTAL ROADWAY ITEMS (PART I)	$22,230,000	
TOTAL STRUCTURE ITEMS (PART II)	$3,321,000	
SUBTOTAL CONSTRUCTION COSTS		$25,551,000
SUPPORT COSTS:		
PA & ED PHASE - Use Approx 5%	$1,280,000	
FINAL DESIGN PHASE - Use Approx. 15%	$3,830,000	
CONST. ADMIN. & DSDC - Use Approx. 15%	$3,830,000	
SUBTOTAL SUPPORT COSTS		$8,940,000
TOTAL RIGHT-OF-WAY AND UTILITIES ITEMS (PART III)		$9,743,500
TOTAL PROJECT COSTS		**$44,200,000**

I. ROADWAY ITEMS

Section 1 - Earthwork	Quantity	Unit	Unit Price	Unit Cost	
Roadway Excavation	73,000	CY	$30.00	$2,190,000	
Imported Borrow	0	CY	$20.00	$0	
Demolitions / Clearing & Grubbing	1	LS	$100,000	$100,000	
				Subtotal Earthwork	**$2,290,000**
Section 2 - Structural Section & Concrete					
Highway Pavement	0	SF	$12.60	$0	
Ramp & Street Pavement	330,000	SF	$8.20	$2,704,472	
Maintenance Vehicle Pullout	0	EA	$10,000	$0	
AC Overlay (Depth Varies)	0	SF	$2.00	$0	
Curb & Gutter	3,900	LF	$40.00	$156,000	
Median Island Curb	5,200	LF	$35.00	$182,000	
Median Island Surfacing (Enhanced)	17,400	SF	$20.00	$348,000	
Median Island Surfacing (Gravel)	7,000	SF	$5.00	$35,000	
Sidewalk	8,000	SF	$9.00	$72,000	
Retrofit Handicap Ramp	0	EA	$3,000	$0	
Bikepath	20,000	SF	$5.00	$100,000	
				Subtotal Structural Section & Concrete	**$3,597,472**
Section 3 - Drainage					
Project Drainage	1	LS	$880,000	$880,000	
Pumping Plants	1	LS	$100,000	$100,000	
Permanent Treatment BMP's	1	LS	$100,000	$100,000	
				Subtotal Drainage	**$1,080,000**
Section 4 - Specialty Items					
Retaining Walls	50,300	SF	$125	$6,287,500	
Noise Walls	0	SF	$75.00	$0	
Type 60 Concrete Barriers	7,400	LF	$100	$740,000	
Metal Beam Guard Railing	350	LF	$30.00	$10,500	
Chain Link Fence	0	LF	$20.00	$0	
Irrigation Crossover	0	LF	$20.00	$0	
Replacement Landscaping	0	AC	$35,000	$0	
Plant Establishment Work (3-year)	0	AC	$20,000	$0	
Erosion Control	9.5	AC	$10,000	$95,000	
SWPPP & Water Pollution Control	1	LS	$150,000	$150,000	
				Subtotal Specialty Items	**$7,283,000**

Page Mill Expwy Planline Study -- "PAGE MILL UNDER" OPTION

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

Section 5 - Traffic Items	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Lighting	1	LS	$300,000	$300,000	
Traffic Signals	1	LS	$300,000	$300,000	
Ramp Metering	0	LS	$65,000	$0	
Overhead and Roadside Signs	0	LS	$20,000	$0	
Traffic Delineation Items	1	LS	$50,000	$50,000	
Traffic Control Systems	1	LS	$100,000	$100,000	
Transportation Management Plan	1	LS	$20,000	$20,000	
Temporary Railing (Type K)	6,500	LF	$15.00	$97,500	
				Subtotal Traffic Items	**$867,500**
				SUBTOTAL SECTIONS 1-5	**$15,117,972**

Section 6 - Minor Items						
(Subtotal Sections 1 - 5)	15,117,972	x	5%	$760,000	**Subtotal**	**$760,000**

Section 7 - Roadway Mobilization						
(Subtotal Sections 1 - 6)	15,877,972	x	10%	$1,590,000	**Subtotal**	**$1,590,000**

Section 8 - Roadway Additions							
Supplemental Work	(Sect. 1 - 6)	15,877,972	x	5%	$790,000		
Contingencies	(Sect. 1 - 6)	15,877,972	x	25%	$3,970,000		
						Subtotal Roadway Additions	**$4,760,000**
						TOTAL ROADWAY ITEMS (Subtotal of Sections 1-8)	**$22,230,000**

II. STRUCTURE ITEMS

	Type	**S.F (deck)**	**Cost Per S.F.**	**Total Cost**	
Page Mill Road Under Structure	CIP Slab	14,760	$225	**$3,321,000**	
				TOTAL STRUCTURE ITEMS	**$3,321,000**

III. RIGHT-OF-WAY & UTILITIES

Parcel Description	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Lands of Stanford	34,870	SF	$50.00	$1,743,500	
				Subtotal Right-Of-Way	**$1,743,500**

Utility Relocation Allowance	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
PG&E Transmission Gas	1	LS	$2,000,000	$2,000,000	
SFPUC Hetch-Hetchy Pipelines	1	LS	$5,000,000	$5,000,000	
Other Utilities	1	LS	$1,000,000	$1,000,000	
				Subtotal Utilities	**$8,000,000**
				TOTAL RIGHT-OF-WAY & UTILITIES	**$9,743,500**

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PRELIMINARY PROJECT COST ESTIMATE SUMMARY

Page Mill Expwy Planline Study -- "PAGE MILL SPLIT" OPTION

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

PROJECT DESCRIPTION: Grade separation of Page Mill Expwy and Foothill Expwy with Page Mill Expwy partially depressed under partially elevated Foothill Expwy. Estimate includes roadway improvements along Page Mill Road between Coyote Hill Road and Porter Drive and approximately 700' North along Foothill Expwy and 700' South along Junipero Serra Blvd.

COST ESTIMATE SUMMARY:

TOTAL ROADWAY ITEMS (PART I)	$29,650,000	
TOTAL STRUCTURE ITEMS (PART II)	$3,321,000	
SUBTOTAL CONSTRUCTION COSTS		$32,971,000
SUPPORT COSTS:		
PA & ED PHASE - Use Approx 5%	$1,650,000	
FINAL DESIGN PHASE - Use Approx. 15%	$4,950,000	
CONST. ADMIN. & DSDC - Use Approx. 15%	$4,950,000	
SUBTOTAL SUPPORT COSTS		$11,550,000
TOTAL RIGHT-OF-WAY AND UTILITIES ITEMS (PART III)		$4,743,500
TOTAL PROJECT COSTS		**$49,300,000**

I. ROADWAY ITEMS

Section 1 - Earthwork	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Roadway Excavation	24,200	CY	$30.00	$726,000	
Imported Borrow	47,600	CY	$20.00	$952,000	
Demolitions / Clearing & Grubbing	1	LS	$100,000	$100,000	
				Subtotal Earthwork	**$1,778,000**
Section 2 - Structural Section & Concrete					
Highway Pavement	0	SF	$12.60	$0	
Ramp & Street Pavement	372,000	SF	$8.20	$3,048,678	
Maintenance Vehicle Pullout	0	EA	$10,000	$0	
AC Overlay (Depth Varies)	39,300	SF	$2.00	$78,600	
Curb & Gutter	3,900	LF	$40.00	$156,000	
Median Island Curb	7,300	LF	$35.00	$255,500	
Median Island Surfacing (Enhanced)	29,700	SF	$20.00	$594,000	
Median Island Surfacing (Gravel)	7,000	SF	$5.00	$35,000	
Sidewalk	8,000	SF	$9.00	$72,000	
Retrofit Handicap Ramp	0	EA	$3,000	$0	
Bikepath	20,000	SF	$5.00	$100,000	
				Subtotal Structural Section & Concrete	**$4,339,778**
Section 3 - Drainage					
Project Drainage	1	LS	$920,000	$920,000	
Pumping Plants	1	LS	$100,000	$100,000	
Permanent Treatment BMP's	1	LS	$100,000	$100,000	
				Subtotal Drainage	**$1,120,000**
Section 4 - Specialty Items					
Retaining Walls	85,000	SF	$125	$10,625,000	
Noise Walls	0	SF	$75.00	$0	
Type 60 Concrete Barriers	11,400	LF	$100	$1,140,000	
Metal Beam Guard Railing	500	LF	$30.00	$15,000	
Chain Link Fence	0	LF	$20.00	$0	
Irrigation Crossover	0	LF	$20.00	$0	
Replacement Landscaping	0	AC	$35,000	$0	
Plant Establishment Work (3-year)	0	AC	$20,000	$0	
Erosion Control	9.5	AC	$10,000	$95,000	
SWPPP & Water Pollution Control	1	LS	$150,000	$150,000	
				Subtotal Specialty Items	**$12,025,000**

Page Mill Expwy Planline Study -- "PAGE MILL SPLIT" OPTION

District-County-Route: n/a **PM** n/a **EA** n/a 2/24/2015

Section 5 - Traffic Items	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Lighting	1	LS	$300,000	$300,000	
Traffic Signals	1	LS	$300,000	$300,000	
Ramp Metering	0	LS	$65,000	$0	
Overhead and Roadside Signs	0	LS	$20,000	$0	
Traffic Delineation Items	1	LS	$50,000	$50,000	
Traffic Control Systems	1	LS	$100,000	$100,000	
Transportation Management Plan	1	LS	$20,000	$20,000	
Temporary Railing (Type K)	9,000	LF	$15.00	$135,000	
				Subtotal Traffic Items	**$905,000**
				SUBTOTAL SECTIONS 1-5	**$20,167,778**

Section 6 - Minor Items						
(Subtotal Sections 1 - 5)	20,167,778	x	5%	$1,010,000	**Subtotal**	**$1,010,000**

Section 7 - Roadway Mobilization						
(Subtotal Sections 1 - 6)	21,177,778	x	10%	$2,120,000	**Subtotal**	**$2,120,000**

Section 8 - Roadway Additions							
Supplemental Work	(Sect. 1 - 6)	21,177,778	x	5%	$1,060,000		
Contingencies	(Sect. 1 - 6)	21,177,778	x	25%	$5,290,000		
						Subtotal Roadway Additions	**$6,350,000**
						TOTAL ROADWAY ITEMS (Subtotal of Sections 1-8)	**$29,650,000**

II. STRUCTURE ITEMS

	Type	**S.F (deck)**	**Cost Per S.F.**	**Total Cost**	
Page Mill Road Split Structure	CIP Slab	14,760	$225	**$3,321,000**	
				TOTAL STRUCTURE ITEMS	**$3,321,000**

III. RIGHT-OF-WAY & UTILITIES

Parcel Description	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
Lands of Stanford	34,870	SF	$50.00	$1,743,500	
				Subtotal Right-Of-Way	**$1,743,500**

Utility Relocation Allowance	**Quantity**	**Unit**	**Unit Price**	**Unit Cost**	
PG&E Transmission Gas	1	LS	$2,000,000	$2,000,000	
Other Utilities	1	LS	$1,000,000	$1,000,000	
				Subtotal Utilities	**$3,000,000**
				TOTAL RIGHT-OF-WAY & UTILITIES	**$4,743,500**

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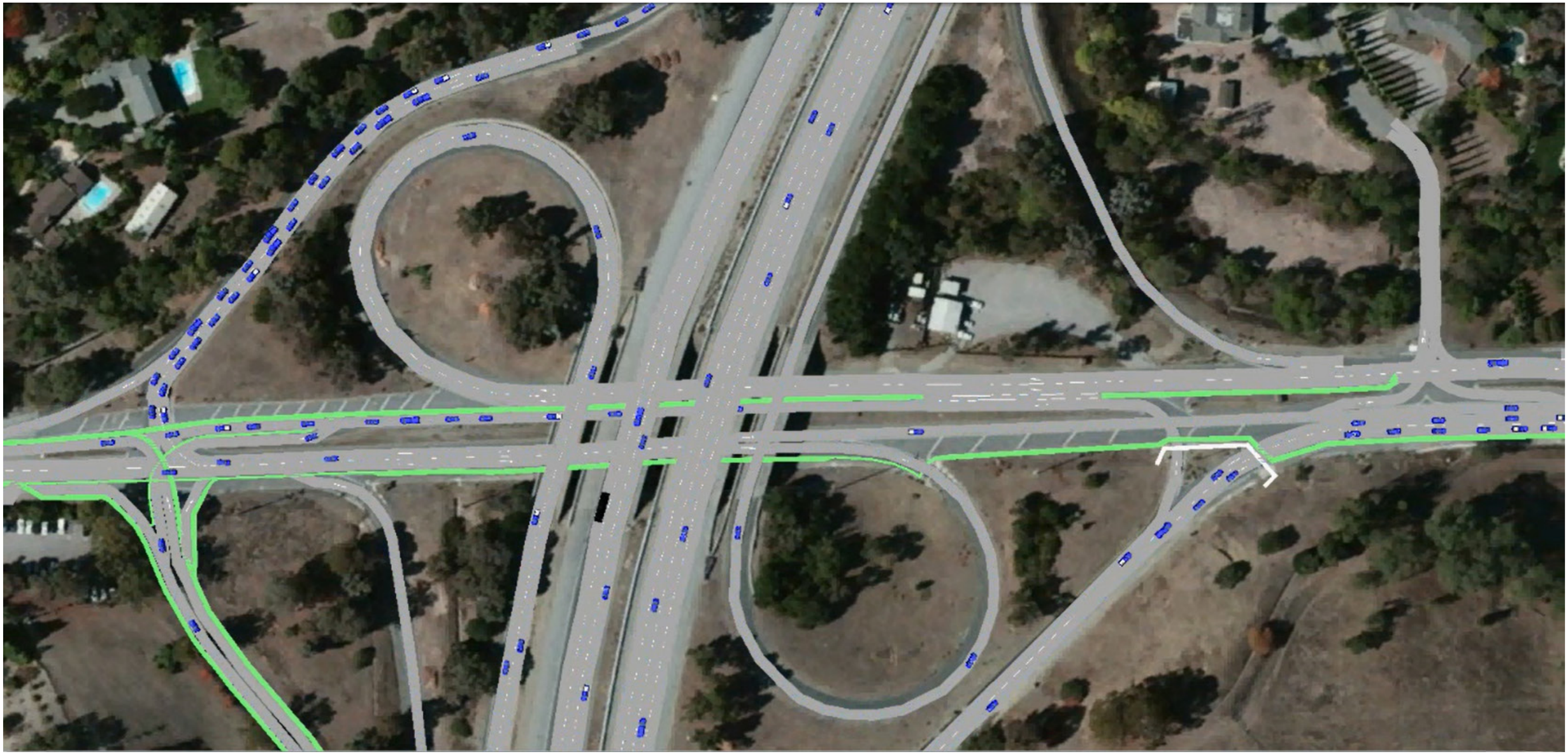
Appendix E

SCREENSHOTS OF MICRO-SIMULATION MODELS PRESENTED AT PUBLIC MEETINGS

EXISTING AM CONDITIONS

EXISTING AM CONDITIONS

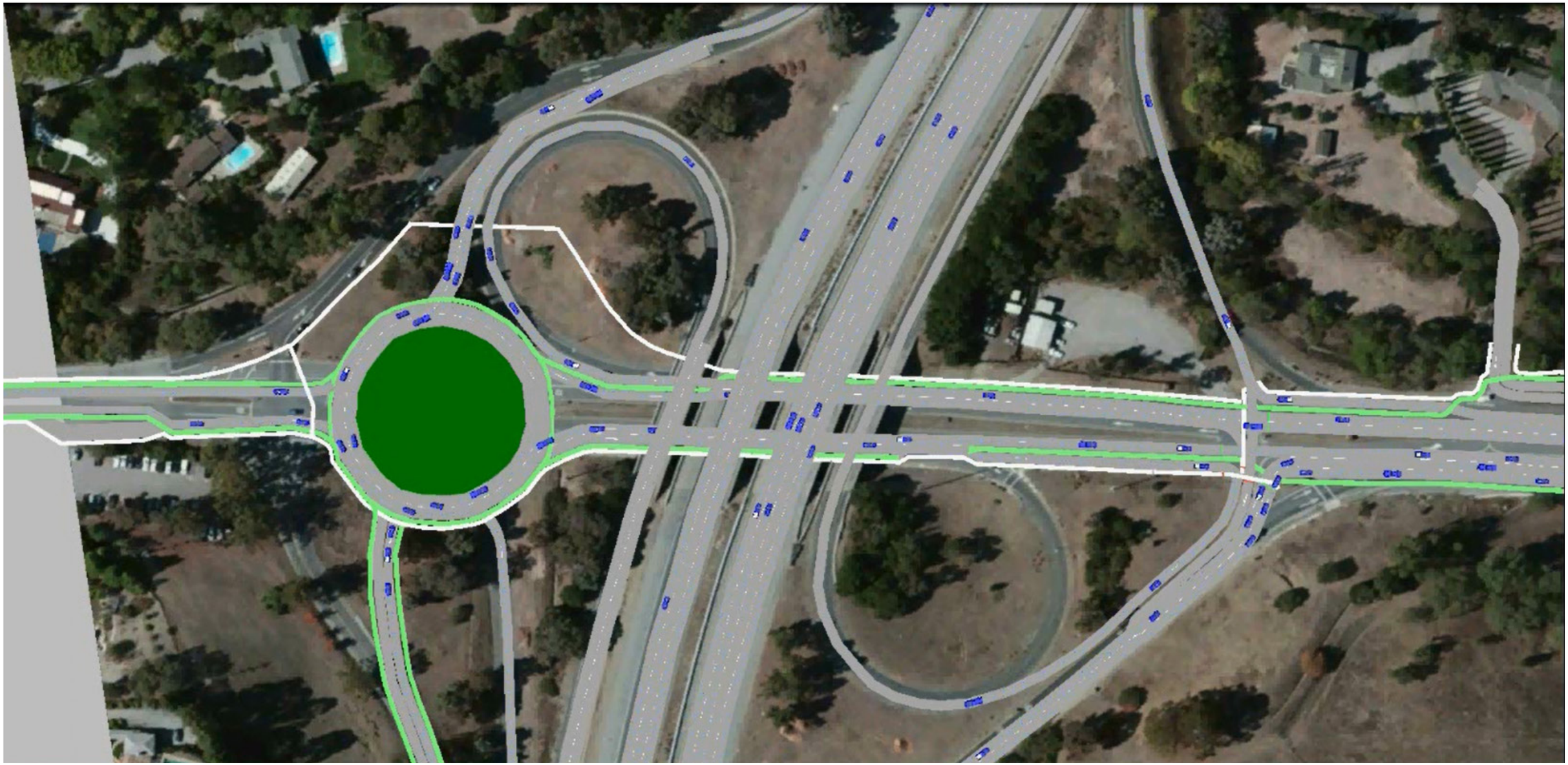


EXISTING PM CONDITIONS

FUTURE YEAR 2025 AM PEAK - CONCEPT 1

FUTURE YEAR 2025 PM PEAK - CONCEPT 2

FUTURE YEAR 2025 AM PEAK - CONCEPT 3



Appendix F

COMMUNITY OUTREACH SUMMARIES AND COMMENT LETTERS RECEIVED

October 2014- January 2015 Community Outreach Meetings
Page Mill-Oregon Expressway Comments

From October 2014 to January 2015, community outreach meetings were held throughout Santa Clara County to provide planning updates for the Expressway Plan 2040. Each meeting featured the expressway(s) located within the host city. Three community meetings were held to share updates on Page Mill-Oregon and Foothill Expressways. These meetings were at the following locations:

- November 17, 2014, SAP, Building 4 Loft, 2nd Floor, 3450 Hillview Avenue, Palo Alto
- November 19, 2014, Terman Middle School, 655 Arastradero Road, Palo Alto
- December 2, 2014, Los Altos Hills Community Center, 26379 Fremont Blvd, Los Altos Hills

The following comments are a compilation of post-it notes and comment cards related to Page Mill Road Expressway collected from these meetings.

Page Mill/I-280 Interchange Comments

1. The Page Mill/280 intersection should be marked LOS F.
2. The video models assume that 280 can accept all traffic. This is not the case, for example PM north traffic. You cannot change 280, but you need a solution which allows non-freeway traffic to pass through. Therefore, all models need to be redone for this scenario.
3. A flyover from SB 280 to Page Mill NB [EB] would solve a lot of problems
4. Do not trade clover leafs for stop lights!
5. Concept 3/roundabout looks promising
6. Page Mill 280 Bike /Ped Traffic- create a bike/ped flyover
7. Be more creative= lights cause more problems than they solve
8. Roundabouts, not lights, at 280/Page Mill
9. Currently, we find it very difficult to exit from our resident on Gerth Lane to Page Mill Expressway during both morning & evening commute hours. A traffic light might be helpful at the Old Page Mill Rd. exit.
10. LAH is a rural community-no street lights, dark skies, no up lighting- signal lights are visible over long distances
11. Please make Page Mill underpass at I-280 so it looks like Alpine under 280!!! Dangerous for bikes - now putting pedestrian crossing. On Oregon at Ross is STUPID! I AM A 50 YEAR OLD PA resident, bike everywhere, always have. This was WRONG solution.
12. Bicycle slot lanes under I-280 both directions like Alpine/I-280
13. Page Mill/280: your models assume that traffic can get onto 280 at any time. However, 280 already has capacity issues, for example Northbound PM. You cannot change 280 but your plan/model needs to make sure that local (non-280) traffic can go through. Thank you.
14. Reduction in emissions associated with roundabouts is desirable
15. No need for new traffic lights. Existing issues can have other (less expensive) solutions. A couple of small car overpasses will solve these issues (small tunnel underpasses for bikes)
16. Sequencing is important: improve Page Mill & Foothill before improving Page Mill/280
17. Would love to see:
    a. Additional lane on 280-South between Page Mill & Magdalena

October 2014- January 2015 Community Outreach Meetings

Page Mill-Oregon Expressway Comments

b. Additional lane on Page Mill off 280-N - always stuck before Deer Creek where I exit.

18. **Concept 1 Signalization**
    a. Gerth Lane is missing from this map
    b. Please indicate future path extension
    c. Move cycle track from NB off ramp to Old Page Mill to two-way mixed use path on north side of Old Page Mill Road.
19. **Concept 2 Southbound Ramp Realignment**
    a. Gerth Lane is missing from this map
    b. Multi-use path north of Old Page Mill for bike access to old Page Mill
    c. Southbound 280 off ramp to have a permanent right turn lane for Page Mill going to LAH needed for concepts 1 & 2
    d. Turn off ramp into bike/ped path up to crossing 280 and connect to Arastradero Preserve.
    e. Channelized westbound right turn lane off of I-280 SB off-ramp
20. **Concept 3 Roundabout**
    a. Consider grade separation concepts not only at Foothill but at the Page Mill/280 interchange as well.
    b. Bicyclists will adversely impact traffic due to not obeying the traffic laws (all concepts)
    c. Residents from Gerth/Christopher Lane area- don't like existing stop sign access, full signal looks good. The half signal seems like an inconvenience. Don't like it.
    d. Combined bike & ped route on northside from Christopher to south of 1-280 SB off ramp
    e. Don't change anything
    f. Channelized right at I-280 NB on ramp feasible? Los Altos Hills rural community and would like to maintain rural character. Prefer stop signs to stop lights.
21. **Park & Ride Lot**
    a. Expansion of Park & Ride is a terrible idea
    b. No expanded Park & Ride Lot!!! If done, it'll be a major disaster for LAH residents.
    c. Move entrance of existing park n ride @ Page Mill + Arastradero up Page Mill toward end of light.
    d. Place park and ride lots in open spaces around I-280. Get rid of existing Park & Ride at the interchange right next to residential area.

Page Mill/Foothill Expressway Comments

1. When faced with the choice of a highly urban solution (Overpass) versus a more rural, less visible solution (below grade) please choose the more rural, less impact solution. Thank you. P.S. Consider animals (PM Overcrossing Alternative 1 HMH)
2. How about a roundabout alternative here? Easier than 280- opportunity for central island landscape-(this is a "Scenic Roadway" after all- by County designation). (Otherwise- keep Foothill below grade) (PM overcrossing HMH Alternative 1)
3. Prefer to keep Foothill underneath for better profile on Foothill (PM Overcrossing Alternative 1 HMH)

October 2014- January 2015 Community Outreach Meetings

Page Mill-Oregon Expressway Comments

4. Concerned about Stanford faculty housing setback reduction caused by additional lanes for Page Mill—grade separation, noise, privacy (especially at intersection with Junipero Serra Blvd)
5. Page Mill-Foothill Intersection: # 2- A better solution-minimizes impact to the homeowners and businesses along Page Mill; #1 & #3 especially # 1 severely impacts the homeowners with excessive noise and blighted sky
6. Suggest keeping Page Mill Road-Oregon Expressway at Grade and trenching Foothill Expressway/JSB under grade in order to not put road above the homes at this intersection. OR-keep Foothill/JSB at grade and trench Page Mill/Oregon Expressway under intersection.
7. Page Mill Road/Junipero Serra Boulevard Intersection- Stanford is proposing parking on Coyote Hill Road for Dish walkers… This will force pedestrians to cross PMR during AM & PM peaks. Dangerous! Traffic study needed, safety measures needed

Coyote Hill Comments

1. Coyote Hill parking makes no sense - new Dish parking should be by the north gate. Coyote Hill parking will eventually become a transit center.
2. Page Mill & Coyote Hill- make it a signalized intersection –keep Stanford Dish parking on the same side of Page Mill and the Dish- no parking on Coyote Hill

Bicycle/Pedestrian Comments

1. Hanover- no turn on red
2. Look at Hanover intersection for Bike & Pedestrian traffic and farther into College Terrace and bike path to Barron Park Neighborhood
    a. Widen Hanover East sidewalk between College Terrace (Calif. Ave) & Page Mill
    b. Pave over landscaping at all corners to make room for cyclists
    c. Make a cross signal just for bikes/peds- no cars turning during signals
3. Yield to bikes signs needed at Hanover and Page Mill
4. Hanover & Page Mill Red signal is too quick
5. Double wide sidewalk at Hanover Page Mill - cars using shoulder
6. Constriction - no ADA NE corner by fire hydrant and light pole
7. 280 Alpine to Ladera bike safety issues near shopping center. Wide path-bikes hard to see-suggest underpass for bikes
8. Hanover is major bike route- to dedicated bike path behind Bol Park.
9. We live in Peter Coutts Circle, off Page Mill. I have two children who commute to Terman & Gunn by bike. Several children from PC & Stanford do so. My kids cross Page Mill at the intersection with Peter Coutts, then bike down on the sidewalk until Hanover. How this is going to work with the proposed changes? We need to make sure biking to school is safe for the Stanford Community. Thank you.
10. The intersection of Page Mill and Hanover is dangerous for bikes-pocket lanes, dedicated lanes, and needed- west improvements needed on Hanover.
11. Bike lanes on ECR

October 2014- January 2015 Community Outreach Meetings

Page Mill-Oregon Expressway Comments

General Comments

1. Build these improvements please
2. Would like to see alleviated traffic on Foothill Expressway.
3. Build mass transit: BART, Feeder buses to Caltrain, El Camino Real, Marguerite
4. If you want mass transit-make BART to circle the bay- don't do half solutions!
5. Long term solution is to require commuters to use buses- jobs miss outpace any reasonable traffic improvements
6. First meeting- complement on the quality of explanation and format
7. Public transportation needed to connect 101 @ Oregon to Page Mill to Foothill. Consider transport to train & schools. Use more roundabouts for traffic calming & safety
8. Coordinate with Stanford Transportation Demand Manager - what they are doing/what info they have
9. Increase Caltrain commute express trains from San Jose, Santa Clara
10. Feeder buses from transit center like Santa Clara transit center, like Palo Alto transit center to feed Stanford research park
11. Caltrain: move express trains
12. Feeder buses to employment (Santa Clara transit center model)

Page Mill to I-280 Signalization Project

One citizen's comments:

- Excellent work by Santa Clara officials and many others to present advanced thinking options for this important project
- Project success will require almost unprecedented levels of coordination between stakeholders: CALTRANS to Santa Clara, Los Altos Hills, Palo Alto and Stanford. Please get agreement that this is a marquee project and requires clear accountability and progress reporting /feedback path with the project management.
- Signalization is only helpful to anyone if Page Mill is first widened.
- Signalization project goals need to include:
    - Preservation of the rural environment that is Los Altos Hills.
    - Understanding that this is not just any intersection, but the main gateway to both one of the finest residential areas in the country, Los Altos Hills, as well as to the industry of Palo Alto and Stanford and all that that means. Do it right.
    - Introduce state of the art construction. Develop barriers to reduce the noise and light pollution to surrounding Los Altos Hills homes.
    - On time execution to project time lines. Minimize local impact.
    - Clean and orderly construction site areas. Minimize local impact.
    - Include adequate and generous budget for final beautification of signal and off-ramp areas; landscaping and appropriate (rural tone) signage.
    - Include coordinated plan and clear responsibility for on-going maintenance of the intersection and surrounding areas as this has suffered from jurisdictional issues in the past.
- Minimize off-load traffic to local rural roads (Arastradero). This may require new turn time restrictions during peak hour traffic. Animal and human life is at risk with heavy traffic on rural roads.

[redacted]
Los Altos Hills resident
[redacted]

Bodduna, Aruna

From: Zeaphod [redacted]
Sent: Wednesday, October 29, 2014 8:11 AM
To: RDA - Dist List - ExpresswayPlan2040
Subject: I-280/Page Mill Rd Interchange

Looked at the proposed alternatives for improving the I-280/.Page Mill Rd Interchange. None are acceptable. The interchange is a death trap for bicyclists and impassable for pedestrians and the proposals don't address the problem. There needs to be a dedicated BPED route from Old Page Mill Rd to the Page Mill Rd/Arastradero Rd intersection. Having BPEDs cross on ramp traffic to a bike lane even with a light won't work. Just look at the median BPED lane under the El Monte/I-280 interchange. Nobody uses it.

STANFORD
UNIVERSITY

November 3, 2014

Dawn Cameron
County of Santa Clara Roads & Airports Department
101 Skyport Drive
San Jose, CA 95110

RE: Expressway Plan 2040: I-280 interchange, Page Mill Road Expressway

Dear Dawn,

Thank you for the opportunity to comment on potential improvements to the I-280 interchange at Page Mill Road. We wanted to express our support for Caltrans' efforts to study improvements designed to increase the safety of the I-280 interchange for vehicular movement. Currently the extensive vehicle queuing at the I-280 south-bound off-ramp creates a dangerous condition most weekday mornings. We also support studying improvements to this interchange that will provide safer access and travel routes for bicyclists and pedestrians.

While we believe the I-280 interchange requires immediate attention due to concerns over safety, we also think it is necessary to study what impacts any changes to the I-280 interchange would have on roadways connected to the interchange, such as Page Mill Road. For example, if vehicles move more efficiently through a signalized intersection at the I-280 interchange, will additional and potentially unsafe queuing occur elsewhere as a result; and if so, what improvements should be studied to prevent or mitigate such queuing?

The study of the broader roadway system connecting to the I-280 interchange should include a thorough and comprehensive approach to improving traffic movement and safety for all vehicles, bicyclists and pedestrians. In particular, any infrastructure improvements, such as roadway widening along portions of Page Mill Road, must include additional rigorous study before we would be able to draw conclusions or express an opinion about such changes.

Finally, we believe that roadway improvements alone do not constitute a comprehensive solution to traffic management. Therefore, we encourage your consideration of complementary transportation demand management strategies as part of the overall plan for improvements to the area. For example, discussion of widening roadways should consider dedicated lanes for high-occupancy vehicles (HOV)/carpools, as well as safe pathways for bicycles and pedestrians.

STANFORD REAL ESTATE
3160 Porter Drive, Palo Alto, CA 94304 · 650-724-4909

Thank you for your consideration of our perspective.

Very sincerely,

Tiffany Griego
Managing Director, Stanford Research Park

Cc: Councilmember Greg Scharff, City of Palo Alto
Hillary Gitelman, Director of Community Environment, City of Palo Alto
Jaime Rodriguez, Chief Transportation Office, City of Palo Alto
Eileen Goodwin, Apex Strategies
Fariba Zohoury, Caltrans
Expressway Plan 2040 via RDAExpresswayPlan2040@rda.sccgov.org

Bodduna, Aruna

From: Josh Moore [redacted]
Sent: Tuesday, November 11, 2014 10:58 AM
To: RDA - Dist List - ExpresswayPlan2040
Subject: page mill and foothill

Follow Up Flag: Follow up
Flag Status: Completed

I am interested in the planning for the page mill and foothill expressways. Unfortunately I cannot attend any of the open houses.

I have reviewed the presentation on your web site and have a few thoughts. First, I am delighted that the county and caltrans are considering improving these corridors which should help alleviate congestion. I frequently travel page mill from arastradero to 101 and Foothill from Page Mill into Los Altos.

For the record, I oppose bike lanes in the median. As you may know, cyclists tend to ride in such a way as to maximize average speed and minimize effort. Having to wait for a traffic light to get on and off the median is not practical from a cyclists perspective. Cyclists will continue to ride on the side of the road or take a lane and this will counteract the improvements you suggest. Dedicated class A bike paths like the one that exists from Coyote Hill to Deer Creek is a much better alternative with bridges or tunnels to get past the on and off ramps. I am surprised this did not make it into consideration.

I am in favor of the roundabout option instead of the 6? lights between arastradero and Foothill expressway. I think the stop lights will be really annoying in non peak hours, which is also not considered in your study.

Thank you for reaching out.

Joshua Moore
[redacted]
Woodside CA 94062.

PARC
[redacted]
Palo Alto, CA 94304

Bodduna, Aruna

From: Radhika Thapa [redacted]
Sent: Monday, December 22, 2014 6:21 PM
To: RDA - Dist List - ExpresswayPlan2040
Subject: Traffic light at the intersection of Old Page Mill Road and Page Mill Expwy

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Ivana,

Thanks for the information. My husband and I would like to submit our request for a traffic light (three way) at the intersection of Old Page Mill and Page Mill. We live on Old Page Mill Road. During rush hour, it is almost impossible (and dangerous) to make a left turn onto Page Mill. It is just as hard to turn right and make a U turn at the stop sign because we have to switch two lanes rapidly, and there is too much traffic to get across.
We have no other option. It is not as if we have an alternate route we can take.
We missed the meeting, so we would like to email our request. I do hope that you will consider our predicament when you plan the traffic signals.

Regards,

Radhika

-----Original Message-----
From: Les Earnest [redacted]
Sent: Monday, January 05, 2015 1:59 PM
To: Collen, Dan
Subject: Page Mill/I-280 interchange

Dan,

Is there a plan to put your group's three alternative Page Mill interchange designs on a web site somewhere?

It appears to me that the version using a traffic circle has a problem in that during morning rush hours there would be a fairly constant flow of southbound off-ramp traffic which would effectively block traffic coming east on Page Mill or north on Arastradero for long periods. The traffic light version avoids that problem.

I note also that none of the three versions that we saw a month or so ago handles bike/ped traffic as well as my old proposal at web.stanford.edu/~learnest/lah/pm280.1403-1.pdf.

-Les Earnest

Bodduna, Aruna

From: Dennis Wantzelius [redacted]
Sent: Wednesday, February 18, 2015 5:41 PM
To: PageMill280@CountyRoads.org
Subject: Roundabout concept

Follow Up Flag: Follow up
Flag Status: Flagged

I don't see how a bicycle can safely get from northbound Arastradero Rd. to westbound Page Mill Rd. through the roundabout. This is very important as it is how you get to continue on northbound Arastradero Rd., a major bike route.

I think this problem should rule out the roundabout unless you build an overpass or underpass for bicycles.

Dennis Wantzelius

Sent from my iPad
Dennis Wantzelius
[redacted]

Bodduna, Aruna

From: Garo Kiremijdian [redacted]
Sent: Saturday, February 21, 2015 2:04 PM
To: RDA - Dist List - ExpresswayPlan2040
Subject: Page Mill/I-280 Study

Dear Ms. Cameron,

Thank you very much for your latest presentation to the Town Council of Los Altos Hills. I would like to provide the following comments with respect to the proposed concepts to improve the Page Mill/I-280 Interchange.

1. Park & Ride

The Park & Ride lot near the Page Mill/I-280 interchange was built by Caltrans in 1988. For more than twenty years the lot was a mere eyesore. However, lately it has become a significant safety concern for the residents of the adjacent neighborhoods. Employees from companies such as Genentech, Zynga, Twitter and Box are frequently picked up and unloaded by large buses. The latter park on dangerous blind curves, execute U turns across major bi-directional commuter feed roads, and block ingress and egress to the lot itself. Such practices have created a dangerous environment susceptible to serious accidents.

The County's proposal to deal with the current situation is to extend the Park & Ride lot. This will exacerbate the underlying and larger problem. The lot is woefully inadequate for today's conditions. Overflow vehicles regularly line both sides of Page Mill for a considerable distance. The proposed extension will attract more companies to use buses for transporting their employees, but will do nothing to alleviate the fundamental and larger overload problem. Instead, the result of extending the lot will be increased bus feeder traffic. Fixing one problem that encourages even more parking load on an already over-taxed parking facility is not a fix at all, merely an expensive exercise in aggravating the existing situation. Finally, the outcome of the extension proposal will not ease the residents' concerns for negative impact on safety, rural environment and property values.

A near term solution to the Park & Ride problem is to eliminate the use of buses for picking up and unloading people. Large corporations as the ones mentioned above have certainly the resources to deploy other means for their employees (e.g., building parking lots, using existing garages, etc.). A longer term solution is to create Park & Ride lots in open spaces away from residential areas) through negotiations with Stanford and San Mateo County.

2. Traffic Signals

All of the concepts contain traffic signals on Page Mill at: (a) the North-bound off-ramp, and (b) near Old Page Mill Road/Gerth Lane. The first concept also places traffic signals at Page Mill/South-bound off-ramp. Recently the County approved Stanford's request to build a parking lot and install traffic signals at the intersection of Page Mill and Coyote Hill. Thus on the 1.5 mile Page Mill Road portion from the interchange to Foothill Expressway there would be 5 to 6 sections of traffic signals. The 2013 Fehr and Peers traffic study of the interchange has determined that almost 7 million vehicles per year pass through the I-280 South-bound off-ramp alone into Page Mill. The planned commercial expansion projects (totaling 1.5 million square feet) on and near Page Mill and Arastradero will significantly increase this number. Even with the expansion of Page Mill between the interchange and Foothill, the traffic backup in peak hours may not improve or it may be worse compared to the current situation.

3. Grade Separation

Grade separation concepts have been extensively studies by the County at several expressway locations including the Foothill/Page Mill intersection. A similar consideration should be given to the Page Mill/I-280 interchange. It is likely that flyovers may significantly ease the congestion on Page Mill. Cost must not be the sole barrier for dismissing the concept. If it turns out that a flyover at the interchange is a long-term tool to significantly ease the Page Mill traffic backup, then this is a more cost effective approach than spending taxpayers' money for projects that would not improve the current traffic situation.

Sincerely yours,

Garo Kiremidjian

Bodduna, Aruna

From: John Seyfarth [redacted]
Sent: Thursday, March 05, 2015 8:07 PM
To: PageMill280@CountyRoads.org
Subject: Dangerous 280 Page Mill Roundabout concept!

Hello!

This roundabout concept looks like a deathtrap for bicyclists turning left from northbound Arastradero to westbound Page Mill. It looks like bicyclists will need to merge with speeding cars for 270 degrees around the roundabout with no stop signs or stop lights to slow down impatient commuter cars turning east on Page Mill from southbound 280 offramp. Very dangerous!

And same concern for westbound Page Mill bicycles riding through the roundabout in the morning!

Hopefully there are better, safer ideas!

--John Seyfarth

Bodduna, Aruna

From: Ken Graham [redacted]
Sent: Wednesday, March 11, 2015 11:18 AM
To: RDA - Dist List - ExpresswayPlan2040
Cc: [redacted]
Subject: Expressway Plan 2040 Page Mill / 280 Roundabout Plan

Dear RDA staff,

Thank you for the opportunity to comment on the Plans for the Page Mill / 280 Roundabout plan.

For reference, I am a 30 year resident of Los Altos Hills and our home is affected by the project as we live at the end of Old Page Mill Road as it is heading toward the 280 / Page Mill freeway ramps.
The roundabout as proposed seems to be a great improvement vs. traffic signals.

However, the plan seems still very weak or flawed on the Palo Alto side of the interchange. If a roundabout works so well, then shouldn't there be another on the Palo Alto side? That is were north
bound 280 traffic merges with traffic coming off the proposed roundabout.(actually that is not a perfect description, but close enough).

A signal in the middle of everything on the Palo Alto side of 280 will stop perhaps twice as many cars as the previously proposed one on the "Los Altos Hills" roundabout , as the traffic from South Bound 280 as well as the downhill traffic from Los Altos Hills will just stack up in the currently proposed roundabout waiting for the signal(s) on the Palo Alto side.
I believe there is plenty of room(if you cover the open drainage ditch on the Palo Alto bound side) to add an additional lane all the way to Foothill Expressway. So the proposal to add a lane all the way to Foothill seems appropriate.

It's not entirely clear to me that the goal for this project is clear regarding traffic flow (or are there other goals in mind?).
What is the progressive (phased) impact toward the ultimate goal regarding the "F" grade currently being experienced?

If people are serious about traffic flow, they'd build a southbound exit flyover from southbound 280 to Palo Alto side of the north bound (Palo Alto bound) Page Mill. Also a flyover going the other way would help as well (northbound 280 toward Los Altos Hill)

All those people at Stanford , Sand Hill, and Page Mill / Stanford Business P ark could find a way (politically or financially) to fund the flyover. ... If they wanted to really move traffic.
Thanks for considering.
Ken
[redacted]

Sent from my iPhone

Bodduna, Aruna

From: Les Earnest [redacted]
Sent: Friday, March 13, 2015 9:44 AM
To: Collen, Dan
Cc: Cameron, Dawn
Subject: Re: Page Mill/I-280 interchange

[redacted]

Dan and Dawn:

[redacted]

It appears to me that each of the three concepts shown on you web site has major defects but some of them are repairable. If you think I have misunderstood something please let me know. Further on I offer a suggestion for dealing with certain emergency situations that you might consider adding to your expressway program.

Regarding my earlier proposal at http://web.stanford.edu/~learnest/lah/pm280.1403.pdf, I agree that it probably makes sense to have the shared path cross the on-ramp at grade under control of a traffic light rather than building a shared use overpass. It appears to me that having a crossing without a traffic light would be unsafe during rush hours because of the fast moving traffic.

An unsafe and unnecessary crosswalk. As you know, there is an existing crosswalk at the foot of the two lane northbound off-ramp from I-280. I have gone through that interchange thousands of times since it was created 49 years ago and do not recall ever seeing a pedestrian attempting to cross there. That makes sense because the traffic typically moves at 45+ MPH and there is no traffic light to stop them, which makes this a totally unsafe crosswalk. It is also rather unsafe area for motorists in that I have seen the results of dozens of solo crashes there, apparently caused by motorists going too fast around the blind corner then losing control and hitting a lamppost or concrete barrier.

If an eastbound pedestrian did succeed in getting across that crosswalk alive, he or she would find a narrow sidewalk next to the expressway heading uphill toward Deer Creek Road. However it terminates about a quarter mile short of that destination, forcing any pedestrians to walk in the expressway, which is dangerous.

Curiously, Concepts 2 and 3 leave that dangerous crosswalk "as is". PLEASE REMOVE THOSE UNSAFE CROSSWALK MARKINGS FROM THE PAVEMENT AND LEAVE THEM OUT OF FUTURE PLANS.

Some embarrassing history. This is not a newly recognized problem. In 1965, before that interchange was completed, the Los Altos Hills Council adopted a resolution pointing out that the planned facilities for non-motorized traffic going through that interchange were unsafe -- see http://web.stanford.edu/~learnest/lah/1965.06.07.pdf. However that request was ignored by Caltrans and County Roads.

In 1993, having retired after many years of commuting through that abominable interchange by car and bicycle, I got appointed to the Town's Pathways Committee and was promptly elected as Chair, then got the Committee and the Town Council to endorse a reconfiguration of the westbound lanes of Page Mill Road going under I-280 so as to make it safer for cyclists and pedestrians.

I then arranged to get a position on the VTA/County Bicycle Advisory Committee and was soon elected Chair of that body, then got them to endorse the same proposal, which County Roads kindly implemented in 1997. However just two years later a dimwit Caltrans engineer, who was totally focused on motoring efficiency, as usual, redesigned those lanes so as to make that segment more dangerous for non-motorized traffic than it had ever been. He then got it approved and built over our objections, which is the way it is today.

Concept 1. This is a version of the signalization plan that was proposed by Caltrans representatives at the Los Altos Hills Traffic Safety Committee public meeting on February 22, 2013. As I pointed out then, their plan did not provide a safe way for pedestrians and cyclists to get through the interchange but it occurred to two of us that a safe pedestrian route could be created by putting in a crosswalk at their proposed signal just East of the freeway and that proposal was subsequently endorsed by the Committee, sent to Caltrans and was adopted by them. Still later I proposed using the median as a cycling route and documented it. I see that both of those ideas are incorporated in Concept 1.

However there appears to be a fundamental defect in this plan. Given that this proposal would adjust signal timing to increase morning traffic flow from the southbound 280 off-ramp onto Page Mill Road but retains only one eastbound lane going through the interchange it would certainly result in an eastbound traffic backup. It also apparently blocks exiting traffic from Christophers lane from turning right onto Page Mill, forcing them to travel east to the traffic light before turning west, which I think makes no sense.

However there is a way to fix this proposal, I believe, namely by taking all pedestrian and cycling routes out of the interchange, providing enough room for two eastbound lanes going through the interchange instead of one, so as to enhance traffic flow, and putting bikes and pedestrians on a two-way shared path just north of Page Mill, as I first proposed in June 2010. In order for that bike-ped path to safely cross the west-to-south on-ramp loop it would be necessary to either provide a signalized crossing of the two lane on-ramp or a tunnel under it.

Concept 2. Curiously this concept blocks Christophers Lane access to eastbound Page Mill and omits the traffic light at the turnoff from Page Mill Expressway to Old Page Mill Road, making it impossible for residents along Old Page Mill Road to head east during rush hours, all of which is unacceptable in my view.

Again there is just one eastbound Page Mill lane going through the interchange, which would lead to morning backups, so I would again recommend taking the bike and pedestrian routes out of the interchange, making room for two eastbound lanes, and creating a two-way shared bike-ped path along the north side of Page Mill Expressway. That shared path should go under the southbound off-ramp.

Concept 3. This proposal is unacceptably dangerous for cyclists. Consider a cyclist heading north on Arastradero Road who needs to go West on Page Mill, which happened to be my bike commute route for nine years. That person would have to enter the roundabout staying on the right side of the outer lane. However, as shown in the lane markings and your Youtube simulations, there would be two lanes of right-turning traffic heading East on Page Mill, which the biker would be unlikely to cross and live to tell about it.

Again this proposal has just one eastbound Page Mill lane going all the way through the interchange, which would lead to morning backups but both of the above problems can be fixed by taking the bikes out of the interchange and sending them along the proposed pedestrian path north of Page Mill. One way to do that would be to leave the stop-sign intersection of Arastradero and Page Mill intact and connect it to the roundabout with one lane roads in each direction. Alternatively a one lane roundabout could be placed there with one lane links to the larger roundabout.

Incidentally, the conceptual map for this proposal erroneously shows an "Existing Bike Path" just South of the Park-and-Ride. While there is an existing pedestrian/equestrian path on part of that route it does not connect to

Arastradero as shown on the map and is actually a dirt path with some gravel sprinkled on top, which turns to mud in rainy weather and which is rutted in part as a result of erosion. In any case, it should play no part in this plan.

Cherry Stem Path. If you end up with some version of Concepts 2 or 3, I suggest adding the Cherry Stem path advocated on Page 2 of http://web.stanford.edu/~learnest/lah/pm280.1403.pdf, which would enable both pedestrians and cyclists to travel safely and scenically between this interchange, the Arastradero Preserve and northbound Arastradero Road and would enable cyclists heading that way to avoid the dangerously narrow Page Mill bridge over Matadero Creek just West of the interchange.

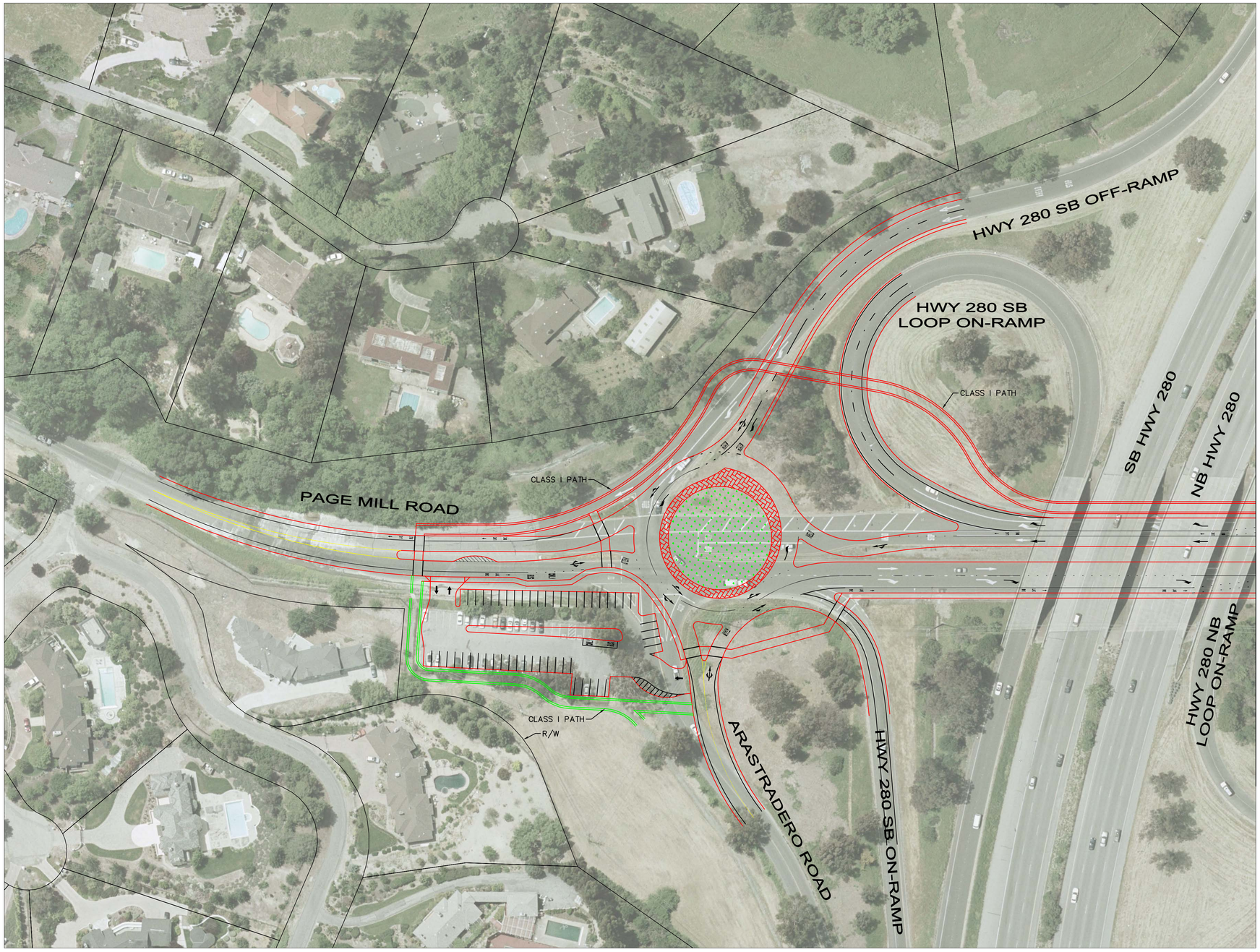
Emergency Access. I suggest also that you consider augmenting your expressway planning program by including negotiations with Caltrans to deal with certain emergency situations following the next big earthquake, which is inevitable though the timing is still unpredictable. As we know, some freeway bridges may collapse and, in the case of Los Altos Hills, such happenings at I-280 interchanges could cut the town in two. To deal with that we plan to negotiate with Caltrans to modify freeway medians on both sides of each interchange so that vehicles on crossing roads such as Page Mill, El Monte, and Magdalena could avoid a collapsed bridge by taking a right turn on the freeway on-ramp, then crossing the median to the lanes going the other way, then turning right on the off-ramp to continue their travel.

Given that many County expressways cross freeways, you might consider augmenting your planning to put similar modifications in freeway medians elsewhere in the County. What do you think of that?

-Les Earnest

Appendix G

PLAN VIEW CONCEPTS OF REFINED CONCEPT 3 — ROUNDABOUT



MATCH LINE
SEE SHEET 2 OF 3

HWY 280 / PAGE MILL ROAD
INTERCHANGE WITH ROUNDABOUT CONCEPT

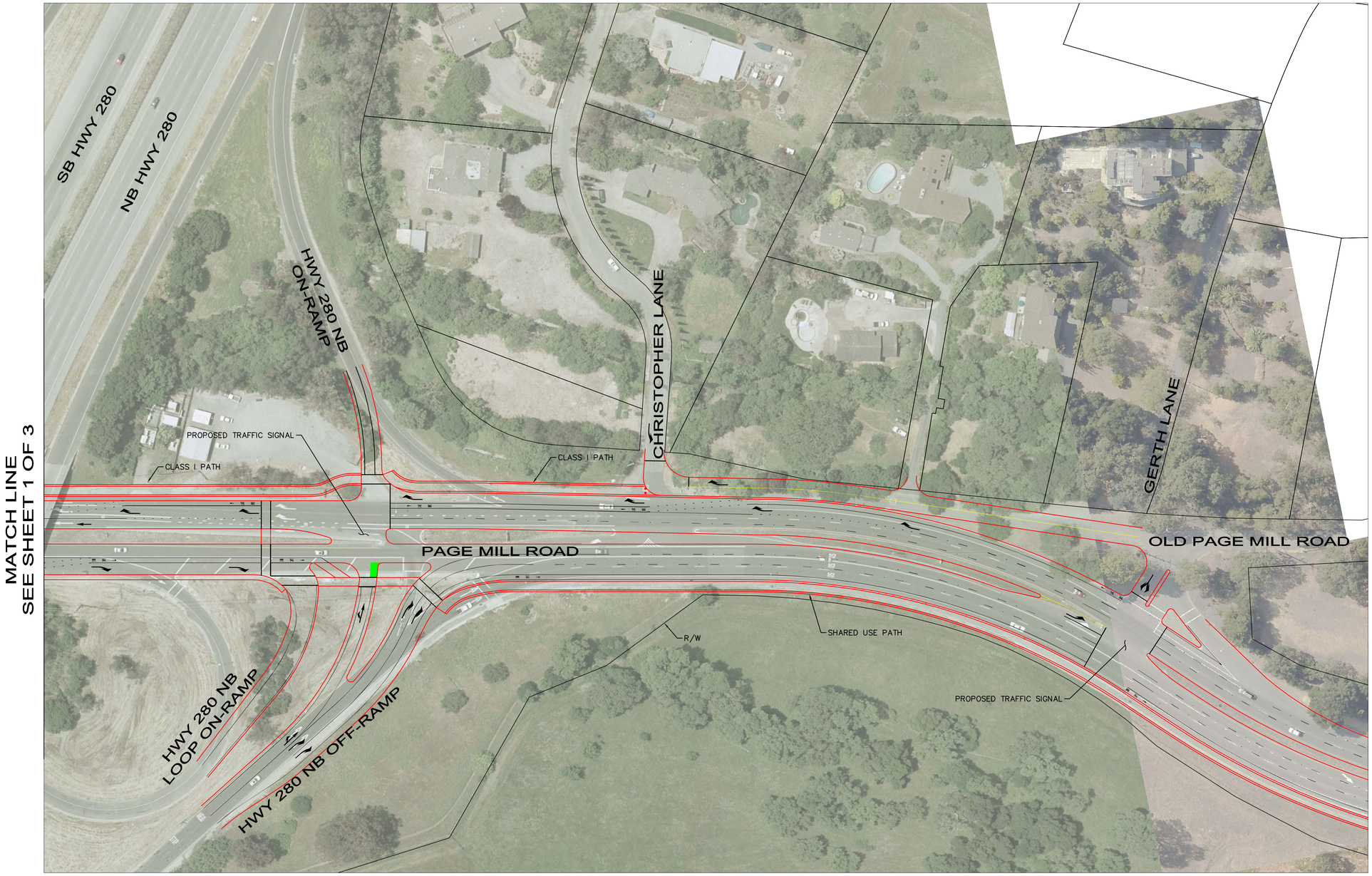
GRAPHIC SCALE

60 0 30 60 120

(IN FEET)
1 inch = 60 ft.

JANUARY 2015
SHEET 1 OF 3

Kimley»Horn



HWY 280 / PAGE MILL ROAD
INTERCHANGE CONCEPT

GRAPHIC SCALE

60 0 30 60 120

(IN FEET)
1 inch = 60 ft.

JANUARY 2015
SHEET 2 OF 3

Kimley»Horn

Appendix H

ROUNDABOUT CONCEPT OPINION OF PROBABLE COST

Hwy 280/Page Mill Road Interchange Project - Concept Study
Roundabout Concept
Conceptual Cost Estimate - February 2015

		Current Cost
ROADWAY & STRUCTURAL ITEMS	**$**	**16,413,600**
SUBTOTAL CONSTRUCTION COST	**$**	**16,413,600**
RIGHT OF WAY	**$**	**-**
TOTAL CAPITAL OUTLAY COST	**$**	**16,414,000**
PR/ED SUPPORT (4%)	**$**	**656,544**
PS&E SUPPORT (6%)	**$**	**984,816**
RIGHT OF WAY SUPPORT	**$**	**-**
Project Administration (5%)	**$**	**820,680**
CONSTRUCTION SUPPORT (5%)	**$**	**820,680**
TOTAL CAPITAL OUTLAY SUPPORT COST*	**$**	**3,282,720**
TOTAL PROJECT COST	**$**	**19,700,000**

I. ROADWAY ITEMS SUMMARY

	Section		Cost
1	**Earthwork**	$	1,560,000
2	**Pavement Structural Section**	$	2,712,100
3	**Drainage**	$	592,300
4	**Structural Items**	$	650,000
5	**Environmental**	$	429,700
6	**Traffic Items**	$	2,876,700
7	**Utilities**	$	888,400
8	**Minor Items**	$	485,500
9	**Roadway Mobilization**	$	1,019,500
10	**Supplemental Work (Environmental)**	$	509,800
11	**State Furnished**	$	-
12	**Contingencies**		$4,689,600
13	**Overhead**		$0
	TOTAL ROADWAY ITEMS	**$**	**16,413,600**

Estimate Prepared By

Name and Title Date Phone

Estimate Reviewed By

Name and Title Date Phone

By signing this estimate you are attesting that you have discussed your project with all functional units and have incorporated all their comments or have discussed with them why they will not be incorporated.

SECTION 1: EARTHWORK

Item code		Unit	Quantity		Unit Price ($)			Cost
160101	Clearing & Grubbing	LS	1	x	100,000.00	=	$	100,000
170101	Develop Water Supply	LS	1	x	100,000.00	=	$	100,000
190101	Roadway Excavation	CY	15,000	x	40.00	=	$	600,000
	Import Borrow	CY	19,000	x	40.00	=	$	760,000

TOTAL EARTHWORK SECTION ITEMS	**$ 1,560,000**

SECTION 2: PAVEMENT STRUCTURAL SECTION

Item code		Unit	Quantity		Unit Price ($)			Cost
						=	$	-
	Pavement	SF	184,225	x	8.00	=	$	1,473,800
	Truck Apron	SF	4,850	x	40.00	=	$	194,000
	Sidewalk	SF	8,250	x	15.00	=	$	123,750
	Curb and Gutter	LF	4,300	x	40.00	=	$	172,000
	Medain Curb and Paving	SF	28,925	x	20.00	=	$	578,500
	Class I Facility	SF	34,000	x	5.00	=	$	170,000

TOTAL STRUCTURAL SECTION ITEMS	**$ 2,712,100**

SECTION 3: DRAINAGE

Item code		Unit	Quantity		Unit Price ($)			Cost
	Drainage Items (10% Project Items)	EA	1	x	592,210.00	=	$	592,210
	De-Watering (10% Project Items)	EA		x		=	$	-

TOTAL DRAINAGE ITEMS	**$**	**592,300**

SECTION 4: STRUCTURAL ITEMS

Item code		Unit	Quantity		Unit Price ($)			Cost
	Bridge Structure	SF	3,250	x	200.00	=	$	650,000

TOTAL SPECIALTY ITEMS	**$**	**650,000**

SECTION 5: ENVIRONMENTAL

5A - ENVIRONMENTAL MITIGATION

Item code	Unit	Quantity	Unit Price ($)	Cost

Subtotal Environmental *$ -*

5B - LANDSCAPE AND IRRIGATION

Item code	Unit	Quantity		Unit Price ($)			Cost
Landscape and Irrigation	EA	1	x	400,000.00	=	$	400,000

Subtotal Landscape and Irrigation *$ 400,000*

5C - NPDES

Item code	Unit	Quantity		Unit Price ($)			Cost
NPDES (0.5% Project Items)	EA	1	x	29,610.50	=	$	29,611

Supplemental Work for NPDES

Subtotal NPDES (Without Supplemental Work) *$ 29,611*

*Applies to all SWPPPs and those WPCPs with sediment control or soil stabilization BMPs.

**Applies to both SWPPPs and WPCP projects.

*** Applies only to project with SWPPPs.

TOTAL ENVIRONMENTAL $ 429,700

SECTION 6: TRAFFIC ITEMS

6A - Traffic Electrical

Item code		Unit	Quantity		Unit Price ($)			Cost
	Traffic Electrical (Page Mill and NB Ramps Signal)	EA	1	x	400,000	=	$	400,000
	Traffic Electrical (Page Mill and Old Page Mill Sign	EA	1	x	400,000	=	$	400,000
	Street Lighting	EA	1	x	200,000	=	$	200,000

Subtotal Traffic Electrical *$ 1,000,000*

6B - Traffic Signing and Striping

Item code		Unit	Quantity		Unit Price ($)			Cost
	Signing and Striping	EA	1	x	100,000	=	$	100,000

Subtotal Traffic Signing and Striping *$ 100,000*

6C - Stage Construction and Traffic Handling

Item code		Unit	Quantity		Unit Price ($)			Cost
	Stage Construction and Traffic Handling (30% Project Items)	EA	1	x	1,776,630	=	$	1,776,630

Subtotal Stage Construction and Traffic Handling *$ 1,776,630*

TOTAL TRAFFIC ITEMS **$ 2,876,700**

SECTION 7: UTILITIES

Include constructing, maintaining, and removal

Item code		Unit	Quantity		Unit Price ($)		Cost
	Utility Relocation (15% of Project Items)	EA	1	x	888,315	= $	888,315
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-

TOTAL Utilities **$ 888,400**

SUBTOTAL SECTIONS 1-7 $ 9,709,200

SECTION 8: MINOR ITEMS

8A - Americans with Disabilities Act Items							
	ADA Items				1.0%	$	97,092
8B - Bike Path Items							
	Bike Path Items				2.0%	$	194,184
8C - Other Minor Items							
	Other Minor Items				2.0%	$	194,184
	Total of Section 1-7	$	9,709,200	x	5.0%	= $	485,460

TOTAL MINOR ITEMS **$ 485,500**

SECTIONS 9: MOBILIZATION

Item code							
999990	Total Section 1-8	$	10,194,700	x	10%	= $	1,019,470

TOTAL MOBILIZATION **$ 1,019,500**

SECTION 10: SUPPLEMENTAL WORK (ENVIRONMENTAL)

Item code		Unit	Quantity		Unit Price ($)		Cost
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
				x		= $	-
	*Cost of **NPDES** Supplemental Work specified in Section 5C*					= $	-
	Total Section 1-8	$	10,194,700		5%	= $	509,735

TOTAL SUPPLEMENTAL WORK **$ 509,800**

SECTION 11: STATE FURNISHED MATERIALS AND EXPENSES

Item code		Unit	Quantity		Unit Price ($)		Cost
				x		=	$0
				x		=	$0
				x		=	$0
				x		=	$0
				x		=	$0
				x		=	$0
				x		=	$0
				x		=	$0
				x		=	$0
	Total Section 1-8	$	10,194,700		0%	=	$ -

TOTAL STATE FURNISHED $0

SECTION 12: TIME-RELATED OVERHEAD

Estiamted Time-Releated Overhead (TRO) Percentage (0% to 10 = 5%

Item code		Unit	Quantity		Unit Price ($)		Cost
070018	Time-Related Overhead	WD	0	X	#DIV/0!	=	$0

TOTAL TIME-RELATED OVERHEAD $0

SECTION 12: CONTINGENCY

(Pre-PSR 30%-50%, PSR 25%, Draft PR 20%, PR 15%, after PR approval 10%, Final PS&E 5%)

	Total Section 1-11	$	11,724,000	x	40%	=	$4,689,600

TOTAL CONTINGENCY $4,689,600

II. RIGHT OF WAY

			Unit	Quantity		Unit Price ($)		Cost
A)	A1) A2)	Acquisition SB-1210	SF		x	$ 75	=	
B)	TieBack Easement					$ 35		
C)	Appraisal, Escrow and Consultant Acquisition: 28 parcels x $25,000 ea							
D)	Utility Easement			#REF!		$ 75		
E)	Business Relocation (5% ROW Acquisition Cost)			1	x	$ -		
F)	Contingency (10%)							

K)

L) **TOTAL RIGHT OF WAY ESTIMATE** **$0**

(Excluding Item #8 - Hazardous Waste)

M) **TOTAL R/W ESTIMATE: Escalated** **$0**

N) **Right of Way Support**

Support Cost Estimate Prepared By		Project Coordinator[1]	Phone
Utility Estimate Prepared By		Utiliy Coordinator[2]	Phone
R/W Acquistion Estimate Prepared By		Right of Way Estimator[3]	Phone

[1] When estimate has Support Costs only [2] When estimate has Utility Relocation [3] When R/W Acquisition is required