12-ORA-133 – PM 0.9/3.4
EA 0Q670K – ID 1217000086
Program Code 20.10.800.100 – Local Funds
August 2022

Project Study Report-Project Development Support (PSR-PDS)

To

Request Approval to Proceed to the Project Approval and Environmental Document Phase for a Locally Funded Project

On Route State Route 133
Between Canyon Acres Drive (PM 0.9)
And El Toro Road (PM 3.4)

SUBMITTED BY:

Shohreh Dupuis

MM **Shohreh Dupuis**, City Manager
City of Laguna Beach

APPROVAL RECOMMENDED:

Barbara McGahey, Project Manager
Caltrans Office of Program and Project Management

GT Lan Zhou

Lan Zhou, Deputy District Director
Caltrans Division of Planning and Local Assistance

APPROVED:

09/27/2022

am **Ryan Chamberlain**, District Director *Date*
Caltrans District 12

Vicinity Map

Project Location
SR-133 from PM 0.9 to
PM 3.4

On Route State Route 133

Between Canyon Acres Drive (PM 0.9)

And El Toro Road (PM 3.4)

This project study report-project development support has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

Girair A. Kotchian

8/18/22

GIRAIR A. KOTCHIAN - REGISTERED CIVIL ENGINEER *DATE*

REGISTERED PROFESSIONAL ENGINEER
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1. INTRODUCTION

The City of Laguna Beach (City), in cooperation with the California Department of Transportation (Caltrans) District 12, is proposing to construct improvements along the State Route 133 (SR-133) corridor extending approximately 2.5 miles from Canyon Acres Drive (Post Mile [PM] 0.9) to El Toro Road (PM 3.4) in the City of Laguna Beach, Orange County (the Project). Project location and vicinity maps are included in **Attachment A.**

SR-133, also known as Laguna Canyon Road (LCR) in this area, extends further south of Canyon Acres Drive, terminating at Pacific Coast Highway (SR-1) and transitions into unincorporated Orange County (County) north of the junction with El Toro Road. LCR is one of three gateways into the City and provides critical access to adjacent recreational spaces as well as key destinations and activities in the City. As such, ensuring that LCR provides efficient, safe access to the area is vital both to the region and to the City itself.

SR-133 within the Project limits consists of a two-lane conventional highway with a two-way left turn lane, limited shoulders, and sporadic off-street angled and parallel parking located along the northbound (NB) side of the roadway. The right-of-way (ROW) is constrained by residential and light commercial land uses, as well as various trails, park uses, institutional uses, and open space preservation areas. This portion of LCR is further constrained by Southern California Edison's (SCE) overhead transmission and distribution line poles near the travel way within the Clear Recovery Zone (CRZ). Furthermore, the existing roadway within the Project limits lacks pedestrian paths or sidewalks, or a designated bikeway, forcing pedestrians and bicyclists to use the limited shoulders to gain access to the various businesses, schools, recreational areas and trails, and transit stops along LCR.

The proposed improvements to LCR within the Project limits generally consist of bicycle lanes, pedestrian pathways/sidewalks, improved access to transit facilities, improved shoulders, and undergrounding of the SCE transmission and distribution lines outside the travel way.

Four Build Alternatives are under consideration, in addition to the No-Build Alternative, ranging in cost from approximately $130 million to $136 million (escalated to Year 2030), inclusive of construction, ROW, engineering, environmental, and construction management costs. The estimated cost for Project Approval/ Environmental Document (PA/ED) for the Project is approximately $4.4 million. Preliminary layout plans and typical sections for the four proposed Build Alternatives and existing utility plans along the corridor are provided in **Attachment B**. Preliminary cost estimates for specific work items included in the Project are provided in **Attachment C**.

Potential funding for the Project is currently being sought from federal, state, and local sources including potential funding from the State Active Transportation Program (ATP), State Transportation Improvement Program (STIP).

The Project has been assigned Project Development Processing Category 4B in accordance with Chapter 8, Section 5 of the Caltrans Project Development Procedures Manual (PDPM), as it does not require substantial new ROW and does not substantially increase traffic capacity. The majority of the ROW costs are attributed to utility undergrounding.

Below is a summary of the Project information:

Project Limits	12-ORA-133 - PM 0.9/3.4			
Number of Alternatives	5 (including No-Build)			
Alternative Recommended for Funding	Alternative 5			
Project Build Alternatives:	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Current Capital Outlay Support Estimate for PA/ED	$4.4 million	$4.4 million	$4.4 million	$4.4 million
Current Capital Outlay Construction Cost Range	$39.4 million	$39.1 million	$39.6 million	$40.2 million
Current Capital Outlay Right-of-Way Cost Range	$74.2 million	$74.7 million	$74.9 million	$77.7 million
Funding Source	TBD			
Type of Facility	2-lane conventional highway (one lane in each direction)			
Number of Structures	0			
Anticipated Environmental Determination or Document	Initial Study (IS)/Mitigated Negative Declaration (MND) and Environmental Assessment (EA)/Finding of No Significant Impact (FONSI)			
Legal Description	In Orange County in Laguna Beach from Canyon Acres Drive to El Toro Road			
Project Development Category	4B Project			

This Project Study Report/Project Development Support (PSR/PDS) will be used to estimate and program the capital outlay support costs necessary to complete the PA/ED phase and request approval of a locally funded project to proceed to the PA/ED phase. The remaining capital outlay support, ROW, and construction components of the Project are preliminary estimates and are not suitable for programming purposes. A Project Report (PR) will serve as the programming document for the remaining components of the Project and will serve as approval of the "selected" alternative.

It is recommended that the project development support component of the Project, as summarized in **Table 15**, be programmed in the STIP as discussed in the Funding Section (see Section 11). Based on the analysis contained in this PSR/PDS, it is recommended that Build Alternatives 2 through 5 be carried forward in the PA/ED phase for further detailed study. Build Alternative 5 should be used as the basis for programming support costs for this Project since it is the highest cost alternative. Final determination of the preferred alternative will be made during the PA/ED phase.

The following assumptions were made in developing the programming schedule and estimated project support costs for the PA/ED phase of the Project.

- The environmental document for this Project is assumed to be an IS/EA leading to a MND/FONSI.
- The environmental document is anticipated to take 18 to 24 months to complete.
- It is anticipated that the IS/EA will evaluate up to four Build Alternatives considered in this PSR/PDS. However, alternatives may be added, removed, or revised during the subsequent PA/ED phase.

2. BACKGROUND

The Transportation, Circulation and Growth Management Element of the City's General Plan identifies LCR as a Primary Arterial, serving as a regional access to and from the City, as well as a critical evacuation route. Due to the topographic constraints with the roadway located within an existing canyon and the proximity of the Pacific Ocean to the south, LCR serves as one of only three routes in and out of the City. Pacific Coast Highway (PCH or SR-1) accommodates travelers north and south along the coast, and LCR is oriented inland. As part of the State Highway System, LCR connects SR-1 and the coastal areas within the County to three of the key inland highways including Interstate 5 (I-5), I-405, and the SR-73 toll road.

A. Existing Facility

LCR within the Project limits generally consists of a 34-foot-wide roadway comprised of one 12-foot travel lane in each direction and a 10-foot center two-way left turn lane. Most of the route includes nonstandard paved shoulders that vary in width from a minimum of approximately 2 feet to a maximum width of 8 feet throughout the Project limits. The roadway alignment also includes tight radius reversing horizontal curves located just south of the Castle Rock Road intersection that are locally referred to as the 'Big Bend.' The roadway terrain gradually slopes downward in the southbound (SB) direction towards the Pacific Ocean. The design speed of the existing roadway is 40 mile per hour. The posted speed limit is 40 miles per hour.

Two signalized intersections at Canyon Acres Drive and El Toro Road are located within the Project limits. In addition, an existing midblock HAWK (High-Intensity Activated crossWalK) signal is located between the LCAD Main Campus and East Campus.

The existing ROW width varies from a minimum of about 53 feet in the vicinity of the 'Big Bend' area to a maximum of about 218 feet at the Canyon Acres Drive intersection. The median ROW width is approximately 73 feet but varies significantly along the route (see **Attachment B**, typical sections).

The roadway is bordered on both the NB and SB sides by SCE overhead utility lines that are comprised of overhead electric transmission, electric primary distribution, electric secondary distribution, telephone, and cable TV lines that run along the length of the SR-133 proposed improvements. The transmission, distribution, and telecommunications lines are for the most part supported on 66-kV transmission poles with electrical services from the overhead distribution lines to the adjacent residences and businesses.

The Orange County Transportation Authority (OCTA) operates Bus Route 89 which provides transit service from inland areas to downtown Laguna Beach via El Toro Road and LCR - terminating at the downtown Laguna Beach Bus Station. Ten bus stops are located within the Project limits, as follows:

- Anneliese's School – NB direction
- Willow Canyon Staging Area/Laguna Coast Wilderness Park, located just south of El Toro Road – SB direction
- Vicinity of Stans Lane and Phillips Street, located just north of Sun Valley Drive – NB and SB directions
- Vicinity of Stan Oaks Drive – NB and SB directions
- LCAD Main Campus – NB and SB directions
- Vicinity of Canyon Acres Drive – NB and SB directions

The City also operates a trolley bus service during the summer months to help relieve the traffic demand associated with beachgoers and other visitors heading to Laguna Beach for special events. This trolley service provides a shuttle between the City Maintenance Yard/Municipal Parking Lot (ACT V Parking Lot), which is heavily used as a park-and-ride lot, and other points downtown. In addition, a weekend Summer Breeze service (OC Bus Route 689) operates during the peak summer months providing bus service from a parking lot near the intersection of SR-133/I-405 to the downtown Laguna Beach Bus Station with intermediate stops at key destinations along LCR.

B. Community Interaction

In April 2013, the City initiated the Laguna Canyon Road Corridor Improvement Assessment (Assessment) in conjunction with Caltrans, Orange County Parks, and OCTA to generate and assess concepts for improving SR-133 and the LCR corridor between the intersection of Canyon Acres Drive and El Toro Road. The goal of the Assessment was to identify alternative ways to improve LCR and to create a multimodal corridor that addresses all modes of transportation, improves safety, retains the semi-rural characteristics of the area, and respects the environmental context within the project study area. Completed in August 2014, the Assessment Report presented five alternatives for improving SR-133/LCR – each alternative was comprised of different configurations of travel lanes, median treatments, complete street elements such as bike lanes and sidewalks, utility undergrounding, multi-use trails, intersection control, roadway widths, and ROW impacts.

Between 2014 and 2015, the City convened the SR-133/Laguna Canyon Road Task Force (Task Force) to review the Assessment Report, conduct additional public outreach, and conduct technical studies to consider the corridor's issues and needs, and evaluate alternative improvement concepts. Although this effort has not led to changes in adopted plans, the Task Force did reach a strong consensus on several issues, including undergrounding of utilities, minimizing impacts to open space, enhancing mobility and safety for multiple modes, making improvements to reduce potential vehicular conflicts, and not adding vehicular travel lanes. The efforts of the Task Force and associated outreach efforts culminated in the recommendation of the top two or three improvement options for further consideration by the City Council, who would prepare recommendations to Caltrans and initiate the Caltrans project development process.

The City, through the work of the Task Force, assessed several corridor improvement options to evaluate a multimodal corridor that considered operational and safety improvements, the incorporation of active transportation and complete street elements, character of the area, as well as environmental constraints along the LCR corridor. This effort culminated in the identification of nine alternatives (A through F and G.0, G.1 and G.2) identified in the September 8, 2015 Task Force Final Report that was presented to the City Council. The Task Force also presented areas of consensus, both positive and negative, regarding the potential improvements, as well as possible next steps. Based on the presentation, the City Council approved the following recommendations:

- *Review the Laguna Canyon Road Task Force's areas of specific consensus, recognizing their strong support or opposition to certain elements; and evaluation of alternative options to improve the State Highway 133/Laguna Canyon Road corridor to improve safety and mobility for motorists, pedestrians, and bicyclists.*
- *Direct the City Manager to transmit the information produced by and for the Laguna Canyon Road Task Force including the areas of specific consensus/concerns to Caltrans, OCTA, and SCAG; with a cover letter stating*

that the City Council is interested in exploring Alternatives E, F, G.0, G.1, and G.2, and the possibility of adding a shared public transit/bicycle lane.

- *Direct the City Manager to request a cost estimate from SCE to design the undergrounding of electrical transmission and distribution poles and wires along Laguna Canyon Road between the [Morro] substation and El Toro Road, and after its receipt, return to City Council with options to expedite undergrounding of utilities.*

It should be noted that Task Force Alternatives F and G have been advanced with minor variations in this PSR/PDS as Build Alternatives 3 and 4, respectively.

3. PURPOSE AND NEED

Purpose:

The purpose of the Project is to:

- Improve vehicular safety along the existing corridor;
- Improve pedestrian and bicycle mobility and safety; and
- Encourage the use of active transportation along the corridor.

Need:

- Overhead Southern California Edison (SCE) transmission and distribution lines currently exist along both sides of the State Route 133 (SR-133) corridor within the Clear Recovery Zone (CRZ) and in close proximity to the edge of travel way. Coupled with high traffic demand, vehicle queuing during both peak and non-peak periods, the lack of traffic breaks or protected left-turn movements, and inadequate shoulders, there is a high concentration of accidents that occur at various locations within the Project limits.
- The corridor currently lacks adequate shoulders and pedestrian and bicycle facilities within the Project limits. Dedicated pedestrian and bicycle paths, sidewalks with Americans with Disabilities Act (ADA) access, and improved shoulders along the corridor would improve access, connectivity, and safety for pedestrians and bicyclists.
- Due to special events and the proximity to the Pacific Ocean as well as multiple adjacent recreational facilities and trails within the Project limits, traffic demand within this corridor already exceeds capacity during weekday AM and PM peak hours and during most summer weekends and holidays. Without the provision for alternative transportation modes such as public transit, walking, and biking to improve connectivity and access to adjacent residential and commercial land uses, recreational trails, and parks within the City of Laguna Beach (City) this multi-modal corridor will continue to degrade.

4. TRAFFIC ENGINEERING PERFORMANCE ASSESSMENT

The Traffic Engineering Performance Assessment (TEPA) prepared for this Project provides an assessment of the traffic information relevant to this Project, as well as the proposed traffic analysis methodology that will be performed in the PA/ED phase of project delivery. The TEPA serves as a reference document for this PSR/PDS (see **Attachment D**) and includes both vehicle traffic demand and operational analyses along the corridor as well as an assessment of complete street elements, such as bike and pedestrian facilities, and transit services.

For purposes of the traffic analysis, the corridor was separated into the following four highway/arterial segments along LCR:

1. Between El Toro Road & Anneliese's School Driveway
2. Between Anneliese's School Driveway & Stan Oaks Drive
3. Between Stan Oaks Drive & LCAD Main Campus Driveway
4. Between LCAD Main Campus Driveway & Canyon Acres Drive

In addition, the traffic study area (see TEPA Figure 1-3) consists of the following nine study intersections/locations along LCR:

1. El Toro Road
2. Anneliese's School Driveway
3. Sun Valley Drive
4. Laguna Beach Dog Park Driveway
5. Stan Oaks Drive
6. Castle Rock Road
7. LCAD Main Campus Driveway
8. City Maintenance Yard/ACT V Parking Lot Driveway
9. Canyon Acres Drive

For arterial segments, traffic counts were collected over a 24-hour period on Thursday November 30, 2017. Weekday intersection AM and PM peak period counts were collected on December 2, 2017, and January 25, 2018. Traffic counts were collected while educational institutions in the vicinity of the Project were in session, thereby ensuring the validity of the data collection.

For the intersections that traffic counts were not directly collected, a methodology was used to develop the turning movement volumes. The methodology consisted of utilizing the arterial counts collected along SR-133 and the Institute of Transportation Engineers (ITE) Trip Generation Manual to estimate the diverging traffic into and out of the cross streets/driveways.

The TEPA provides existing and forecast traffic conditions in the Project area. Detailed methodologies and analyses can be found in the TEPA. Key findings and recommendations are summarized herein. The opening year established for the PSR/PDS is 2030 and the horizon year is 2050. Thus, the scenarios that are evaluated in the TEPA include:

- Existing Baseline (2017) Conditions
- Opening Year (2030) Conditions
- Horizon Year (2050) Conditions

The traffic analysis for the existing, No-Build and four Build Alternatives include complete street elements such as bike and pedestrian facilities and transit services. Since additional lanes are not being added for Build Alternatives 2 to 4, the traffic capacity enhancements provided by the proposed Project under Build Alternatives 2 to 4 are consistent from one alternative to another.

Traffic demand within this corridor already exceeds capacity during weekday AM and PM peak hours and during most summer weekends and holidays due to special events and the proximity to the Pacific Ocean as well as multiple adjacent recreational facilities and trails. A reversible lane alternative, Build Alternative 5, is being considered part of the overall corridor improvements evaluation in the PSR/PDS in order to handle the overcapacity traffic conditions. For Build Alternative 5, the peak direction is proposed to have two lanes. Left turn at the two-way stop-controlled intersections/locations are prohibited between Anneliese’s School Driveway and Act V/City Maintenance Facility Yard Parking Lot Driveway within the project limits. All driveways have right-in and right-out accesses. The reversible traffic lanes add peak-direction capacity to a two-way road and decrease congestion by borrowing available lane capacity from the other (off-peak) direction. Peak season daily and corresponding peak hour traffic volumes were used to evaluate the traffic conditions for Alternative 5. The peak season traffic volume increase rate was developed to be approximately 12% higher than the off-peak months. Therefore, the No-Build and Build traffic volumes under Alternative 1 through Alternative 4 remain the same. The Alternative 5 traffic volumes are generally 12% higher than the Alternative 1 through 4 volumes.

Based on the 2014 Transportation Concept Report (TCR) for SR-133, the target concept level of service is LOS D for Year 2050. The concept LOS indicates the minimum LOS that would be allowed on a route prior to proposing an alternative to improve operating conditions. However, based on the forecast 2050 traffic volumes, concurrence from Caltrans staff, and the approved traffic methodology for this Project, the target LOS was determined to be LOS E.

Highway Segment Analysis

Table 1 through **Table 3** present the Existing, Opening Year, and Horizon Year AM and PM peak hour and daily volumes for the four highway segments along LCR. Traffic demand for LCR is at capacity during peak hours of the day/week and is expected to increase more than 50 percent from existing approximately 36,000 vehicles per day to approximately 55,000 vehicles per day by the year 2050 during non-peak season. Existing AM and PM peak hour intersection turning movement volumes for the nine study intersections/locations can be found in the TEPA.

Table 1: Existing Highway Segment Traffic Volumes

ID	Description	Direction	AM Peak Hour	PM Peak Hour	Daily
1	Between El Toro Road & Sun Valley Drive	Northbound	1,006	1,348	36,337
		Southbound	1,239	1,251	
2	Between Sun Valley Drive & Stan Oaks Drive	Northbound	988	1,350	36,373
		Southbound	1,267	1,264	
3	Between Stan Oaks Drive & LCAD Driveway	Northbound	989	1,306	35,690
		Southbound	1,249	1,282	
4	Between LCAD Driveway & Canyon Acres Drive	Northbound	1,032	1,307	36,088
		Southbound	1,235	1,301	

Source: LCR Traffic Engineering Performance Assessment (March 30, 2022) Table 3-1

Table 2: Opening Year (2030) Highway Segment Traffic Volumes

ID	Description	Direction	AM Peak Hour	PM Peak Hour	Daily
Alternatives 1 to 4					
1	Between El Toro Road & Sun Valley Drive	Northbound	1,310	1,920	44,600
		Southbound	1,720	1,730	
2	Between Sun Valley Drive & Stan Oaks Drive	Northbound	1,300	1,960	45,100
		Southbound	1,780	1,730	
3	Between Stan Oaks Drive & LCAD Driveway	Northbound	1,350	1,890	44,300
		Southbound	1,770	1,790	
4	Between LCAD Driveway & Canyon Acres Drive	Northbound	1,370	1,890	44,800
		Southbound	1,760	1,800	
Alternative 5					
1	Between El Toro Road & Sun Valley Drive	Northbound	1,470	2,150	50,000
		Southbound	1,930	1,940	
2	Between Sun Valley Drive & Stan Oaks Drive	Northbound	1,460	2,200	50,500
		Southbound	1,990	1,940	
3	Between Stan Oaks Drive & LCAD Driveway	Northbound	1,510	2,120	49,600
		Southbound	1,980	2,000	
4	Between LCAD Driveway & Canyon Acres Drive	Northbound	1,530	2,120	50,200
		Southbound	1,970	2,020	

Source: LCR Traffic Engineering Performance Assessment (March 30, 2022) Table 4-1 and Table 4-2

Table 3: Horizon Year (2050) Highway Segment Traffic Volumes

ID	Description	Direction	AM Peak Hour	PM Peak Hour	Daily
Alternatives 1 to 4					
1	Between El Toro Road & Sun Valley Drive	Northbound	1,680	2,625	54,800
		Southbound	2,310	2,310	
2	Between Sun Valley Drive & Stan Oaks Drive	Northbound	1,680	2,730	55,900
		Southbound	2,415	2,310	
3	Between Stan Oaks Drive & LCAD Driveway	Northbound	1,785	2,625	54,800
		Southbound	2,415	2,415	
4	Between LCAD Driveway & Canyon Acres Drive	Northbound	1,785	2,625	55,400
		Southbound	2,415	2,415	
Alternative 5					
1	Between El Toro Road & Sun Valley Drive	Northbound	1,880	2,940	61,400
		Southbound	2,590	2,590	
2	Between Sun Valley Drive & Stan Oaks Drive	Northbound	1,880	3,060	62,600
		Southbound	2,700	2,590	
3	Between Stan Oaks Drive & LCAD Driveway	Northbound	2,000	2,940	61,400
		Southbound	2,700	2,700	
4	Between LCAD Driveway & Canyon Acres Drive	Northbound	2,000	2,940	62,000
		Southbound	2,700	2,700	

Source: LCR Traffic Engineering Performance Assessment (March 30, 2022) Table 4-7 and Table 4-8

Table 4 presents highway analysis LOS results for the four segments along LCR under Existing conditions, and under Opening Year and Horizon Year No-Build and Build conditions. As shown in the table, all the study area highway segments currently operate at LOS E or better under existing conditions. Under Opening Year (2030) conditions, all the study area highway segments are projected to operate at LOS F with No-Build and Build Alternatives, 1 to 4. Similarly, all the study area highway segments are projected to operate at LOS F under Horizon Year (2050) conditions with No-Build and Build Alternatives, 1 to 4. For Build Alternative 5 conditions, the peak direction, i.e., southbound during AM peak and northbound during PM peak, operate at LOS C and D with two-lane configuration utilizing the center reversible lane under Opening Year (2030) and Horizon Year (2050), respectively.

Table 4: Highway Analysis LOS Results along SR-133

ID	**From**	**To**	**Existing (2017)**		**Opening Year* (2030)**		**Horizon Year* (2050)**	
			AM Peak Hour LOS	**PM Peak Hour LOS**	**AM Peak Hour LOS**	**PM Peak Hour LOS**	**AM Peak Hour LOS**	**PM Peak Hour LOS**
Alternatives 1 to 4								
Laguna Canyon Road (Northbound)								
1	El Toro Road	Sun Valley Drive	E	E	**F**	**F**	**F**	**F**
2	Sun Valley Drive	Stan Oaks Drive	E	E	**F**	**F**	**F**	**F**
3	Stan Oaks Drive	LCAD Driveway	E	E	**F**	**F**	**F**	**F**
4	LCAD Driveway	Canyon Acres Drive	E	E	**F**	**F**	**F**	**F**
Laguna Canyon Road (Southbound)								
1	El Toro Road	Sun Valley Drive	E	E	**F**	**F**	**F**	**F**
2	Sun Valley Drive	Stan Oaks Drive	E	E	**F**	**F**	**F**	**F**
3	Stan Oaks Drive	LCAD Driveway	E	E	**F**	**F**	**F**	**F**
4	LCAD Driveway	Canyon Acres Drive	E	E	**F**	**F**	**F**	**F**
Alternative 5								
Laguna Canyon Road (Northbound)								
1	El Toro Road	Sun Valley Drive	E	E	**F**	C	**F**	D
2	Sun Valley Drive	Stan Oaks Drive	E	E	**F**	C	**F**	D
3	Stan Oaks Drive	LCAD Driveway	E	E	**F**	C	**F**	D
4	LCAD Driveway	Canyon Acres Drive	E	E	**F**	C	**F**	D
Laguna Canyon Road (Southbound)								
1	El Toro Road	Sun Valley Drive	E	E	C	**F**	D	**F**
2	Sun Valley Drive	Stan Oaks Drive	E	E	C	**F**	D	**F**
3	Stan Oaks Drive	LCAD Driveway	E	E	C	**F**	D	**F**
4	LCAD Driveway	Canyon Acres Drive	E	E	C	**F**	D	**F**
LOS = Level of Service; **Bold**: LOS **F;** * No-Build and Build Conditions								

Source: LCR Traffic Engineering Performance Assessment (March 30, 2022) Tables 6-1, 6-3, 6-4, 6-13 & 6-14

Intersection Analysis

No-Build Condition – Alternative 1

Table 5 presents intersection LOS results for the study intersections/locations under Existing, Opening Year and Horizon Year No-Build conditions. As shown in the table, all study area intersections currently operate at LOS E or better under existing conditions, except the following which operate at LOS F:

- Anneliese's School driveway, during AM Peak Hour
- LCAD Main Campus driveway, during AM Peak Hour
- City Maintenance Yard driveway, during AM and PM Peak Hours

Under Opening Year (2030) No-Build conditions, all study area intersections will operate at LOS E or better, except the following which operate at LOS F:

- Anneliese's School driveway, during AM and PM Peak Hours
- Stan Oaks Drive, during PM Peak Hour
- Castle Rock Road, during PM Peak Hour
- LCAD Main Campus driveway, during AM and PM Peak Hours
- City Maintenance Yard driveway, during AM and PM Peak Hours

Under Horizon Year (2050) No-Build conditions, all study area intersections will operate at LOS E or better, except the following which operate at LOS F:

- Anneliese's School driveway, during AM and PM Peak Hours
- Sun Valley Drive, during AM and PM Peak Hours
- Laguna Beach Dog Park driveway, during AM and PM Peak Hours
- Stan Oaks Drive, during AM and PM Peak Hours
- Castle Rock Road, during AM and PM Peak Hours
- LCAD Main Campus driveway, during AM and PM Peak Hours
- City Maintenance Yard driveway, during AM and PM Peak Hours

Table 5: Intersection Analysis LOS results along SR-133 (No-Build Condition)

ID	Intersection/ Driveway	Traffic Control	Existing (2017)		Opening Year (2030)		Horizon Year (2050)	
			AM Peak Hour LOS	PM Peak Hour LOS	AM Peak Hour LOS	PM Peak Hour LOS	AM Peak Hour LOS	PM Peak Hour LOS
1	El Toro Road	Signalized	C	B	C	C	E	D
2	Anneliese's School Driveway	Stop-Controlled	**F**	E	**F**	**F**	**F**	**F**
3	Sun Valley Drive	Stop-Controlled	D	D	E	E	**F**	**F**
4	Laguna Beach Dog Park Driveway	Stop-Controlled	D	D	E	E	**F**	**F**
5	Stan Oaks Drive	Stop-Controlled	D	D	E	**F**	**F**	**F**
6	Castle Rock Road	Stop-Controlled	D	D	E	**F**	**F**	**F**
7	LCAD Main Campus Driveway	Stop-Controlled	**F**	D	**F**	**F**	**F**	**F**
8	City Maintenance Yard Driveway	Stop-Controlled	**F**	**F**	**F**	**F**	**F**	**F**
9	Canyon Acres Drive	Signalized	A	A	A	A	A	A
LOS = Level of Service; **Bold**: LOS **F**								

Source: LCR Traffic Engineering Performance Assessment (March 30, 2022) Tables 6-2, 6-5, & 6-15

Build Condition – Alternatives 2, 3, 4, and 5

The comparative evaluation of the Project alternatives provided in the TEPA is based on the latest Caltrans Intersection Control Evaluation (ICE) review process as well as a preliminary peak hour warrant analysis under the Horizon Year (2050) conditions.

The ICE review follows a two-step process that includes an initial screening assessment appropriate for this PSR/PDS followed by further design and analysis in the subsequent PA/ED phase. The goal of this process is to allow for an informed decision to be made to implement the most efficient intersection control system or strategy at each location along the State ROW - with an increased emphasis on pedestrian and bike access and safety.

Based on the preliminary analysis included in the TEPA, the following three driveways, analyzed as stop-controlled intersections, met the peak hour traffic signal warrant thresholds during the AM peak hour under existing (2017) conditions:

- Anneliese’s School Driveway
- LCAD Main Campus Driveway
- City Maintenance Yard Driveway

At the junction of SR-133 with Anneliese's School driveway, the peak hour typically occurs before the school starts and after the school dismisses. Traffic entering and exiting Anneliese's School is expected to be minimal for the rest of the time periods. To avoid the interruption of the traffic flow along LCR and due to the close proximity of the driveway to the SR-133/El Toro Road Intersection immediately to the north, the junction of SR-133 with Anneliese's School driveway remains stop-controlled under the future build conditions. To reflect the worst-case scenario with low left turn movement volumes at this driveway, the driveway is analyzed with left turn movement allowed under Build Alternatives 2 to 4.

At the ingress/egress of SR-133 with the LCAD Main Campus Driveway, traffic entering and exiting the driveway is expected to spread throughout the day. To provide adequate gaps for left turning traffic and safe access in and out of the school, the driveway was analyzed as signalized intersection under the future year Build Alternatives 2 to 4 conditions. This driveway was analyzed as a stop-controlled right-in and right-out intersection under Build Alternative 5 with the worst-case peak season volumes. The existing signalized High-Intensity Activated Crosswalk Beacon (HAWK) is located 250 feet upstream of this driveway. Under Build Alternatives 2 to 4 conditions with the signalization at the junction of LCR and Laguna College of Arts & Design Driveway, the HAWK signal is recommended to be removed and a pedestrian crossing walk at this signalized driveway is recommended to be added. Under Build Alternative 5, the HAWK signal is recommended to remain as is. Decisions on the signalization at the junction of LCR with Laguna College of Arts & Design Driveway and removal of the HAWK signal is deferred to the PA/ED phase for further evaluation.

The ingress/egress at the City Maintenance Yard Driveway was also analyzed as a stop-controlled intersection. Although the City Maintenance Yard Driveway is warranted for a traffic signal during the AM peak hour, a traffic signal is not recommended at this location due to right-of-way constraints and the close proximity to the Canyon Acres Drive intersection located immediately to the south. Therefore, this intersection is recommended to be maintained as a stop-controlled intersection under the future build conditions.

The intersections at El Toro Road and Canyon Acres Drive would remain as signalized intersections in all Build scenarios.

The above recommendations were applied in the analysis under the four Build Alternatives. Further warrant analysis is required to be performed in the PA/ED phase to determine the need for traffic signals at the above proposed locations.

As further discussed below in Section 6 - *Corridor and System Coordination*, two separate improvement projects are currently being advanced by Caltrans encompassing the El Toro Road/SR-133 and the Canyon Acres Drive/SR-133 signalized intersections. These proposed improvements are anticipated to be constructed in advance of this Project and are, therefore, assumed to be an existing condition. Thus, an ICE analysis to evaluate an alternative intersection control system at these locations, such as a roundabout, has not been performed and is considered to be outside the scope of this ATP/utility undergrounding Project.

Although improvements to the El Toro Road/SR-133 intersection are currently considered outside the scope of this PSR/PDS, subsequent studies may be warranted to evaluate options to potentially improve the El Toro Road/SR-133 intersection and the portion of El Toro Road from the SR-133 intersection to SR-73. Among many options, a roundabout at the El Toro Road/SR-133 intersection is being considered.

Table 6 presents the projected intersection LOS results under Opening Year (2030) Build conditions. As shown, the study area intersections will operate at LOS E or better under Opening Year (2030) Build Alternatives 2 to 4 conditions, except the following which are expected to operate at LOS F.

- SR-133 at Anneliese's School Driveway, during AM and PM Peak Hours
- SR-133 at Stan Oaks Drive, during PM Peak Hour
- SR-133 at Castle Rock Road, during PM Peak Hour
- SR-133 at LCAD Driveway, during AM Peak Hour
- SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway, during AM and PM Peak Hours

As shown, all study area intersections operate at LOS E or better under Opening Year (2030) Build Alternative 5 conditions, except the following which are expected to operate at LOS F.

- SR-133 at Anneliese's School Driveway, during AM Peak Hour
- SR-133 at LCAD Driveway, during PM Peak Hour
- SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway, during AM and PM Peak Hours

Table 6: Intersection Analysis Year Opening Year (2030) Build Condition

ID	Intersection/ Driveway	Traffic Control	Alternatives 1 to 4		Alternative 5	
			AM Peak Hour LOS	PM Peak Hour LOS	AM Peak Hour LOS	PM Peak Hour LOS
1	El Toro Road	Signalized	C	C	D	C
2	Anneliese's School Driveway	Stop-controlled	**F**	**F**	**F**	D
3	Sun Valley Drive	Stop-controlled	E	E	E	C
4	Laguna Beach Dog Park Driveway	Stop-controlled	E	E	E	C
5	Stan Oaks Drive	Stop-controlled	E	**F**	E	C
6	Castle Rock Road	Stop-controlled	E	**F**	E	C
7	LCAD Main Campus Driveway	Signalized/ Stop-controlled	**F**	D	D	**F**
8	City Maintenance Yard Driveway	Stop-controlled	**F**	**F**	**F**	**F**
9	Canyon Acres Drive	Signalized	A	A	A	A

LOS = Level of Service; **Bold**: LOS F; * Signalized under Alternatives 1 to 4 and Minor Street Stop Controlled intersection under Alternative 5

Source: LCR Traffic Engineering Performance Assessment (March 30, 2022) Tables 6-6 and 6-7

Table 7 presents the projected intersection LOS results under Horizon Year (2050) Build conditions. As shown, the study area intersections will operate at LOS F under Horizon Year Build Alternatives 2 to 4 conditions, except for the intersections at SR-133/El Toro Road, which operates at LOS E and LOS D during the AM and PM peak hours, respectively, and SR-133/Canyon Acres Drive, which operates at LOS A during both the AM and the PM peak hours. As shown, all study area intersections operate at LOS E or better under Horizon Year (2050) Build Alternative 5 conditions, except the following intersections which are expected to operate at LOS F.

- SR-133 at El Toro Road, during AM Peak Hour
- SR-133 at Anneliese’s School Driveway, during AM and PM Peak Hours
- SR-133 at Sun Valley Drive, during AM Peak Hour
- SR-133 at Laguna Beach Dog Park Driveway, during AM Peak Hour
- SR-133 at Stan Oaks Drive, during AM Peak Hour
- SR-133 at Castle Rock Road, during AM Peak Hour
- SR-133 at LCAD Driveway, during AM and PM Peak Hours
- SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway, during AM and PM Peak Hours

Table 7: Intersection Analysis Horizon Year (2050) Build Condition

ID	Intersection/ Driveway	Traffic Control	Alternatives 1 to 4		Alternative 5	
			AM Peak Hour LOS	PM Peak Hour LOS	AM Peak Hour LOS	PM Peak Hour LOS
1	El Toro Road	Signalized	E	D	**F**	D
2	Anneliese's School Driveway	Stop-controlled	**F**	**F**	**F**	**F**
3	Sun Valley Drive	Stop-controlled	**F**	**F**	**F**	D
4	Laguna Beach Dog Park Driveway	Stop-controlled	**F**	**F**	**F**	D
5	Stan Oaks Drive	Stop-controlled	**F**	**F**	**F**	D
6	Castle Rock Road	Stop-controlled	**F**	**F**	**F**	D
7	LCAD Main Campus Driveway	Signalized/ Stop-controlled	**F**	**F**	**F**	**F**
8	City Maintenance Yard Driveway	Stop-controlled	**F**	**F**	**F**	**F**
9	Canyon Acres Drive	Signalized	A	A	A	A
LOS = Level of Service; **Bold**: LOS **F**; * Signalized under Alternatives 1 to 4 and Minor Street Stop Controlled intersection under Alternative 5						
Source: LCR Traffic Engineering Performance Assessment (March 30, 2022) Tables 6-16 and 6-17						

Multimodal Analysis

A multimodal analysis was performed to identify existing operational deficiencies and evaluate and compare the different alternatives. The methodologies put forth by Highway Capacity Manual (HCM) 6 were used to assess the LOS performance of bicycle, transit and pedestrian modes of transportation along LCR. The methodology and inputs used to assess the different modes can be found in the TEPA.

Table 8 presents the worst-case results of the multimodal analysis under the Opening Year (2030) and the Horizon Year (2050) conditions for Alternative 1 (No-Build) and Alternatives 2, 3, 4, and 5 (Build). As shown, under the No-Build condition, transit and pedestrian modes operate at LOS E or better, while vehicle and bicycle modes operate at LOS F. However, under the four Build conditions (Alternatives 2, 3, 4, and 5), transit, pedestrian, and bicycle modes operate at LOS E or better, while vehicle mode operates at LOS F.

Table 8: Opening Year (2030) and Horizon Year (2050) Multimodal LOS Comparison

Mode	**Alt 1 (No-Build)**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Laguna Canyon Road (Northbound)					
Vehicle	**F**	**F**	**F**	**F**	**F/D***
Transit	E	B	A	A	B
Bicycle	**F**	A	B	A	A
Pedestrian	D	A	A	A	A
Laguna Canyon Road (Southbound)					
Vehicle	**F**	**F**	**F**	**F**	**F/D***
Transit	E	B	C	A	B
Bicycle	**F**	A	A	A	A
Pedestrian	D	N/A	A	A	A

LOS = Level of Service; **Bold**: LOS **F**; Alt = Alternative; N/A = Not Applicable;
* off-peak/peak direction results

Source: LCR Traffic Engineering Performance Assessment (March 30, 2022)
Tables 6-8, 6-9, 6-10, 6-11, 6-12, 6-18, 6-19, 6-20, 6-21, and 6-22

The multimodal analysis results show improvement in pedestrian, transit and bicycle LOS for all Build Alternatives as compared to the No-Build Alternative due to the addition of bike, pedestrian and transit improvements along the corridor. The vehicular LOS remains F for the Build Alternatives 2 to 4 conditions since no additional capacity is proposed as part of the Project. Under Build Alternative 5 conditions, vehicle mode operates at LOS F and D for the off-peak and peak directions, respectively. The peak direction vehicular LOS would improve resulting from the two-lane configuration with the reversible lane conversion.

Traffic Analysis Summary

The No-Build and three Build Alternatives 2 to 4 provide one vehicular travel lane in each direction along LCR, thereby adding no capacity compared to existing conditions. Therefore, vehicular traffic demand is forecasted to be the same for No-Build and Build, Alternatives 1 to 4 conditions.

The No-Build and Build, Alternatives 1 to 4, differ from one another in the number, classification, and configuration of pedestrian, bike, and transit facilities they provide.

Alternative 5 was proposed to focus on the peak season with the worst-case traffic volumes. As mentioned in previous section, the peak direction configurations are proposed to have two lanes during the peak hours using the reversible lane concept, i.e., Build Alternative 5.

For Alternatives 1 to 4, since none of the alternatives have proposed any addition in number of lanes, there was no significant improvement in vehicular operations along the corridor. As shown in **Table 4**, the corridor operations for the peak direction under Build Alternative 5 would improve significantly with the reversible lane conversion.

Table 6 and **Table 7** compare years 2030 and 2050 intersection analysis, respectively. As shown in the tables, the intersections service levels would improve at several stop-controlled intersections with the right-in and right-out configuration during the PM peak hour under Build Alternative 5.

Table 8 compares the results of the multimodal analysis for Alternatives 1 through 5 under the Opening Year (2030) and Horizon Year (2050) conditions. As shown, the LOS performance for transit, bike, and pedestrian modes improves for all four Build Alternatives compared to the No-Build Alternative. The peak direction LOS performance for vehicle modes improves with the two-lane configuration under Build Alternative 5 compared to the No-Build Alternative.

Due to heavy traffic experienced during weekdays, summer weekends and holidays, several operational constraints are observed along the corridor, including vehicular queuing, inadequate gaps for left-turning traffic from driveways and cross streets, and conflicts between vehicles, pedestrians and bicycles due to inadequate bike lanes and sidewalks. The proposed Build Alternatives accommodate safety improvements and improvements for alternative transportation modes; thus, enhancing the safety and circulation for all modes of transportation and addressing the constraints observed.

As a result of the Build Alternatives, the corridor is expected to be safer for pedestrians and bicyclists due to a reduction in conflicts with vehicles.

Complete Streets

This Project is consistent with Deputy Directive 64-R2 and addresses the mobility and safety needs of bicyclists and pedestrians by implementing ‘complete streets’ elements such as dedicated pedestrian paths/sidewalks and bicycle lanes.

Safety/Collision Data

The Traffic Accident Surveillance and Analysis System (TASAS) Tables B collision data provided by Caltrans District 12 were analyzed for collisions that occurred for the 60-month period between January 1, 2016 and December 31, 2020 on SR-133 from PM 0.940 to PM 3.415. **Table 9** provides a summary of Caltrans’ TASAS Table B - Selective Accident Rate Calculation. Table B provides actual and average rates for similar highways and intersections. TASAS Selective Accident Retrieval (TSAR) provides a summary of the type of collision by location. TSAR data for the study area can be found in **Table 10**. A more detailed analysis can be found in the TEPA.

Northbound SR-133

As shown in **Tables 9** and **10**, there were a total of 103 collisions in the NB direction recorded on SR-133 within the Project limits, with 50 injury collisions and no fatality collision. The majority of the collisions were rear ends and broadsides corresponding to approximately 51 percent and 14 percent of the total collisions, respectively. In addition, there were two auto-pedestrian collisions recorded from the LCAD Main Campus Driveway to Anneliese's School.

As shown in **Table 9**, the total actual collision rate for each of the four NB segments, measured in collisions per million vehicle-miles (a/mvm), are approximately double the statewide average collision rates for similar facilities.

Table 9: TASAS Table B Accident Rates for SR-133

Post Mile (PM)	Location	Number of Accidents				Accident Rates [1]					
						Actual			Average		
		Total (T)	Fatal (F)	Injury (I)	F + I	Fat	F+I	Total	Fat	F+I	Total
Laguna Canyon Road (Northbound)											
PM 0.94 to 1.573	From Canyon Acres Drive to Laguna Canyon of Arts and Design	35	0	14	14	0.00	**0.68**	**1.70**	0.012	0.40	0.83
PM 1.573 to 2.446	From Laguna Canyon Arts and Design to Stan Oaks Drive	30	0	16	16	0.00	**0.55**	**1.03**	0.013	0.40	0.82
PM 2.446 to 3.330	From Stan Oaks Drive to Laguna Canyon Arts and Design	36	0	20	20	0.00	**0.66**	**1.19**	0.013	0.40	0.82
PM 3.330 to 3.415	From Anneliese's School to El Toro Road	2	0	0	0	0.00	0.00	0.74	0.013	0.40	0.82
Laguna Canyon Road (Southbound)											
PM 1.573 to 0.94	From Laguna Canyon Arts and Design to Canyon Acres Drive	16	0	7	7	0.00	0.34	0.78	0.012	0.40	0.83
PM 2.446 to 1.573	From Stan Oaks Drive to Laguna Canyon Arts and Design	17	0	10	10	0.00	0.34	0.58	0.013	0.40	0.82
PM 3.330 to 2.446	From Anneliese's School to Stan Oaks Drive	24	0	17	17	0.00	**0.56**	0.79	0.013	0.40	0.82
PM 3.415 to 3.330	From El Toro Road to Anneliese's School	6	0	2	2	0.00	**0.74**	**2.23**	0.013	0.40	0.82

Source: Caltrans District 12 TASAS Table B (January1, 2016 to December 31, 2020)
Notes: [1] the accident rate is the number of accidents per million vehicle-miles (a/mvm)
Bold indicates total actual accident rate that is higher than the statewide average accident rate for similar facilities

Source: LCR Traffic Engineering Performance Assessment (March 30, 2022) Table 3-4

Southbound SR-133

As shown in **Tables 9** and **10**, there were a total of 63 collisions in the SB direction recorded on SR-133 within the Project limits, with 36 injury collisions and no fatality collision. The majority of the collisions were rear ends and hit objects corresponding to approximately 41 percent and 24 percent of the total collisions, respectively. In addition, one auto-pedestrian collisions were recorded from LCAD Main Campus Driveway to Stan Oaks Drive.

Similar to the NB direction, as shown in **Table 9**, the total actual collision rate for each of the four SB segments are approximately double the statewide average collision rates for similar facilities.

Table 10: Summary of Accident Types

Post Mile (PM)	**Location**	**Accident Type**	**Head-on**	**Sideswipe**	**Rear End**	**Broadside**	**Hit Object**	**Overturn**	**Auto-pedestrian**	**Other**	**TOTAL**
Laguna Canyon Road (Northbound)											
0.94 to 1.573	From Canyon Acres Drive to Laguna Canyon Arts and Design	Total	3	4	22	3	2	1	0	0	35
		%	8.6%	**11.4%**	**62.9%**	8.6%	5.7%	2.9%	0.0%	0.0%	100%
1.573 to 2.446	From LCAD Main Campus Driveway to Stan Oaks Drive	Total	3	5	11	6	3	1	1	0	30
		%	10.0%	16.7%	**36.7%**	**20.0%**	10.0%	3.3%	3.3%	0.0%	100%
2.446 to 3.330	From Stan Oaks Drive to Anneliese's School	Total	2	3	20	4	4	1	1	1	36
		%	5.6%	8.3%	**55.6%**	**11.1%**	**11.1%**	2.8%	2.8%	2.8%	100%
3.330 to 3.415	From Anneliese's School to El Toro Road	Total	0	0	0	1	1	0	0	0	2
		%	0.0%	0.0%	0.0%	**50.0%**	**50.0%**	0.0%	0.0%	0.0%	100%
Laguna Canyon Road (Southbound)											
1.573 to 0.94	From LCAD Main Campus Driveway to Canyon Acres Drive	Total	2	2	4	0	4	2	0	2	16
		%	**12.5%**	**12.5%**	**25.0%**	0.0%	**25.0%**	**12.5%**	0.0%	**12.5%**	100%
2.446 to 1.573	From Stan Oaks Drive to LCAD Main Campus Driveway	Total	3	0	7	0	6	0	1	0	17
		%	17.6%	0.0%	**41.2%**	0.0%	**35.3%**	0.0%	5.9%	0.0%	100%
3.330 to 2.446	From Anneliese's School to Stan Oaks Drive	Total	2	2	13	0	3	3	0	1	24
		%	8.3%	8.2%	**54.2%**	0.0%	**12.5%**	**12.5%**	0.0%	4.2%	100%
3.415 to 3.330	From El Toro Road to Anneliese's School	Total	0	2	2	0	2	0	0	0	6
		%	0.0%	**33.3%**	**33.3%**	0.0%	**33.3%**	0.0%	0.0%	0.0%	100%

Source: Caltrans District 12 TASAS Selective Accident Retrieval (TSAR) (January 2016 to December 2020)
Bold indicates most occurring accident
Bold Red indicates second most occurring accident

Source: LCR Traffic Engineering Performance Assessment (March 30,2022) Table 3-5

Based on the analysis above, it is anticipated that the improvements proposed under Alternatives 2, 3, 4, and 5 including: (1) the removal of overhead utility poles and other obstacles located along the edge of the roadway; (2) improved shoulders; and (3) the introduction of separate bike and pedestrian facilities, would alleviate the identified deficiencies along the route and potentially decrease collision rates.

Traffic Engineering Studies

The TEPA report provides a summary of the existing deficiencies along the SR-133 corridor and discusses and analyzes possible alternatives to determine the operational feasibility of each alternative. A detailed operational analysis and traffic report will be prepared during the PA/ED phase. The analysis will include capacity, delay, queuing, LOS, signal warrants, and safety analysis.

5. DEFICIENCIES

The SR-133 corridor within the Project limits experiences substantial congestion at two bottleneck locations during the period of high visitor travel to the City. These periods include most summer weekends and holidays. Additionally, congestion is observed during a typical weekday peak period without high visitor travel. The two bottlenecks occur along the SB travel lane just south of the Laguna Canyon Road (SR-133)/El Toro Road intersection, and along the NB travel lane just north of Canyon Acres Drive where SR-133 transitions from two northbound lanes to one. Improvements are currently proposed under separate projects for both locations as further discussed in Section 6, below.

This segment of LCR consists of one 12-foot-wide travel lane in each direction, a 10-foot-wide nonstandard center two-way left turn lane, nonstandard shoulders, and limited on-street parking. Although no additional travel lanes are proposed with the Project under Build Alternatives 2 to 4, multimodal capacity of the corridor will improve significantly due to the addition of bike, pedestrian, and transit improvements.

Sidewalks or dedicated pedestrian paths do not exist along SR-133 within the Project limits, with the exception of a 0.2-mile-long sidewalk on the east side of SR-133 near the Laguna Beach Dog Park. Pedestrian access is limited to the paved shoulder next to the traffic lanes or in dirt areas adjacent to nonstandard shoulders. A large number of bicyclists utilize SR-133 within the Project limits. These bicyclists have limited access on narrow, nonstandard paved shoulders that are separated from traffic lanes only by a travel way edge stripe.

The properties along NB SR-133 consist predominantly of residential and commercial land uses, many of which have direct driveway access to and from SR-133. SB SR-133 includes several satellite parking lots. Vehicular congestion and queuing, and inadequate gaps during peak traffic periods create difficulty for left-turning vehicles accessing these driveways and parking lots. This issue is compounded through the ‘Big Bend’ area, where restricted sight distance through the horizontal curves can create difficulty for left-turning vehicles to find adequate gaps in traffic to make a safe left-turn movement through the oncoming traffic stream.

The availability of public parking is highly constrained throughout the City. City transit and trolley services make a critical contribution in improving traffic circulation by removing additional vehicles from utilizing the corridor, especially during the peak summer season. The City Maintenance Yard Parking Lot located at the southern end of the Project limits primarily serves as a park-and-ride location for the trolley service during summer months. Vehicular congestion and queuing, coupled with inadequate gaps during peak periods, makes ingress and egress difficult for vehicles and the trolley service accessing this lot.

Overhead utilities exist along both sides of LCR through most of the corridor within the Project limits. These overhead utility poles, and other fixed objects along the edge of the roadway in both directions, are located within the CRZ, increasing the risk of collisions with errant vehicles.

6. CORRIDOR AND SYSTEM COORDINATION

The proposed Project improvements are consistent with the state, regional and local mobility goals, and objectives, and are being coordinated with the responsible governmental, regulatory, and local agencies in the area to ensure consistency with their regional plans.

The following project is proposed by Caltrans within the Project limits:

EA #	Project Limits	Scope of Work	Status
12-0P94U4	El Toro Road to SR-73 (PM 3.1/R4.1)	Provide two lanes on NB SR-133 between El Toro Road and SR-133/73 Interchange by extending the second NB lane by 600 feet and extending the SB merge lane by 900 feet south of El Toro Road; and provide two left-turn lanes on SB El Toro Road at SR-133; Construct 8 foot shoulder in both directions (status: In Construction)	In Construction

The proposed improvements for the above projects have been assumed to be an existing condition for this Project.

Regional and System Planning

The State of California’s TCR for SR-133 anticipates that “SR 133 will experience increased traffic from regional growth and recreational travel” and states that “improving safety and circulation for all modes of transportation is a key focus for the SR 133 corridor.” Between Canyon Acres Drive and El Toro Road (which the TCR designates as Segment 4), the TCR indicates that potential opportunities for improvements “may include adding a lane in one or both directions, or a roundabout at one or several locations." In addition, anticipated development within the City of Irvine at the northern end of LCR near I-405 "may necessitate system operations and management concepts such as implementation of complete streets, and strategies to respond to traffic impacts from new developments to maintain safe and efficient access for all users. These improvements may include safety spot improvements, limitation and separation of left turn movements, reduction of driveways and access points (typically done with re-development) reduction or combination, right turn pockets, bus turn-outs, signal synchronization and other Transportation Management System (TMS) improvements." In short, the State anticipates that the portion of LCR within the Project limits may need some combination of complete streets improvements, safety enhancements, traffic capacity enhancements, and property access management to serve the future multimodal user needs of the corridor.

OCTA's 2014 Long Range Transportation Plan includes multimodal corridor improvements between El Toro Road and Canyon Acres Drive. OCTA is currently updating this plan. The 2022 Long Range Transportation Plan is expected to be finalized in Fall of 2022.

SR-133 between El Toro Road and Canyon Acres Drive is listed for multimodal corridor improvements in the adopted 2020 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Strategic Projects list developed by the Southern California Association of Governments (SCAG)(RTP ID S2160012). Future improvement projects must be in the adopted RTP/SCS financially constrained list of projects to be eligible for state and federal funding.

The build alternatives are also consistent with applicable City General Plan goals and policies to provide a safe circulation system for all users while protecting and encouraging bicycle and pedestrian travel.

7. ALTERNATIVES

Five alternatives were analyzed for the Project: one No-Build Alternative and four Build Alternatives, which include varying design configurations. No additional travel lanes are proposed for the Project. Each of the proposed Build Alternatives include a combination of the following elements:

- Undergrounding existing overhead utility lines outside travel lanes
- On-street and/or off-street bicycle facilities
- Emergency lanes
- ADA compliant pedestrian facilities (curb ramps, sidewalks/paths, and driveways)
- Removal of the existing High-Intensity Activated Crosswalk Beacon (HAWK)
- Improved shoulders
- Improved bus stops/turnouts
- Off-street parking
- New curb and gutter

- Cold Plane and place asphalt concrete overlay
- Drainage improvements
- Remove existing MBGR and install new MGS
- Install bike trail flexible posts
- Lighting and sign illumination
- Pavement delineations and signs

In addition to the project elements above, intersection improvements common to the four Build Alternatives are proposed at the following locations along SR-133:

- City Maintenance Yard Driveway – Southbound right-turn pocket and driveway entrance modifications

At the northern project limits, bike lanes would conform to the proposed improvements at the El Toro Road Intersection (see Section 6; Caltrans Project EA 12-0P94U4, El Toro Road to SR-73). At the southern project limit, Canyon Acres Drive, cyclists would continue southbound along SR-133 as they do today or cross at the Canyon Acres Drive signalized intersection to access downtown Laguna Beach.

Due to the ROW constraints and varying available width along the corridor as described in Section 3A (Existing Facility), the proposed improvements evaluated for all three Build Alternatives consist of a 64-foot-wide typical section for the majority of the Project's length with the exception of the constrained area in the vicinity of the 'Big Bend' where a 53-foot to 58-foot typical section is proposed depending on the alternative. Layouts and Typical Sections for the proposed three Build Alternatives are provided in **Attachment B**.

The proposed Build Alternatives are consistent with the recommendation identified in Caltrans' June 2014 TCR for this segment of SR-133, including widened shoulders, where feasible, to better accommodate bicyclists and pedestrians, and to promote the development of integrated multimodal projects in balance with community goals, plans and values.

Project Alternatives

Additional details of each alternative are provided below:

Alternative 1 - No-Build Alternative

The No-Build Alternative would maintain LCR in its current condition. No improvements would be implemented at this time; therefore, no capital costs are associated with this alternative. Utility poles on both the NB and SB sides of the road would not be undergrounded to allow full use of the State ROW for complete street elements to be incorporated into the corridor that encourage increased use of active modes of transportation. As the traffic demand increases, traffic operation will further deteriorate, which may result in an increase in congestion, vehicle queuing, vehicle delay, and safety issues. This alternative would not satisfy the Purpose and Need of the Project.

The No-Build Alternative includes the improvements proposed by Caltrans for the Canyon Acres Drive Intersection and the El Toro Road Intersection improvements as further described in Section 7 of this PSR/PDS.

The No-Build Alternative is being considered because it serves as the baseline against which to evaluate the effectiveness of the proposed Build Alternatives. This alternative allows decision makers to make a comparison between the impacts of the Build Alternatives and the impacts of the No-Build scenario.

Alternative 2

Alternative 2 generally consists of a typical width of 64 to 65 feet for the majority of the route including the vehicle, pedestrian and bicycle facilities. This alternative includes narrowed 11-foot travel lanes, a 10-foot center dual left-turn lane, 7-foot shoulders in both the NB and SB directions, and a pedestrian path/sidewalk on the NB side. Alternative 2 also includes a 10- to 12-foot wide, two-way Class I bikeway on the SB side of the roadway. Flexible posts would be located within the buffer area between the bike lane and travel way. During emergencies, there is space for four outbound evacuation travel lanes on the roadway and one inbound emergency vehicle lane by utilizing the bike lane. The bikeway/pedestrian path on the SB side of the roadway would have openings, which would allow emergency vehicles to traverse the curb.

Within the constrained segment in the vicinity of the 'Big Bend,' the NB and SB shoulders are eliminated, and the adjacent bikeway becomes a Class I two-way, shared-use path with pedestrians and a narrower buffer. At the pinch point of 53 feet available ROW width, the NB shoulder would end within this short segment.

Alternative 3 (former September 8, 2015, Task Force Final Report Alt. F)

Alternative 3 generally consists of a typical width of 64 feet for most of the route, including the vehicle, pedestrian, and bicycle facilities. This alternative includes narrowed 11-foot travel lanes, a 10-foot center dual left-turn lane, a 7-foot Class II bike lane, and a pedestrian path/sidewalk on the NB side of the roadway. Alternative 3 also includes a Class I bikeway on the SB side of the roadway. Portions of the SB side of the roadway have a 5-foot pedestrian sidewalk. Flexible posts would be located within the buffer area between the bike lane and travel way. During emergencies, there is space for three outbound evacuation travel lanes and one inbound emergency vehicle lane by utilizing the bike lane. The bikeway/pedestrian path on the SB side of the roadway would have openings, which would allow emergency vehicles to traverse the curb.

Within the constrained segment in the vicinity of the 'Big Bend,' the dedicated pedestrian path on the SB side of the roadway would be eliminated and the buffer between the shared-use, two-way Class I bike path and the SB travel lane would be narrowed. At the pinch point of 53 feet available ROW width, the 7-foot Class II bike lane on the NB side would be removed within this short segment.

Alternative 4 (former September 8, 2015, Task Force Final Report Alt. G)

Alternative 4 generally consists of a typical width of 64 feet for most of the route including the vehicle, pedestrian, and bicycle facilities. This alternative includes 12-foot travel lanes, and a 10-foot center dual left-turn lane, pedestrian paths/sidewalks on both the NB and SB sides of the roadway, and a 5- to 7-foot Class II buffered bike lane/shoulder on both sides of the roadway. During emergencies, there is space for four outbound evacuation travel lanes and one inbound emergency vehicle lane by utilizing the bike lanes.

Within the constrained segment in the vicinity of the 'Big Bend,' the bike lane widths would be reduced to five feet and the travel lanes reduced to 11 feet. At the pinch point of 53 feet available ROW width, the pedestrian paths and bike lane buffers on either side of the roadway would be reduced within this short segment.

Alternative 5 *(Recommended for Programming)*

Alternative 5 introduces a reversible lane that would provide a peak-direction capacity to a two-way road and decrease congestion by borrowing available lane capacity from the other (off-peak) direction. This alternative generally consists of a typical width of 64-ft. including the vehicle, pedestrian, and bicycle facilities. It would include 12-foot travel lanes and a 12- to 14- foot center reversible lane, pedestrian paths/sidewalks on both the NB and SB sides of the roadway, and a 5-foot Class II buffered bike lane on both sides of the roadway. During emergencies, there is space for four outbound evacuation travel lanes and one inbound emergency vehicle lane by utilizing the bike lanes.

Nonstandard Design Features

There are nonstandard features that have been identified in the No-Build and proposed Build Alternatives based on Caltrans Highway Design Manual (HDM) 6th Edition standards. Further analysis will be performed in the PA/ED phase and Design Standard Decision Documents (DSDD) will be prepared and further analyzed to document the nonstandard features prior to completion of the PA/ED phase for the Project. **Tables 11 & 12** include a listing of the identified nonstandard design features for the No-Build and Build Alternatives including the probability of approval and justification.

Table 11: Design Standards Risk Assessment

Bold Design Standards Risk Assessment			
Alternative	**Design Standard from Highway Design Manual Tables 82.1A & 82.1B**	**Probability of Nonstandard Design Feature Approval (None, Low, Medium, High,)**	**Justification for Probability Rating**
2, 3, 4, & 5	201.1 - Stopping Sight Distance – *Table 201.1 shows the minimum standards for stopping sight distance related to design speed for motorists.* ▪ Various Locations	Medium	Based on the existing alignment for this road, standard stopping sight distance may not be possible. Stopping sight distance will be improved from the existing condition when feasible, but the roadway centerline is not planned to be revised from its existing alignment due to utility and right of way impacts.
2, 3, 4, & 5	202.2 – Standards for Superelevation- *Table 202.2D Minimum Radii for Design Superelevation Rates, Design Speeds, and emax=10%* ▪ Sta. 102+06 to 114+21	Medium	The roadway centerline is proposed to maintain its existing alignment and superelevation. As such the standard radii and standard superelevation rates would not be achieved. The feasibility of meeting this standard will be explored in the PA/ED phase of project.
2, 3, 4, & 5	301.1 - Lane Width- *The minimum lane width on two-lane and multilane highways, ramps, collector-distributor roads, and other appurtenant roadways shall be 12 feet* • Throughout Project ▪	Medium	Lane widths are proposed to be reduced to 11ft to provide traffic calming within the project area and to accommodate proposed bike and pedestrian facilities. Where feasible 12’ lanes will be provided adjacent to bike lanes. Improved shoulders, bike and pedestrian facilities will be provided as part of this project.
2 & 3	302.1 – Shoulder Width- *The table widths given in Table 302.1 shall be the minimum continuous usable width of paved shoulder on highways.* • Throughout Project	Medium	The existing shoulders vary from 0ft- 6ft. Project improvements include increasing the width of the existing non-standard shoulders and providing improved bike and pedestrian paths.
2 & 3	309.1(3)(a)- Minimum Clearance- *The minimum horizontal clearance to all objects, such as bridge rails and safety shaped concrete barriers, as well as sand-filled barrels, guardrail, etc., on all freeway and expressway facilities, including auxiliary lanes, ramps, and collector-distributor roads, shall be equal to the standard shoulder width of the highway facility as stated in Table 302.1.* • Various Locations	Medium	Maximizing horizontal clearances between roadside objects and the edge of traveled way, will be provided when feasible. Project improvements include increasing the width of the existing non-standard shoulders and providing improved bike and pedestrian paths.

Bold Design Standards Risk Assessment			
Alternative	**Design Standard from Highway Design Manual Tables 82.1A & 82.1B**	**Probability of Nonstandard Design Feature Approval (None, Low, Medium, High,)**	**Justification for Probability Rating**
2 & 3	1003.1 Class I Bikeways (Bike Paths)(1)(b) – Widths and Cross Slopes - Shoulder *A minimum 2-foot wide shoulder, composed of the same pavement material as the bike path or all weather surface material that is free of vegetation, shall be provided adjacent to the traveled way of the bike path when not on a structure* • Throughout Project in various locations	Medium	2-foot wide shoulders will be provided where feasible. Class I Bikeways are proposed where none exist today. Alternatives 2 & 3 provides an option for an off-street bike path where the other Alternatives 4 & 5 provide a options for on-street Class II bike lanes. Overall safety improvement and other factors (conflict points, speed and volume) would be taken into consideration between these two options.
2 & 3	1003.1 Class I Bikeways (Bike Paths)(7) – Bike Paths Parallel and Adjacent to Streets and Highways *The minimum separation between the edge of traveled way 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 width. Bike paths within the clear recovery zone of freeways shall include a physical barrier separation.* • Throughout Project in various locations	Medium	Class I Bikeways are proposed where none exist today. Design will take into consideration conflicts that may arise at intersections and public transit facilities. Alternatives 2 & 3 provides an option for an off-street bike path where the other Alternatives 4 & 5 provide options for on-street Class II bike lanes. The AASHTO Highway Safety Manual will be used to justify the best cross section of roadway, bicycle and pedestrian facilities.

Table 12: Underline Design Standards Risk Assessment

Underlined Design Standards Risk Assessment			
Alternative	**Design Standard from Highway Design Manual Tables 82.1A & 82.1B**	**Probability of Nonstandard Design Feature Approval (None, Low, Medium, High,)**	**Justification for Probability Rating**
2, 3, 4, & 5	105.2 – Sidewalks and Walkways- *The minimum width of a sidewalk should be 8 feet between a curb and a building when in urban and rural main street place types. For all other locations the minimum width of sidewalk should be 6 feet when contiguous to a curb or 5 feet when separated by a planting strip.* • Throughout Project	Medium	Sidewalks or dedicated pedestrian paths do not exist along SR-133 within the Project limits, with the exception of a 0.2-mile long sidewalk on the east side of SR-133 near the Laguna Beach Dog Park. The proposed 5ft sidewalk meets the City standard for sidewalk width and also complies with the ADA minimum standard width of 4ft.
2, 3, 4, & 5	202.5(1) – Superelevation Transition- *A superelevation transition should be designed in accordance with the diagram and tabular data shown in Figure 202.5A to satisfy the requirements of safety, comfort and pleasing appearance* ▪ Various Locations	Medium	Based on the existing alignment for this road, standard superelevation transitions may not be possible due to existing small radius reversing curves.
2, 3, 4, & 5	202.5(2) – Superelevation runoff- *Two-thirds of the superelevation runoff should be on the tangent and one-third within the curve.* ▪ Various Locations	Medium	Based on the existing alignment for this road, standard superelevation runoff may not be possible due to existing small radius reversing curves.
2, 3, 4, & 5	203.6 – Reversing curves- *When horizontal curves reverse direction the connecting tangents should be long enough to accommodate the standard superelevation runoffs given on Figure 202.5A. If this is not possible, the 6 percent per 100 feet rate of change should govern (see Index 202.5(3)).* • Sta 100+43 to 102+06	Medium	The existing roadway alignment includes tight radius reversing horizontal curves located just south of the Castle Rock Road intersection. Roadway widening conforms to the existing roadway centerline.

Transportation Management Plan

Due to the topography constraints of the canyon, lack of adequate detour routes in and out of the City, and required access to the commercial, residential, and recreational land uses along the corridor, a minimum of one lane of through traffic in each direction would need to be maintained throughout the construction duration. It may be necessary to temporarily close driveways at night during Project construction.

The closest parallel detour routes to access PCH north and south of the City from inland locations are via Newport Coast Drive to the north and Crown Valley Parkway to the south.

Proposed Transportation Management Plan (TMP) elements that would mitigate traffic impacts during construction and their associated costs are listed in the attached Preliminary TMP Data Sheet (**Attachment E**). Due to the similarity of the proposed improvements, the TMP Data Sheet is considered common to all four Build Alternatives for this phase. The TMP Data Sheet will be further developed during the PA/ED phase to recommend specific methods of reducing construction and circulation impacts. The Plans, Specifications, and Estimates (PS&E) package will include detailed detour, staging, and traffic handling plans.

Construction Staging

It is anticipated that the Project will be constructed in three general stages. For Stage 1, traffic lanes would be shifted to the SB side of the roadway. Construction of the underground distribution lines and NB side of the roadway would be constructed a portion at a time in order to maintain access to all properties.

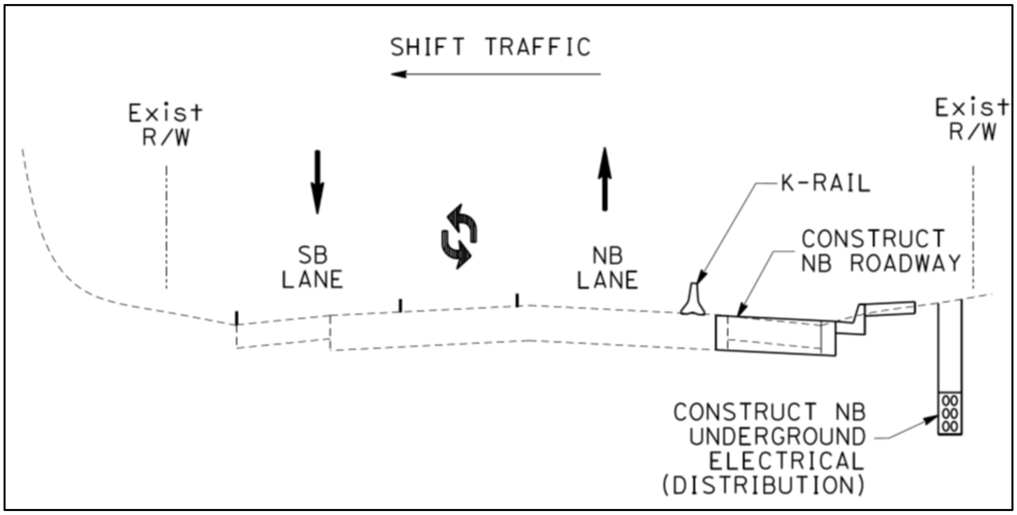


Figure 1 - LCR Construction Stage 1

For Stage 2, traffic would be shifted to the NB side of the roadway that was constructed in the previous stage. K-rail barrier would be placed for most of the length of the Project to construct the underground transmission lines and bike path.

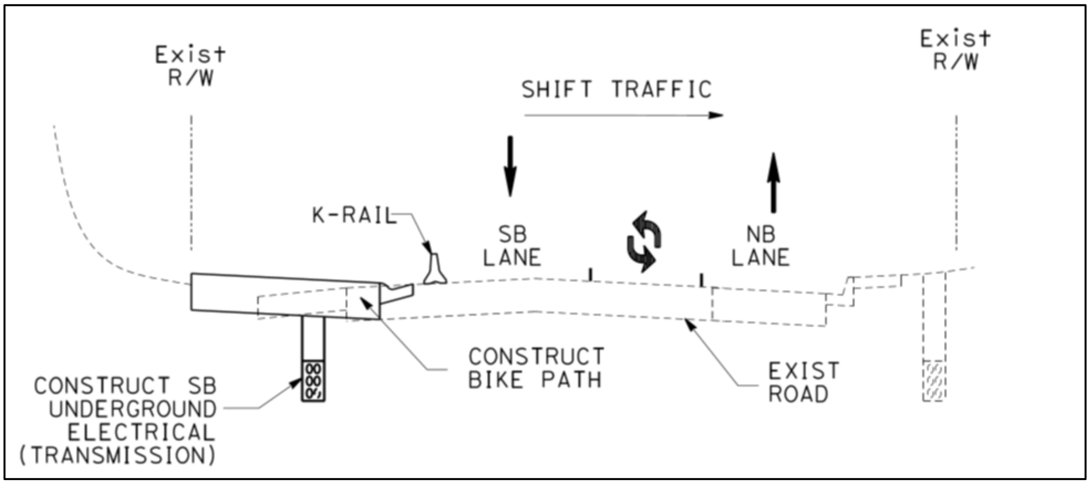


Figure 2 – LCR Construction Stage 2

For Stage 3, construction of the overlay within the existing pavement area would be completed in sections during non-peak hours. Temporary traffic control would be used for this construction to cold plane and place the asphalt overlay.

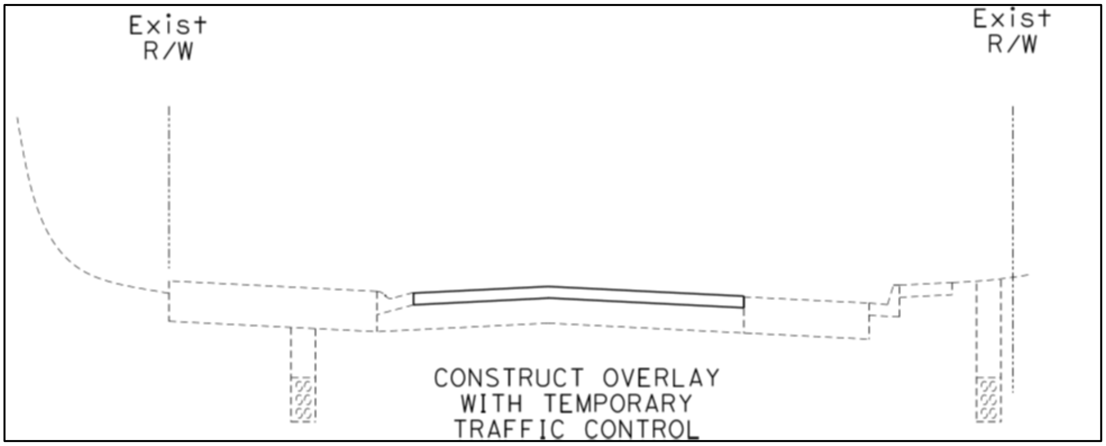


Figure 3 - LCR Construction Stage 3

A minimum of one 11-foot lane of through traffic in each direction and access to local business, schools and residential properties would be maintained throughout the construction duration.

Stormwater BMPs

A Storm Water Data Report (SWDR) has been prepared to accompany this PSR/PDS (**Attachment F**). The anticipated stormwater project risk level is Level 2. The SWDR recommends the implementation of treatment best management practices (BMPs) to treat the project targeted design pollutants. It is anticipated that post-Project State ROW will provide adequate area for BMPs. This will be confirmed during the PA/ED and PS&E phases. The SWDR will be updated during both the PA/ED and PS&E phases to confirm the risk level, disturbed soil area, change in amount of impervious area, and specific BMPs to be implemented for design pollution prevention and treatment, if needed. The construction contractor will prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) to address construction site BMPs. For this phase, permanent BMPs have been evaluated from a corridor scoping level.

The limits of the proposed project are within the jurisdiction of the San Diego Regional Water Quality Control Board (RWQCB). The receiving water body for the proposed project is Laguna Canyon Channel, which is not 2020/2021 CWA section 303(d) listed as being impaired. However, the project is located within the Twenty Beaches and Creeks Total Maximum Daily Load (TMDL) as identified in Attachment IV of the Caltrans Statewide NPDES Permit. Since this project discharges to an area with an established TMDL, any runoff treated in excess of the new impervious area created by the project may be claimed as a Compliance Unit (CU) to meet Caltrans NPDES permit requirements for achieving the TMDL compliance strategy. The project is located within and is contiguous to the Coastal Zone.

This project must conform to all applicable water quality regulations and/or permit requirements of the State Water Resources Control Board (SWRCB) and the local Santa Ana Regional Water Quality Control Board (RWQCB), including, but not limited to, the Caltrans Statewide NPDES Permit (Order No. 2014-0077-DWQ) amending (Order No. 2012-0011-DWQ, NPDES No. CAS000003), the Statewide General NPDES Permit for Construction Activities (Order No. 2012-0006-DWQ) amending (Order No. 2009-0009-DWQ, NPDES No. CAS000002), the Caltrans Storm Water Management Plan (December 2015 revision), and any subsequent revision and/or additional requirements at the time of construction. Should dewatering be required, dewatering must comply with the San Diego Regional Water Quality Control Board’s Order R9-2015-0013, NPDES Permit No. CAG919003 for general water discharge requirements for groundwater extraction discharges to surface waters within the San Diego Region.

Project Costs

Project costs for the four Build Alternatives are summarized in **Table 13**. Preliminary cost estimates are included as **Attachment C**. Estimated project support costs are summarized in Section 12.

Table 13: Project Cost Summary*

	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Roadway Items	$39,356,214	$38,104,247	$39,679,059	$40,265,628
Structures Items	$0	$0	$0	$0
SUBTOTAL CONSTRUCTION	**$39,356,214**	**$38,104,247**	**$39,679,059**	**$40,265,628**
Right-of-way Acquisition	$5,817,985	$6,347,159	$6,501,125	$9,319,186
Electrical Undergrounding	$56,486,000	$56,486,000	$56,486,000	$56,486,000
Other Utilities	$11,895,000	$11,895,000	$11,895,000	$11,895,000
SUBTOTAL ROW	**$74,198,985**	**$74,728,159**	**$74,882,125**	**$77,700,186**
PA/ED Support	$4,375,000	$4,375,000	$4,375,000	$4,375,000
PS&E Support	$5,000,000	$5,000,000	$5,000,000	$5,000,000
ROW Support	$2,721,875	$2,860,625	$3,178,750	$3,846,875
Const. Management	$5,000,000	$5,000,000	$5,000,000	$5,000,000
SUBTOTAL SUPPORT COSTS	**$17,096,875**	**$17,235,625**	**$17,553,750**	**$18,221,875**
TOTAL PROJECT COST	**$130,652,074**	**$130,068,031**	**$132,114,934**	**$136,187,689**

*Escalated values 4% per year to mid-point of construction (Year 2029)

Alternatives Considered and Withdrawn

A total of nine preliminary alternatives were developed during the PSR/PDS process for consideration by the Project Development Team (PDT) including SR-133/Laguna Canyon Road Task Force Alternatives F and G (*see Section 2B – Community Interaction*). The nine preliminary alternatives in addition to the No-Build were evaluated based on the following general criteria, which encompass operational and safety improvements as well as active transportation elements along the corridor:

- Undergrounding Outside Travel Lanes/Safety
- Off-Street Bicycle Facilities
- Pedestrian Sidewalk or Path
- Bus Stop Compatibility
- Emergency Access
- Breakdown Shoulder
- On-Street Bicycle Facilities
- On-Street Parking

Each preliminary alternative was evaluated by applying a weighted score to each of the above criteria. The top three scoring alternatives were carried on and further refined into Build Alternatives 2, 3 and 4. The six lowest scoring alternatives were dropped from further consideration (see **Attachment G** – Alternatives Screening Process and Evaluation Matrix).

8. RIGHT-OF-WAY

ROW Data Sheets for the four Project Build Alternatives and one No Build Alternative are included in **Attachment H**. **Attachment C** provides the Conceptual Cost Estimate – Right-of-Way Component.

The acquisition of permanent easements and temporary easements are proposed for all Build Alternatives. All permanent easements are proposed to be partial acquisitions and include both private parcels and public parcels controlled by the County of Orange. Temporary easement would be required for all Build Alternatives. These temporary easements are needed mostly for construction of proposed adjacent sidewalks along the entire roadway. For estimating purposes, it is assumed that the temporary easement will need a width of 10' of each parcel's frontage adjacent to proposed sidewalk. It is also assumed that the easements will be needed for a three-year period. The government owned properties needed for construction purposes are proposed to be procured through each government entities' permitting process. Costs for these properties include only the services needed to obtain the permits. There are no railroad facilities or right of way affected. There are no proposed displacements that would require relocations. There are no expected dedications.

For the build alternatives (Alternatives 2-5) right of way impacts vary. **Table 14** provides a summary of the highway easement and TCEs proposed for each build alternative.

Table 14: Proposed Permanent and Temporary Easements for Build Alternatives

Alternative	Permanent Easements		Temporary Easements	
	#	Total sf	#	Total sf
2	2	5,100	83	188,898
3	2	6,760	85	195,708
4	18	7,605	78	186,954
5	29	24,672	86	192,669

Utilities (Build Alternatives 2, 3, 4 and 5)

Impacted utilities are similar for each of the alternatives. A preliminary utility investigation was performed as part of the PSR/PDS. Potential utility owners with known facilities within the corridor were contacted to attain information about their existing facilities. Based on the gathering of that information, the following types of facilities and owners are present within the Project limits:

Utility	Owner
Water	Laguna Beach County Water District
Sewer	City of Laguna Beach
Telephone/Communications	Cox Communications Extenet Systems, Inc. Crown Castle Sprint T Mobile USA Frontier
Electrical	Southern California Edison (SCE)
Storm Drain	City of Laguna Beach OC Flood Control Division
Gas	Southern California Gas/Sempra Utilities

Coordination with the identified utility companies will be carried out during the subsequent phases. Preliminary utility sheets are provided in **Attachment B**. For programming purposes, it is assumed that all proposed Build Alternatives will impact the existing facilities. The specific facilities and owners in conflict with the proposed Build Alternatives, and their subsequent need for relocation and proposed location is further discussed below. Final utility dispositions will be confirmed and coordinated during the PA/ED phase.

SR-133 between El Toro Road and Canyon Acres Drive is included on the Statewide Construction Evaluation Map for the Middle-Mile Broadband Initiative. Further investigation will be completed during the PA/ED to determine locations of ducts that can be included in the statewide Broadband Middle-Mile Network.

Utility Undergrounding

Transmission and Distribution Lines (SCE)

The Project limits contain approximately 2.5 pole-miles of SCE transmission, distribution, and joint-use poles that would require undergrounding. The 66-kV transmission lines are primarily on wood poles, and for the most part, located on the NB side of SR-133 with sections also located on the SB side. Overhead distribution lines are installed as 'underbuilds' on the same poles as the 66-kV transmission lines. At some locations, the distribution lines are on separate poles. The distribution lines consist of primary lines with the voltage ranging from 12 to 25 kV and secondary lines with the voltage being 120 to 240 V normally for residences and 208 V or 480 V services for businesses. A portion of the distribution lines in the vicinity of the 'Big Bend' area were undergrounded by SCE in 2016. The locations of the existing power lines along the Project alignment are shown in the Existing Utility Plans included in **Attachment B**.

The 66-kV transmission lines are proposed to be placed underground in a utility trench along the SB side of the roadway. This arrangement would allow for distribution lines to be placed within a utility trench on the NB side of the roadway since the existing residences and businesses are mostly located on the NB side. The design for both underground transmission and distribution lines will be coordinated with SCE and Caltrans and will depend on the proposed improvements. The standard underground duct banks used by SCE consists of PVC conduits encased in concrete with a 3-foot depth of cover over the bank. The proposed trench locations are shown in the Typical Cross Sections included in **Attachment B.**

Conversion of overhead electric facilities to underground will require the use of manholes or vaults used for splicing cables. Standard underground transmission vaults used by SCE are precast concrete spaced approximately every 2,000 feet along the alignment with approximate dimensions of 20'x 10' x 10' in length, width, and height. Underground vaults for splicing distribution cables are precast concrete and normally spaced approximately 1,000 feet apart. The vaults would vary in size depending on the number and size of cables. Transformers and switching equipment will be required to convert the distribution voltage for residential and businesses use and can be placed either above ground or in underground vaults.

Due to the constrained existing corridor ROW width, manholes or vaults are proposed to be located within the bike lanes, sidewalks, and pedestrian paths, or in landscaped areas within the existing ROW outside the travel lanes and would be traffic loading rated.

Other considerations for converting the existing overhead electrical facilities to underground include, but are not limited to:

- Installation of transition poles on either end of the Project and along lateral roads to convert from underground back to overhead
- Undergrounding of electrical transmission and distribution line taps or connections to other overhead lines to the next available existing poles or to a new pole set at certain distances from the edge of the improvement
- Conversion of overhead services to residents and businesses to underground
- Conversion or replacement of the customer panel boxes to accept the underground service
- Improvements at the SCE Morro Substation located approximately 1,200 feet south of the Canyon Acres Drive intersection

The placement of the underground electrical lines will depend upon the number and location of existing underground substructures such as storm drains, sewer lines, water lines, gas lines, and others such as pipelines. These existing underground substructures will most likely dictate the alignment and placement of the duct banks and vaults required to underground the overhead electrical facilities. Consequently, the configuration, design, and ROW/easement requirements of the underground lines will need to be determined during the subsequent PA/ED phase and will need to be further coordinated with Caltrans, SCE and the other utility owners.

Telecommunication Facilities (Cox, Extenet, Crown Castle, Sprint, T-Mobile, Frontier)
There are approximately 2.5 pole-miles of overhead communication lines that run from the start to the end of the proposed improvements, for the most part on the SB side with sections also running on the NB side. The underground telecommunication lines will most likely be installed in duct banks and manholes will also be required. The telecommunication facilities are proposed to be placed in a joint trench with the electrical distribution lines. It would be preferable to place the joint trench on the NB side of the roadway since most of the businesses and/or residences are located on the NB side. This placement would minimize service conduit runs to the adjacent properties and reduce overall costs. Specific impacts to each of the communication line owners will be determined during the PA/ED phase of the project.

Streetlights (City of Laguna Beach)
The existing streetlights installed on SCE power poles are owned by SCE and will need to be relocated because of the project. The streetlights are currently fed from the overhead power lines and will be modified because of the undergrounding (see above). New underground circuits, controls, foundations, poles, and luminaires will be required, and would be installed along the proposed sidewalks and pedestrian paths. Decorative roadway lighting is an option, as well as decorative pathway lighting, based on the City's preference and available funding. The City will take ownership of the streetlights within the project limits.

Sewer (City of Laguna Beach)
The City of Laguna Beach has a sewer line along northbound side of the roadway for the length of the project. It is unknown if the sewer line can remain in place. For programming purposes, it is assumed that the sewer line will be relocated.

Water (Laguna Beach County Water District)
The Laguna Beach County Water District has water lines on both sides of the project. It is assumed that the waterline located on the southbound side of the roadway will not require relocation because there are no apparent conflicts; however, further investigation will be required. For the northbound side of the roadway, it uncertain if the water lines can remain in place. As such, it is assumed that the waterline on the northbound side of the roadway will be relocated.

Gas (Southern California Gas)
The Southern California Gas Company (SCG) has a gas line that exists along northbound side of the roadway for the length of the project. It is uncertain if these gas lines will be impacted. It is assumed that the existing gas lines will be relocated outside of the proposed roadway for the length of the project.

Railroad

There is no railroad involvement within the Project limits.

9. STAKEHOLDER INVOLVEMENT

City of Laguna Beach staff (the Project sponsor) and various functional units from Caltrans District 12 have attended the monthly PDT meetings and technical workshops to develop the purpose and need, assist in screening the proposed alternatives under consideration, and review the four proposed Build Alternatives and design options. Comments received to-date from the various stakeholder agencies with facilities along LCR, including SCE, the County of Orange Public Works, Laguna Beach County Water District, and LCAD, have been incorporated.

External stakeholder input, as well as prior assessments/studies of the corridor, have been reviewed and incorporated, as applicable. In addition, the City has continued to solicit community input and involvement with local stakeholder groups throughout the development of this PSR/PDS to balance the transportation needs of the corridor with community values. Furthermore, as described in *Section 2B – Community Interaction*, two of the four proposed Build Alternatives were developed in conjunction with the prior work of the SR-133/Laguna Canyon Road Task Force.

Community input will continue to be solicited during the subsequent PA/ED phase. A series of public workshops/informational meetings, as well as meetings with stakeholders and property owners, are anticipated to gain input prior to completion of the environmental document for the Project.

10. ENVIRONMENTAL COMPLIANCE

The preliminary environmental investigation focused on the proposed Project impacts from the four proposed Build Alternatives. Since a funding source has not been identified, environmental documentation pursuant to both CEQA and NEPA would be completed.

A Preliminary Environmental Analysis Report (PEAR) has been prepared for the Project and is included as **Attachment I**. A summary of environmental considerations for the Project is provided in the PEAR.

It is anticipated that the proposed Project will require the following permits and approvals:

- State Water Resources Board: National Pollutant Discharge Elimination System (NPDES) Construction General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities
- San Diego Regional Water Quality Control Board: Section 401 Water Quality Certification
- U.S. Army Corps of Engineers: Section 404 Nationwide Permit
- California Department of Fish and Wildlife 1602 Streambed Alteration Agreement
- California Coastal Commission/City of Laguna Beach: Coastal Development Permit (State and Local Jurisdiction)

- Section 4(f) concurrence from Orange County Parks for *de minimis* impact determination
- California Department of Fish and Wildlife (CDFW): 1602 Streambed Alteration Agreement
- State Historic Preservation Office Consultation

Initial Site Assessment (ISA)

The ISA Checklist for hazardous waste was completed in June 2018 and is included as **Attachment J**. Potential hazardous waste/materials issues associated with the proposed Project include aerially-deposited lead (ADL) in previously undisturbed soil areas or unpaved areas within Caltrans ROW along the shoulders of SR-133, lead chromate in yellow traffic striping and pavement marking materials along SR-133, polychlorinated biphenyls (PCB) in utility pole- and pad-mounted electrical transformers, and creosote and pentachlorophenol in wooden utility poles.

A full ISA for all ROW acquisition properties and Preliminary Site Investigations (PSI) will be conducted during the PA/ED phase.

11. FUNDING

Potential funding for the Project is currently being sought from federal, state, and local sources and is to be determined. Additional funding from the State ATP and State STIP may also become available at a later stage. A summary of potential funding sources and amounts identified to-date are included in **Table 15**. It has been determined that this project is eligible for Federal-aid funding.

Table 15: Current Capital Outlay Project Estimate

Alternative	Range of Estimate		Other Funds/To Be Determined	
	Const.	ROW*	Const.	ROW
2	$39.4M	$74.7M	$39.4M	$74.7M
3	$38.1M	$74.4M	$38.1M	$74.4M
4	$39.7M	$74.9M	$39.7M	$74.9M
5	$40.2M	$77.7M	$40.2M	$77.7M
* Includes ROW acquisition and utility relocation costs				

The level of detail available to develop these capital outlay project estimates is only accurate to within the above ranges and is useful for long-range planning purposes only. The capital outlay project estimates should not be used to program or commit State-programmed capital outlay funds.

Capital Outlay Support Estimate

Capital outlay support estimate for programming for this Project is shown in **Table 16**, below:

Table 16: Capital Outlay Support Estimate

Phase	Cost	Percentage
PA/ED	$4.375M	3.9%
PS&E	$5.0M	4.4%
ROW	$2.72 - $3.85M	2.4%- 3.3%
Construction	$5M	4.4%
Total	**$17.1-18.2M**	**15.1%-15.4%**

12. DELIVERY SCHEDULE

Tentative Project schedule milestones (common to all four Build Alternatives) are as follows:

Project Milestones		Scheduled Delivery Date (Month/Year)
PSR/PDS Approval	M010	October 2022
Program Project	M015	July 2023
Project Report/Env. Document Approval	M200	July 2025
Complete PS&E	M380	January 2027
Right-of-way Certification	M410	April 2027
Obtain Coastal Development Permit	---	July 2027
Ready-to-list	M460	October 2027
Advertise/Bid/Award Contract	M495	February 2028
Construction Contract Complete	M800	February 2030

The anticipated funding fiscal year for construction is 2028/2029.

Project milestones listed above are used to indicate relative timeframes for planning purposes and are dependent on the identification and/or availability of funding.

The City is the lead agency for development of the Project. Caltrans will provide oversight for the duration of the Project. A Cooperative Agreement between the City and the Caltrans should be developed to define the responsibilities of each agency for the PA/ED, PS&E, and Construction phases.

13. RISKS

Fourteen potential risks have been identified during the Project Initiation Document (PID) phase. While probability and impact vary with each one, these risks require close attention throughout the Project. These risks should be monitored, updated, and expanded during the PA/ED, PS&E and construction phases. See **Attachment K** for the Risk Register and **Table 11** for the nonstandard design feature risk evaluation.

14. EXTERNAL AGENCY COORDINATION

Federal Highway Administration (FHWA)

The Project is not located on the interstate system, coordination with the FHWA for review and approval of project actions is not required.

The project requires the following coordination/consultation:

- State Historic Preservation Office Consultation
- Section 106 Consultation
- AB 52 Native Americans Tribal Consultation
- Section 4(f) Coordination
- Coastal Orange County NCCP/HCP or USFWS Endangered Species Act Section 7 Consultation
- Cooperative Agreements with Caltrans
- Maintenance Agreement with Caltrans
- County of Orange
- Agreements with utility companies/agencies

15. PROJECT REVIEWS

NPDES ______________________________ Date 6/7/2022
System Planning ______________________________ Date 6/6/2022
Traffic Operations ______________________________ Date 6/6/2022
Project Manager ______________________________ Date 5/31/2022
District Safety Review ______________________________ Date 5/12/2022

16. PROJECT PERSONNEL

Principal contacts for the Project are as follows:

City of Laguna Beach:	
Shohreh Dupuis, City Manager	(949) 497-0351
Tom Perez, Capital Programs Manager	(949) 464-6688
Caltrans:	
Lori Subida, Project Manager	(657) 328-6265
Raouf Fam, Project Engineer	(657) 328-6269
Grace Tell, Branch Chief – Advance Planning	(657) 328-6068
HDR Engineering, Inc.:	
Girair Kotchian, Project Manager	(714) 730-2493
Steve Crouch, Project Engineer	(714) 833-2743
Douglas Smith, Traffic	(714) 368-5635
Angie Kung, Environmental	(714) 730-2395

17. ATTACHMENTS

A. Location and Vicinity Maps
B. Preliminary Engineering Studies
C. Preliminary Project Cost Estimates
D. Traffic Engineering Performance Assessment (TEPA)
E. Transportation Management Plan (TMP) Data Sheets
F. Storm Water Data Report (SWDR
G. Alternatives Screening Process and Evaluation Matrix
H. Right-of-way Data Sheets
I. Preliminary Environmental Analysis Report (PEAR)
J. Initial Site Assessment (ISA) Checklist
K. Risk Register

ATTACHMENT A

LOCATION AND VICINITY MAPS

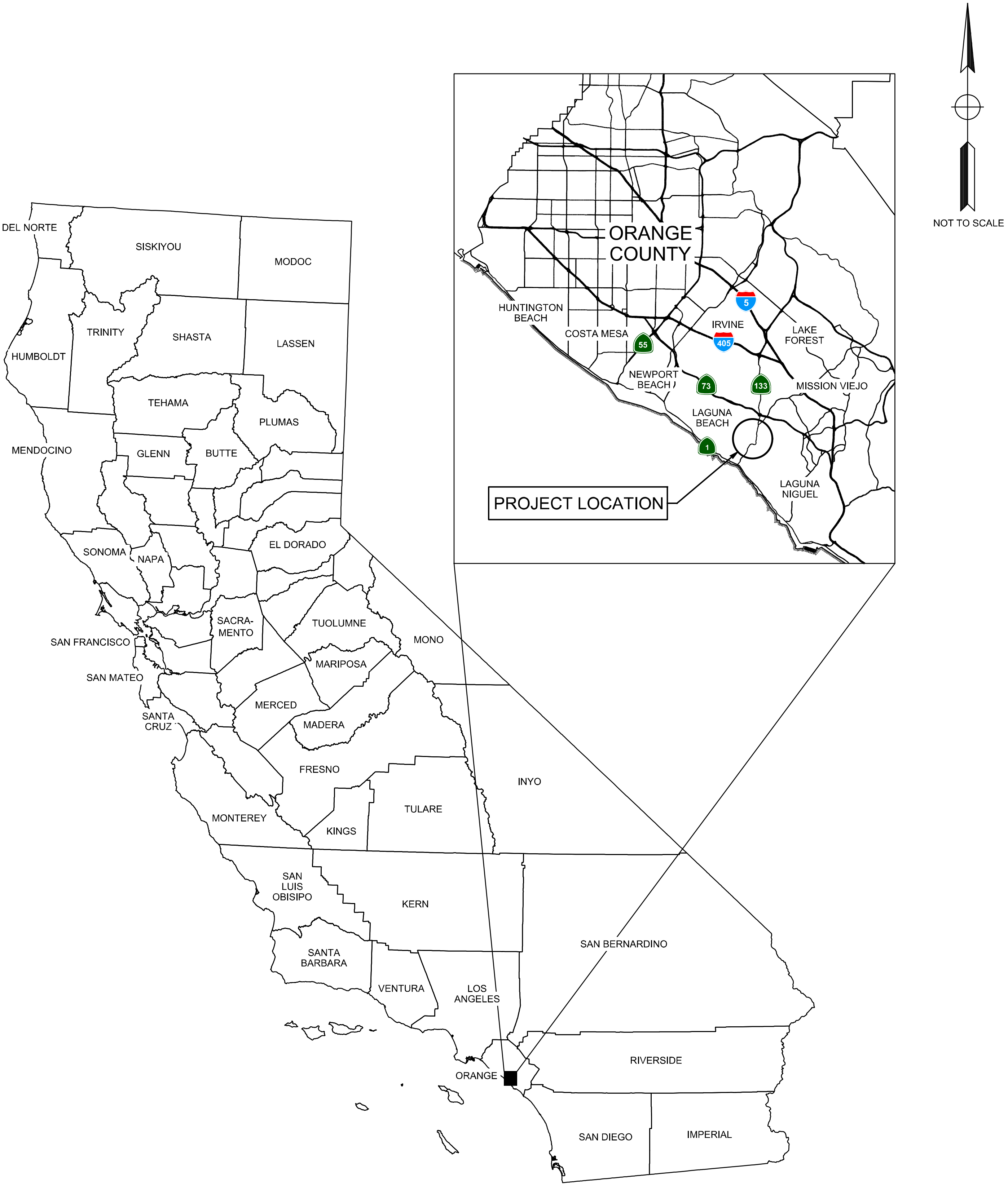


FIGURE 1

PROJECT LOCATION

LAGUNA CANYON ROAD / SR-133

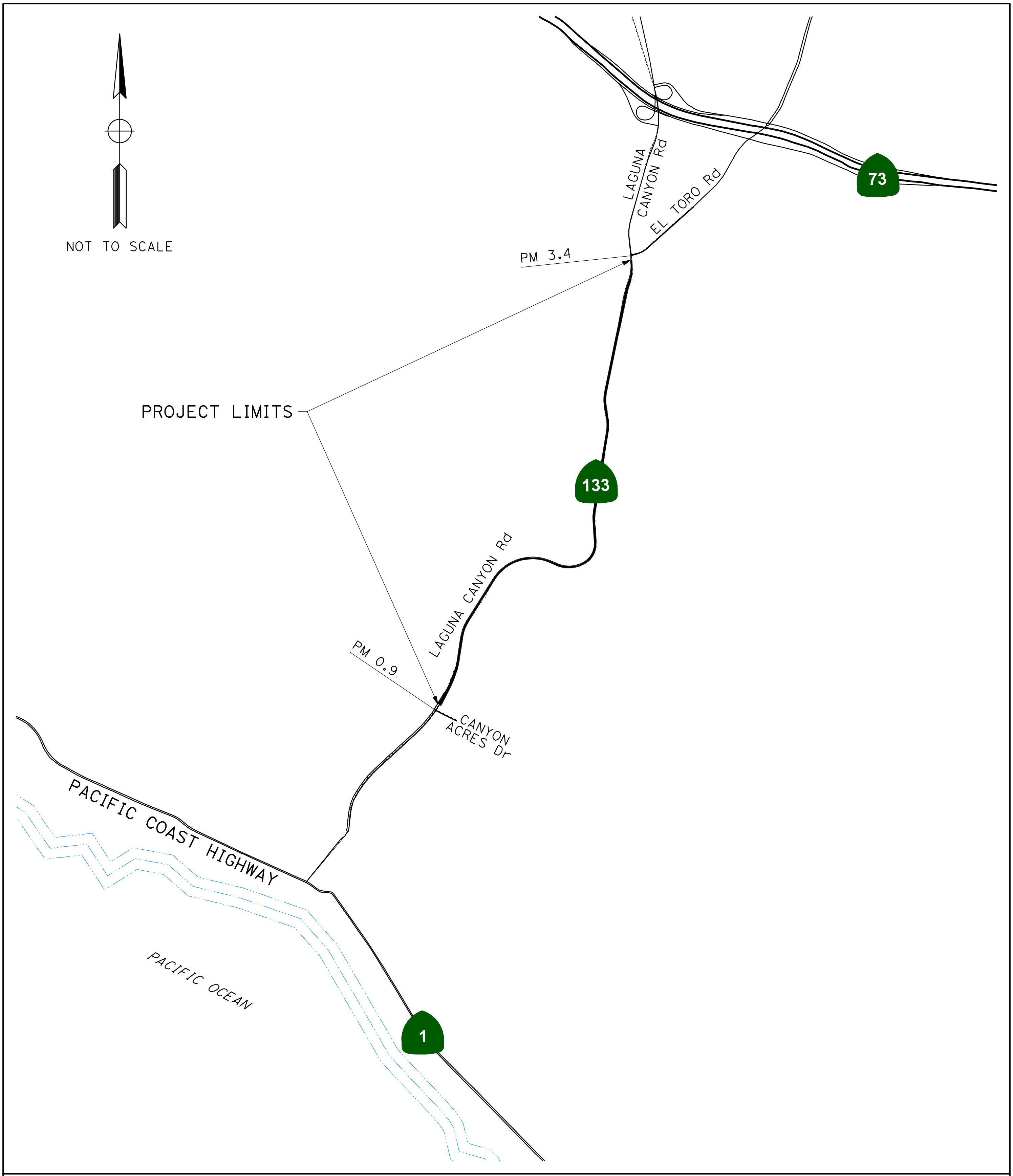


Figure 2

PROJECT LOCATION

Laguna Canyon Road / SR-133

ATTACHMENT B

PRELIMINARY ENGINEERING STUDIES

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

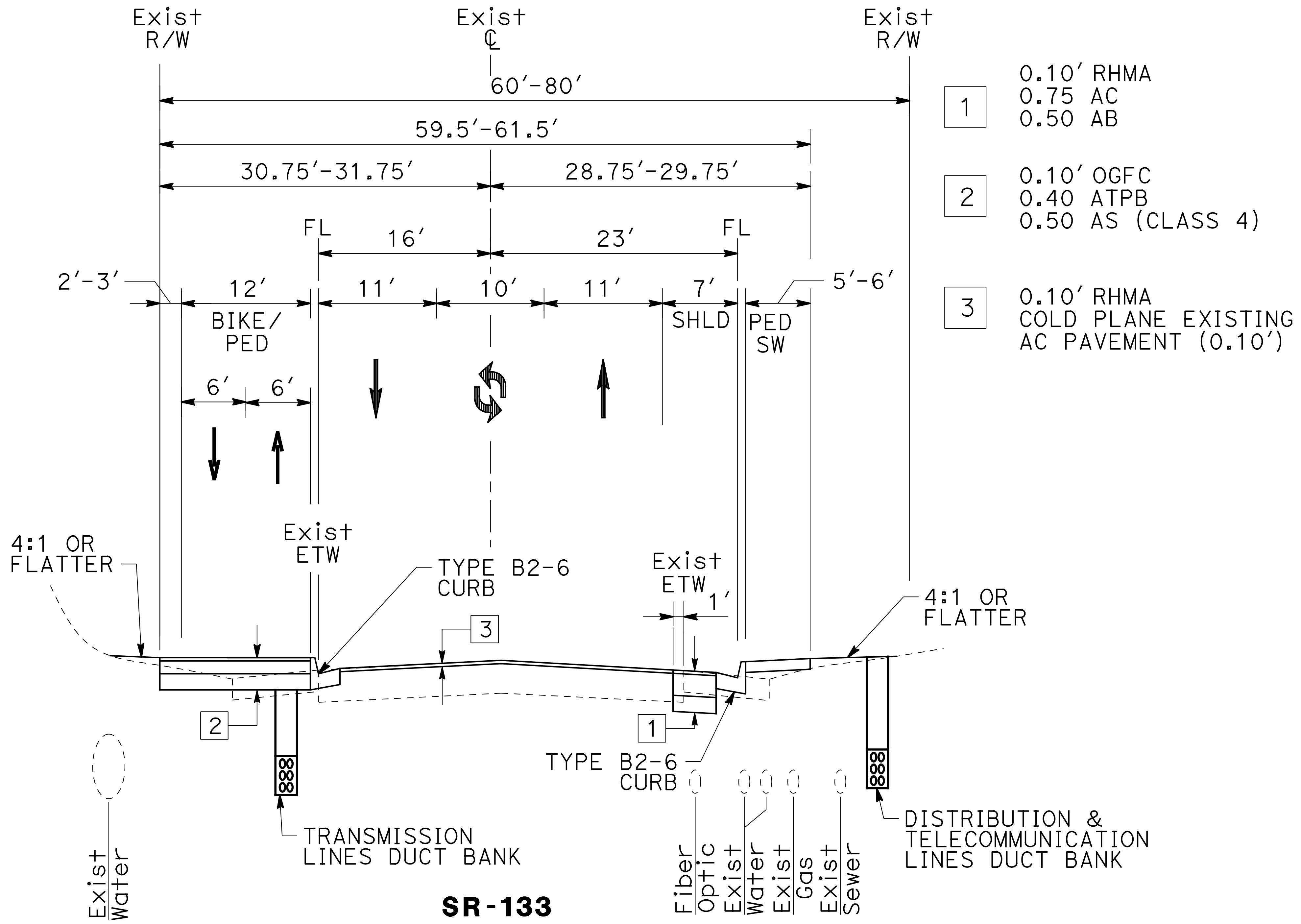
REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
Exp.
CIVIL
STATE OF CALIFORNIA

HDR ENGINEERING INC.
3230 EL CAMINO REAL
SUITE 200
IRVINE, CA 92602

AUTHORIZING AGENCY
CITY OF LAGUNA BEACH
505 FOREST AVE.
LAGUNA BEACH, CA 92651-2394

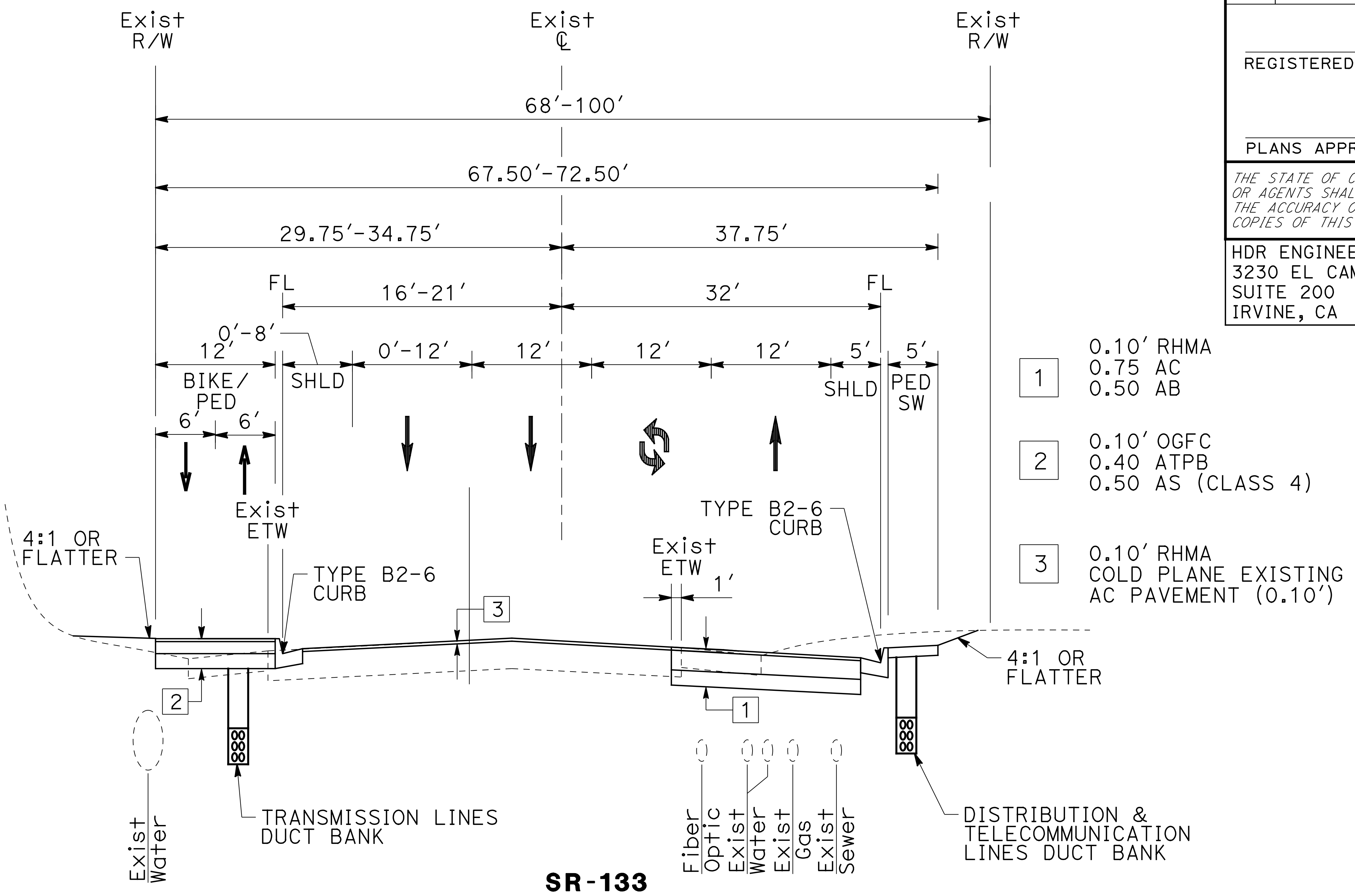
NOTES:

1. EXIST UNDERGOUND UTILITIES LOCATION SHOWN ARE APPROXIMATE. CLEARANCE TO EXIST UNDERGOUND UTILITIES TO BE DETERMINED.



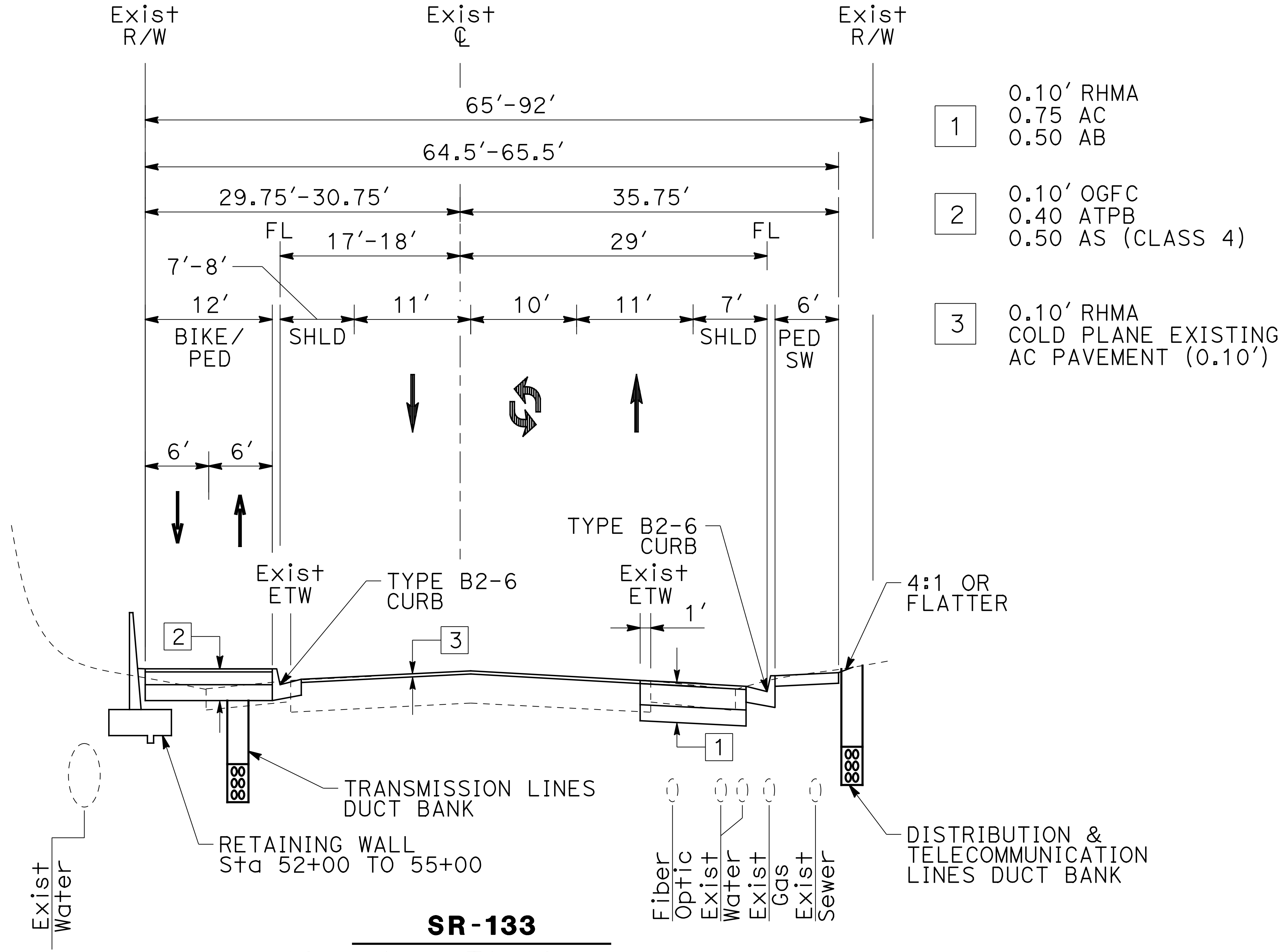
SR-133

Sta 84+50 TO Sta 96+40
Sta 102+50 TO Sta 107+00



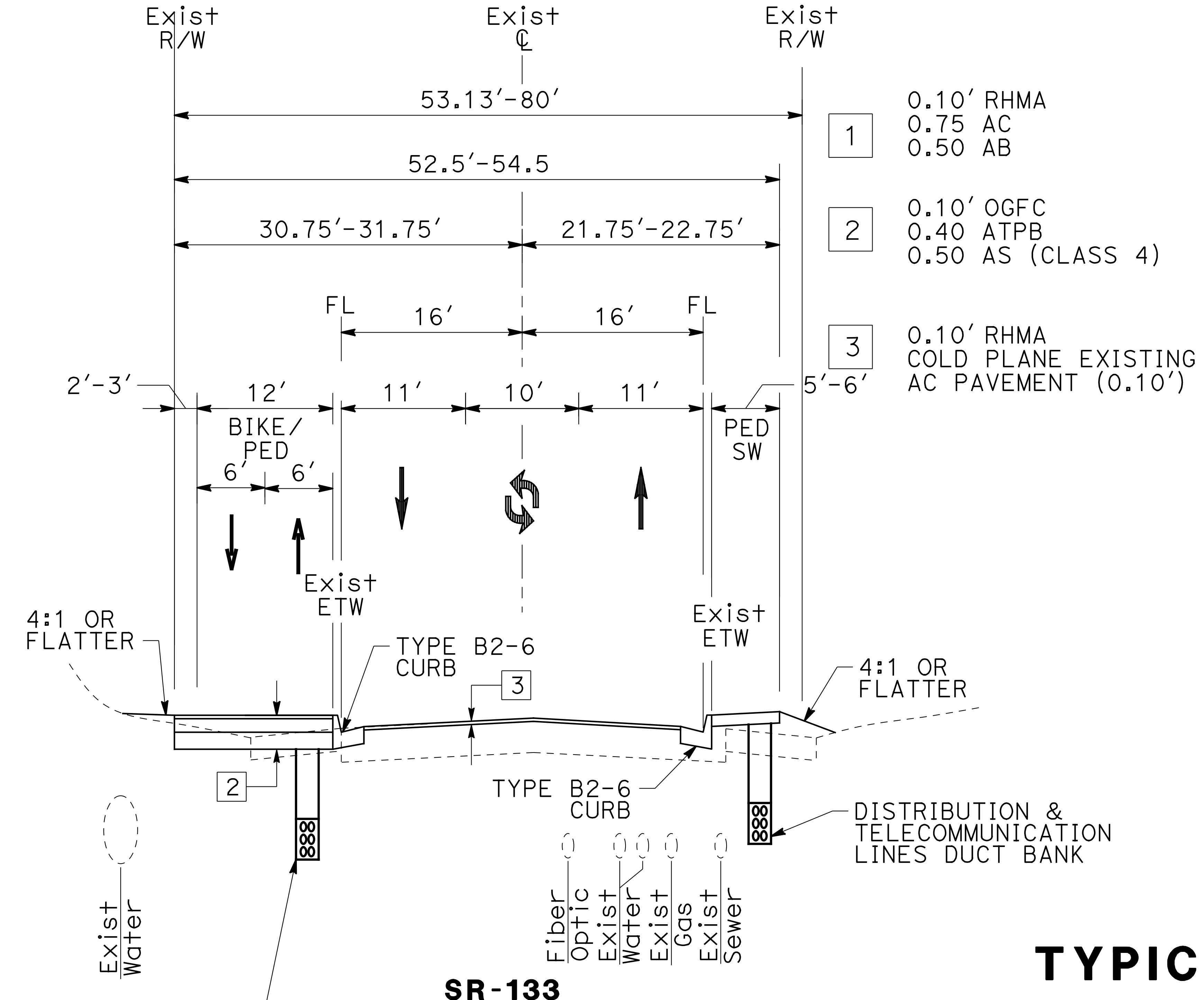
SR-133

Sta 164+60 TO Sta 180+00



SR-133

Sta 53+00 TO Sta 84+50
Sta 113+50 TO Sta 164+60



SR-133

Sta 96+40 TO Sta 102+50
Sta 107+00 TO Sta 113+50

TYPICAL CROSS SECTIONS ALTERNATIVE 2

NO SCALE

X-1

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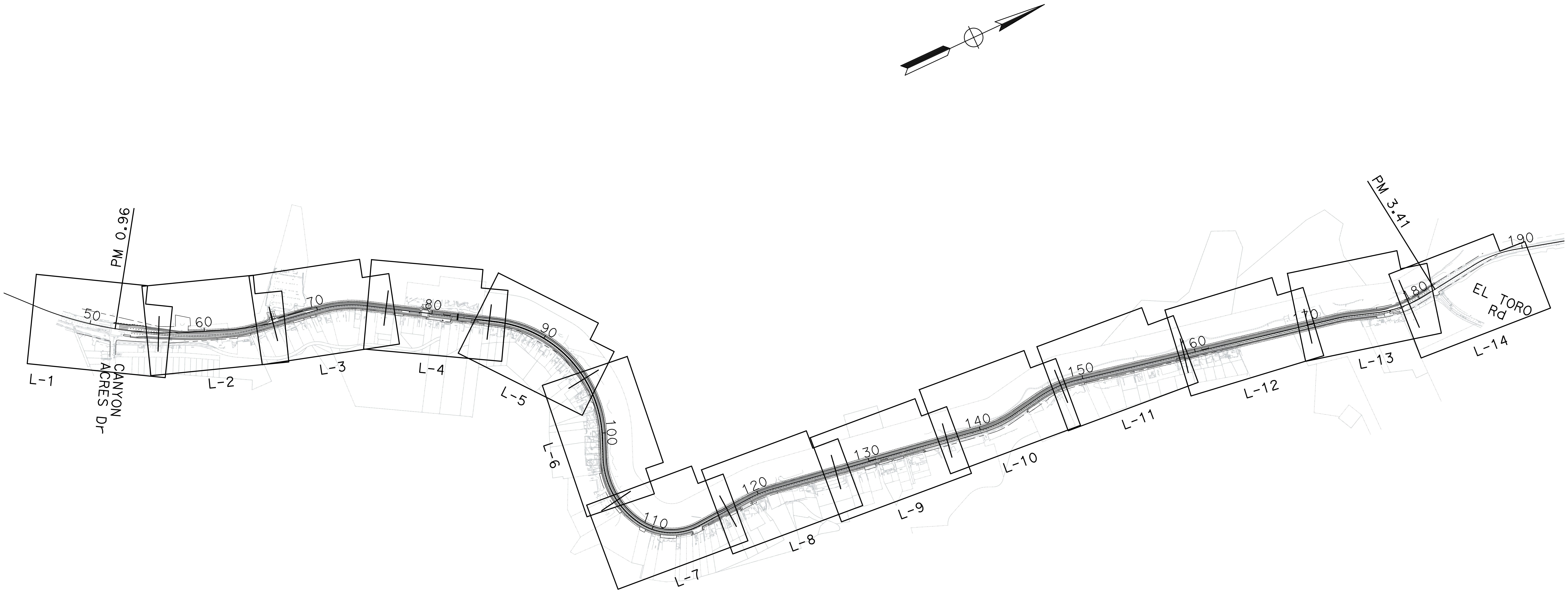

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KEY MAP
ALTERNATIVE 2

NOT TO SCALE

K-1

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0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

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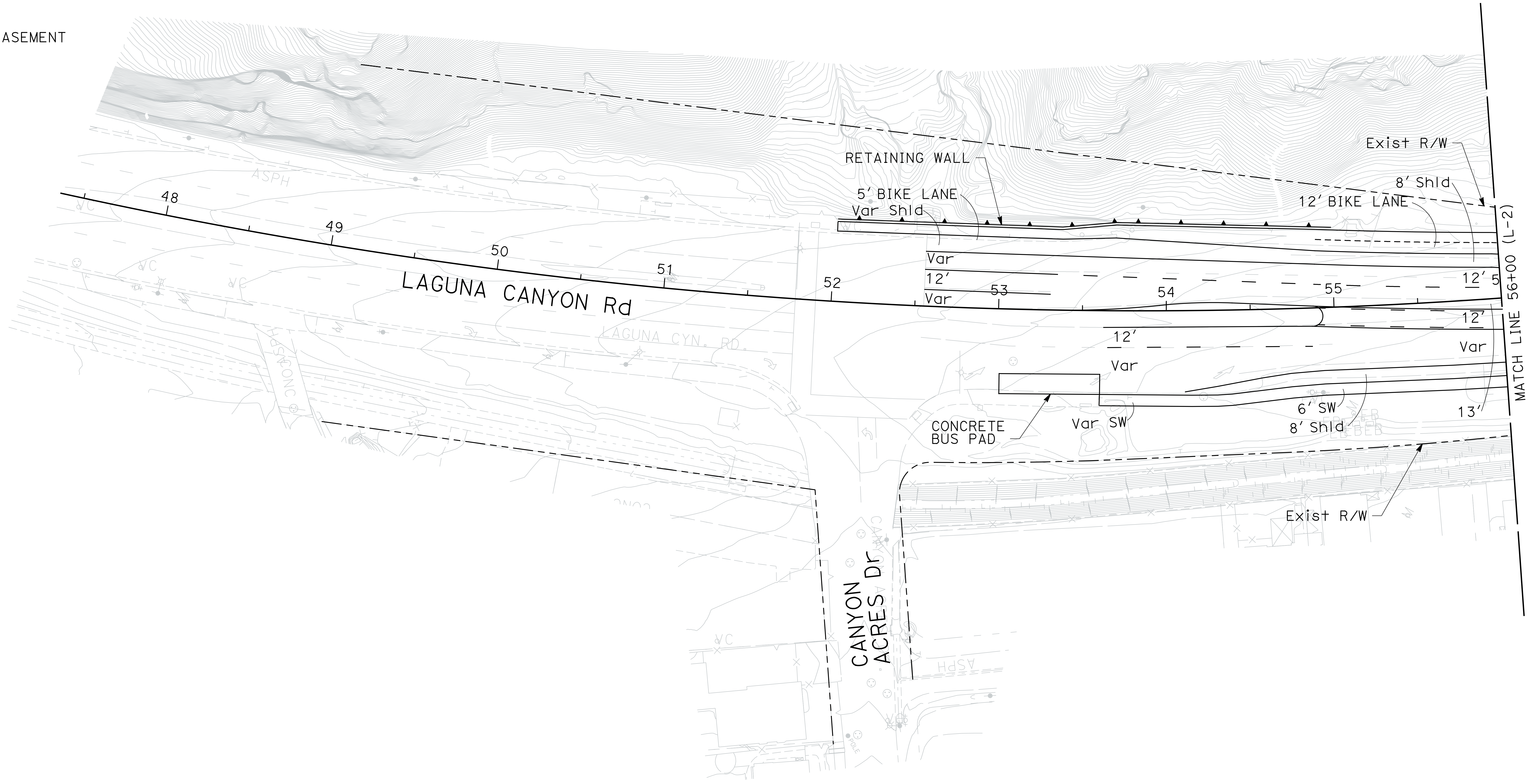
LEGEND:

—·—·—·	EXISTING RIGHT OF WAY
—— – ——	PROPOSED RIGHT OF WAY
— — —	TEMPORARY CONSTRUCTION EASEMENT
▩	RIGHT-OF-WAY REQUIREMENT
▨	TEMPORARY CONSTRUCTION EASEMENT

ABBREVIATIONS:

Exist	EXISTING
Prop	PROPOSED
R/W	RIGHT OF WAY
Shld	SHOULDER
SW	SIDEWALK
TCE	TEMPORARY CONSTRUCTION EASEMENT
Var	VARIABLE



LAYOUT
ALTERNATIVE 2

SCALE: 1" = 40'

L-1

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UNIT 0000

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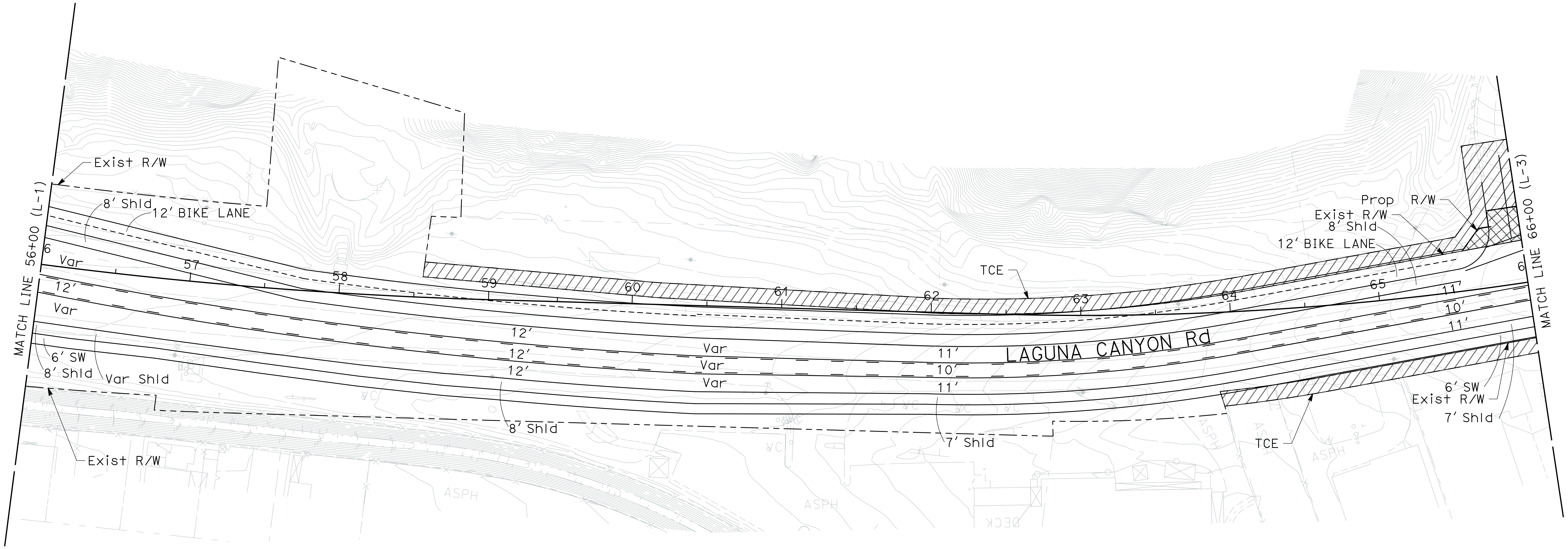

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UNIT 0000

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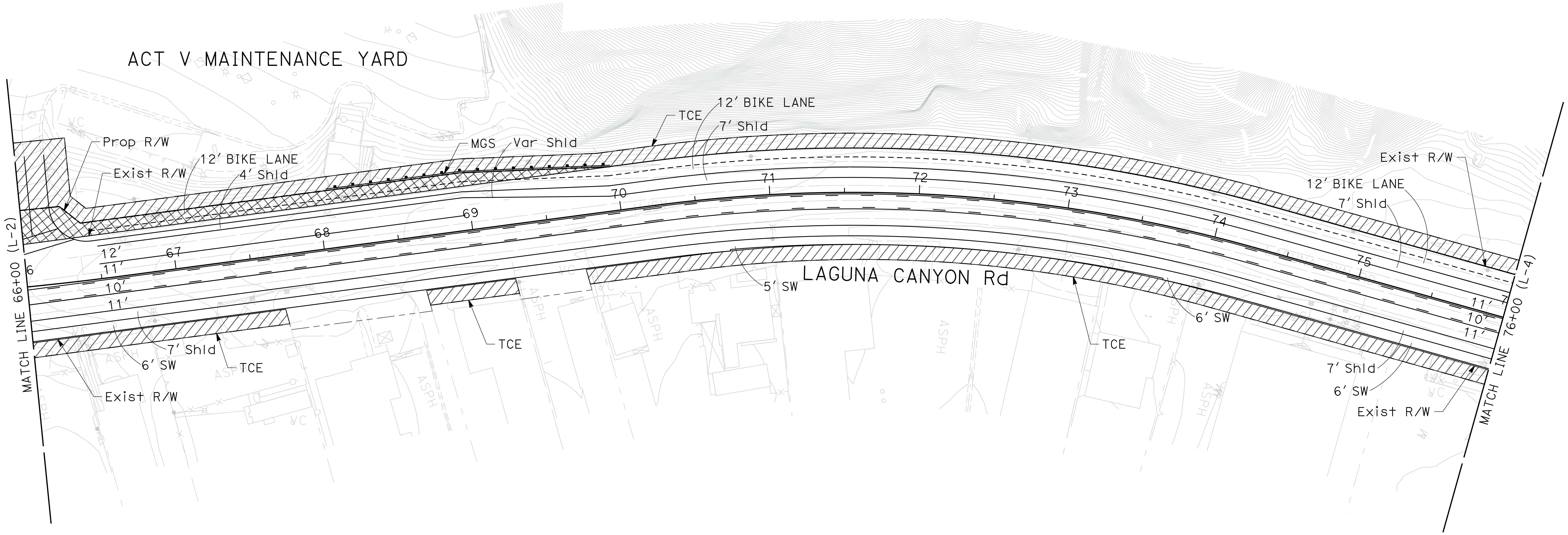

LAYOUT
ALTERNATIVE 2

SCALE: 1" = 40'

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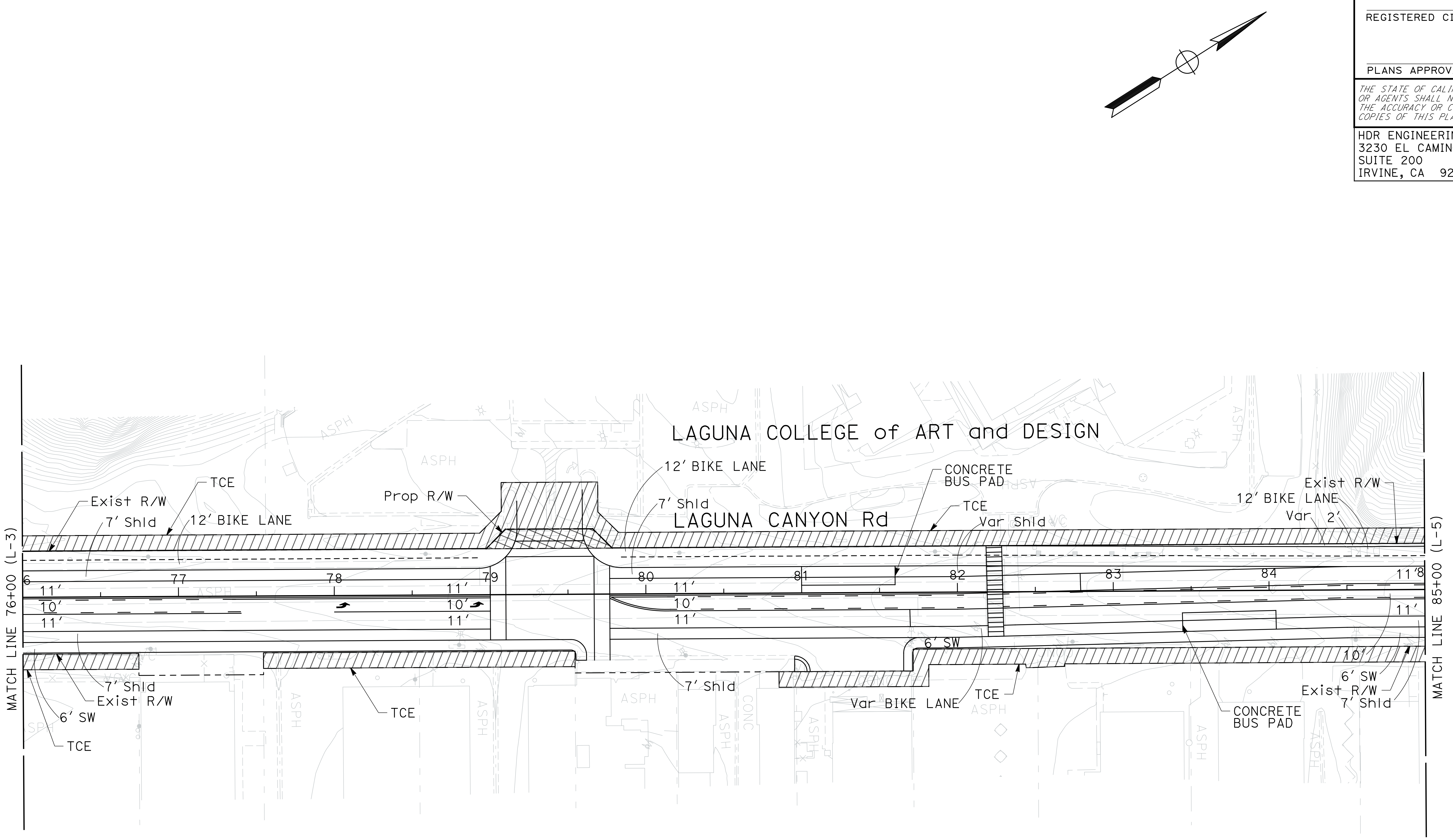

LAYOUT
ALTERNATIVE 2

SCALE: 1" = 40'

L-4

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UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

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PLANS APPROVAL DATE

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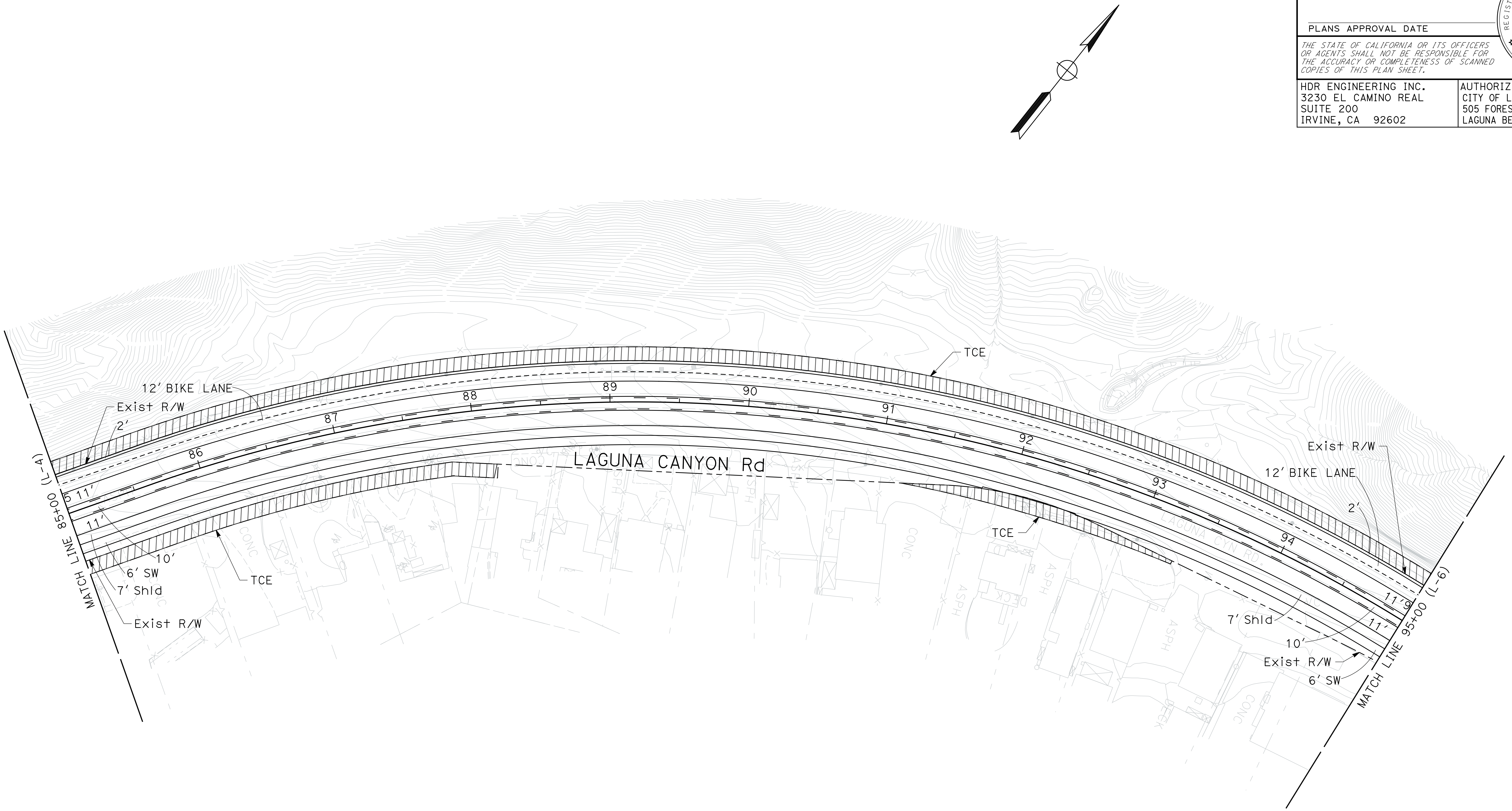

LAYOUT
ALTERNATIVE 2

SCALE: 1" = 40'

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PROJECT NUMBER & PHASE 12000Q670

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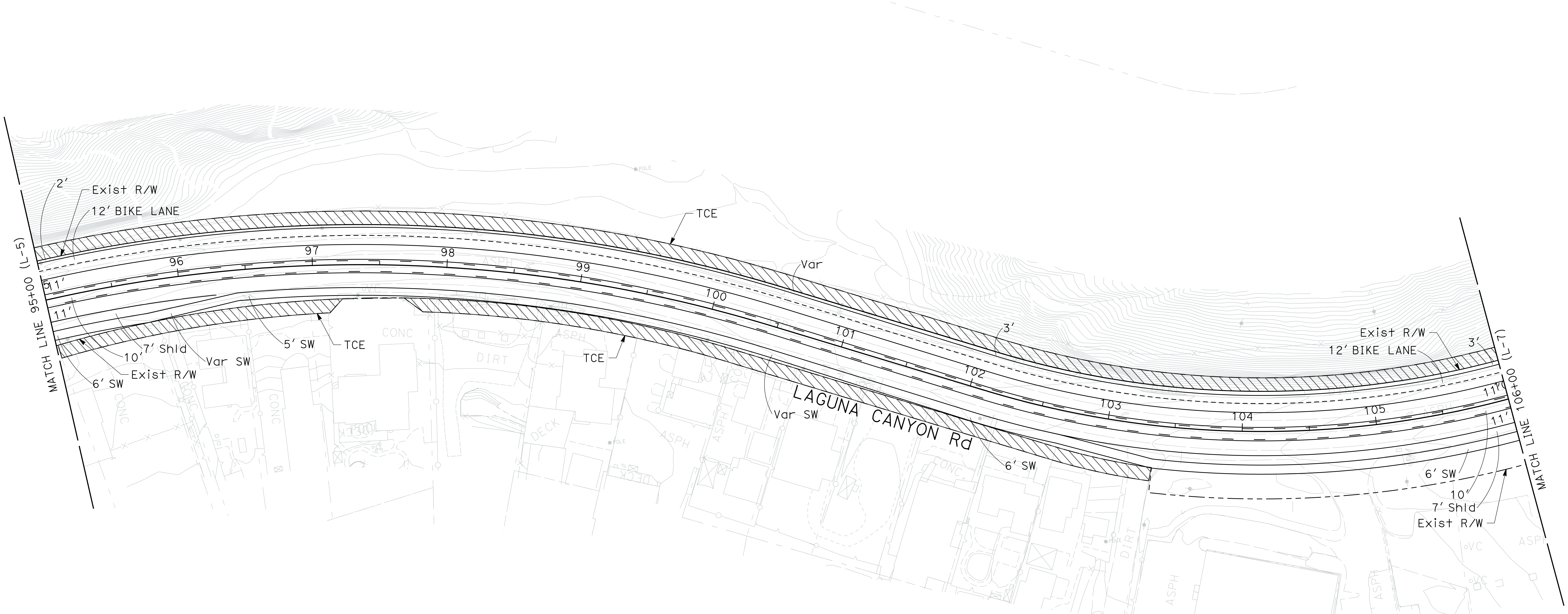

LAYOUT
ALTERNATIVE 2

SCALE: 1" = 40'

L-6

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UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

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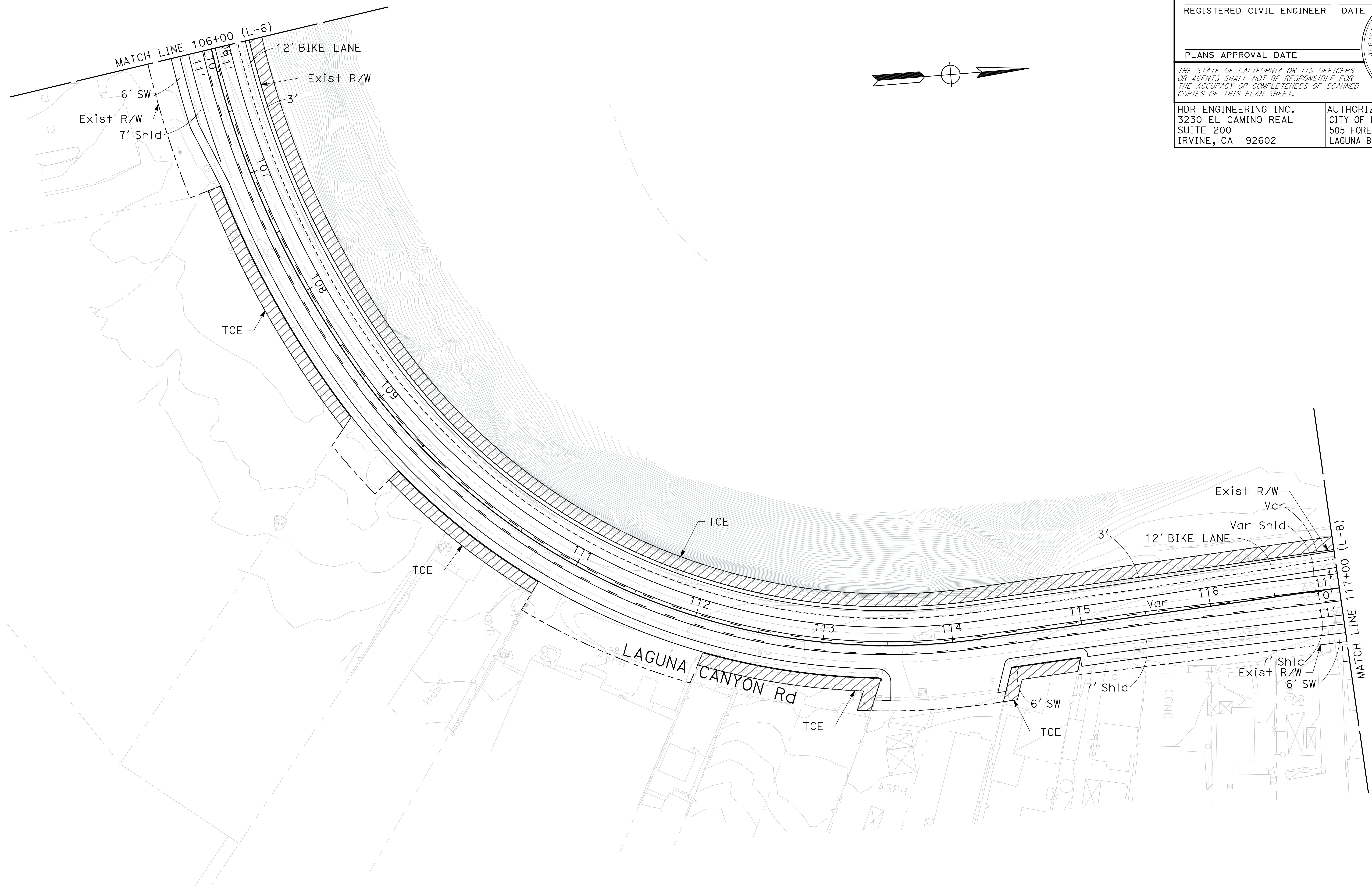

LAYOUT ALTERNATIVE 2

SCALE: 1" = 40'

L-7

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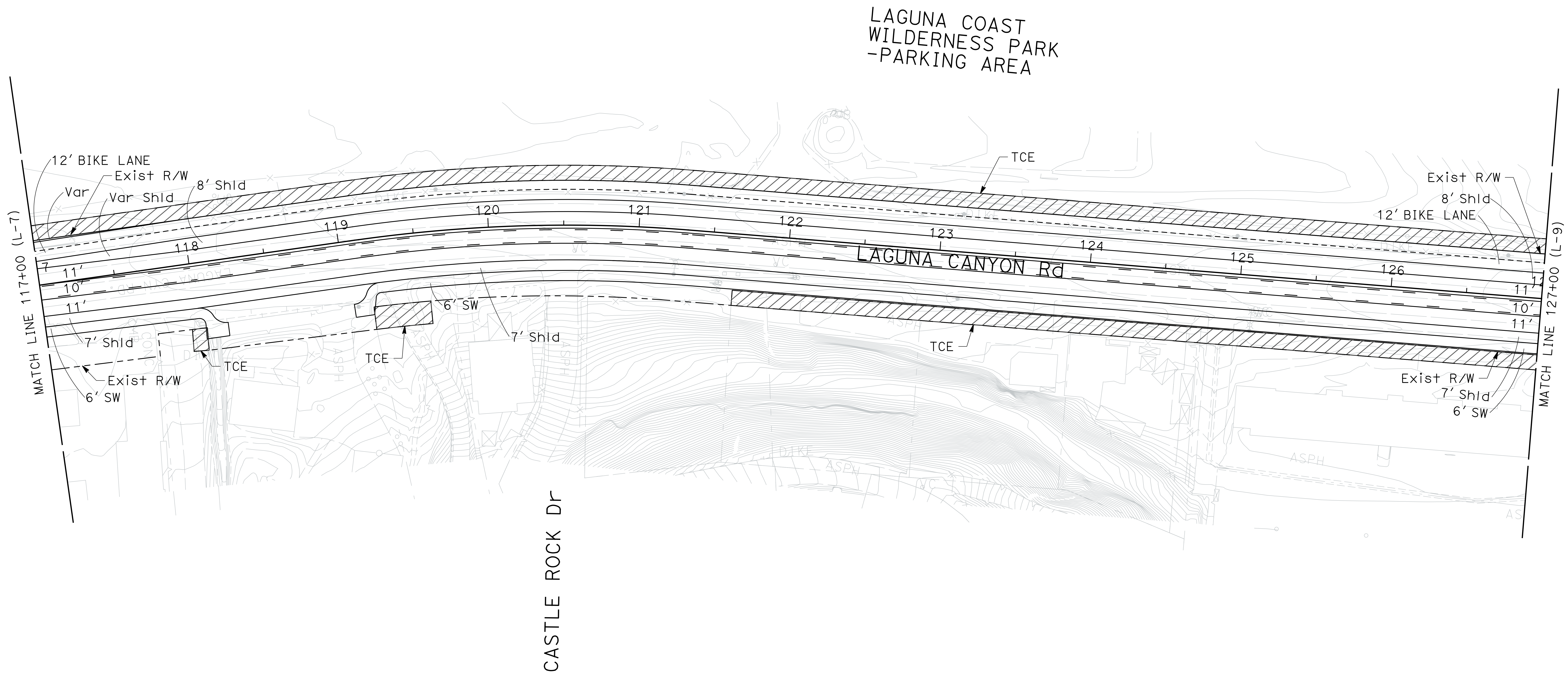

LAYOUT
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SCALE: 1" = 40'

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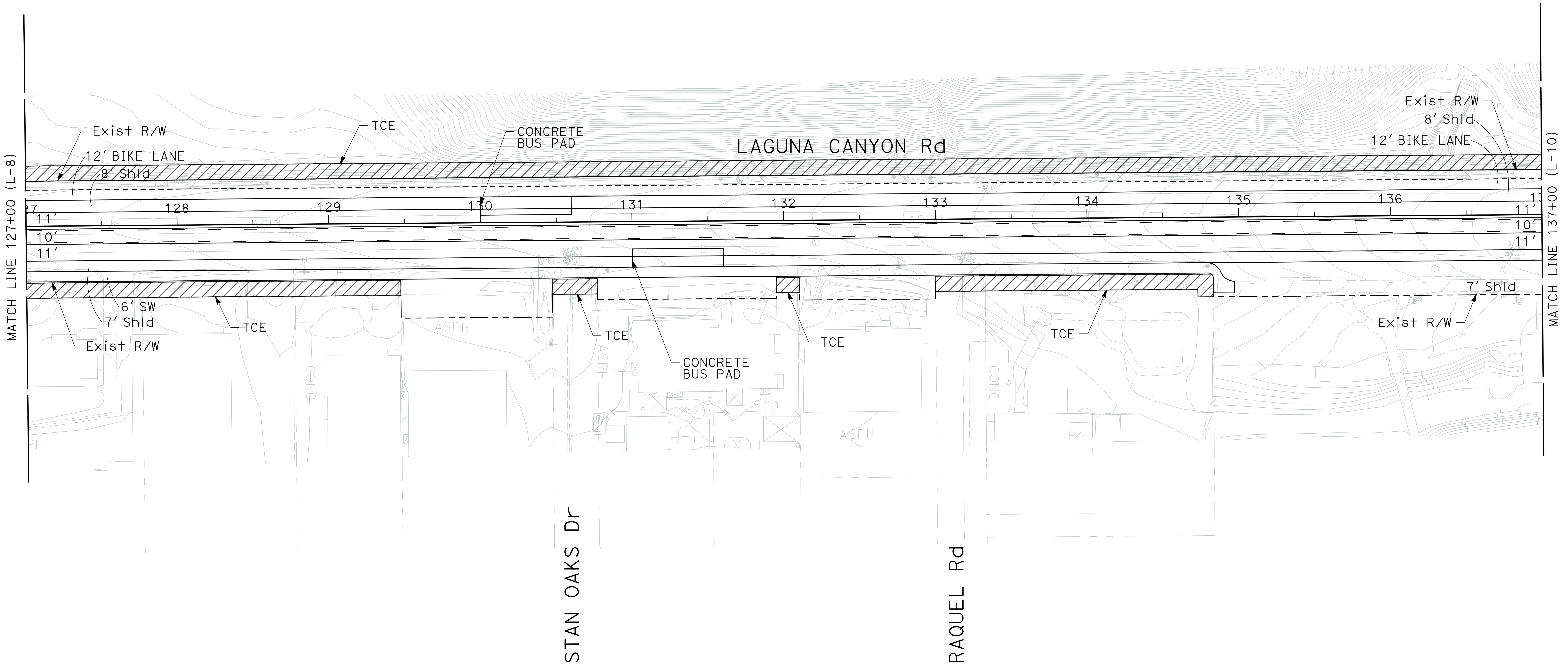

LAYOUT
ALTERNATIVE 2

SCALE: 1" = 40'

L-9

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UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

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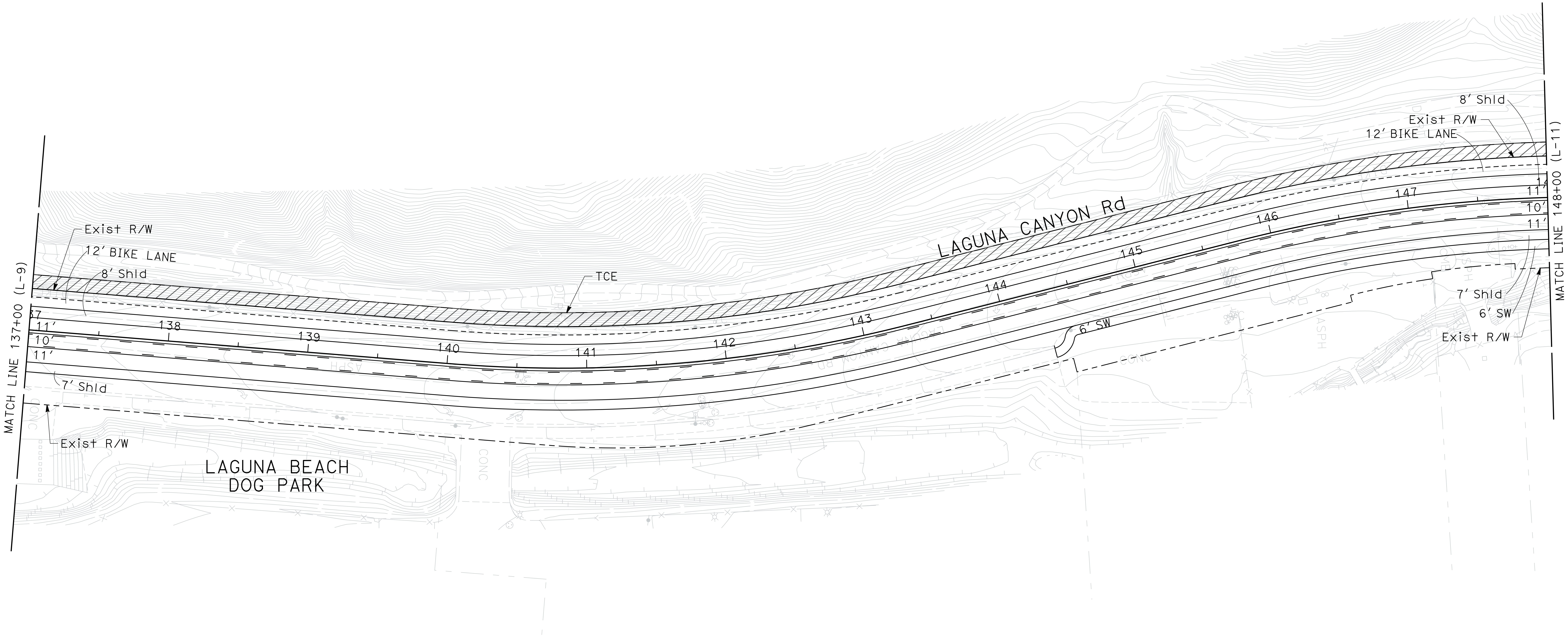

LAYOUT
ALTERNATIVE 2

SCALE: 1" = 40'

L-10

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UNIT 0000

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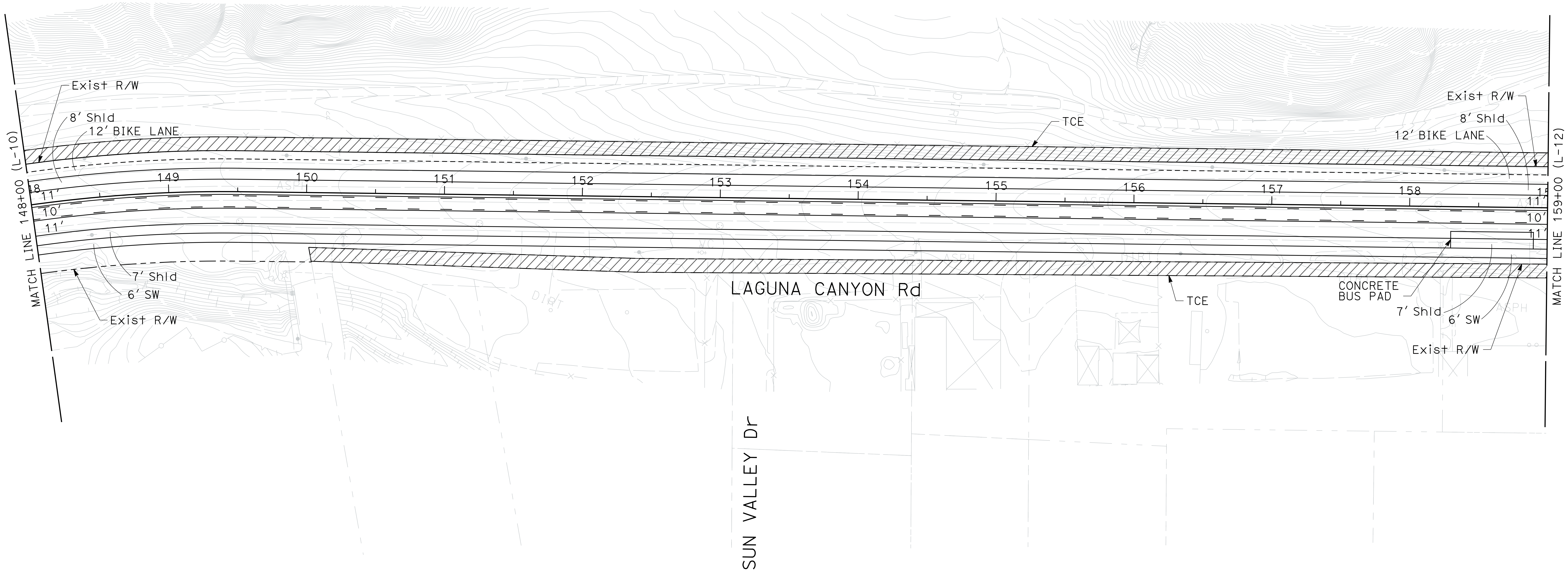

LAYOUT
ALTERNATIVE 2

SCALE: 1" = 40'

L-11

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0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE
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SUITE 200
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CITY OF LAGUNA BEACH
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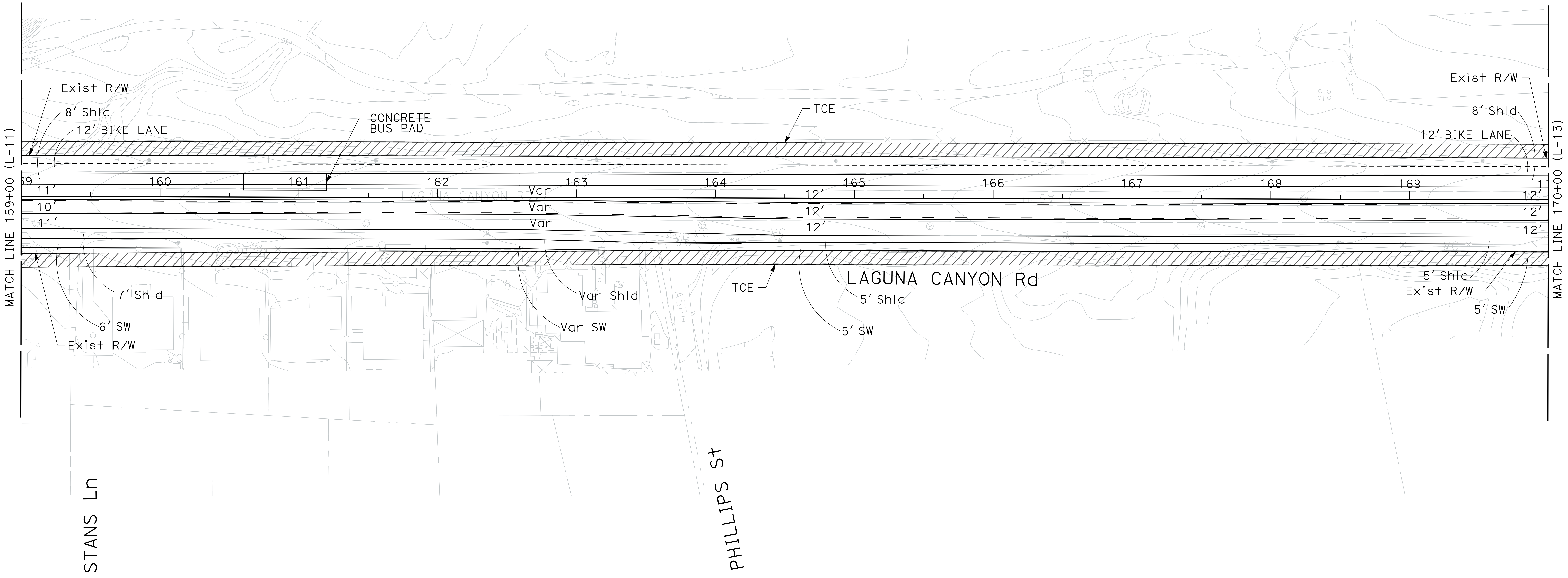
LAGUNA BEACH, CA 92651-2394



LAYOUT
ALTERNATIVE 2

SCALE: 1" = 40'

L-12

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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CALCULATED-DESIGNED BY	CHECKED BY
NAME	STEVE CROUCH
REVISED BY	DATE REVISED

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DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

GIRAIR KOTCHIAN
No. C64212
Exp.
CIVIL

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CALCULATED-DESIGNED BY	CHECKED BY
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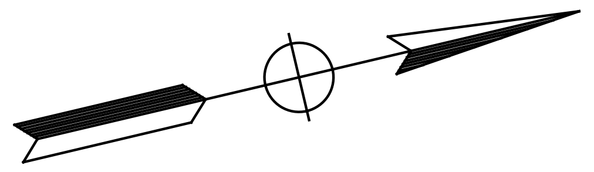

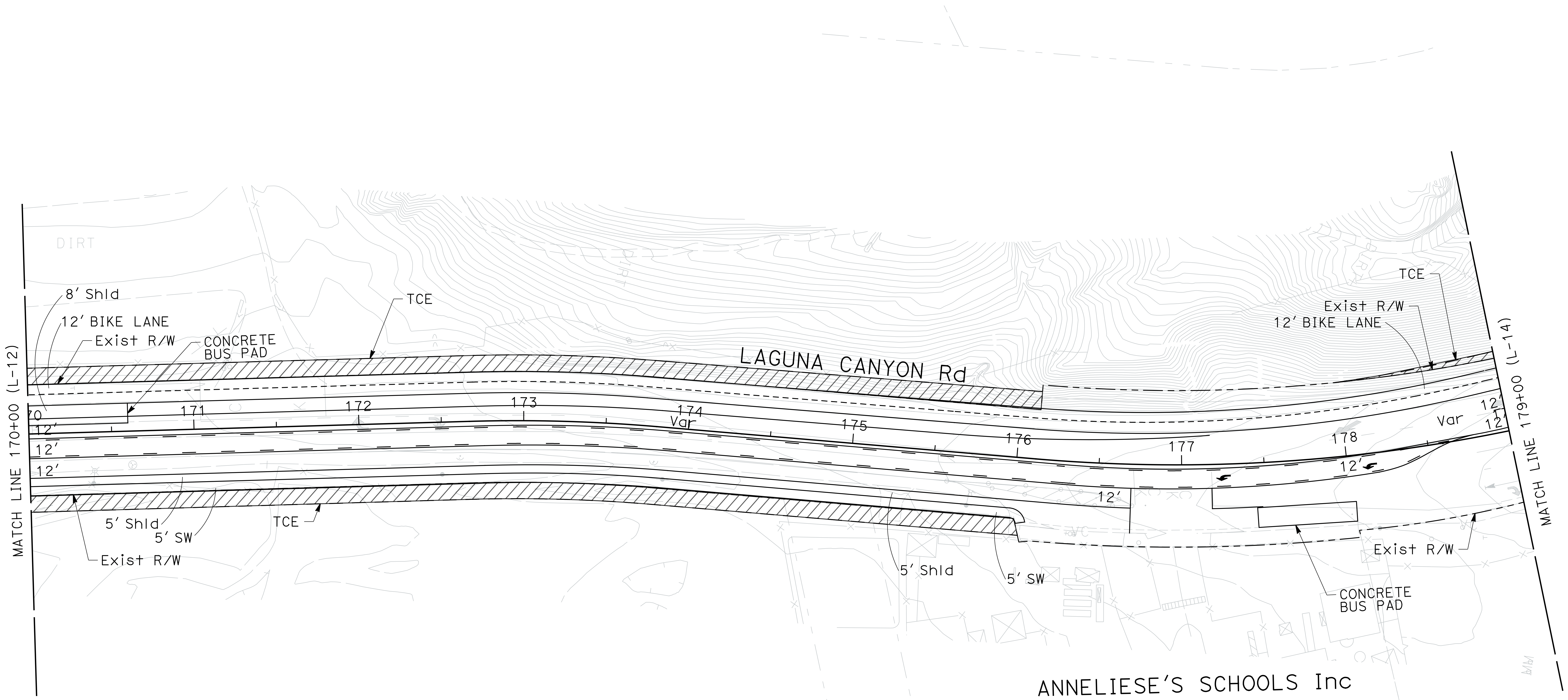

LAYOUT ALTERNATIVE 2

SCALE: 1" = 40'

L-13

LAST REVISION 00-00-00
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010
USERNAME => $USER
DGN FILE => $REQUEST
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.96/3.41	X	X

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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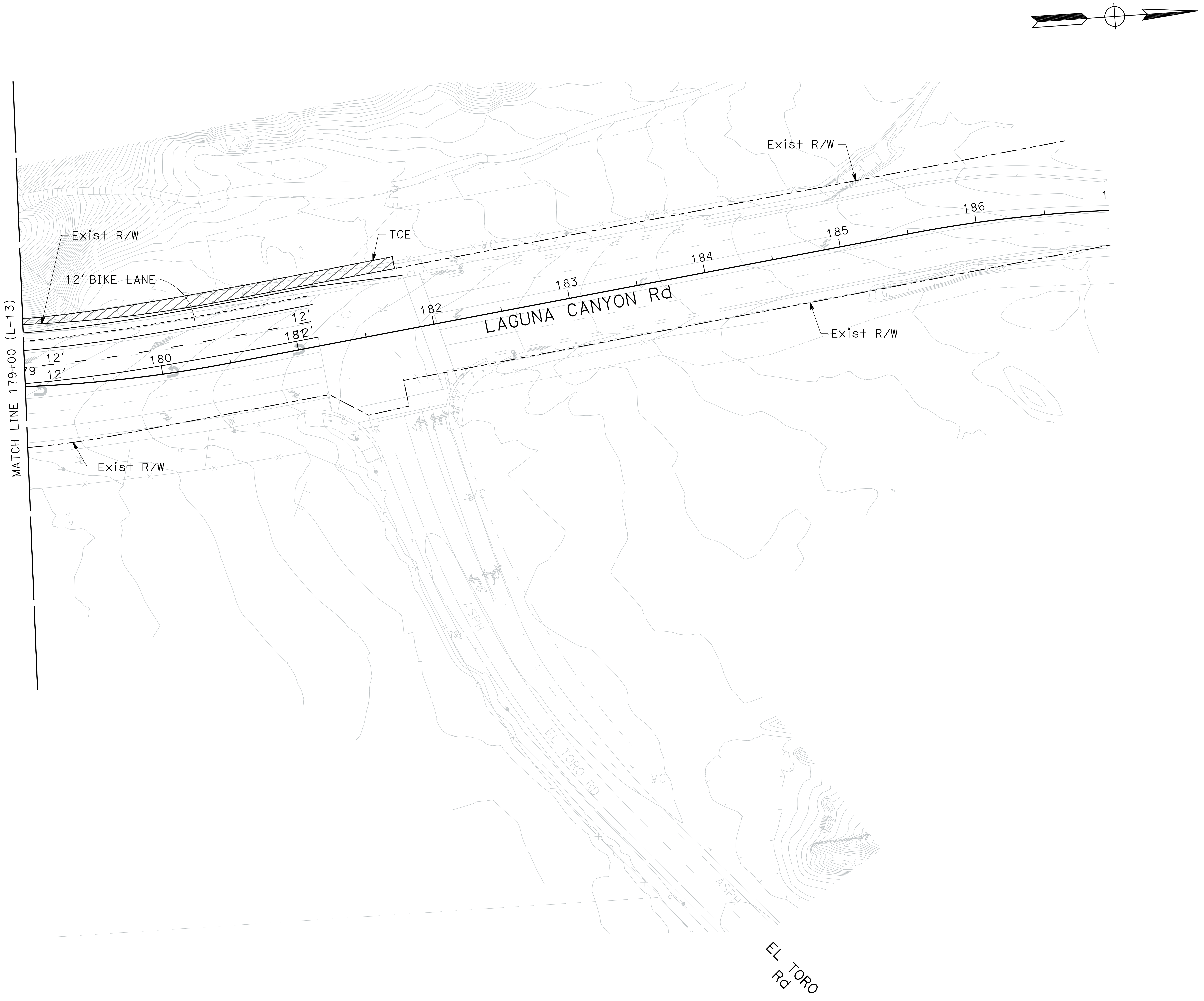

LAYOUT
ALTERNATIVE 2

SCALE: 1" = 40'

L-14

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DATE PLOTTED => $DATE
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USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
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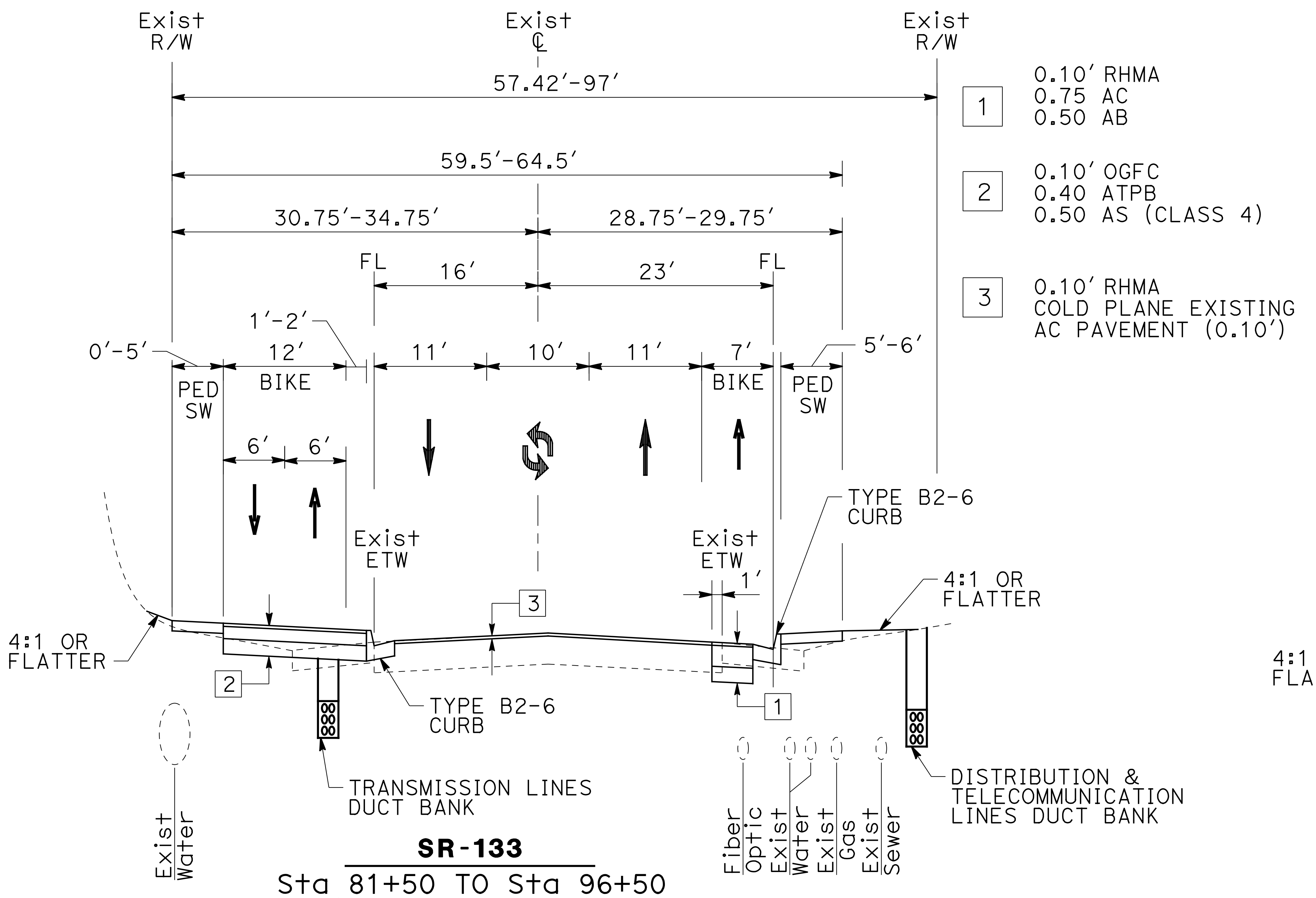
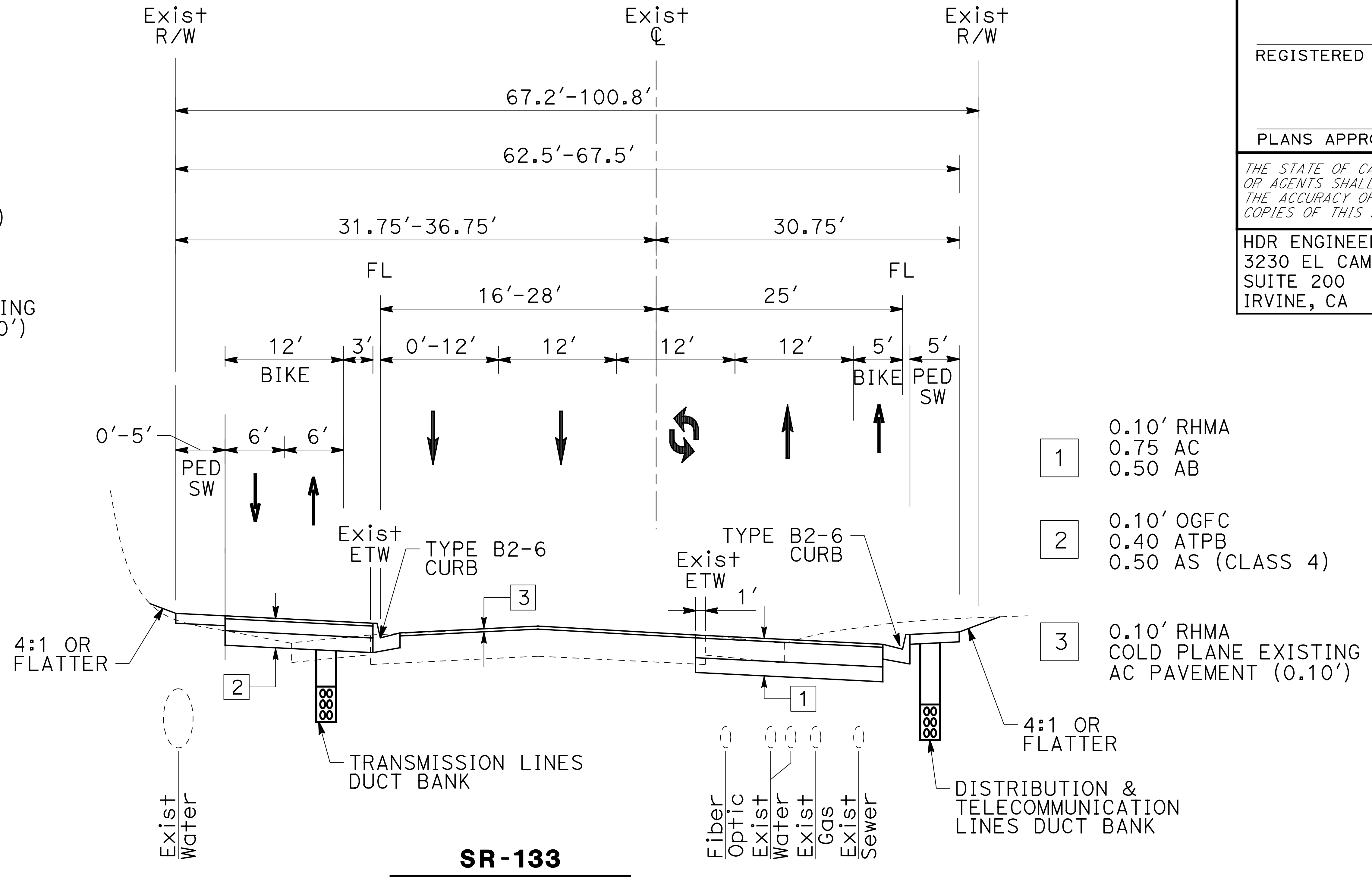
NOTES:

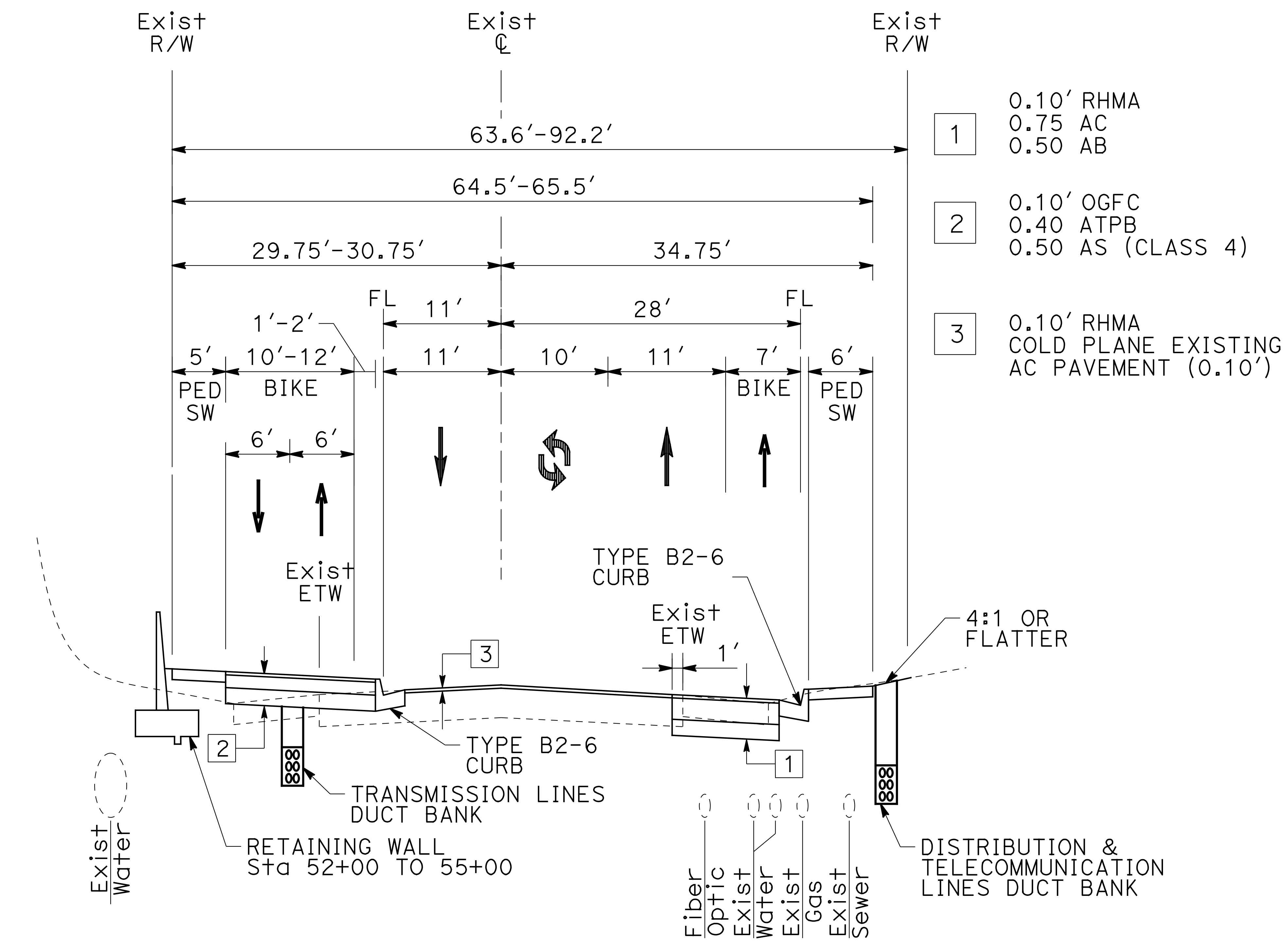
1. EXIST UNDERGOUND UTILITIES LOCATION SHOWN ARE APPROXIMATE. CLEARANCE TO EXIST UNDERGOUND UTILITIES TO BE DETERMINED.



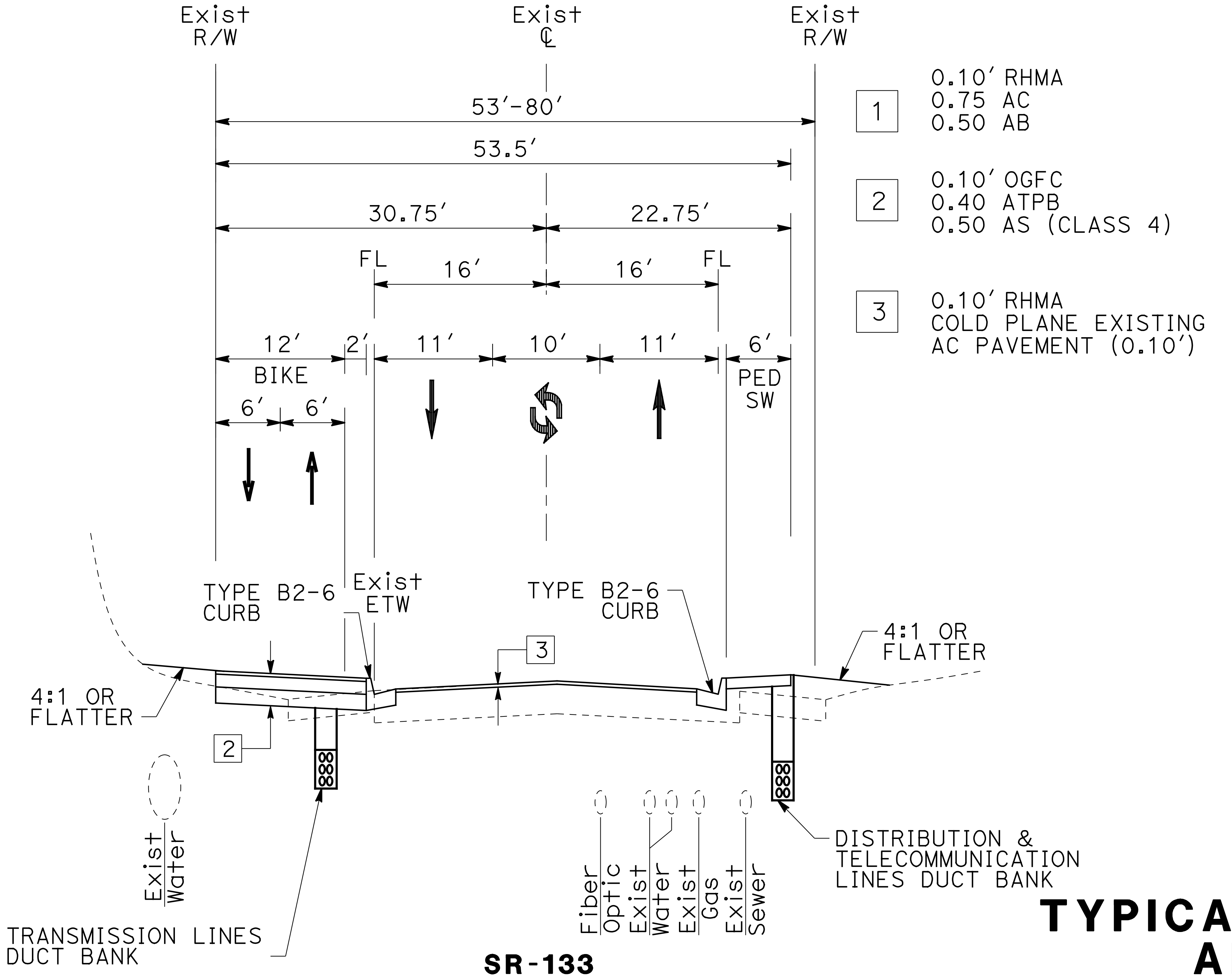
SR-133
Sta 81+50 TO Sta 96+50
Sta 102+50 TO Sta 107+00
Sta 115+00 TO Sta 118+00



SR-133
Sta 164+60 TO Sta 180+00



SR-133
Sta 53+00 TO Sta 81+50
Sta 118+00 TO Sta 164+60



SR-133
Sta 96+50 TO Sta 102+50
Sta 107+00 TO Sta 115+00

TYPICAL CROSS SECTIONS
ALTERNATIVE 3

NO SCALE

X-1

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TIME PLOTTED => $TIME

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USERNAME => $USER
DGN FILE => $REQUEST
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0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE
120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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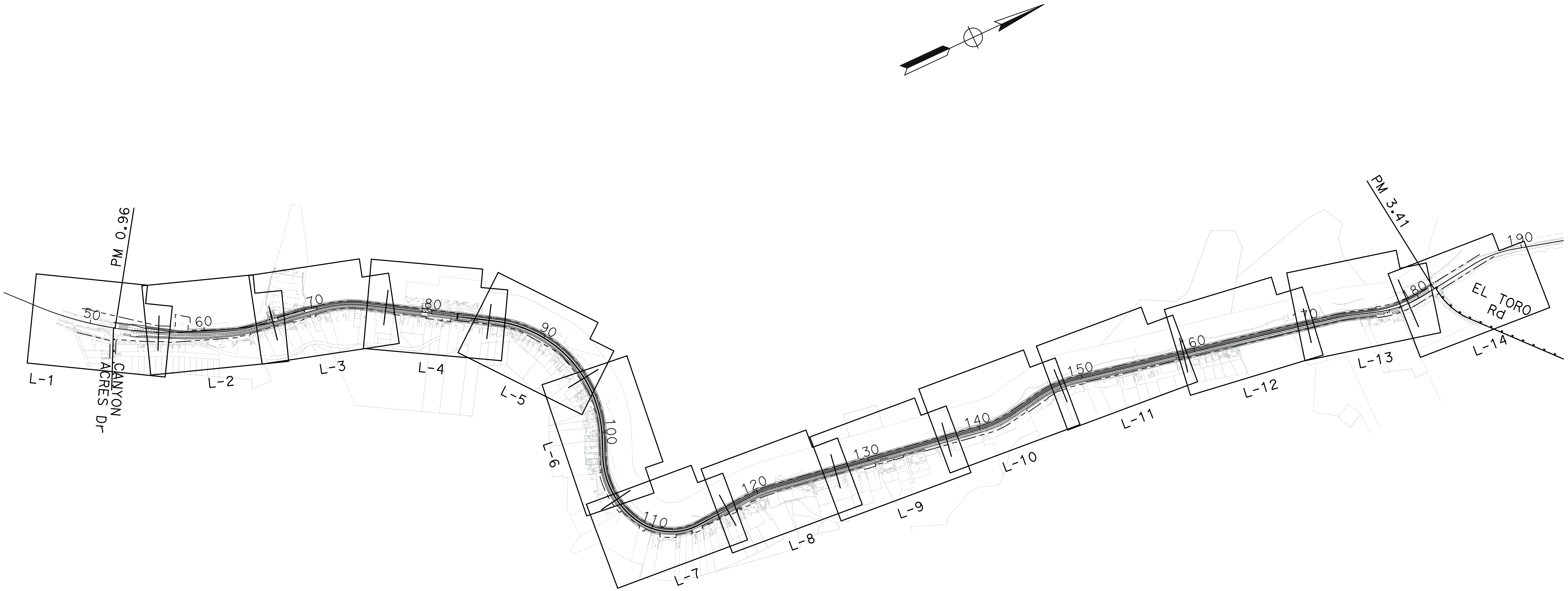

KEY MAP
ALTERNATIVE 3

NOT TO SCALE

K-1

11/16/2018

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TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
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UNIT 0000

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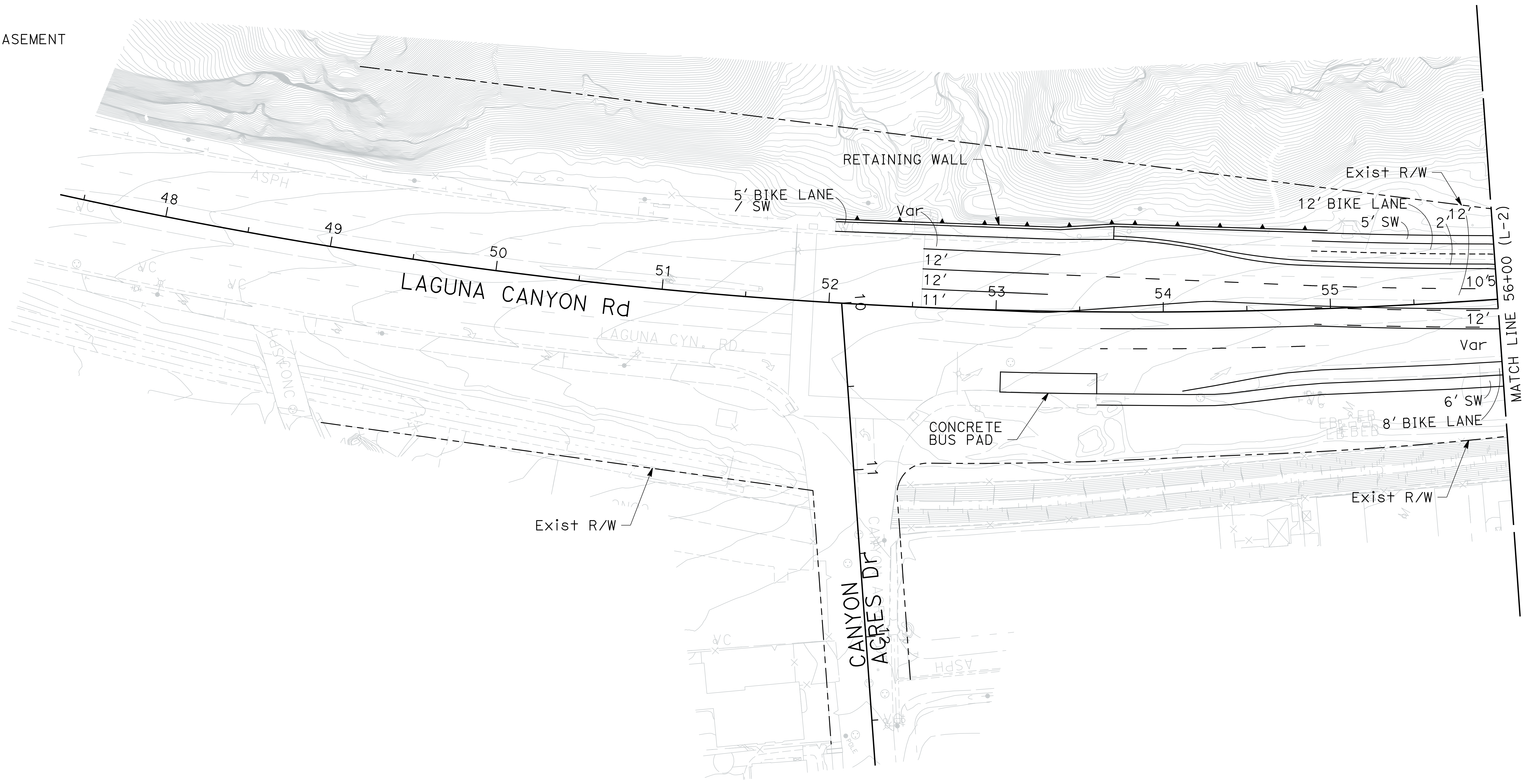
LEGEND:

—·—·—·—	EXISTING RIGHT OF WAY
——·——·——	PROPOSED RIGHT OF WAY
— — — —	TEMPORARY CONSTRUCTION EASEMENT
▩	RIGHT-OF-WAY REQUIREMENT
▨	TEMPORARY CONSTRUCTION EASEMENT

ABBREVIATIONS:

Exist	EXISTING
Prop	PROPOSED
R/W	RIGHT OF WAY
Shld	SHOULDER
SW	SIDEWALK
TCE	TEMPORARY CONSTRUCTION EASEMENT
Var	VARIABLE



LAYOUT ALTERNATIVE 3

SCALE: 1" = 40′

L-1

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USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

LAST REVISION 00-00-00
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER   DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
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STATE OF CALIFORNIA

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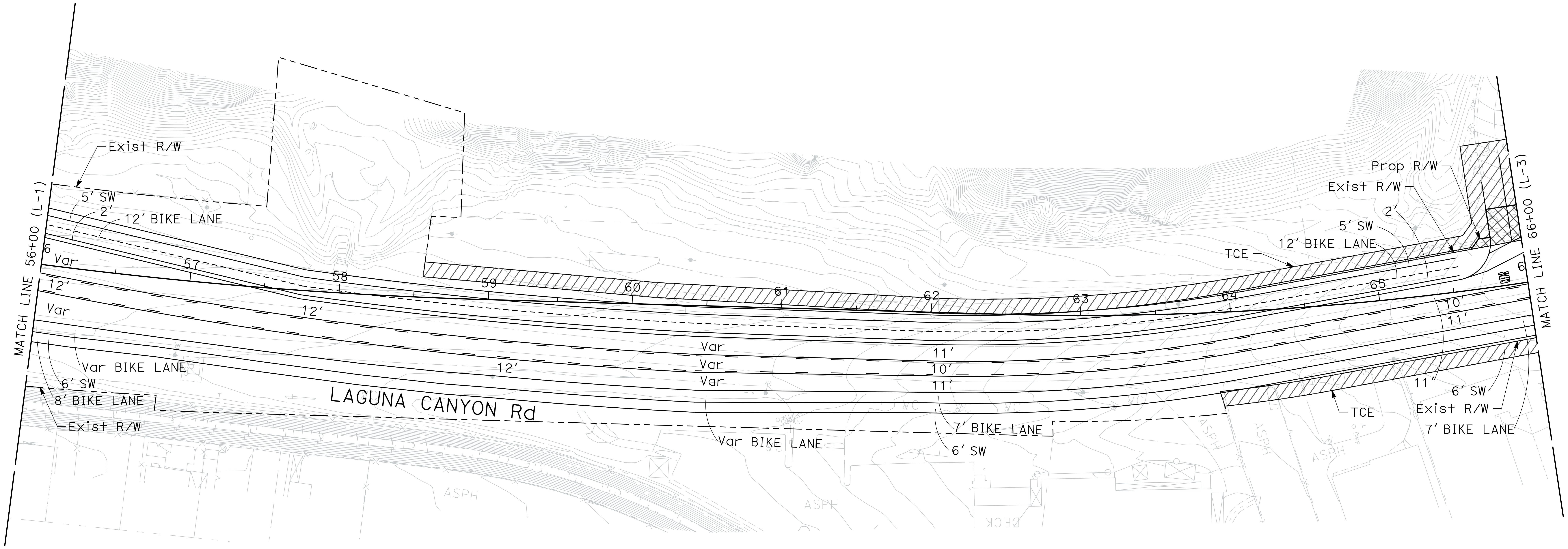

LAYOUT ALTERNATIVE 3

SCALE: 1" = 40'

L-2

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REVISED BY		DATE REVISED

LAST REVISION 00-00-00

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

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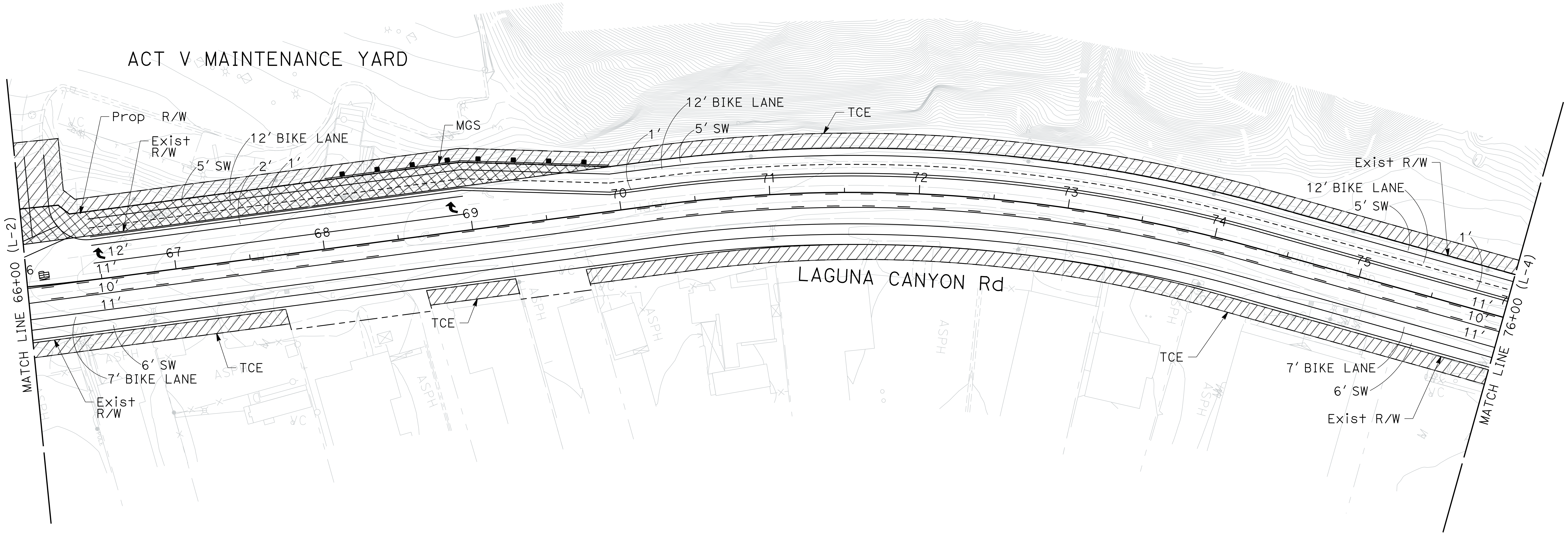

LAYOUT
ALTERNATIVE 3

SCALE: 1" = 40'

L-3

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DATE REVISED
NAME
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GIRAIR KOTCHIAN

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TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010
USERNAME => $USER
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RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE
120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

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GIRAIR KOTCHIAN
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CIVIL
STATE OF CALIFORNIA

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NAME: STEVE CROUCH

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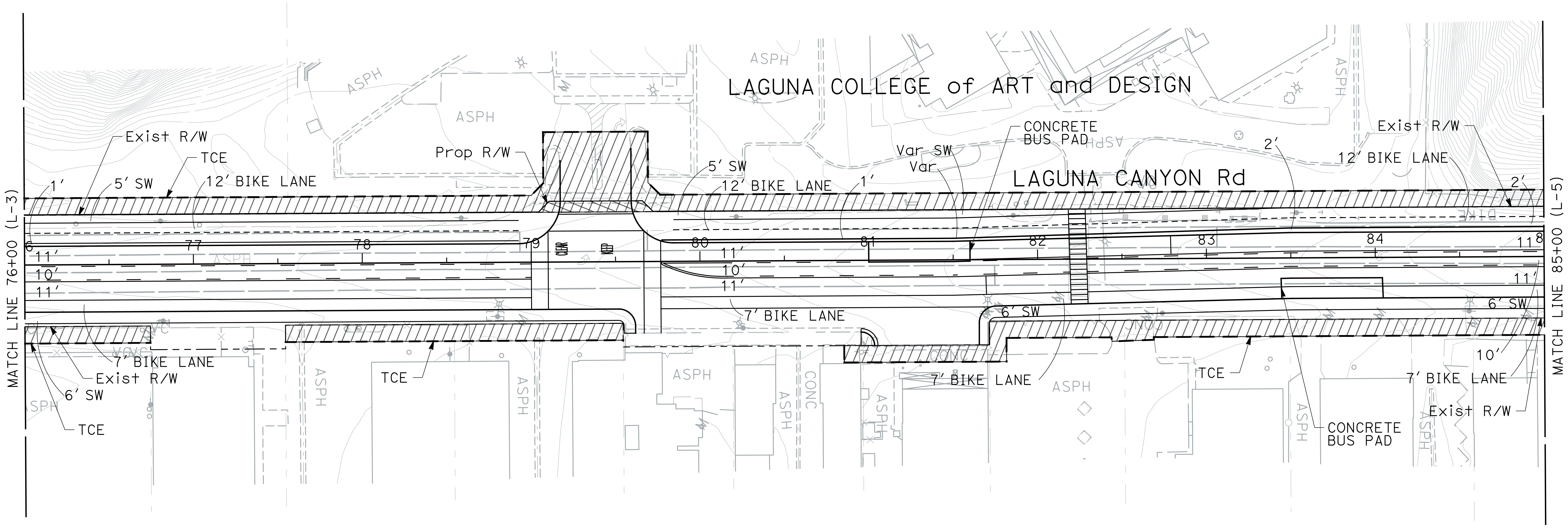

LAYOUT
ALTERNATIVE 3

SCALE: 1" = 40'

L-4

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BORDER LAST REVISED 7/2/2010

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UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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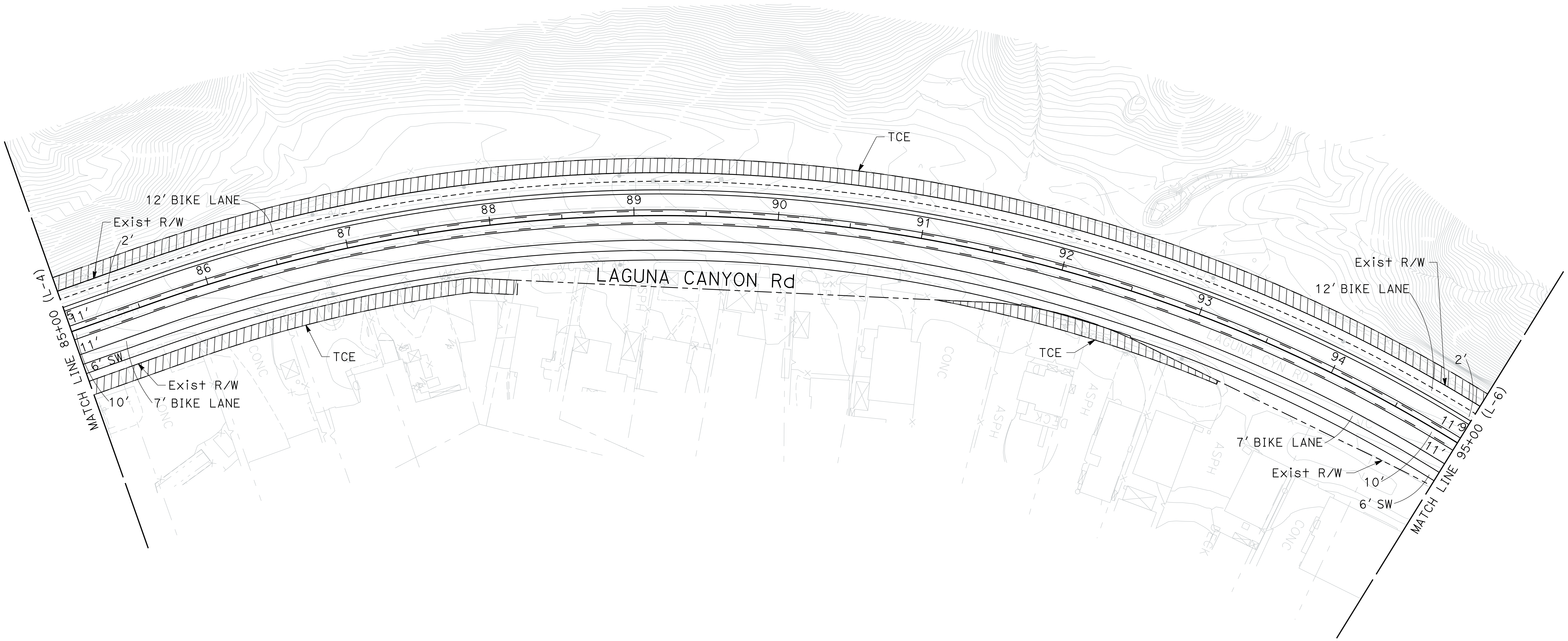

LAYOUT
ALTERNATIVE 3

SCALE: 1" = 40'

L-5

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USERNAME => $USER
DGN FILE => $REQUEST
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE 120000Q670

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DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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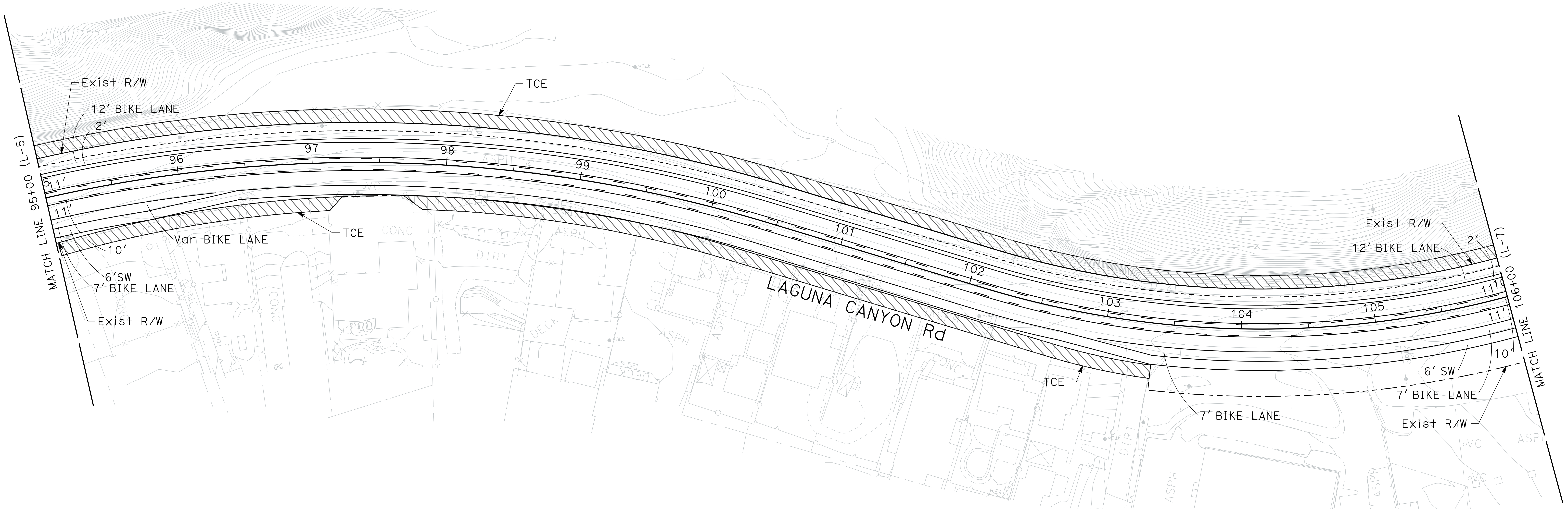

LAYOUT
ALTERNATIVE 3

SCALE: 1" = 40'

L-6

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TIME PLOTTED => $TIME

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USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 1200000670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
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No. C64212
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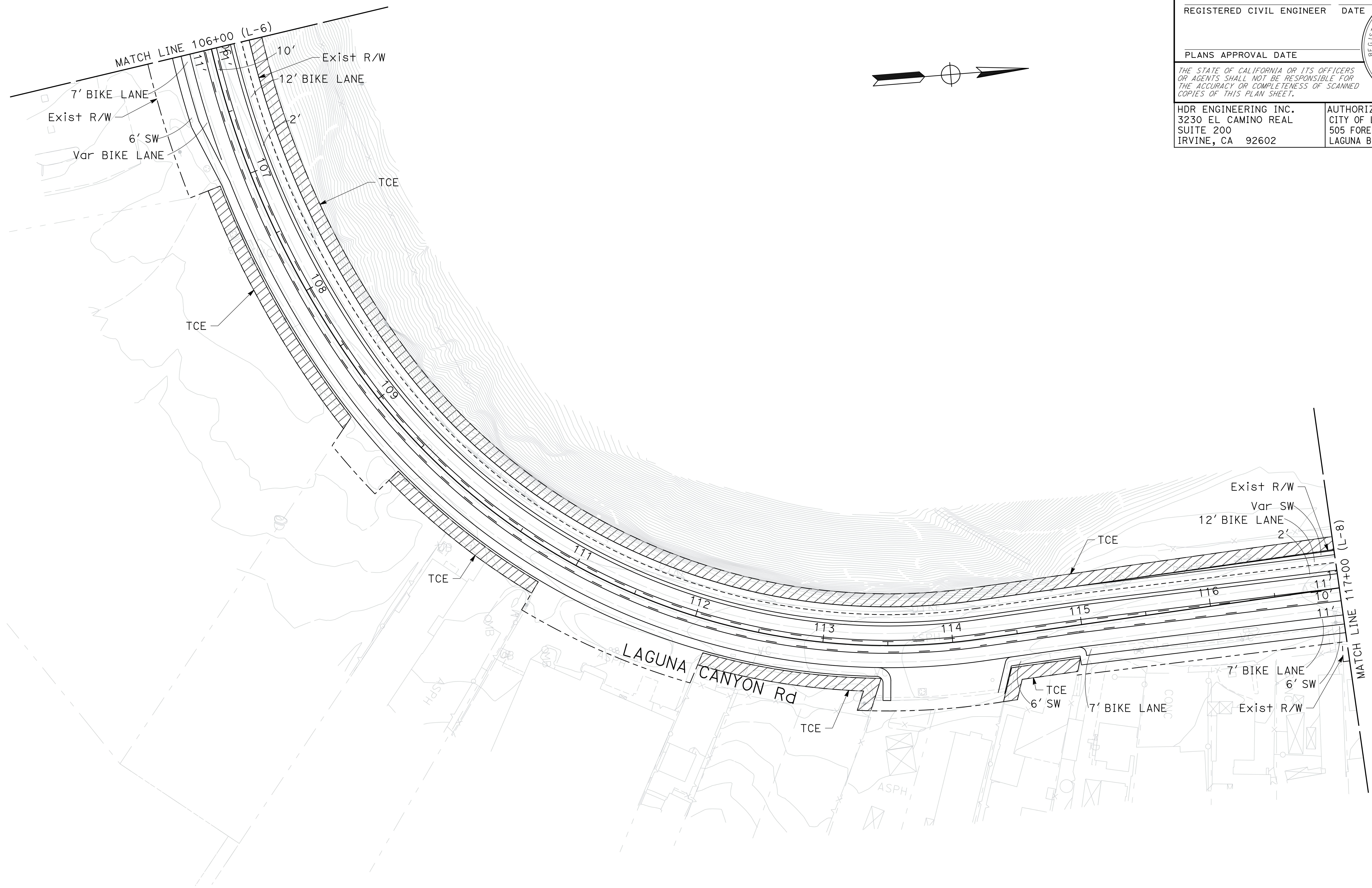

LAYOUT
ALTERNATIVE 3

SCALE: 1" = 40'

L-7

LAST REVISION 00-00-00

DATE PLOTTED => $DATE
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BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES

0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

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12	Ora	133	0.9/3.4	X	

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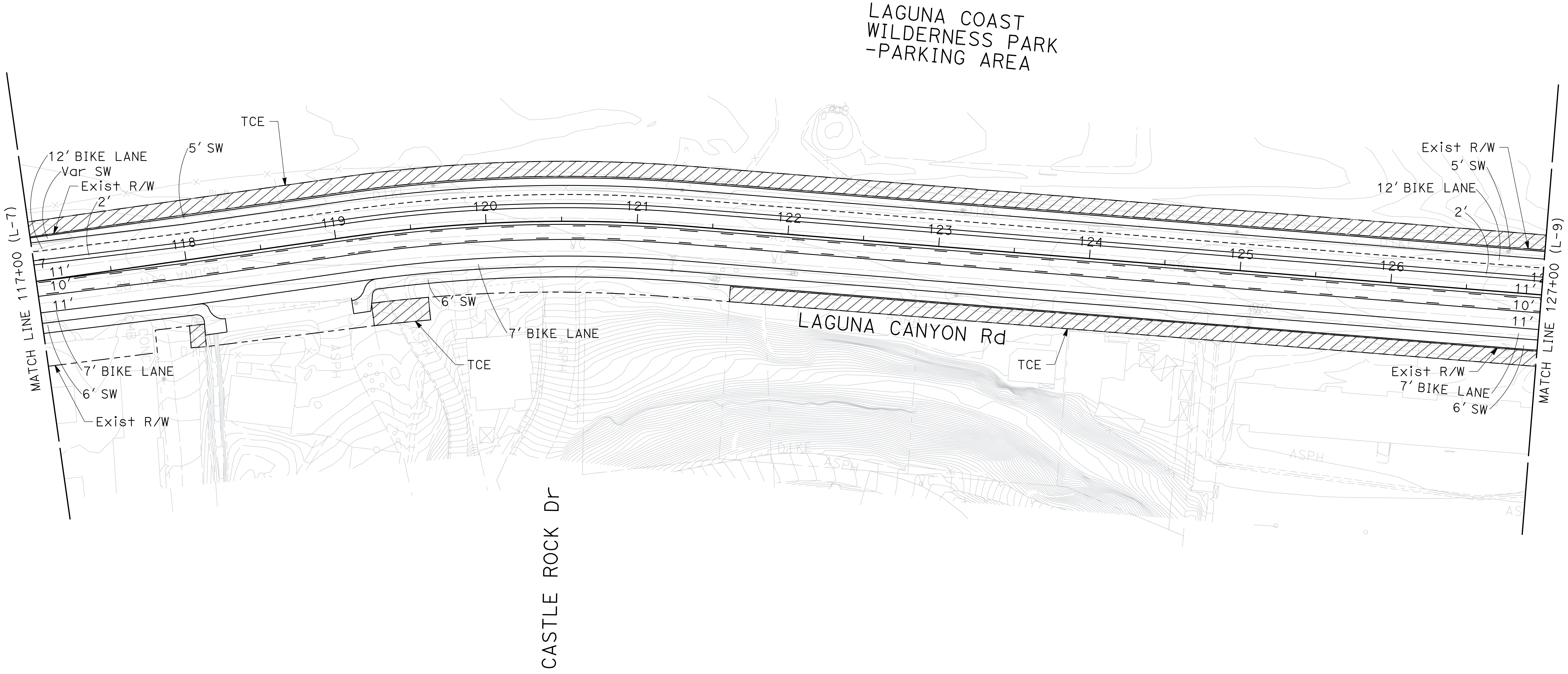

LAYOUT ALTERNATIVE 3

SCALE: 1" = 40'

L-8

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UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

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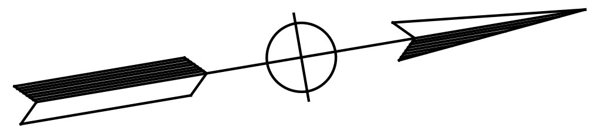

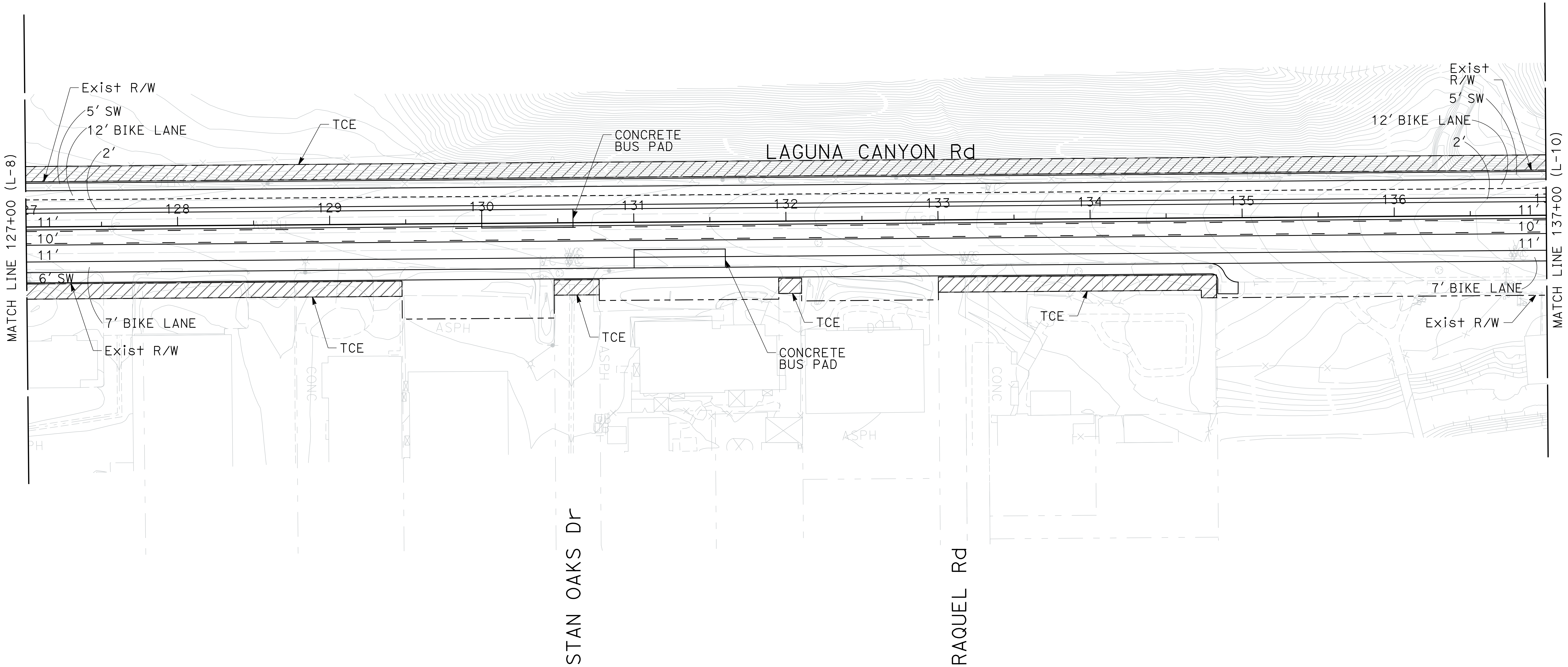

LAYOUT
ALTERNATIVE 3

SCALE: 1" = 40'

L-9

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DATE REVISED

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TIME PLOTTED => $TIME

LAST REVISION
00-00-00

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

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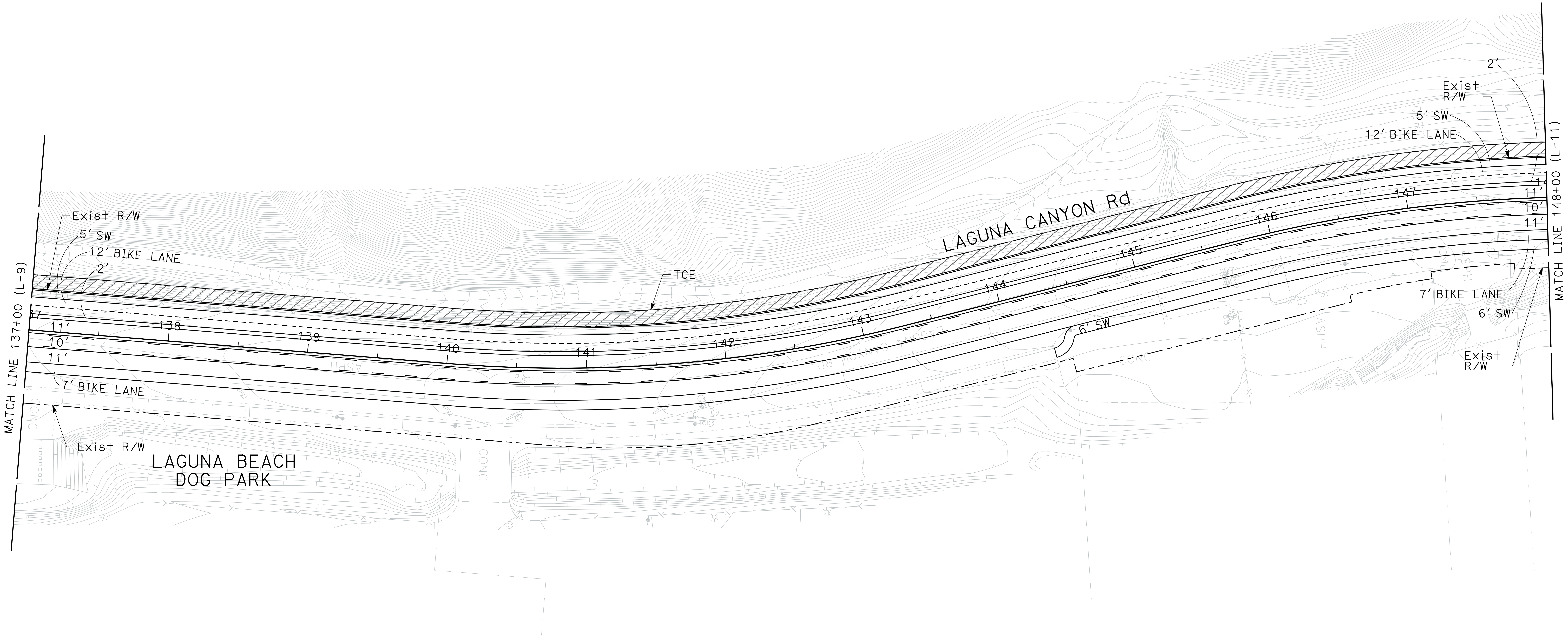
GIRAIR KOTCHIAN				

NAME: STEVE CROUCH



LAYOUT
ALTERNATIVE 3

SCALE: 1" = 40'

L-10

LAST REVISION 00-00-00

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	X

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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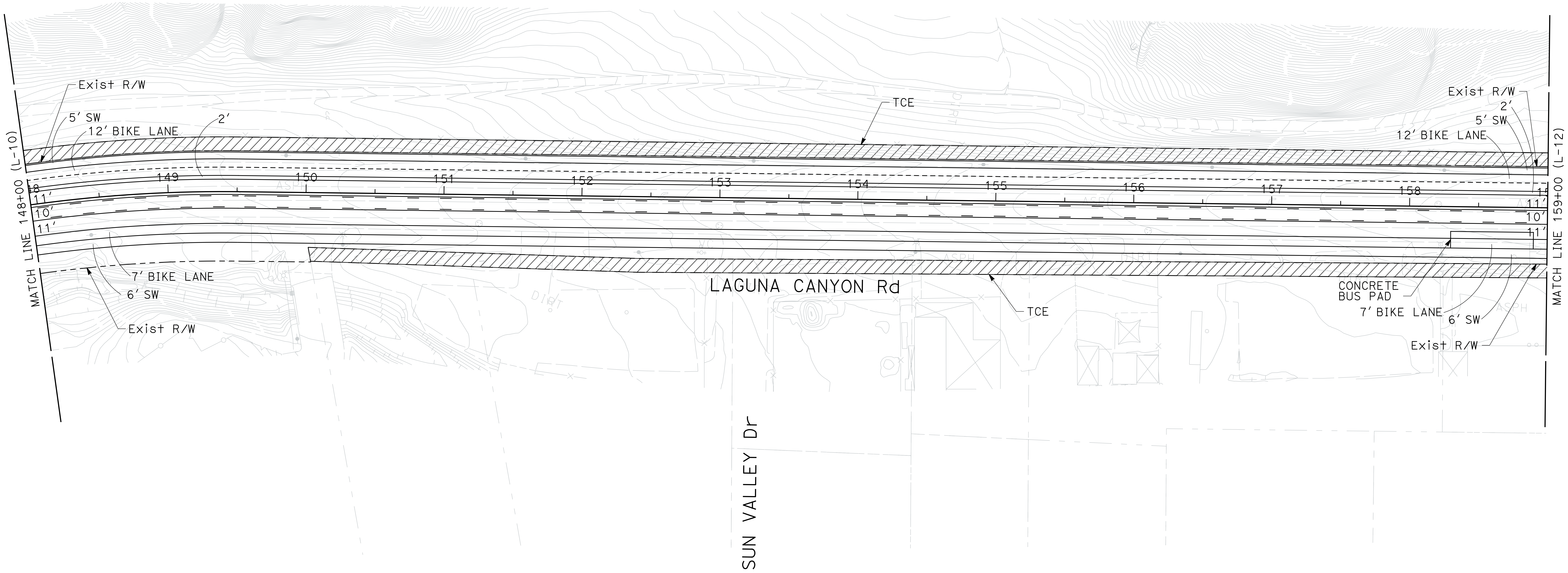

LAYOUT
ALTERNATIVE 3

SCALE: 1" = 40'

L-11

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TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010
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0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE 1200000670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
Exp.
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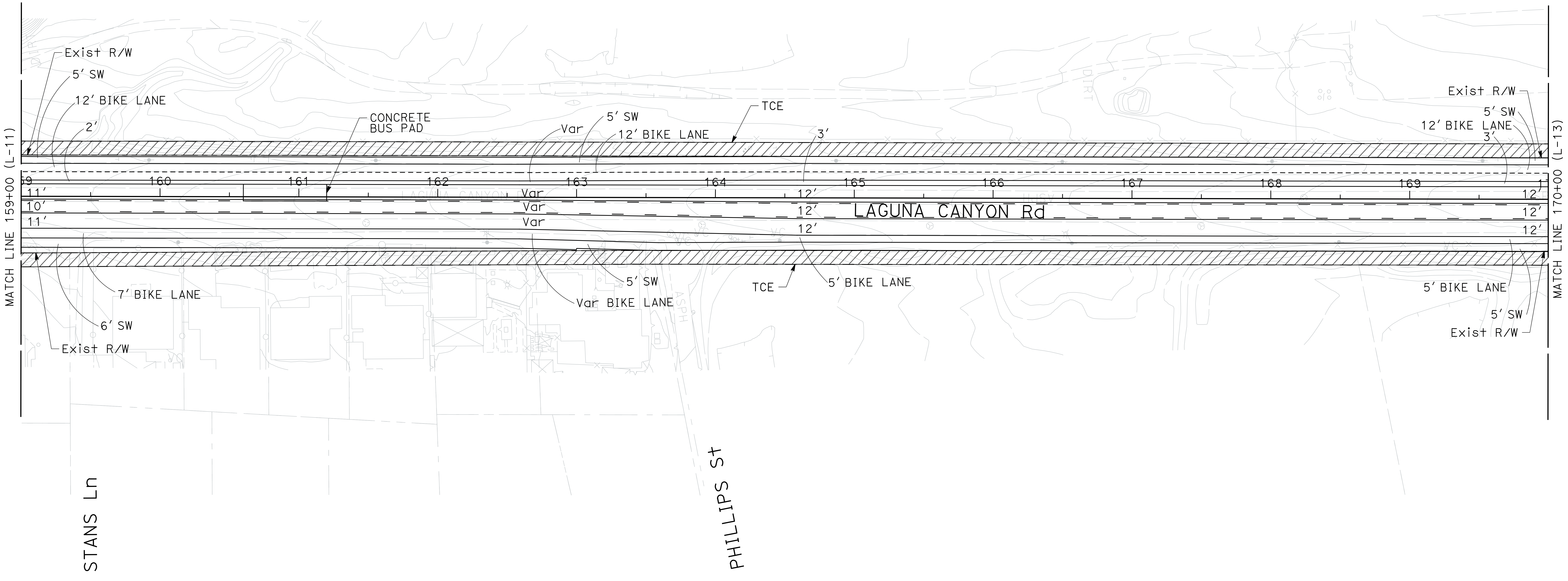

LAYOUT
ALTERNATIVE 3

SCALE: 1" = 40'

L-12

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NAME	STEVE CROUCH
REVISED BY	DATE REVISED

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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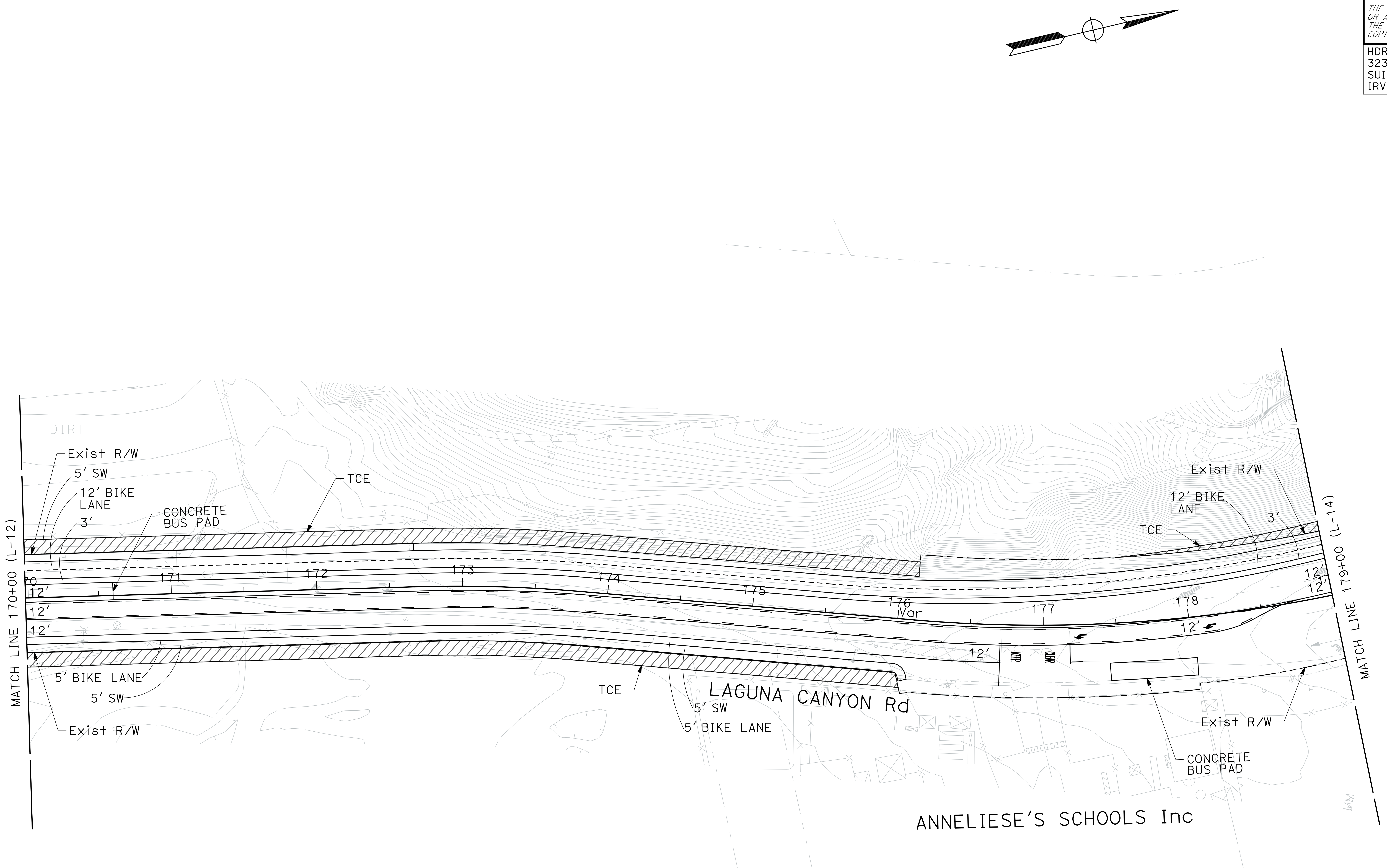

LAYOUT ALTERNATIVE 3

SCALE: 1" = 40'

L-13

BORDER LAST REVISED 7/2/2010

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RELATIVE BORDER SCALE IS IN INCHES

0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE

12000Q670

LAST REVISION 00-00-00

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	X

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
Exp.
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STATE OF CALIFORNIA

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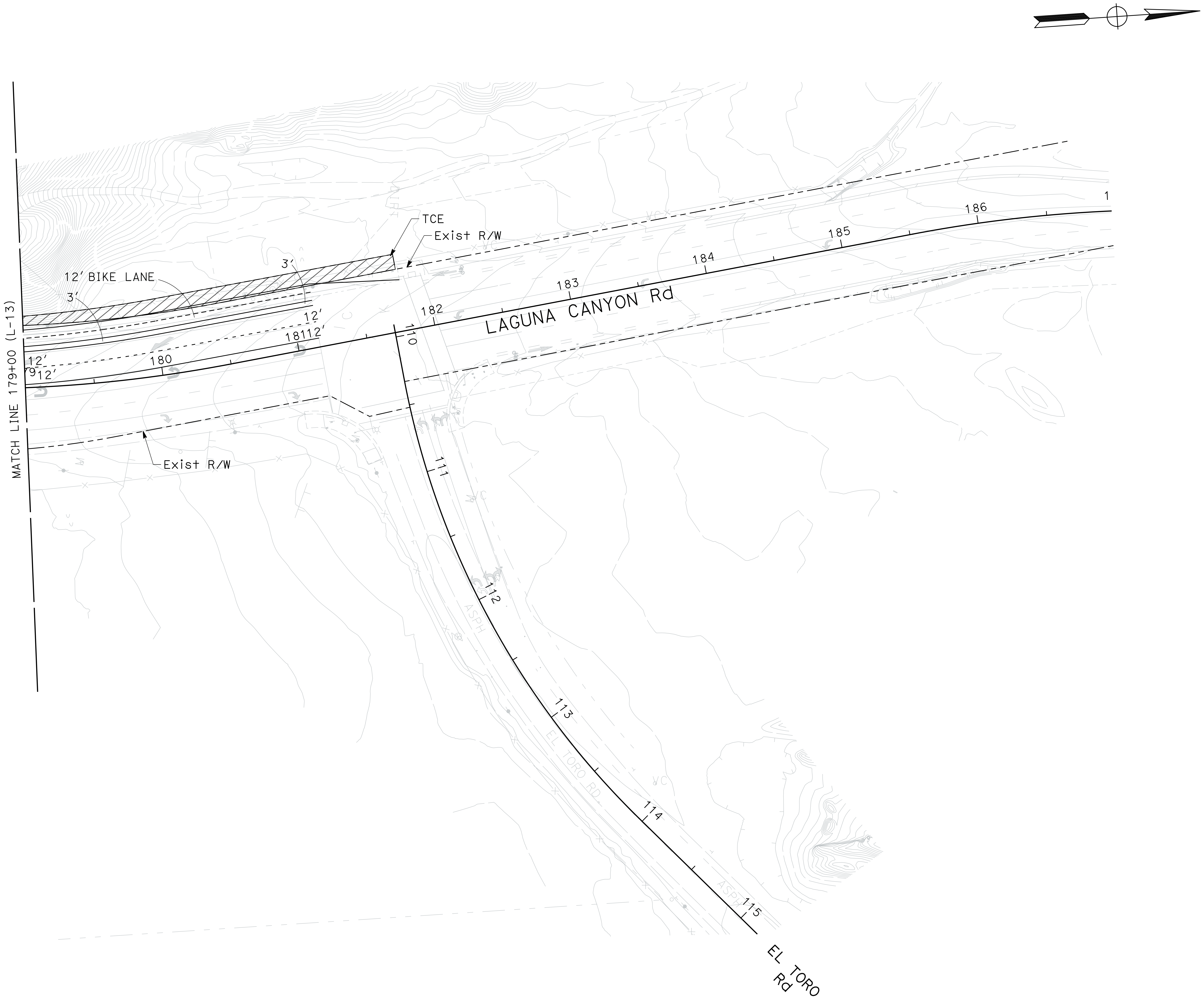

LAYOUT
ALTERNATIVE 3

SCALE: 1" = 40'

L-14

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DATE PLOTTED => $DATE
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USERNAME => $USER
DGN FILE => $REQUEST

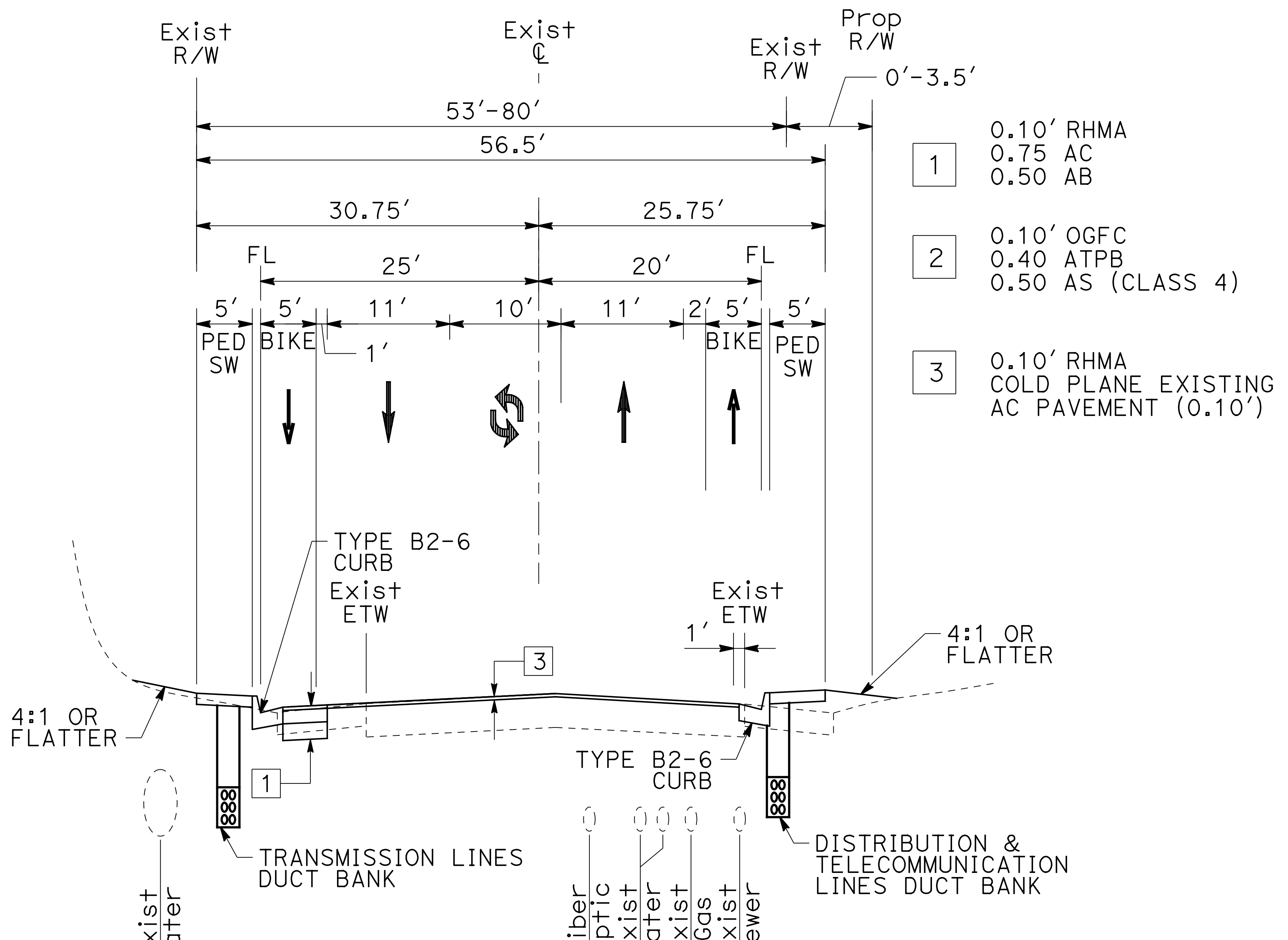
RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

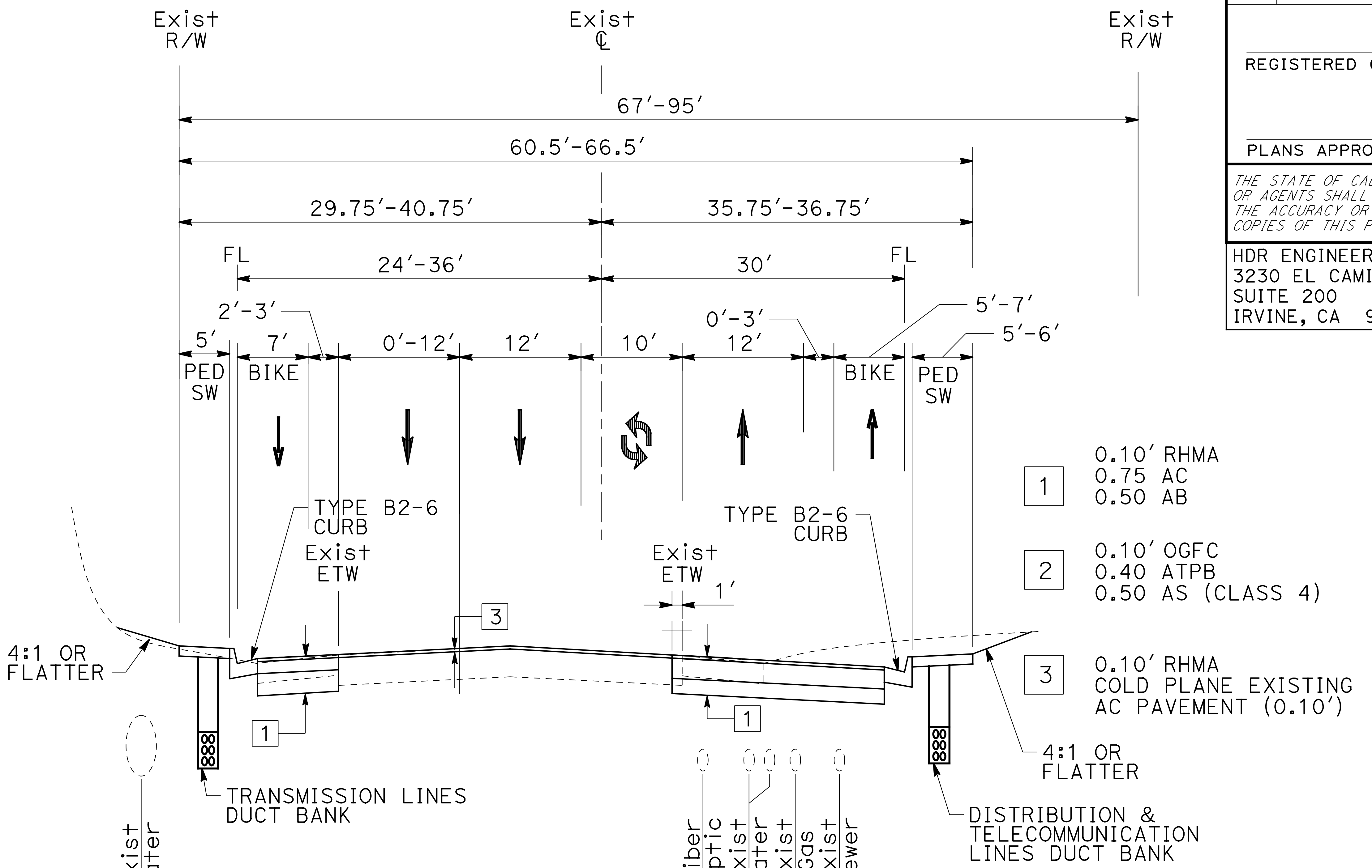
NOTES:

1. EXIST UNDERGOUND UTILITIES LOCATION SHOWN ARE APPROXIMATE. CLEARANCE TO EXIST UNDERGOUND UTILITIES TO BE DETERMINED.



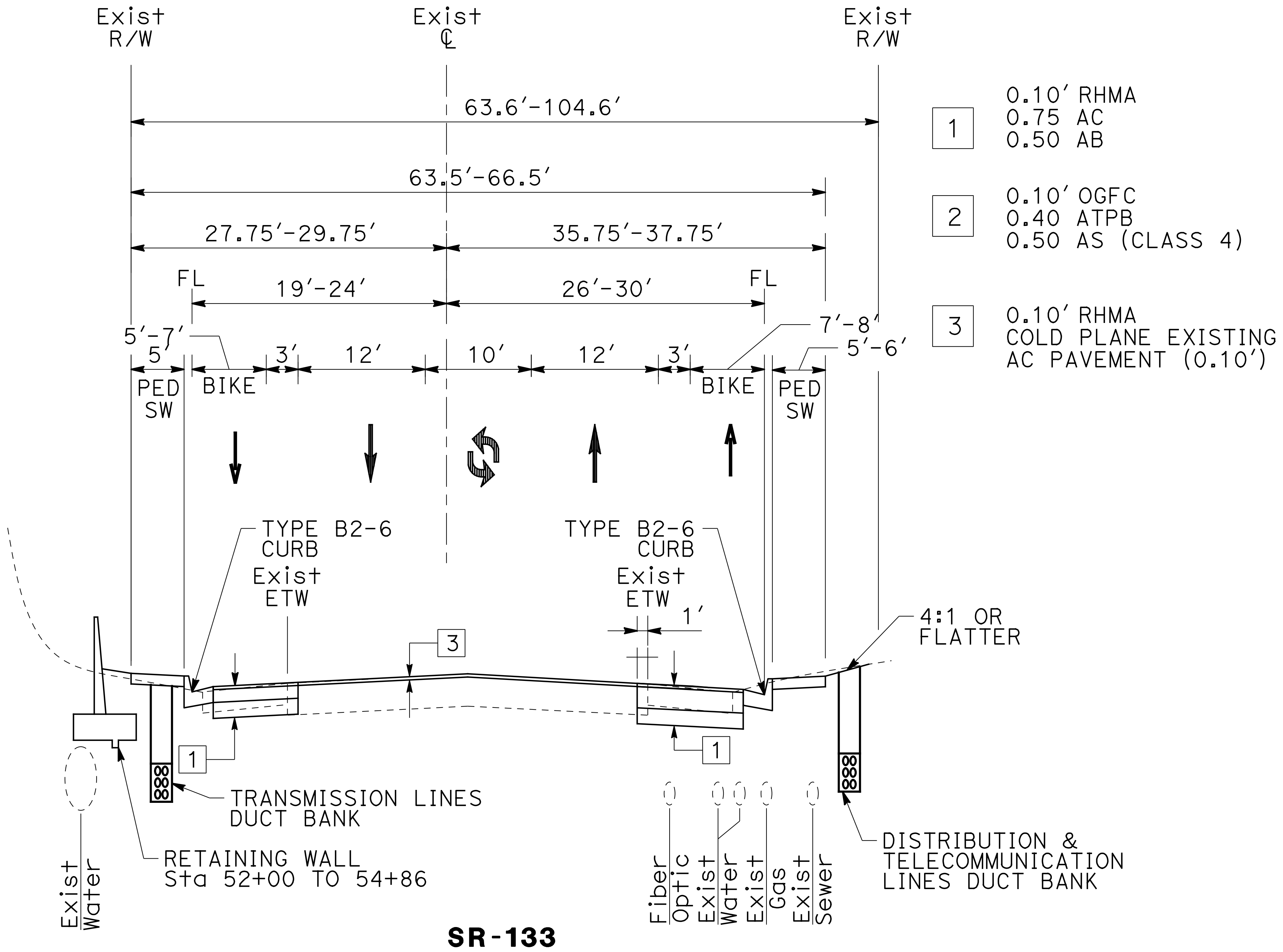
SR-133

Sta 84+50 TO Sta 113+50



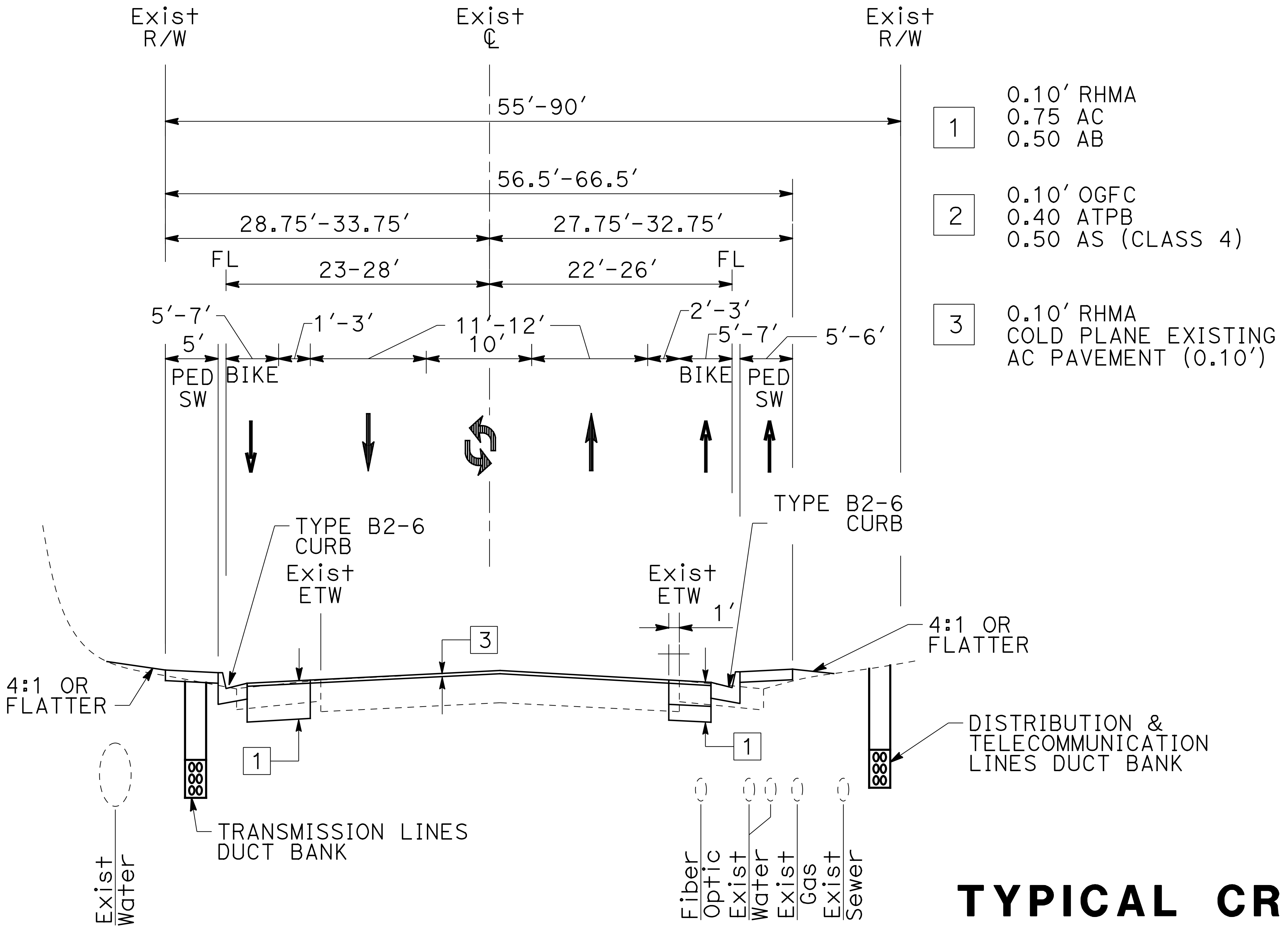
SR-133

Sta 164+00 TO Sta 180+00



SR-133

Sta 53+00 TO Sta 84+50
Sta 121+00 TO Sta 164+00



SR-133

Sta 113+50 TO Sta 121+00

TYPICAL CROSS SECTIONS ALTERNATIVE 4

NO SCALE

X-1

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4		

REGISTERED CIVIL ENGINEER DATE

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CONSULTANT FUNCTIONAL SUPERVISOR
GIRAIR KOTCHIAN
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0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE
120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

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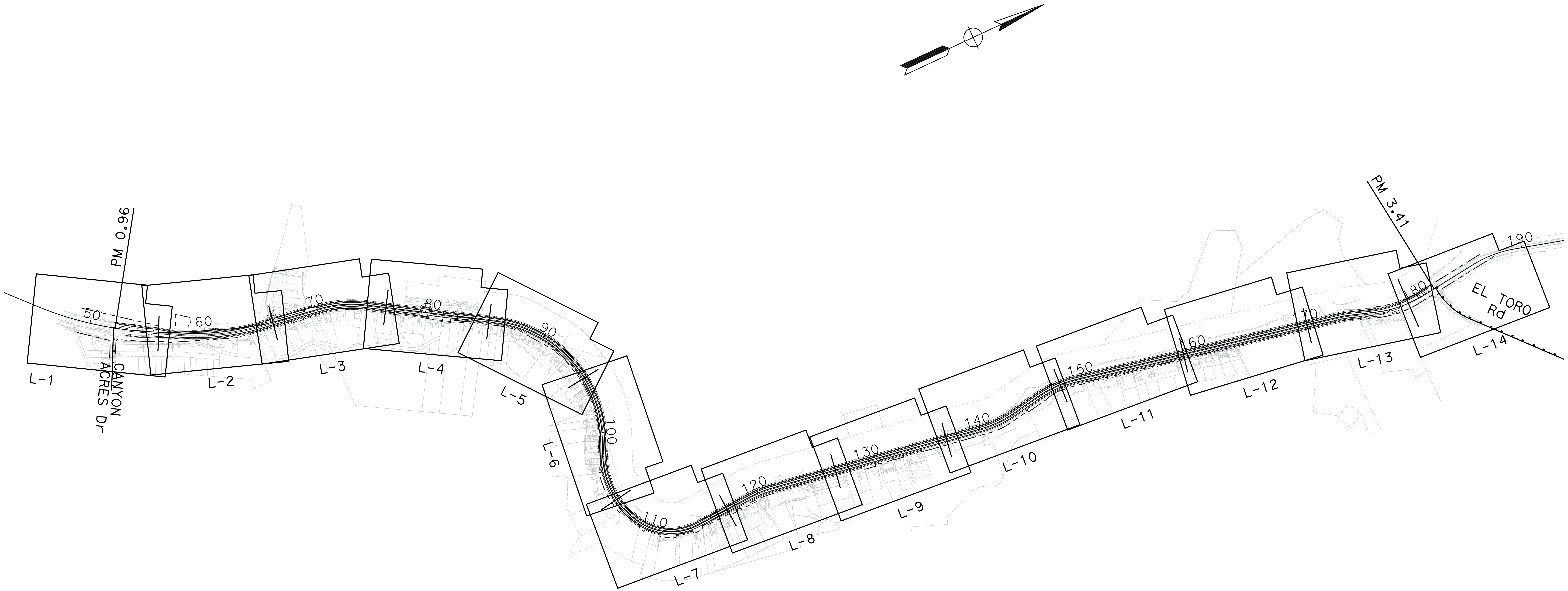

11/16/2018

KEY MAP
ALTERNATIVE 4

NOT TO SCALE

K-1

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DATE REVISED

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UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

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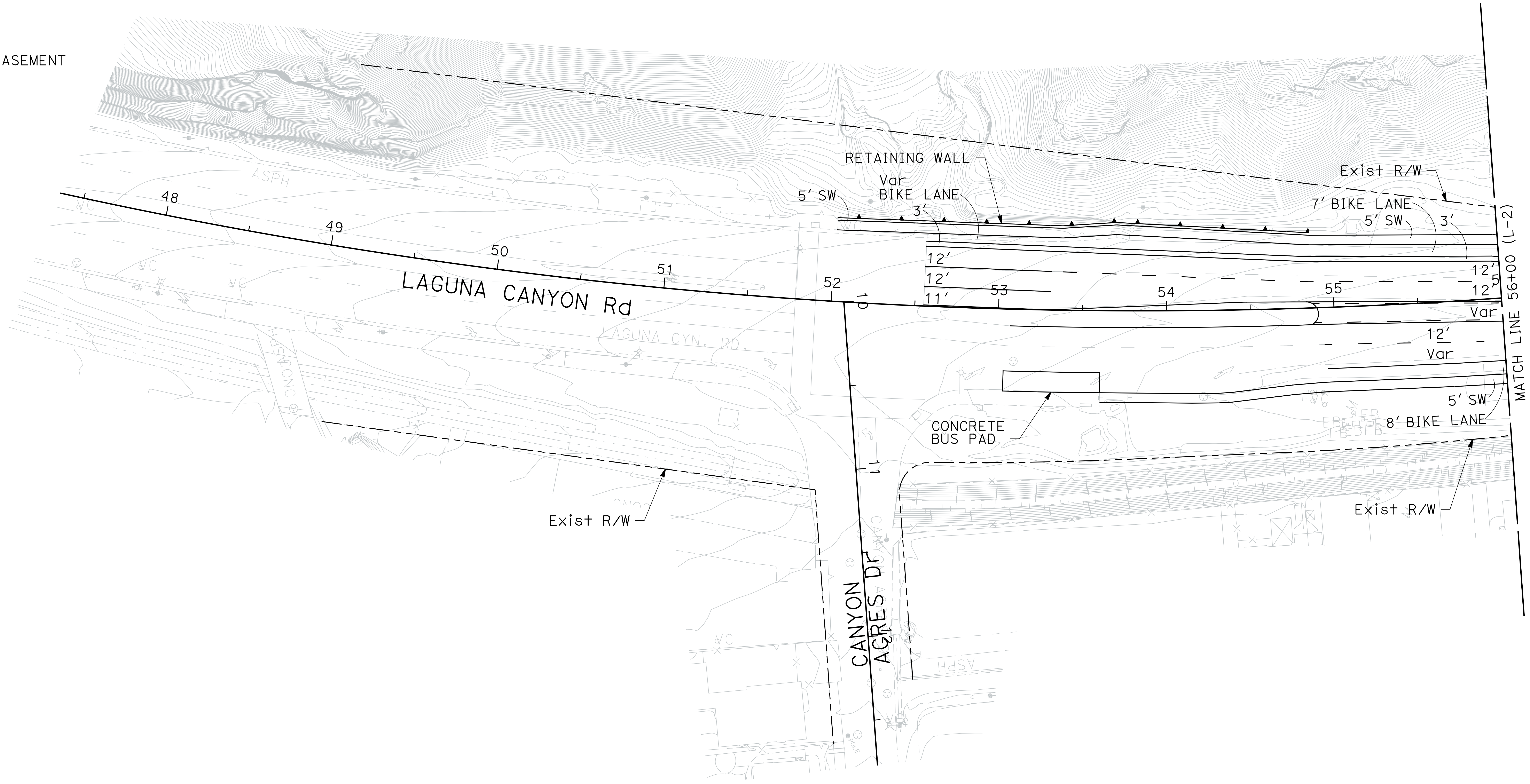
LEGEND:

—— - - ——	EXISTING RIGHT OF WAY
—— - - ——	PROPOSED RIGHT OF WAY
— — — —	TEMPORARY CONSTRUCTION EASEMENT
▩	RIGHT-OF-WAY REQUIREMENT
▨	TEMPORARY CONSTRUCTION EASEMENT

ABBREVIATIONS:

Exist	EXISTING
Prop	PROPOSED
R/W	RIGHT OF WAY
Shld	SHOULDER
SW	SIDEWALK
TCE	TEMPORARY CONSTRUCTION EASEMENT
Var	VARIABLE



LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

LAST REVISION 00-00-00
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TIME PLOTTED => $TIME

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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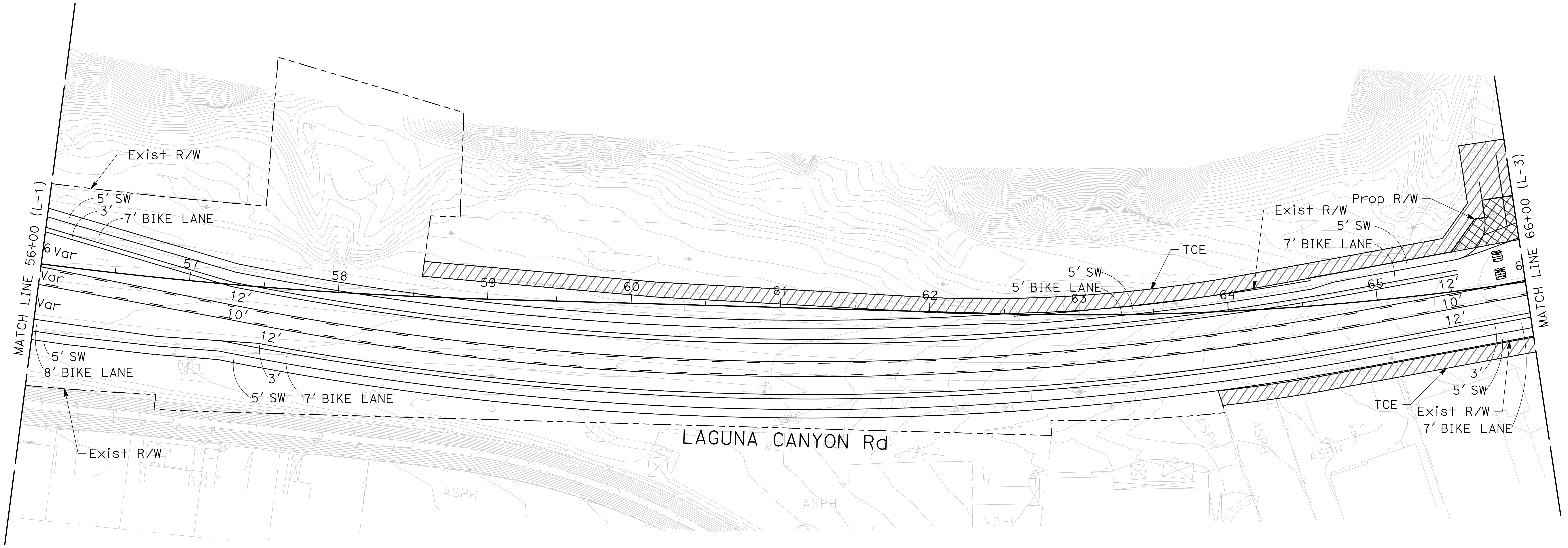

LAYOUT ALTERNATIVE 4

SCALE: 1" = 40'

L-2

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USERNAME => $USER
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RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 12000Q670

LAST REVISION 00-00-00

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

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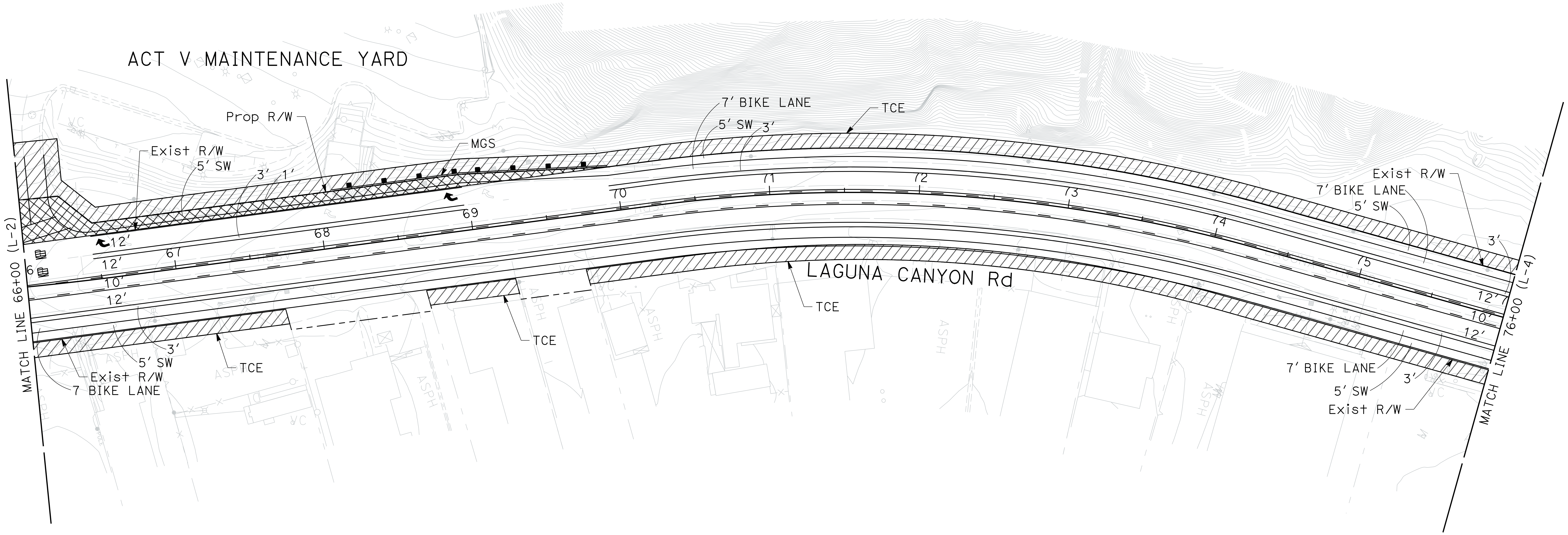

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-3

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TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

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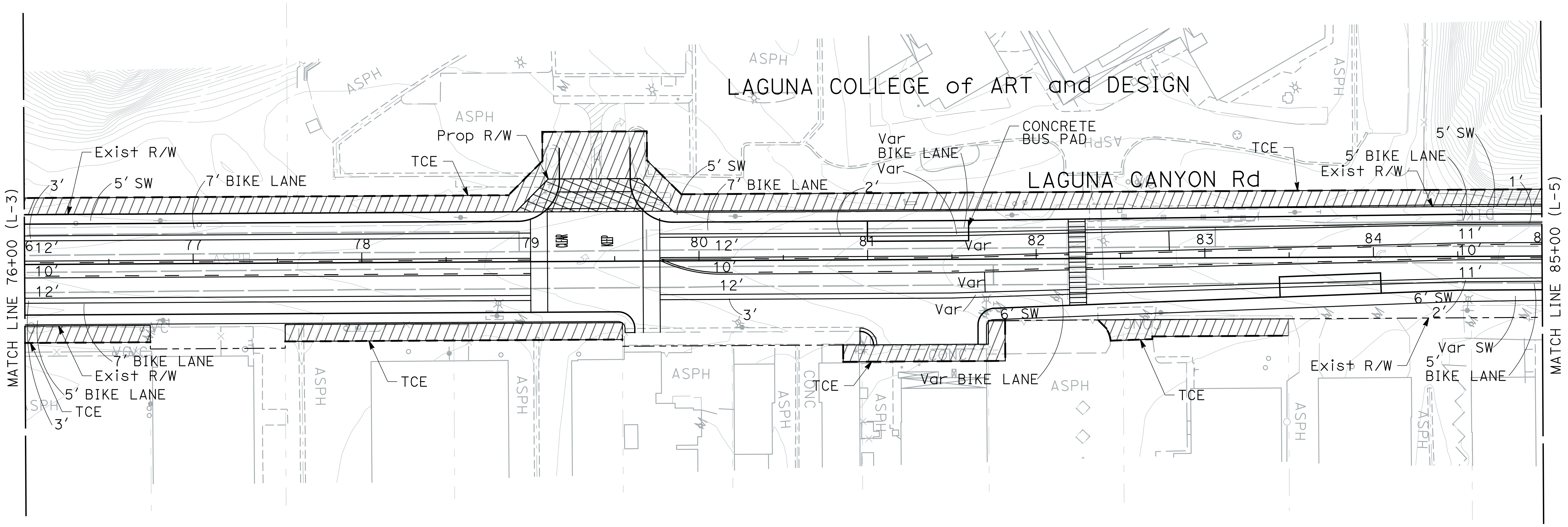

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-4

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LAST REVISION
00-00-00
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010
USERNAME => $USER
DGN FILE => $REQUEST
RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE
120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

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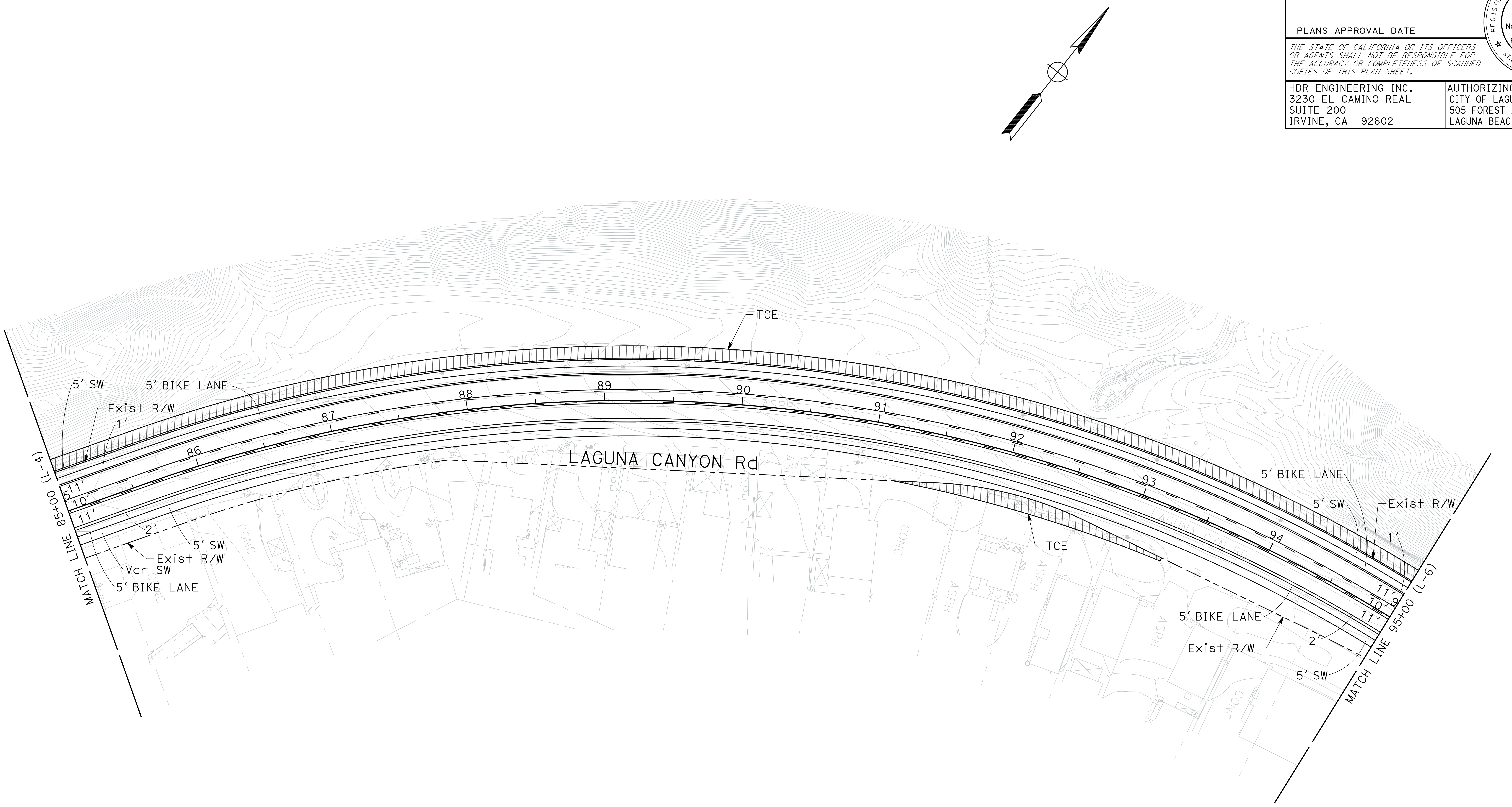

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-5

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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GIRAIR KOTCHIAN	NAME	STEVE CROUCH		

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DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 12000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
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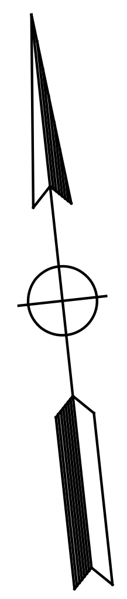

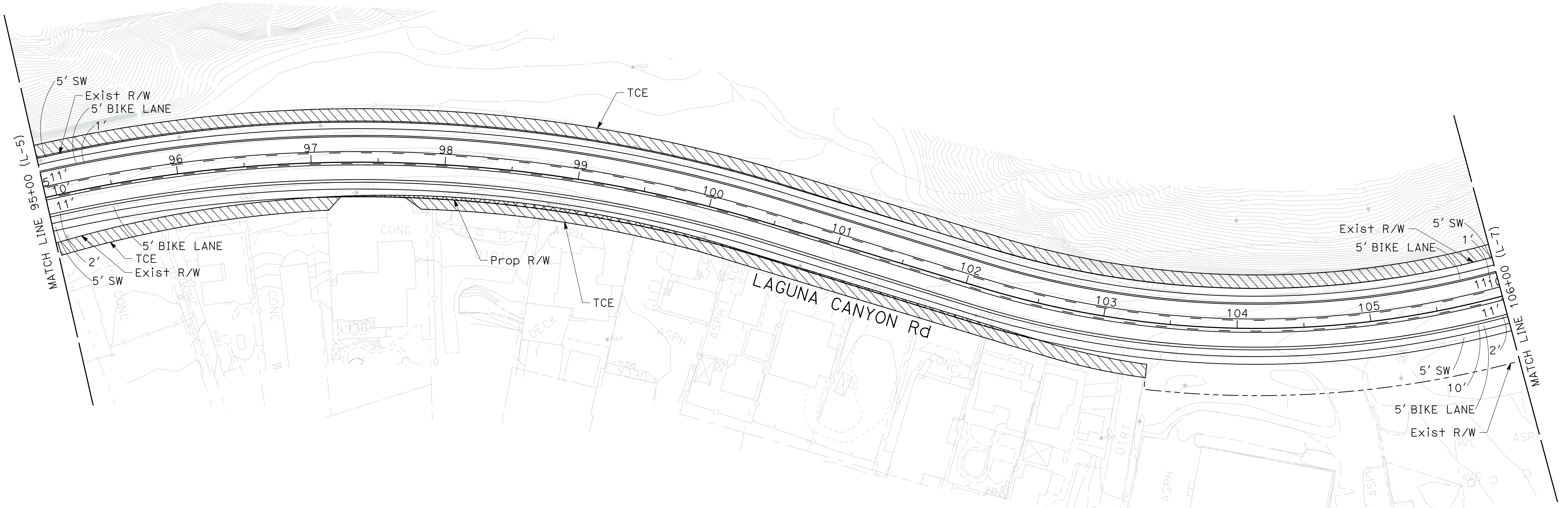

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40′

L-6

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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CHECKED BY	
NAME	
REVISED BY	
DATE REVISED	

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES

0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

LAST REVISION 00-00-00

DATE PLOTTED => $DATE
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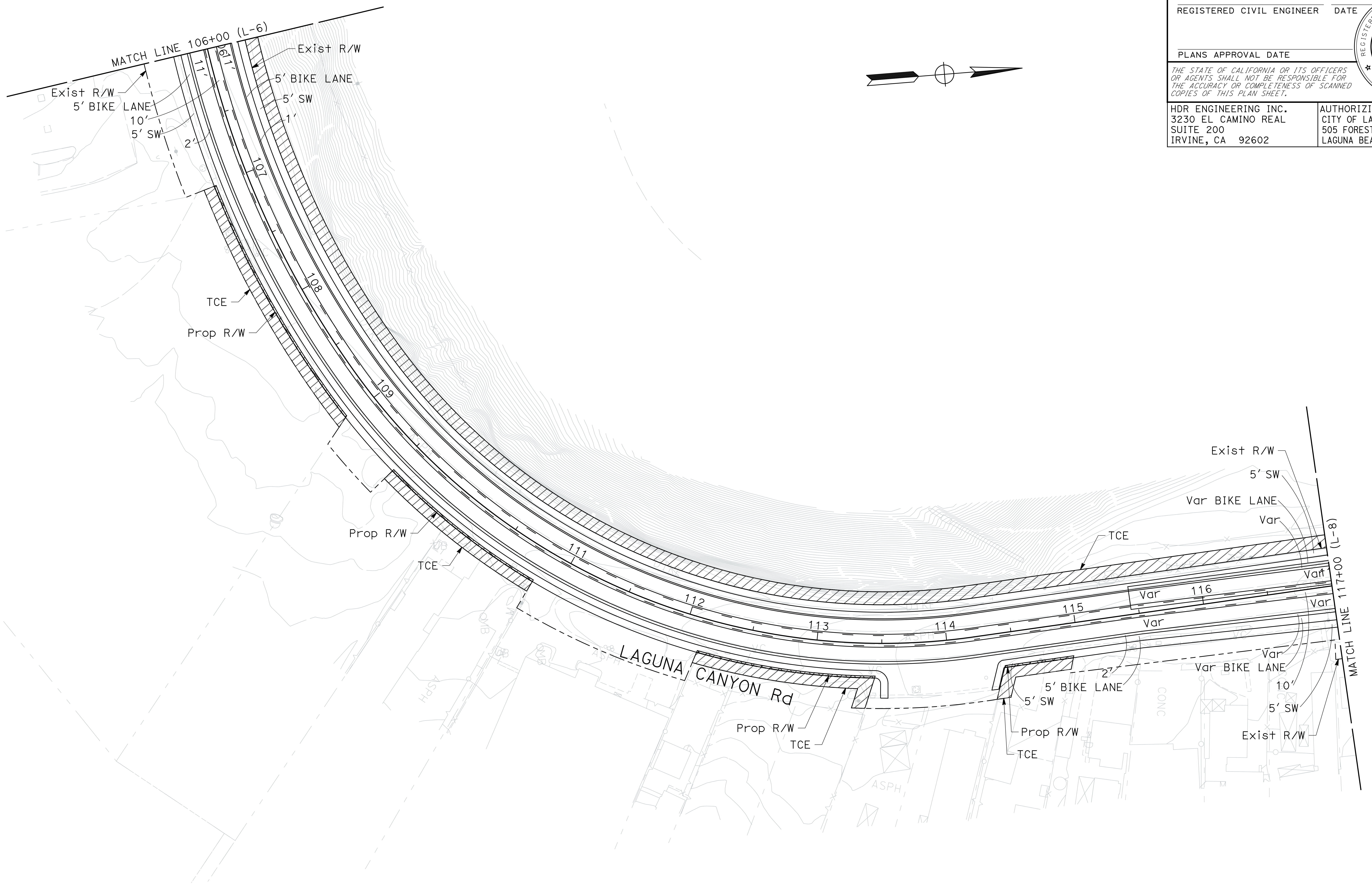

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-7

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REVISED BY	DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

LAST REVISION 00-00-00

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12	Ora	133	0.9/3.4	X	

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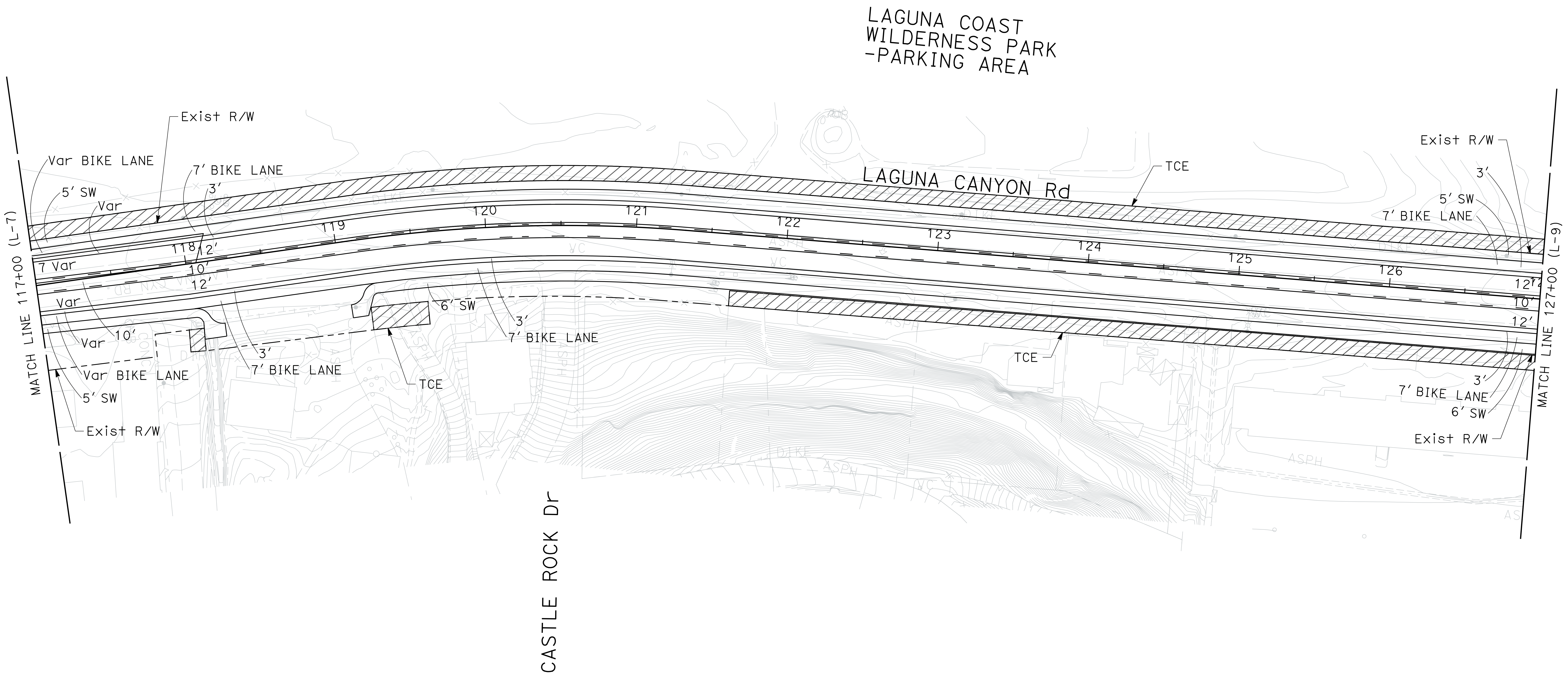

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-8

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DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 12000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

GIRAIR KOTCHIAN
No. C64212
Exp.
CIVIL

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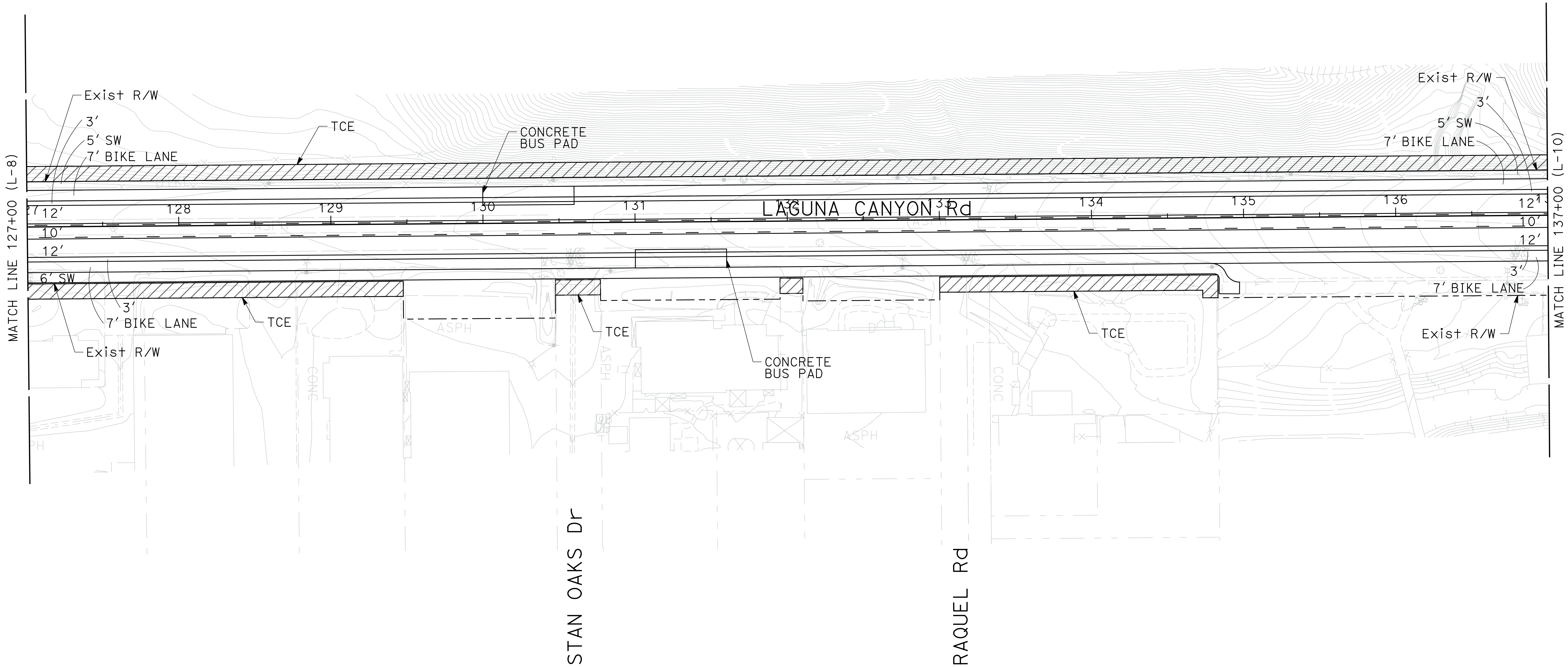

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-9

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DATE REVISED

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

LAST REVISION 00-00-00

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

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PLANS APPROVAL DATE

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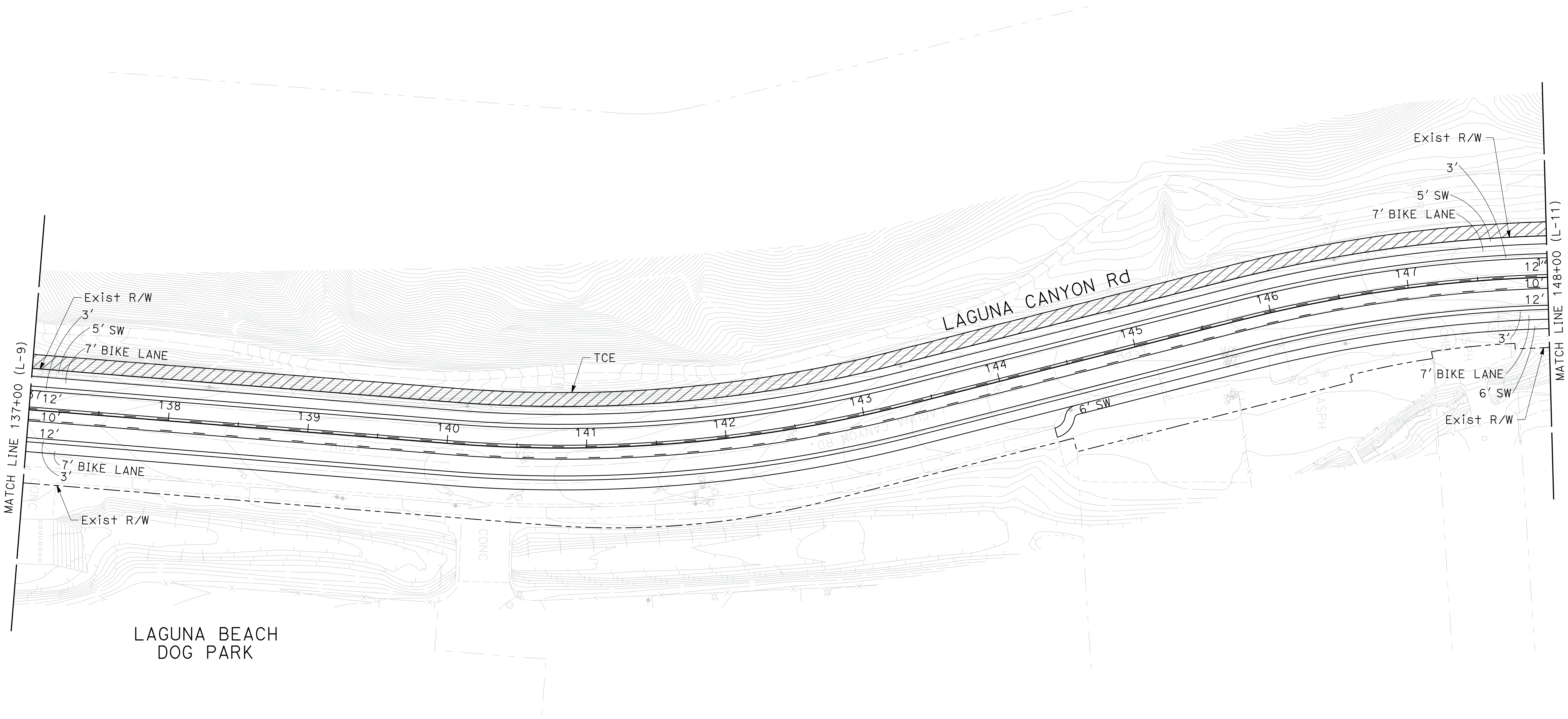

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-10

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BORDER LAST REVISED 7/2/2010

USERNAME => $USER
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UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

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12	Ora	133	0.9/3.4	X	X

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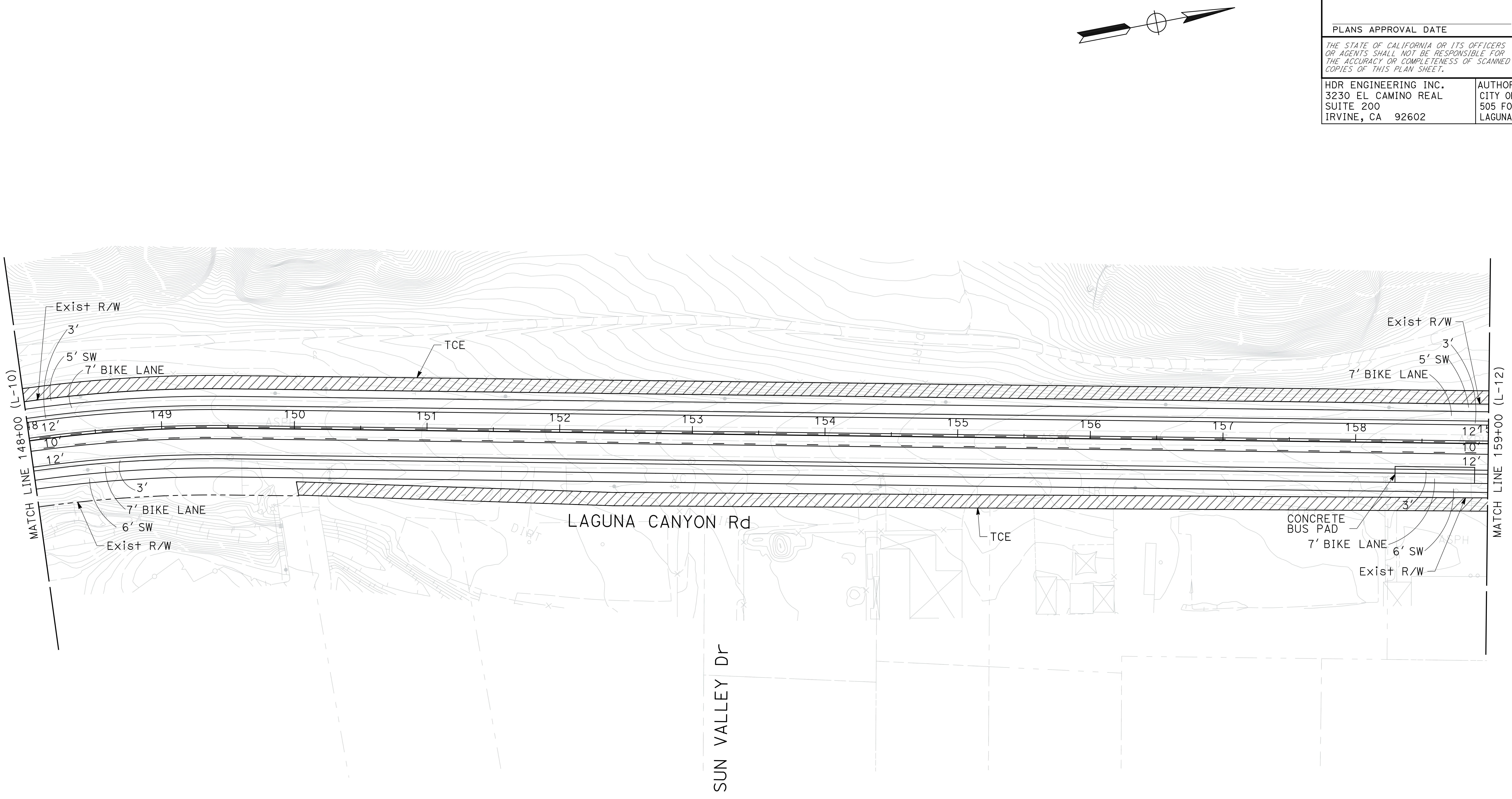

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-11

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TIME PLOTTED => $TIME

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RELATIVE BORDER SCALE IS IN INCHES

0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

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12	Ora	133	0.9/3.4	X	

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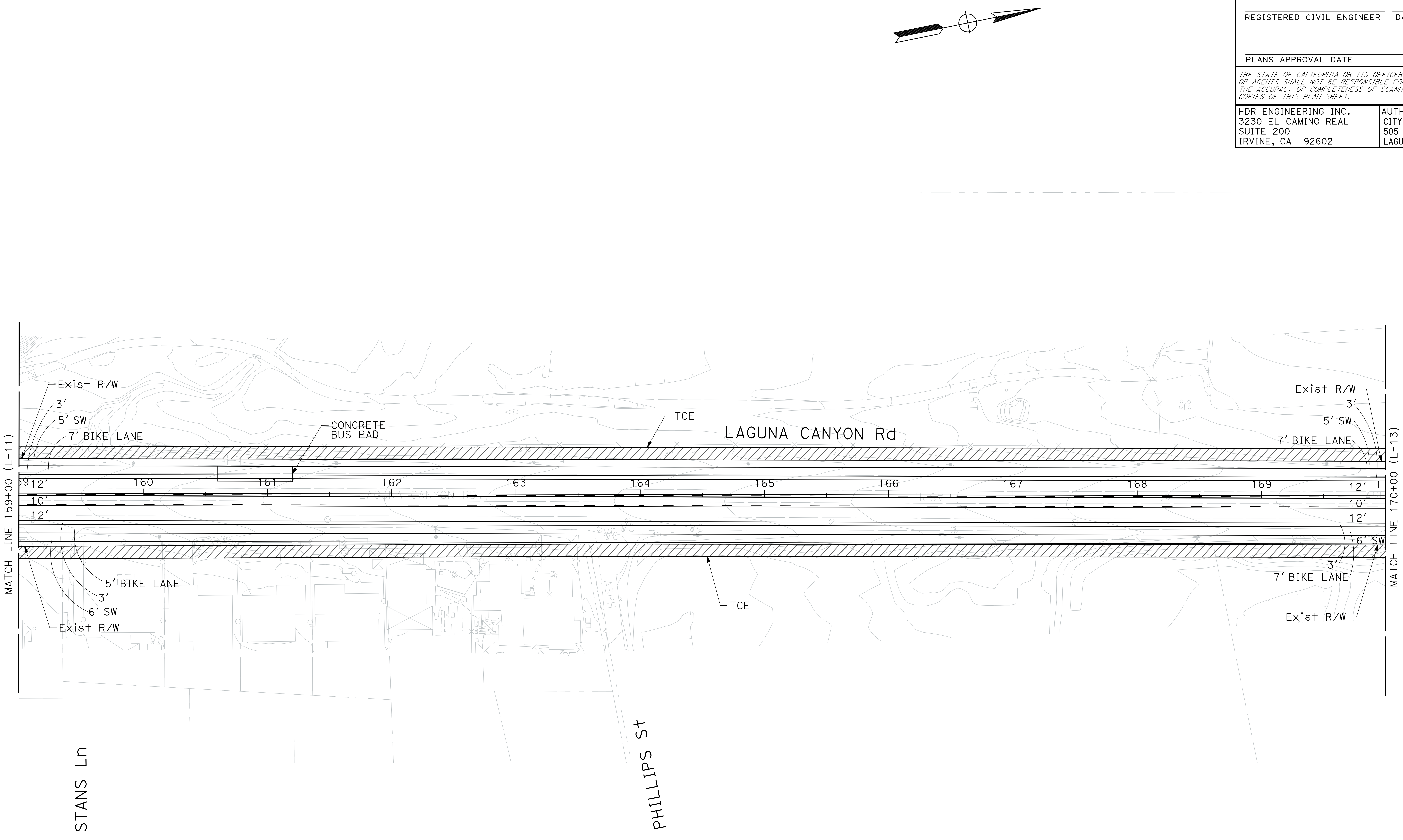

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-12

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USERNAME => $USER
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RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE 120000Q670

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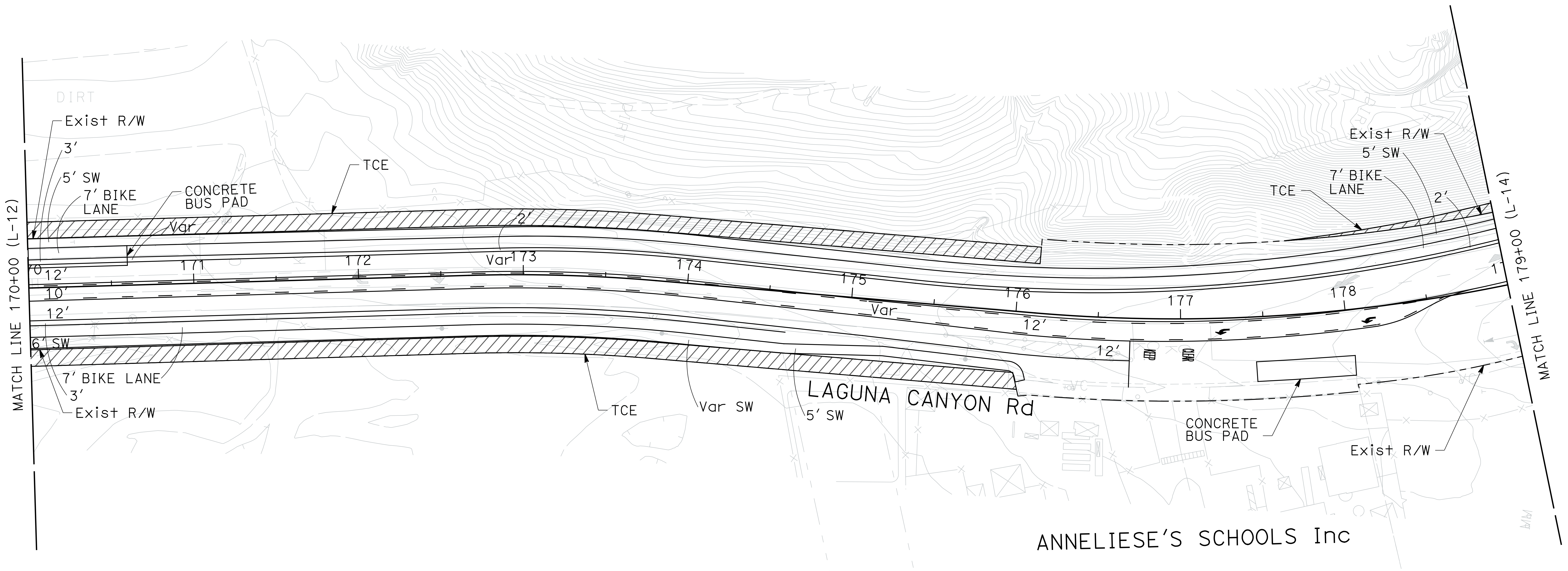

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-13

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UNIT 0000

PROJECT NUMBER & PHASE 12000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	X

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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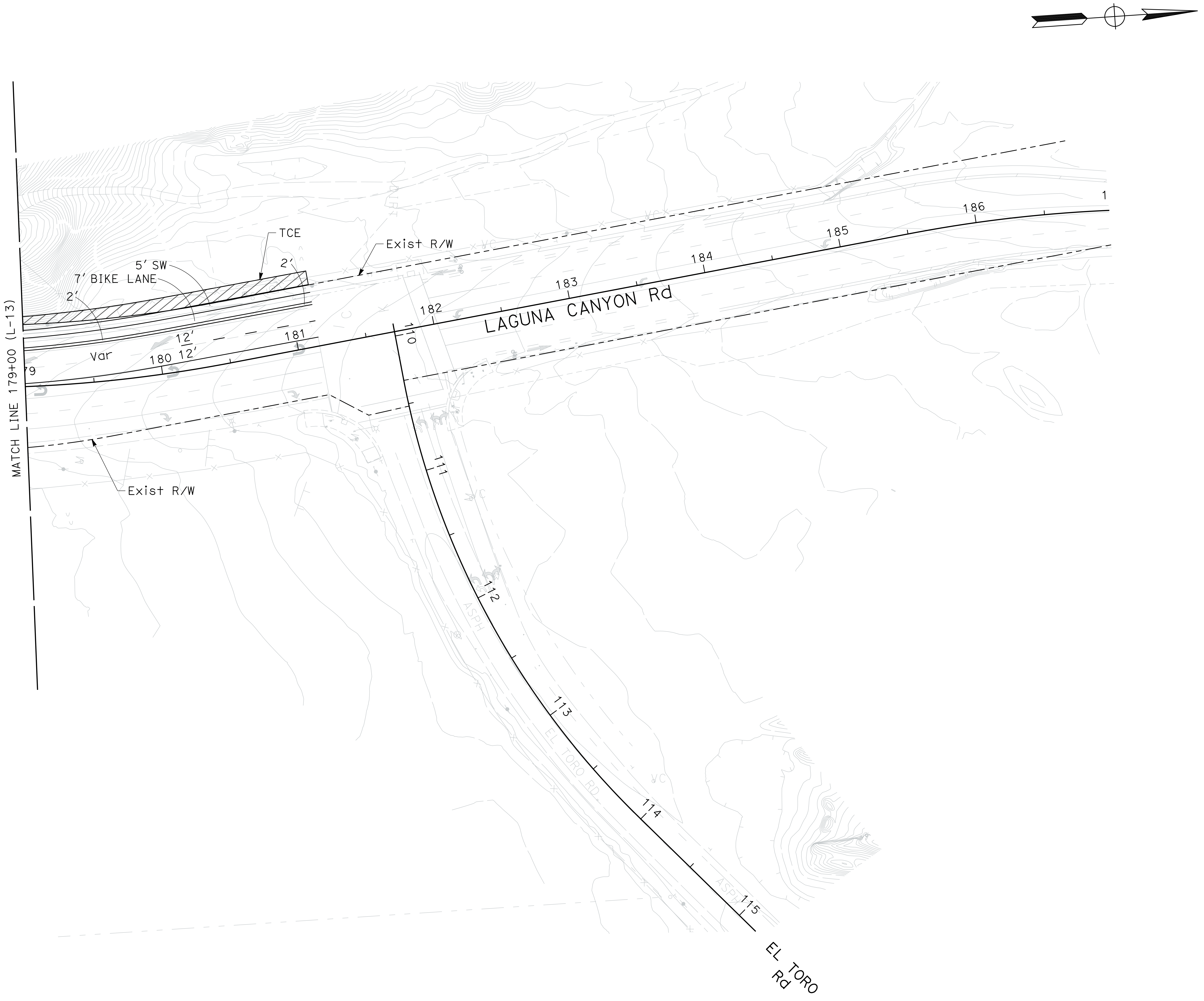

LAYOUT
ALTERNATIVE 4

SCALE: 1" = 40'

L-14

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USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES

0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE

12000Q670

NOTES:

1. EXIST UNDERGOUND UTILITIES LOCATION SHOWN ARE APPROXIMATE. CLEARANCE TO EXIST UNDERGOUND UTILITIES TO BE DETERMINED.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
Exp.
CIVIL
STATE OF CALIFORNIA

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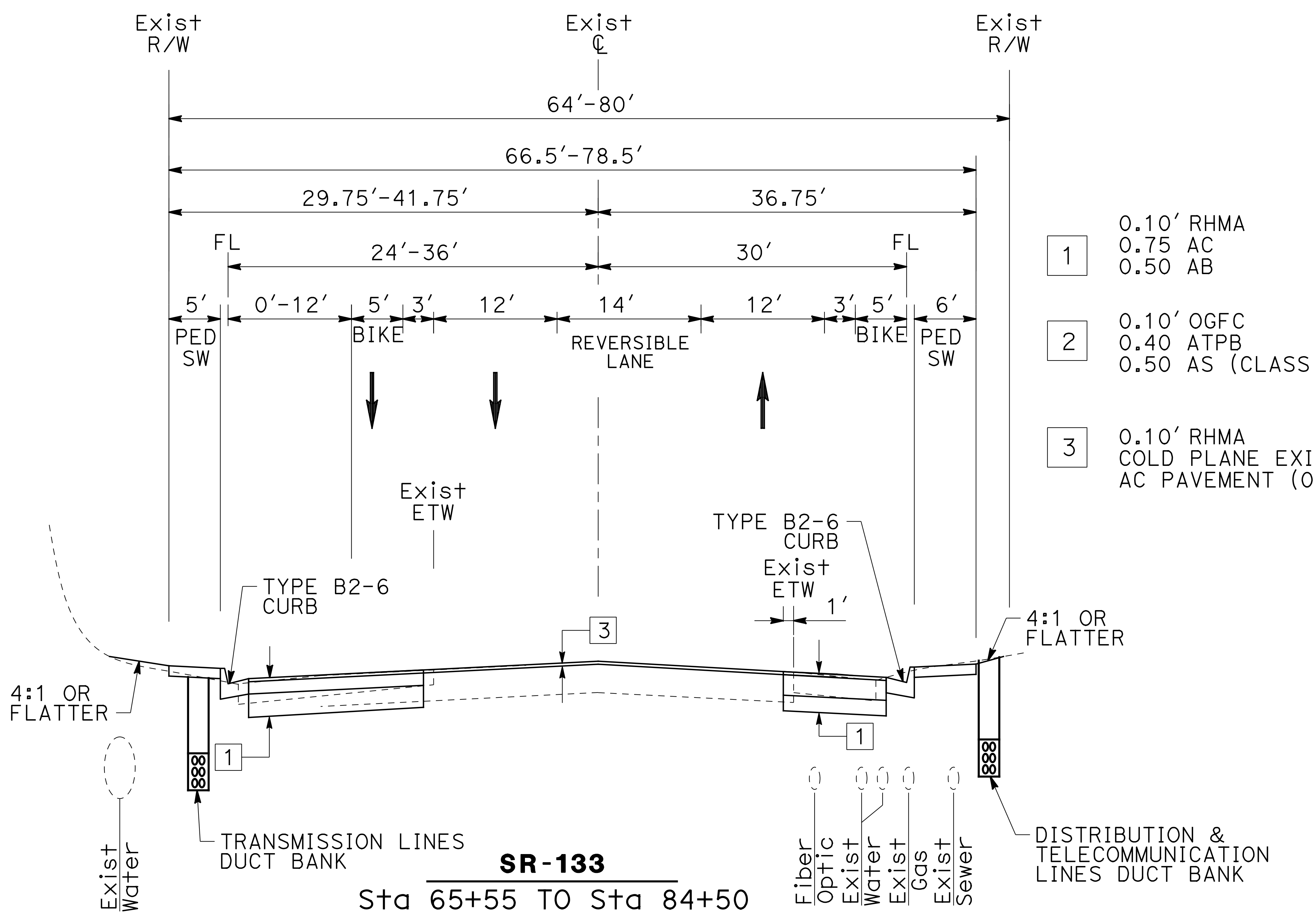
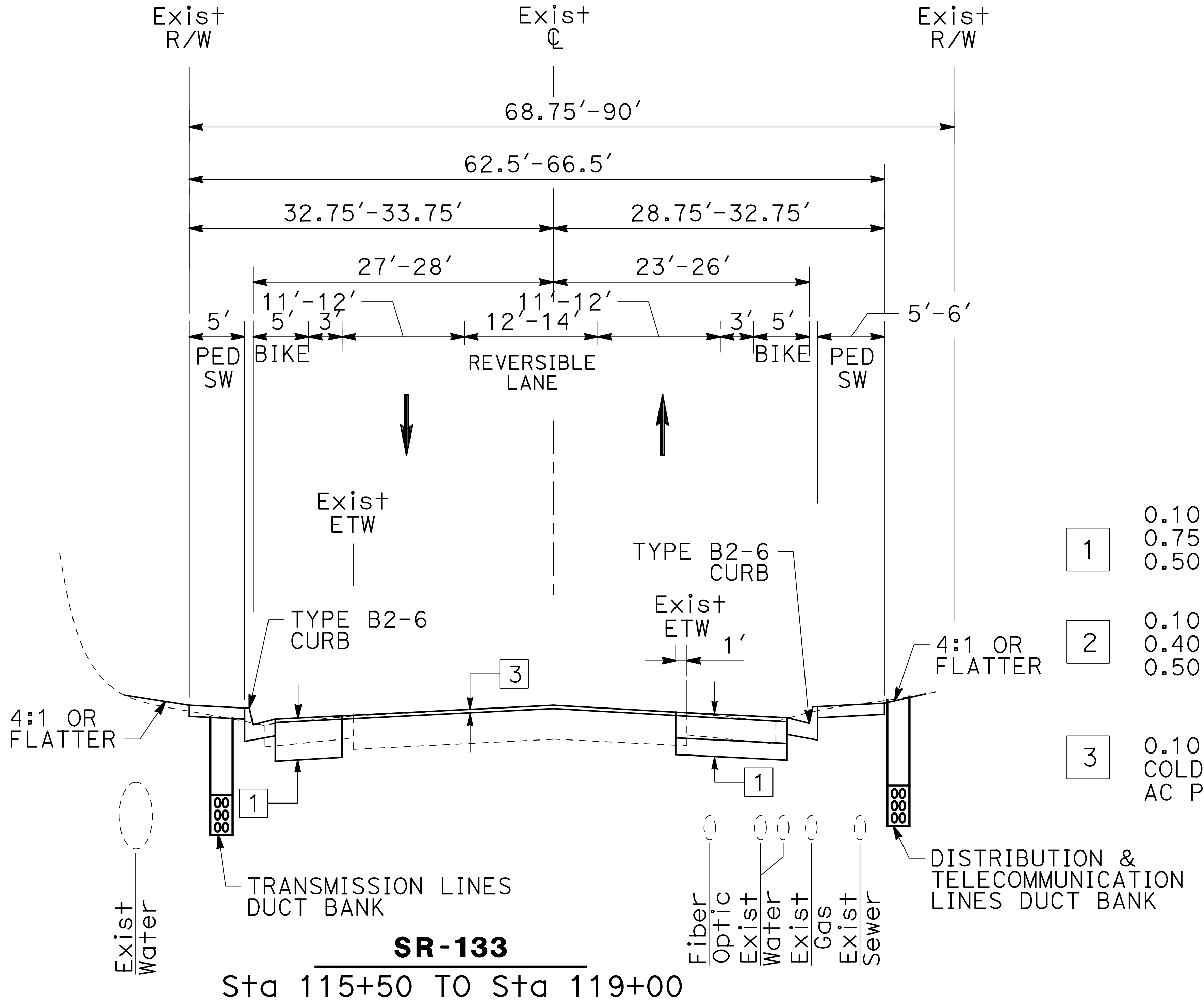


SR-133
Sta 65+55 TO Sta 84+50

1 0.10' RHMA
0.75 AC
0.50 AB

2 0.10' OGFC
0.40 ATPB
0.50 AS (CLASS 4)

3 0.10' RHMA
COLD PLANE EXISTING
AC PAVEMENT (0.10')

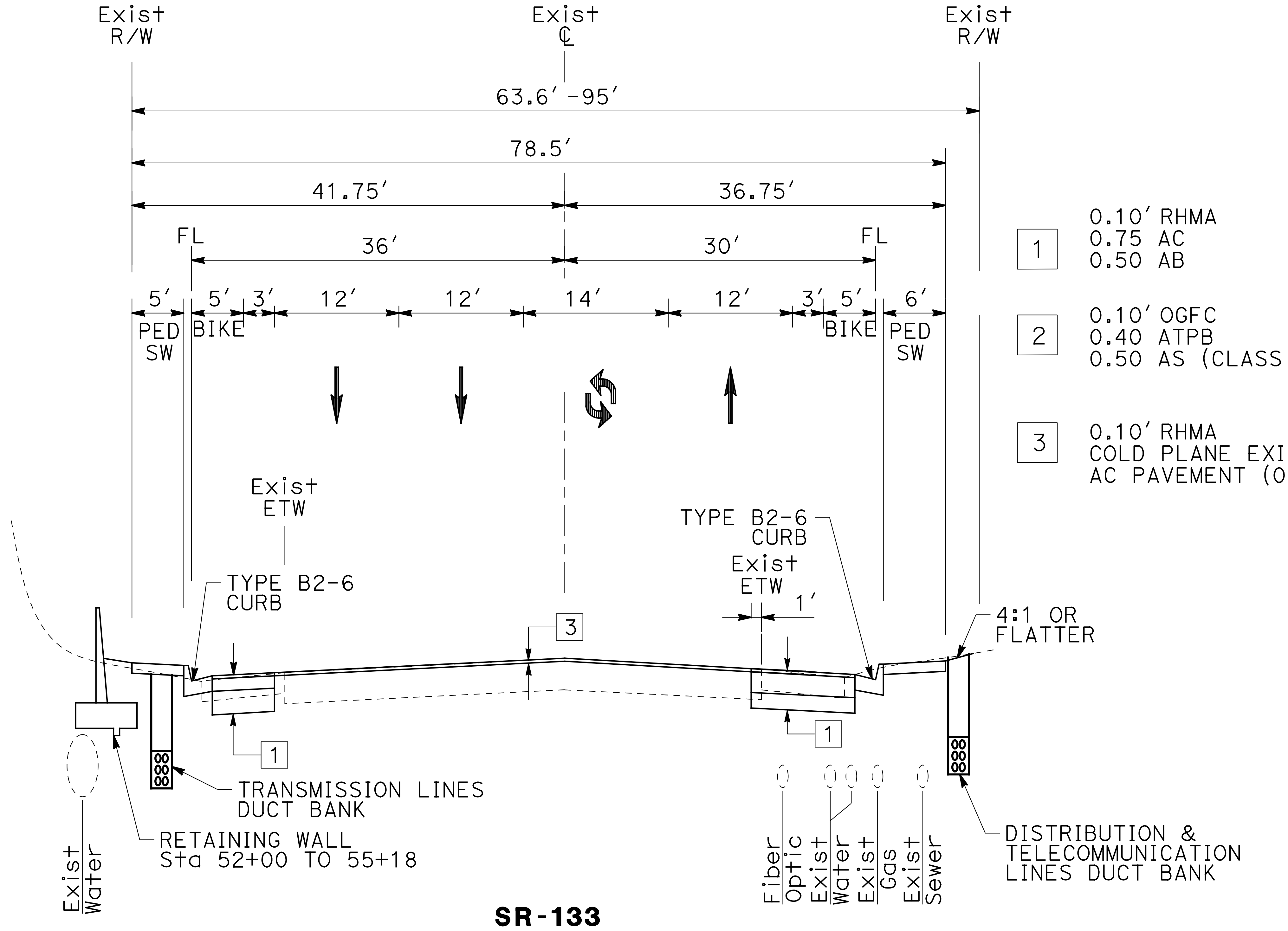


SR-133
Sta 115+50 TO Sta 119+00

1 0.10' RHMA
0.75 AC
0.50 AB

2 0.10' OGFC
0.40 ATPB
0.50 AS (CLASS 4)

3 0.10' RHMA
COLD PLANE EXISTING
AC PAVEMENT (0.10')

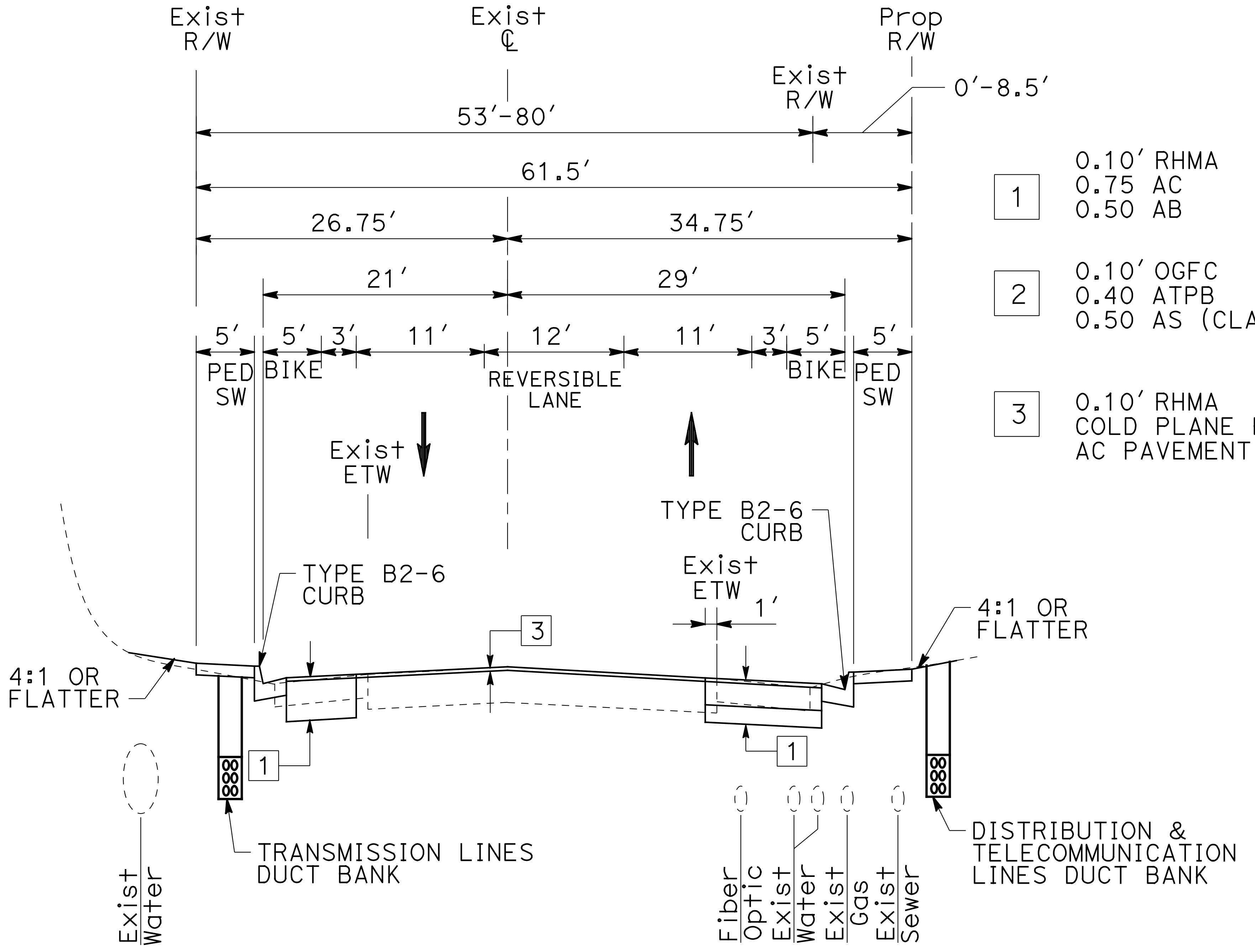


SR-133
Sta 53+00 TO Sta 65+55

1 0.10' RHMA
0.75 AC
0.50 AB

2 0.10' OGFC
0.40 ATPB
0.50 AS (CLASS 4)

3 0.10' RHMA
COLD PLANE EXISTING
AC PAVEMENT (0.10')



SR-133
Sta 84+50 TO Sta 115+50

1 0.10' RHMA
0.75 AC
0.50 AB

2 0.10' OGFC
0.40 ATPB
0.50 AS (CLASS 4)

3 0.10' RHMA
COLD PLANE EXISTING
AC PAVEMENT (0.10')

TYPICAL CROSS SECTIONS ALTERNATIVE 5

NO SCALE

X-1

REVISED BY	DATE REVISED
NAME	STEVE CROUCH
CALCULATED-DESIGNED BY	CHECKED BY
CONSULTANT FUNCTIONAL SUPERVISOR	GIRAIR KOTCHIAN

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12	Ora	133	0.9/3.4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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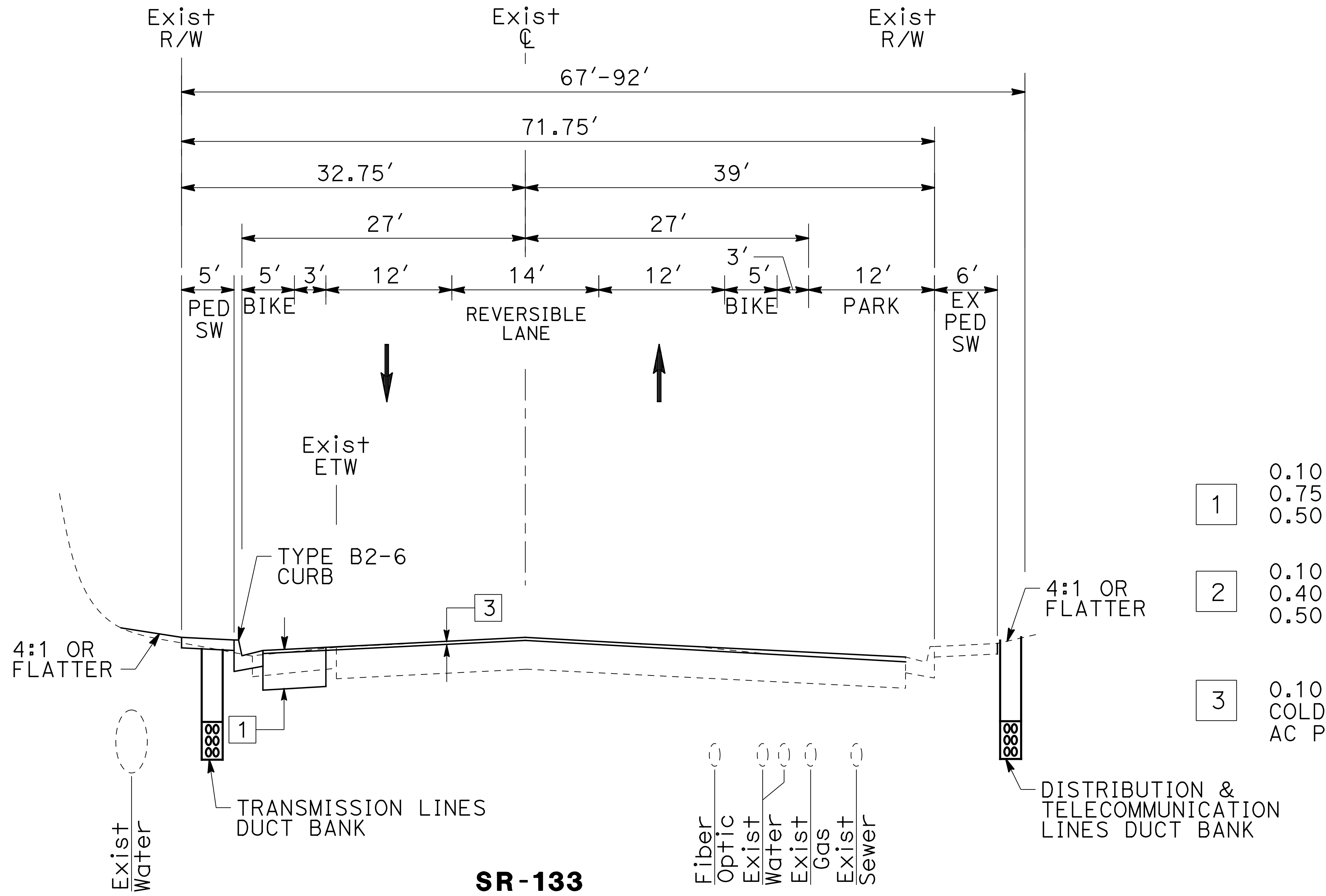
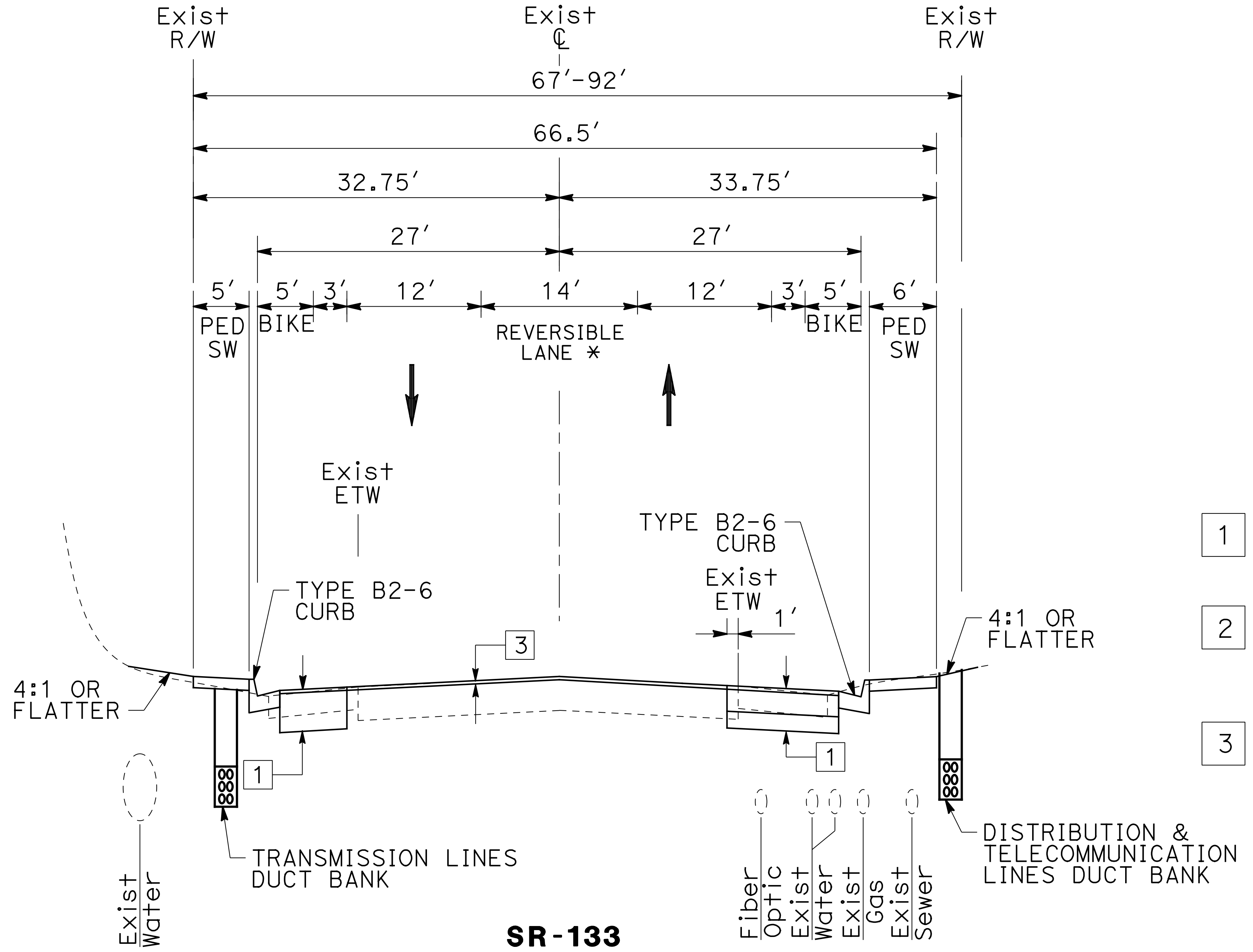


SR-133
Sta 135+00 TO Sta 144+00

1	0.10′ RHMA 0.75 AC 0.50 AB
2	0.10′ OGFC 0.40 ATPB 0.50 AS (CLASS 4)
3	0.10′ RHMA COLD PLANE EXISTING AC PAVEMENT (0.10′)



SR-133
Sta 119+00 TO Sta 135+00
Sta 144+00 TO Sta 181+15
*** REVERSIBLE LANE END AT Sta 176+70**

1	0.10′ RHMA 0.75 AC 0.50 AB
2	0.10′ OGFC 0.40 ATPB 0.50 AS (CLASS 4)
3	0.10′ RHMA COLD PLANE EXISTING AC PAVEMENT (0.10′)

TYPICAL CROSS SECTIONS
ALTERNATIVE 5

NO SCALE

X-2

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NAME
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DATE REVISED

LAST REVISION 00-00-00
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010
USERNAME => $USER
DGN FILE => $REQUEST
RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE
12000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

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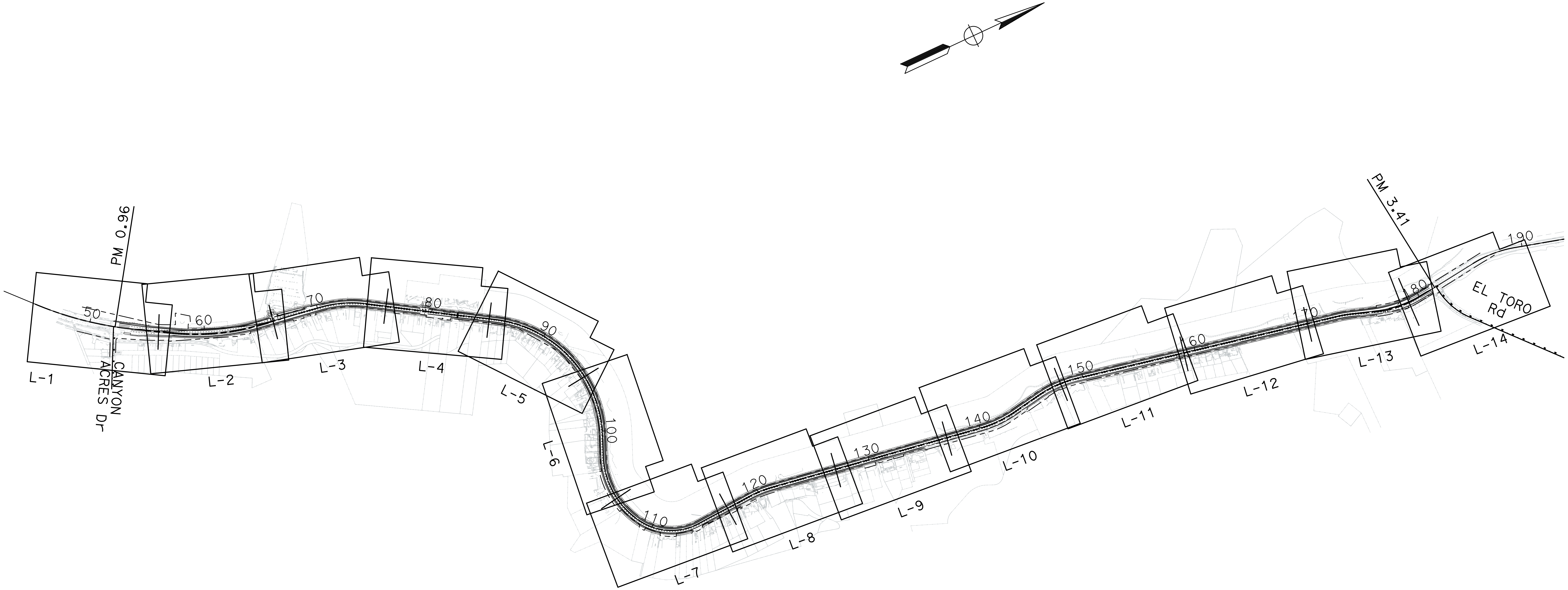
GIRAIR KOTCHIAN	CALCULATED-DESIGNED BY	CHECKED BY
	STEVE CROUCH	
	REVISED BY	DATE REVISED



11/16/2018

KEY MAP
ALTERNATIVE 5

NOT TO SCALE

K-1

LAST REVISION 00-00-00
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010
USERNAME => $USER
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REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
Exp.
CIVIL
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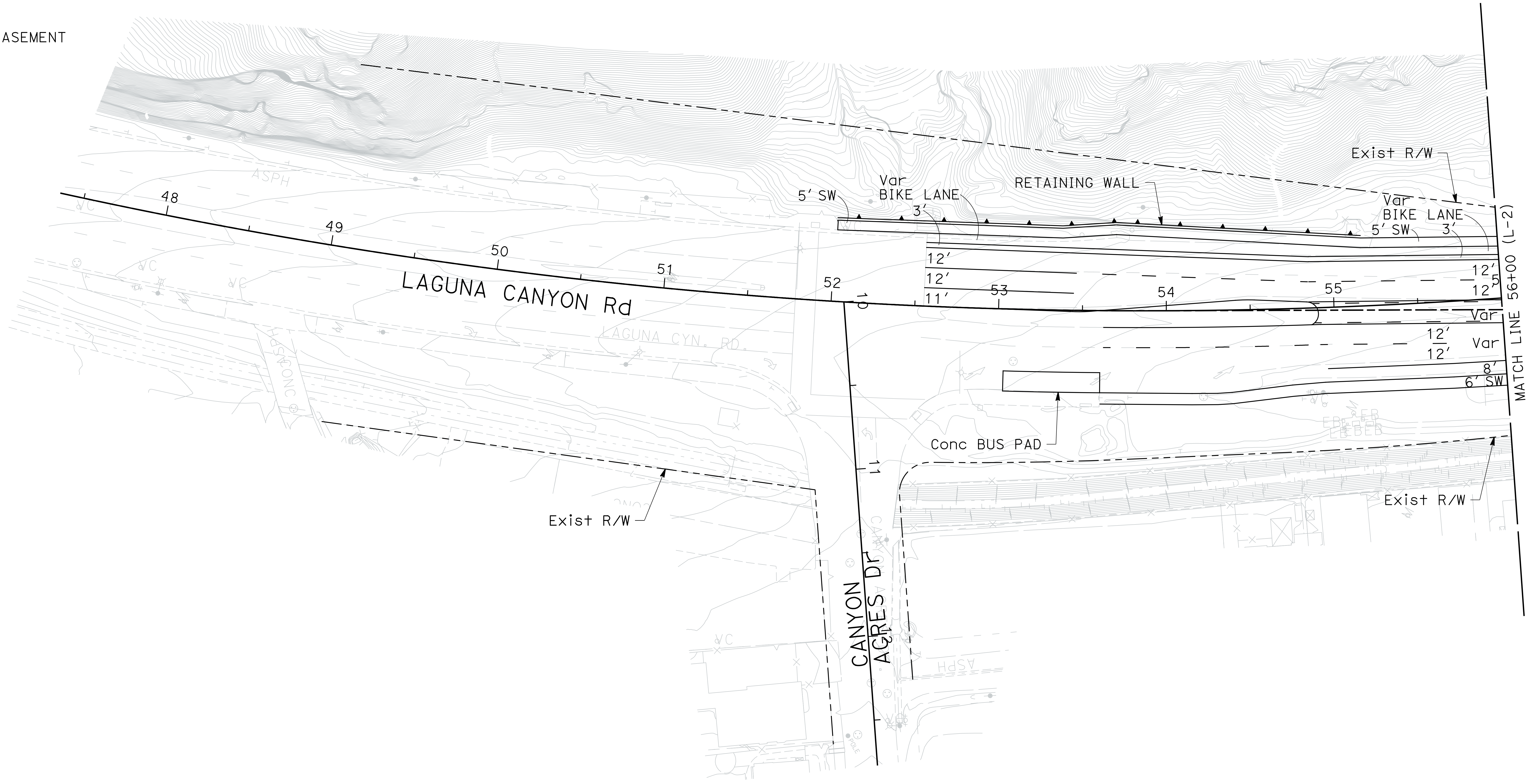
LEGEND:

—-—-—-	EXISTING RIGHT OF WAY
——-——-	PROPOSED RIGHT OF WAY
— — — —	TEMPORARY CONSTRUCTION EASEMENT
▩	RIGHT-OF-WAY REQUIREMENT
▨	TEMPORARY CONSTRUCTION EASEMENT

ABBREVIATIONS:

Exist	EXISTING
Prop	PROPOSED
R/W	RIGHT OF WAY
Shld	SHOULDER
SW	SIDEWALK
TCE	TEMPORARY CONSTRUCTION EASEMENT
Var	VARIABLE



LAYOUT ALTERNATIVE 5

SCALE: 1" = 40'

L-1

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NAME
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GIRAIR KOTCHIAN
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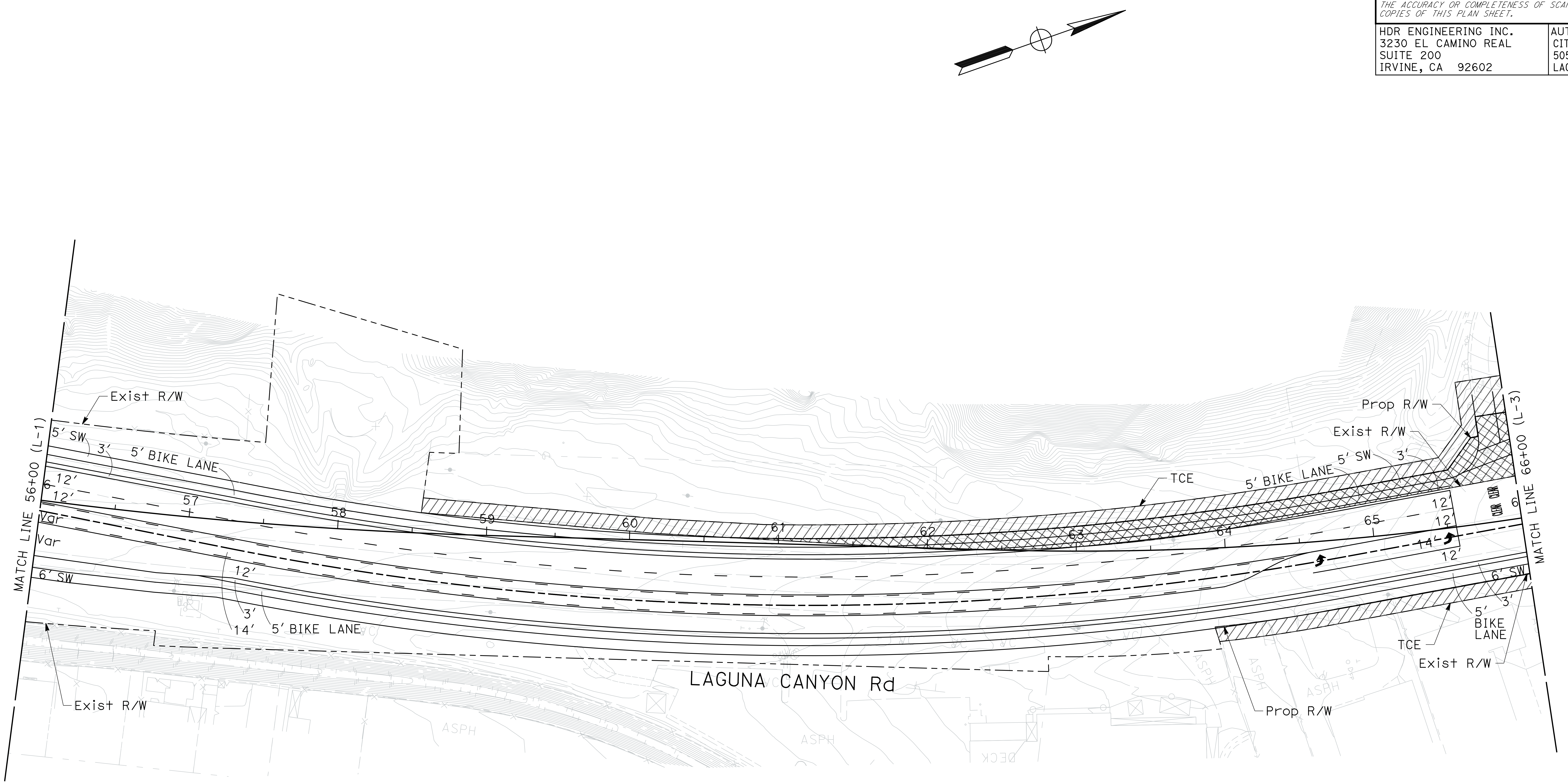

LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-2

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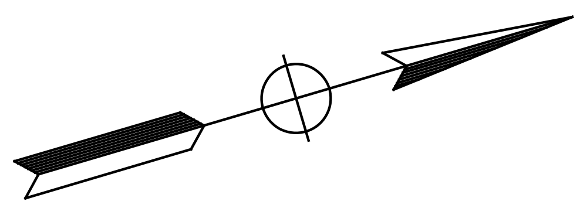

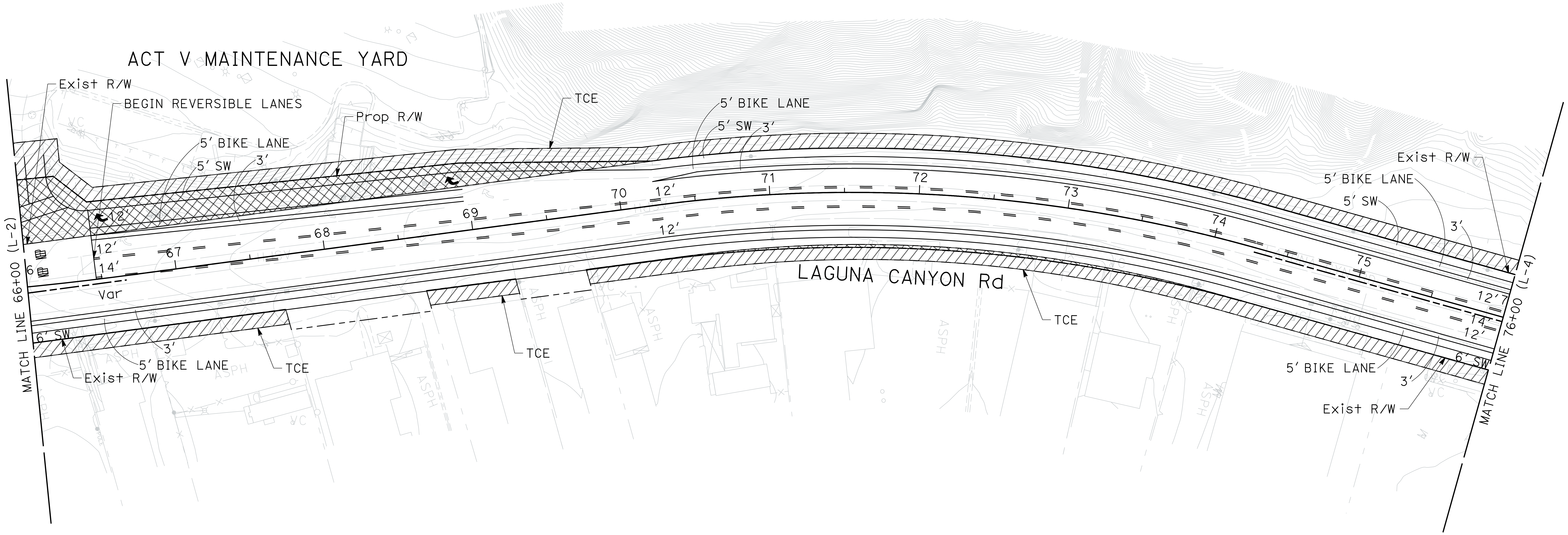

LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-3

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0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

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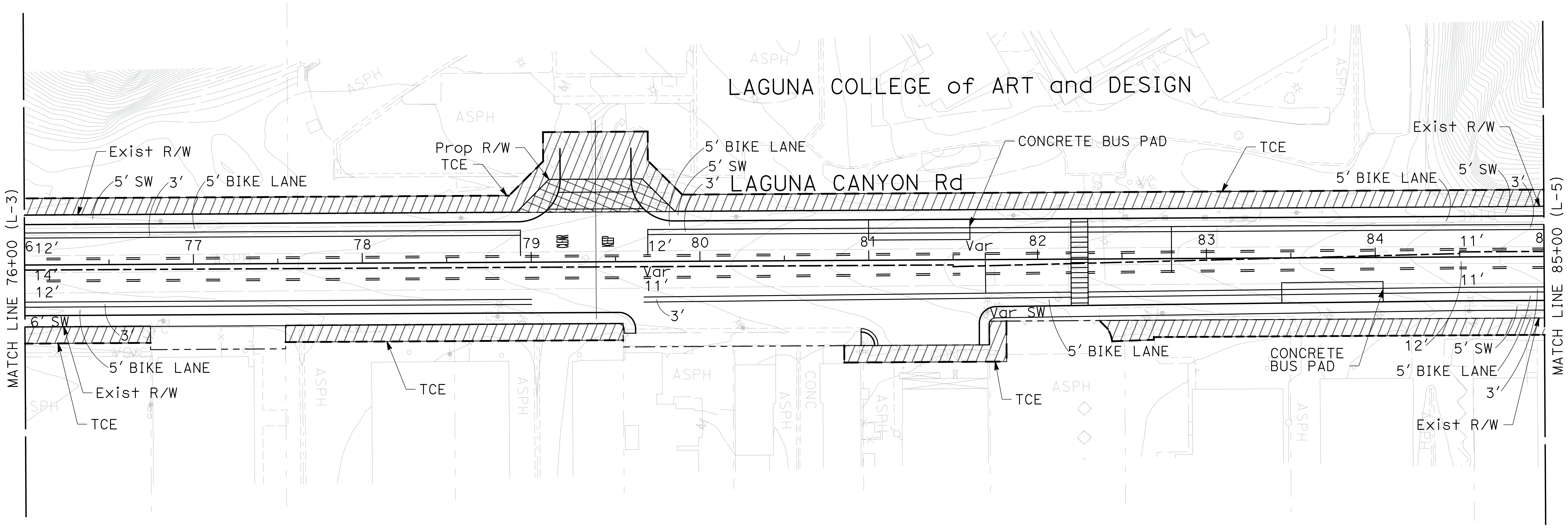

LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-4

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

CONSULTANT FUNCTIONAL SUPERVISOR: GIRAIR KOTCHIAN

CALCULATED-DESIGNED BY

CHECKED BY

NAME: STEVE CROUCH

REVISED BY

DATE REVISED

LAST REVISION 00-00-00

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES

0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

GIRAIR KOTCHIAN
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Exp.
CIVIL

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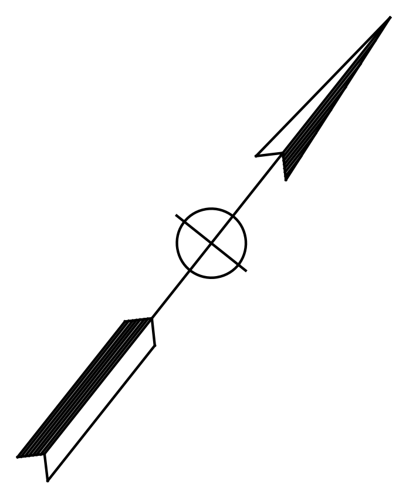

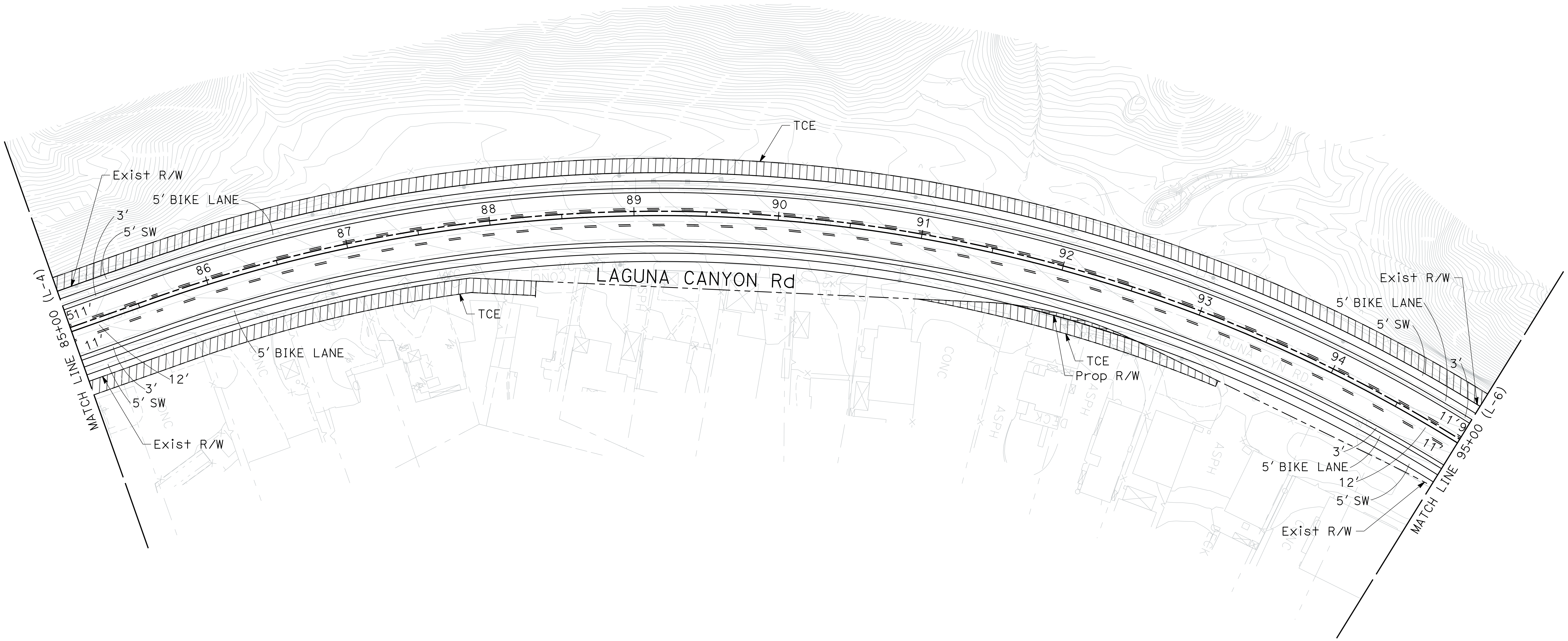

LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-5

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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GIRAIR KOTCHIAN

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CHECKED BY

NAME
STEVE CROUCH

REVISED BY
DATE REVISED

LAST REVISION 00-00-00
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
Exp.
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STATE OF CALIFORNIA

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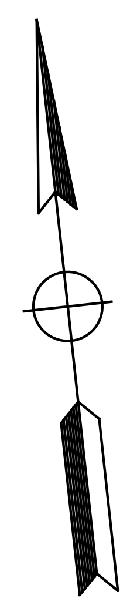

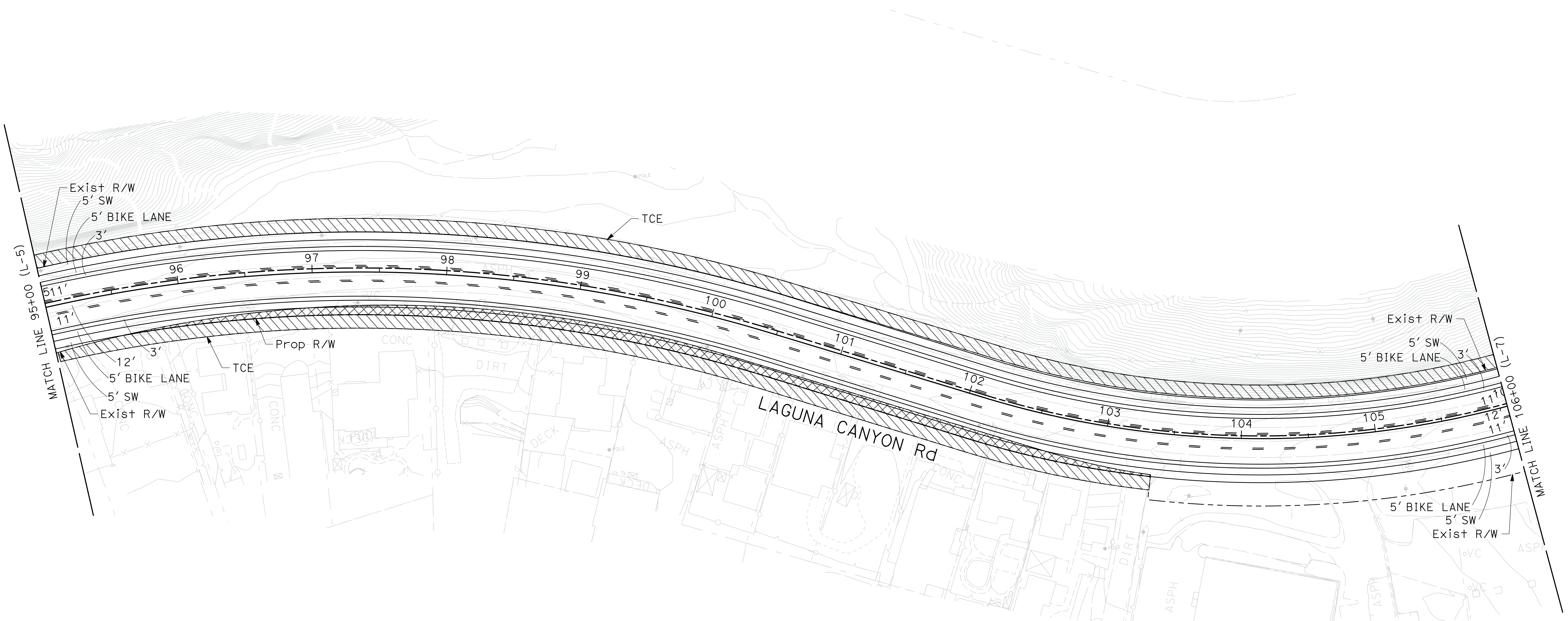

LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-6

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 12000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

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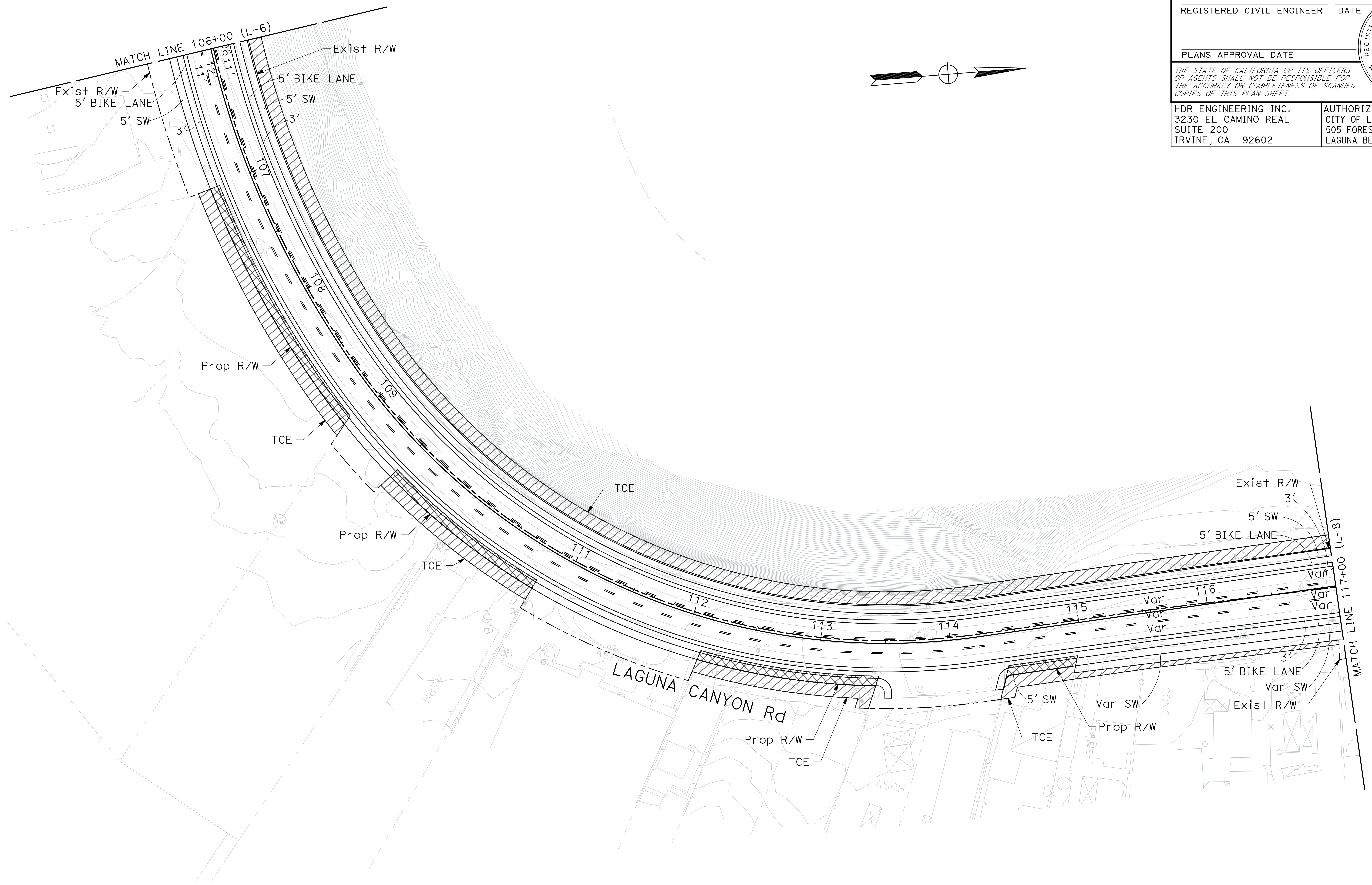
GIRAIR KOTCHIAN			STEVE CROUCH		



LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-7

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BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER   DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
Exp.
CIVIL
STATE OF CALIFORNIA

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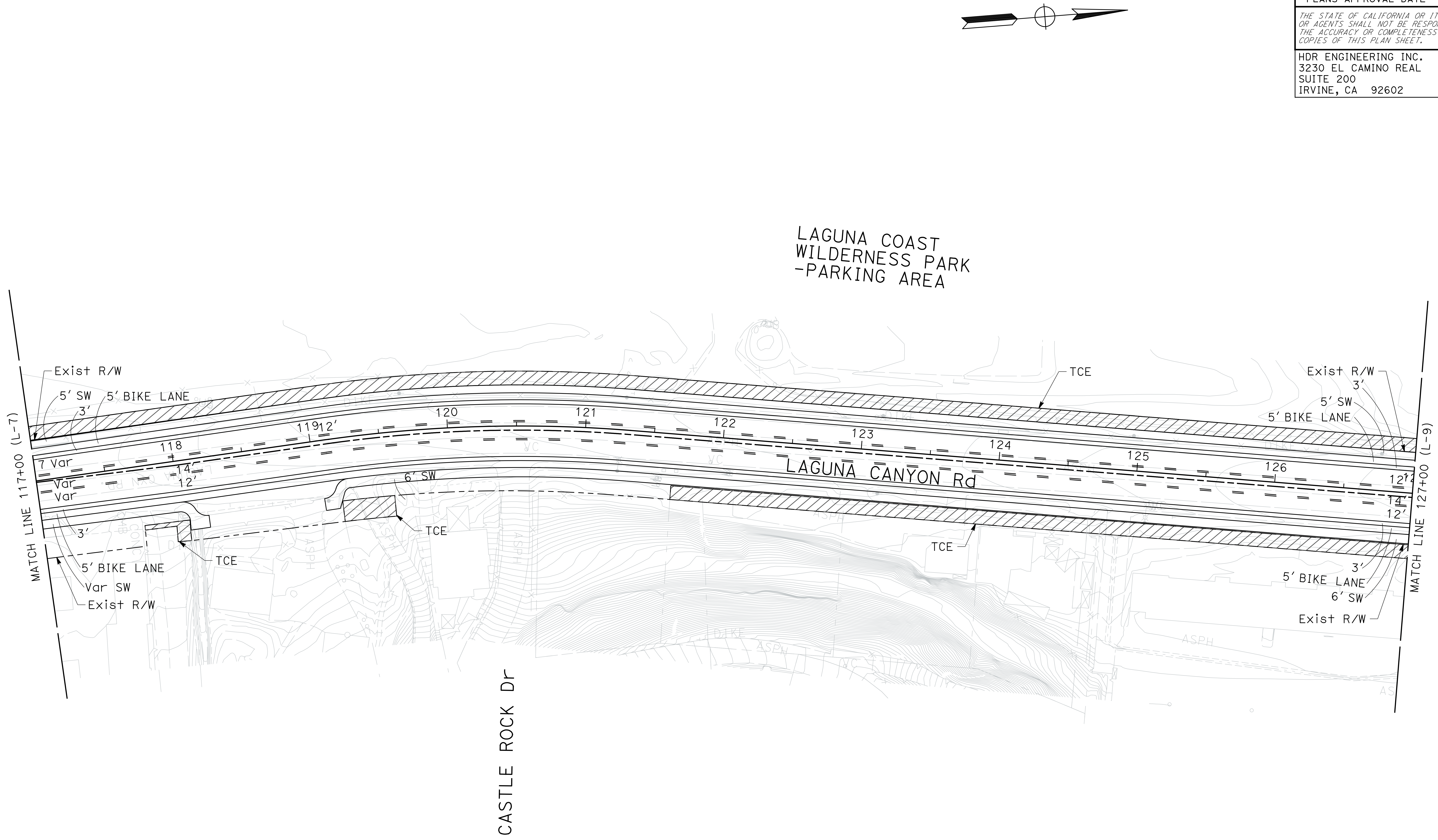

LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-8

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LAST REVISION 00-00-00
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010
USERNAME => $USER
DGN FILE => $REQUEST
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

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PLANS APPROVAL DATE

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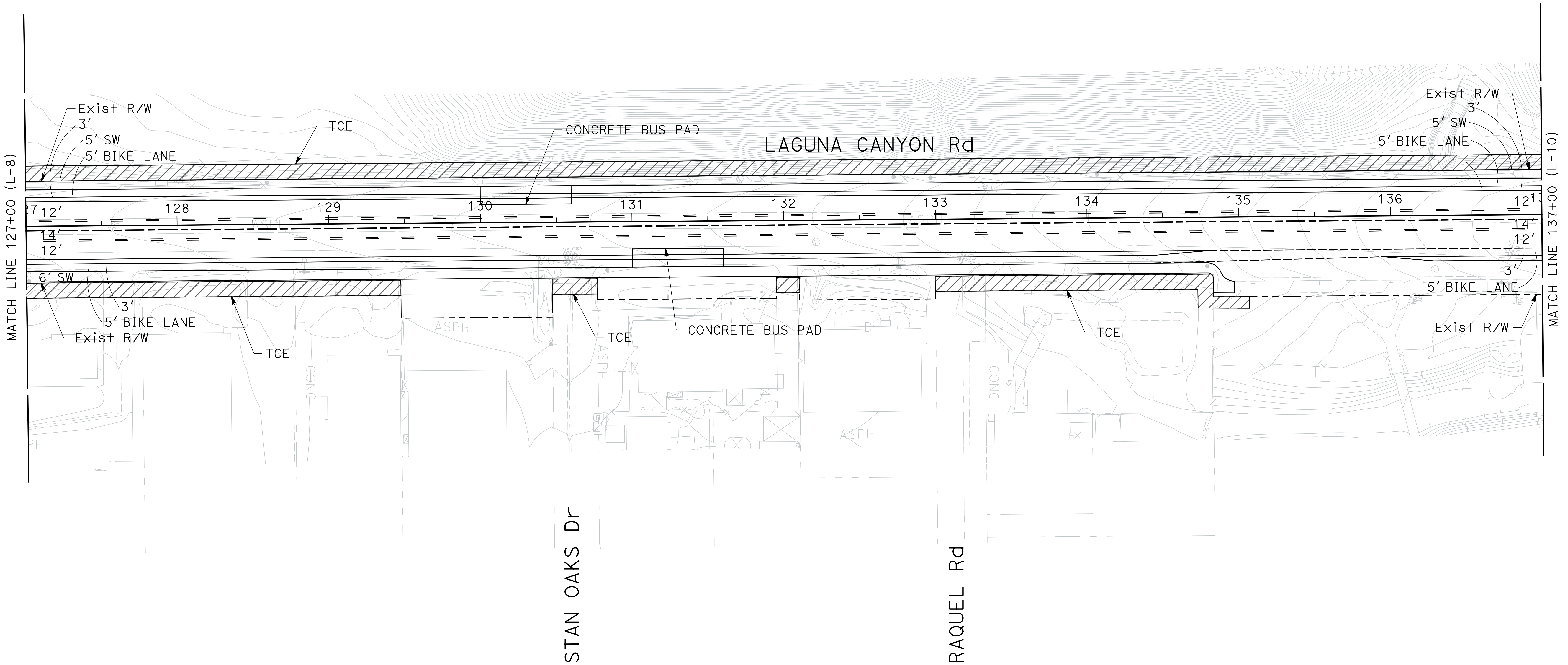

LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-9

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 12000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
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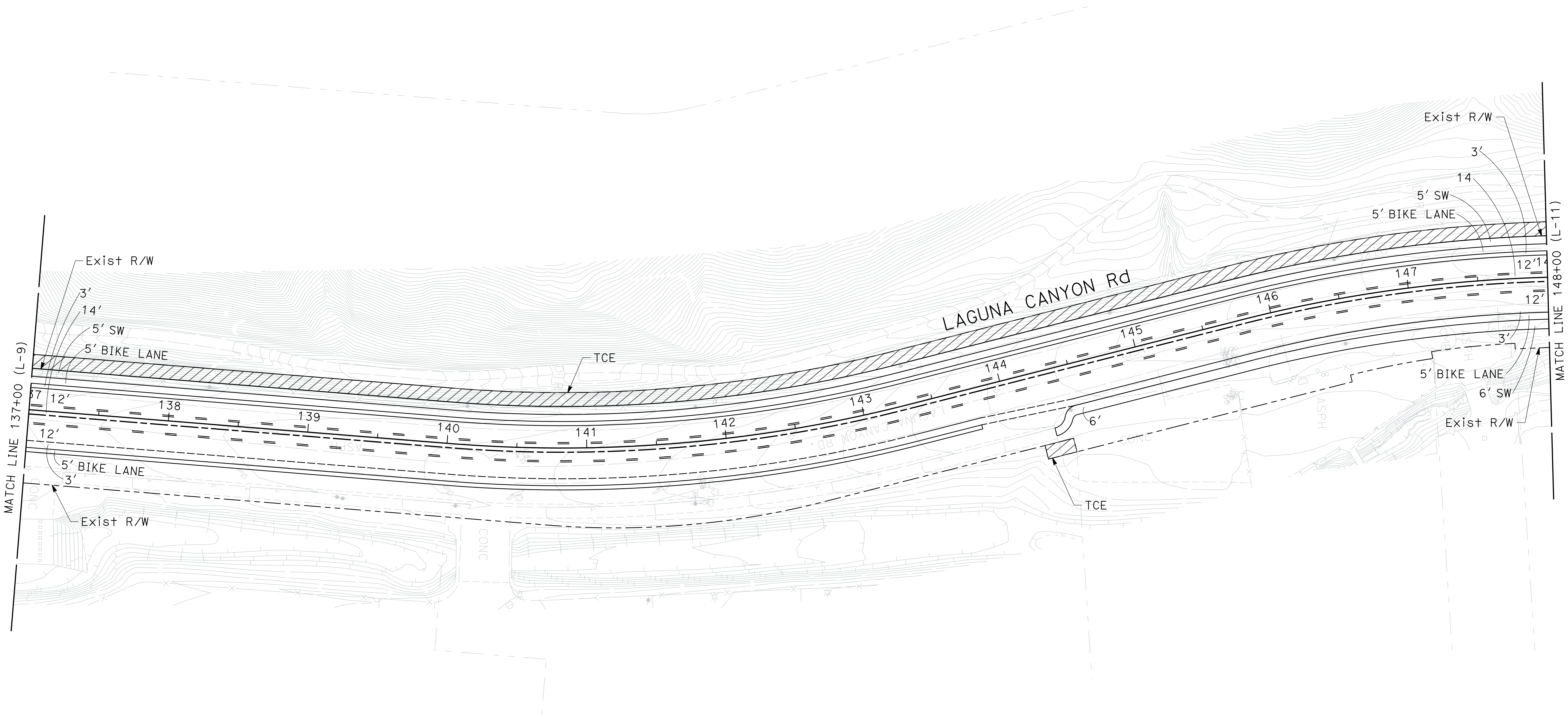

LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-10

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 12000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	X

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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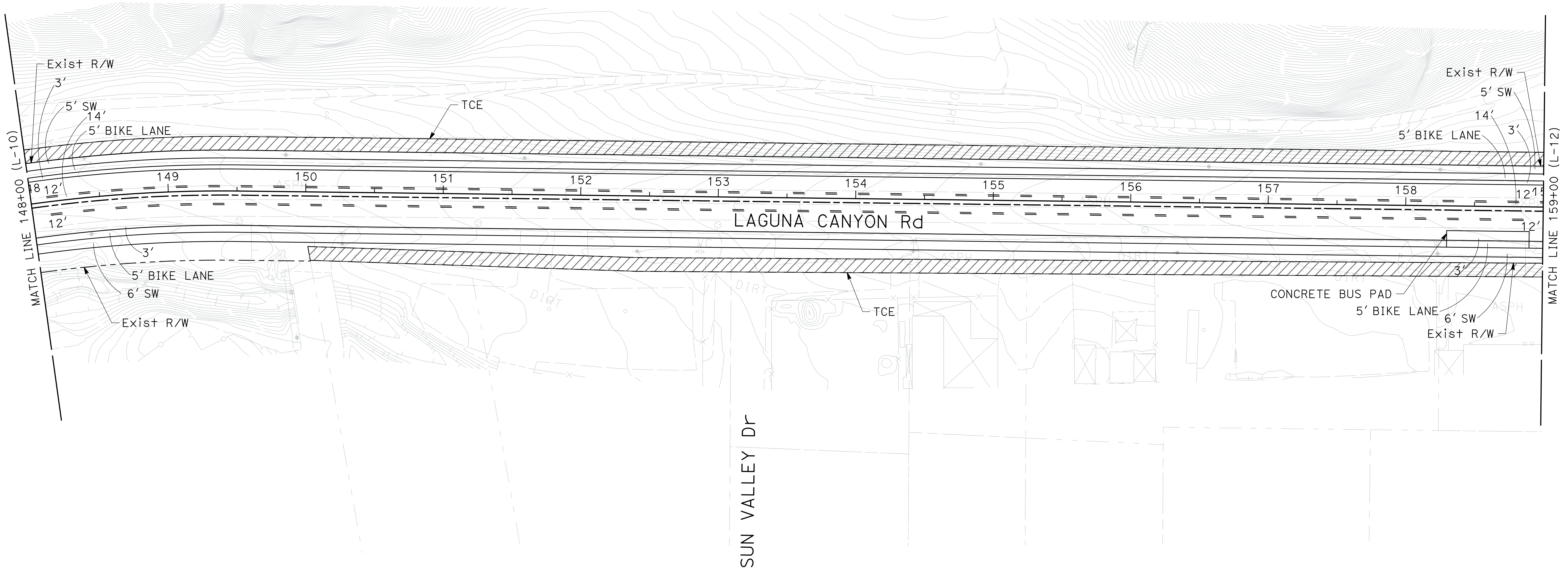

LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-11

REVISED BY
DATE REVISED

NAME
STEVE CROUCH

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GIRAIR KOTCHIAN

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TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010
USERNAME => $USER
DGN FILE => $REQUEST
RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE 12000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
Exp.
CIVIL
STATE OF CALIFORNIA

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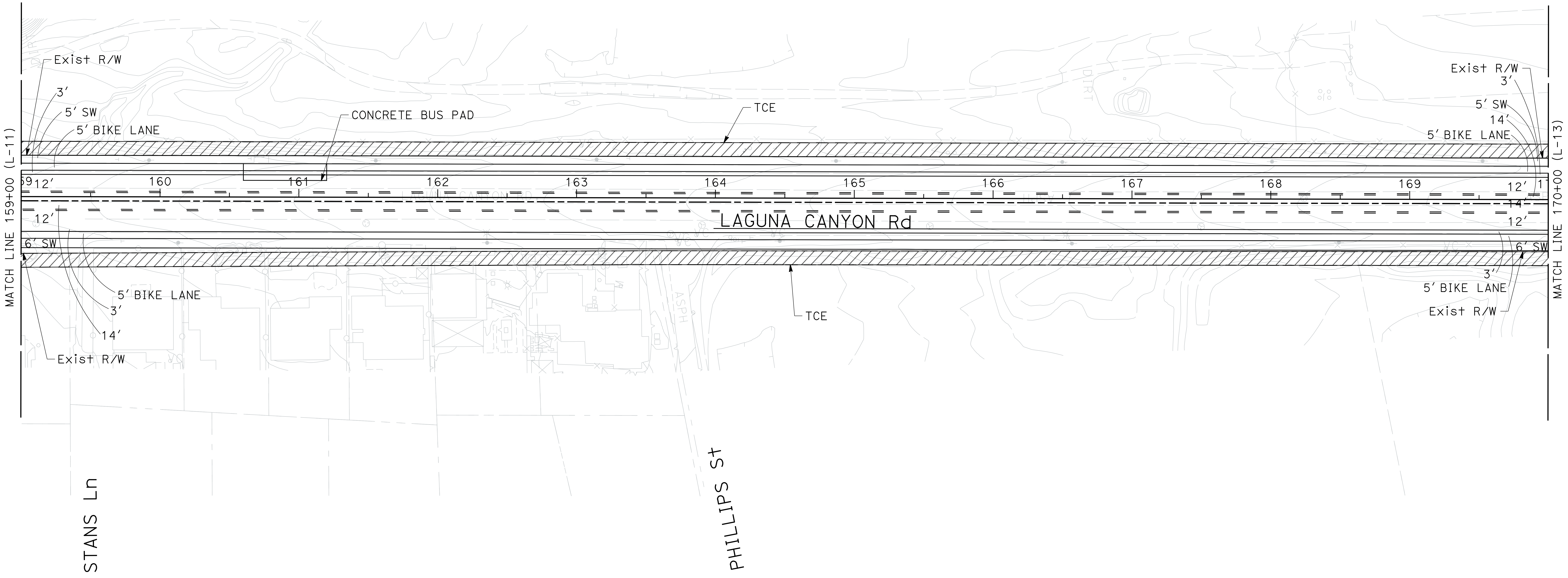

LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-12

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NAME: STEVE CROUCH

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DATE REVISED

LAST REVISION 00-00-00

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES

0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE

12000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

GIRAIR KOTCHIAN
No. C64212
Exp.
CIVIL

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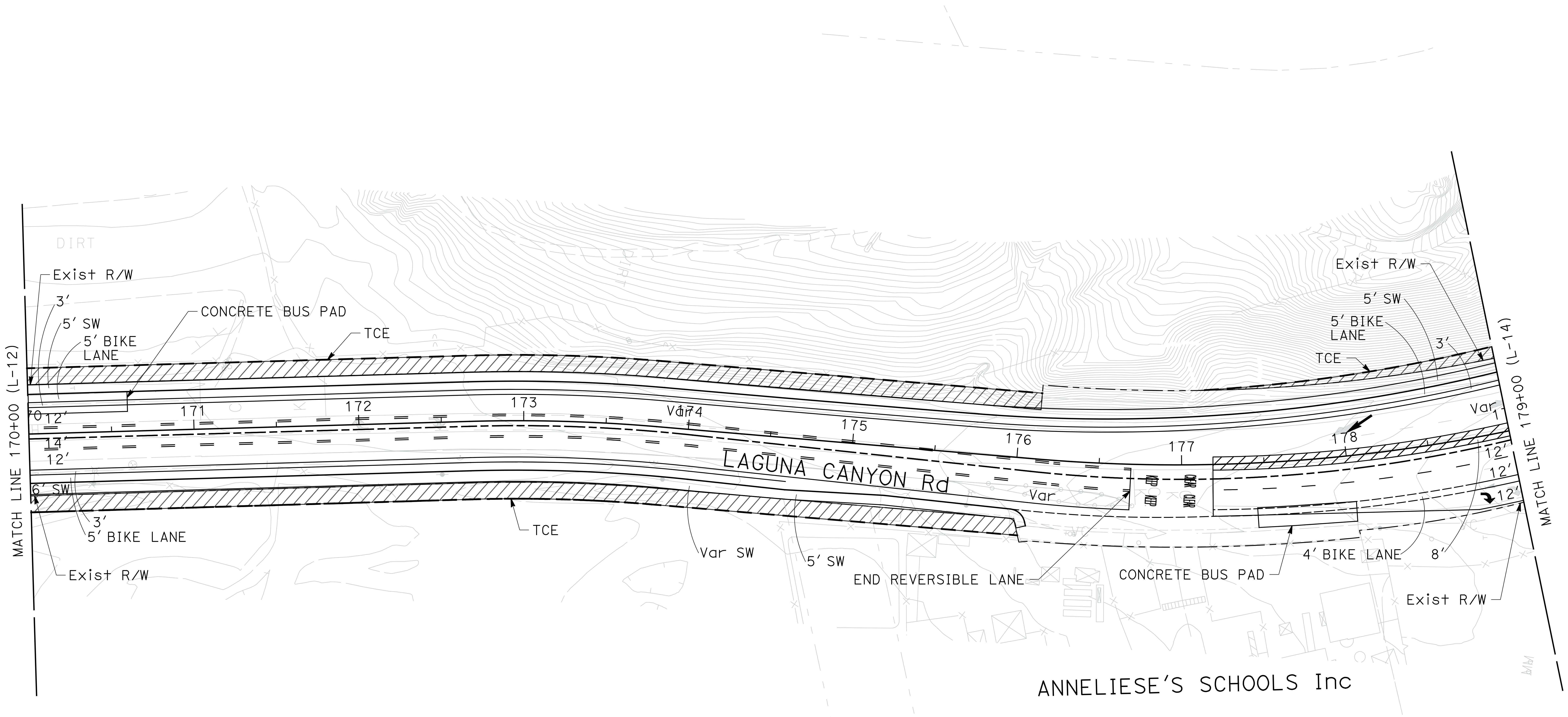

LAYOUT ALTERNATIVE 5

SCALE: 1" = 40'

L-13

DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

LAST REVISION 00-00-00

BORDER LAST REVISED 7/2/2010

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4	X	X

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

GIRAIR KOTCHIAN
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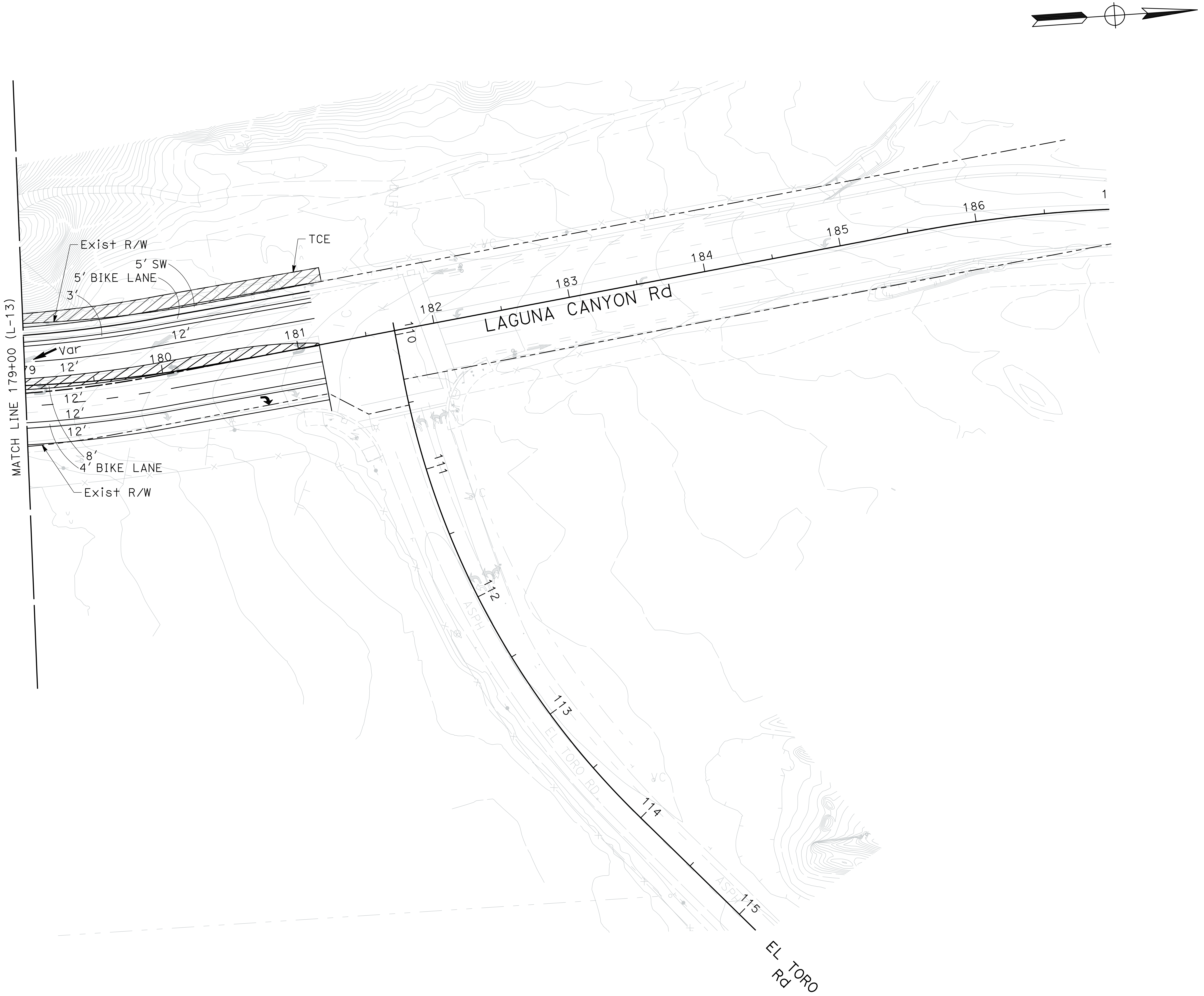

LAYOUT
ALTERNATIVE 5

SCALE: 1" = 40'

L-14

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USERNAME => $USER
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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 120000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

GIRAIR KOTCHIAN
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Exp.
CIVIL

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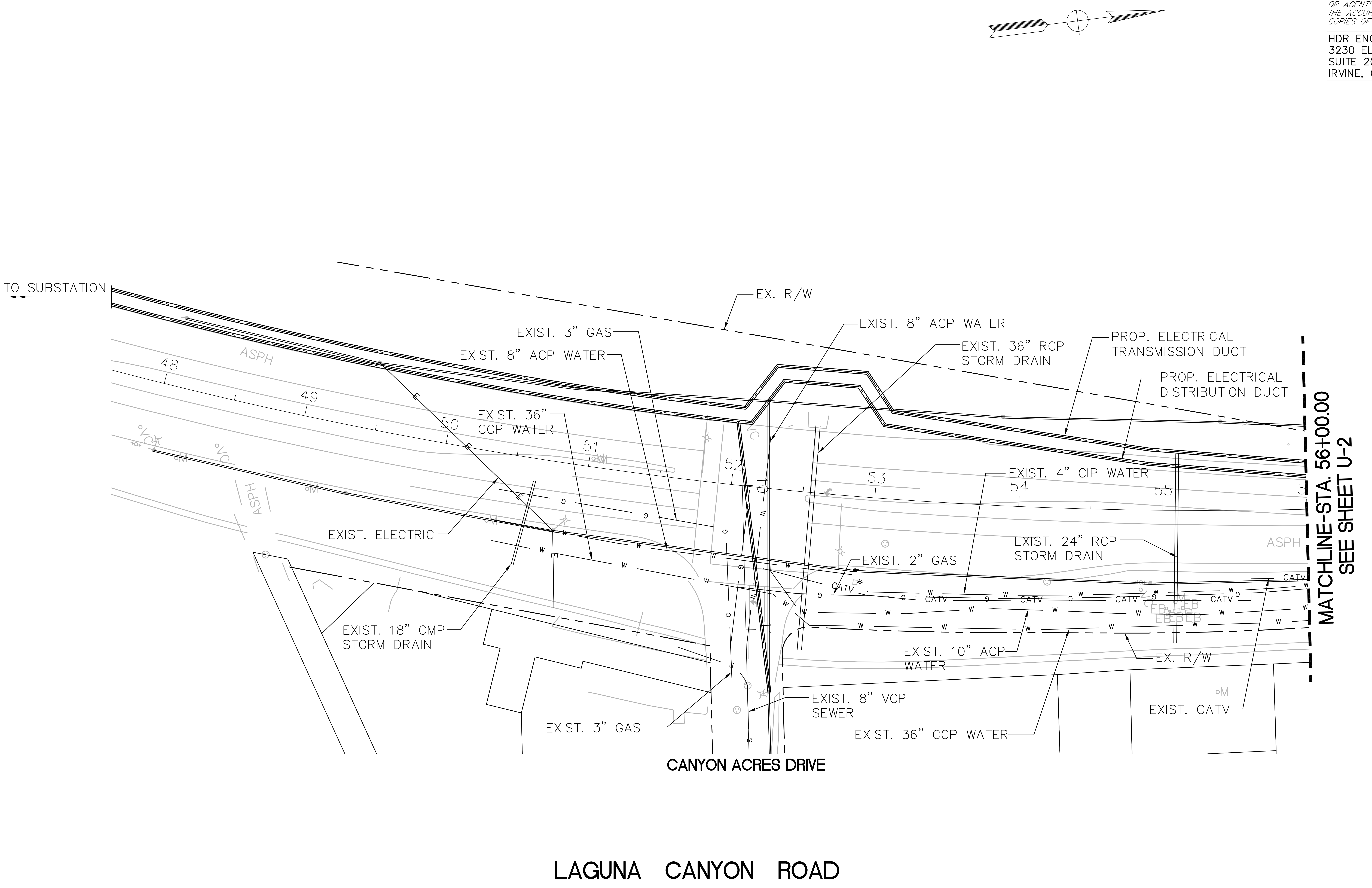

EXISTING UTILITY PLAN

SCALE: 1"=40'

U-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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LAST REVISION 00-00-00
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 0000000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
Exp.
CIVIL
STATE OF CALIFORNIA

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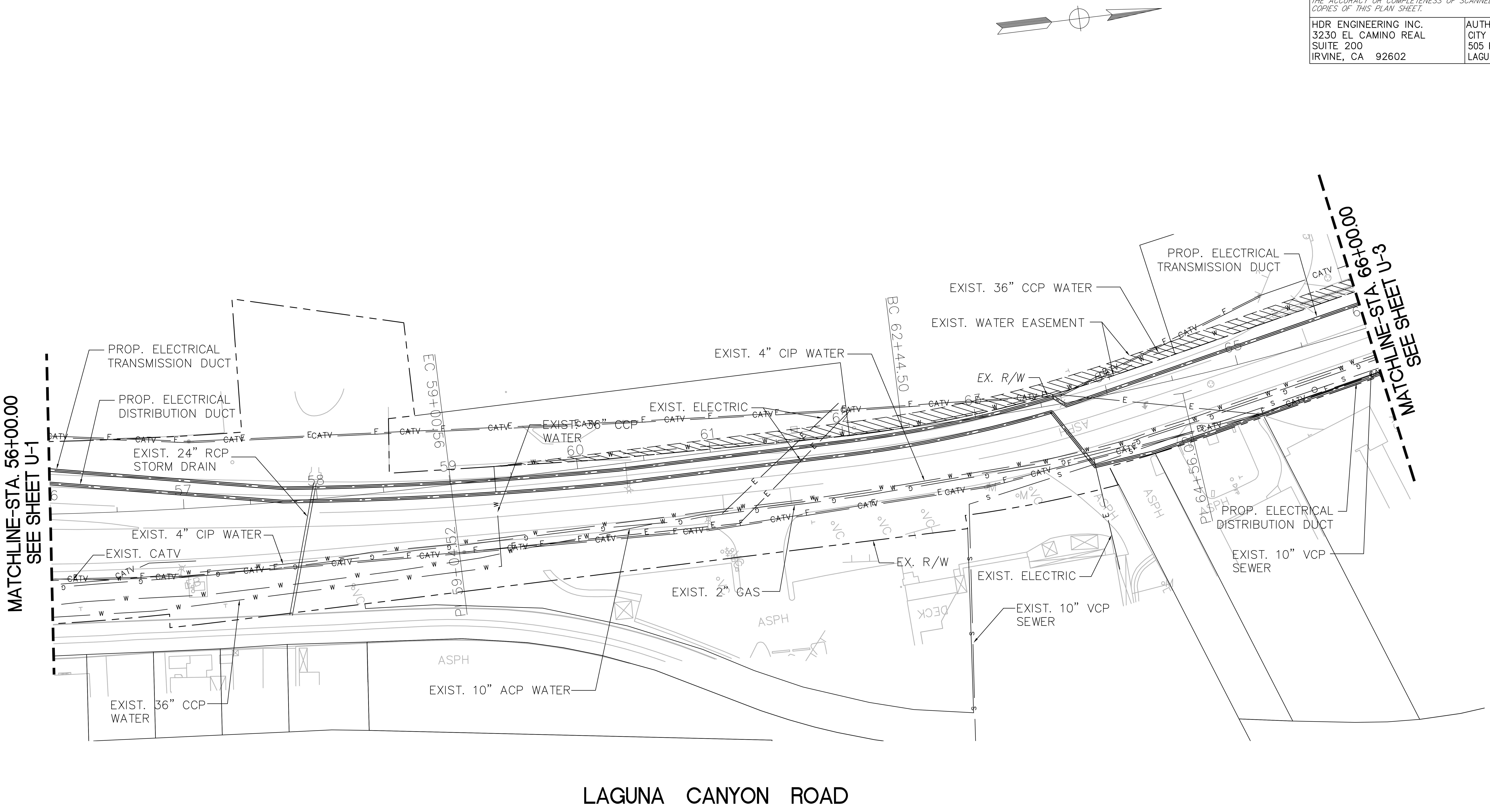

EXISTING UTILITY PLAN

SCALE: 1"=40'

U-2

STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION

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USERNAME => $USER
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RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE

0000000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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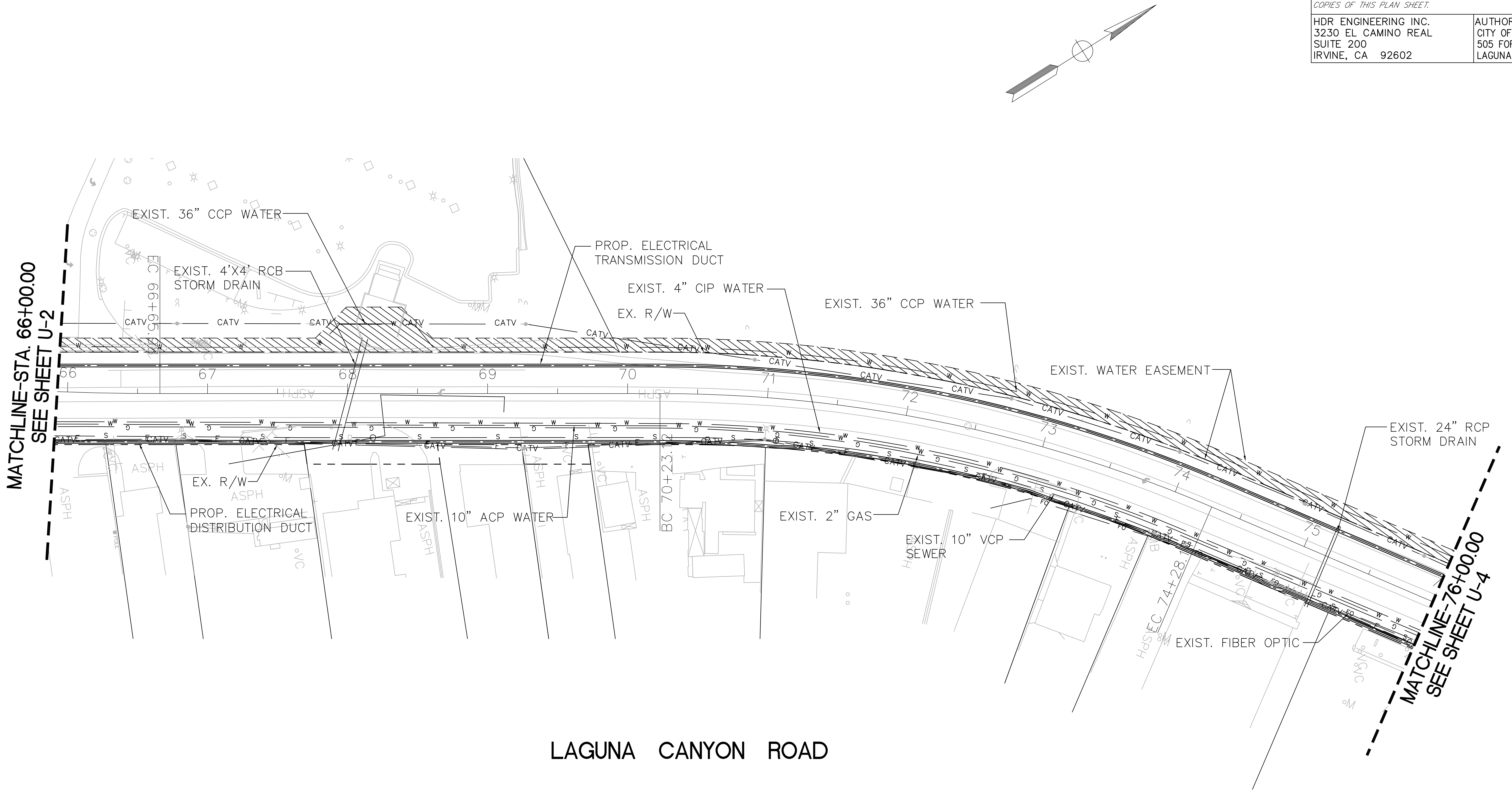

EXISTING UTILITY PLAN

SCALE: 1"=40'

U-3

STATE OF CALIFORNIA — DEPARTMENT OF TRANSPORTATION

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0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE
0000000Q670

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12	Ora	133	0.9/3.4		

REGISTERED CIVIL ENGINEER   DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
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Exp.
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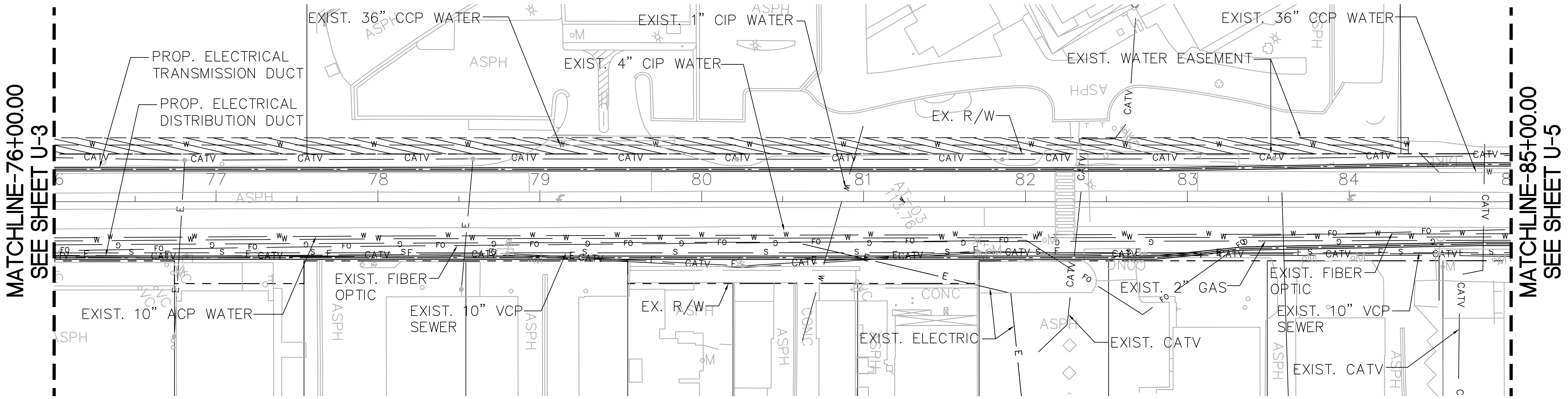

LAGUNA CANYON ROAD

EXISTING UTILITY PLAN
SCALE: 1"=40'

U-4

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LAST REVISION 00-00-00
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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4		

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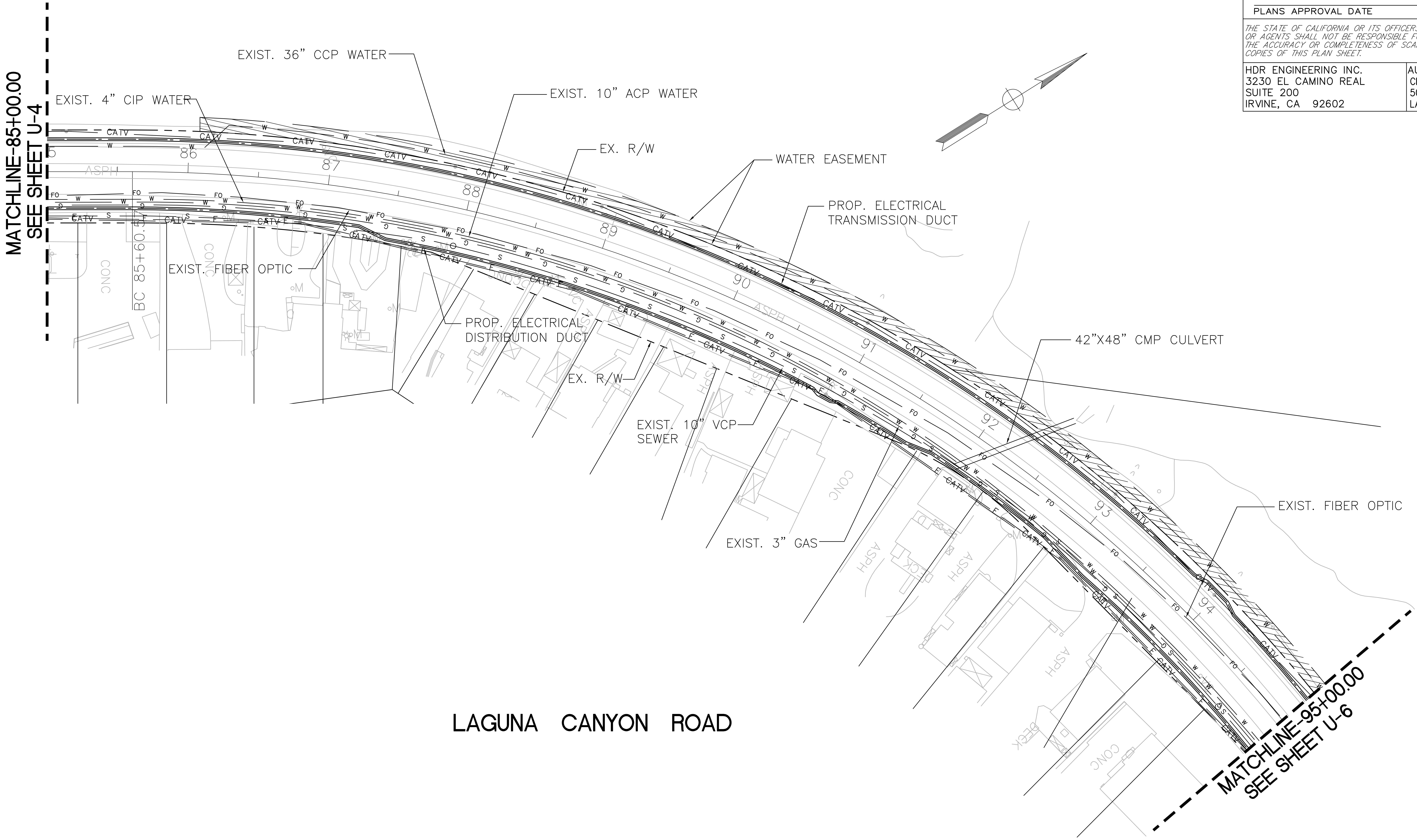
AUTHORIZING AGENCY
CITY OF LAGUNA BEACH
505 FOREST AVE.
LAGUNA BEACH, CA 92651-2394



EXISTING UTILITY PLAN

SCALE: 1"=40'

U-5

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

CONSULTANT FUNCTIONAL SUPERVISOR
GIRAIR KOTCHIAN

CALCULATED-DESIGNED BY
CHECKED BY

NAME
STEVE CROUCH

REVISED BY
DATE REVISED

LAST REVISION 00-00-00
DATE PLOTTED => $DATE
TIME PLOTTED => $TIME

BORDER LAST REVISED 7/2/2010

USERNAME => $USER
DGN FILE => $REQUEST

RELATIVE BORDER SCALE IS IN INCHES
0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 0000000Q670

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	133	0.9/3.4		

REGISTERED CIVIL ENGINEER DATE

GIRAIR KOTCHIAN
No. C64212
Exp.
CIVIL

PLANS APPROVAL DATE

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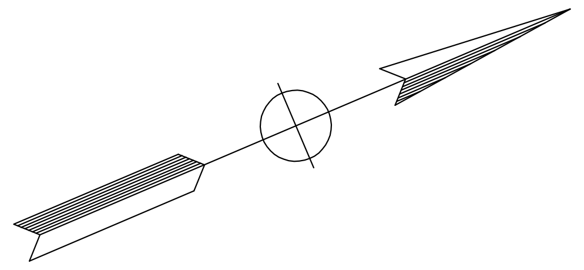

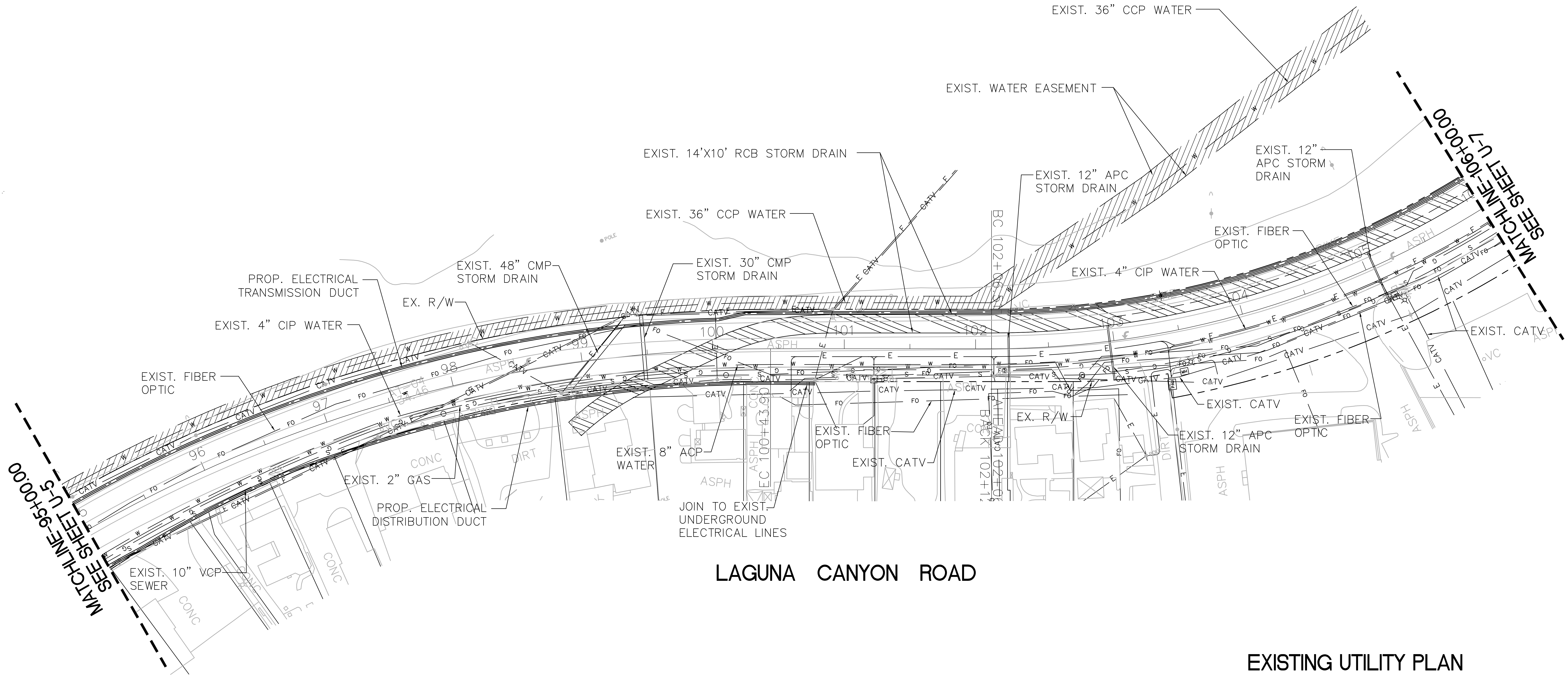

EXISTING UTILITY PLAN

SCALE: 1"=40'

U-6

STATE OF CALIFORNIA — DEPARTMENT OF TRANSPORTATION

Caltrans

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0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE

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PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
GIRAIR KOTCHIAN
No. C64212
Exp.
CIVIL
STATE OF CALIFORNIA

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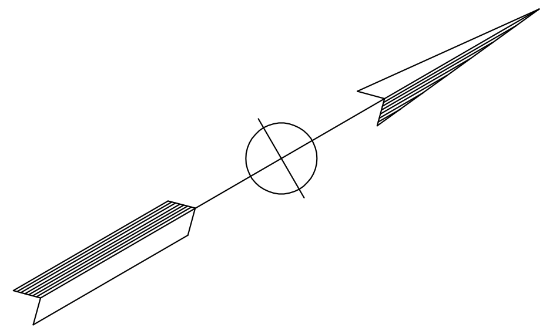

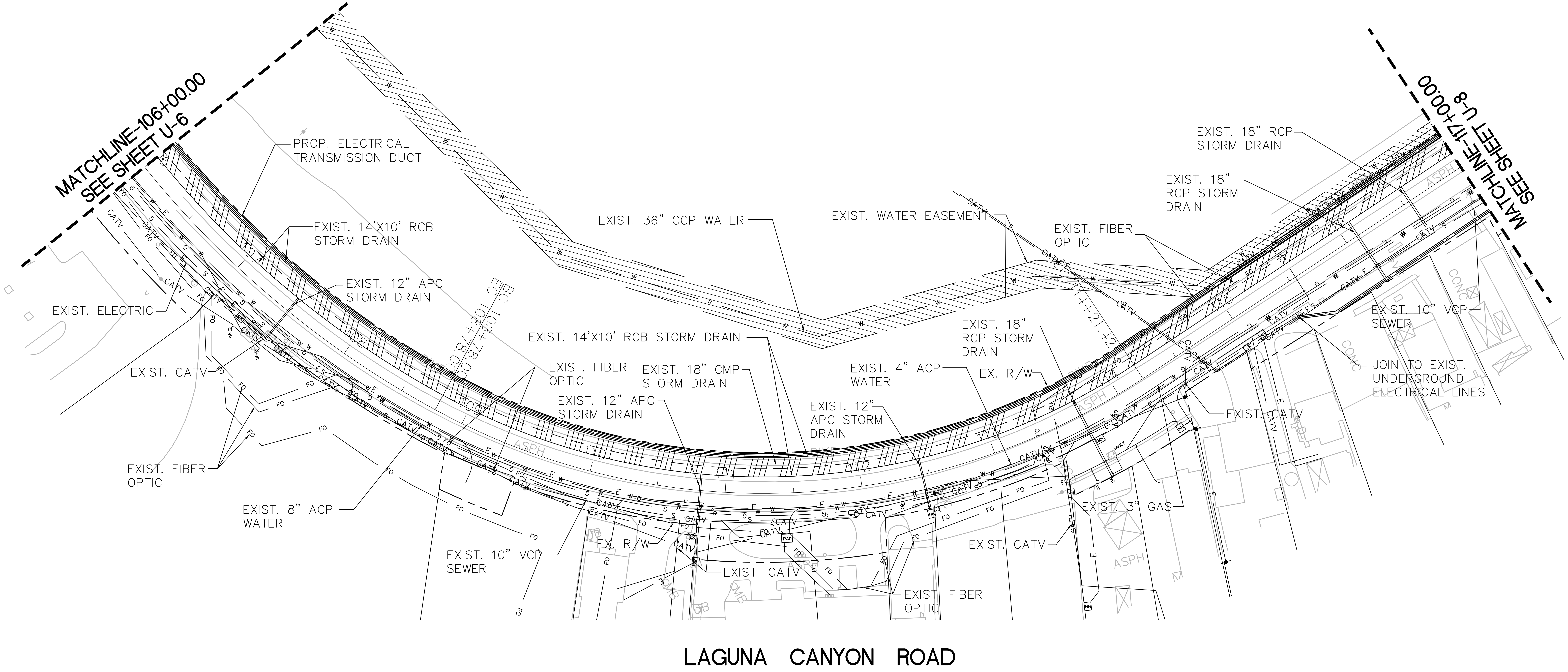

EXISTING UTILITY PLAN

SCALE: 1"=40'

U-7

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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GIRAIR KOTCHIAN			STEVE CROUCH		

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No. C64212
Exp.
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NAME	STEVE CROUCH
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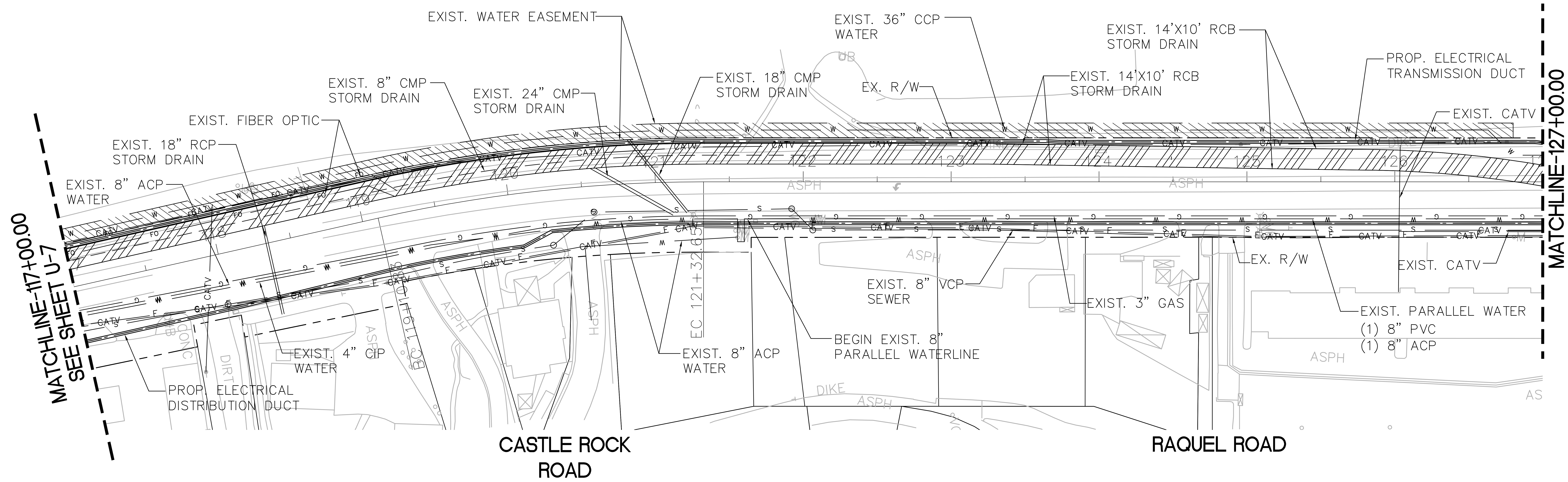

LAGUNA CANYON ROAD

EXISTING UTILITY PLAN

SCALE: 1"=40'

U-8

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0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE 0000000Q670

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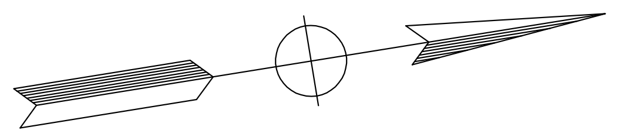

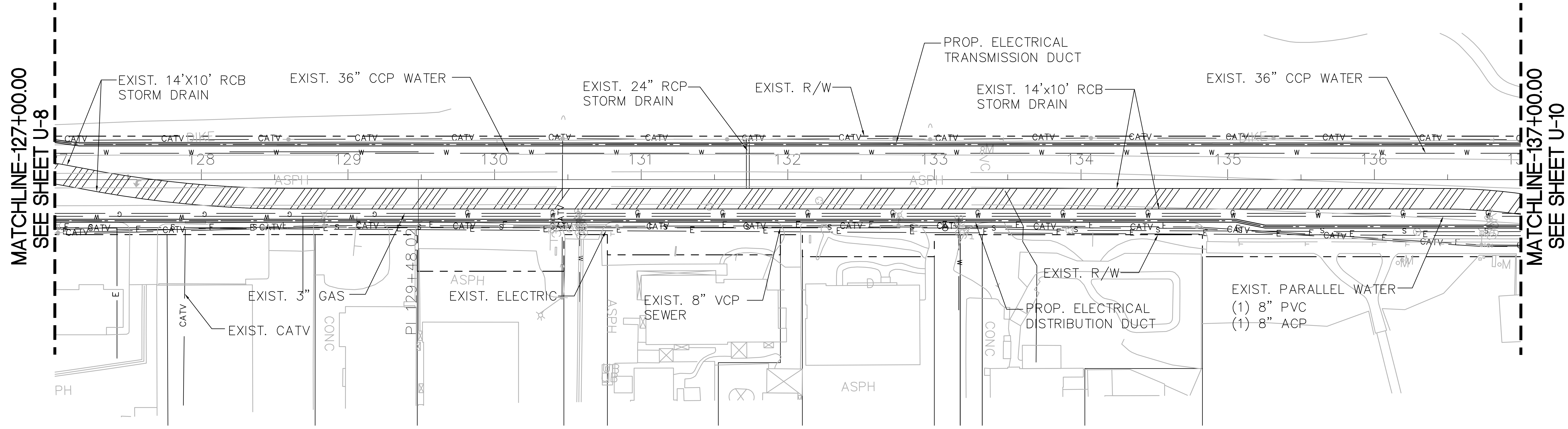

LAGUNA CANYON ROAD

EXISTING UTILITY PLAN

SCALE: 1"=40'

U-9

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE

0000000Q670

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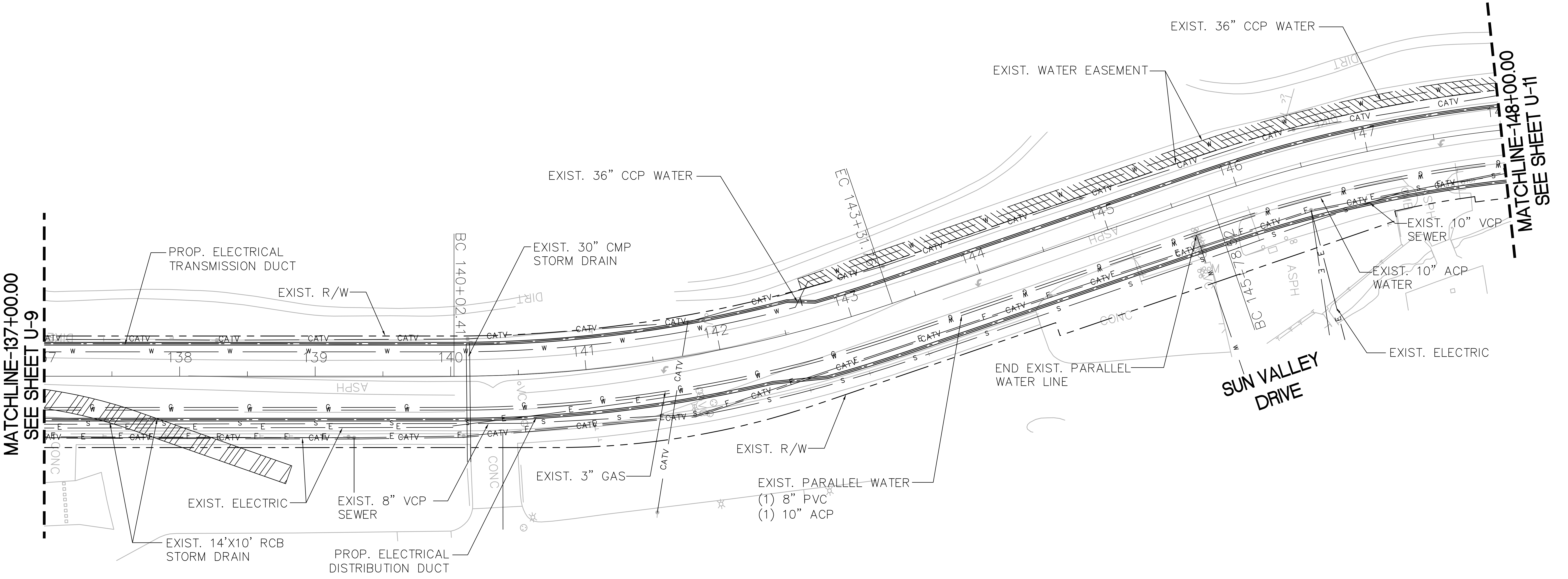

LAGUNA CANYON ROAD

EXISTING UTILITY PLAN

SCALE: 1"=40'

U-10

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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UNIT 0000
PROJECT NUMBER & PHASE 0000000Q670

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12	Ora	133	0.9/3.4		

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PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
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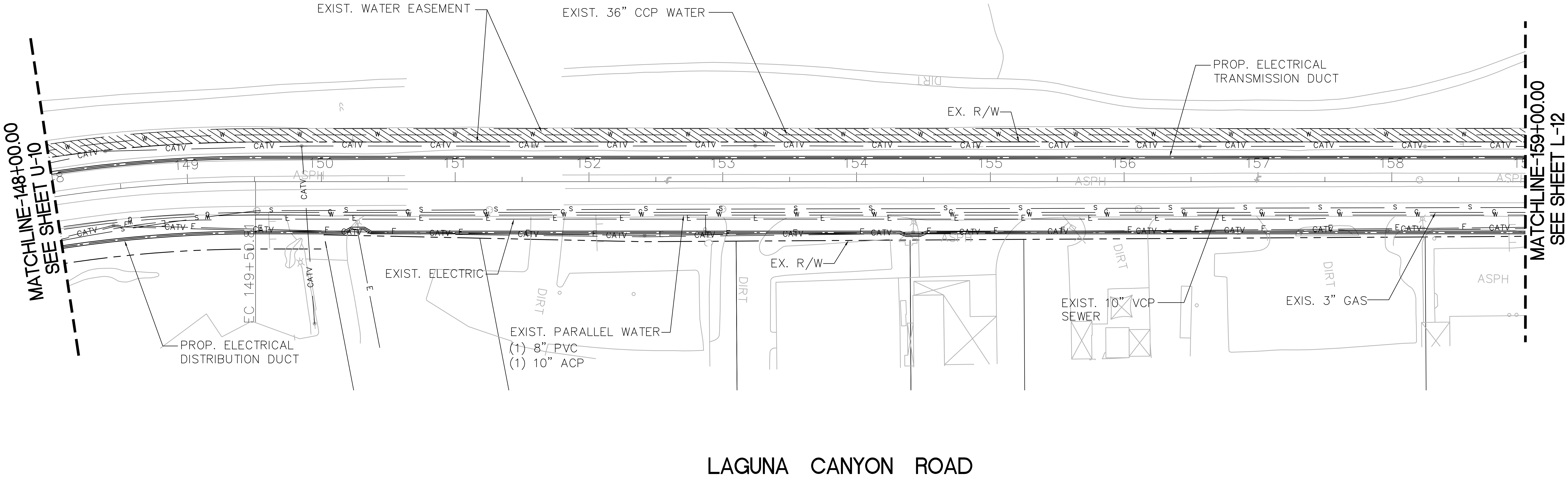

EXISTING UTILITY PLAN

SCALE: 1"=40'

U-11

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GIRAIR KOTCHIAN			STEVE CROUCH		

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PLANS APPROVAL DATE

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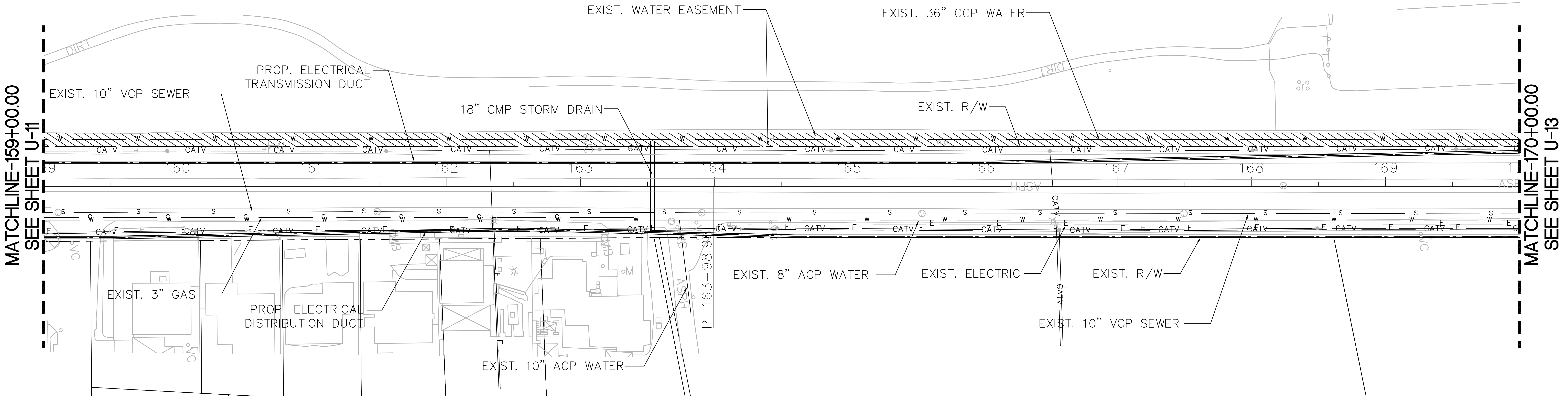

LAGUNA CANYON ROAD

EXISTING UTILITY PLAN

SCALE: 1"=40'

U-12

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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0 1 2 3
UNIT 0000
PROJECT NUMBER & PHASE
0000000Q670

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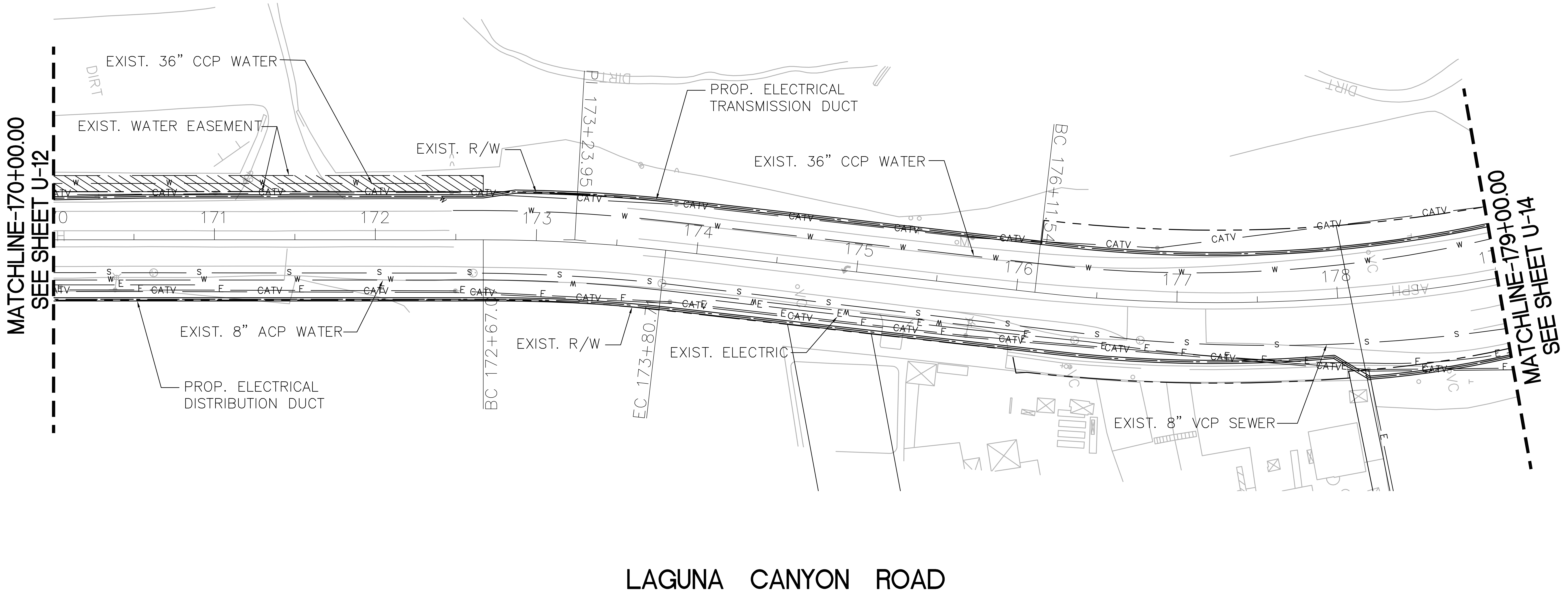

EXISTING UTILITY PLAN

SCALE: 1"=40'

U-13

STATE OF CALIFORNIA – DEPARTMENT OF TRANSPORTATION

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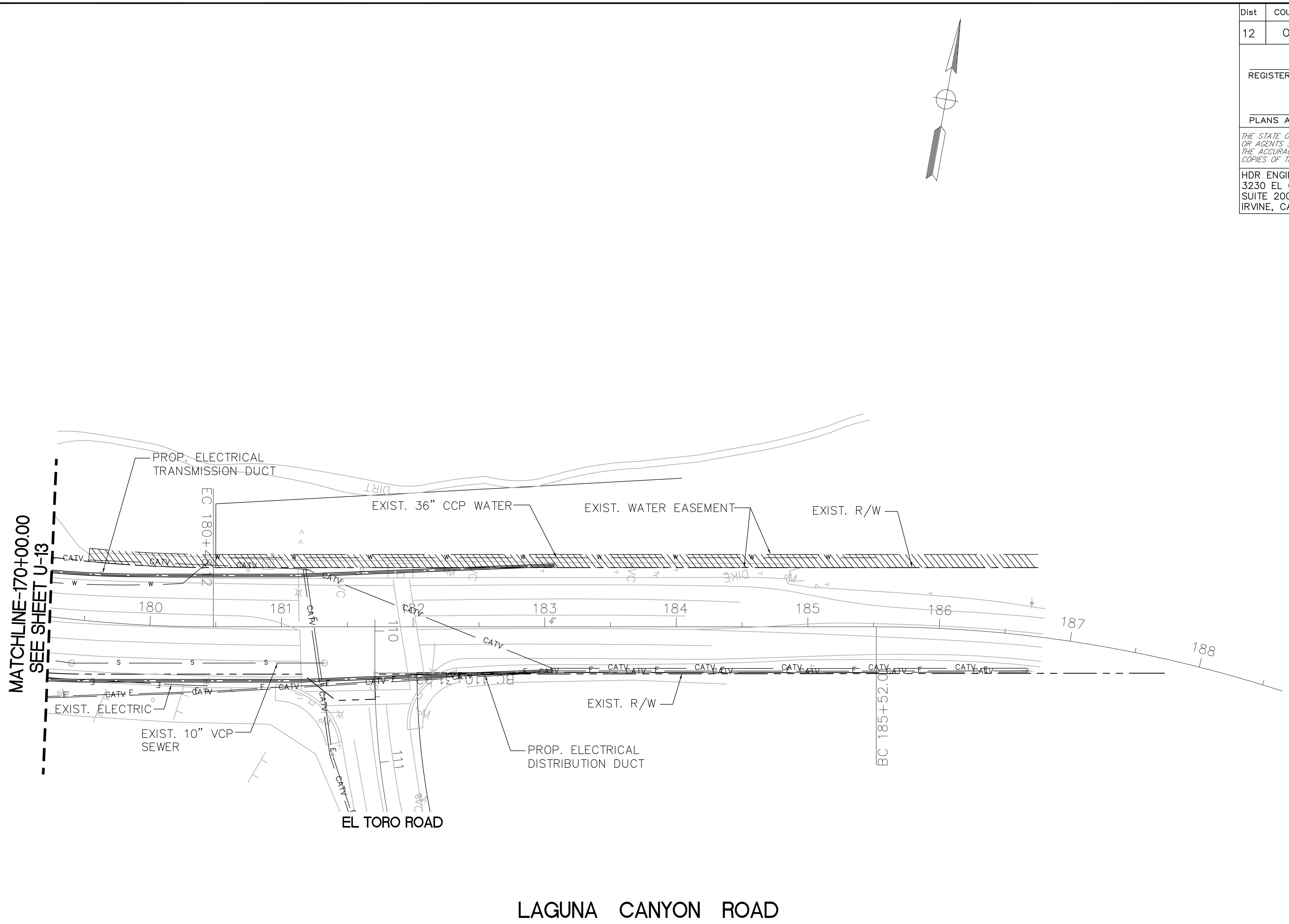

EXISTING UTILITY PLAN
SCALE: 1"=40'

U-14

STATE OF CALIFORNIA — DEPARTMENT OF TRANSPORTATION

Caltrans

CONSULTANT FUNCTIONAL SUPERVISOR: GIRAIR KOTCHIAN

CALCULATED-DESIGNED BY

CHECKED BY

NAME: STEVE CROUCH

REVISED BY

DATE REVISED

LAST REVISION 00-00-00

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UNIT 0000

PROJECT NUMBER & PHASE 0000000Q670

ATTACHMENT C

PRELIMINARY PROJECT COST ESTIMATES

PROJECT

EA: 0Q670K

EA: 0Q670K PID: ID 1217000086

PID: ID 1217000086

District-County-Route: 12-OC-133
PM: 0.9 - 3.4

Type of Estimate : PSR/PDS
Project Limits : Canyon Acres Drive to El Toro Road
Project Description: SR-133 (Laguna Canyon Road) Improvements
Scope : Underground utilities, construct bike lane, construct ped path/sidewalks & improve shoulders
Alternative : 2

SUMMARY OF PROJECT COST ESTIMATE

	Current Year Cost		Escalated Cost	
TOTAL ROADWAY COST	**$**	**28,757,200**	**$**	**39,356,214**
TOTAL STRUCTURES COST	**$**	**-**	**$**	**-**
SUBTOTAL CONSTRUCTION COST	**$**	**28,757,200**	**$**	**39,356,214**
TOTAL RIGHT OF WAY COST	**$**	**60,818,840**	**$**	**74,198,985**
TOTAL CAPITAL OUTLAY COSTS	**$**	**89,576,040**	**$**	**113,556,000**
PR/ED SUPPORT	**$**	**4,375,000**	**$**	**5,468,750**
PS&E SUPPORT	**$**	**5,000,000**	**$**	**6,250,000**
RIGHT OF WAY SUPPORT	**$**	**2,721,875**	**$**	**3,402,344**
CONSTRUCTION SUPPORT	**$**	**5,000,000**	**$**	**6,250,000**
TOTAL SUPPORT COST	**$**	**17,096,875**	**$**	**21,371,094**
TOTAL PROJECT COST	**$**	**106,672,915**	**$**	**134,927,094**

If Project has been programmed enter Programmed Amount

	Month	/	Year
Date of Estimate (Month/Year)	6	/	2022
Estimated Construction Start (Month/Year)	6	/	2028
Number of Working Days =			650
Estimated Mid-Point of Construction (Month/Year)	9	/	2029
Estimated Construction End (Month/Year)	9	/	2030
Number of Plant Establishment Days			261

Estimated Project Schedule

PID Approval	October-18
PA/ED Approval	December-20
PS&E	December-22
RTL	May-23
Begin Construction	July-23

Cost Estimate Certifier	Girair A. Kotchian **Girair Kotchian, PE - Consultant PM**	**6/17/2022** **Date**	(714) 730-2493 **Phone**
Approved by Program Manager	**Tom Perez, City Program Manager**	**6/17/2022** **Date**	(949) 464-6688 **Phone**

I. ROADWAY ITEMS SUMMARY

	Section	Cost
1	**Earthwork**	$ 653,300
2	**Pavement Structural Section**	$ 3,955,100
3	**Drainage**	$ 2,104,600
4	**Specialty Items**	$ 54,500
5	**Environmental**	$ 1,530,600
6	**Traffic Items**	$ 4,509,800
7	**Detours**	$ -
8	**Minor Items**	$ 1,921,200
9	**Roadway Mobilization**	$ 1,473,000
10	**Supplemental Work**	$ 828,200
11	**State Furnished**	$ 1,329,200
12	**Time-Related Overhead**	$ 1,473,000
13	**Roadway Contingency**	$ 8,924,700

TOTAL ROADWAY ITEMS $ 28,757,200

Estimate Prepared By : Stephen P.A. Crouch **6/17/2022** (714) 833-2743
Stephen P.A. Crouch Date Phone

Estimate Reviewed By : Girair A. Kotchian **6/17/2022** (714) 730-2493
Girair Kotchian, PE - Consultant PM 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
190101	Roadway Excavation	CY	10,305	x	60.00	=	$	618,300
19010X	Roadway Excavation (Type X) ADL	CY		x		=	$	-
194001	Ditch Excavation	CY		x		=	$	-
19801X	Imported Borrow	CY/TON		x		=	$	-
192037	Structure Excavation (Retaining Wall)	CY		x		=	$	-
193013	Structure Backfill (Retaining Wall)	CY		x		=	$	-
193031	Pervious Backfill Material (Retaining Wall)	CY		x		=	$	-
16010X	Clearing & Grubbing	LS	1	x	20,000.00	=	$	20,000
170101	Develop Water Supply	LS	1	x	15,000.00	=	$	15,000
19801X	Imported Borrow	CY/TON		x		=	$	-
210130	Duff	ACRE		x		=	$	-
XXXXXX	Some Item	Unit						

TOTAL EARTHWORK SECTION ITEMS $ 653,300

SECTION 2: PAVEMENT STRUCTURAL SECTION

Item code		Unit	Quantity		Unit Price ($)			Cost
401050	Jointed Plain Concrete Pavement	CY	157	x	900.00	=	$	141,300
400050	Continuously Reinforced Concrete Pavement	CY		x		=	$	-
404092	Seal Pavement Joint	LF		x		=	$	-
404093	Seal Isolation Joint	LF		x		=	$	-
413117	Seal Concrete Pavement Joint (Silicone)	LF		x		=	$	-
413118	Seal Pavement Joint (Asphalt Rubber)	LF		x		=	$	-
280010	Rapid Strength Concrete Base	CY		x		=	$	-
410095	Dowel Bar (Drill and Bond)	EA		x		=	$	-
390132	Hot Mix Asphalt (Type A)	TON	6,390	x	160.00	=	$	1,022,400
390137	Rubberized Hot Mix Asphalt (Gap Graded)	TON	3,725	x	135.00	=	$	502,875
39300X	Geosynthetic Pavement Interlayer (Type X)	SQYD		x		=	$	-
26020X	Class 2 Aggregate Base	CY	2,385	x	85.00	=	$	202,725
390401	HMA - Open Graded (Open Graded Friction Course)	TON	1,165	x	160.00	=	$	186,400
290201	Asphalt Treated Permeable Base	CY	2,381	x	170.00	=	$	404,770
250401	Class 4 Aggregate Subbase	CY	2,976	x	95.00	=	$	282,720
374002	Asphaltic Emulsion (Fog Seal Coat)	TON		x		=	$	-
397005	Tack Coat	TON		x		=	$	-
377501	Slurry Seal	TON		x		=	$	-
3750XX	Screenings (Type XX)	TON		x		=	$	-
374492	Asphaltic Emulsion (Polymer Modified)	TON		x		=	$	-
370001	Sand Cover (Seal)	TON		x		=	$	-
731504	Minor Concrete (Curb and Gutter)	CY	1,485	x	440.00	=	$	653,400
731521	Minor Concrete (Sidewalk)	CY	784	x	600.00	=	$	470,400
39407X	Place Hot Mix Asphalt Dike (Type X)	LF		x		=	$	-
150771	Remove Asphalt Concrete Dike	LF		x		=	$	-
420201	Grind Existing Concrete Pavement	SQYD		x		=	$	-
150860	Remove Base and Surfacing	CY		x		=	$	-
390095	Replace Asphalt Concrete Surfacing	CY		x		=	$	-
15312X	Remove Concrete	LF/CY/LS		x		=	$	-
394090	Place Hot Mix Asphalt (Miscellaneous Area)	SQYD		x		=	$	-
153103	Cold Plane Asphalt Concrete Pavement	SQYD	4,401	x	20.00	=	$	88,020
39405X	Shoulder Rumble Strip (HMA, X-In Indentations)	STA		x		=	$	-
413113	Repair Spalled Joints, Polyester Grout	SQYD		x		=	$	-
420102	Groove Existing Concrete Pavement	SQYD		x		=	$	-
390136	Minor Hot Mix Asphalt	TON		x		=	$	-
394095	Roadside Paving (Miscellaneous Areas)	SQYD		x		=	$	-
XXXXXX	Open Grade Finishing Course (OGFC)	CY		x		=	$	-

TOTAL PAVEMENT STRUCTURAL SECTION ITEMS $ 3,955,100

SECTION 3: DRAINAGE

Item code		Unit	Quantity		Unit Price ($)			Cost
15080X	Remove Culvert	EA/LF		x		=	$	-
150820	Modify Inlet	EA		x		=	$	-
155232	Sand Backfill	CY		x		=	$	-
15020X	Abandon Culvert	EA/LF		x		=	$	-
152430	Adjust Inlet	LF		x		=	$	-
155003	Cap Inlet	EA		x		=	$	-
510501	Minor Concrete	CY		x		=	$	-
510502	Minor Concrete (Minor Structure)	CY	62	x	2,000.00	=	$	124,000
5105XX	Minor Concrete (Type XX)	CY		x		=	$	-
620XXX	XX" Alternative Pipe Culvert (Type X)	LF		x		=	$	-
6411XX	XX" Plastic Pipe	LF		x		=	$	-
65XXXX	24" Reinforced Concrete Pipe (Type X)	LF	2,023	x	200.00	=	$	404,600
6650XX	36" Reinforced Concrete Pipe (Type X)	LF	1,200	x	260.00	=	$	312,000
68XXXX	XX" Plastic Pipe (Edge Drain)	LF		x		=	$	-
69011X	XX" Corrugated Steel Pipe Downdrain (0.XXX" Thic	LF		x		=	$	-
70321X	XX" Corrugated Steel Pipe Inlet (0.XXX" Thick)	LF		x		=	$	-
70XXXX	XX" Corrugated Steel Pipe Riser (0.XXX" Thick)	LF		x		=	$	-
7050XX	XX" Steel Flared End Section	EA		x		=	$	-
703233	Grated Line Drain	LF		x		=	$	-
72XXXX	Rock Slope Protection (Type and Method)	CY/TON		x		=	$	-
72901X	Rock Slope Protection Fabric (Class X)	SQYD		x		=	$	-
721420	Concrete (Ditch Lining)	CY		x		=	$	-
721430	Concrete (Channel Lining)	CY		x		=	$	-
750001	Miscellaneous Iron and Steel	LB		x		=	$	-
750029	Inlet Frame and Grate	EA	15	x	927.00	=	$	13,905
7500xx	Other Drainage Items (7% of Roadway)	LS	1	x	1,250,000.00	=	$	1,250,000

TOTAL DRAINAGE ITEMS $ 2,104,600

SECTION 4: SPECIALTY ITEMS

Item code		Unit	Quantity		Unit Price ($)			Cost
080050	Progress Schedule (Critical Path Method)	LS	1	x	40,000.00	=	$	40,000
582001	Sound Wall (Masonry Block)	SQFT		x		=	$	-
510530	Minor Concrete (Wall)	CY		x		=	$	-
15325X	Remove Sound Wall	LF/LS		x		=	$	-
070030	Lead Compliance Plan	LS		x		=	$	-
141120	Treated Wood Waste	LB		x		=	$	-
153221	Remove Concrete Barrier	LF		x		=	$	-
150661	Remove Metal Beam Guard Railing	LF	200	x	10.00	=	$	2,000
150668	Remove Flared End Section	EA	3	x	500.00	=	$	1,500
8000XX	Chain Link Fence (Type XX)	LF		x		=	$	-
80XXXX	XX" Chain Link Gate (Type CL-6)	EA		x		=	$	-
832005	Midwest Guardrail System	LF	200	x	40.00	=	$	8,000
839301	Single Thrie Beam Barrier	LF		x		=	$	-
839310	Double Thrie Beam Barrier	LF		x		=	$	-
839521	Cable Railing	LF		x		=	$	-
839539	Terminal System (Type SKT)	EA	3	x	1,000.00	=	$	3,000
839585	Alternative Flared Terminal System	EA		x		=	$	-
839584	Alternative In-line Terminal System	EA		x		=	$	-
4906XX	CIDH Concrete Piling (Insert Diameter)	LF		x		=	$	-
839XXX	Crash Cushion (Insert Type)	EA		x		=	$	-
839701	Bike Trail Barrier (Type TBD)	LF		x		=	$	-
520103	Bar Reinforced Steel (Retaining Wall)	LB		x		=	$	-
510060	Structural Concrete, Retaining Wall	CY		x		=	$	-
513553	Retaining Wall (Masonry Wall)	SQFT	1,500	x		=	$	-
511035	Architectural Treatment	SQFT		x		=	$	-
598001	Anti-Graffiti Coating	SQFT		x		=	$	-
203070	Rock Stain	SQFT		x		=	$	-
5136XX	Reinforced Concrete Crib Wall (Type X)	SQFT		x		=	$	-
83954X	Transition Railing (Type X)	EA		x		=	$	-
597601	Prepare and Stain Concrete	SQFT		x		=	$	-
839561	Rail Tensioning Assembly	EA		x		=	$	-
83958X	Some Item	EA		x		=	$	-
839701	Some Item	Unit		x		=	$	-

TOTAL SPECIALTY ITEMS $ 54,500

SECTION 5: ENVIRONMENTAL

5A - ENVIRONMENTAL MITIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost
14XXXX	Biological Mitigation	LS	1	x	20,000.00	=	$	20,000
14XXXX	Archaeological Commitments	LS	1	x	10,000.00	=	$	10,000
14XXXX	Historical Commitments	LS	1	x	10,000.00	=	$	10,000
130670	Temporary Reinforced Silt Fence	LF		x		=	$	-
141000	Temporary Fence (Type ESA)	LF		x		=	$	-
14XXXX	Other Environmental Mitigation	LS	1	x	250,000.00	=	$	250,000
					Subtotal Environmental Mitigation		$	290,000

5B - LANDSCAPE AND IRRIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost
20XXXX	Highway Planting	LS	1	x	300,000.00	=	$	300,000
20XXXX	Irrigation System	LS	1	x	100,000.00	=	$	100,000
204099	Plant Establishment Work	LS	1	x	50,000.00	=	$	50,000
204101	Extend Plant Establishment Work	LS		x		=	$	-
20XXXX	Follow-up Landscape Project	LS		x		=	$	-
150685	Remove Irrigation Facility	LS		x		=	$	-
20XXXX	Maintain Existing (Irrigation or Planted Areas)	LS		x		=	$	-
206400	Check and Test Existing Irrigation Facilities	LS		x		=	$	-
21011X	Imported Topsoil (X)	CY/TON		x		=	$	-
20XXXX	Rock Blanket, Rock Mulch, DG, Gravel Mulch	SF/SY		x		=	$	-
200122	Weed Germination	SQYD		x		=	$	-
208304	Water Meter	EA		x		=	$	-
2087XX	XX" Conduit (Use for Irrigation x-overs)	LF		x		=	$	-
20890X	Extend X" Conduit (Exten Irrigation x-overs)	LF		x		=	$	-
					Subtotal Landscape and Irrigation		$	450,000

5C - EROSION CONTROL

Item code		Unit	Quantity		Unit Price ($)			Cost
210010	Move In/Move Out (Erosion Control)	EA		x		=	$	-
210350	Fiber Rolls	LF		x		=	$	-
210360	Compost Sock	LF		x		=	$	-
2102XX	Rolled Erosion Control Product (X)	SQFT		x		=	$	-
21025X	Bonded Fiber Matrix	SQFT/ACRE		x		=	$	-
210300	Hydromulch	SQFT		x		=	$	-
210420	Straw	SQFT		x		=	$	-
210430	Hydroseed	SQFT		x		=	$	-
210600	Compost	SQFT		x		=	$	-
210630	Incorporate Materials	SQFT		x		=	$	-
2106XX	Other Erosion Control	LS	1	x	200000	=	$	200,000
					Subtotal Erosion Control		$	200,000

5D - NPDES

Item code		Unit	Quantity		Unit Price ($)			Cost
130300	Prepare SWPPP	LS	1	x	15,000.00	=	$	15,000
130200	Prepare WPCP	LS		x		=	$	-
130100	Job Site Management	LS	1	x	60,000.00	=	$	60,000
130330	Storm Water Annual Report	EA	3	x	2,500.00	=	$	7,500
130310	Rain Event Action Plan (REAP)	EA	64	x	600.00	=	$	38,400
130320	Storm Water Sampling and Analysis Day	EA	26	x	1,300.00	=	$	33,800
130520	Temporary Hydraulic Mulch	SQYD		x		=	$	-
130550	Temporary Hydroseed	SQYD		x		=	$	-
130505	Move-In/Move-Out (Temp Erosion Control)	EA		x		=	$	-
130640	Temporary Fiber Roll	LF	25,872	x	3.50	=	$	90,552
130900	Temporary Concrete Washout	LS	1	x	20,000.00	=	$	20,000
130710	Temporary Construction Entrance	EA	2	x	5,000.00	=	$	10,000
130610	Temporary Check Dam	LF		x		=	$	-
130620	Temporary Drainage Inlet Protection	EA	20	x	265.00	=	$	5,300
130730	Street Sweeping	LS	1	x	10,000.00	=	$	10,000
XXXXXX	Permenant BMPs	LS	1	x	300,000.00	=	$	300,000
					Subtotal NPDES		$	590,552

TOTAL ENVIRONMENTAL $ 1,530,600

Supplemental Work for NPDES

066595	Water Pollution Control Maintenance Sharing*	LS	1	x	28,000.00	=	$	28,000
066596	Additional Water Pollution Control**	LS	1	x	8,000.00	=	$	8,000
066597	Storm Water Sampling and Analysis***	LS		x		=	$	-
066916	CPG Fees	LS	1	x	3,000.00	=	$	3,000
					Subtotal Supplemental Work for NDPS		$	39,000

*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.

SECTION 6: TRAFFIC ITEMS

6A - Traffic Electrical

Item code		Unit	Quantity		Unit Price ($)			Cost
860460	Lighting and Sign Illumination	LS	1	x	2,000,000.00	=	$	2,000,000
860201	Signal and Lighting	EA	2	x	400,000.00	=	$	800,000
860990	Closed Circuit Television System	LS		x		=	$	-
86110X	Ramp Metering System (Location X)	LS		x		=	$	-
86070X	Interconnection Conduit and Cable	LS		x		=	$	-
5602XX	Furnish Sign Structure (Type X)	LB		x		=	$	-
5602XX	Install Sign Structure (Type X)	LB		x		=	$	-
498040	XX" CIDHC Pile (Sign Foundation)	LF		x		=	$	-
860806	Inductive Loop Detectors	LS		x		=	$	-
8609XX	Traffic Monitoring Station (Type X)	LS		x		=	$	-
15075X	Remove Sign Structure	EA/LS		x		=	$	-
151581	Reconstruct Sign Structure	EA		x		=	$	-
152641	Modify Sign Structure	EA		x		=	$	-
860090	Maintain Existing Traffic Management System Ele	LS		x		=	$	-
86XXXX	Fiber Optic Conduit System	LS		x		=	$	-
XXXXX	Some Item	LS		x		=	$	-

Subtotal Traffic Electrical *$* *2,800,000*

6B - Traffic Signing and Striping

Item code		Unit	Quantity		Unit Price ($)			Cost
566011	Roadside Sign - One Post	EA	50	x	500.00	=	$	25,000
566012	Roadside Sign - Two Post	EA	10	x	600.00	=	$	6,000
5602XX	Furnish Sign	SQFT		x		=	$	-
568016	Install Sign Panel on Existing Frame	SQFT		x		=	$	-
150711	Remove Painted Traffic Stripe	LF	51,744	x	1.00	=	$	51,744
141101	Remove Yellow Painted Stripe (Haz Waste)	LF		x		=	$	-
150712	Remove Painted Pavement Marking	SQFT		x		=	$	-
150742	Remove Roadside Sign	EA	60	x	150.00	=	$	9,000
152320	Reset Roadside Sign	EA		x		=	$	-
152390	Relocate Roadside Sign	EA		x		=	$	-
82010X	Delineator (Class X)	EA		x		=	$	-
840502	Thermo Stripe (Enhanced Wet Night Visibility)	LF	51,744	x	0.55	=	$	28,459
846012	Thermo Crosswalk & Pav. Marking	SQFT		x		=	$	-
120090	Construction Area Signs	LS	1	x	5,000.00	=	$	5,000
84XXXX	Permanent Pavement Delineation	LF	38,808	x	0.55	=	$	21,344

Subtotal Traffic Signing and Striping *$* *146,548*

6C - Traffic Management Plan

Item code		Unit	Quantity		Unit Price ($)			Cost
12865X	Portable Changeable Message Signs	EA	10	x	$ 10,000	=	$	100,000

Subtotal Traffic Management Plan *$* *100,000*

6C - Stage Construction and Traffic Handling

Item code		Unit	Quantity		Unit Price ($)			Cost
120199	Traffic Plastic Drum	EA		x		=	$	-
12016X	Channelizer (Type X)	EA		x		=	$	-
120120	Type III Barricade	EA		x		=	$	-
129100	Temporary Crash Cushion Module	EA	420	x	250.00	=	$	105,000
120100	Traffic Control System	LS	1	x	40,000.00	=	$	40,000
129110	Temporary Crash Cushion	EA		x		=	$	-
129000	Temporary Railing (Type K)	LF	38,808	x	17.00	=	$	659,736
120149	Temporary Pavement Marking (Paint)	SQFT		x		=	$	-
120151	Temporary Pavement Striping (Paint)	LF	155,232	x	2.00	=	$	310,464
82010X	Delineator (Class X)	EA		x		=	$	-
XXXXXX	Temporary Ground Mounted Signs	LS	1	x	48,000.00	=	$	48,000
XXXXXX	Other Street Improvements	LS	1	x	300,000.00	=	$	300,000

Subtotal Stage Construction and Traffic Handling *$* *1,463,200*

TOTAL TRAFFIC ITEMS **$** **4,509,800**

SECTION 7: DETOURS

Includes constructing, maintaining, and removal

Item code		Unit	Quantity		Unit Price ($)		Cost
190101	Roadway Excavation	CY		x		=	$ -
19801X	Imported Borrow	CY/TON		x		=	$ -
390132	Hot Mix Asphalt (Type A)	TON		x		=	$ -
26020X	Class 2 Aggregate Base	TON/CY		x		=	$ -
250401	Class 4 Aggregate Subbase	CY		x		=	$ -
130620	Temporary Drainage Inlet Protection	EA		x		=	$ -
129000	Temporary Railing (Type K)	LF		x		=	$ -
128601	Temporary Signal System	LS		x		=	$ -
120149	Temporary Pavement Marking (Paint)	SQFT		x		=	$ -
80010X	Temporary Fence (Type X)	LF		x		=	$ -
XXXXXX	Some Item	Unit		x		=	$ -

TOTAL DETOURS $ -

SUBTOTAL SECTIONS 1 through 7 $ 12,807,900

SECTION 8: MINOR ITEMS

8A - Americans with Disabilities Act Items						
ADA Items				5.0%		$ 640,395
8B - Bike Path Items						
Bike Path Items				0.0%		$ -
8C - Other Minor Items						
Other Minor Items				10.0%		$ 1,280,790
Total of Section 1-7	$ 12,807,900	x		15.0%	=	$ 1,921,185

TOTAL MINOR ITEMS $ 1,921,200

SECTIONS 9: MOBILIZATION

Item code						
999990	Total Section 1-8	$ 14,729,100	x	10%	=	$ 1,472,910

TOTAL MOBILIZATION $ 1,473,000

SECTION 10: SUPPLEMENTAL WORK

Item code		Unit	Quantity		Unit Price ($)		Cost
066670	Payment Adjustments For Price Index Fluctuations	LS		x		=	$ -
066094	Value Analysis	LS		x		=	$ -
066070	Maintain Traffic	LS	1	x	200,000.00	=	$ 200,000
066919	Dispute Resolution Board	LS		x		=	$ -
066921	Dispute Resolution Advisor	LS		x		=	$ -
066015	Federal Trainee Program	LS		x		=	$ -
066610	Partnering	LS		x		=	$ -
066204	Remove Rock and Debris	LS		x		=	$ -
066222	Locate Existing Crossover	LS		x		=	$ -
XXXXXX	Some Item	Unit		x		=	$ -

Cost of ***NPDES*** *Supplemental Work specified in Section 5D* = $ 39,000

Total Section 1-8 $ 14,729,100 4% = $ 589,164

TOTAL SUPPLEMENTAL WORK $ 828,200

SECTION 11: STATE FURNISHED MATERIALS AND EXPENSES

Item code		Unit	Quantity		Unit Price ($)		Cost
066105	Resident Engineers Office	LS	1	x	200,000.00	=	$200,000
066063	Traffic Management Plan - Public Information	LS	1	x	120,000.00	=	$120,000
066901	Water Expenses	LS		x		=	$0
8609XX	Traffic Monitoring Station (X)	LS		x		=	$0
066841	Traffic Controller Assembly	LS		x		=	$0
066840	Traffic Signal Controller Assembly	LS		x		=	$0
066062	COZEEP Contract	LS	1	x	170,000.00	=	$170,000
066838	Reflective Numbers and Edge Sealer	LS		x		=	$0
066065	Tow Truck Service Patrol	LS	1	x	250,000.00	=	$250,000
066916	Annual Construction General Permit Fee	LS		x		=	$0
XXXXXX	Some Item	Unit		x		=	$0
	Total Section 1-8	$	14,729,100		4%	= $	589,164

TOTAL STATE FURNISHED **$1,329,200**

SECTION 12: TIME-RELATED OVERHEAD

Total of Roadway and Structures Contract Items excluding Mobilization	$14,729,100	(used to calculate TRO)
Total Construction Cost (excluding TRO and Contingency)	$18,359,500	(used to check if project is greater than $5 million excluding contingency)

Estimated Time-Related Overhead (TRO) Percentage (0% to 10%) = **10%**

Item code		Unit	Quantity		Unit Price ($)		Cost
070018	Time-Related Overhead	WD	650	X	$2,266	=	$1,473,000

TOTAL TIME-RELATED OVERHEAD **$1,473,000**

Note: If the building portion of the project is greater than 50% of the total project cost, then TRO is not included.

SECTION 13: ROADWAY CONTINGENCY

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

Total Section 1-12 $ 19,832,500 x **45%** = $8,924,625

TOTAL CONTINGENCY **$8,924,700**

II. STRUCTURE ITEMS

	Bridge 1				
DATE OF ESTIMATE	00/00/00		00/00/00		00/00/00
Bridge Name	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Bridge Number	57-XXX		57-XXX		57-XXX
Structure Type	Pedestrian OC		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF		0 LF		0 LF
Total Bridge Length (Feet)	0 LF		0 LF		0 LF
Total Area (Square Feet)	0 SQFT		0 SQFT		0 SQFT
Structure Depth (Feet)	0 LF		0 LF		0 LF
Footing Type (pile or spread)	TBD		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$1,750		$0		$0
COST OF EACH	**$0**		**$0**		**$0**

* to include elevators and other ancilliary items

DATE OF ESTIMATE	00/00/00		00/00/00		00/00/00
Name	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Bridge Number	57-XXX		57-XXX		57-XXX
Structure Type	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF		0 LF		0 LF
Total Length (Feet)	0 LF		0 LF		0 LF
Total Area (Square Feet)	0 SQFT		0 SQFT		0 SQFT
Structure Depth (Feet)	0 LF		0 LF		0 LF
Footing Type (pile or spread)	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$100		$0		$0
COST OF EACH	**$0**		**$0**		**$0**

TOTAL COST OF BRIDGES		**$0**
TOTAL COST OF BUILDINGS		**$0**
Structures Mobilization Percentage	10%	**$0**

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

Structures Contingency Percentage	10%	**$0**
TOTAL COST OF STRUCTURES		**$0**

Estimate Prepared By: ______________________________

XXXXXXXXXXXXXXXXX ------ Division of Structures

____

Date

EA: 0Q670K PID: ID 1217000086

III. RIGHT OF WAY

Fill in all of the available information from the Right of Way data sheet.

A)	A1)*	Acquisition, including Excess Land Purchases, Damages & Goodwill, Fees		$	4,708,840
	A2)	SB-1210		$	0
		*Acquisition costs include all professional R/W services including Title and Escrow			
B)		Acquisition of Offsite Mitigation		$	0
C)	C1)	Utility Relocation (State Share)		$	0
	C2)	Potholing (Design Phase)		$	0
D)		Railroad Acquisition		$	0
E)		Clearance / Demolition		$	0
F)		Relocation Assistance (RAP and/or Last Resort Housing Costs)		$	0
G)		Title and Escrow (included in A above)		$	0
H)		Environmental Review		$	60,000
I)		Condemnation Settlements	0%	$	0
J)		Design Appreciation Factor	0%	$	0
K)		Undergrounding Electrical Transmission (Total Capital Cost)		$	22,600,000
		Undergrounding Electrical Distribution (Total Capital Costs)		$	23,700,000
		Other Utilities (Sewer, Water, Gas, Telephone, FO)			9,750,000
		Total Utility Relocation (Construction Cost)		$	56,050,000

L) **TOTAL RIGHT OF WAY ESTIMATE** **$60,818,840**

M) **TOTAL R/W ESTIMATE: Escalated** **$74,198,985**

N) **RIGHT OF WAY SUPPORT** **$2,721,875**

Support Cost Estimate Prepared By	Project Coordinator[1]	714-833-2439 Phone
Utility Estimate Prepared By	Utility Coordinator[2]	714-833-2439 Phone
R/W Acquisition Estimate Prepared By	Right of Way Estimator[3]	714-730-2317 Phone

Note: Items G & H applied to items A + B

[1] When estimate has Support Costs only

[2] When estimate has Utility Relocation

[3] When R/W Acquisition is required

IV. SUPPORT COST ESTIMATE SUMMARY

Note: Use PRSM project data.		Escalated Support Cost for Estimate To Completion (ETC)				
Total by FY		**PA&ED**	**PS&E**	**RW**	**CON**	**Total $**
< 2014	Expended					
	ETC					
2015	Expended					
	ETC					
2016	Expended					
	ETC					
2017	Expended					
	ETC					
2018	Expended					
	ETC					
2019	Expended					
	ETC					
2020	Expended					
	ETC					
2021	Expended					
	ETC					
2022	Expended					
	ETC					
2023	Expended	$2,000,000				**$2,000,000**
	ETC					
2024	Expended	$2,375,000				**$2,375,000**
	ETC					
2025	Expended		$2,500,000	$907,291		**$3,407,291**
	ETC					
2026	Expended		$2,500,000	$1,814,584		**$4,314,584**
	ETC					
2027	Expended				$5,000,000	**$5,000,000**
	ETC					
2028	Expended					
	ETC					
2029>	Expended					
	ETC					
EAC (Expended + ETC)		**$4,375,000**	**$5,000,000**	**$2,721,875**	**$5,000,000**	**$17,096,875**
Approved Budget (PRSM)						
Difference (Budget - EAC)		**-$4,375,000**	**-$5,000,000**	**-$2,721,875**	**-$5,000,000**	**-$17,096,875**
Support Ratio (EAC / Cap Cost)		**3.9%**	**4.4%**	**2.4%**	**4.4%**	**15.1%**

Total Capital Cost:	**$113,556,000**
Total Capital Outlay Support Cost:	**$17,096,875**
Overall Percent Support Cost:	**15.06%**

PROJECT

EA: 0Q670K PID: ID 1217000086

EA: **0Q670K**

PID: **ID 1217000086**

District-County-Route: 12-OC-133

PM: 0.9 - 3.4

Type of Estimate : PSR/PDS

Project Limits : Canyon Acres Drive to El Toro Road

Project Description: SR-133 (Laguna Canyon Road) Improvements

Scope : Underground utilities, construct bike lane, construct ped path/sidewalks & improve shoulders

Alternative : **3**

SUMMARY OF PROJECT COST ESTIMATE

	Current Year Cost		Escalated Cost	
TOTAL ROADWAY COST	**$**	**27,842,400**	**$**	**38,104,247**
TOTAL STRUCTURES COST	**$**	**-**	**$**	**-**
SUBTOTAL CONSTRUCTION COST	**$**	**27,842,400**	**$**	**38,104,247**
TOTAL RIGHT OF WAY COST	**$**	**61,252,589**	**$**	**74,728,159**
TOTAL CAPITAL OUTLAY COSTS	**$**	**89,094,989**	**$**	**112,832,406**
PR/ED SUPPORT	**$**	**4,375,000**	**$**	**5,468,750**
PS&E SUPPORT	**$**	**5,000,000**	**$**	**6,250,000**
RIGHT OF WAY SUPPORT	**$**	**2,860,625**	**$**	**3,575,781**
CONSTRUCTION SUPPORT	**$**	**5,000,000**	**$**	**6,250,000**
TOTAL SUPPORT COST	**$**	**17,235,625**	**$**	**21,544,531**
TOTAL PROJECT COST	**$**	**106,330,614**	**$**	**134,376,937**

If Project has been programmed enter Programmed Amount

	Month	/	Year
Date of Estimate (Month/Year)	6	/	2022
Estimated Construction Start (Month/Year)	6	/	2028
Number of Working Days =			650
Estimated Mid-Point of Construction (Month/Year)	9	/	2029
Estimated Construction End (Month/Year)	9	/	2030
Number of Plant Establishment Days			261

Estimated Project Schedule	
PID Approval	October-18
PA/ED Approval	December-20
PS&E	December-22
RTL	May-23
Begin Construction	July-23

Cost Estimate Certifier	Girair A. Kotchian	**6/17/2022**	(714) 730-2493
	Girair Kotchian, PE - Consultant PM	**Date**	**Phone**
Approved by Program Manager		**6/17/2022**	(949) 464-6688
	Tom Perez, City Program Manager	**Date**	**Phone**

I. ROADWAY ITEMS SUMMARY

	Section	Cost
1	Earthwork	$ 542,300
2	Pavement Structural Section	$ 3,636,600
3	Drainage	$ 2,105,500
4	Specialty Items	$ 54,500
5	Environmental	$ 1,530,600
6	Traffic Items	$ 4,509,800
7	Detours	$ -
8	Minor Items	$ 1,856,900
9	Roadway Mobilization	$ 1,423,700
10	Supplemental Work	$ 808,500
11	State Furnished	$ 1,309,500
12	Time-Related Overhead	$ 1,423,700
13	Roadway Contingency	$ 8,640,800

TOTAL ROADWAY ITEMS $ 27,842,400

Estimate Prepared By :	Stephen P.A. Crouch	**6/17/2022**	(714) 833-2743
	Stephen P.A. Crouch	Date	Phone
Estimate Reviewed By :	Girair A. Kotchian	**6/17/2022**	(714) 730-2493
	Girair Kotchian, PE - Consultant PM	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
190101	Roadway Excavation	CY	12,682	x	40.00	=	$	507,280
19010X	Roadway Excavation (Type X) ADL	CY		x		=	$	-
194001	Ditch Excavation	CY		x		=	$	-
19801X	Imported Borrow	CY/TON		x		=	$	-
192037	Structure Excavation (Retaining Wall)	CY		x		=	$	-
193013	Structure Backfill (Retaining Wall)	CY		x		=	$	-
193031	Pervious Backfill Material (Retaining Wall)	CY		x		=	$	-
16010X	Clearing & Grubbing	LS	1	x	20,000.00	=	$	20,000
170101	Develop Water Supply	LS	1	x	15,000.00	=	$	15,000
19801X	Imported Borrow	CY/TON		x		=	$	-
210130	Duff	ACRE		x		=	$	-
XXXXXX	Some Item	Unit						

TOTAL EARTHWORK SECTION ITEMS $ 542,300

SECTION 2: PAVEMENT STRUCTURAL SECTION

Item code		Unit	Quantity		Unit Price ($)			Cost
401050	Jointed Plain Concrete Pavement	CY	153	x		=	$	-
400050	Continuously Reinforced Concrete Pavement	CY		x		=	$	-
404092	Seal Pavement Joint	LF		x		=	$	-
404093	Seal Isolation Joint	LF		x		=	$	-
413117	Seal Concrete Pavement Joint (Silicone)	LF		x		=	$	-
413118	Seal Pavement Joint (Asphalt Rubber)	LF		x		=	$	-
280010	Rapid Strength Concrete Base	CY		x		=	$	-
410095	Dowel Bar (Drill and Bond)	EA		x		=	$	-
390132	Hot Mix Asphalt (Type A)	TON	7,032	x	160.00	=	$	1,125,120
390137	Rubberized Hot Mix Asphalt (Gap Graded)	TON	3,686	x	135.00	=	$	497,610
39300X	Geosynthetic Pavement Interlayer (Type X)	SQYD		x		=	$	-
26020X	Class 2 Aggregate Base	CY	2,468	x	85.00	=	$	209,780
390401	HMA - Open Graded (Open Graded Friction Course)	TON	1,063	x	160.00	=	$	170,080
290201	Asphalt Treated Permeable Base	CY	2,100	x	170.00	=	$	357,000
250401	Class 4 Aggregate Subbase	CY	2,625	x	95.00	=	$	249,375
374002	Asphaltic Emulsion (Fog Seal Coat)	TON		x		=	$	-
397005	Tack Coat	TON		x		=	$	-
377501	Slurry Seal	TON		x		=	$	-
3750XX	Screenings (Type XX)	TON		x		=	$	-
374492	Asphaltic Emulsion (Polymer Modified)	TON		x		=	$	-
370001	Sand Cover (Seal)	TON		x		=	$	-
731504	Minor Concrete (Curb and Gutter)	CY	662	x	440.00	=	$	291,280
731521	Minor Concrete (Sidewalk)	CY	1,182	x	600.00	=	$	709,200
39407X	Place Hot Mix Asphalt Dike (Type X)	LF		x		=	$	-
150771	Remove Asphalt Concrete Dike	LF		x		=	$	-
420201	Grind Existing Concrete Pavement	SQYD		x		=	$	-
150860	Remove Base and Surfacing	CY		x		=	$	-
390095	Replace Asphalt Concrete Surfacing	CY		x		=	$	-
15312X	Remove Concrete	LF/CY/LS		x		=	$	-
394090	Place Hot Mix Asphalt (Miscellaneous Area)	SQYD		x		=	$	-
153103	Cold Plane Asphalt Concrete Pavement	SQYD	1,357	x	20.00	=	$	27,140
39405X	Shoulder Rumble Strip (HMA, X-In Indentations)	STA		x		=	$	-
413113	Repair Spalled Joints, Polyester Grout	SQYD		x		=	$	-
420102	Groove Existing Concrete Pavement	SQYD		x		=	$	-
390136	Minor Hot Mix Asphalt	TON		x		=	$	-
394095	Roadside Paving (Miscellaneous Areas)	SQYD		x		=	$	-
XXXXXX	Open Grade Finishing Course (OGFC)	CY		x		=	$	-

TOTAL PAVEMENT STRUCTURAL SECTION ITEMS $ 3,636,600

SECTION 3: DRAINAGE

Item code		Unit	Quantity		Unit Price ($)			Cost
15080X	Remove Culvert	EA/LF		x		=	$	-
150820	Modify Inlet	EA		x		=	$	-
155232	Sand Backfill	CY		x		=	$	-
15020X	Abandon Culvert	EA/LF		x		=	$	-
152430	Adjust Inlet	LF		x		=	$	-
155003	Cap Inlet	EA		x		=	$	-
510501	Minor Concrete	CY		x		=	$	-
510502	Minor Concrete (Minor Structure)	CY	62	x	2,000.00	=	$	124,000
5105XX	Minor Concrete (Type XX)	CY		x		=	$	-
620XXX	XX" Alternative Pipe Culvert (Type X)	LF		x		=	$	-
6411XX	XX" Plastic Pipe	LF		x		=	$	-
65XXXX	24" Reinforced Concrete Pipe (Type X)	LF	2,023	x	200.00	=	$	404,600
6650XX	36" Reinforced Concrete Pipe (Type X)	LF	1,200	x	260.00	=	$	312,000
68XXXX	XX" Plastic Pipe (Edge Drain)	LF		x		=	$	-
69011X	XX" Corrugated Steel Pipe Downdrain (0.XXX" Thic	LF		x		=	$	-
70321X	XX" Corrugated Steel Pipe Inlet (0.XXX" Thick)	LF		x		=	$	-
70XXXX	XX" Corrugated Steel Pipe Riser (0.XXX" Thick)	LF		x		=	$	-
7050XX	XX" Steel Flared End Section	EA		x		=	$	-
703233	Grated Line Drain	LF		x		=	$	-
72XXXX	Rock Slope Protection (Type and Method)	CY/TON		x		=	$	-
72901X	Rock Slope Protection Fabric (Class X)	SQYD		x		=	$	-
721420	Concrete (Ditch Lining)	CY		x		=	$	-
721430	Concrete (Channel Lining)	CY		x		=	$	-
750001	Miscellaneous Iron and Steel	LB		x		=	$	-
750029	Inlet Frame and Grate	EA	16	x	927.00	=	$	14,832
7500xx	Other Drainage Items (7% of Roadway)	LS	1	x	1,250,000.00	=	$	1,250,000

TOTAL DRAINAGE ITEMS $ 2,105,500

SECTION 4: SPECIALTY ITEMS

Item code		Unit	Quantity		Unit Price ($)			Cost
080050	Progress Schedule (Critical Path Method)	LS	1	x	40,000.00	=	$	40,000
582001	Sound Wall (Masonry Block)	SQFT		x		=	$	-
510530	Minor Concrete (Wall)	CY		x		=	$	-
15325X	Remove Sound Wall	LF/LS		x		=	$	-
070030	Lead Compliance Plan	LS		x		=	$	-
141120	Treated Wood Waste	LB		x		=	$	-
153221	Remove Concrete Barrier	LF		x		=	$	-
150661	Remove Metal Beam Guard Railing	LF	200	x	10.00	=	$	2,000
150668	Remove Flared End Section	EA	3	x	500.00	=	$	1,500
8000XX	Chain Link Fence (Type XX)	LF		x		=	$	-
80XXXX	XX" Chain Link Gate (Type CL-6)	EA		x		=	$	-
832005	Midwest Guardrail System	LF	200	x	40.00	=	$	8,000
839301	Single Thrie Beam Barrier	LF		x		=	$	-
839310	Double Thrie Beam Barrier	LF		x		=	$	-
839521	Cable Railing	LF		x		=	$	-
839539	Terminal System (Type SKT)	EA	3	x	1,000.00	=	$	3,000
839585	Alternative Flared Terminal System	EA		x		=	$	-
839584	Alternative In-line Terminal System	EA		x		=	$	-
4906XX	CIDH Concrete Piling (Insert Diameter)	LF		x		=	$	-
839XXX	Crash Cushion (Insert Type)	EA		x		=	$	-
839701	Bike Trail Mountable Curb (Type E-6)	CY		x		=	$	-
520103	Bar Reinforced Steel (Retaining Wall)	LB		x		=	$	-
510060	Structural Concrete, Retaining Wall	CY		x		=	$	-
513553	Retaining Wall (Masonry Wall)	SQFT	1,500	x		=	$	-
511035	Architectural Treatment	SQFT		x		=	$	-
598001	Anti-Graffiti Coating	SQFT		x		=	$	-
203070	Rock Stain	SQFT		x		=	$	-
5136XX	Reinforced Concrete Crib Wall (Type X)	SQFT		x		=	$	-
83954X	Transition Railing (Type X)	EA		x		=	$	-
597601	Prepare and Stain Concrete	SQFT		x		=	$	-
839561	Rail Tensioning Assembly	EA		x		=	$	-
83958X	Some Item	EA		x		=	$	-
839701	Some Item	Unit		x		=	$	-

TOTAL SPECIALTY ITEMS $ 54,500

SECTION 5: ENVIRONMENTAL

5A - ENVIRONMENTAL MITIGATION

Item code		*Unit*	*Quantity*		*Unit Price ($)*			*Cost*
14XXXX	Biological Mitigation	LS	1	x	20,000.00	=	$	20,000
14XXXX	Archaeological Commitments	LS	1	x	10,000.00	=	$	10,000
14XXXX	Historical Commitments	LS	1	x	10,000.00	=	$	10,000
130670	Temporary Reinforced Silt Fence	LF		x		=	$	-
141000	Temporary Fence (Type ESA)	LF		x		=	$	-
14XXXX	Other Environmental Mitigation	LS	1	x	250,000.00	=	$	250,000

Subtotal Environmental Mitigation *$* *290,000*

5B - LANDSCAPE AND IRRIGATION

Item code		*Unit*	*Quantity*		*Unit Price ($)*			*Cost*
20XXXX	Highway Planting	LS	1	x	300,000.00	=	$	300,000
20XXXX	Irrigation System	LS	1	x	100,000.00	=	$	100,000
204099	Plant Establishment Work	LS	1	x	50,000.00	=	$	50,000
204101	Extend Plant Establishment Work	LS		x		=	$	-
20XXXX	Follow-up Landscape Project	LS		x		=	$	-
150685	Remove Irrigation Facility	LS		x		=	$	-
20XXXX	Maintain Existing (Irrigation or Planted Areas)	LS		x		=	$	-
206400	Check and Test Existing Irrigation Facilities	LS		x		=	$	-
21011X	Imported Topsoil (X)	CY/TON		x		=	$	-
20XXXX	Rock Blanket, Rock Mulch, DG, Gravel Mulch	SF/SY		x		=	$	-
200122	Weed Germination	SQYD		x		=	$	-
208304	Water Meter	EA		x		=	$	-
2087XX	XX" Conduit (Use for Irrigation x-overs)	LF		x		=	$	-
20890X	Extend X" Conduit	LF		x		=	$	-

Subtotal Landscape and Irrigation *$* *450,000*

5C - EROSION CONTROL

Item code		*Unit*	*Quantity*		*Unit Price ($)*			*Cost*
210010	Move In/Move Out (Erosion Control)	EA		x		=	$	-
210350	Fiber Rolls	LF		x		=	$	-
210360	Compost Sock	LF		x		=	$	-
2102XX	Rolled Erosion Control Product (X)	SQFT		x		=	$	-
21025X	Bonded Fiber Matrix	QFT/ACRE		x		=	$	-
210300	Hydromulch	SQFT		x		=	$	-
210420	Straw	SQFT		x		=	$	-
210430	Hydroseed	SQFT		x		=	$	-
210600	Compost	SQFT		x		=	$	-
210630	Incorporate Materials	SQFT		x		=	$	-
2106XX	Other Erosion Control	LS	1	x	200000	=	$	200,000

Subtotal Erosion Control *$* *200,000*

5D - NPDES

Item code		*Unit*	*Quantity*		*Unit Price ($)*			*Cost*
130300	Prepare SWPPP	LS	1	x	15,000.00	=	$	15,000
130200	Prepare WPCP	LS		x		=	$	-
130100	Job Site Management	LS	1	x	60,000.00	=	$	60,000
130330	Storm Water Annual Report	EA	3	x	2,500.00	=	$	7,500
130310	Rain Event Action Plan (REAP)	EA	64	x	600.00	=	$	38,400
130320	Storm Water Sampling and Analysis Day	EA	26	x	1,300.00	=	$	33,800
130520	Temporary Hydraulic Mulch	SQYD		x		=	$	-
130550	Temporary Hydroseed	SQYD		x		=	$	-
130505	Move-In/Move-Out (Temp Erosion Control)	EA		x		=	$	-
130640	Temporary Fiber Roll	LF	25,872	x	3.50	=	$	90,552
130900	Temporary Concrete Washout	LS	1	x	20,000.00	=	$	20,000
130710	Temporary Construction Entrance	EA	2	x	5,000.00	=	$	10,000
130610	Temporary Check Dam	LF		x		=	$	-
130620	Temporary Drainage Inlet Protection	EA	20	x	265.00	=	$	5,300
130730	Street Sweeping	LS	1	x	10,000.00	=	$	10,000
XXXXXX	Permenant BMPs	LS	1	x	300,000.00	=	$	300,000

Subtotal NPDES *$* *590,552*

TOTAL ENVIRONMENTAL $ 1,530,600

Supplemental Work for NPDES

066595	Water Pollution Control Maintenance Sharing*	LS	1	x	28,000.00	=	$	28,000
066596	Additional Water Pollution Control**	LS	1	x	8,000.00	=	$	8,000
066597	Storm Water Sampling and Analysis***	LS		x		=	$	-
066916	CPG Fees	LS	1	x	3,000.00	=	$	3,000

Subtotal Supplemental Work for NDPS *$* *39,000*

*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.

SECTION 6: TRAFFIC ITEMS

6A - Traffic Electrical

Item code		*Unit*	*Quantity*		*Unit Price ($)*			*Cost*
860460	Lighting and Sign Illumination	LS	1	x	2,000,000.00	=	$	2,000,000
860201	Signal and Lighting	EA	2	x	400,000.00	=	$	800,000
860990	Closed Circuit Television System	LS		x		=	$	-
86110X	Ramp Metering System (Location X)	LS		x		=	$	-
86070X	Interconnection Conduit and Cable	LS		x		=	$	-
5602XX	Furnish Sign Structure (Type X)	LB		x		=	$	-
5602XX	Install Sign Structure (Type X)	LB		x		=	$	-
498040	XX" CIDHC Pile (Sign Foundation)	LF		x		=	$	-
860806	Inductive Loop Detectors	LS		x		=	$	-
8609XX	Traffic Monitoring Station (Type X)	LS		x		=	$	-
15075X	Remove Sign Structure	EA/LS		x		=	$	-
151581	Reconstruct Sign Structure	EA		x		=	$	-
152641	Modify Sign Structure	EA		x		=	$	-
860090	Maintain Existing Traffic Mgt.System	LS		x		=	$	-
86XXXX	Fiber Optic Conduit System	LS		x		=	$	-
XXXXX	Some Item	LS		x		=	$	-

Subtotal Traffic Electrical *$* *2,800,000*

6B - Traffic Signing and Striping

Item code		*Unit*	*Quantity*		*Unit Price ($)*			*Cost*
566011	Roadside Sign - One Post	EA	50	x	500.00	=	$	25,000
566012	Roadside Sign - Two Post	EA	10	x	600.00	=	$	6,000
5602XX	Furnish Sign	SQFT		x		=	$	-
568016	Install Sign Panel on Existing Frame	SQFT		x		=	$	-
150711	Remove Painted Traffic Stripe	LF	51,744	x	1.00	=	$	51,744
141101	Remove Yellow Stripe (Hazardous Waste)	LF		x		=	$	-
150712	Remove Painted Pavement Marking	SQFT		x		=	$	-
150742	Remove Roadside Sign	EA	60	x	150.00	=	$	9,000
152320	Reset Roadside Sign	EA		x		=	$	-
152390	Relocate Roadside Sign	EA		x		=	$	-
82010X	Delineator (Class X)	EA		x		=	$	-
840502	Thermo Traffic Stripe	LF	51,744	x	0.55	=	$	28,459
846012	Thermo Crosswalk and Pavement Marking	SQFT		x		=	$	-
120090	Construction Area Signs	LS	1	x	5,000.00	=	$	5,000
84XXXX	Permanent Pavement Delineation	LF	38,808	x	0.55	=	$	21,344

Subtotal Traffic Signing and Striping *$* *146,548*

6C - Traffic Management Plan

Item code		Unit	Quantity		Unit Price ($)			Cost
12865X	Portable Changeable Message Signs	LS	10	x	$ 10,000	=	$	100,000

Subtotal Traffic Management Plan *$* *100,000*

6C - Stage Construction and Traffic Handling

Item code		*Unit*	*Quantity*		*Unit Price ($)*			*Cost*
120199	Traffic Plastic Drum	EA		x		=	$	-
12016X	Channelizer (Type X)	EA		x		=	$	-
120120	Type III Barricade	EA		x		=	$	-
129100	Temporary Crash Cushion Module	EA	420	x	250.00	=	$	105,000
120100	Traffic Control System	LS	1	x	40,000.00	=	$	40,000
129110	Temporary Crash Cushion	EA		x		=	$	-
129000	Temporary Railing (Type K)	LF	38,808	x	17.00	=	$	659,736
120149	Temporary Pavement Marking (Paint)	SQFT		x		=	$	-
120151	Temporary Pavement Striping (Paint)	LF	155,232	x	2.00	=	$	310,464
82010X	Delineator (Class X)	EA		x		=	$	-
XXXXXX	Temporary Ground Mounted Signs	LS	1	x	48,000.00	=	$	48,000
XXXXXX	Other Street Improvements	Unit	1	x	300,000.00	=	$	300,000

Subtotal Stage Construction and Traffic Handling *$* *1,463,200*

TOTAL TRAFFIC ITEMS **$** **4,509,800**

SECTION 7: DETOURS

Includes constructing, maintaining, and removal

Item code		Unit	Quantity		Unit Price ($)		Cost
190101	Roadway Excavation	CY		x		=	$ -
19801X	Imported Borrow	CY/TON		x		=	$ -
390132	Hot Mix Asphalt (Type A)	TON		x		=	$ -
26020X	Class 2 Aggregate Base	TON/CY		x		=	$ -
250401	Class 4 Aggregate Subbase	CY		x		=	$ -
130620	Temporary Drainage Inlet Protection	EA		x		=	$ -
129000	Temporary Railing (Type K)	LF		x		=	$ -
128601	Temporary Signal System	LS		x		=	$ -
120149	Temporary Pavement Marking (Paint)	SQFT		x		=	$ -
80010X	Temporary Fence (Type X)	LF		x		=	$ -
XXXXXX	Some Item	Unit		x		=	$ -

TOTAL DETOURS $ -

SUBTOTAL SECTIONS 1 through 7 $ 12,379,300

SECTION 8: MINOR ITEMS

8A - Americans with Disabilities Act Items			
ADA Items	5.0%	$	618,965
8B - Bike Path Items			
Bike Path Items	0.0%	$	-
8C - Other Minor Items			
Other Minor Items	10.0%	$	1,237,930

Total of Section 1-7 $ 12,379,300 x 15.0% = $ 1,856,895

TOTAL MINOR ITEMS $ 1,856,900

SECTIONS 9: MOBILIZATION

Item code						
999990	Total Section 1-8	$ 14,236,200	x	10%	=	$ 1,423,620

TOTAL MOBILIZATION $ 1,423,700

SECTION 10: SUPPLEMENTAL WORK

Item code		Unit	Quantity		Unit Price ($)		Cost
066670	Payment Adjustments For Price Index Fluctuations	LS		x		=	$ -
066094	Value Analysis	LS		x		=	$ -
066070	Maintain Traffic	LS	1	x	200,000.00	=	$ 200,000
066919	Dispute Resolution Board	LS		x		=	$ -
066921	Dispute Resolution Advisor	LS		x		=	$ -
066015	Federal Trainee Program	LS		x		=	$ -
066610	Partnering	LS		x		=	$ -
066204	Remove Rock and Debris	LS		x		=	$ -
066222	Locate Existing Crossover	LS		x		=	$ -
XXXXXX	Some Item	Unit		x		=	$ -

Cost of ***NPDES*** *Supplemental Work specified in Section 5D* = $ 39,000

Total Section 1-8 $ 14,236,200 4% = $ 569,448

TOTAL SUPPLEMENTAL WORK $ 808,500

SECTION 11: STATE FURNISHED MATERIALS AND EXPENSES

Item code		Unit	Quantity		Unit Price ($)		Cost
066105	Resident Engineers Office	LS	1	x	200,000.00	=	$200,000
066063	Traffic Management Plan - Public Information	LS	1	x	120,000.00	=	$120,000
066901	Water Expenses	LS		x		=	$0
8609XX	Traffic Monitoring Station (X)	LS		x		=	$0
066841	Traffic Controller Assembly	LS		x		=	$0
066840	Traffic Signal Controller Assembly	LS		x		=	$0
066062	COZEEP Contract	LS	1	x	170,000.00	=	$170,000
066838	Reflective Numbers and Edge Sealer	LS		x		=	$0
066065	Tow Truck Service Patrol	LS	1	x	250,000.00	=	$250,000
066916	Annual Construction General Permit Fee	LS		x		=	$0
XXXXXX	Some Item	Unit		x		=	$0
	Total Section 1-8	$	14,236,200		4%	= $	569,448

TOTAL STATE FURNISHED **$1,309,500**

SECTION 12: TIME-RELATED OVERHEAD

Total of Roadway and Structures Contract Items excluding Mobilization	$14,236,200	(used to calculate TRO)
Total Construction Cost (excluding TRO and Contingency)	$17,777,900	(used to check if project is greater than $5 million excluding contingency)

Estimated Time-Related Overhead (TRO) Percentage (0% to 10%) = **10%**

Item code		Unit	Quantity		Unit Price ($)		Cost
070018	Time-Related Overhead	WD	650	X	$2,190	=	$1,423,700

TOTAL TIME-RELATED OVERHEAD **$1,423,700**

Note: If the building portion of the project is greater than 50% of the total project cost, then TRO is not included.

SECTION 13: ROADWAY CONTINGENCY

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

Total Section 1-12	$	19,201,600	x	**45%**	=	$8,640,720

TOTAL CONTINGENCY **$8,640,800**

II. STRUCTURE ITEMS

	Bridge 1				
DATE OF ESTIMATE	00/00/00		00/00/00		00/00/00
Bridge Name	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Bridge Number	57-XXX		57-XXX		57-XXX
Structure Type	Pedestrian OC		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF		0 LF		0 LF
Total Bridge Length (Feet)	0 LF		0 LF		0 LF
Total Area (Square Feet)	0 SQFT		0 SQFT		0 SQFT
Structure Depth (Feet)	0 LF		0 LF		0 LF
Footing Type (pile or spread)	TBD		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$1,750		$0		$0
COST OF EACH	**$0**		**$0**		**$0**

* to include elevators and other ancilliary items

DATE OF ESTIMATE	00/00/00		00/00/00		00/00/00
Name	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Bridge Number	57-XXX		57-XXX		57-XXX
Structure Type	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF		0 LF		0 LF
Total Length (Feet)	0 LF		0 LF		0 LF
Total Area (Square Feet)	0 SQFT		0 SQFT		0 SQFT
Structure Depth (Feet)	0 LF		0 LF		0 LF
Footing Type (pile or spread)	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$100		$0		$0
COST OF EACH	**$0**		**$0**		**$0**

TOTAL COST OF BRIDGES		**$0**
TOTAL COST OF BUILDINGS		**$0**
Structures Mobilization Percentage	10%	**$0**

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

Structures Contingency Percentage	10%	**$0**

TOTAL COST OF STRUCTURES $0

Estimate Prepared By: ______________________________ ______________________________

XXXXXXXXXXXXXXXXX ------ Division of Structures Date

EA: 0Q670K PID: ID 1217000086

III. RIGHT OF WAY

Fill in all of the available information from the Right of Way data sheet.

A)	A1)	Acquisition, including Excess Land Purchases, Damages & Goodwill, Fees		$	5,142,589
	A2)	SB-1210		$	0
B)		Acquisition of Offsite Mitigation		$	0
C)	C1)	Utility Relocation (State Share)		$	0
	C2)	Potholing (Design Phase)		$	0
D)		Railroad Acquisition		$	0
E)		Clearance / Demolition		$	
F)		Relocation Assistance (RAP and/or Last Resort Housing Costs)		$	0
G)		Title and Escrow		$	
H)		Environmental Review		$	60,000
I)		Condemnation Settlements	0%	$	0
J)		Design Appreciation Factor	0%	$	0
K)		Undergrounding Electrical Transmission (Total Capital Cost)		$	22,600,000
		Undergrounding Electrical Distribution (Total Capital Costs)		$	23,700,000
		Other Utilities (Sewer, Water, Gas, Telephone, FO)		$	9,750,000
		Total Utility Relocation (Construction Cost)		$	56,050,000

L)	**TOTAL RIGHT OF WAY ESTIMATE**	**$61,252,589**
M)	**TOTAL R/W ESTIMATE: Escalated**	**$74,728,159**
N)	**RIGHT OF WAY SUPPORT**	**$2,860,625**

Support Cost Estimate Prepared By	Stephen V.G. Crone Project Coordinator[1]	714-833-2439 Phone
Utility Estimate Prepared By	Stephen V.G. Crone Utility Coordinator[2]	714-833-2439 Phone
R/W Acquisition Estimate Prepared By	John Craig Right of Way Estimator[3]	714-730-2317 Phone

Note: Items G & H applied to items A + B

[1] When estimate has Support Costs only

[2] When estimate has Utility Relocation

[3] When R/W Acquisition is required

IV. SUPPORT COST ESTIMATE SUMMARY

Note: Use PRSM project data.

		Escalated Support Cost for Estimate To Completion (ETC)				
Total by FY		**PA&ED**	**PS&E**	**RW**	**CON**	**Total $**
< 2014	Expended					
	ETC					
2015	Expended					
	ETC					
2016	Expended					
	ETC					
2017	Expended					
	ETC					
2018	Expended					
	ETC					
2019	Expended					
	ETC					
2020	Expended					
	ETC					
2021	Expended					
	ETC					
2022	Expended					
	ETC					
2023	Expended	$2,000,000				**$2,000,000**
	ETC					
2024	Expended	$2,375,000				**$2,375,000**
	ETC					
2025	Expended		$2,500,000	$953,542		**$3,453,542**
	ETC					
2026	Expended		$2,500,000	$1,907,083		**$4,407,083**
	ETC					
2027	Expended				$5,000,000	**$5,000,000**
	ETC					
2028	Expended					
	ETC					
2029>	Expended					
	ETC					
EAC (Expended + ETC)		**$4,375,000**	**$5,000,000**	**$2,860,625**	**$5,000,000**	**$17,235,625**
Approved Budget (PRSM)						
Difference (Budget - EAC)		**-$4,375,000**	**-$5,000,000**	**-$2,860,625**	**-$5,000,000**	**-$17,235,625**
Support Ratio (EAC / Cap Cost)		**3.9%**	**4.4%**	**2.5%**	**4.4%**	**15.3%**

Total Capital Cost:	**$112,832,406**
Total Capital Outlay Support Cost:	**$17,235,625**
Overall Percent Support Cost:	**15.28%**

PROJECT

EA: 0Q670K

EA: 0Q670K PID: ID 1217000086

PID: ID 1217000086

District-County-Route: 12-OC-133
PM: 0.9 - 3.4

Type of Estimate : PSR/PDS
Project Limits : Canyon Acres Drive to El Toro Road
Project Description: SR-133 (Laguna Canyon Road) Improvements
Scope : Underground utilities, construct bike lane, construct ped path/sidewalks & improve shoulders
Alternative : **4**

SUMMARY OF PROJECT COST ESTIMATE

	Current Year Cost	Escalated Cost
TOTAL ROADWAY COST	**$ 28,993,100**	**$ 39,679,059**
TOTAL STRUCTURES COST	**$ -**	**$ -**
SUBTOTAL CONSTRUCTION COST	**$ 28,993,100**	**$ 39,679,059**
TOTAL RIGHT OF WAY COST	**$ 61,378,791**	**$ 74,882,125**
TOTAL CAPITAL OUTLAY COSTS	**$ 90,079,000**	**$ 114,561,184**
PR/ED SUPPORT	**$ 4,375,000**	**$ 5,468,750**
PS&E SUPPORT	**$ 5,000,000**	**$ 6,250,000**
RIGHT OF WAY SUPPORT	**$ 3,178,750**	**$ 3,973,438**
CONSTRUCTION SUPPORT	**$ 5,000,000**	**$ 6,250,000**
TOTAL SUPPORT COST	**$ 17,553,750**	**$ 21,942,188**
TOTAL PROJECT COST	**$ 107,632,750**	**$ 136,503,372**

If Project has been programmed enter Programmed Amount

	Month	/	Year
Date of Estimate (Month/Year)	6	/	2022
Estimated Construction Start (Month/Year)	6	/	2028
Number of Working Days =			650
Estimated Mid-Point of Construction (Month/Year)	9	/	2029
Estimated Construction End (Month/Year)	9	/	2030
Number of Plant Establishment Days			261

Estimated Project Schedule

PID Approval	October-18
PA/ED Approval	December-20
PS&E	December-22
RTL	May-23
Begin Construction	July-23

Cost Estimate Certifier	Girair A. Kotchian	**6/17/2022**	(714) 730-2493
	Girair Kotchian, PE - Consultant PM	**Date**	**Phone**
Approved by Program Manager		**6/17/2022**	(949) 464-6688
	Tom Perez, City Program Manager	**Date**	**Phone**

I. ROADWAY ITEMS SUMMARY

	Section		Cost
1	Earthwork	$	336,500
2	Pavement Structural Section	$	4,381,500
3	Drainage	$	2,105,500
4	Specialty Items	$	54,500
5	Environmental	$	1,530,600
6	Traffic Items	$	4,509,800
7	Detours	$	-
8	Minor Items	$	1,937,800
9	Roadway Mobilization	$	1,485,700
10	Supplemental Work	$	833,300
11	State Furnished	$	1,334,300
12	Time-Related Overhead	$	1,485,700
13	Roadway Contingency	$	8,997,900

TOTAL ROADWAY ITEMS	**$**	**28,993,100**

Estimate Prepared By :	Stephen P.A. Crouch	**6/17/2022**	(714) 833-2743
	Stephen P.A. Crouch	Date	Phone
Estimate Reviewed By :	Girair A. Kotchian	**6/17/2022**	(714) 730-2493
	Girair Kotchian, PE - Consultant PM	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
190101	Roadway Excavation	CY	7,536	x	40.00	=	$	301,440
19010X	Roadway Excavation (Type X) ADL	CY		x		=	$	-
194001	Ditch Excavation	CY		x		=	$	-
19801X	Imported Borrow	CY/TON		x		=	$	-
192037	Structure Excavation (Retaining Wall)	CY		x		=	$	-
193013	Structure Backfill (Retaining Wall)	CY		x		=	$	-
193031	Pervious Backfill Material (Retaining Wall)	CY		x		=	$	-
16010X	Clearing & Grubbing	LS	1	x	20,000.00	=	$	20,000
170101	Develop Water Supply	LS	1	x	15,000.00	=	$	15,000
19801X	Imported Borrow	CY/TON		x		=	$	-
210130	Duff	ACRE		x		=	$	-
XXXXXX	Some Item	Unit						

TOTAL EARTHWORK SECTION ITEMS $ 336,500

SECTION 2: PAVEMENT STRUCTURAL SECTION

Item code		Unit	Quantity		Unit Price ($)			Cost
401050	Jointed Plain Concrete Pavement	CY	134	x		=	$	-
400050	Continuously Reinforced Concrete Pavement	CY		x		=	$	-
404092	Seal Pavement Joint	LF		x		=	$	-
404093	Seal Isolation Joint	LF		x		=	$	-
413117	Seal Concrete Pavement Joint (Silicone)	LF		x		=	$	-
413118	Seal Pavement Joint (Asphalt Rubber)	LF		x		=	$	-
280010	Rapid Strength Concrete Base	CY		x		=	$	-
410095	Dowel Bar (Drill and Bond)	EA		x		=	$	-
390132	Hot Mix Asphalt (Type A)	TON	11,064	x	160.00	=	$	1,770,240
390137	Rubberized Hot Mix Asphalt (Gap Graded)	TON	4,538	x	135.00	=	$	612,630
39300X	Geosynthetic Pavement Interlayer (Type X)	SQYD		x		=	$	-
26020X	Class 2 Aggregate Base	CY	3,946	x	85.00	=	$	335,410
390401	HMA - Open Graded (Open Graded Friction Course)	TON		x		=	$	-
290201	Asphalt Treated Permeable Base	CY		x		=	$	-
250401	Class 4 Aggregate Subbase	CY		x		=	$	-
374002	Asphaltic Emulsion (Fog Seal Coat)	TON		x		=	$	-
397005	Tack Coat	TON		x		=	$	-
377501	Slurry Seal	TON		x		=	$	-
3750XX	Screenings (Type XX)	TON		x		=	$	-
374492	Asphaltic Emulsion (Polymer Modified)	TON		x		=	$	-
370001	Sand Cover (Seal)	TON		x		=	$	-
731504	Minor Concrete (Curb and Gutter)	CY	1,483	x	440.00	=	$	652,520
731521	Minor Concrete (Sidewalk)	CY	1,528	x	600.00	=	$	916,800
39407X	Place Hot Mix Asphalt Dike (Type X)	LF		x		=	$	-
150771	Remove Asphalt Concrete Dike	LF		x		=	$	-
420201	Grind Existing Concrete Pavement	SQYD		x		=	$	-
150860	Remove Base and Surfacing	CY		x		=	$	-
390095	Replace Asphalt Concrete Surfacing	CY		x		=	$	-
15312X	Remove Concrete	LF/CY/LS		x		=	$	-
394090	Place Hot Mix Asphalt (Miscellaneous Area)	SQYD		x		=	$	-
153103	Cold Plane Asphalt Concrete Pavement	SQYD	4,694	x	20.00	=	$	93,880
39405X	Shoulder Rumble Strip (HMA, X-In Indentations)	STA		x		=	$	-
413113	Repair Spalled Joints, Polyester Grout	SQYD		x		=	$	-
420102	Groove Existing Concrete Pavement	SQYD		x		=	$	-
390136	Minor Hot Mix Asphalt	TON		x		=	$	-
394095	Roadside Paving (Miscellaneous Areas)	SQYD		x		=	$	-
XXXXXX	Open Grade Finishing Course (OGFC)	CY		x		=	$	-

TOTAL PAVEMENT STRUCTURAL SECTION ITEMS $ 4,381,500

SECTION 3: DRAINAGE

Item code		Unit	Quantity		Unit Price ($)			Cost
15080X	Remove Culvert	EA/LF		x		=	$	-
150820	Modify Inlet	EA		x		=	$	-
155232	Sand Backfill	CY		x		=	$	-
15020X	Abandon Culvert	EA/LF		x		=	$	-
152430	Adjust Inlet	LF		x		=	$	-
155003	Cap Inlet	EA		x		=	$	-
510501	Minor Concrete	CY		x		=	$	-
510502	Minor Concrete (Minor Structure)	CY	62	x	2,000.00	=	$	124,000
5105XX	Minor Concrete (Type XX)	CY		x		=	$	-
620XXX	XX" Alternative Pipe Culvert (Type X)	LF		x		=	$	-
6411XX	XX" Plastic Pipe	LF		x		=	$	-
65XXXX	24" Reinforced Concrete Pipe (Type X)	LF	2,023	x	200.00	=	$	404,600
6650XX	36" Reinforced Concrete Pipe (Type X)	LF	1,200	x	260.00	=	$	312,000
68XXXX	XX" Plastic Pipe (Edge Drain)	LF		x		=	$	-
69011X	XX" Corrugated Steel Pipe Downdrain (0.XXX" Thic	LF		x		=	$	-
70321X	XX" Corrugated Steel Pipe Inlet (0.XXX" Thick)	LF		x		=	$	-
70XXXX	XX" Corrugated Steel Pipe Riser (0.XXX" Thick)	LF		x		=	$	-
7050XX	XX" Steel Flared End Section	EA		x		=	$	-
703233	Grated Line Drain	LF		x		=	$	-
72XXXX	Rock Slope Protection (Type and Method)	CY/TON		x		=	$	-
72901X	Rock Slope Protection Fabric (Class X)	SQYD		x		=	$	-
721420	Concrete (Ditch Lining)	CY		x		=	$	-
721430	Concrete (Channel Lining)	CY		x		=	$	-
750001	Miscellaneous Iron and Steel	LB		x		=	$	-
750029	Inlet Frame and Grate	EA	16	x	927.00	=	$	14,832
7500xx	Other Drainage Items (7% of Roadway)	LS	1	x	1,250,000.00	=	$	1,250,000

TOTAL DRAINAGE ITEMS $ 2,105,500

SECTION 4: SPECIALTY ITEMS

Item code		Unit	Quantity		Unit Price ($)			Cost
080050	Progress Schedule (Critical Path Method)	LS	1	x	40,000.00	=	$	40,000
582001	Sound Wall (Masonry Block)	SQFT		x		=	$	-
510530	Minor Concrete (Wall)	CY		x		=	$	-
15325X	Remove Sound Wall	LF/LS		x		=	$	-
070030	Lead Compliance Plan	LS		x		=	$	-
141120	Treated Wood Waste	LB		x		=	$	-
153221	Remove Concrete Barrier	LF		x		=	$	-
150661	Remove Metal Beam Guard Railing	LF	200	x	10.00	=	$	2,000
150668	Remove Flared End Section	EA	3	x	500.00	=	$	1,500
8000XX	Chain Link Fence (Type XX)	LF		x		=	$	-
80XXXX	XX" Chain Link Gate (Type CL-6)	EA		x		=	$	-
832005	Midwest Guardrail System	LF	200	x	40.00	=	$	8,000
839301	Single Thrie Beam Barrier	LF		x		=	$	-
839310	Double Thrie Beam Barrier	LF		x		=	$	-
839521	Cable Railing	LF		x		=	$	-
839539	Terminal System (Type SKT)	EA	3	x	1,000.00	=	$	3,000
839585	Alternative Flared Terminal System	EA		x		=	$	-
839584	Alternative In-line Terminal System	EA		x		=	$	-
4906XX	CIDH Concrete Piling (Insert Diameter)	LF		x		=	$	-
839XXX	Crash Cushion (Insert Type)	EA		x		=	$	-
839701	Bike Trail Barrier (Type TBD)	LF		x	150.00	=	$	-
520103	Bar Reinforced Steel (Retaining Wall)	LB		x		=	$	-
510060	Structural Concrete, Retaining Wall	CY		x		=	$	-
513553	Retaining Wall (Masonry Wall)	SQFT	1,430	x		=	$	-
511035	Architectural Treatment	SQFT		x		=	$	-
598001	Anti-Graffiti Coating	SQFT		x		=	$	-
203070	Rock Stain	SQFT		x		=	$	-
5136XX	Reinforced Concrete Crib Wall (Type X)	SQFT		x		=	$	-
83954X	Transition Railing (Type X)	EA		x		=	$	-
597601	Prepare and Stain Concrete	SQFT		x		=	$	-
839561	Rail Tensioning Assembly	EA		x		=	$	-
83958X	Some Item	EA		x		=	$	-
839701	Some Item	Unit		x		=	$	-

TOTAL SPECIALTY ITEMS $ 54,500

SECTION 5: ENVIRONMENTAL

5A - ENVIRONMENTAL MITIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost		
14XXXX	Biological Mitigation	LS	1	x	20,000.00	=	$	20,000		
14XXXX	Archaeological Commitments	LS	1	x	10,000.00	=	$	10,000		
14XXXX	Historical Commitments	LS	1	x	10,000.00	=	$	10,000		
130670	Temporary Reinforced Silt Fence	LF		x		=	$	-		
141000	Temporary Fence (Type ESA)	LF		x		=	$	-		
14XXXX	Other Environmental Mitigation	LS	1	x	250,000.00	=	$	250,000		
					Subtotal Environmental Mitigation				*$*	*290,000*

5B - LANDSCAPE AND IRRIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost		
20XXXX	Highway Planting	LS	1	x	300,000.00	=	$	300,000		
20XXXX	Irrigation System	LS	1	x	100,000.00	=	$	100,000		
204099	Plant Establishment Work	LS	1	x	50,000.00	=	$	50,000		
204101	Extend Plant Establishment Work	LS		x		=	$	-		
20XXXX	Follow-up Landscape Project	LS		x		=	$	-		
150685	Remove Irrigation Facility	LS		x		=	$	-		
20XXXX	Maintain Existing (Irrigation or Planted Areas)	LS		x		=	$	-		
206400	Check and Test Existing Irrigation Facilities	LS		x		=	$	-		
21011X	Imported Topsoil (X)	CY/TON		x		=	$	-		
20XXXX	Rock Blanket, Rock Mulch, DG, Gravel Mulch	SF/SY		x		=	$	-		
200122	Weed Germination	SQYD		x		=	$	-		
208304	Water Meter	EA		x		=	$	-		
2087XX	XX" Conduit (Use for Irrigation x-overs)	LF		x		=	$	-		
20890X	Extend X" Conduit (Irrigation x-overs)	LF		x		=	$	-		
					Subtotal Landscape and Irrigation				*$*	*450,000*

5C - EROSION CONTROL

Item code		Unit	Quantity		Unit Price ($)			Cost		
210010	Move In/Move Out (Erosion Control)	EA		x		=	$	-		
210350	Fiber Rolls	LF		x		=	$	-		
210360	Compost Sock	LF		x		=	$	-		
2102XX	Rolled Erosion Control Product (X)	SQFT		x		=	$	-		
21025X	Bonded Fiber Matrix	QFT/ACRE		x		=	$	-		
210300	Hydromulch	SQFT		x		=	$	-		
210420	Straw	SQFT		x		=	$	-		
210430	Hydroseed	SQFT		x		=	$	-		
210600	Compost	SQFT		x		=	$	-		
210630	Incorporate Materials	SQFT		x		=	$	-		
2106XX	Other Erosion Control	LS	1	x	200000	=	$	200,000		
					Subtotal Erosion Control				*$*	*200,000*

5D - NPDES

Item code		Unit	Quantity		Unit Price ($)			Cost		
130300	Prepare SWPPP	LS	1	x	15,000.00	=	$	15,000		
130200	Prepare WPCP	LS		x		=	$	-		
130100	Job Site Management	LS	1	x	60,000.00	=	$	60,000		
130330	Storm Water Annual Report	EA	3	x	2,500.00	=	$	7,500		
130310	Rain Event Action Plan (REAP)	EA	64	x	600.00	=	$	38,400		
130320	Storm Water Sampling and Analysis Day	EA	26	x	1,300.00	=	$	33,800		
130520	Temporary Hydraulic Mulch	SQYD		x		=	$	-		
130550	Temporary Hydroseed	SQYD		x		=	$	-		
130505	Move-In/Move-Out (Temp Erosion Control)	EA		x		=	$	-		
130640	Temporary Fiber Roll	LF	25,872	x	3.50	=	$	90,552		
130900	Temporary Concrete Washout	LS	1	x	20,000.00	=	$	20,000		
130710	Temporary Construction Entrance	EA	2	x	5,000.00	=	$	10,000		
130610	Temporary Check Dam	LF		x		=	$	-		
130620	Temporary Drainage Inlet Protection	EA	20	x	265.00	=	$	5,300		
130730	Street Sweeping	LS	1	x	10,000.00	=	$	10,000		
XXXXXX	Permenant BMPs	LS	1	x	300,000.00	=	$	300,000		
					Subtotal NPDES				*$*	*590,552*

TOTAL ENVIRONMENTAL	**$**	**1,530,600**

Supplemental Work for NPDES

066595	Water Pollution Control Maintenance Sharing*	LS	1	x	28,000.00	=	$	28,000		
066596	Additional Water Pollution Control**	LS	1	x	8,000.00	=	$	8,000		
066597	Storm Water Sampling and Analysis***	LS		x		=	$	-		
066916	CPG Fees	LS	1	x	3,000.00	=	$	3,000		
					Subtotal Supplemental Work for NDPS				*$*	*39,000*

*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.

SECTION 6: TRAFFIC ITEMS

6A - Traffic Electrical

Item code		Unit	Quantity		Unit Price ($)			Cost
860460	Lighting and Sign Illumination	LS	1	x	2,000,000.00	=	$	2,000,000
860201	Signal and Lighting	EA	2	x	400,000.00	=	$	800,000
860990	Closed Circuit Television System	LS		x		=	$	-
86110X	Ramp Metering System (Location X)	LS		x		=	$	-
86070X	Interconnection Conduit and Cable	LS		x		=	$	-
5602XX	Furnish Sign Structure (Type X)	LB		x		=	$	-
5602XX	Install Sign Structure (Type X)	LB		x		=	$	-
498040	XX" CIDHC Pile (Sign Foundation)	LF		x		=	$	-
860806	Inductive Loop Detectors	LS		x		=	$	-
8609XX	Traffic Monitoring Station (Type X)	LS		x		=	$	-
15075X	Remove Sign Structure	EA/LS		x		=	$	-
151581	Reconstruct Sign Structure	EA		x		=	$	-
152641	Modify Sign Structure	EA		x		=	$	-
860090	Maintain Existing Traffic Mgt. System	LS		x		=	$	-
86XXXX	Fiber Optic Conduit System	LS		x		=	$	-
XXXXX	Some Item	LS		x		=	$	-

Subtotal Traffic Electrical *$* *2,800,000*

6B - Traffic Signing and Striping

Item code		Unit	Quantity		Unit Price ($)			Cost
566011	Roadside Sign - One Post	EA	50	x	500.00	=	$	25,000
566012	Roadside Sign - Two Post	EA	10	x	600.00	=	$	6,000
5602XX	Furnish Sign	SQFT		x		=	$	-
568016	Install Sign Panel on Existing Frame	SQFT		x		=	$	-
150711	Remove Painted Traffic Stripe	LF	51,744	x	1.00	=	$	51,744
141101	Remove Yellow Stripe (Hazardous Waste)	LF		x		=	$	-
150712	Remove Painted Pavement Marking	SQFT		x		=	$	-
150742	Remove Roadside Sign	EA	60	x	150.00	=	$	9,000
152320	Reset Roadside Sign	EA		x		=	$	-
152390	Relocate Roadside Sign	EA		x		=	$	-
82010X	Delineator (Class X)	EA		x		=	$	-
840502	Thermo Traffic Stripe	LF	51,744	x	0.55	=	$	28,459
846012	Thermo Crosswalk and Pavement Marking	SQFT		x		=	$	-
120090	Construction Area Signs	LS	1	x	5,000.00	=	$	5,000
84XXXX	Permanent Pavement Delineation	LF	38,808	x	0.55	=	$	21,344

Subtotal Traffic Signing and Striping *$* *146,548*

6C - Traffic Management Plan

Item code		Unit	Quantity		Unit Price ($)			Cost
12865X	Portable Changeable Message Signs	LS	10	x	$ 10,000	=	$	100,000

Subtotal Traffic Management Plan *$* *100,000*

6C - Stage Construction and Traffic Handling

Item code		Unit	Quantity		Unit Price ($)			Cost
120199	Traffic Plastic Drum	EA		x		=	$	-
12016X	Channelizer (Type X)	EA		x		=	$	-
120120	Type III Barricade	EA		x		=	$	-
129100	Temporary Crash Cushion Module	EA	420	x	250.00	=	$	105,000
120100	Traffic Control System	LS	1	x	40,000.00	=	$	40,000
129110	Temporary Crash Cushion	EA		x		=	$	-
129000	Temporary Railing (Type K)	LF	38,808	x	17.00	=	$	659,736
120149	Temporary Pavement Marking (Paint)	SQFT		x		=	$	-
120151	Temporary Pavement Striping (Paint)	LF	155,232	x	2.00	=	$	310,464
82010X	Delineator (Class X)	EA		x		=	$	-
XXXXXX	Temporary Ground Mounted Signs	LS	1	x	48,000.00	=	$	48,000
XXXXXX	Other Street Improvements	Unit	1	x	300,000.00	=	$	300,000

Subtotal Stage Construction and Traffic Handling *$* *1,463,200*

TOTAL TRAFFIC ITEMS **$** **4,509,800**

SECTION 7: DETOURS

Includes constructing, maintaining, and removal

Item code		Unit	Quantity		Unit Price ($)		Cost	
190101	Roadway Excavation	CY		x		=	$	-
19801X	Imported Borrow	CY/TON		x		=	$	-
390132	Hot Mix Asphalt (Type A)	TON		x		=	$	-
26020X	Class 2 Aggregate Base	TON/CY		x		=	$	-
250401	Class 4 Aggregate Subbase	CY		x		=	$	-
130620	Temporary Drainage Inlet Protection	EA		x		=	$	-
129000	Temporary Railing (Type K)	LF		x		=	$	-
128601	Temporary Signal System	LS		x		=	$	-
120149	Temporary Pavement Marking (Paint)	SQFT		x		=	$	-
80010X	Temporary Fence (Type X)	LF		x		=	$	-
XXXXXX	Some Item	Unit		x		=	$	-

TOTAL DETOURS $ -

SUBTOTAL SECTIONS 1 through 7 $ 12,918,400

SECTION 8: MINOR ITEMS

8A - Americans with Disabilities Act Items						
ADA Items				5.0%	$	645,920
8B - Bike Path Items						
Bike Path Items				0.0%	$	-
8C - Other Minor Items						
Other Minor Items				10.0%	$	1,291,840
Total of Section 1-7	$	12,918,400	x	15.0%	= $	1,937,760

TOTAL MINOR ITEMS $ 1,937,800

SECTIONS 9: MOBILIZATION

Item code								
999990	Total Section 1-8	$	14,856,200	x	10%	=	$	1,485,620

TOTAL MOBILIZATION $ 1,485,700

SECTION 10: SUPPLEMENTAL WORK

Item code		Unit	Quantity		Unit Price ($)		Cost	
066670	Payment Adjustments For Price Index Fluctuations	LS		x		=	$	-
066094	Value Analysis	LS		x		=	$	-
066070	Maintain Traffic	LS	1	x	200,000.00	=	$	200,000
066919	Dispute Resolution Board	LS		x		=	$	-
066921	Dispute Resolution Advisor	LS		x		=	$	-
066015	Federal Trainee Program	LS		x		=	$	-
066610	Partnering	LS		x		=	$	-
066204	Remove Rock and Debris	LS		x		=	$	-
066222	Locate Existing Crossover	LS		x		=	$	-
XXXXXX	Some Item	Unit		x		=	$	-

Cost of ***NPDES*** *Supplemental Work specified in Section 5D* = $ 39,000

Total Section 1-8 $ 14,856,200 4% = $ 594,248

TOTAL SUPPLEMENTAL WORK $ 833,300

SECTION 11: STATE FURNISHED MATERIALS AND EXPENSES

Item code		Unit	Quantity		Unit Price ($)		Cost
066105	Resident Engineers Office	LS	1	x	200,000.00	=	$200,000
066063	Traffic Management Plan - Public Information	LS	1	x	120,000.00	=	$120,000
066901	Water Expenses	LS		x		=	$0
8609XX	Traffic Monitoring Station (X)	LS		x		=	$0
066841	Traffic Controller Assembly	LS		x		=	$0
066840	Traffic Signal Controller Assembly	LS		x		=	$0
066062	COZEEP Contract	LS	1	x	170,000.00	=	$170,000
066838	Reflective Numbers and Edge Sealer	LS		x		=	$0
066065	Tow Truck Service Patrol	LS	1	x	250,000.00	=	$250,000
066916	Annual Construction General Permit Fee	LS		x		=	$0
XXXXXX	Some Item	Unit		x		=	$0
	Total Section 1-8	$	14,856,200		4%	= $	594,248

TOTAL STATE FURNISHED **$1,334,300**

SECTION 12: TIME-RELATED OVERHEAD

Total of Roadway and Structures Contract Items excluding Mobilization	$14,856,200	(used to calculate TRO)
Total Construction Cost (excluding TRO and Contingency)	$18,509,500	(used to check if project is greater than $5 million excluding contingency)

Estimated Time-Related Overhead (TRO) Percentage (0% to 10%) = **10%**

Item code		Unit	Quantity		Unit Price ($)		Cost
070018	Time-Related Overhead	WD	650	X	$2,286	=	$1,485,700

TOTAL TIME-RELATED OVERHEAD **$1,485,700**

Note: If the building portion of the project is greater than 50% of the total project cost, then TRO is not included.

SECTION 13: ROADWAY CONTINGENCY

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

Total Section 1-12	$	19,995,200	x	**45%**	=	$8,997,840

TOTAL CONTINGENCY **$8,997,900**

II. STRUCTURE ITEMS

	Bridge 1				
DATE OF ESTIMATE	00/00/00		00/00/00		00/00/00
Bridge Name	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Bridge Number	57-XXX		57-XXX		57-XXX
Structure Type	Pedestrian OC		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF		0 LF		0 LF
Total Bridge Length (Feet)	0 LF		0 LF		0 LF
Total Area (Square Feet)	0 SQFT		0 SQFT		0 SQFT
Structure Depth (Feet)	0 LF		0 LF		0 LF
Footing Type (pile or spread)	TBD		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$1,750		$0		$0
COST OF EACH	**$0**		**$0**		**$0**

* to include elevators and other ancilliary items

DATE OF ESTIMATE	00/00/00		00/00/00		00/00/00
Name	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Bridge Number	57-XXX		57-XXX		57-XXX
Structure Type	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF		0 LF		0 LF
Total Length (Feet)	0 LF		0 LF		0 LF
Total Area (Square Feet)	0 SQFT		0 SQFT		0 SQFT
Structure Depth (Feet)	0 LF		0 LF		0 LF
Footing Type (pile or spread)	xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$100		$0		$0
COST OF EACH	**$0**		**$0**		**$0**

TOTAL COST OF BRIDGES		**$0**
TOTAL COST OF BUILDINGS		**$0**
Structures Mobilization Percentage	10%	**$0**

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

Structures Contingency Percentage	10%	**$0**
TOTAL COST OF STRUCTURES		**$0**

Estimate Prepared By: ______________________ ______________________

XXXXXXXXXXXXXXXXX ------ Division of Structures Date

EA: 0Q670K PID: ID 1217000086

III. RIGHT OF WAY

Fill in all of the available information from the Right of Way data sheet.

A)	A1)	Acquisition, including Excess Land Purchases, Damages & Goodwill, Fees		$	5,268,791
	A2)	SB-1210		$	0
B)		Acquisition of Offsite Mitigation		$	0
C)	C1)	Utility Relocation (State Share)		$	0
	C2)	Potholing (Design Phase)		$	0
D)		Railroad Acquisition		$	0
E)		Clearance / Demolition		$	0
F)		Relocation Assistance (RAP and/or Last Resort Housing Costs)		$	0
G)		Title and Escrow		$	
H)		Environmental Review		$	60,000
I)		Condemnation Settlements	0%	$	0
J)		Design Appreciation Factor	0%	$	0
K)		Undergrounding Electrical Transmission (Total Capital Cost)		$	22,600,000
		Undergrounding Electrical Distribution (Total Capital Costs)		$	23,700,000
		Other Utilities (Sewer, Water, Gas, Telephone, FO)			9,750,000
		Total Utility Relocation (Construction Cost)		$	56,050,000

L)	**TOTAL RIGHT OF WAY ESTIMATE**	**$61,378,791**
M)	**TOTAL R/W ESTIMATE: Escalated**	**$74,882,125**
N)	**RIGHT OF WAY SUPPORT**	**$3,178,750**

Support Cost Estimate Prepared By	Stephen V.G. Crone Project Coordinator[1]	714-833-2439 Phone
Utility Estimate Prepared By	Stephen V.G. Crone Utility Coordinator[2]	714-833-2439 Phone
R/W Acquisition Estimate Prepared By	John Craig Right of Way Estimator[3]	714-730-2317 Phone

Note: Items G & H applied to items A + B

[1] When estimate has Support Costs only

[2] When estimate has Utility Relocation

[3] When R/W Acquisition is required

IV. SUPPORT COST ESTIMATE SUMMARY

Note: Use PRSM project data.

		Escalated Support Cost for Estimate To Completion (ETC)				
Total by FY		PA&ED	PS&E	RW	CON	Total $
< 2014	Expended					
	ETC					
2015	Expended					
	ETC					
2016	Expended					
	ETC					
2017	Expended					
	ETC					
2018	Expended					
	ETC					
2019	Expended					
	ETC					
2020	Expended					
	ETC					
2021	Expended					
	ETC					
2022	Expended					
	ETC					
2023	Expended	$2,000,000				$2,000,000
	ETC					
2024	Expended	$2,375,000				$2,375,000
	ETC					
2025	Expended		$2,500,000	$1,059,583		$3,559,583
	ETC					
2026	Expended		$2,500,000	$2,119,167		$4,619,167
	ETC					
2027	Expended				$5,000,000	$5,000,000
	ETC					
2028	Expended					
	ETC					
2029>	Expended					
	ETC					
EAC (Expended + ETC)		**$4,375,000**	**$5,000,000**	**$3,178,750**	**$5,000,000**	**$17,553,750**
Approved Budget (PRSM)						
Difference (Budget - EAC)		**-$4,375,000**	**-$5,000,000**	**-$3,178,750**	**-$5,000,000**	**-$17,553,750**
Support Ratio (EAC / Cap Cost)		**3.8%**	**4.4%**	**2.8%**	**4.4%**	**15.3%**

Total Capital Cost:	**$114,561,184**
Total Capital Outlay Support Cost:	**$17,553,750**
Overall Percent Support Cost:	**15.32%**

PROJECT

EA: 0Q670K PID: ID 1217000086

EA: 0Q670K

PID: ID 1217000086

District-County-Route: 12-OC-133

PM: 0.9 - 3.4

Type of Estimate : PSR/PDS

Project Limits : Canyon Acres Drive to El Toro Road

Project Description: SR-133 (Laguna Canyon Road) Improvements

Scope : Underground utilities, construct bike lane, construct ped path/sidewalks & improve shoulders

Alternative : 5

SUMMARY OF PROJECT COST ESTIMATE

	Current Year Cost	Escalated Cost
TOTAL ROADWAY COST	**$ 29,421,700**	**$ 40,265,628**
TOTAL STRUCTURES COST	**$ -**	**$ -**
SUBTOTAL CONSTRUCTION COST	**$ 29,421,700**	**$ 40,265,628**
TOTAL RIGHT OF WAY COST	**$ 63,688,677**	**$ 77,700,186**
TOTAL CAPITAL OUTLAY COSTS	**$ 90,079,000**	**$ 117,965,814**
PR/ED SUPPORT	**$ 4,375,000**	**$ 5,468,750**
PS&E SUPPORT	**$ 5,000,000**	**$ 6,250,000**
RIGHT OF WAY SUPPORT	**$ 3,846,875**	**$ 4,808,594**
CONSTRUCTION SUPPORT	**$ 5,000,000**	**$ 6,250,000**
TOTAL SUPPORT COST	**$ 18,221,875**	**$ 22,777,344**
TOTAL PROJECT COST	**$ 108,300,875**	**$ 140,743,158**

If Project has been programmed enter Programmed Amount

	Month	/	Year
Date of Estimate (Month/Year)	6	/	2022
Estimated Construction Start (Month/Year)	6	/	2028
Number of Working Days =			650
Estimated Mid-Point of Construction (Month/Year)	9	/	2029
Estimated Construction End (Month/Year)	9	/	2030
Number of Plant Establishment Days			261

Estimated Project Schedule

PID Approval	October-18
PA/ED Approval	December-20
PS&E	December-22
RTL	May-23
Begin Construction	July-23

Cost Estimate Certifier Girair A. Kotchian **6/17/2022** (714) 730-2493

Girair Kotchian, PE - Consultant PM **Date** **Phone**

Approved by Program Manager **6/17/2022** (949) 464-6688

Tom Perez, City Program Manager **Date** **Phone**

I. ROADWAY ITEMS SUMMARY

	Section	Cost
1	**Earthwork**	$ 354,400
2	**Pavement Structural Section**	$ 4,564,500
3	**Drainage**	$ 2,105,500
4	**Specialty Items**	$ 54,500
5	**Environmental**	$ 1,530,600
6	**Traffic Items**	$ 4,509,800
7	**Detours**	$ -
8	**Minor Items**	$ 1,967,900
9	**Roadway Mobilization**	$ 1,508,800
10	**Supplemental Work**	$ 842,500
11	**State Furnished**	$ 1,343,500
12	**Time-Related Overhead**	$ 1,508,800
13	**Roadway Contingency**	$ 9,130,900

TOTAL ROADWAY ITEMS	$	29,421,700

Estimate Prepared By : Stephen P.A. Crouch **6/17/2022** (714) 833-2743

Stephen P.A. Crouch Date Phone

Estimate Reviewed By : Girair A. Kotchian **6/17/2022** (714) 730-2493

Girair Kotchian, PE - Consultant PM 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
190101	Roadway Excavation	CY	7,983	x	40.00	=	$	319,320
19010X	Roadway Excavation (Type X) ADL	CY		x		=	$	-
194001	Ditch Excavation	CY		x		=	$	-
19801X	Imported Borrow	CY/TON		x		=	$	-
192037	Structure Excavation (Retaining Wall)	CY		x		=	$	-
193013	Structure Backfill (Retaining Wall)	CY		x		=	$	-
193031	Pervious Backfill Material (Retaining Wall)	CY		x		=	$	-
16010X	Clearing & Grubbing	LS	1	x	20,000.00	=	$	20,000
170101	Develop Water Supply	LS	1	x	15,000.00	=	$	15,000
19801X	Imported Borrow	CY/TON		x		=	$	-
210130	Duff	ACRE		x		=	$	-
XXXXXX	Some Item	Unit						

TOTAL EARTHWORK SECTION ITEMS $ 354,400

SECTION 2: PAVEMENT STRUCTURAL SECTION

Item code		Unit	Quantity		Unit Price ($)			Cost
401050	Jointed Plain Concrete Pavement	CY	153	x		=	$	-
400050	Continuously Reinforced Concrete Pavement	CY		x		=	$	-
404092	Seal Pavement Joint	LF		x		=	$	-
404093	Seal Isolation Joint	LF		x		=	$	-
413117	Seal Concrete Pavement Joint (Silicone)	LF		x		=	$	-
413118	Seal Pavement Joint (Asphalt Rubber)	LF		x		=	$	-
280010	Rapid Strength Concrete Base	CY		x		=	$	-
410095	Dowel Bar (Drill and Bond)	EA		x		=	$	-
390132	Hot Mix Asphalt (Type A)	TON	11,719	x	160.00	=	$	1,875,040
390137	Rubberized Hot Mix Asphalt (Gap Graded)	TON	4,801	x	135.00	=	$	648,135
39300X	Geosynthetic Pavement Interlayer (Type X)	SQYD		x		=	$	-
26020X	Class 2 Aggregate Base	CY	4,195	x	85.00	=	$	356,575
390401	HMA - Open Graded (Open Graded Friction Course)	TON		x		=	$	-
290201	Asphalt Treated Permeable Base	CY		x		=	$	-
250401	Class 4 Aggregate Subbase	CY		x		=	$	-
374002	Asphaltic Emulsion (Fog Seal Coat)	TON		x		=	$	-
397005	Tack Coat	TON		x		=	$	-
377501	Slurry Seal	TON		x		=	$	-
3750XX	Screenings (Type XX)	TON		x		=	$	-
374492	Asphaltic Emulsion (Polymer Modified)	TON		x		=	$	-
370001	Sand Cover (Seal)	TON		x		=	$	-
731504	Minor Concrete (Curb and Gutter)	CY	1,480	x	440.00	=	$	651,200
731521	Minor Concrete (Sidewalk)	CY	1,557	x	600.00	=	$	934,200
39407X	Place Hot Mix Asphalt Dike (Type X)	LF		x		=	$	-
150771	Remove Asphalt Concrete Dike	LF		x		=	$	-
420201	Grind Existing Concrete Pavement	SQYD		x		=	$	-
150860	Remove Base and Surfacing	CY		x		=	$	-
390095	Replace Asphalt Concrete Surfacing	CY		x		=	$	-
15312X	Remove Concrete	LF/CY/LS		x		=	$	-
394090	Place Hot Mix Asphalt (Miscellaneous Area)	SQYD		x		=	$	-
153103	Cold Plane Asphalt Concrete Pavement	SQYD	4,963	x	20.00	=	$	99,260
39405X	Shoulder Rumble Strip (HMA, X-In Indentations)	STA		x		=	$	-
413113	Repair Spalled Joints, Polyester Grout	SQYD		x		=	$	-
420102	Groove Existing Concrete Pavement	SQYD		x		=	$	-
390136	Minor Hot Mix Asphalt	TON		x		=	$	-
394095	Roadside Paving (Miscellaneous Areas)	SQYD		x		=	$	-
XXXXXX	Open Grade Finishing Course (OGFC)	CY		x		=	$	-

TOTAL PAVEMENT STRUCTURAL SECTION ITEMS $ 4,564,500

SECTION 3: DRAINAGE

Item code		Unit	Quantity		Unit Price ($)			Cost
15080X	Remove Culvert	EA/LF		x		=	$	-
150820	Modify Inlet	EA		x		=	$	-
155232	Sand Backfill	CY		x		=	$	-
15020X	Abandon Culvert	EA/LF		x		=	$	-
152430	Adjust Inlet	LF		x		=	$	-
155003	Cap Inlet	EA		x		=	$	-
510501	Minor Concrete	CY		x		=	$	-
510502	Minor Concrete (Minor Structure)	CY	62	x	2,000.00	=	$	124,000
5105XX	Minor Concrete (Type XX)	CY		x		=	$	-
620XXX	XX" Alternative Pipe Culvert (Type X)	LF		x		=	$	-
6411XX	XX" Plastic Pipe	LF		x		=	$	-
65XXXX	24" Reinforced Concrete Pipe (Type X)	LF	2,023	x	200.00	=	$	404,600
6650XX	36" Reinforced Concrete Pipe (Type X)	LF	1,200	x	260.00	=	$	312,000
68XXXX	XX" Plastic Pipe (Edge Drain)	LF		x		=	$	-
69011X	XX" Corrugated Steel Pipe Downdrain (0.XXX" Thic	LF		x		=	$	-
70321X	XX" Corrugated Steel Pipe Inlet (0.XXX" Thick)	LF		x		=	$	-
70XXXX	XX" Corrugated Steel Pipe Riser (0.XXX" Thick)	LF		x		=	$	-
7050XX	XX" Steel Flared End Section	EA		x		=	$	-
703233	Grated Line Drain	LF		x		=	$	-
72XXXX	Rock Slope Protection (Type and Method)	CY/TON		x		=	$	-
72901X	Rock Slope Protection Fabric (Class X)	SQYD		x		=	$	-
721420	Concrete (Ditch Lining)	CY		x		=	$	-
721430	Concrete (Channel Lining)	CY		x		=	$	-
750001	Miscellaneous Iron and Steel	LB		x		=	$	-
750029	Inlet Frame and Grate	EA	16	x	927.00	=	$	14,832
7500xx	Other Drainage Items (7% of Roadway)	LS	1	x	1,250,000.00	=	$	1,250,000

TOTAL DRAINAGE ITEMS $ 2,105,500

SECTION 4: SPECIALTY ITEMS

Item code		Unit	Quantity		Unit Price ($)			Cost
080050	Progress Schedule (Critical Path Method)	LS	1	x	40,000.00	=	$	40,000
582001	Sound Wall (Masonry Block)	SQFT		x		=	$	-
510530	Minor Concrete (Wall)	CY		x		=	$	-
15325X	Remove Sound Wall	LF/LS		x		=	$	-
070030	Lead Compliance Plan	LS		x		=	$	-
141120	Treated Wood Waste	LB		x		=	$	-
153221	Remove Concrete Barrier	LF		x		=	$	-
150661	Remove Metal Beam Guard Railing	LF	200	x	10.00	=	$	2,000
150668	Remove Flared End Section	EA	3	x	500.00	=	$	1,500
8000XX	Chain Link Fence (Type XX)	LF		x		=	$	-
80XXXX	XX" Chain Link Gate (Type CL-6)	EA		x		=	$	-
832005	Midwest Guardrail System	LF	200	x	40.00	=	$	8,000
839301	Single Thrie Beam Barrier	LF		x		=	$	-
839310	Double Thrie Beam Barrier	LF		x		=	$	-
839521	Cable Railing	LF		x		=	$	-
839539	Terminal System (Type SKT)	EA	3	x	1,000.00	=	$	3,000
839585	Alternative Flared Terminal System	EA		x		=	$	-
839584	Alternative In-line Terminal System	EA		x		=	$	-
4906XX	CIDH Concrete Piling (Insert Diameter)	LF		x		=	$	-
839XXX	Crash Cushion (Insert Type)	EA		x		=	$	-
839701	Bike Trail Barrier (Type TBD)	LF		x		=	$	-
520103	Bar Reinforced Steel (Retaining Wall)	LB		x		=	$	-
510060	Structural Concrete, Retaining Wall	CY		x		=	$	-
513553	Retaining Wall (Masonry Wall)	SQFT	1,590	x		=	$	-
511035	Architectural Treatment	SQFT		x		=	$	-
598001	Anti-Graffiti Coating	SQFT		x		=	$	-
203070	Rock Stain	SQFT		x		=	$	-
5136XX	Reinforced Concrete Crib Wall (Type X)	SQFT		x		=	$	-
83954X	Transition Railing (Type X)	EA		x		=	$	-
597601	Prepare and Stain Concrete	SQFT		x		=	$	-
839561	Rail Tensioning Assembly	EA		x		=	$	-
83958X	Some Item	EA		x		=	$	-
839701	Some Item	Unit		x		=	$	-

TOTAL SPECIALTY ITEMS $ 54,500

SECTION 5: ENVIRONMENTAL

5A - ENVIRONMENTAL MITIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost		
14XXXX	Biological Mitigation	LS	1	x	20,000.00	=	$	20,000		
14XXXX	Archaeological Commitments	LS	1	x	10,000.00	=	$	10,000		
14XXXX	Historical Commitments	LS	1	x	10,000.00	=	$	10,000		
130670	Temporary Reinforced Silt Fence	LF		x		=	$	-		
141000	Temporary Fence (Type ESA)	LF		x		=	$	-		
14XXXX	Other Environmental Mitigation	LS	1	x	250,000.00	=	$	250,000		
					Subtotal Environmental Mitigation				*$*	*290,000*

5B - LANDSCAPE AND IRRIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost		
20XXXX	Highway Planting	LS	1	x	300,000.00	=	$	300,000		
20XXXX	Irrigation System	LS	1	x	100,000.00	=	$	100,000		
204099	Plant Establishment Work	LS	1	x	50,000.00	=	$	50,000		
204101	Extend Plant Establishment Work	LS		x		=	$	-		
20XXXX	Follow-up Landscape Project	LS		x		=	$	-		
150685	Remove Irrigation Facility	LS		x		=	$	-		
20XXXX	Maintain Existing (Irrigation or Planted Areas)	LS		x		=	$	-		
206400	Check and Test Existing Irrigation Facilities	LS		x		=	$	-		
21011X	Imported Topsoil (X)	CY/TON		x		=	$	-		
20XXXX	Rock Blanket, Rock Mulch, DG, Gravel Mulch	SF/SY		x		=	$	-		
200122	Weed Germination	SQYD		x		=	$	-		
208304	Water Meter	EA		x		=	$	-		
2087XX	XX" Conduit (Use for Irrigation x-overs)	LF		x		=	$	-		
20890X	Extend X" Conduit (Irrigation x-overs)	LF		x		=	$	-		
					Subtotal Landscape and Irrigation				*$*	*450,000*

5C - EROSION CONTROL

Item code		Unit	Quantity		Unit Price ($)			Cost		
210010	Move In/Move Out (Erosion Control)	EA		x		=	$	-		
210350	Fiber Rolls	LF		x		=	$	-		
210360	Compost Sock	LF		x		=	$	-		
2102XX	Rolled Erosion Control Product (X)	SQFT		x		=	$	-		
21025X	Bonded Fiber Matrix	QFT/ACRE		x		=	$	-		
210300	Hydromulch	SQFT		x		=	$	-		
210420	Straw	SQFT		x		=	$	-		
210430	Hydroseed	SQFT		x		=	$	-		
210600	Compost	SQFT		x		=	$	-		
210630	Incorporate Materials	SQFT		x		=	$	-		
2106XX	Other Erosion Control	LS	1	x	200000	=	$	200,000		
					Subtotal Erosion Control				*$*	*200,000*

5D - NPDES

Item code		Unit	Quantity		Unit Price ($)			Cost		
130300	Prepare SWPPP	LS	1	x	15,000.00	=	$	15,000		
130200	Prepare WPCP	LS		x		=	$	-		
130100	Job Site Management	LS	1	x	60,000.00	=	$	60,000		
130330	Storm Water Annual Report	EA	3	x	2,500.00	=	$	7,500		
130310	Rain Event Action Plan (REAP)	EA	64	x	600.00	=	$	38,400		
130320	Storm Water Sampling and Analysis Day	EA	26	x	1,300.00	=	$	33,800		
130520	Temporary Hydraulic Mulch	SQYD		x		=	$	-		
130550	Temporary Hydroseed	SQYD		x		=	$	-		
130505	Move-In/Move-Out (Temp Erosion Control)	EA		x		=	$	-		
130640	Temporary Fiber Roll	LF	25,872	x	3.50	=	$	90,552		
130900	Temporary Concrete Washout	LS	1	x	20,000.00	=	$	20,000		
130710	Temporary Construction Entrance	EA	2	x	5,000.00	=	$	10,000		
130610	Temporary Check Dam	LF		x		=	$	-		
130620	Temporary Drainage Inlet Protection	EA	20	x	265.00	=	$	5,300		
130730	Street Sweeping	LS	1	x	10,000.00	=	$	10,000		
XXXXXX	Permenant BMPs	LS	1	x	300,000.00	=	$	300,000		
					Subtotal NPDES				*$*	*590,552*

TOTAL ENVIRONMENTAL $ 1,530,600

Supplemental Work for NPDES

066595	Water Pollution Control Maintenance Sharing*	LS	1	x	28,000.00	=	$	28,000		
066596	Additional Water Pollution Control**	LS	1	x	8,000.00	=	$	8,000		
066597	Storm Water Sampling and Analysis***	LS		x		=	$	-		
066916	CPG Fees	LS	1	x	3,000.00	=	$	3,000		
					Subtotal Supplemental Work for NDPS				*$*	*39,000*

*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.

SECTION 6: TRAFFIC ITEMS

6A - Traffic Electrical

Item code		Unit	Quantity		Unit Price ($)			Cost
860460	Lighting and Sign Illumination	LS	1	x	2,000,000.00	=	$	2,000,000
860201	Signal and Lighting	EA	2	x	400,000.00	=	$	800,000
860990	Closed Circuit Television System	LS		x		=	$	-
86110X	Ramp Metering System (Location X)	LS		x		=	$	-
86070X	Interconnection Conduit and Cable	LS		x		=	$	-
5602XX	Furnish Sign Structure (Type X)	LB		x		=	$	-
5602XX	Install Sign Structure (Type X)	LB		x		=	$	-
498040	XX" CIDHC Pile (Sign Foundation)	LF		x		=	$	-
860806	Inductive Loop Detectors	LS		x		=	$	-
8609XX	Traffic Monitoring Station (Type X)	LS		x		=	$	-
15075X	Remove Sign Structure	EA/LS		x		=	$	-
151581	Reconstruct Sign Structure	EA		x		=	$	-
152641	Modify Sign Structure	EA		x		=	$	-
860090	Maintain Existing Traffic Mgt. System	LS		x		=	$	-
86XXXX	Fiber Optic Conduit System	LS		x		=	$	-
XXXXX	Some Item	LS		x		=	$	-

Subtotal Traffic Electrical *$* *2,800,000*

6B - Traffic Signing and Striping

Item code		Unit	Quantity		Unit Price ($)			Cost
566011	Roadside Sign - One Post	EA	50	x	500.00	=	$	25,000
566012	Roadside Sign - Two Post	EA	10	x	600.00	=	$	6,000
5602XX	Furnish Sign	SQFT		x		=	$	-
568016	Install Sign Panel on Existing Frame	SQFT		x		=	$	-
150711	Remove Painted Traffic Stripe	LF	51,744	x	1.00	=	$	51,744
141101	Remove Yellow Stripe (Hazardous Waste)	LF		x		=	$	-
150712	Remove Painted Pavement Marking	SQFT		x		=	$	-
150742	Remove Roadside Sign	EA	60	x	150.00	=	$	9,000
152320	Reset Roadside Sign	EA		x		=	$	-
152390	Relocate Roadside Sign	EA		x		=	$	-
82010X	Delineator (Class X)	EA		x		=	$	-
840502	Thermo Traffic Stripe	LF	51,744	x	0.55	=	$	28,459
846012	Thermo Crosswalk and Pavement Marking	SQFT		x		=	$	-
120090	Construction Area Signs	LS	1	x	5,000.00	=	$	5,000
84XXXX	Permanent Pavement Delineation	LF	38,808	x	0.55	=	$	21,344

Subtotal Traffic Signing and Striping *$* *146,548*

6C - Traffic Management Plan

Item code		Unit	Quantity		Unit Price ($)			Cost
12865X	Portable Changeable Message Signs	LS	10	x	$ 10,000	=	$	100,000

Subtotal Traffic Management Plan *$* *100,000*

6C - Stage Construction and Traffic Handling

Item code		Unit	Quantity		Unit Price ($)			Cost
120199	Traffic Plastic Drum	EA		x		=	$	-
12016X	Channelizer (Type X)	EA		x		=	$	-
120120	Type III Barricade	EA		x		=	$	-
129100	Temporary Crash Cushion Module	EA	420	x	250.00	=	$	105,000
120100	Traffic Control System	LS	1	x	40,000.00	=	$	40,000
129110	Temporary Crash Cushion	EA		x		=	$	-
129000	Temporary Railing (Type K)	LF	38,808	x	17.00	=	$	659,736
120149	Temporary Pavement Marking (Paint)	SQFT		x		=	$	-
120151	Temporary Pavement Striping (Paint)	LF	155,232	x	2.00	=	$	310,464
82010X	Delineator (Class X)	EA		x		=	$	-
XXXXXX	Temporary Ground Mounted Signs	LS	1	x	48,000.00	=	$	48,000
XXXXXX	Other Street Improvements	Unit	1	x	300,000.00	=	$	300,000

Subtotal Stage Construction and Traffic Handling *$* *1,463,200*

TOTAL TRAFFIC ITEMS **$** **4,509,800**

SECTION 7: DETOURS

Includes constructing, maintaining, and removal

Item code		Unit	Quantity		Unit Price ($)		Cost
190101	Roadway Excavation	CY		x		=	$ -
19801X	Imported Borrow	CY/TON		x		=	$ -
390132	Hot Mix Asphalt (Type A)	TON		x		=	$ -
26020X	Class 2 Aggregate Base	TON/CY		x		=	$ -
250401	Class 4 Aggregate Subbase	CY		x		=	$ -
130620	Temporary Drainage Inlet Protection	EA		x		=	$ -
129000	Temporary Railing (Type K)	LF		x		=	$ -
128601	Temporary Signal System	LS		x		=	$ -
120149	Temporary Pavement Marking (Paint)	SQFT		x		=	$ -
80010X	Temporary Fence (Type X)	LF		x		=	$ -
XXXXXX	Some Item	Unit		x		=	$ -

TOTAL DETOURS $ -

SUBTOTAL SECTIONS 1 through 7 $ 13,119,300

SECTION 8: MINOR ITEMS

8A - Americans with Disabilities Act Items							
ADA Items				5.0%		$	655,965
8B - Bike Path Items							
Bike Path Items				0.0%		$	-
8C - Other Minor Items							
Other Minor Items				10.0%		$	1,311,930
Total of Section 1-7	$	13,119,300	x	15.0%	=	$	1,967,895

TOTAL MINOR ITEMS $ 1,967,900

SECTIONS 9: MOBILIZATION

Item code								
999990	Total Section 1-8	$	15,087,200	x	10%	=	$	1,508,720

TOTAL MOBILIZATION $ 1,508,800

SECTION 10: SUPPLEMENTAL WORK

Item code		Unit	Quantity		Unit Price ($)		Cost
066670	Payment Adjustments For Price Index Fluctuations	LS		x		=	$ -
066094	Value Analysis	LS		x		=	$ -
066070	Maintain Traffic	LS	1	x	200,000.00	=	$ 200,000
066919	Dispute Resolution Board	LS		x		=	$ -
066921	Dispute Resolution Advisor	LS		x		=	$ -
066015	Federal Trainee Program	LS		x		=	$ -
066610	Partnering	LS		x		=	$ -
066204	Remove Rock and Debris	LS		x		=	$ -
066222	Locate Existing Crossover	LS		x		=	$ -
XXXXXX	Some Item	Unit		x		=	$ -

Cost of ***NPDES*** *Supplemental Work specified in Section 5D* = $ 39,000

Total Section 1-8 $ 15,087,200 4% = $ 603,488

TOTAL SUPPLEMENTAL WORK $ 842,500

SECTION 11: STATE FURNISHED MATERIALS AND EXPENSES

Item code		Unit	Quantity		Unit Price ($)		Cost
066105	Resident Engineers Office	LS	1	x	200,000.00	=	$200,000
066063	Traffic Management Plan - Public Information	LS	1	x	120,000.00	=	$120,000
066901	Water Expenses	LS		x		=	$0
8609XX	Traffic Monitoring Station (X)	LS		x		=	$0
066841	Traffic Controller Assembly	LS		x		=	$0
066840	Traffic Signal Controller Assembly	LS		x		=	$0
066062	COZEEP Contract	LS	1	x	170,000.00	=	$170,000
066838	Reflective Numbers and Edge Sealer	LS		x		=	$0
066065	Tow Truck Service Patrol	LS	1	x	250,000.00	=	$250,000
066916	Annual Construction General Permit Fee	LS		x		=	$0
XXXXXX	Some Item	Unit		x		=	$0
	Total Section 1-8	$	15,087,200		4%	=	$ 603,488

TOTAL STATE FURNISHED $1,343,500

SECTION 12: TIME-RELATED OVERHEAD

Total of Roadway and Structures Contract Items excluding Mobilization	$15,087,200	(used to calculate TRO)
Total Construction Cost (excluding TRO and Contingency)	$18,782,000	(used to check if project is greater than $5 million excluding contingency)

Estimated Time-Related Overhead (TRO) Percentage (0% to 10%) = **10%**

Item code		Unit	Quantity		Unit Price ($)		Cost
070018	Time-Related Overhead	WD	650	X	$2,321	=	$1,508,800

TOTAL TIME-RELATED OVERHEAD $1,508,800

Note: If the building portion of the project is greater than 50% of the total project cost, then TRO is not included.

SECTION 13: ROADWAY CONTINGENCY

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

Total Section 1-12	$	20,290,800	x	**45%**	=	$9,130,860

TOTAL CONTINGENCY $9,130,900

II. STRUCTURE ITEMS

	Bridge 1		
DATE OF ESTIMATE	00/00/00	00/00/00	00/00/00
Bridge Name	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxx
Bridge Number	57-XXX	57-XXX	57-XXX
Structure Type	Pedestrian OC	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF	0 LF	0 LF
Total Bridge Length (Feet)	0 LF	0 LF	0 LF
Total Area (Square Feet)	0 SQFT	0 SQFT	0 SQFT
Structure Depth (Feet)	0 LF	0 LF	0 LF
Footing Type (pile or spread)	TBD	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$1,750	$0	$0
COST OF EACH	**$0**	**$0**	**$0**

* to include elevators and other ancilliary items

DATE OF ESTIMATE	00/00/00	00/00/00	00/00/00
Name	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxx
Bridge Number	57-XXX	57-XXX	57-XXX
Structure Type	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF	0 LF	0 LF
Total Length (Feet)	0 LF	0 LF	0 LF
Total Area (Square Feet)	0 SQFT	0 SQFT	0 SQFT
Structure Depth (Feet)	0 LF	0 LF	0 LF
Footing Type (pile or spread)	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$100	$0	$0
COST OF EACH	**$0**	**$0**	**$0**

TOTAL COST OF BRIDGES		**$0**
TOTAL COST OF BUILDINGS		**$0**
Structures Mobilization Percentage	10%	**$0**

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

Structures Contingency Percentage	10%	**$0**
TOTAL COST OF STRUCTURES		**$0**

Estimate Prepared By: ______________________________ ______________________

XXXXXXXXXXXXXXXXX ------ Division of Structures Date

EA: 0Q670K PID: ID 1217000086

III. RIGHT OF WAY

Fill in all of the available information from the Right of Way data sheet.

A)	A1)	Acquisition, including Excess Land Purchases, Damages & Goodwill, Fees		$	7,578,677
	A2)	SB-1210		$	0
B)		Acquisition of Offsite Mitigation		$	0
C)	C1)	Utility Relocation (State Share)		$	0
	C2)	Potholing (Design Phase)		$	0
D)		Railroad Acquisition		$	0
E)		Clearance / Demolition		$	0
F)		Relocation Assistance (RAP and/or Last Resort Housing Costs)		$	0
G)		Title and Escrow		$	
H)		Environmental Review		$	60,000
I)		Condemnation Settlements	0%	$	0
J)		Design Appreciation Factor	0%	$	0
K)		Undergrounding Electrical Transmission (Total Capital Cost)		$	22,600,000
		Undergrounding Electrical Distribution (Total Capital Costs)		$	23,700,000
		Other Utilities (Sewer, Water, Gas, Telephone, FO)			9,750,000
		Total Utility Relocation (Construction Cost)		$	56,050,000

L)	**TOTAL RIGHT OF WAY ESTIMATE**	**$63,688,677**
M)	**TOTAL R/W ESTIMATE: Escalated**	**$77,700,186**
N)	**RIGHT OF WAY SUPPORT**	**$3,846,875**

Support Cost Estimate Prepared By: Stephen V.G. Crowe — Project Coordinator[1] — 714-833-2439 Phone

Utility Estimate Prepared By: Stephen V.G. Crowe — Utility Coordinator[2] — 714-833-2439 Phone

R/W Acquisition Estimate Prepared By: John Craig — Right of Way Estimator[3] — 714-730-2317 Phone

Note: Items G & H applied to items A + B

[1] When estimate has Support Costs only

[2] When estimate has Utility Relocation

[3] When R/W Acquisition is required

IV. SUPPORT COST ESTIMATE SUMMARY

Note: Use PRSM project data.		Escalated Support Cost for Estimate To Completion (ETC)				
Total by FY		**PA&ED**	**PS&E**	**RW**	**CON**	**Total $**
< 2014	Expended					
	ETC					
2015	Expended					
	ETC					
2016	Expended					
	ETC					
2017	Expended					
	ETC					
2018	Expended					
	ETC					
2019	Expended					
	ETC					
2020	Expended					
	ETC					
2021	Expended					
	ETC					
2022	Expended					
	ETC					
2023	Expended	$2,000,000				**$2,000,000**
	ETC					
2024	Expended	$2,375,000				**$2,375,000**
	ETC					
2025	Expended		$2,500,000	$1,282,292		**$3,782,292**
	ETC					
2026	Expended		$2,500,000	$2,564,583		**$5,064,583**
	ETC					
2027	Expended				$5,000,000	**$5,000,000**
	ETC					
2028	Expended					
	ETC					
2029>	Expended					
	ETC					
EAC (Expended + ETC)		**$4,375,000**	**$5,000,000**	**$3,846,875**	**$5,000,000**	**$18,221,875**
Approved Budget (PRSM)						
Difference (Budget - EAC)		**-$4,375,000**	**-$5,000,000**	**-$3,846,875**	**-$5,000,000**	**-$18,221,875**
Support Ratio (EAC / Cap Cost)		**3.7%**	**4.2%**	**3.3%**	**4.2%**	**15.4%**

Total Capital Cost:	**$117,965,814**
Total Capital Outlay Support Cost:	**$18,221,875**
Overall Percent Support Cost:	**15.45%**

ATTACHMENT D

TRAFFIC ENGINEERING PERFORMANCE ASSESSMENT (TEPA)

(With Attachments)

Traffic Engineering Performance Assessment

Laguna Canyon Road Improvements

12-OC-133 - PM 0.9 - 3.4
EA: 0Q670K – ID 1217000086

Laguna Beach, CA
June 13, 2022

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Appendices

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1 Introduction

This section describes the purpose of this study, study area, and report organization.

1.1 Project Description

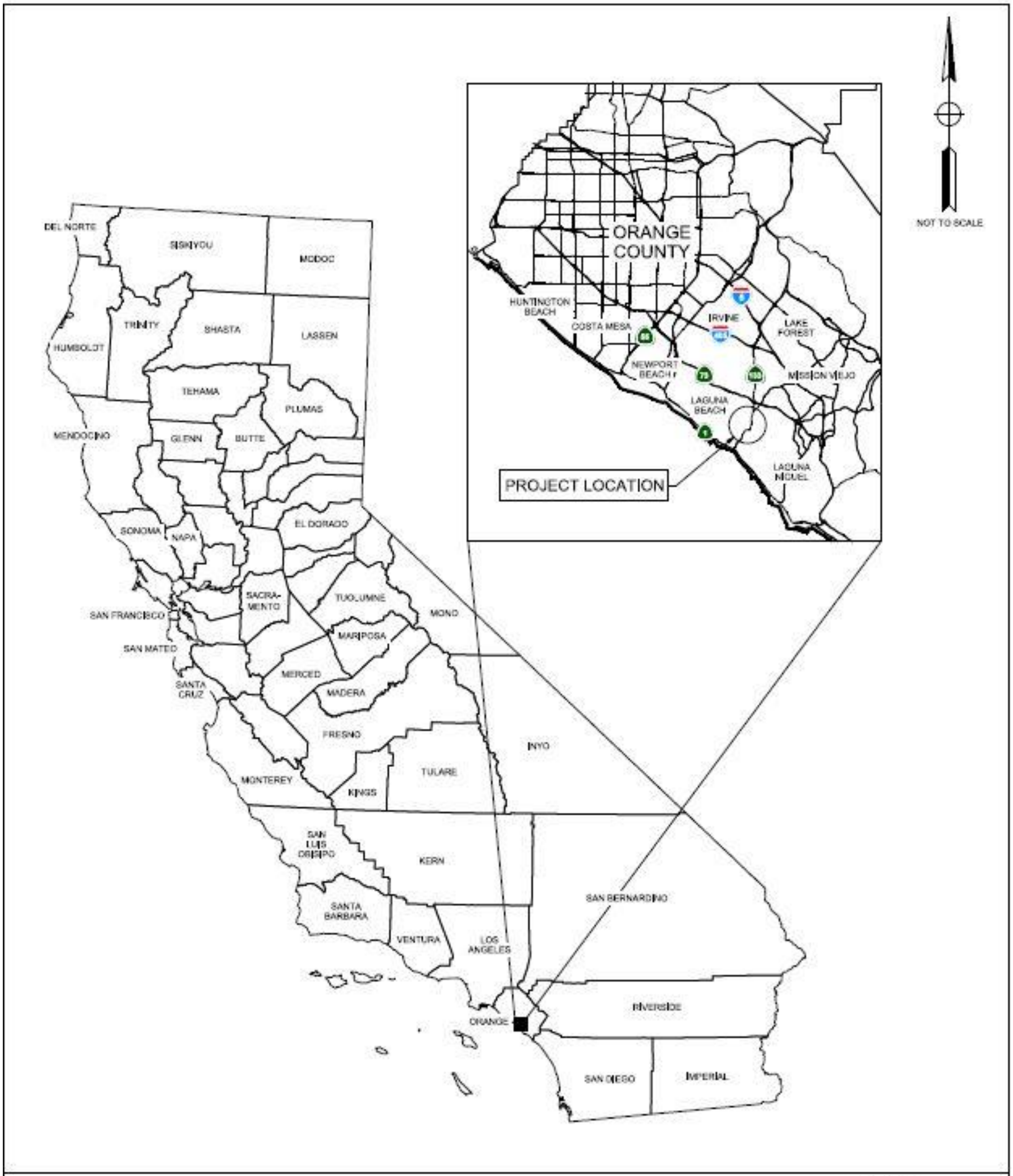
One of the most significant challenges facing City of Laguna Beach is managing increasing traffic congestion along Laguna Canyon Road (LCR) (State Route 133). The City of Laguna Beach (City), in cooperation with the California Department of Transportation (CALTRANS) proposes improvements along State Route 133 (SR-133), Laguna Canyon Road. The project area extends from approximately Canyon Acres Drive to El Toro Road. LCR is one of the three gateways to Laguna Beach and provides critical access to adjacent recreational spaces as well as activities in the City. Figure 1-1 shows the regional location and project vicinity and Figure 1-2 presents the project area limits.

This project is intended as a ‘Complete Streets’ project which is consistent with Caltrans’ latest Transportation Concept Report (TCR) for SR-133. No capacity improvements are proposed as part of this project. The project would include operational improvements at select locations, provide transit access and bike and pedestrian facilities and undergrounding of existing utilities.

1.2 Study Area and Project Background

As part of the State Highway System, LCR connects Pacific Coast Highway (SR-1) and other coastal areas with three of the key inland freeways namely I-5, I-405 and SR-73. The study area extends approximately 2.5 miles along LCR and transitions from the Laguna Canyon area into unincorporated Orange County extending to the junction with El Toro Road. This segment of the corridor consists of a two-lane highway with a center two-way left turn lane (TWLTL) and limited on-street parking and no designated bikeways. The corridor lacks adequate shoulders and pedestrian and bicycle facilities within the project limits. The right-of-way is constrained by residential and light commercial developments as well as various open space/environmental constraints along the route. The route is further constrained by overhead Southern California Edison’s (SCE) transmission and distribution lines in close proximity to the roadway that pose safety concerns.

Figure 1-1. Project Location & Vicinity Map



**PROJECT LOCATION
AND VICINITY MAP**
LAGUNA CANYON ROAD / SR-133

CITY OF LAGUNA BEACH
CALIFORNIA

Figure 1-2. Project Limits

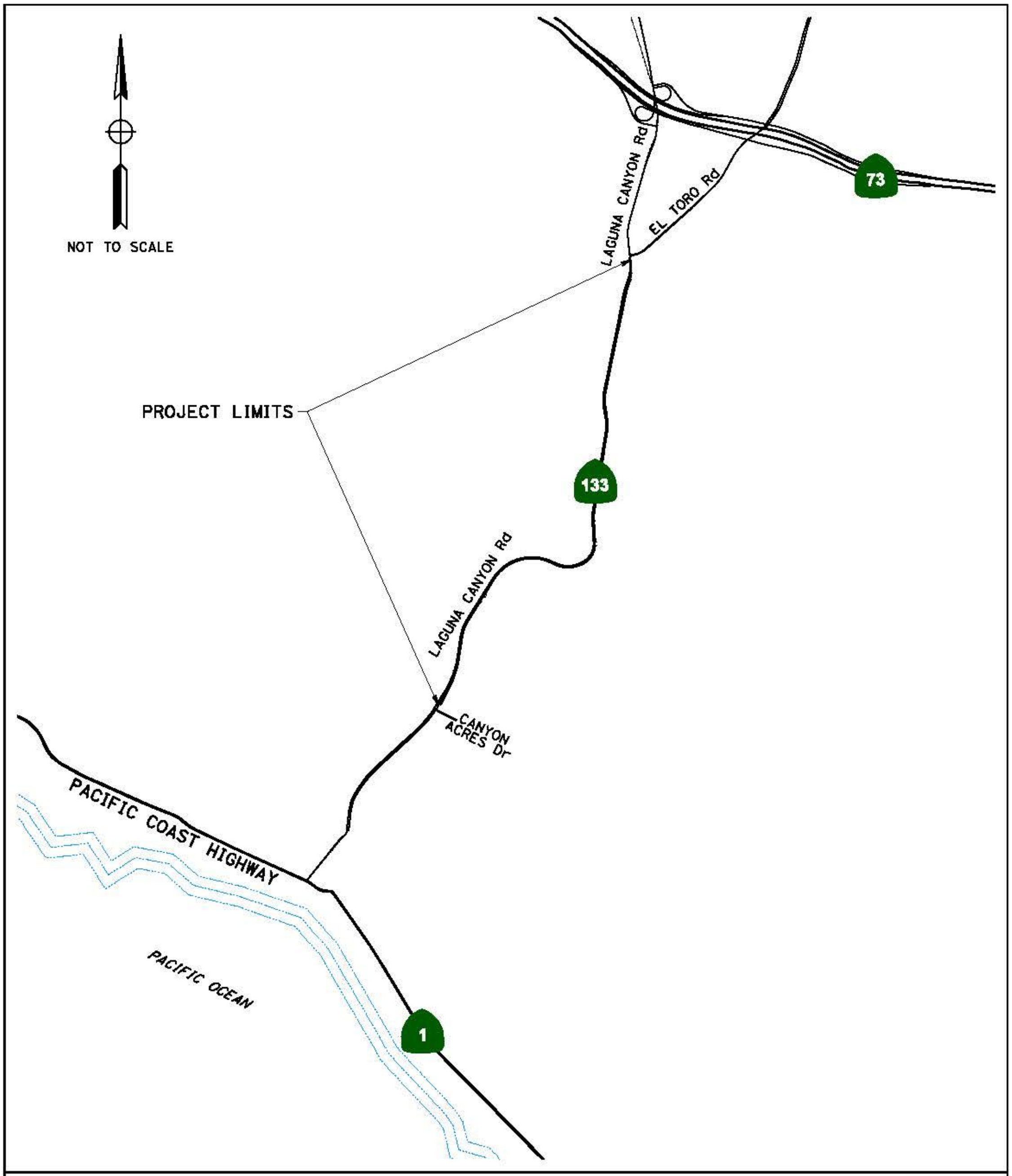


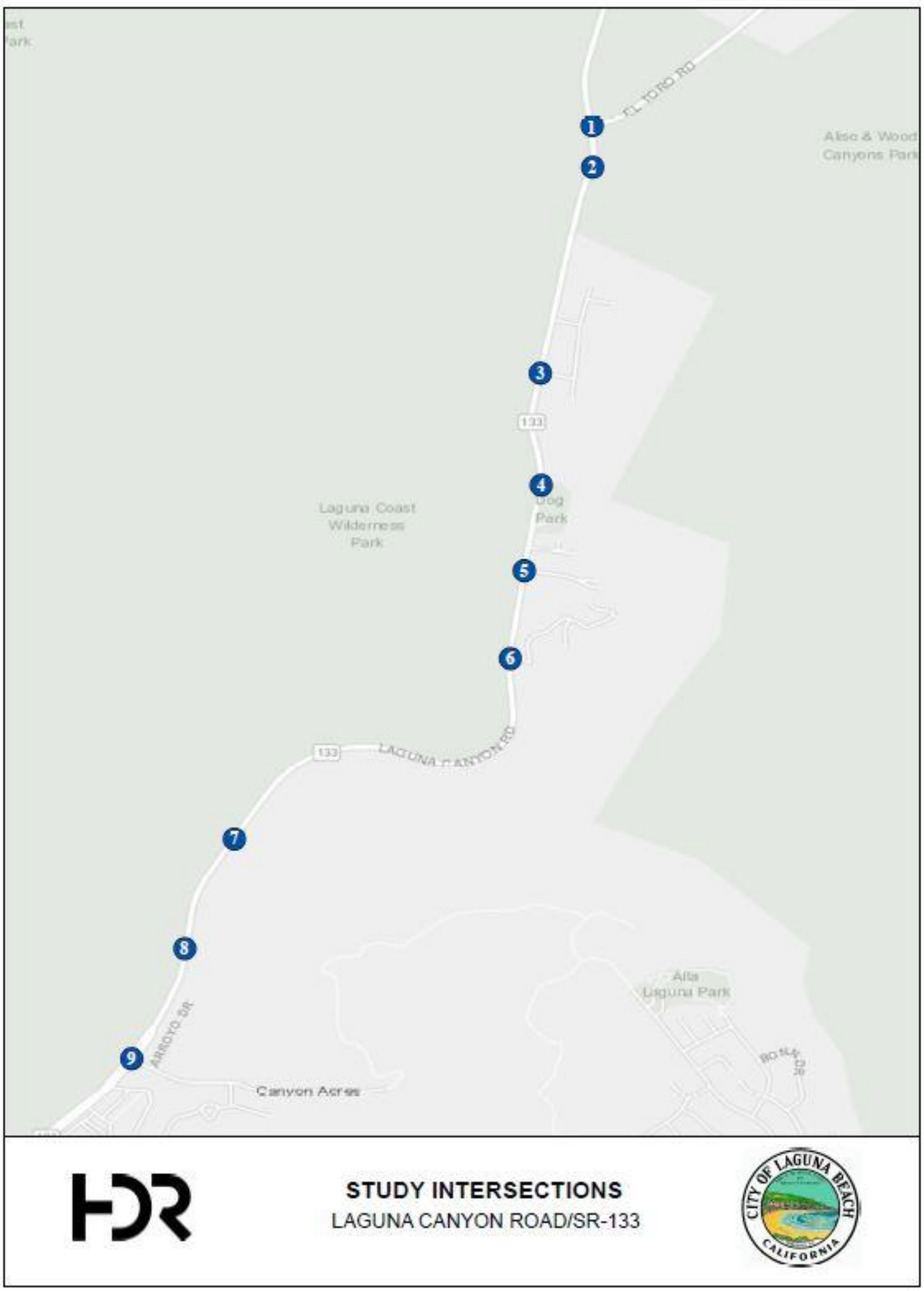
Figure 2
PROJECT LOCATION
Laguna Canyon Road / SR-133

Based on discussions with the City and Caltrans, the study area consists of nine (9) study intersections/locations along the corridor between El Toro Road and Canyon Acres Drive. Figure 1-3 shows the study intersections and driveways.

Study Intersections/Driveways:

1. Laguna Canyon Road (LCR)/SR-133 at El Toro Road
2. Laguna Canyon Road (LCR)/SR-133 at Anneliese's School Driveway
3. Laguna Canyon Road (LCR)/SR-133 at Sun Valley Drive
4. Laguna Canyon Road (LCR)/SR-133 at Laguna Beach Dog Park Driveway
5. Laguna Canyon Road (LCR)/SR-133 at Stan Oaks Drive
6. Laguna Canyon Road (LCR)/SR-133 at Castle Rock Road
7. Laguna Canyon Road (LCR)/SR-133 at Laguna College of Art and Design Driveway
8. Laguna Canyon Road (LCR)/SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway
9. Laguna Canyon Road (LCR)/SR-133 at Canyon Acres Drive

Figure 1-3. Study Intersections



1.3 Need and Purpose

LCR is a critical access route for the City of Laguna Beach today and will continue to remain so in the future. Traffic demand for the corridor is at capacity during peak hours of the day/week and is expected to increase by nearly 50 percent from approximately 36,000 to approximately 54,500 vehicles per day by the year 2050. The corridor within the project limits experiences substantial congestion at two bottleneck locations during the period of high visitor travel to the City. These periods include typical weekdays, most summer weekends and holidays. Additionally, congestion is observed during a typical weekday peak period without high visitor travel. The two bottlenecks occur at the southbound travel lane just south of El Toro Road intersection, and the northbound travel lane just north of Canyon Acres Drive where the corridor transitions from two northbound lanes to one northbound lane. According to Caltrans Table C, which lists the potential investigation locations, these locations are above average collision locations compared to similar facilities statewide with a high concentration of collisions at the non-standard lane merges.

The corridor consists of a two-lane highway with limited on-street parking and no designated bikeway. The right-of-way is constrained by residential and light commercial developments as well as various environmental constraints along the route. The route is further constrained by overhead SCE transmission and distribution lines in close proximity to the roadway that pose safety concerns. Pedestrians and bicycles come in close proximity of high speeding vehicles due to lack of pedestrian and bicycle facilities. Lack of sight distance around the Big Bend area have resulted in high number of accidents along the corridor. The on-street parking at the dog park area creates congestion and increases the potential for collisions. Based on field observations, there are several other safety hot-spot locations along the corridor which are prone to high accidents due to illegal U-turns, angled on-street parking, unsafe driveway exits, failing to stay in their travel lane due to inadequate superelevation along the curves, red light violations, and improper merge at lane drops. Based on information from the City’s police department, the corridor within the project limits has experienced approximately 75 traffic accidents per year over a period of seven and half years. Additionally, the data obtained from Caltrans’ Traffic Accident and Surveillance Analysis Systems (TASAS) was used to conduct the accident analysis presented in this report.

Without operational improvements, including accommodations for safety improvements and provisions for alternative transportation modes such as City transit services and bike and pedestrian paths, the quality and level of service along the corridor would continue to degrade.

The purpose of the project is to provide pedestrian and bike facilities and center two-way left turn lane for the existing two travel lanes along the corridor within the project limits. Under some circumstances and as an alternative, the center two-way left turn lane could be used as a reversible lane. No additional lanes are proposed and the incorporation of traffic calming and active transportation features would provide continuous access to transit and pedestrian and bike facilities. The proposed improvements include a dedicated pedestrian pathway and off-street bicycle lanes within the project limits. Overhead utilities within the right-of-way and in close proximity to the edge of travel way are proposed to be relocated or undergrounded where feasible.

1.4 Report Organization

Following this introduction chapter, this report is organized into the following chapters:

2.0 Project Alternatives – This chapter describes four proposed project alternatives.

3.0 Existing Conditions – This chapter describes the existing traffic network within the study area and summarize operational deficiencies for existing traffic conditions including accident analysis.

4.0 Traffic Volume Forecasts – This chapter describes the future forecasting methodology and presents the forecast traffic volumes for Opening Year (2030) and Horizon Year (2050) conditions.

5.0 Analysis Methodology – This chapter describes the methodologies, standards, and thresholds utilized to perform various Levels of Service Analyses.

6.0 Traffic Engineering Performance Assessment Findings – This chapter presents the analysis results for Existing (2017), Opening Year (2030) and Horizon Year (2050) conditions. It also presents a discussion on operational deficiencies and results from intersection evaluation.

7.0 Summary and Conclusion – This chapter summarizes the overall study results and presents key findings.

8.0 Scope of Future Traffic Engineering Studies – This chapter describes the scope of future traffic engineering studies intended to address outstanding operational and safety issues.

2 Project Alternatives

This section describes the Project Alternatives including a No Build condition. The Project Alternatives include complete street elements such as bike and pedestrian facilities and transit services. Due to limited right-of-way, a constrained condition for each build alternative was analyzed, for which the improvements are proposed within the existing right-of-way along most of the study corridor.

2.1 Alternative 1 (No Build)

The No Build Alternative would maintain the corridor in its current condition. No improvements would be implemented therefore, no capital costs are associated with this alternative. Utility poles on both the NB and SB sides of the road would not be undergrounded to allow full use of the State ROW for complete street elements to be incorporated into the corridor that encourage increased use of active modes of transportation. As the traffic demand increases, traffic operation would further deteriorate, which may result in an increase in congestion, vehicle queuing, vehicle delay, and safety issues. This alternative would not satisfy the Purpose and Need of the Project.

The No Build Alternative includes the improvements completed by Caltrans for the Canyon Acres Drive Intersection improvements as further described in Section 7 of this PSR/PDS.

The No Build Alternative is being considered because it serves as the baseline against which to evaluate the effectiveness of the proposed Build Alternatives. This alternative allows decision makers to make a comparison between the impacts of the Build Alternatives and the impacts of the No Build scenario.

2.2 Alternative 2

Alternative 2 generally consists of a typical width of approximately 64 feet for the majority of the route including vehicle, pedestrian and bicycle facilities. This alternative includes 11-to-12-foot travel lanes, a 10-to-12-foot center TWLTL, 5-to-7-foot shoulders in both the NB and SB directions, and a pedestrian path/sidewalk on the NB side. Alternative 2 also includes a 12-foot-wide Class IV separated bikeway on the SB side of the roadway. During emergencies, there is space for up to four outbound evacuation travel lanes on the roadway and one inbound emergency vehicle lane by utilizing the bike lane. A representative cross section is presented in Figure 2-1. See PSR/PDS for cross sections in detail.

Within the constrained segment, in the vicinity of the ’Big Bend,’ the SB shoulder is eliminated and the adjacent bikeway becomes a Class I shared-use path. At the pinch point of minimum 53 feet available ROW width, the NB parking lane/shoulder would end within this short segment.

2.3 Alternative 3

Alternative 3 generally consists of a typical width of approximately 64 feet for the majority of the route, including vehicle, pedestrian and bicycle facilities. This alternative includes 11-to-12-foot travel lanes, a 10-to-12-foot center TWLTL, 5-to-7-foot bike lane and 5-to-6-foot pedestrian path/sidewalk on the NB side of the roadway. Alternative 3 also includes a 10-to-12-foot Class IV separated bikeway with adjacent pedestrian path on the SB side of the roadway. During emergencies, there is space for three outbound evacuation travel lanes and one inbound emergency vehicle lane by utilizing the bike lane. A representative cross section is presented in Figure 2-2. See PSR/PDS for cross sections in detail.

Within the constrained segment, in the vicinity of the ’Big Bend,’ the dedicated pedestrian path on the SB side of the roadway would be eliminated and the buffer between the shared-use Class IV bike path and the SB travel lane would be narrowed. At the pinch point of approximately 53 feet available ROW width, the 7-foot shoulder/Class II bike lane on the NB side would be removed within this short segment.

2.4 Alternative 4

Alternative 4 generally consists of a typical width of approximately 64 feet for the majority of the route including vehicle, pedestrian and bicycle facilities. This alternative includes 11-to-12-foot travel lanes, and a 10-foot center TWLTL, pedestrian paths/sidewalks on both the NB and SB sides of the roadway, and a 5-to-8-foot Class II buffered bike lane on both sides of the roadway. During emergencies, there is space for up to four outbound evacuation travel lanes and one inbound emergency vehicle lane by utilizing the bike lanes. A representative cross section is presented in Figure 2-3. See PSR/PDS for cross sections in detail.

Within the constrained segment, in the vicinity of the ’Big Bend,’ the bike lane widths would be reduced to five feet and the travel lanes reduced to 11 feet. At the pinch point of approximately 53 feet available ROW width, the pedestrian paths and bike lane buffers on either side of the roadway would be reduced within this short segment.

2.5 Alternative 5

Alternative 5 generally consists of a typical width of approximately 64 feet for the majority of the route including vehicle, pedestrian and bicycle facilities. With a reversible lane, the cross-section would include 11-to-12-foot travel lanes, and a 12-to-14-foot center reversible lane, pedestrian paths/sidewalks on both the NB and SB sides of the roadway, and a 5-foot Class II buffered bike lane/shoulder on both sides of the roadway. During emergencies, the configuration could provide for up to four outbound evacuation travel lanes and one inbound emergency vehicle lane by utilizing the bike lanes. A representative cross section is presented in Figure 2-4. See PSR/PDS for cross sections in detail.

Within the constrained segment, in the vicinity of the ’Big Bend’, the travel lanes reduced to 11 feet. At the pinch point of approximately 53 feet available ROW width, the pedestrian paths and bike lane buffers on either side of the roadway would be reduced within this short segment.

Figure 2-1. Alternative 2 Cross-Section

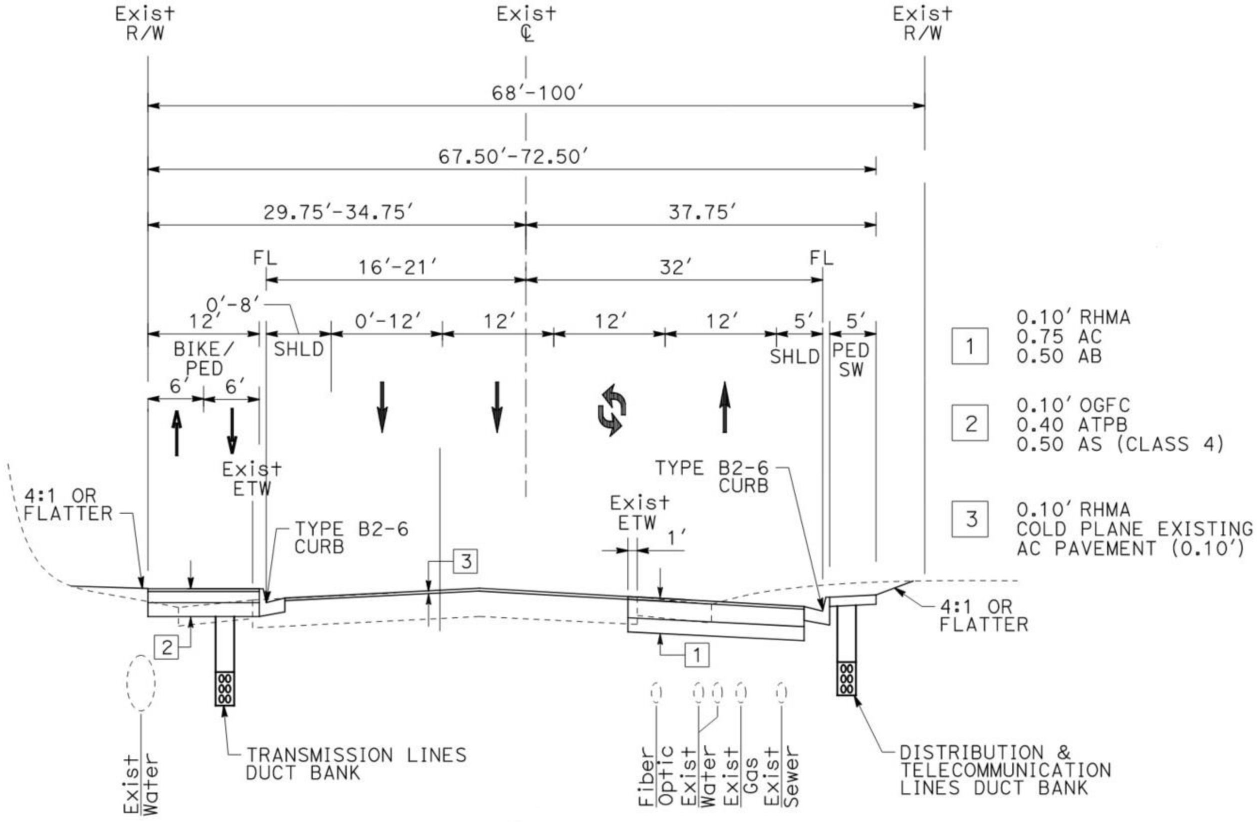


Figure 2-2. Alternative 3 Cross-Section

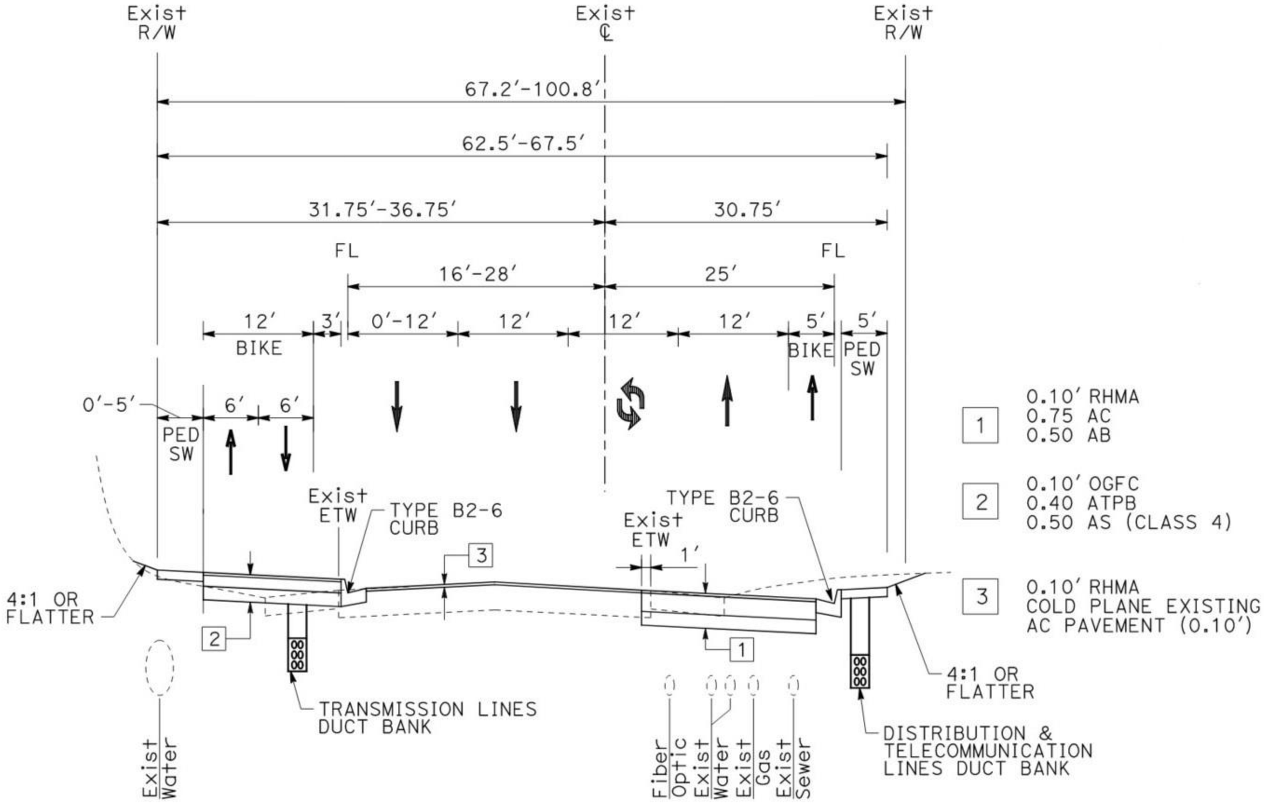


Figure 2-3. Alternative 4 Cross-Section

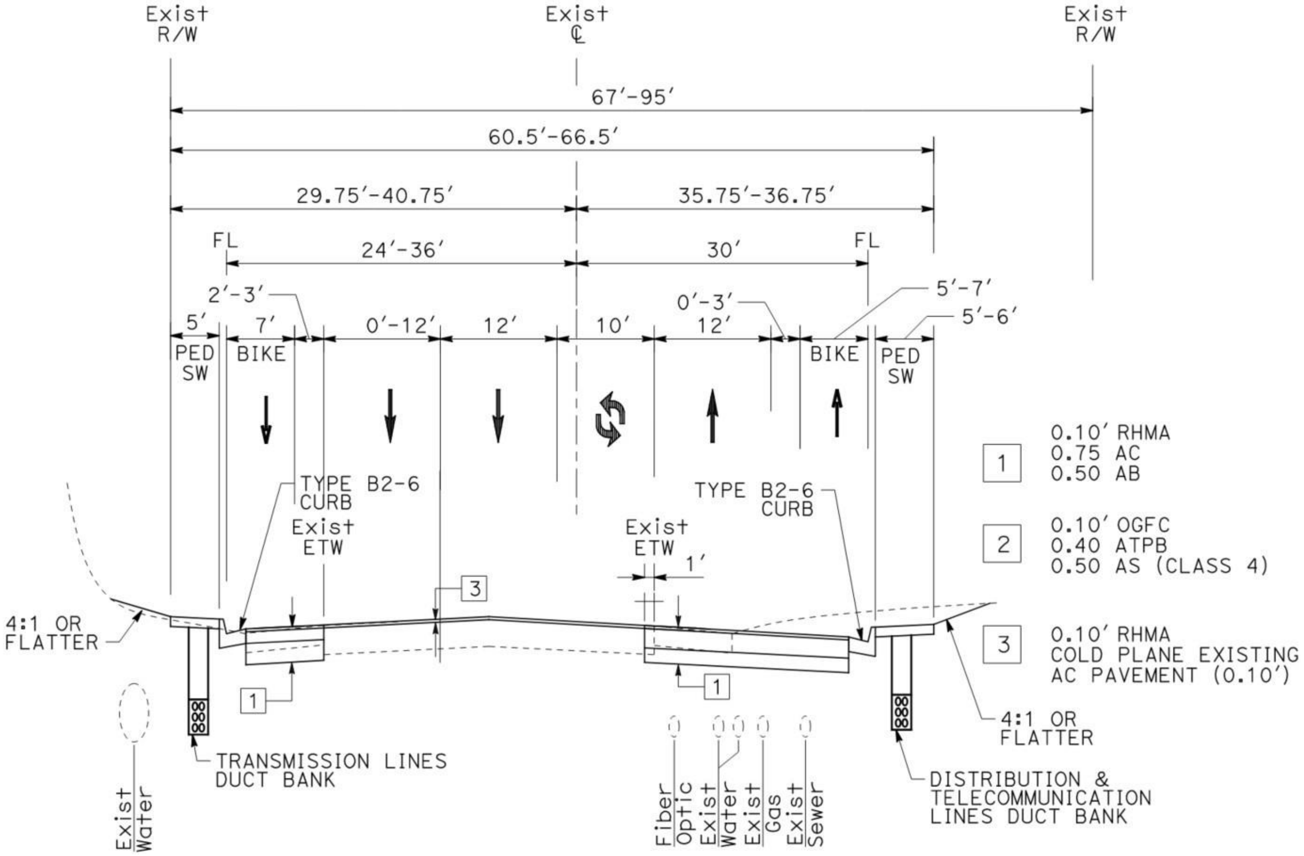
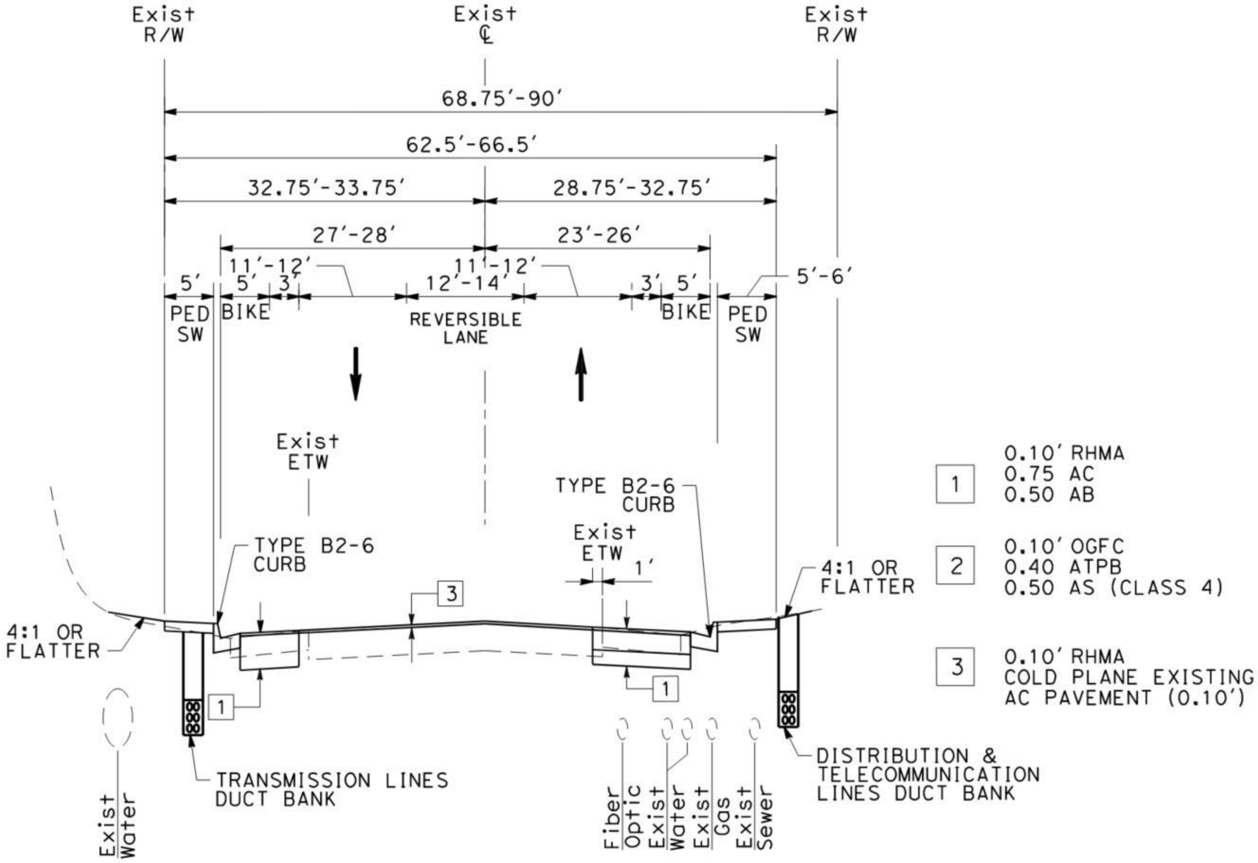


Figure 2-4. Alternative 5 Cross-Section



3 Existing Conditions

This section describes key roadway segments and intersections; reports existing daily roadway and peak hour intersection traffic volume information; and summarizes existing operational deficiencies.

3.1 Existing Roadway Network

Laguna Canyon Road (LCR) (SR-133) – it is a 13.6 mile long north-south state highway with a southern terminus in the City of Laguna Beach at Pacific Coast Highway (SR-1) and northern terminus in the City of Irvine at Foothill/Eastern Transportation Corridor Toll Road (SR-241).

El Toro Road – it is an 11.5 mile long east-west major arterial highway with a southern terminus at LCR and a northern terminus with Santiago Canyon Road and Live Oak Canyon Road. El Toro Road is a six-lane highway from San Joaquin Hills Corridor Toll Road (SR-73) extending northeasterly through the cities of Laguna Woods and Lake Forest. El Toro Road is a two-lane highway between LCR and San Joaquin Hills Corridor Toll Road (SR-73). The intersection of LCR and El Toro Road is signalized.

Anneliese's School Driveway – it is a two lane east-west driveway which provides access to the Anneliese's School. The intersection of LCR and Anneliese's School Driveway is stop-controlled.

Willow Canyon Road – it is an entrance road/trail to Willow Canyon Staging area. Willow Canyon Staging area provides access to the Laguna Coast Wilderness Park and is operated by OC Parks. The intersection of LCR and Willow Canyon Road is stop-controlled.

Sun Valley Drive – it is a two lane east-west roadway which provides access to residential areas. The intersection of LCR and Sun Valley Drive is stop-controlled.

Laguna Beach Dog Park Driveway – it is a two-lane local roadway which provides access to the dog park area from LCR. The intersection of LCR and Laguna Beach Dog Park Driveway is stop-controlled.

Stan Oaks Drive – it is a two lane east-west roadway which provides access to the local businesses. It connects these businesses to LCR. The intersection of LCR and Stan Oaks Drive is stop-controlled.

Castle Rock Road – it is a two lane east-west roadway which provides access to the local businesses and residential areas. It is a winding road which connects these businesses to LCR. The intersection of LCR and Castle Rock Road is stop-controlled.

Laguna College of Arts and Design Driveway – it is a two lane east-west roadway which provides access to the Laguna College of Arts and Design parking lots. It provides a direct access from LCR. The intersection of LCR and Laguna College of Arts and Design Driveway is stop-controlled.

Act V/City Maintenance Yard Facility Parking Lot Driveway – it is a two lane east-west roadway which provides access to the public parking lot. The parking lot also serves as a trolley stop. The intersection of LCR and Act V/City Maintenance Yard Facility Parking Lot Driveway is stop-controlled.

Canyon Acres Drive – is an east-west collector providing local residents' access to LCR. Canyon Acres Drive eastern terminus is a cul-de-sac approximately 0.5 miles east of LCR. Western terminus of Canyon Acres Drive is at LCR. The intersection of LCR and Canyon Acres Drive is signalized.

3.2 Existing Traffic Volumes

For arterial segments, counts were collected over a 24-hour period and reported in 15-minute intervals on Thursday November 30, 2017. Weekday intersection AM and PM peak period counts were collected on 2nd December and 25th January 2018. All traffic counts were collected while all educational institutions in the vicinity of the project were in session, thereby ensuring the validity of data collection. The counts represent a typical weekday commuter traffic during a non-peak season. Since the month of November is within seasonal off-peak period and does not have highest yearly traffic volumes on the corridor, traffic conditions (due to recreational traffic) during peak season are expected to be worse than what is presented in this Study.

For the intersections that traffic counts were not directly collected, turning movement volumes were developed using arterial counts collected and the ITE trip generation manual to estimate the diverging traffic into and out of the cross streets/driveways.

Table 3-1 presents the existing peak hour and daily counts for the four highway segments along the corridor. Table 3-2 and Table 3-3 present the existing AM and PM peak hour segment and intersection turning movement volumes respectively. Figure 3-1 presents existing intersection turning movement volumes under existing conditions. Note that the volumes were balanced to conserve flow. Appendix A provides the traffic count worksheets.

Table 3-1. Existing Highway Segment Volumes

ID	Segment	Description	Direction	AM Peak Hour	PM Peak Hour	Daily
1	LCR/SR-133	Btwn. El Toro Road & Sun Valley Drive	Northbound	1,006	1,348	36,337
			Southbound	1,239	1,251	
2	LCR/SR-133	Btwn. Sun Valley Drive & Stan Oaks Drive	Northbound	988	1,350	36,373
			Southbound	1,267	1,264	
3	LCR/SR-133	Btwn. Stan Oaks Drive & LCAD Driveway	Northbound	989	1,306	35,690
			Southbound	1,249	1,282	
4	LCR/SR-133	Btwn. LCAD Driveway & Canyon Acres Drive	Northbound	1,032	1,307	36,088
			Southbound	1,235	1,301	

Table 3-2. Existing AM Peak Hour Intersection Turning Movement Volumes

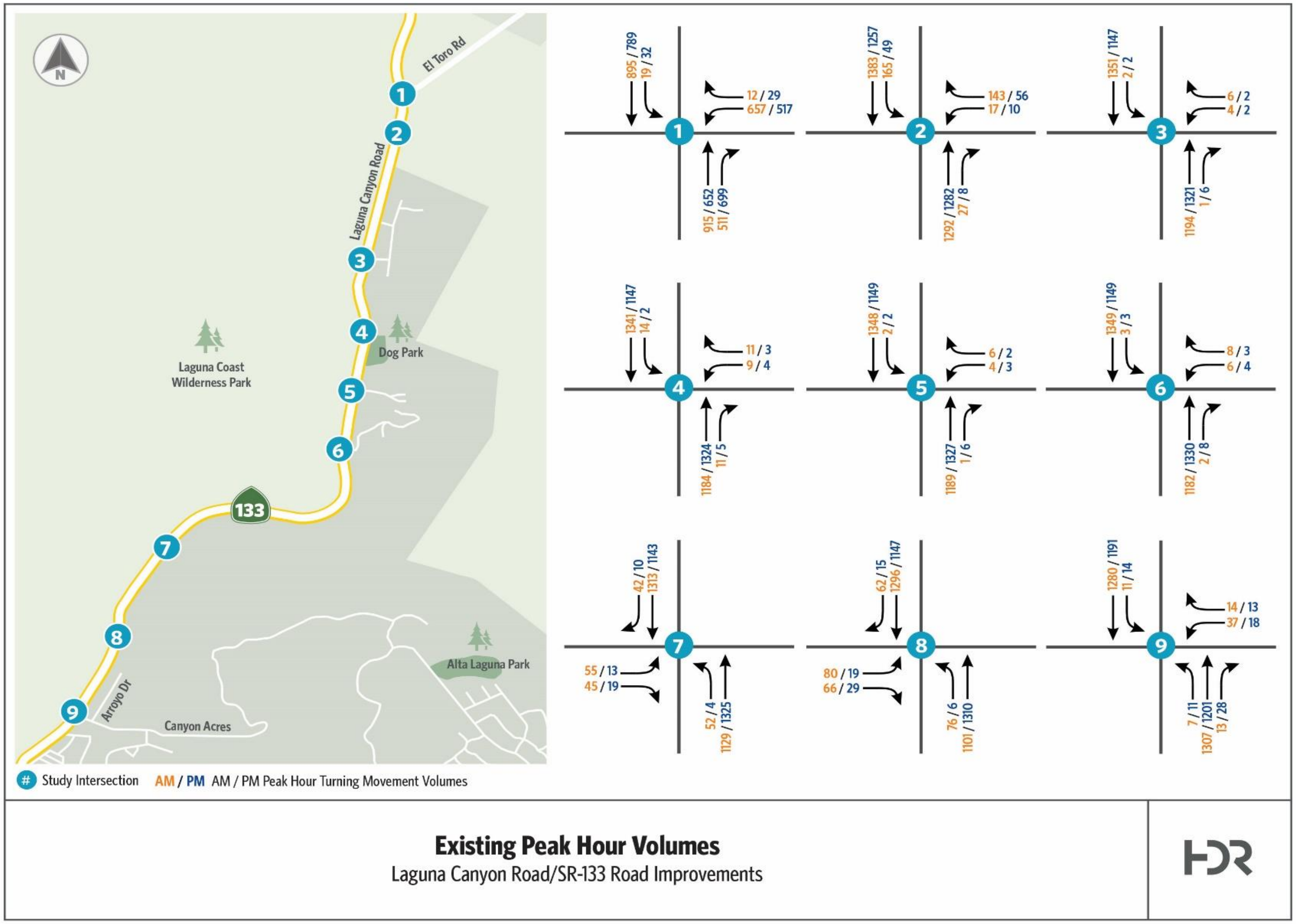
ID	Description	NBL[1]	NBT[2]	NBR[3]	SBL	SBT	SBR	EBL	EBR	WBL	WBR	Total
1	LCR/SR-133 at El Toro Road	0	915	511	19	895	0	0	0	657	12	3009
2	LCR/SR-133 at Anneliese's School Driveway	0	1292	27	165	1383	0	0	0	17	143	3027
3	LCR/SR-133 at Sun Valley Drive	0	1194	1	2	1351	0	0	0	4	6	2558
4	LCR/SR-133 at Laguna Beach Dog Park Driveway	0	1184	11	14	1341	0	0	0	9	11	2570
5	LCR/SR-133 at Stan Oaks Drive	0	1189	1	2	1348	0	0	0	4	6	2550
6	LCR/SR-133 at Castle Rock Road	0	1182	2	3	1349	0	0	0	6	8	2550
7	LCR/SR-133 at Laguna College of Arts & Design Driveway	52	1129	0	0	1313	42	55	45	0	0	2636
8	LCR/SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway	76	1101	0	0	1296	62	80	66	0	0	2681
9	LCR/SR-133 at Canyon Acres Drive	7	1307	13	11	1280	0	0	0	37	14	2669

[1]L = Left - [2]T = Through - [3]R = Right

Table 3-3. Existing PM Peak Hour Intersection Turning Movement Volumes

ID	Description	NBL[1]	NBT[2]	NBR[3]	SBL	SBT	SBR	EBL	EBR	WBL	WBR	Total
1	LCR/SR-133 at El Toro Road	0	652	699	32	789	0	0	0	517	29	2718
2	LCR/SR-133 at Anneliese's School Driveway	0	1282	8	49	1257	0	0	0	10	56	2662
3	LCR/SR-133 at Sun Valley Drive	0	1321	6	2	1147	0	0	0	2	2	2480
4	LCR/SR-133 at Laguna Beach Dog Park Driveway	0	1324	5	2	1147	0	0	0	4	3	2485
5	LCR/SR-133 at Stan Oaks Drive	0	1327	6	2	1149	0	0	0	3	2	2489
6	LCR/SR-133 at Castle Rock Road	0	1330	8	3	1149	0	0	0	4	3	2497
7	LCR/SR-133 at Laguna College of Arts & Design Driveway	4	1325	0	0	1143	10	13	19	0	0	2514
8	LCR/SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway	6	1310	0	0	1147	15	19	29	0	0	2526
9	LCR/SR-133 at Canyon Acres Drive	11	1201	28	14	1191	0	0	0	18	13	2476
[1]L = Left - [2]T = Through - [3]R = Right												

Figure 3-1. Existing Intersection Peak Hour Volumes



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3.3 Accident Analysis

Traffic accident data was assembled from Caltrans' Traffic Accident and Surveillance Analysis Systems (TASAS) for a 60-month period, January 1, 2016 through December 31, 2020. Table 3-4 provides a summary of Caltrans' TASAS Table B - Selective Accident Rate Calculation (Table B). Table B provides actual and average rates for highways and intersections. TASAS Selective Accident Retrieval (TSAR) provides a summary of type of accident by location. Table B and TSAR accident data are provided in Appendix B.

In order to analyze accident data for various sections of LCR, the corridor was divided into five zones. Zone 1 is located south of Canyon Acres Drive outside of the accident data area and project study area. Therefore, no accident data is presented for Zone 1 in Table 3-4 and Table 3-5. Zone 2 is the section from Canyon Acres Drive to Laguna College of Art and Design which is 3,200 feet north of Canyon Acres Drive. Zone 3 is from Laguna College of Art and Design to Stan Oaks Drive. Zone 4 is from Stan Oaks Drive to Anneliese's School. Zone 5 is from Anneliese's School to 350 feet north of El Toro Road. Figure 3-2 shows the accident analysis zones.

Caltrans' TASAS data for January 1, 2016 to December 31, 2020 indicates a total of 166 collisions for all the zones within the study area, Canyon Acres Drive to El Toro Road (Zone 2 to Zone 5). The majority of the collisions were classified as rear end type collision with the majority cited for unsafe speed. The 2nd leading collision type was hit object followed by sideswipe type of collision. Table 3-4 provides a summary of Caltrans' accident rates. Table 3-5 provides a summary of accident type.

Figure 3-2. Accident Analysis Zones

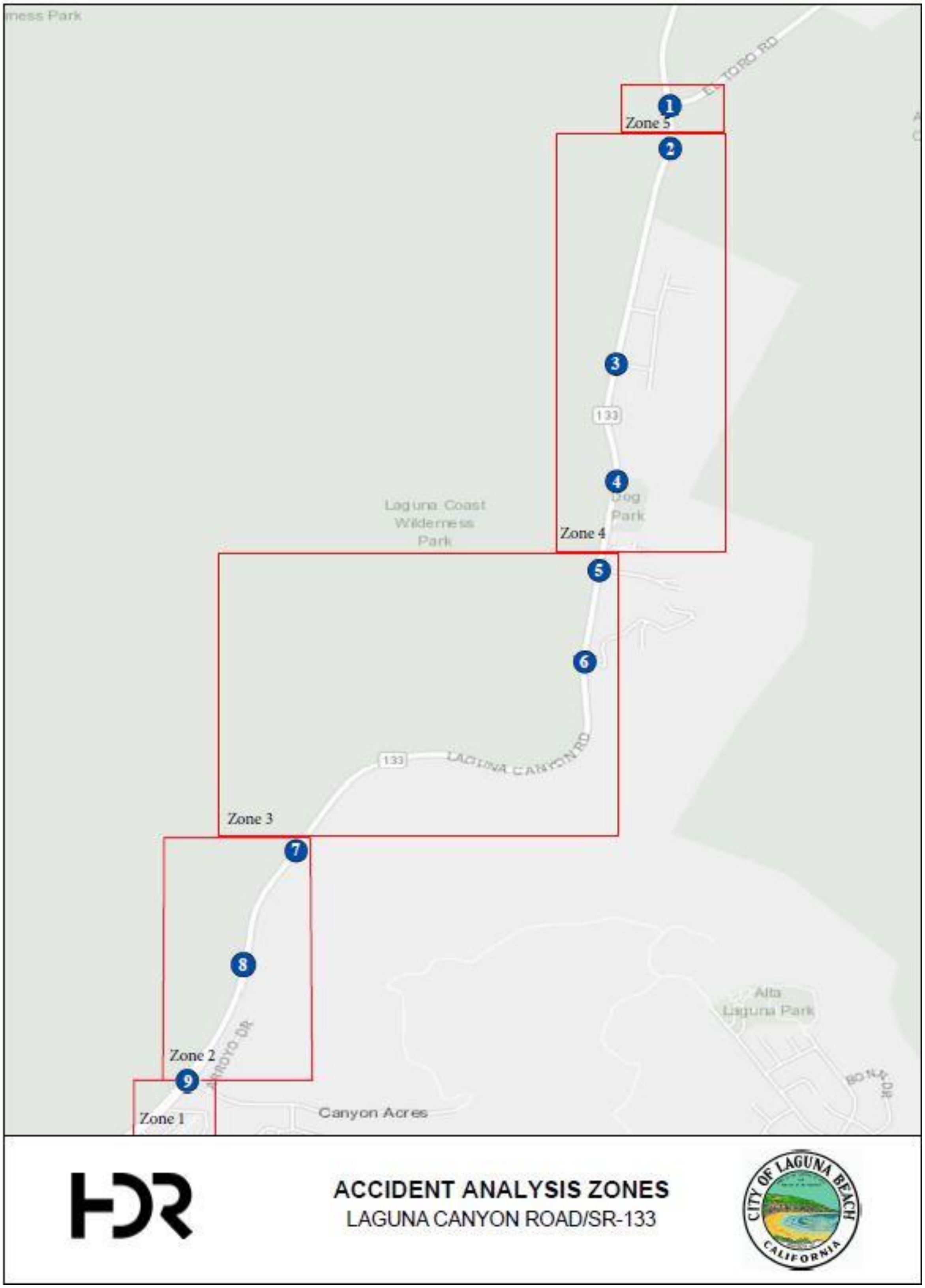

Table 3-4. Summary of Caltrans' TASAS Table B

Post Mile (PM)	**Location**	**Number of Accidents**				**Actual Accident Rates** [1]			**Average Accident Rates** [1]		
		Total (T)	**Fatal (F)**	**Injury (I)**	**F+I**	**Fatal**	**F+I**	**Total**	**Fatal**	**F+I**	**Total**
Zone 2											
Laguna Canyon Road/SR-133 Northbound											
PM 0.94 to 1.573	From Canyon Acres Drive to Laguna Canyon of Arts and Design	35	0	14	14	0.00	**0.68**	**1.70**	0.012	0.40	0.83
Laguna Canyon Rd Southbound											
PM 0.94 to 1.573	From Laguna Canyon Arts and Design to Canyon Acres Drive	16	0	7	7	0.00	0.34	0.78	0.012	0.40	0.83
Zone 3											
Laguna Canyon Rd Northbound											
PM 1.573 to 2.446	From Laguna Canyon Arts and Design to Stan Oaks Drive	30	0	16	16	0.00	**0.55**	**1.03**	0.013	0.40	0.82
Laguna Canyon Rd Southbound											
PM 1.573 to 2.446	From Stan Oaks Drive to Laguna Canyon Arts and Design	17	0	10	10	0.00	0.34	0.58	0.013	0.40	0.82
Zone 4											
Laguna Canyon Rd Northbound											
PM 2.446 to 3.330	From Stan Oaks Drive to Anneliese's School	36	0	20	20	0.00	**0.66**	**1.19**	0.013	0.40	0.82

Table 3-4. Summary of Caltrans' TASAS Table B

Post Mile (PM)	Location	Number of Accidents				Actual Accident Rates [1]			Average Accident Rates [1]		
		Total (T)	Fatal (F)	Injury (I)	F+I	Fatal	F+I	Total	Fatal	F+I	Total
Laguna Canyon Rd Southbound											
PM 2.446 to 3.330	From Anneliese's School to Stan Oaks Drive	24	0	17	17	0.00	**0.56**	0.79	0.013	0.40	0.82
Zone 5											
Laguna Canyon Rd Northbound											
PM 3.330 to 3.415	From Anneliese's School to El Toro Road	2	0	0	0	0.00	0.00	0.74	0.013	0.40	0.82
Laguna Canyon Rd Southbound											
PM 3.330 to 3.415	From El Toro Road to Anneliese's School	6	0	2	2	0.00	**0.74**	**2.23**	0.013	0.40	0.82

Source: Caltrans District 12 TASAS Table B (January 2016 to December 2020)
Notes: 1- the accident rate is the number of accidents per million vehicle-miles.
Bold indicates an actual accident rate that is higher than the average accident rate.

Table 3-5. Summary of Accidents by Type

PM (post mile)	Location	Accident Type	Head-on	Sideswipe	Rear End	Broadside	Hit Object	Overturn	Auto-pedestrian	Other	TOTAL
ZONE 2											
Laguna Canyon Rd Northbound											
PM 0.94 to 1.573	From Canyon Acres Drive to Laguna Canyon Arts and Design	Total	3	4	22	3	2	1	0	0	35
		Percent	8.6%	**11.4%**	**62.9%**	8.6%	5.7%	2.9%	0.0%	0.0%	100%
Laguna Canyon Rd Southbound											
PM 0.94 to 1.573	From Laguna Canyon Arts and Design to Canyon Acres Drive	Total	2	2	4	0	4	2	0	2	16
		Percent	**12.5%**	**12.5%**	**25.0%**	0.0%	**25.0**%	**12.5%**	0.0%	**12.5%**	100%
ZONE 3											
Laguna Canyon Rd Northbound											
PM 1.573 to 2.446	From Laguna Canyon Arts and Design to Stan Oaks Drive	Total	3	5	11	6	3	1	1	0	30
		Percent	10.0%	16.7%	**36.7%**	**20.0%**	10.0%	3.3%	3.3%	0.0%	100.0%
Laguna Canyon Rd Southbound											
PM 1.573 to 2.446	From Stan Oaks Drive to Laguna Canyon Arts and Design	Total	3	0	7	0	6	0	1	0	17
		Percent	17.6%	0.0%	**41.2%**	0.0%	**35.3%**	0.0%	5.9%	0.0%	100.0%
ZONE 4											
Laguna Canyon Rd Northbound											
PM 2.446 to 3.330	From Stan Oaks Drive to Anneliese's School	Total	2	3	20	4	4	1	1	1	36
		Percent	5.6%	8.3%	**55.6%**	**11.1%**	**11.1%**	2.8%	2.8%	2.8%	100%

Table 3-5. Summary of Accidents by Type

PM (post mile)	Location	Accident Type	Head-on	Sideswipe	Rear End	Broadside	Hit Object	Overturn	Auto-pedestrian	Other	TOTAL
Laguna Canyon Rd Southbound											
PM 2.446 to 3.330	From Anneliese's School to Stan Oaks Drive	Total	2	2	13	0	3	3	0	1	24
		Percent	8.3%	8.2%	**54.2%**	0.0%	**12.5%**	**12.5%**	0.0%	4.2%	100%
ZONE 5											
Laguna Canyon Rd Northbound											
PM 3.330 to 3.415	From Anneliese's School to El Toro Road	Total	0	0	0	1	1	0	0	0	2
		Percent	0.0%	0.0%	0.0%	**50.0%**	**50.0%**	0.0%	0.0%	0.0%	100%
Laguna Canyon Rd Southbound											
PM 3.330 to 3.415	From El Toro Road to Anneliese's School	Total	0	2	2	0	2	0	0	0	6
		Percent	0.0%	**33.3%**	**33.3%**	0.0%	**33.3%**	0.0%	0.0%	0.0%	100%

Source: Caltrans District 12 TASAS Selective Accident Retrieval (TSAR) (January 2016 to December 2020)
Bold Red indicates most occurring accident
Bold indicates second most occurring accident

LCR – Zone 2 (Canyon Acres Drive to Laguna Canyon Arts and Design). This segment consists of one northbound lane, one southbound lane divided by a TWLTL.

Traffic accident data indicates 51 collisions occurred during this 60-month period with 12 collisions in 2016, 7 collisions in 2017, 17 collisions in 2018, 8 collisions in 2019, and 7 collisions in 2020.

For primary collision factors of the 51 collisions, 30 (i.e., 59%) of the accidents was speeding, 2 were under influence of alcohol, 1 was failure to yield, 6 were improper turn, 6 were other violations, 1 was other than driver, and 5 were unknown. Also, 26 (i.e., 51%) of the collisions were classified as rear end type collision, 5 were head-on collision, 6 were sideswipe collisions, 3 were broadside, 6 were hit an object, 3 were overturn, and 2 were classified as others.

LCR – Zone 3 (Laguna Canyon Arts and Design to Stan Oaks Drive). This segment consists of one northbound lane, one southbound lane divided by a TWLTL.

Traffic accident data indicates 47 collisions occurred during this 60-month period with 13 collisions in 2016, 9 collisions in 2017, 11 collisions in 2018, 10 collisions in 2019, and 4 collisions in 2020.

For primary collision factors of the 47 collisions, 17 (i.e., 36%) of the accidents was speeding, 10 (i.e., 21%) were under influence of alcohol, 2 were following too close, 1 was failure to yield, 5 were improper turn, 10 (i.e., 21%) were other violations, and 2 were other than driver. Also, 18 (i.e., 38%) of the collisions were classified as rear end type collision, 6 were head-on collision, 5 were sideswipe collisions, 6 were broadside, 9 were hit an object, 1 was overturn, and 2 were auto-pedestrian collision.

LCR – Zone 4 (Stan Oaks Drive to Anneliese's School). This segment consists of one northbound lane, one southbound lane divided by a TWLTL.

Traffic accident data indicates 60 collisions occurred during this 60-month period with 16 collisions in 2016, 8 collisions in 2017. 14 collisions in 2018, 14 collisions in 2019, and 8 collisions in 2020.

For primary collision factors of the 60 collisions, 33 (i.e., 55%) of the accidents was speeding, 6 were under influence of alcohol, 3 were following too close, 3 were failure to yield, 7 were improper turn, 1 was other violations, 2 were other than driver, 5 were classified as unknown. 33 (i.e., 55%) of the collisions were classified as rear end type collision, 4 were head-on collision, 5 were sideswipe collisions, 4 were broadside, 7 were hit an object, 4 were overturn, 1 was auto-pedestrian collision, and 2 were classified as others.

LCR – Zone 5 (Anneliese's School to El Toro Road). This segment consists of two northbound lanes, single northbound right turn lane, two southbound lanes and single southbound left turn lane.

Traffic accident data indicates 8 collisions occurred during this 60-month period with 3 collisions in 2016, 0 collisions in 2017, 3 collisions in 2018, 0 collisions in 2019, and 2 collisions in 2020.

For primary collision factors of the 8 collisions, 3 (i.e., 37.5%) of the accidents was speeding, 1 was failure to yield, 1 was improper turn, 1 was other violations, 1 was other than driver, and 1 was classified as unknown. Also, 2 of the collisions were classified as rear end type collision, 2 were sideswipe collisions, 1 was broadside, and 3 (i.e., 37.5%) were hit an object.

3.4 Existing Deficiencies

The traffic demand for this corridor is expected to increase substantially in the near future. The existing poor operating conditions are expected to further worsen without any implementation of improvements.

This segment of LCR consists of a two-lane highway with 12-foot-wide travel lanes, a 10-foot non-standard center TWLTL and limited on-street parking. Although no additional travel lanes are proposed with the project enhancing capacity, multimodal capacity of the corridor would improve due to the addition of bike, pedestrian and transit improvements.

Sidewalks or dedicated pedestrian paths do not exist along LCR within the project limits. The exception is a 0.2-mile-long sidewalk on the east side of LCR near the Laguna Beach Dog Park. Pedestrian access is limited to the paved shoulder next to the traffic lanes or in dirt areas adjacent to non-standard shoulders. A large number of bicyclists were observed during peak periods along the study corridor. Since this is a popular recreational route, it experiences high bike traffic on weekends and holidays. These bicyclists have limited access on fairly narrow, non-standard paved shoulders that are separated from traffic lanes only by a travel way edge stripe. The northbound LCR consists of residential and commercial land uses, many of which have direct driveway access to and from LCR. The southbound LCR includes several satellite parking lots. Vehicular congestion and queuing, and inadequate gaps during peak traffic periods create difficulty for left turning vehicles accessing these driveways and parking lots. This issue is compounded through the Big Bend area, where restricted sight distance through the horizontal curves can create difficulty for left turning vehicles to find adequate gaps for a safe left turn movement through the oncoming traffic stream.

The availability of public parking is highly constrained throughout the City. City transit and trolley services make a critical contribution in improving traffic circulation by removing additional motorists from utilizing the corridor, especially during the peak summer season. The Act V/City Maintenance Facility Yard parking lot located at the southern end of the project limits primarily serves as a park-and-ride location for the trolley service during summer months. Vehicular congestion and queuing in addition to the inadequate gaps during peak periods makes ingress and egress difficult for vehicles and the trolley service accessing this lot.

Overhead utilities exist along both sides of LCR through most of the corridor within the project limits. These overhead utility poles along the edge of the roadway in both directions are located within the clear recovery zone increasing the risk of collisions with errant vehicles.

4 Traffic Volume Forecasts

This chapter describes the assumptions and methodologies used to forecast traffic volumes at nine study intersections and driveways along LCR.

4.1 Traffic Forecasting Methodology and Assumptions

Future traffic forecasts at the study intersections and highway segments under the Opening Year (2030) and Horizon Year (2050) are developed using the assumptions contained in the Transportation Demand Forecasting (TDF) model OCTAM version 4.0. The Base Year (2012) and Future Year (2040) OCTAM models were used to calculate the annual growth volumes at the study facilities, which were applied to existing traffic counts using the difference method (Existing Counts + Model growth) or using the Furness method (using approach and departure growth to adjust intersection forecast) to generate 2050 and opening year volumes. The forecast volumes were balanced along the corridor to ensure conservation of flow. In average, the annual growth rate is approximately 2% for the year 2030 forecasts. The extrapolation growth rate is assumed to be 0.5% per year to develop the year 2050 forecasts. The 0.5% per year is based on the forecasted social and economic growth in the region.

A model post-processor was constructed to refine the “raw” model output link volumes. The post-processor was based on the methodologies delineated in the National Cooperative Highway Research Program Report (NCHRP) 255 published by the Transportation Research Board (TRB). The purpose of the post processor is to go beyond what can reasonably be achieved in terms of accuracy and detail from the OCTAM Regional Planning Model. Post-processing adjustments provide a greater level of consistency with available base year counts.

It should be noted that the vehicular forecast volumes for the No Build and Build alternatives are the same for Opening Year (2030) and Horizon Year (2050) since the traffic demands in the study area would not change between No Build and Build alternatives. Therefore, future forecast volumes between the scenarios would maintain consistency and potential benefits and impacts associated with each alternative can clearly be identified.

Traffic demand within this corridor already exceeds capacity during weekday AM and PM peak hours and during most summer weekends and holidays due to special events and the proximity to the Pacific Ocean as well as multiple adjacent recreational facilities and trails. A reversible lane alternative, Alternative 5, is being considered part of the overall corridor improvements evaluation in the PSR/PDS in order to handle the overcapacity traffic conditions. A technical memorandum on *reversible lane operations concept memorandum, HDR, December 21, 2021*, presents various aspects for Alternative 5 in detail. This technical memorandum is included in Appendix C. As described in the memorandum, reversible traffic lanes add peak-direction capacity to a two-way road and decrease congestion by borrowing available lane capacity from the other (off-peak) direction. Reversing lanes reduces congestion for handling special event traffic, during morning and evening commutes, when an incident affects operation, or when construction or maintenance activity is present on the road. Roads that may be used as emergency evacuation routes or for special events also benefit from reversible lane strategies. Under the circumstance, peak season daily and corresponding peak hour traffic volumes were used to evaluate the traffic conditions for Alternative 5.

To develop the peak season traffic volume increase rate, the Caltrans Census counts on LCR between Canyon Acres Drive and El Toro Road were extracted from Caltrans website and evaluated. From year 1990 to 1996, the peak month ADT is about 18% to 19% higher than the average ADT for the off-peak months. But from year 1997 to 2018, the peak month ADT is about 11% to 12% higher than the average ADT for the off-peak months. The peak month ADT is about 1% higher for the years 2019 and 2020. On average between 1990 and 2020, the peak month ADT is assumed to be 12% higher than the average ADT for the off-peak months. The calculation worksheet is included in Appendix D.

To be consistent, the peak hour volumes along roadway segments and the through movement on LCR at the intersections are assumed to apply 12% increase.

Based on the existing peak hour directional flow, the reversible lane would be operational for southbound traffic during the AM peak period and northbound during the PM peak period. Hours of operations may occur between 7 am to 9 am during the AM peak period and 4 pm to 6 pm during the PM peak period. During off-peak periods, the reversible lane may operate as a TWLTL. With the center TWLTL reversible lane, left turn movements are prohibited between Anneliese’s School Driveway and Act V/City Maintenance Facility Yard Parking Lot Driveway within the project limits. The left turn traffic would proceed downstream until the end point intersection of the reversible lane to make a U-turn and then make the right turn onto the targeted access or driveway.

Based on the discussions in this section, the No Build and Build traffic volumes under Alternative 1 through Alternative 4 remain the same. The Alternative 5 traffic volumes are generally 12% higher than the Alternative 1 through 4 volumes.

4.2 Opening Year (2030) Traffic Volumes

Table 4-1 presents peak hour and daily volume forecast for study segments under Opening Year (2030) No Build and Build, Alternatives 1 to 4, conditions. Opening Year (2030) arterial segment volumes under Alternatives 1 to 4 are around 14% higher than the existing volumes. Table 4-2 presents peak hour and daily volume forecast for study segments under Opening Year (2030) Build Alternative 5 conditions which is around 12% higher than the Alternatives 1 to 4 volumes as discussed in Section 4.1.

Table 4-3 and Table 4-5 present intersection volume forecast for the study intersections under Opening Year (2030) No Build and Build, Alternatives 1 to 4, conditions during AM and PM peak hours, respectively. Table 4-4 and Table 4-6 present intersection volume forecast for the study intersections under Opening Year (2030) Build Alternative 5 conditions during AM and PM peak hours, respectively.

Figure 4-1 presents intersection turning movement volumes under Opening Year (2030) No Build and Build, Alternatives 1 to 4, conditions. Figure 4-2 presents intersection turning movement volumes under Opening Year (2030) Build Alternative 5 conditions.

Table 4-1. Opening Year (2030) No Build and Build Arterial Segment Volumes – Alternatives 1 to 4

ID	Segment	Description	Direction	AM Peak Hour	PM Peak Hour	Daily
1	Laguna Canyon Rd/SR-133	Btwn. El Toro Road & Sun Valley Drive	Northbound	1,310	1,920	44,600
			Southbound	1,720	1,730	
2	Laguna Canyon Rd//SR-133	Btwn. Sun Valley Drive & Stan Oaks Drive	Northbound	1,300	1,960	45,100
			Southbound	1,780	1,730	
3	Laguna Canyon Rd//SR-133	Btwn. Stan Oaks Drive & LCAD Driveway	Northbound	1,350	1,890	44,300
			Southbound	1,770	1,790	
4	Laguna Canyon Rd//SR-133	Btwn. LCAD Driveway & Canyon Acres Drive	Northbound	1,370	1,890	44,800
			Southbound	1,760	1,800	

Table 4-2. Opening Year (2030) Build Arterial Segment Volumes – Alternative 5

ID	Segment	Description	Direction	AM Peak Hour	PM Peak Hour	Daily
1	Laguna Canyon Rd/SR-133	Btwn. El Toro Road & Sun Valley Drive	Northbound	1,470	2,150	50,000
			Southbound	1,930	1,940	
2	Laguna Canyon Rd//SR-133	Btwn. Sun Valley Drive & Stan Oaks Drive	Northbound	1,460	2,200	50,500
			Southbound	1,990	1,940	
3	Laguna Canyon Rd//SR-133	Btwn. Stan Oaks Drive & LCAD Driveway	Northbound	1,510	2,120	49,600
			Southbound	1,980	2,000	
4	Laguna Canyon Rd//SR-133	Btwn. LCAD Driveway & Canyon Acres Drive	Northbound	1,530	2,120	50,200
			Southbound	1,970	2,020	

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Table 4-3. 2030 No Build and Build AM Peak Hour Intersection Turning Movement Volumes – Alternatives 1 to 4

ID	Description	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBR	WBL	WBR	Total
1	SR-133 at El Toro Road	0	1045	711	28	1079	0	0	0	815	16	3694
2	SR-133 at Anneliese’s School Driveway	0	1610	30	168	1726	0	0	0	20	146	3700
3	SR-133 at Sun Valley Drive	0	1444	1	2	1694	0	0	0	4	6	3151
4	SR-133 at Laguna Beach Dog Park Driveway	0	1430	15	15	1683	0	0	0	10	15	3168
5	SR-133 at Stan Oaks Drive	0	1439	1	2	1691	0	0	0	4	6	3143
6	SR-133 at Castle Rock Road	0	1432	2	3	1692	0	0	0	6	8	3143
7	SR-133 at Laguna College of Arts & Design Driveway	52	1379	0	0	1656	42	55	45	0	0	3229
8	SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway	76	1351	0	0	1639	62	80	66	0	0	3274
9	SR-133 at Canyon Acres Drive	18	1555	15	16	1511	0	0	0	40	16	3171

Table 4-4. 2030 Build AM Peak Hour Intersection Turning Movement Volumes – Alternative 5

ID	Description	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBR	WBL	WBR	Total
1	SR-133 at El Toro Road	76	1232	711	28	1208	0	0	0	815	16	4086
2	SR-133 at Anneliese’s School Driveway	0	1873	30	168	1931	0	0	0	20	146	4168
3	SR-133 at Sun Valley Drive	0	1703	3	0	1901	0	0	0	0	10	3617
4	SR-133 at Laguna Beach Dog Park Driveway	0	1681	30	0	1901	0	0	0	0	25	3637
5	SR-133 at Stan Oaks Drive	0	1701	3	0	1901	0	0	0	0	10	3615
6	SR-133 at Castle Rock Road	0	1690	5	0	1901	0	0	0	0	14	3610
7	SR-133 at Laguna College of Arts & Design Driveway	0	1695	0	0	1807	94	0	100	0	0	3696
8	SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway	76	1615	0	0	1845	62	80	66	0	0	3744
9	SR-133 at Canyon Acres Drive	18	1742	15	93	1640	0	0	0	40	16	3564

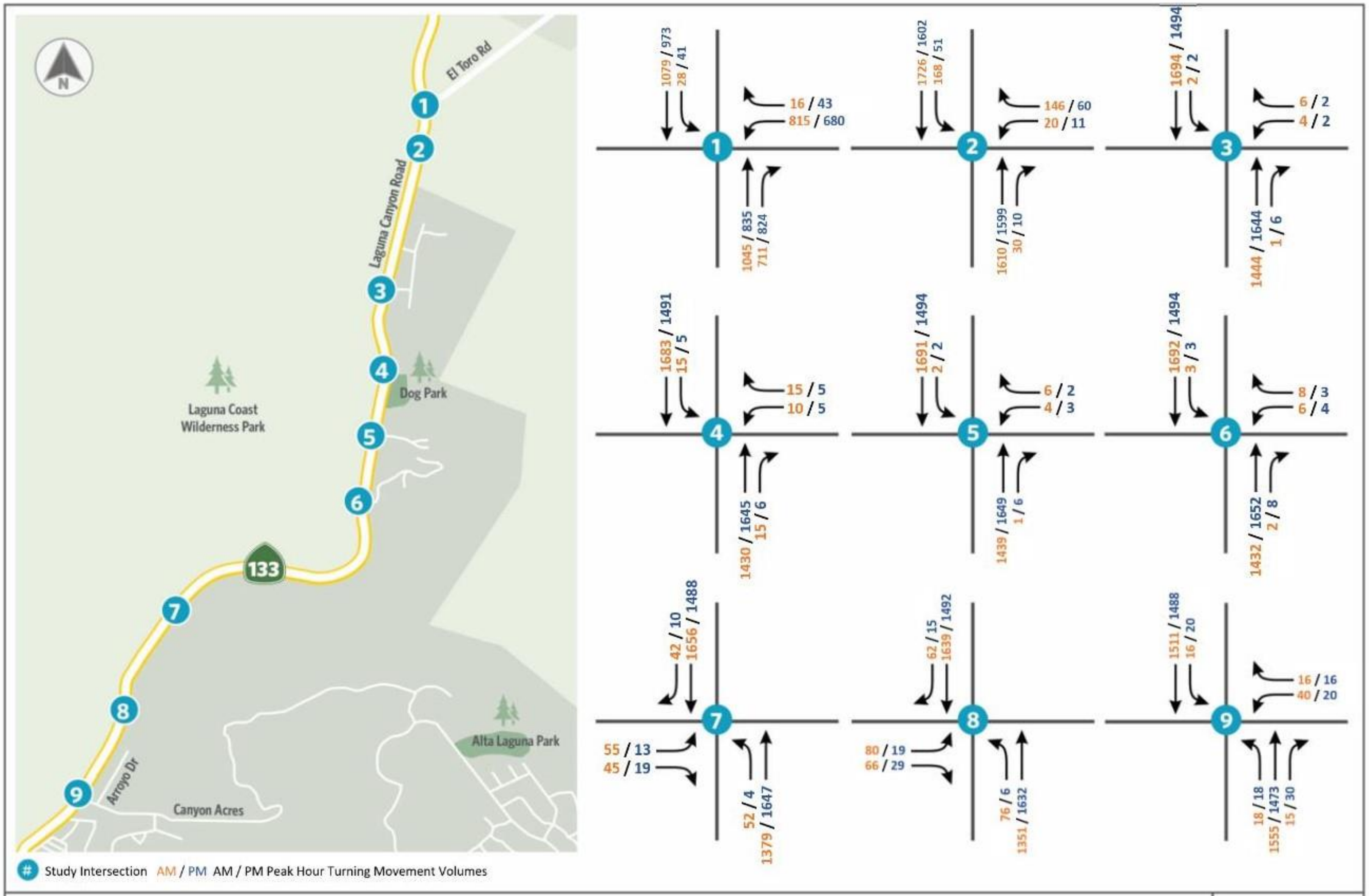
Table 4-5. 2030 No Build and Build PM Peak Hour Intersection Turning Movement Volumes – Alternatives 1 to 4

ID	Description	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBR	WBL	WBR	Total
1	SR-133 at El Toro Road	0	835	824	41	973	0	0	0	680	43	3396
2	SR-133 at Anneliese’s School Driveway	0	1599	10	51	1602	0	0	0	11	60	3333
3	SR-133 at Sun Valley Drive	0	1644	6	2	1494	0	0	0	2	2	3150
4	SR-133 at Laguna Beach Dog Park Driveway	0	1645	6	5	1491	0	0	0	5	5	3157
5	SR-133 at Stan Oaks Drive	0	1649	6	2	1494	0	0	0	3	2	3156
6	SR-133 at Castle Rock Road	0	1652	8	3	1494	0	0	0	4	3	3164
7	SR-133 at Laguna College of Arts & Design Driveway	4	1647	0	0	1488	10	13	19	0	0	3181
8	SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway	6	1632	0	0	1492	15	19	29	0	0	3193
9	SR-133 at Canyon Acres Drive	18	1473	30	20	1488	0	0	0	20	16	3065

Table 4-6. 2030 Build PM Peak Hour Intersection Turning Movement Volumes – Alternative 5

ID	Description	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBR	WBL	WBR	Total
1	SR-133 at El Toro Road	18	1012	824	41	1090	0	0	0	680	43	3708
2	SR-133 at Anneliese’s School Driveway	0	1794	10	51	1737	0	0	0	11	60	3663
3	SR-133 at Sun Valley Drive	0	1837	8	0	1631	0	0	0	0	4	3480
4	SR-133 at Laguna Beach Dog Park Driveway	0	1835	11	0	1631	0	0	0	0	10	3487
5	SR-133 at Stan Oaks Drive	0	1841	8	0	1631	0	0	0	0	5	3485
6	SR-133 at Castle Rock Road	0	1842	11	0	1631	0	0	0	0	7	3491
7	SR-133 at Laguna College of Arts & Design Driveway	0	1853	0	0	1617	14	0	32	0	0	3516
8	SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway	6	1834	0	0	1634	15	19	29	0	0	3537
9	SR-133 at Canyon Acres Drive	18	1650	30	45	1605	0	0	0	20	16	3384

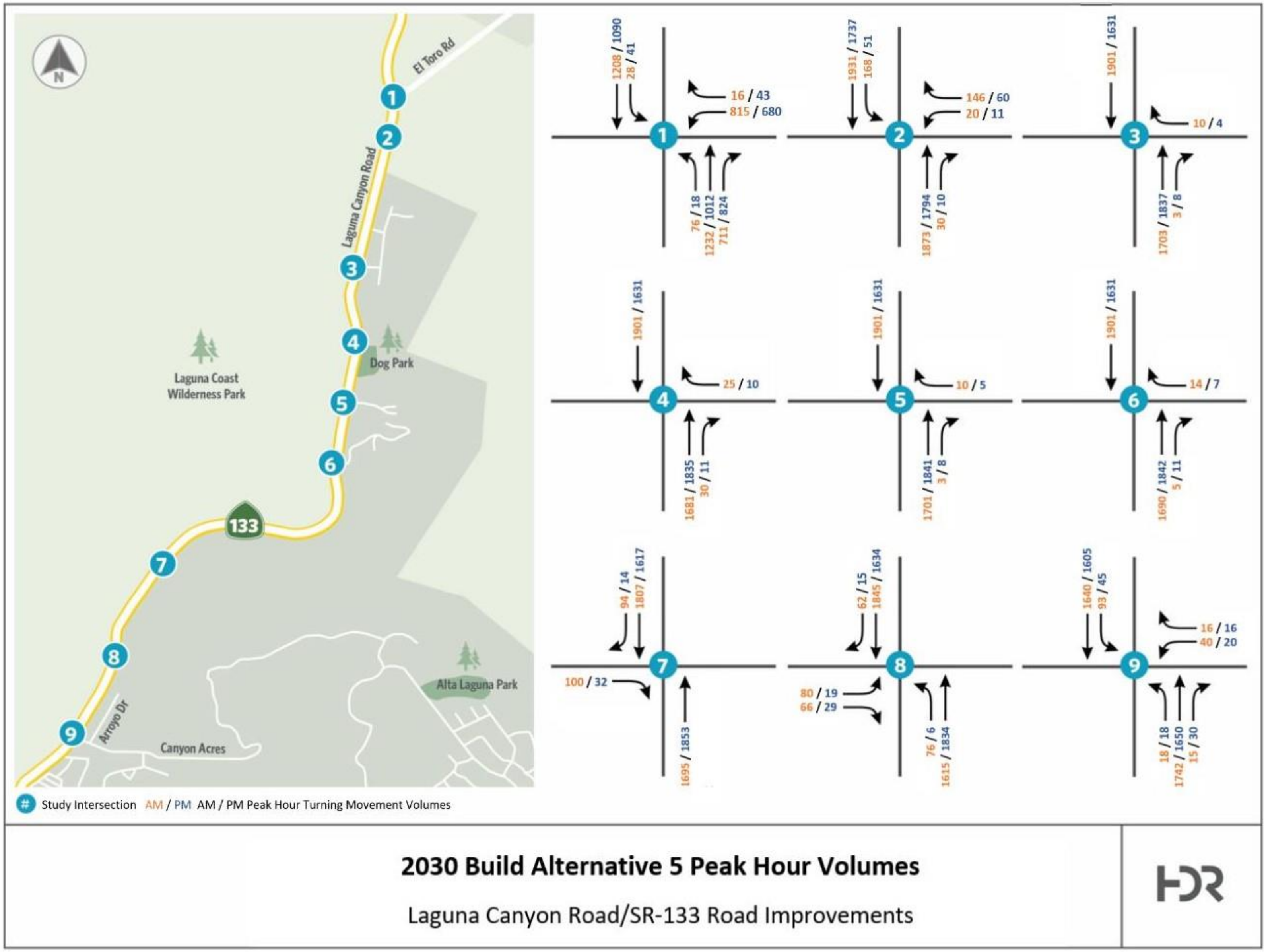
Figure 4-1. Opening Year (2030) No Build and Build Intersection Peak Hour Volumes - Alternatives 1 to 4



2030 No Build and Build Alternatives 1 through 4 Peak Hour Volumes

Laguna Canyon Road/SR-133 Road Improvements

Figure 4-2. Opening Year (2030) Build Intersection Peak Hour Volumes – Alternative 5



4.3 Horizon Year (2050) Traffic Volumes

Table 4-7 presents peak hour and daily volume forecast for study area highway segments under Horizon Year (2050) No Build and Build, Alternatives 1 to 4, conditions. Horizon Year (2050) arterial segment volumes under Alternatives 1 to 4 are around 50% higher than the existing volumes. Table 4-8 presents peak hour and daily volume forecast for Study Area highway segments under Horizon Year (2050) No Build and Build, Alternatives 1 to 4, conditions. Horizon Year (2050) arterial segment volumes under Alternative 5 are around 12% higher than the Alternatives 1 to 4 volumes.

Table 4-9 and Table 4-11 present intersection volume forecast for the study intersections under Horizon Year (2050) No Build and Build, Alternatives 1 to 4, conditions during AM and PM peak hours, respectively. Table 4-10 and Table 4-12 present intersection volume forecast for the study intersections under Horizon Year (2050) Build Alternatives 5 conditions during AM and PM peak hours, respectively. Figure 4-3 presents intersection turning movement volumes under Horizon Year (2050) No Build and Build, Alternatives 1 to 4, conditions. Figure 4-4 presents intersection turning movement volumes under Horizon Year (2050) Build Alternative 5 conditions.

Table 4-7. Horizon Year (2050) No Build and Build Arterial Segment Volumes - Alternatives 1 to 4

ID	Segment	Description	Direction	AM Peak Hour	PM Peak Hour	Daily
1	Laguna Canyon Rd//SR-133	Btwn. El Toro Road & Sun Valley Drive	Northbound	1,680	2,625	54,800
			Southbound	2,310	2,310	
2	Laguna Canyon Rd//SR-133	Btwn. Sun Valley Drive & Stan Oaks Drive	Northbound	1,680	2,730	55,900
			Southbound	2,415	2,310	
3	Laguna Canyon Rd//SR-133	Btwn. Stan Oaks Drive & LCAD Driveway	Northbound	1,785	2,625	54,800
			Southbound	2,415	2,415	
4	Laguna Canyon Rd//SR-133	Btwn. LCAD Driveway & Canyon Acres Drive	Northbound	1,785	2,625	55,400
			Southbound	2,415	2,415	

Table 4-8. Horizon Year (2050) Build Arterial Segment Volumes - Alternative 5

ID	Segment	Description	Direction	AM Peak Hour	PM Peak Hour	Daily
1	Laguna Canyon Rd//SR-133	Btwn. El Toro Road & Sun Valley Drive	Northbound	1,880	2,940	61,400
			Southbound	2,590	2,590	
2	Laguna Canyon Rd//SR-133	Btwn. Sun Valley Drive & Stan Oaks Drive	Northbound	1,880	3,060	62,600
			Southbound	2,700	2,590	
3	Laguna Canyon Rd//SR-133	Btwn. Stan Oaks Drive & LCAD Driveway	Northbound	2,000	2,940	61,400
			Southbound	2,700	2,700	
4	Laguna Canyon Rd//SR-133	Btwn. LCAD Driveway & Canyon Acres Drive	Northbound	2,000	2,940	62,000
			Southbound	2,700	2,700	

Table 4-9. 2050 No Build and Build AM Peak Hour Intersection Turning Movement Volumes - Alternatives 1 to 4

ID	Description	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBR	WBL	WBR	Total
1	SR-133 at El Toro Road	0	1225	976	38	1334	0	0	0	1035	21	4629
2	SR-133 at Anneliese's School Driveway	0	2050	30	178	2191	0	0	0	20	151	4620
3	SR-133 at Sun Valley Drive	0	1784	1	2	2164	0	0	0	4	6	3961
4	SR-133 at Laguna Beach Dog Park Driveway	0	1770	15	15	2153	0	0	0	10	15	3978
5	SR-133 at Stan Oaks Drive	0	1779	1	2	2161	0	0	0	4	6	3953
6	SR-133 at Castle Rock Road	0	1772	2	3	2162	0	0	0	6	8	3953
7	SR-133 at Laguna College of Arts & Design Driveway	52	1719	0	0	2126	42	55	45	0	0	4039
8	SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway	76	1691	0	0	2109	62	80	66	0	0	4084
9	SR-133 at Canyon Acres Drive	28	1895	15	21	1836	0	0	0	40	21	3856

Table 4-10. 2050 Build AM Peak Hour Intersection Turning Movement Volumes - Alternative 5

ID	Description	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBR	WBL	WBR	Total
1	SR-133 at El Toro Road	76	1452	976	38	1494	0	0	0	1035	21	5092
2	SR-133 at Anneliese's School Driveway	0	2353	30	178	2427	0	0	0	20	151	5159
3	SR-133 at Sun Valley Drive	0	2083	3	0	2402	0	0	0	0	10	4498
4	SR-133 at Laguna Beach Dog Park Driveway	0	2061	30	0	2402	0	0	0	0	25	4518
5	SR-133 at Stan Oaks Drive	0	2081	3	0	2402	0	0	0	0	10	4496
6	SR-133 at Castle Rock Road	0	2070	5	0	2402	0	0	0	0	14	4491
7	SR-133 at Laguna College of Arts & Design Driveway	0	2075	0	0	2308	94	0	100	0	0	4577
8	SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway	76	1995	0	0	2346	62	80	66	0	0	4625
9	SR-133 at Canyon Acres Drive	28	2122	15	98	1996	0	0	0	40	21	4320

Table 4-11. 2050 No Build and Build PM Peak Hour Intersection Turning Movement Volumes - Alternatives 1 to 4

ID	Description	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBR	WBL	WBR	Total
1	SR-133 at El Toro Road	0	1095	999	46	1223	0	0	0	900	53	4316
2	SR-133 at Anneliese's School Driveway	0	2034	10	56	2067	0	0	0	16	60	4243
3	SR-133 at Sun Valley Drive	0	2084	6	2	1959	0	0	0	2	2	4055
4	SR-133 at Laguna Beach Dog Park Driveway	0	2085	11	5	1956	0	0	0	5	5	4067
5	SR-133 at Stan Oaks Drive	0	2094	6	2	1959	0	0	0	3	2	4066
6	SR-133 at Castle Rock Road	0	2097	8	3	1959	0	0	0	4	3	4074
7	SR-133 at Laguna College of Arts & Design Driveway	4	2092	0	0	1953	10	13	19	0	0	4091
8	SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway	6	2077	0	0	1957	15	19	29	0	0	4103
9	SR-133 at Canyon Acres Drive	28	1843	30	20	1898	0	0	0	20	21	3860

Table 4-12. 2050 Build PM Peak Hour Intersection Turning Movement Volumes - Alternative 5

ID	Description	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBR	WBL	WBR	Total
1	SR-133 at El Toro Road	18	1316	999	46	1370	0	0	0	900	53	4702
2	SR-133 at Anneliese's School Driveway	0	2273	10	56	2232	0	0	0	16	60	4647
3	SR-133 at Sun Valley Drive	0	2321	8	0	2126	0	0	0	0	4	4459
4	SR-133 at Laguna Beach Dog Park Driveway	0	2319	16	0	2126	0	0	0	0	10	4471
5	SR-133 at Stan Oaks Drive	0	2330	8	0	2126	0	0	0	0	5	4469
6	SR-133 at Castle Rock Road	0	2331	11	0	2126	0	0	0	0	7	4475
7	SR-133 at Laguna College of Arts & Design Driveway	0	2342	0	0	2112	14	0	32	0	0	4500
8	SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway	6	2323	0	0	2129	15	19	29	0	0	4521
9	SR-133 at Canyon Acres Drive	28	2064	30	45	2045	0	0	0	20	21	4253

Figure 4-3. Horizon Year (2050) No Build and Build Intersection Peak Hour Volumes – Alternatives 1 to 4

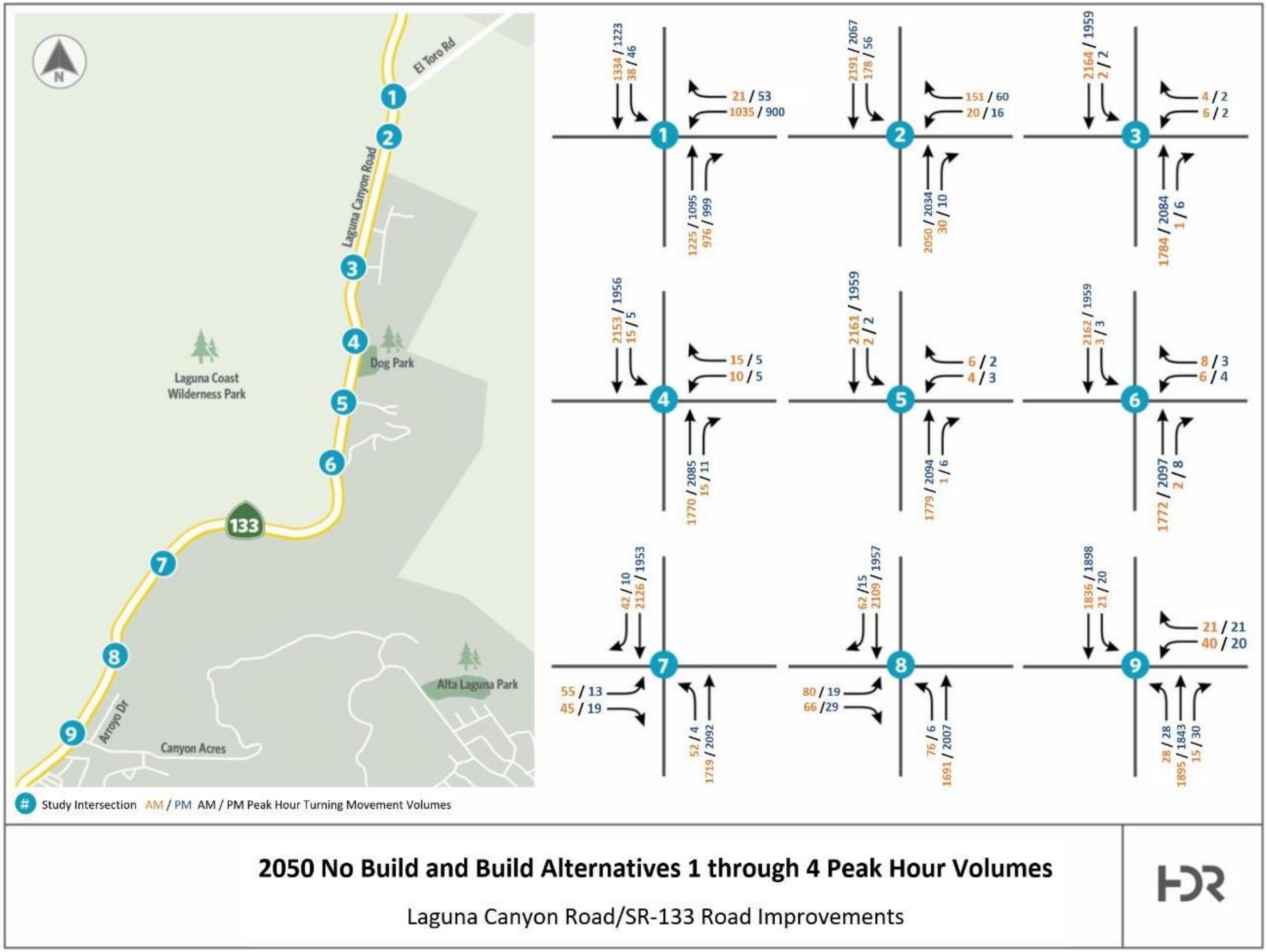
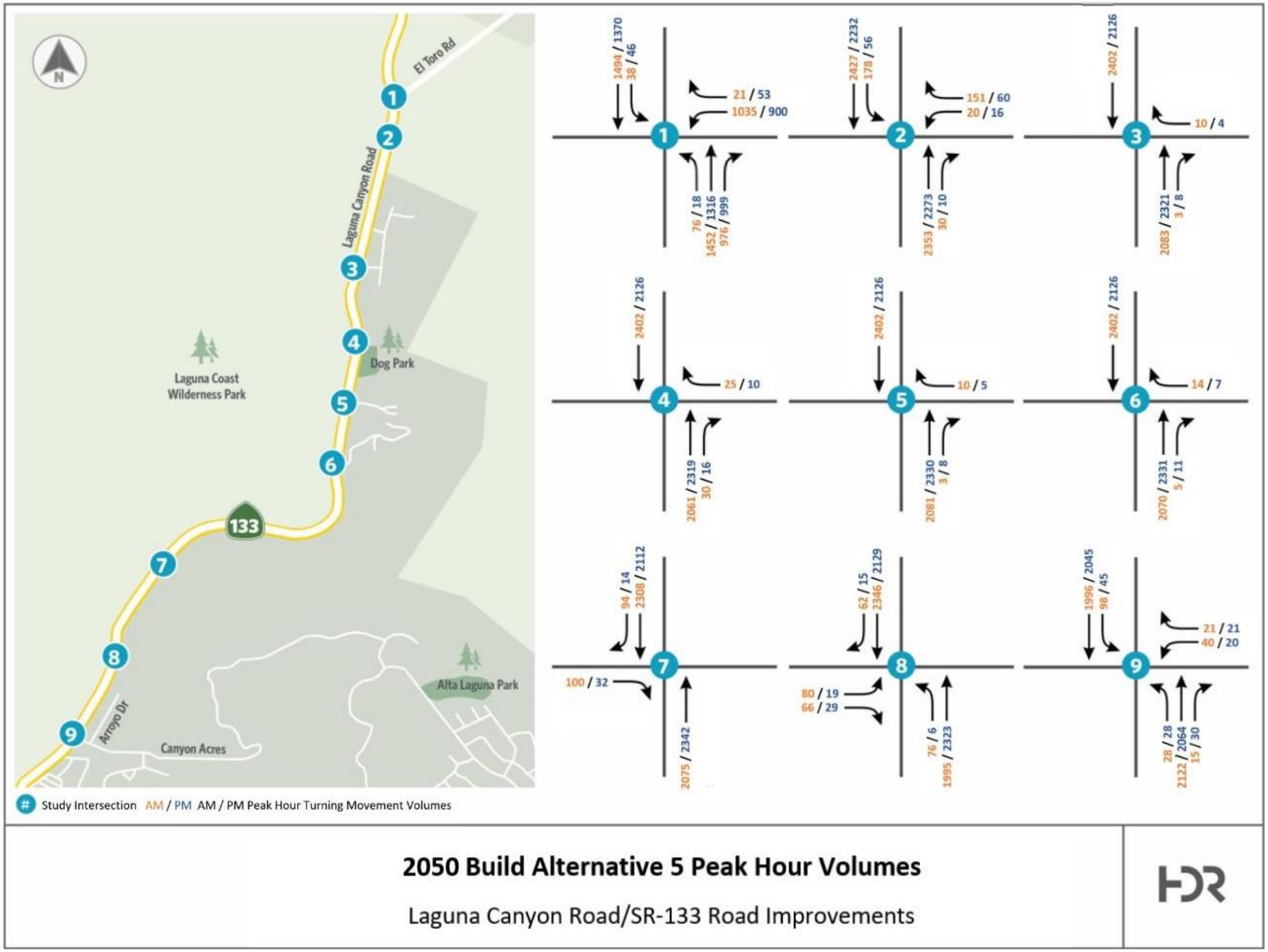


Figure 4-4. Horizon Year (2050) Build Intersection Peak Hour Volumes – Alternative 5



5 Analysis Methodology

This section provides the methodology for the analysis of the existing, No Build and four (4) Build alternatives that include complete street elements such as bike, pedestrian facilities and transit services. As the Build alternatives do not provide additional lanes, the capacity enhancements provided by the proposed project are consistent from one alternative to another. Since traffic volumes do not change between No Build Alternative 1 and Build alternatives 2 to 4, the automobile LOS for highway segments is expected to remain the same for both No Build and Build alternatives 2 to 4 for Opening Year (2030) and Horizon Year (2050). However, the multimodal capacity of the corridor would improve due to the addition of bike, pedestrian and transit improvements. Therefore, the alternatives are evaluated in two ways: (1) the methodologies from Highway Capacity Manual (HCM) 2010 to analyze the level of service of the state highway facility as required by Caltrans policy including highway segments, and intersections and (2) the new multimodal LOS methodologies put forth by the recently released HCM 6 for bicycle, transit and pedestrians.

Standard evaluations for intersections, road segments and arterials are as valid for reversible lane system facilities as for any facility. The implementation of a reversal does not fundamentally change the expectations for roadway facilities. Therefore, the various methodologies, as described in the HCM, for example, are still valid for use by the City and Caltrans.

Based on the 2014 Transportation Concept Report for the SR-133 highway, the target concept level of service is LOS D for Year 2050. The concept LOS indicates the minimum level of service is LOS D that the District would allow on a route prior to proposing an alternative to improve operating conditions. However, based on the forecast 2050 traffic volumes, concurrence from Caltrans staff and Caltrans's approved methodology, the target level of service is LOS E.

5.1 Two-Lane Highways Level of Service Standards and Thresholds

The HCM 2010 Two-Lane Highway LOS methodology was used to assess the automobiles LOS performance along LCR. The HCM 2010 categorizes two-lane highways into three categories: Class I, II, and II. The LCR falls under Class I category. For Class I highways two measures of effectiveness below are used to determine automobile LOS:

- ATS (Average Travel Speed): Reflects mobility on a two-lane highway. It is defined as the highway segment length divided by the average travel time taken by vehicles to traverse it during a designated time interval.
- PTSF (Percent time spent following): Represents the freedom to maneuver and the comfort and convenience of travel. It is the average percentage of time that vehicles must travel in platoons behind slower vehicles due to the inability to pass.

Table 5-1 presents the automobile LOS criteria for Class I highways based on ATS and PTSF.

Table 5-1. Automobile LOS for Two-Lane Highways

LOS	Percent time spent following (PTSF)	Average Travel Speed (MPH)	Description
A	<35.0	>55.0	Free-flow operations, motorists can travel at desired speed and passing demand is well below capacity
B	>35.0 and <50.0	>50.0 and <55.0	Stable flow, with speeds generally higher than 50 miles per hour. The passing demand to maintain desired speeds becomes significant
.C	>50.0 and < 80.0	>45.0 and 50.0	Stable flow at slower speeds. Individuals become noticeably affected by interactions with others, and percent time spent following drastically increases
D	>65.0 and <80.0	>40.0 and <45.0	Unstable flow with slower speeds and long platoons. Turning vehicles and roadside distractions cause major shock waves in the traffic stream.
E	>80.0	< 40.0	Operating conditions at or near capacity. Speeds are slow and passing is virtually impossible. Platooning becomes intense.
F	N/A	N/A	Heavily congested flow.

Source: 2010 Highway Capacity Manual, Chapter 15, Page 15-7. Exhibit 15-3

5.2 Multi-Lane Highways Level of Service Standards and Thresholds

The HCM 2010 Multi-Lane Highway LOS methodology was used to assess the automobiles LOS performance along LCR for the peak direction under Build Alternative 5 conditions. Because speeds are constant through a broad range of flow rates, LOS is defined on the basis of density, which is a measure of the proximity of vehicles to each other in the traffic stream. Table 5-2 summarizes the automobile LOS for multilane highway segments.

Table 5-2. Automobile LOS for Multilane Highway Segments

LOS	FFS (mi/h)	Density (pc/mi/ln)
A	All	>0-11
B	All	>11-18
C	All	>18-26
D	All	>26-35
E	60 55 50 45	>35-40 >35-41 >35-43 >35-45
F	Demand Exceeds Capacity	
	60 55 50 45	>40 >41 >43 >45

Source: 2010 Highway Capacity Manual, Exhibit 14-4

5.3 Intersection Level of Service Standards and Thresholds

This section presents the methodologies used to perform peak hour intersection capacity analyses for signalized and unsignalized intersections.

5.3.1 Signalized Intersection Analysis

The analysis of signalized intersections utilized the operational analysis procedure as outlined in the HCM 2010. This method defines LOS in terms of delay, or more specifically, average stopped delay per vehicle. Delay is a measure of driver and/or passenger discomfort, frustration, fuel consumption and lost travel time. This technique uses 1,900 vehicles per hour per lane (VPHPL) as the maximum saturation volume of an intersection. This saturation volume was adjusted to account for lane width, on-street parking, pedestrians, traffic composition (i.e., percentage trucks) and shared lane movements (i.e., through and right-turn movements originating from the same lane). The LOS criteria used for this technique are described in Table 5-3.

Table 5-3. Signalized Intersection Level of Service

Average Stopped Delay Per Vehicle (seconds)	LOS Characteristics
<10.0	*LOS A* describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
10.1 – 20.0	*LOS B* describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
20.1 – 35.0	*LOS C* describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
35.1 – 55.0	*LOS D* describes operations with high delay, resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.
55.1 – 80.0	*LOS E* is considered the limit of acceptable delay. Individual cycle failures are frequent occurrences.
>80.0	*LOS F* describes a condition of excessively high delay, considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the LOS D capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.

Source: Highway Capacity Manual 2010

5.3.2 Unsignalized Intersection Analysis

Unsignalized intersections, including two-way and all-way stop controlled intersections were analyzed using the HCM 2010 (Section 10) unsignalized intersection analysis methodology. The LOS for a two-way stop-controlled intersection is determined by the computed or measured control delay and is defined for each minor movement. Table 5-4 summarizes the LOS criteria utilized for unsignalized intersection analyses.

Table 5-4. Unsignalized Intersection Level of Service

Average Control Delay (sec/veh)	LOS
≤10	A
>10 and ≤15	B
>15 and ≤25	C
>25 and ≤35	D
>35 and ≤50	E
>50	F

Source: Highway Capacity Manual 2010

5.4 Multimodal Level of Service Analysis

As previously mentioned, the methodologies put forth by HCM 6 were used to assess the LOS performance of bicycle, transit and pedestrian modes of transportation along LCR. Table 5-5 displays the LOS criteria and thresholds for bicycle, transit, and pedestrian facilities. Figure 5-1 displays the Integrated Multimodal Evaluation Framework underlying the methodology. The factors affecting the LOS of bicycle, transit, and pedestrian modes are:

- Bicycle LOS: Mainly affected by length of link between signalized intersections and number of access points the cyclist must cross along with level of comfort in traversing facility.
- Transit LOS: Based on number and spacing of transit stops and frequency of buses/hour or headway.
- Pedestrian LOS: Mainly affected by pedestrian traffic volume and speed. Also, conflicts with other modes and distance from vehicular traffic affects the LOS.
- Vehicle LOS: Mainly affected by length of link between signalized intersections and number of access points the motorist must travel along with level of comfort in traversing facility. The LOS is based on travel speed.

Table 5-5. Bicycle, Transit and Pedestrian LOS

LOS	LOS Score
A	<=2.00
B	>2.00 – 2.75
C	>2.76 – 3.50
D	>3.51 – 4.25
E	>4.26 – 5.00

Source: Mineta Transportation Institute (MTI)

Table 5-6 displays the inputs used to assess the LOS criteria for pedestrian facilities. LOS score is determined based on Pedestrian Exposure to Traffic at Signalized Intersections (PETSI) and modal conflicts. Table 5-7 shows the inputs used to assess the LOS criteria for Bicycle facilities. LOS score is determined based on Levels of Traffic Stress (LTS).

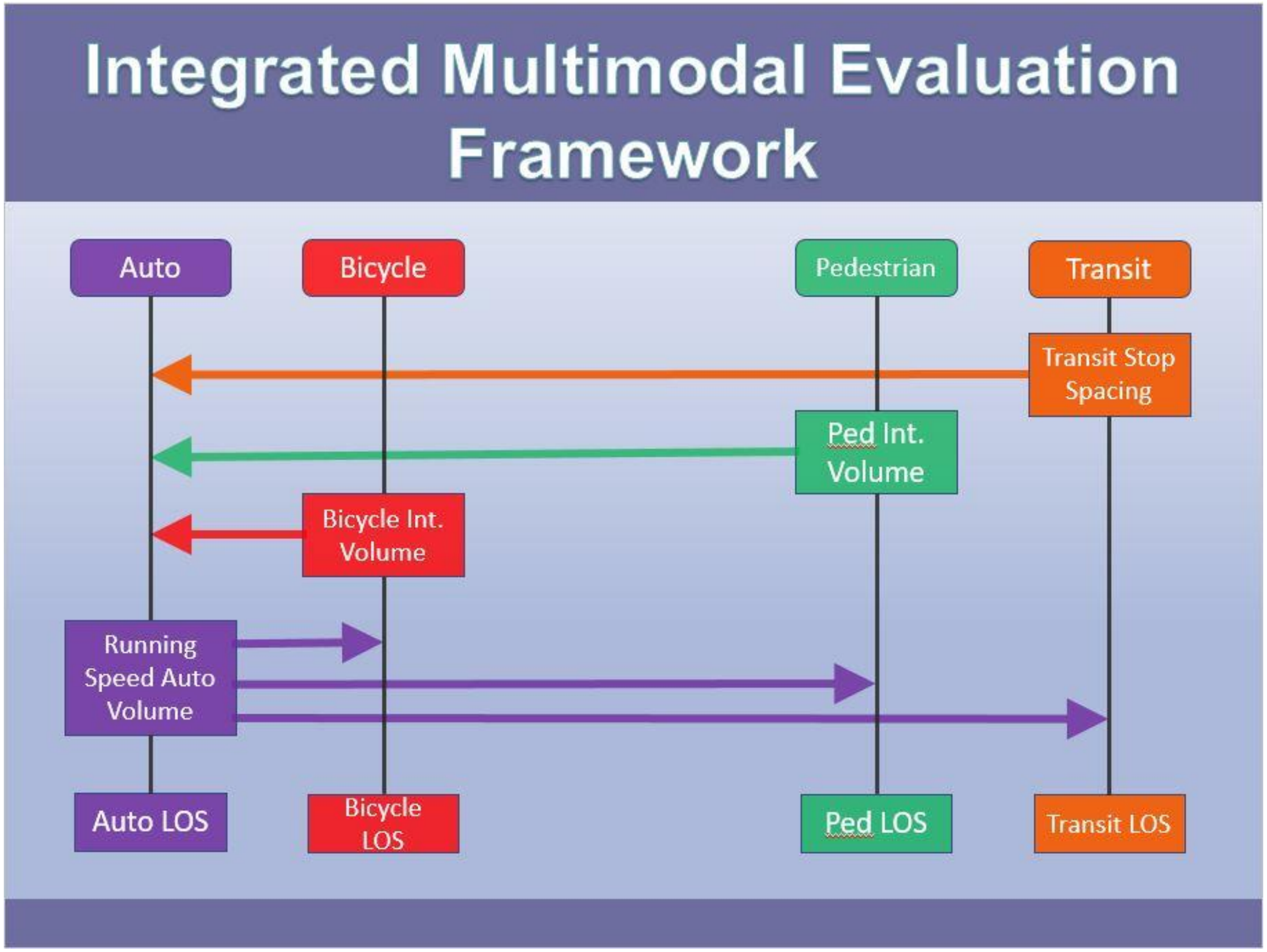
Table 5-6. Pedestrian Level of Service Inputs

Segments	Intersections
Sidewalks and Parkway Widths	Crossing Width
Vehicle Volumes	Corner Radius
Vehicle Speeds	Potential Conflicts
Physical Separation	Visibility
-	Delay
Source: Mineta Transportation Institute (MTI)	

Table 5-7. Bicycle Level of Service Inputs

Segments	Intersections
Facility Characteristics	Conflicts with turning vehicles
Street Width	Impediments/accommodations
Vehicle Speeds	Accessibility
Parking and Blockages	Parking Adjacent
-	Perceived Safety
Source: Mineta Transportation Institute (MTI)	

Figure 5-1. Multimodal Evaluation Framework



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6 Traffic Engineering Performance Assessment Findings

This section discusses operational performance of study intersections and roadway segments along LCR under Existing, Opening Year (2030), and Horizon Year (2050).

6.1 Existing Year (2017) Conditions

This section presents the results of LOS analysis for study intersections and highway segments along LCR under existing conditions. The methodologies used to perform the analysis are previously described in Section 5.

6.1.1 Highway Analysis

Table 6-1 displays highway analysis results for segments along LCR under existing conditions. As shown, all the study segments currently operate at acceptable LOS E or better under existing conditions. HCM 2010 analysis worksheets are presented in Appendix E.

Table 6-1. Highway Analysis: Existing 2017 Conditions

ID	Highway	From	To	AM Peak Hour		PM Peak Hour	
				ATS (mph) / PTSF (%)	LOS	ATS (mph) / PTSF (%)	LOS
Laguna Canyon Road (Northbound)							
1	LCR/SR-133	El Toro Road	Sun Valley Drive	28.9 / 88.9	E	26.0 / 94.5	E
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	28.9 / 88.5	E	25.9 / 94.4	E
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	29.0 / 88.4	E	26.1 / 93.9	E
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	28.7 / 89.5	E	25.9 / 93.8	E
Laguna Canyon Road (Southbound)							
1	LCR/SR-133	El Toro Road	Sun Valley Drive	28.7 / 92.9	E	26.1 / 93.1	E
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	28.6 / 93.6	E	26.0 / 93.3	E
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	28.8 / 93.2	E	26.1 / 93.4	E
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	28.5 / 93.1	E	26.0 / 93.6	E

ATS = Average Travel Speed (miles per hour)
PTSF = Percent Time Spent Following
LOS = Level of Service

6.1.2 Intersection LOS Analysis

Table 6-2 displays intersection LOS and average vehicle delay results for study intersections under Existing Conditions. The LOS worksheets for the Existing Conditions analysis are presented in Appendix F. As shown in Table 6-2, all study area intersections currently operate at acceptable LOS of E or better under existing conditions, except the following which operate at LOS F:

- SR-133 at Anneliese's School Driveway, during AM Peak Hour
- SR-133 at Laguna College of Arts & Design Driveway, during AM Peak Hour
- SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway, during AM and PM Peak Hours

Table 6-2. Intersection Analysis: Existing 2017 Conditions

ID	Intersection	Existing Traffic Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	LCR/SR-133 at El Toro Road	Signalized	26.3	C	19.4	B
2	LCR/SR-133 at Anneliese's School Driveway	Stop-Controlled	>50	**F**	35.6	E
3	LCR/SR-133 at Sun Valley Drive	Stop-Controlled	28.8	D	28.7	D
4	LCR/SR-133 at Laguna Beach Dog Park Driveway	Stop-Controlled	26.2	D	27.9	D
5	LCR/SR-133 at Stan Oaks Drive	Stop-Controlled	26.1	D	27.9	D
6	LCR/SR-133 at Castle Rock Road	Stop-Controlled	27.1	D	28.3	D
7	LCR/SR-133 at Laguna College of Arts & Design Driveway	Stop-Controlled	73.2	**F**	28.4	D
8	LCR/SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway	Stop-Controlled	>50	**F**	>50	**F**
9	LCR/SR-133 at Canyon Acres Drive	Signalized	3.8	A	3.3	A

LOS = Level of Service
Intersection operation is expressed in average seconds of delay (sec/veh) for HCM methodology.
Bold: LOS F

6.1.3 Intersection Control

Considering the high traffic volumes along LCR (SR-133) and inadequate Levels of Service at three of the study intersections, a preliminary peak hour warrant analysis was conducted. The results of warrant analysis indicated that three stop-controlled study intersections, listed below, meet the thresholds of peak hour warrant:

- SR-133 at Anneliese's School Driveway, during AM Peak Hour

- SR-133 at Laguna College of Arts & Design Driveway, during AM Peak Hour
- SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway, during AM Peak Hour

It should be noted that the recommendation of a traffic signal at an intersection should not be merely based on peak hour warrant analysis. Satisfying the thresholds of peak hour warrant does however indicate the need for further warrant analysis. As described in Section 8, further warrant analysis such as the Eight-Hour and pedestrian volume warrants are required to be performed to have a better understanding of the need for a traffic signal at these intersections.

6.2 Opening Year (2030) Conditions

This section presents the results of LOS analysis for study intersections and roadway segments along LCR under Opening Year (2030) conditions. The methodologies used to perform the analysis are previously described in Section 5.

6.2.1 Highway Analysis

Table 6-3 and Table 6-4 display highway analysis results for segments along LCR under Opening Year (2030) No Build and Build conditions. The highway LOS worksheets are presented in Appendix G. As shown in Table 6-3 and Table 6-4, all the study area highway segments operate at LOS F under Opening Year (2030) No Build and Build, Alternatives 1 to 4, conditions. Under Build Alternative 5 conditions, southbound during AM peak and northbound during PM peak, the peak direction operate at LOS C with two-lane configuration utilizing the center reversible lane.

Table 6-3. Highway Analysis: Opening Year 2030 No Build and Build Conditions- Alternatives 1 to 4

ID	Highway	From	To	AM Peak Hour		PM Peak Hour	
				ATS (mph) / PTSF (%)	LOS	ATS (mph) / PTSF (%)	LOS
Laguna Canyon Road (Northbound)							
1	LCR/SR-133	El Toro Road	Sun Valley Drive	22.6 / 94.1	**F**	17.4 / 99.7	**F**
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	22.2 / 94.1	**F**	17.0 / 100.0	**F**
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	21.9 / 94.8	**F**	17.1 / 99.1	**F**
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	21.8 / 94.9	**F**	17.0 / 99.1	**F**
Laguna Canyon Road (Southbound)							
1	LCR/SR-133	El Toro Road	Sun Valley Drive	22.4 / 99.1	**F**	17.4 / 98.1	**F**
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	22.0 / 99.9	**F**	17.1 / 98.2	**F**
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	21.7 / 99.6	**F**	17.1 / 98.4	**F**
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	21.5 / 99.5	**F**	17.0 / 98.4	**F**

ATS = Average Travel Speed (miles per hour)
PTSF = Percent Time Spent Following
LOS = Level of Service, **Bold** = LOS F

Table 6-4. Highway Analysis: Opening Year 2030 Build Conditions- Alternative 5

ID	Highway	From	To	AM Peak Hour		PM Peak Hour	
				ATS (mph) / PTSF (%) or D (pc/mi/ln)*	LOS	ATS (mph) / PTSF (%) or D (pc/mi/ln)*	LOS
Laguna Canyon Road (Northbound)							
1	LCR/SR-133	El Toro Road	Sun Valley Drive	25.7 / 80.5	**F**	50.0 / 23.6	C
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	25.2 / 80.1	**F**	50.0 / 24.1	C
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	25.1 / 81.3	**F**	50.0 / 23.3	C
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	25.1 / 81.6	**F**	50.0 / 23.3	C
Laguna Canyon Road (Southbound)							
1	LCR/SR-133	El Toro Road	Sun Valley Drive	50.0 / 21.2	C	21.9 / 88.3	**F**
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	50.0 / 21.8	C	21.4 / 88.2	**F**
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	50.0 / 21.7	C	21.9 / 89.1	**F**
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	50.0 / 22.2	C	21.8 / 89.3	**F**

ATS = Average Travel Speed (miles per hour)
PTSF = Percent Time Spent Following; D = Density
LOS = Level of Service, **Bold** = LOS F
* Density was applied to the southbound during the PM peak and northbound during the AM peak as the reversible lane require multi-lane highways methodology

6.2.2 Intersection LOS Analysis

6.2.2.1 Alternative 1 (No Build)

Under the No build alternative, the roadway network and lane configurations were assumed to remain the same as the existing conditions. Table 6-5 displays intersection LOS and average vehicle delay results for Study Area intersections under Opening Year (2030) No Build Conditions. The LOS worksheets for the Opening Year (2030) No Build Conditions analysis are presented in Appendix H. As shown in Table 6-5, all study area intersections operate at acceptable LOS of E or better under existing conditions, except the following which operate at LOS F.

- SR-133 at Anneliese's School Driveway, during AM and PM Peak Hours
- SR-133 at Stan Oaks Drive, during PM Peak Hour
- SR-133 at Castle Rock Road, during PM Peak Hour
- SR-133 at Laguna College of Arts and Design Driveway, during AM and PM Peak Hours
- SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway, during AM and PM Peak Hours

Table 6-5. Intersection Analysis: Opening Year 2030 No Build Conditions

ID	Intersection	Existing Traffic Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	LCR/SR-133 at El Toro Road	Signalized	34.6	C	23.2	C
2	LCR/SR-133 at Anneliese's School Driveway	Stop-Controlled	>50	**F**	>50	**F**
3	LCR/SR-133 at Sun Valley Drive	Stop-Controlled	44.0	E	49.1	E
4	LCR/SR-133 at Laguna Beach Dog Park Driveway	Stop-Controlled	45.6	E	47	E
5	LCR/SR-133 at Stan Oaks Drive	Stop-Controlled	43.6	E	>50	**F**
6	LCR/SR-133 at Castle Rock Road	Stop-Controlled	45.9	E	>50	**F**
7	LCR/SR-133 at Laguna College of Arts & Design Driveway	Stop-Controlled	>50	**F**	>50	**F**
8	LCR/SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway	Stop-Controlled	>50	**F**	>50	**F**
9	LCR/SR-133 at Canyon Acres Drive	Signalized	4.5	A	3.9	A

LOS = Level of Service
Intersection operation is expressed in average seconds of delay (sec/veh) for HCM methodology.
Bold: LOS F

6.2.2.2 Alternatives 2, 3, 4 (Build)

Under Existing (2017) condition, the following three intersections met the peak hour warrant thresholds during AM peak hour:

- SR-133 at Anneliese's School Driveway
- SR-133 at Laguna College of Arts & Design Driveway
- SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway

At the intersection of LCR with Anneliese's School driveway, the peak hour typically occurs before the school starts and after the school dismisses. Traffic entering and exiting Anneliese's School is expected to be minimal for the rest time periods. To avoid the interruption of the traffic flow along LCR, the intersection of SR-133 with Anneliese's School driveway remains stop-controlled intersection under the future build conditions. To reflect the worst-case scenario with low left turn movement volumes at this driveway, the driveway is analyzed with left turn movement allowed under Build Alternatives 2 to 4.

Installation of a traffic signal is not recommended at intersection of LCR with Act V/City Maintenance Yard Facility Parking Lot Driveway due to the close proximity to the Canyon Acres Road intersection located immediately to the south. Therefore, the intersection of LCR with Act V/City Maintenance Facility Yard Parking Lot Driveway was analyzed as a stop-controlled intersection under the future build conditions.

At the intersections of LCR with Laguna College of Arts & Design driveway, traffic entering and exiting the driveway are expected to spread throughout the day. To provide adequate gaps for left turning traffic and safe access in and out of the driveway, the intersection was analyzed as signalized intersection under the future year Build Alternatives 2 to 4 conditions. This intersection was analyzed as a stop-controlled intersection under the Build Alternative 5 with the worst-case peak season volumes. The existing signalized High-Intensity Activated Crosswalk Beacon (HAWK) is located 250 feet upstream of this intersection. Under Build Alternatives 2 to 4 conditions with the signalization at the intersection of LCR and Laguna College of Arts & Design driveway, the HAWK signal is recommended to be removed and a pedestrian crossing walk at this signalized intersection is recommended to be added. Under Build Alternative 5, the HAWK signal is recommended to remain as is. Decisions on the signalization at the intersection of LCR with Laguna College of Arts & Design driveway and removal of the HAWK signal is deferred to the PA/ED Phase for further evaluation.

The intersections at El Toro Road and Canyon Acres Drive would remain as a signalized intersection in all the Build scenarios.

Table 6-6 displays intersection LOS and average vehicle delay results for all study intersections under the Opening Year (2030) Build Alternatives 2 to 4 conditions. As shown, all study area intersections operate at acceptable LOS of E or better under Opening Year (2030) Build Alternatives 2 to 4 conditions, except the following which are expected to operate at LOS F.

- SR-133 at Anneliese's School Driveway, during AM and PM Peak Hours

- SR-133 at Stan Oaks Drive, during PM Peak Hour
- SR-133 at Castle Rock Road, during PM Peak Hour
- SR-133 at Laguna College of Arts and Design Driveway, during AM Peak Hour
- SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway, during AM and PM Peak Hours

The LOS worksheets for the Opening Year (2030) Build Alternatives 2 to 4 analyses are presented in Appendix H.

Table 6-6. Intersection Analysis: Opening Year 2030 Build Conditions – Alternatives 1 to 4

ID	Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	LCR/SR-133 at El Toro Road	Signalized	34.6	C	23.2	C
2	LCR/SR-133 at Anneliese's School Driveway	Stop-Controlled	>50	**F**	>50	**F**
3	LCR/SR-133 at Sun Valley Drive	Stop-Controlled	44	E	49.1	E
4	LCR/SR-133 at Laguna Beach Dog Park Driveway	Stop-Controlled	45.6	E	47	E
5	LCR/SR-133 at Stan Oaks Drive	Stop-Controlled	43.6	E	>50	**F**
6	LCR/SR-133 at Castle Rock Road	Stop-Controlled	45.9	E	>50	**F**
7	LCR/SR-133 at Laguna College of Arts & Design Driveway	Signalized*****	>80	**F**	51	D
8	LCR/SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway	Stop-Controlled	>50	**F**	>50	**F**
9	LCR/SR-133 at Canyon Acres Drive	Signalized	4.5	A	3.9	A

LOS = Level of Service
Intersection operation is expressed in average seconds of delay (sec/veh) for HCM methodology.
Bold: LOS F
* Proposed Traffic Control

6.2.2.3 Alternatives 5 (Build)

As discussed in Section 4.1, the reversible lane would be operational for southbound traffic during the AM peak period and northbound during the PM peak period. With the center TWLTL being a reversible lane during the peak hours, left turn movements are prohibited at all the intersections and driveways between Anneliese's School Driveway and Act V/City Maintenance Facility Yard Parking Lot Driveway within the project limits. Therefore, the intersections of SR-133 with Laguna College of Arts & Design driveway was analyzed as a stop-controlled intersection.

Table 6-7 displays intersection LOS and average vehicle delay results for all study intersections under the Opening Year (2030) Build Alternative 5 conditions. As shown, all study area intersections operate at acceptable LOS of E or better under Opening Year (2030) Build conditions, except the following which are expected to operate at LOS F.

- SR-133 at Anneliese's School Driveway, during AM Peak Hour
- SR-133 at Laguna College of Arts and Design Driveway, during PM Peak Hour
- SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway, during AM and PM Peak Hours

The LOS worksheets for the Opening Year (2030) Build Alternative 5 analysis are presented in Appendix H.

Table 6-7. Intersection Analysis: Opening Year 2030 Build Conditions – Alternative 5

ID	Intersection	Existing Traffic Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	LCR/SR-133 at El Toro Road	Signalized	39.4	D	25.3	C
2	LCR/SR-133 at Anneliese's School Driveway	Stop-Controlled	>50	**F**	34.9	D
3	LCR/SR-133 at Sun Valley Drive	Stop-Controlled	49.3	E	20.2	C
4	LCR/SR-133 at Laguna Beach Dog Park Driveway	Stop-Controlled	49.5	E	19.6	C
5	LCR/SR-133 at Stan Oaks Drive	Stop-Controlled	49.3	E	20.3	C
6	LCR/SR-133 at Castle Rock Road	Stop-Controlled	>50	E	20.5	C
7	LCR/SR-133 at Laguna College of Arts & Design Driveway	Stop-Controlled	33.9	D	>80	**F**
8	LCR/SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway	Stop-Controlled	>50	**F**	>50	**F**
9	LCR/SR-133 at Canyon Acres Drive	Signalized	7.2	A	4.9	A

LOS = Level of Service
Intersection operation is expressed in average seconds of delay (sec/veh) for HCM methodology.
Bold: LOS F

6.2.3 Multimodal LOS Analysis

6.2.3.1 Alternative 1 (No Build)

Table 6-8 displays the results of multimodal analysis under the Opening Year (2030) Alternative 1 (No Build) conditions. As shown, transit and pedestrian modes operate at satisfactory LOS E or better, while vehicle and bicycle modes operate at LOS F.

Table 6-8. 2030 Alt 1 Multimodal LOS

Mode	Score	LOS
Laguna Canyon Rd/SR-133 (Northbound)		
Vehicle	17 MPH	**F**
Transit	4.5	E
Bicycle	5.5	**F**
Pedestrian	4.0	D
Laguna Canyon Rd/SR-133 (Southbound)		
Vehicle	17 MPH	**F**
Transit	4.5	E
Bicycle	5.5	**F**
Pedestrian	4.0	D
MPH: Miles per Hour - LOS = Level of Service - **Bold**: LOS F		

6.2.3.2 Alternative 2

Table 6-9 displays the results of multimodal analysis under the Opening Year (2030) Alternative 2 conditions. As shown, transit, pedestrian, and bicycle modes operate at satisfactory LOS E or better, while vehicle mode operates at LOS F.

Table 6-9. 2030 Alt 2 Multimodal LOS

Mode	Score	LOS
Laguna Canyon Rd/SR-133 (Northbound)		
Vehicle	17 MPH	**F**
Transit	2.6	B
Bicycle	1.0	A
Pedestrian	2.0	A
Laguna Canyon Rd/SR-133 (Southbound)		
Vehicle	17 MPH	**F**
Transit	2.3	B
Bicycle	1.0	A
Pedestrian	N/A	N/A
MPH: Miles per Hour - LOS = Level of Service - **Bold**: LOS F		

6.2.3.3 Alternative 3

Table 6-10 displays the results of multimodal analysis under the Opening Year (2030) Alternative 3 conditions. As shown, transit, pedestrian, and bicycle modes operate at satisfactory LOS E or better, while vehicle mode operates at LOS F.

Table 6-10. 2030 Alt 3 Multimodal LOS

Mode	Score	LOS
Laguna Canyon Rd/SR-133 (Northbound)		
Vehicle	17 MPH	**F**
Transit	2.0	A
Bicycle	2.5	B
Pedestrian	1.5	A
Laguna Canyon Rd/SR-133 (Southbound)		
Vehicle	17 MPH	**F**
Transit	2.8	C
Bicycle	1.5	A
Pedestrian	1.5	A
MPH: Miles per Hour - LOS = Level of Service - **Bold**: LOS F		

6.2.3.4 Alternative 4

Table 6-11 displays the results of multimodal analysis under the Opening Year (2030) Alternative 4 conditions. As shown, transit, pedestrian, and bicycle modes operate at satisfactory LOS E or better, while vehicle mode operates at LOS F.

Table 6-11. 2030 Alt 4 Multimodal LOS

Mode	Score	LOS
Laguna Canyon Rd/SR-133 (Northbound)		
Vehicle	17 MPH	**F**
Transit	2.0	A
Bicycle	1.8	A
Pedestrian	1.5	A
Laguna Canyon Rd/SR-133 (Southbound)		
Vehicle	17 MPH	**F**
Transit	2.0	A
Bicycle	1.8	A
Pedestrian	1.5	A
MPH: Miles per Hour - LOS = Level of Service - **Bold**: LOS F		

6.2.3.5 Alternative 5

Table 6-12 displays the results of multimodal analysis under the Opening Year (2030) Alternative 5 conditions. As shown, transit, pedestrian, and bicycle modes operate at satisfactory LOS E or better, while vehicle mode operates at LOS F for the off-peak direction which represents the worst-case scenario.

Table 6-12. 2030 Alt 5 Multimodal LOS

Mode	Score	LOS
Laguna Canyon Rd/SR-133 (Northbound)		
Vehicle	25.1 MPH	**F**
Transit	2.2	B
Bicycle	2.0	A
Pedestrian	1.5	A
Laguna Canyon Rd/SR-133 (Southbound)		
Vehicle	21.4 MPH	**F**
Transit	2.2	B
Bicycle	2.0	A
Pedestrian	1.5	A
MPH: Miles per Hour LOS = Level of Service **Bold**: LOS F		

6.3 Horizon Year (2050) Conditions

This section presents the results of LOS analysis for study intersections and highway segments along LCR under Horizon Year (2050) conditions. The methodologies used to perform the analysis are previously described in Section 5.

6.3.1 Highway Analysis

Table 6-13 displays highway analysis results for segments along LCR under Horizon Year (2050) No Build and Build conditions. The highway LOS worksheets are presented in Appendix I. As shown in Table 6-13, all the study area highway segments operate at LOS F under Horizon Year (2050) No Build and Build, Alternatives 1 to 4, conditions. Under Build Alternative 5 conditions, the peak direction, southbound during AM peak and northbound during PM peak, operate at LOS D with two-lane lane configuration utilizing the center reversible lane.

Table 6-13. Highway Analysis: Horizon Year 2050 No Build and Build Conditions – Alternatives 1 to 4

ID	Highway	From	To	AM Peak Hour		PM Peak Hour	
				ATS (mph) / PTSF (%)	LOS	ATS (mph) / PTSF (%)	LOS
Laguna Canyon Rd/SR-133 (Northbound)							
1	LCR/SR-133	El Toro Road	Sun Valley Drive	14.5 / 98.2	**F**	6.5 / 100	**F**
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	13.6 / 98.3	**F**	5.6 / 100	**F**
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	12.7 / 99.0	**F**	5.7 / 100	**F**
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	12.7 / 99.0	**F**	5.7 / 100	**F**
Laguna Canyon Rd/SR-133 (Southbound)							
1	LCR/SR-133	El Toro Road	Sun Valley Drive	14.5 / 100	**F**	6.5 / 100	**F**
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	13.6 / 100	**F**	5.7 / 100	**F**
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	12.7 / 100	**F**	5.7 / 100	**F**
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	12.5 / 100	**F**	5.7 / 100	**F**

ATS = Average Travel Speed (miles per hour)
PTSF = Percent Time Spent Following
LOS = Level of Service
Bold = LOS F

Table 6-14. Highway Analysis: Horizon Year 2050 Build Conditions – Alternative 5

ID	Highway	From	To	AM Peak Hour		PM Peak Hour	
				ATS (mph) / PTSF (%) or D (pc/mi/ln)*	LOS	ATS (mph) / PTSF (%) or D (pc/mi/ln)*	LOS
Laguna Canyon Rd/SR-133 (Northbound)							
1	LCR/SR-133	El Toro Road	Sun Valley Drive	18.4 / 86.7	**F**	29.1 / 32.9	D
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	17.5 / 86.5	**F**	48.7 / 34.5	D
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	17.0 / 88.3	**F**	49.1 / 32.9	D
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	17.0 / 88.3	**F**	49.1 / 32.9	D
Laguna Canyon Rd/SR-133 (Southbound)							
1	LCR/SR-133	El Toro Road	Sun Valley Drive	50.0 / 28.4	D	12.4 / 94.5	**F**
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	49.7 / 29.8	D	11.4 / 94.4	**F**
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	49.7 / 29.8	D	12.0 / 96.9	**F**
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	49.7 / 29.8	D	12.0 / 96.9	**F**

ATS = Average Travel Speed (miles per hour); LOS = Level of Service
PTSF = Percent Time Spent Following; D = Density
Bold = LOS F
* Density was applied to the southbound during the PM peak and northbound during the AM peak

6.3.2 Intersection LOS Analysis

6.3.2.1 Alternative 1 (No Build)

Under the No build alternative, the roadway network and lane configurations were assumed to remain the same as the Existing conditions. Table 6-15 displays intersection LOS and average vehicle delay results for Study Area intersections under Horizon Year (2050) Conditions. The LOS worksheets for the Horizon Year (2050) No build analysis are presented in Appendix J. As shown, study area intersections operate at acceptable LOS of E or better under Horizon Year (2050) No Build conditions, except the following which operate at LOS F during AM and PM peak hours:

- SR-133 at Anneliese’s School Driveway, during AM and PM Peak Hours
- SR-133 at Sun Valley Drive, during AM and PM Peak Hours
- SR-133 at Laguna Beach Dog Park Driveway, during AM and PM Peak Hours
- SR-133 at Stan Oaks Drive, during AM and PM Peak Hours
- SR-133 at Castle Rock Road, during AM and PM Peak Hours
- SR-133 at Laguna College of Arts and Design Driveway, during AM and PM Peak Hours
- SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway, during AM and PM Peak Hours

Table 6-15. Intersection Analysis: Horizon Year 2050 No Build Conditions

ID	Intersection	Existing Traffic Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	LCR/SR-133 at El Toro Road	Signalized	67.3	**E**	43.5	D
2	LCR/SR-133 at Anneliese's School Driveway	Stop-Controlled	> 50	**F**	>50	**F**
3	LCR/SR-133 at Sun Valley Drive	Stop-Controlled	>50	**F**	>50	**F**
4	LCR/SR-133 at Laguna Beach Dog Park Driveway	Stop-Controlled	>50	**F**	>50	**F**
5	LCR/SR-133 at Stan Oaks Drive	Stop-Controlled	>50	**F**	>50	**F**
6	LCR/SR-133 at Castle Rock Road	Stop-Controlled	>50	**F**	>50	**F**
7	LCR/SR-133 at Laguna College of Arts & Design Driveway	Stop-Controlled	>50	**F**	>50	**F**
8	LCR/SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway	Stop-Controlled	> 50	**F**	> 50	**F**
9	LCR/SR-133 at Canyon Acres Drive	Signalized	5.5	A	4.9	A

LOS = Level of Service; **Bold**: LOS F

Intersection operation is expressed in average seconds of delay (sec/veh) for HCM methodology.

6.3.2.2 Alternatives 2, 3, 4 (Build)

Table 6-16 displays intersection LOS and average vehicle delay results for all study intersections under the Horizon Year (2050) Build Alternatives 2 to 4 conditions. Intersection control assumptions for Horizon Year (2050) Build Alternatives 2 to 4 conditions remain the same as Opening Year (2030) Build Alternatives 2 to 4 conditions as described in Section 6.2.2.2. As shown, all study area intersections operate at LOS F under Horizon Year (2050) Build Alternatives 2 to 4 conditions during the AM and PM peak hours except the intersection of SR-133/El Toro Road which operates at LOS E and LOS D during the AM and the PM peak hour respectively and the intersection at Canyon Acres Drive which operates at LOS A during the AM and PM peak hours. The LOS worksheets for the Horizon Year (2050) Build Alternative analysis are presented in Appendix J.

Table 6-16. Intersection Analysis: Horizon Year 2050 Build Conditions – Alternatives 1 to 4

ID	Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	LCR/SR-133 at El Toro Road	Signalized	67.3	**E**	43.5	D
2	LCR/SR-133 at Anneliese's School Driveway	Stop-Controlled	> 50	**F**	>50	**F**
3	LCR/SR-133 at Sun Valley Drive	Stop-Controlled	>50	**F**	>50	**F**
4	LCR/SR-133 at Laguna Beach Dog Park Driveway	Stop-Controlled	>50	**F**	>50	**F**
5	LCR/SR-133 at Stan Oaks Drive	Stop-Controlled	>50	**F**	>50	**F**
6	LCR/SR-133 at Castle Rock Road	Stop-Controlled	>50	**F**	>50	**F**
7	LCR/SR-133 at Laguna College of Arts & Design Driveway	Signalized*****	>80	**F**	>80	**F**
8	LCR/SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway	Stop-Controlled	> 50	**F**	> 50	**F**
9	LCR/SR-133 at Canyon Acres Drive	Signalized	5.5	A	4.9	A

LOS = Level of Service
Intersection operation is expressed in average seconds of delay (sec/veh) for HCM methodology.
Bold: LOS F
* Proposed Traffic Control

6.3.2.3 Alternatives 5 (Build)

Table 6-17 displays intersection LOS and average vehicle delay results for all study intersections under the Horizon Year (2050) Build Alternative 5 conditions. Intersection control assumptions for Horizon Year (2050) Build Alternative 5 conditions remain the same as Opening Year (2030) Build Alternative 5 conditions as described in Section

6.2.2.2. As shown, all study area intersections operate at acceptable LOS of E or better under Horizon Year (2050) Build Alternative 5 conditions, except the following intersections which are expected to operate at LOS F.

- SR-133 at El Toro Road, during AM Peak Hour
- SR-133 at Anneliese's School Driveway, during AM and PM Peak Hours
- SR-133 at Sun Valley Drive, during AM Peak Hour
- SR-133 at Laguna Beach Dog Park Driveway, during AM Peak Hour
- SR-133 at Stan Oaks Drive, during PM Peak Hour
- SR-133 at Castle Rock Road, during PM Peak Hour
- SR-133 at Laguna College of Arts and Design Driveway, during AM and PM Peak Hours
- SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway, during AM and PM Peak Hours

The LOS worksheets for the Horizon Year (2050) Build Alternative 5 analysis are presented in Appendix J.

Table 6-17. Intersection Analysis: Horizon Year 2050 Build Conditions – Alternative 5

ID	Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	LCR/SR-133 at El Toro Road	Signalized	>80	**F**	53.4	D
2	LCR/SR-133 at Anneliese's School Driveway	Stop-Controlled	> 50	**F**	>50	**F**
3	LCR/SR-133 at Sun Valley Drive	Stop-Controlled	>50	**F**	28	D
4	LCR/SR-133 at Laguna Beach Dog Park Driveway	Stop-Controlled	>50	**F**	27	D
5	LCR/SR-133 at Stan Oaks Drive	Stop-Controlled	>50	**F**	28.4	D
6	LCR/SR-133 at Castle Rock Road	Stop-Controlled	>50	**F**	28.8	D
7	LCR/SR-133 at Laguna College of Arts & Design Driveway	Stop-Controlled	>50	**F**	>50	**F**
8	LCR/SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway	Stop-Controlled	> 50	**F**	> 50	**F**
9	LCR/SR-133 at Canyon Acres Drive	Signalized	4.5	A	3.9	A

LOS = Level of Service; **Bold**: LOS F;
Intersection operation is expressed in average seconds of delay (sec/veh) for HCM methodology.

6.3.3 Multimodal LOS Analysis

6.3.3.1 Alternative 1 (No Build)

Table 6-18 displays the results of multimodal analysis under the Horizon Year (2050) Alternative 1 (No Build) conditions. As shown, transit and pedestrian modes operate at satisfactory LOS E or better, while vehicle and bicycle modes operate at LOS F.

Table 6-18. 2050 Alt 1 Multimodal LOS

Mode	Score	LOS
Laguna Canyon Rd/SR-133 (Northbound)		
Vehicle	5.6 MPH	**F**
Transit	4.5	**E**
Bicycle	5.5	**F**
Pedestrian	4.0	D
Laguna Canyon Rd/SR-133 (Southbound)		
Vehicle	5.6 MPH	**F**
Transit	4.5	**E**
Bicycle	5.5	**F**
Pedestrian	4.0	D
MPH: Miles per Hour - LOS = Level of Service - **Bold**: LOS F		

6.3.3.2 Alternative 2

Table 6-19 displays the results of multimodal analysis under the Horizon Year (2050) Alternative 2 conditions. As shown, transit, pedestrian, and bicycle modes operate at satisfactory LOS E or better, while vehicle mode operates at LOS F.

Table 6-19. 2050 Alt 2 Multimodal LOS

Mode	Score	LOS
Laguna Canyon Rd/SR-133 (Northbound)		
Vehicle	5.6 MPH	**F**
Transit	2.6	B
Bicycle	1.0	A
Pedestrian	2.0	A
Laguna Canyon Rd/SR-133 (Southbound)		
Vehicle	5.6 MPH	**F**
Transit	2.3	B
Bicycle	1.0	A
Pedestrian	N/A	N/A
MPH: Miles per Hour - LOS = Level of Service - **Bold**: LOS F		

6.3.3.3 Alternative 3

Table 6-20 displays the results of multimodal analysis under the Horizon Year (2050) Alternative 3 conditions. As shown, transit, pedestrian, and bicycle modes operate at satisfactory LOS E or better, while vehicle mode operates at LOS F.

Table 6-20. 2050 Alt 3 Multimodal LOS

Mode	Score	LOS
Laguna Canyon Rd/SR-133 (Northbound)		
Vehicle	5.6 MPH	**F**
Transit	2.0	A
Bicycle	2.5	B
Pedestrian	1.5	A
Laguna Canyon Rd/SR-133 (Southbound)		
Vehicle	5.6 MPH	**F**
Transit	2.8	C
Bicycle	1.5	A
Pedestrian	1.5	A
MPH: Miles per Hour - LOS = Level of Service - **Bold**: LOS F		

6.3.3.4 Alternative 4

Table 6-21 displays the results of multimodal analysis under the Horizon Year (2050) Alternative 4 conditions. As shown, transit, pedestrian, and bicycle modes operate at satisfactory LOS E or better, while vehicle mode operates at LOS F.

Table 6-21. 2050 Alt 4 Multimodal LOS

Mode	Score	LOS
Laguna Canyon Rd/SR-133 (Northbound)		
Vehicle	5.6 MPH	**F**
Transit	2.0	A
Bicycle	1.8	A
Pedestrian	1.5	A
Laguna Canyon Rd/SR-133 (Southbound)		
Vehicle	5.6 MPH	**F**
Transit	2.0	A
Bicycle	1.8	A
Pedestrian	1.5	A
MPH: Miles per Hour - LOS = Level of Service - **Bold**: LOS F		

6.3.3.5 Alternative 5

Table 6-22 displays the results of multimodal analysis under the Horizon Year (2050) Alternative 5 conditions. As shown, transit, pedestrian, and bicycle modes operate at satisfactory LOS E or better, while vehicle mode operates at LOS F for the off-peak direction which represents the worst-case scenario.

Table 6-22. 2050 Alt 5 Multimodal LOS

Mode	Score	LOS
Laguna Canyon Rd/SR-133 (Northbound)		
Vehicle	17 MPH	**F**
Transit	2.2	B
Bicycle	2.0	A
Pedestrian	1.5	A
Laguna Canyon Rd/SR-133 (Southbound)		
Vehicle	11 MPH	**F**
Transit	2.2	B
Bicycle	2.0	A
Pedestrian	1.5	A
MPH: Miles per Hour - LOS = Level of Service - **Bold**: LOS F		

6.4 Intersection Control Evaluation

The Intersection Control Evaluation (ICE) Review process is a fairly recent requirement for state highway modifications. This task requires that the Caltrans Design Coordinator, Design Reviewer, the Headquarter Traffic Liaison, and the FHWA Transportation Engineer (where applicable) review and approve the analysis of each interchange concept and provide input on the preferred traffic control configuration. The goal of this process is to make the decision to implement the most efficient intersection control system or strategy at each location along the state right of way. It is also meant to consider innovative traffic control measures such as roundabouts, single point urban interchanges, diverging diamond interchanges and other measures that reduce the number of signalized intersections being implemented. There also is an increased emphasis on pedestrian and bike access and safety.

The evaluation provided in this Traffic Engineering Performance Assessment report follows the latest Caltrans Intersection Control Evaluation (ICE) Process Informational Guide which follows a two-step process that includes a screening assessment (PSR) followed by design and analysis (PA/ED). The TEPA analysis addressed performance with respect to safety, mobility, and cost for a reasonable range of practical configuration and control alternatives. This process received input from the City regarding traffic control at various locations and the recommendations for several of the intersections ultimately developed along the state highway. Between 2014 and 2015, the City convened a SR-133/Laguna Canyon Road Task Force to review the

Assessment Report, conduct additional public outreach, and conduct technical studies to consider the corridor’s issues and needs, and evaluate alternative improvement concepts. The City task force alternatives analysis and the most recent alternative screening was used as a starting point to identify the intersection control treatments. Finally, recommendations for two intersections were developed based on the analysis that would apply under any of the four Build Alternatives.

The intersection at Laguna College of Arts and Design Driveway is analyzed as a signalized intersection based on the Caltrans ICE Process Informational Guide and preliminary traffic signal warrants analysis under Build Alternatives 2 to 4. With the signalization, it is recommended to remove the existing HAWK signal and add a pedestrian crossing across at the newly signalized intersection. Under Build Alternative 5, the intersection is analyzed as a right-in and right out access due to the reversible lane concept and the HAWK signal is recommended to remain as is. Decisions on the signalization at the intersection of LCR with Laguna College of Arts & Design driveway and removal of the HAWK signal is deferred to the PA/ED Phase for further evaluation.

The intersection at Act V/City Maintenance Yard Facility Parking Lot Driveway meets the thresholds of peak hour signal warrant. Although the intersection was warranted for a traffic signal during the AM peak hour, a traffic signal is not recommended at this location due to the close proximity to the Canyon Acres Road intersection located immediately to the south. Furthermore, the intersection at the Act V Parking Lot Driveway was also considered for a roundabout. A roundabout at this location was determined to be unfeasible due to right-of-way constraints and operationally deficient per the high traffic volumes traversing LCR in contrast to the very low traffic volumes entering and existing the Lot in addition to potential vehicle queuing impacts from the Canyon Acres Road intersection. Therefore, this intersection is recommended to be maintained as a stop-controlled intersection.

7 Summary and Conclusion

This section summarizes the analysis results and findings presented in previous sections of this report. The analysis was performed for roadway segments and intersections within the study area under Existing (2017), Opening Year (2030) and Horizon Year (2050) No Build and Build conditions. The purpose of this analysis was to identify existing operational deficiencies and assess different alternatives and its traffic impacts.

7.1 Existing Conditions

Under Existing conditions all study area highway segments along LCR operate at satisfactory LOS E during both AM and PM peak hours.

The intersection capacity analysis under Existing conditions indicates that most study intersections operate at satisfactory LOS E or better. However, three intersections operate at LOS F.

The three intersections, which operate at LOS F are unsignalized intersections. The three intersections are warranted for a traffic signal based on the peak hour traffic warrant analysis but would require further warrant analysis. All three intersections that operate at LOS F and that are warranted for a traffic signal are listed below.

- SR-133 at Anneliese’s School Driveway, during AM Peak Hour
- SR-133 at Laguna College of Arts and Design Driveway, during AM Peak Hour
- SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway, during AM and PM Peak Hours

7.2 Opening Year (2030) Conditions

Under Opening Year conditions all study area highway segments along LCR operate at LOS F during both AM and PM peak hours. These results were expected given the traffic congestion under existing conditions.

The intersection capacity analysis under Opening Year (2030) No Build indicates that the study intersections operate at LOS E or better with the exception of the following intersections.

- SR-133 at Anneliese’s School Driveway, during AM and PM Peak Hours
- SR-133 at Stan Oaks Drive, during PM Peak Hour
- SR-133 at Castle Rock Road, during PM Peak Hour
- SR-133 at Laguna College of Arts and Design Driveway, during AM and PM Peak Hours
- SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway, during AM and PM Peak Hours

The intersection capacity analysis under Opening Year (2030) Build Alternatives 2 to 4 indicates that the study intersections operate at LOS E or better with the exception of the following intersections.

- SR-133 at Anneliese's School Driveway, during AM and PM Peak Hours
- SR-133 at Stan Oaks Drive, during PM Peak Hour
- SR-133 at Castle Rock Road, during PM Peak Hour
- SR-133 at Laguna College of Arts and Design Driveway, during AM Peak Hour
- SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway, during AM and PM Peak Hours

One more intersection was analyzed as signalized intersection in Opening Year (2030) Build Alternatives 2 to 4 scenarios:

- SR-133 at Laguna College of Arts and Design Driveway

The intersection capacity analysis under Opening Year (2030) Build Alternative 5 indicates that the study intersections operate at LOS E or better with the exception of the following intersections. Due to the reversible lane concept, the unsignalized intersections between Anneliese's School Driveway and Act V/City Maintenance Facility Yard Parking Lot Driveway within the project limits including Laguna College of Arts and Design Driveway are analyzed as right-in and right-out accesses under Build Alternative 5.

- SR-133 at Anneliese's School Driveway, during AM Peak Hour
- SR-133 at Laguna College of Arts and Design Driveway, during PM Peak Hour
- SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway, during AM and PM Peak Hours

The multimodal analysis results show improvement in pedestrian, transit and bicycle LOS for all Build alternatives as compared to the No Build due to the addition of bike, pedestrian and transit improvements along the corridor. The LOS results for each of the Build alternatives are similar and no alternative provides a significant advantage over the others. The vehicular LOS remains LOS F for Build Alternatives 2 to 4 since no addition of capacity was proposed for these alternatives. Under Build Alternative 5 conditions, the vehicular LOS are LOS F and C for the off-peak and peak direction, respectively. The peak direction vehicular LOS would improve resulting from the two-lane configuration with the reversible lane conversion.

7.3 Horizon Year (2050) Conditions

Under Horizon Year conditions all study area highway segments along LCR operate at LOS F during both AM and PM peak hours. These results were expected given the traffic congestion under existing conditions.

The intersection capacity analysis under Horizon Year (2050) No Build indicates that most study intersections operate at LOS F. All the intersections operating at LOS F are unsignalized intersections.

One more intersection was analyzed as signalized intersection in Horizon Year (2050) Build Alternatives 2 to 4 scenarios:

- SR-133 at Laguna College of Arts and Design Driveway

The intersection analyzed with signal installation would operate at LOS F during the AM and PM peak hours. All the unsignalized intersections operate at LOS F during both peak periods.

The intersection capacity analysis under Horizon Year (2050) Build Alternative 5 indicates that the study intersections operate at LOS E or better with the exception of the following intersections. Similar to the Opening Year (2030) conditions, the unsignalized intersections between Anneliese's School Driveway and Act V/City Maintenance Facility Yard Parking Lot Driveway within the project limits including Laguna College of Arts and Design Driveway are analyzed as right-in and right-out accesses under Build Alternative 5.

- SR-133 at El Toro Road, during AM Peak Hour
- SR-133 at Anneliese's School Driveway, during AM and PM Peak Hours
- SR-133 at Sun Valley Drive, during AM Peak Hour
- SR-133 at Laguna Beach Dog Park Driveway, during AM Peak Hour
- SR-133 at Stan Oaks Drive, during PM Peak Hour
- SR-133 at Castle Rock Road, during PM Peak Hour
- SR-133 at Laguna College of Arts and Design Driveway, during AM and PM Peak Hours
- SR-133 at Act V/City Maintenance Yard Facility Parking Lot Driveway, during AM and PM Peak Hours

The multimodal analysis results show improvement in pedestrian, transit and bicycle LOS for all Build alternatives as compared to the No Build due to the addition of bike, pedestrian and transit improvements along the corridor. The LOS results for each of the Build alternatives are similar and no alternative provides a significant advantage over the others. The vehicular LOS remains LOS F for Build Alternatives 2 to 4 since no addition of capacity was proposed for these alternatives. Under Build Alternative 5 conditions, the vehicular LOS are LOS F and D for the off-peak and peak direction, respectively. The peak direction vehicular LOS would improve resulting from the two-lane configuration with the reversible lane conversion.

7.4 Comparative Analysis of Alternatives

The No Build and Build, Alternatives 1 to 4, provide one vehicular travel lane in each direction along LCR, thereby adding no capacity compared to existing conditions.

Therefore, vehicular traffic demand was forecast to be the same for No Build and Build, Alternatives 1 to 4, conditions. The No Build and Build, Alternatives 1 to 4, differ only from one another in number, classification, and configuration of pedestrian, bicycle, and transit facilities they provide. Alternative 5 was proposed to focus on the peak season with the worst-case traffic volumes. As mentioned in previous section, the peak direction configurations are proposed to have two lanes during the peak hours using the reversible lane concept. Table 7-1 compares the results of the highway analysis under 2030 and 2050 all scenarios. As shown in the table, the corridor operations for the peak direction under Build Alternative 5 would improve significantly with the reversible lane conversion.

Table 7-2 and Table 7-3 compare years 2030 and 2050 intersection analysis, respectively. As shown in the tables, the intersections service levels would improve at several stop-controlled intersections with the right-in and right-out configuration during the PM peak hour. The traffic operations at the Laguna College of Arts & Design Driveway intersection are expected to improve during the AM and PM peak hours under Build Alternatives 2 to 4 and Build Alternative 5 conditions, respectively.

The multimodal analysis results were compared to evaluate the different alternatives. Table 7-4 compares the results of the multimodal analysis for Alternatives 1, 2, 3, 4, and 5 under Opening Year (2030) and Horizon Year (2050) conditions. The LOS results for each of the Build alternatives are similar and no alternative provides a significant advantage over the others.

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Table 7-1. 2030 and 2050 No Build and Build Highway Analysis Comparison

ID	Highway	From	To	2030 No Build/Build Alternatives 1-4				2030 Build Alternative 5				2050 No Build/Build Alternatives 1-4				2050 Build Alternative 5			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				ATS (mph) / PTSF (%)	LOS	ATS (mph) / PTSF (%)	LOS	ATS (mph) / PTSF (%) or D (pc/mi/ln)*	LOS	ATS (mph) / PTSF (%) or D (pc/mi/ln)*	LOS	ATS (mph) / PTSF (%)	LOS	ATS (mph) / PTSF (%)	LOS	ATS (mph) / PTSF (%) or D (pc/mi/ln)*	LOS	ATS (mph) / PTSF (%) or D (pc/mi/ln)*	LOS
Laguna Canyon Rd/SR-133 (Northbound)																			
1	LCR/SR-133	El Toro Road	Sun Valley Drive	22.6 / 94.1	**F**	17.4 / 99.7	**F**	25.7 / 80.5	**F**	50.0 / 23.6	C	14.5 / 98.2	**F**	6.5 / 100	**F**	18.4 / 86.7	**F**	29.1 / 32.9	D
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	22.2 / 94.1	**F**	17.0 / 100.0	**F**	25.2 / 80.1	**F**	50.0 / 24.1	C	13.6 / 98.3	**F**	5.6 / 100	**F**	17.5 / 86.5	**F**	48.7 / 34.5	D
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	21.9 / 94.8	**F**	17.1 / 99.1	**F**	25.1 / 81.3	**F**	50.0 / 23.3	C	12.7 / 99.0	**F**	5.7 / 100	**F**	17.0 / 88.3	**F**	49.1 / 32.9	D
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	21.8 / 94.9	**F**	17.0 / 99.1	**F**	25.1 / 81.6	**F**	50.0 / 23.3	C	12.7 / 99.0	**F**	5.7 / 100	**F**	17.0 / 88.3	**F**	49.1 / 32.9	D
Laguna Canyon Rd/SR-133 (Southbound)																			
1	LCR/SR-133	El Toro Road	Sun Valley Drive	22.4 / 99.1	**F**	17.4 / 98.1	**F**	50.0 / 21.2	C	21.9 / 88.3	**F**	14.5 / 100	**F**	6.5 / 100	**F**	50.0 / 28.4	D	12.4 / 94.5	**F**
2	LCR/SR-133	Sun Valley Drive	Stan Oaks Drive	22.0 / 99.9	**F**	17.1 / 98.2	**F**	50.0 / 21.8	C	21.4 / 88.2	**F**	13.6 / 100	**F**	5.7 / 100	**F**	49.7 / 29.8	D	11.4 / 94.4	**F**
3	LCR/SR-133	Stan Oaks Drive	LCAD Driveway	21.7 / 99.6	**F**	17.1 / 98.4	**F**	50.0 / 21.7	C	21.9 / 89.1	**F**	12.7 / 100	**F**	5.7 / 100	**F**	49.7 / 29.8	D	12.0 / 96.9	**F**
4	LCR/SR-133	LCAD Driveway	Canyon Acres Drive	21.5 / 99.5	**F**	17.0 / 98.4	**F**	50.0 / 22.2	C	21.8 / 89.3	**F**	12.5 / 100	**F**	5.7 / 100	**F**	49.7 / 29.8	D	12.0 / 96.9	**F**

ATS = Average Travel Speed (miles per hour); PTSF = Percent Time Spent Following; D = Density; LOS = Level of Service; **Bold** = LOS F

* Density was applied to the southbound results during the PM peak and northbound results during the AM peak

Table 7-2. 2030 No Build and Build Intersection Analysis Comparison

Int. #	Intersection	Existing Traffic Control	2030 No Build				2030 Build Alternatives 2-4				2030 Build Alternative 5			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	LCR/SR-133 at El Toro Road	Signalized	34.6	C	23.2	C	34.6	C	23.2	C	39.4	D	25.3	C
2	LCR/SR-133 at Anneliese's School Driveway	Minor Street Stop Controlled	>50	**F**	>50	**F**	>50	**F**	>50	**F**	>50	**F**	34.9	D
3	LCR/SR-133 at Sun Valley Drive	Minor Street Stop Controlled	44	E	49.1	**E**	44	E	49.1	E	49.3	E	20.2	C
4	LCR/SR-133 at Laguna Beach Dog Park Driveway	Minor Street Stop Controlled	45.6	E	47	**E**	45.6	E	47	E	49.5	E	19.6	C
5	LCR/SR-133 at Stan Oaks Drive	Minor Street Stop Controlled	43.6	E	>50	**F**	43.6	E	>50	**F**	49.3	E	20.3	C
6	LCR/SR-133 at Castle Rock Road	Minor Street Stop Controlled	45.9	E	>50	**F**	45.9	E	>50	**F**	>50	E	20.5	C
7	LCR/SR-133 at Laguna College of Arts & Design Driveway	Minor Street Stop Controlled/Signalized*	>50	**F**	>50	**F**	>80	**F**	51	D	33.9	D	>80	**F**
8	LCR/SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway	Minor Street Stop Controlled	>50	**F**	>50	**F**	>50	**F**	>50	**F**	>50	**F**	>50	**F**
9	LCR/SR-133 at Canyon Acres Drive	Signalized	4.5	A	3.9	A	4.5	A	3.9	A	7.2	A	4.9	A

LOS = Level of Service

Intersection operation is expressed in average seconds of delay (del/veh) for HCM methodology.

* Minor Street Stop Controlled intersection under No Build and Build Alternative 5; Signalized intersection under Build Alternatives 2 to 4

Table 7-3. 2050 No Build and Build Intersection Analysis Comparison

Int. #	Intersection	Existing Traffic Control	2050 No Build				2050 Build Alternatives 2-4				2050 Build Alternative 5			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	LCR/SR-133 at El Toro Road	Signalized	67.3	E	43.5	D	67.3	E	43.5	D	>80	**F**	53.4	D
2	LCR/SR-133 at Anneliese's School Driveway	Minor Street Stop Controlled	> 50	**F**	>50	**F**	> 50	**F**	>50	**F**	> 50	**F**	>50	**F**
3	LCR/SR-133 at Sun Valley Drive	Minor Street Stop Controlled	>50	**F**	>50	**F**	>50	**F**	>50	**F**	>50	**F**	28	D
4	LCR/SR-133 at Laguna Beach Dog Park Driveway	Minor Street Stop Controlled	>50	**F**	>50	**F**	>50	**F**	>50	**F**	>50	**F**	27	D
5	LCR/SR-133 at Stan Oaks Drive	Minor Street Stop Controlled	>50	**F**	>50	**F**	>50	**F**	>50	**F**	>50	**F**	28.4	D
6	LCR/SR-133 at Castle Rock Road	Minor Street Stop Controlled	>50	**F**	>50	**F**	>50	**F**	>50	**F**	>50	**F**	28.8	D
7	LCR/SR-133 at Laguna College of Arts & Design Driveway	Minor Street Stop Controlled/Signalized*	>50	**F**	>50	**F**	>80	**F**	>80	**F**	>50	**F**	>50	**F**
8	LCR/SR-133 at Act V/City Maintenance Facility Yard Parking Lot Driveway	Minor Street Stop Controlled	> 50	**F**	> 50	**F**	> 50	**F**	> 50	**F**	> 50	**F**	> 50	**F**
9	LCR/SR-133 at Canyon Acres Drive	Signalized	5.5	A	4.9	A	5.5	A	4.9	A	9.6	A	6.5	A

LOS = Level of Service

Intersection operation is expressed in average seconds of delay (del/veh) for HCM methodology.

* Minor Street Stop Controlled intersection under No Build and Build Alternative 5; Signalized intersection under Build Alternatives 2 to 4

Table 7-4. 2030 and 2050 Build Multimodal Analysis Comparison

Mode	Alternative 1 (No Build)		Alternative 2		Alternative 3		Alternative 4		Alternative 5	
	Score	LOS	Score	LOS	Score	LOS	Score	LOS	Score	LOS
Laguna Canyon Rd/SR-133 (Northbound)										
Transit	4.5	E	2.6	B	2.0	A	2.0	A	2.2	B
Bicycle	5.5	F	1.0	A	2.5	B	1.8	A	2.0	A
Pedestrian	4	D	2.0	A	1.5	A	1.5	A	1.5	A
Laguna Canyon Rd/SR-133 (Southbound)										
Transit	4.5	E	2.3	B	2.8	C	2.0	A	2.2	B
Bicycle	5.5	F	1.0	A	1.5	A	1.8	A	2.0	A
Pedestrian	4	D	N/A	N/A	1.5	A	1.5	A	1.5	A

As evident above in Table 7-4, the LOS performance for Transit, Bicycle, and Pedestrian modes improves for all four Build alternatives compared to the No Build alternative.

7.5 Key Findings and Conclusions

The study intersections and roadway segments along the LCR operate at satisfactory LOS in the existing conditions with the exception of intersections at Anneliese's School Driveway, Laguna College of Arts and Design Driveway and Act V/City Maintenance Facility Yard Parking Lot Driveway. Due to heavy traffic during the period of weekdays, summer weekends and holidays, several operational constraints such as vehicular queuing, inadequate gaps for left turning traffic from driveways, conflicts between vehicles and pedestrian and bicycles due to inadequate bike lanes and sidewalks are observed along the corridor. The proposed alternatives accommodate innovative safety improvements and improvements for active and transit transportation modes for improving the safety and circulation for all modes of transportation. In the proposed Build alternatives, the constraints related to pedestrians, bicycles and transit are addressed. There is a significant improvement in multimodal LOS along the corridor for all the proposed Build alternatives in the Year 2050. The corridor is expected to be safer for pedestrians, and bicycles under the proposed alternatives due to reduction in conflicts with vehicles.

For Alternatives 1 to 4, since none of the alternatives have proposed any addition in number of lanes, there was no significant improvement in vehicular operations along the corridor. All the unsignalized intersections and roadway segments operate at LOS F during the Year 2050 No Build and Build, Alternatives 1 to 4, conditions. One of the key vehicular safety issues along the corridor is the lack of traffic breaks for left turning vehicles in and out of driveways. Therefore, signalization of intersections is recommended at the stop-controlled locations with high turning volumes as roundabouts were infeasible. The signalization of intersections would result in formation of vehicle platoons which would increase traffic breaks along the corridor resulting in safer conditions for left turning vehicles in and out of the driveways. Based on preliminary peak hour warrant analysis, three unsignalized study intersections meet the thresholds of the peak hour signal warrant. However, only one of those intersections is analyzed as signalized intersections as explained earlier in Section 6.2.2 and Section 6.4 under Build Alternatives 2 to 4. This signalized intersection would continue to operate at LOS F in the Year 2050 conditions. However, it would contribute to enhance safety for left turning vehicles in and out of driveway along the corridor. The signalized intersection is listed below:

- SR-133 at Laguna College of Arts & Design Driveway

For Alternative 5, the peak direction is proposed to have two lanes. Left turn at the two-way stop-controlled intersections/driveways are prohibited between Anneliese's School Driveway and Act V/City Maintenance Facility Yard Parking Lot Driveway within the project limits. The driveways have right-in and right-out accesses, which include the intersection at Laguna College of Arts & Design Driveway. The peak direction vehicular operations along the corridor have significant improvements during the directional peak hours. The intersection service levels have significant improvements at several intersections during the PM peak hours.

The proposed Build alternatives are a combination of complete streets improvements, and safety enhancements which would serve the future multimodal user needs of the corridor.

8 Scope of Future Traffic Engineering Studies

The Traffic Engineering Performance Assessment (TEPA) report provided the details of the existing deficiencies along the Laguna Canyon Road (LCR) (SR-133) corridor. The possible alternatives were discussed and analyzed to determine the operational feasibility of each alternative. TEPA document is generally used to estimate the scope and magnitude of the Project Approval and Environmental Document (PA&ED) phase. The detailed operational analysis is required as part of the PA&ED phase.

8.1 Study Intersections and Data Collection

As part of the future detailed traffic operational analysis, it is recommended that the intersection LCR at Willow Canyon Road/Willow Staging Area be included in the analysis to assess and address potential operational and safety concerns that Caltrans has been receiving from the public. The data collection efforts are required to be conducted during the seasonal peak period (summer) on a typical weekday (Tuesday, Wednesday, or Thursday) and weekend to document the peak seasonal recreational traffic conditions along the corridor. Peak period turning movement counts are recommended to be collected at all study intersections (including its minor streets) along with pedestrian and bicycle counts. Additionally, arterial counts must be collected over a 24-hour period for all study segments along LCR and minor streets of all study intersections.

8.2 Signal Warrant Analysis

A full set of traffic warrant analysis (Warrants 1-9) is required to be considered as per the latest version of California Manual on Uniform Traffic Control Devices (CA MUTCD), Chapter 4C. The warrant analysis needs to be conducted using the actual counts data. The analysis for all the applicable warrants should be conducted to justify the need for a traffic signal at intersections.

8.3 Accident Analysis

Any future study must obtain accident data from Caltrans' Traffic Accident and Surveillance Analysis Systems (TASAS) for the latest 36-month period. The accident analysis must be performed and compiled similar to Section 3.3 of this study.

8.4 Forecasting

As part of the detailed operational analysis, the future traffic volume forecasts at the study intersections and highway segments for the future year conditions should be developed using the assumptions contained in the latest version of Transportation Demand Forecasting (TDF) model OCTAM. The existing counts, base year and future year OCTAM models should be used to calculate the annual growth at the study facilities, which should be applied to existing traffic counts using the difference method

(Existing Counts + Model growth) or using the Furness method (using approach and departure growth to adjust intersection forecast) to generate the future year volumes.

The future model output link volumes should be converted to the future year peak hour turning movement volumes by post-processing. The post-processing shall be based on the methodologies delineated in the National Cooperative Highway Research Program Report (NCHRP) 255 published by the Transportation Research Board (TRB). The purpose of the post-processing is to go beyond what can reasonably be achieved in terms of accuracy and detail from the OCTAM Regional Planning Model. Post-processing adjustments provide a greater level of consistency with available base year counts.

The forecasting years for analysis of the project include:

- Opening Year
- Horizon Year (2050 or later)

8.5 Operational/Capacity Analysis and Evaluation

The future year peak hour turn volumes and the ADT link volumes obtained from the volume forecasting would be used for the operational analysis at study intersections and roadway segments respectively. The operational and capacity analysis should be conducted for all the future No Build and Build scenarios to estimate the level of operational improvements along the corridor with recommended improvements. All the alternatives should be analyzed with the future volumes to determine the feasibility and operational performance of each alternative. The proposed alternatives along the LCR corridor included improvements for alternative transportation modes for improving the safety and circulation for all modes of transportation. Therefore, it is recommended to evaluate the operations of all study intersections and roadway segments using the Multimodal Level of Service based on the methodology in the latest Highway Capacity Manual (HCM). The LOS standards for the operational analysis should be LOS E for all the study intersections and roadway segments unless alternative direction is provided by the governing jurisdictions.

8.6 Safety Analysis and Evaluation

Safety is a key concern for the City along the LCR corridor. A traffic safety analysis should be completed as part of the study to evaluate the existing safety concerns along the corridor. A safety analysis for all the proposed alternatives would help determine the most feasible alternative improvement for the corridor.

Appendix A. Traffic Counts

National Data & Surveying Services Intersection Turning Movement Count

Location: SR-133 & Canyon Acres Dr
City: Laguna Beach
Control: Signalized

Project ID: 17-01254-001
Date: 11/30/2017

Total

NS/EW Streets:	SR-133				SR-133				Canyon Acres Dr				Canyon Acres Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	0	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	76	0	0	0	103	0	0	0	0	0	0	1	0	1	0	181
6:15 AM	0	99	2	0	1	134	0	0	0	0	0	0	4	0	2	0	242
6:30 AM	0	170	1	1	1	193	0	0	0	0	0	0	0	0	0	0	366
6:45 AM	0	220	2	0	4	288	0	0	0	0	0	0	0	0	3	0	517
7:00 AM	0	215	1	0	1	331	0	1	0	0	0	0	6	0	1	0	556
7:15 AM	0	239	6	0	4	347	0	2	0	0	0	0	12	0	3	0	613
7:30 AM	0	319	2	2	2	333	0	0	0	0	0	0	4	0	4	0	666
7:45 AM	0	310	3	2	2	366	0	1	0	0	0	0	12	0	2	0	698
8:00 AM	0	319	1	2	3	294	0	0	0	0	0	0	6	0	2	0	627
8:15 AM	0	326	6	1	0	310	0	0	0	0	0	0	11	0	6	0	660
8:30 AM	0	352	3	2	4	310	0	1	0	0	0	0	8	0	4	0	684
8:45 AM	0	327	5	2	4	306	0	1	0	0	0	0	2	0	6	0	653
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	2972	32	12	26	3315	0	6	0	0	0	0	66	0	34	0	6463
APPROACH %'s :	0.00%	98.54%	1.06%	0.40%	0.78%	99.04%	0.00%	0.18%					66.00%	0.00%	34.00%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	1307	13	7	9	1280	0	2	0	0	0	0	37	0	14	0	2669
PEAK HR FACTOR :	0.000	0.928	0.542	0.875	0.563	0.874	0.000	0.500	0.000	0.000	0.000	0.000	0.771	0.000	0.583	0.000	0.956
	0.929				0.875								0.750				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	0	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	279	6	4	3	310	0	1	0	0	0	0	3	0	5	0	611
4:15 PM	0	301	9	3	5	295	0	0	0	0	0	0	8	0	3	0	624
4:30 PM	0	301	5	3	4	338	0	0	0	0	0	0	9	0	2	0	662
4:45 PM	0	263	10	1	1	280	0	0	0	0	0	0	2	0	2	0	559
5:00 PM	0	312	7	2	4	279	0	1	0	0	0	0	3	0	6	0	614
5:15 PM	0	325	6	5	4	294	0	0	0	0	0	0	4	0	3	0	641
5:30 PM	0	299	9	2	5	257	0	0	0	0	0	0	7	0	4	0	583
5:45 PM	0	273	6	5	4	275	0	4	0	0	0	0	1	0	3	0	571
6:00 PM	0	218	5	1	4	296	0	0	0	0	0	0	4	0	3	0	531
6:15 PM	0	207	4	0	4	239	0	0	0	0	0	0	3	0	0	0	457
6:30 PM	0	209	1	4	6	275	0	0	0	0	0	0	3	0	4	0	502
6:45 PM	0	178	4	1	2	270	0	0	0	0	0	0	3	0	1	0	459
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	3165	72	31	46	3408	0	6	0	0	0	0	50	0	36	0	6814
APPROACH %'s :	0.00%	96.85%	2.20%	0.95%	1.33%	98.50%	0.00%	0.17%					58.14%	0.00%	41.86%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	1201	28	11	13	1191	0	1	0	0	0	0	18	0	13	0	2476
PEAK HR FACTOR :	0.000	0.924	0.700	0.550	0.813	0.881	0.000	0.250	0.000	0.000	0.000	0.000	0.500	0.000	0.542	0.000	0.935
	0.923				0.881								0.705				

National Data & Surveying Services Intersection Turning Movement Count

Location: SR-133 & Canyon Acres Dr
City: Laguna Beach
Control: Signalized

Project ID: 17-01254-001
Date: 11/30/2017

Bikes

NS/EW Streets:	SR-133				SR-133				Canyon Acres Dr				Canyon Acres Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	0	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
7:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
7:30 AM	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	10
7:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
8:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	11	1	0	1	13	0	0	0	0	0	0	1	0	0	0	27
APPROACH %'s :	0.00%	91.67%	8.33%	0.00%	7.14%	92.86%	0.00%	0.00%					100.00%	0.00%	0.00%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	1	1	0	0	3	0	0	0	0	0	0	0	0	0	0	5
PEAK HR FACTOR :	0.000	0.250	0.250	0.000	0.000	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.625
	0.500				0.750												

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	0	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
4:15 PM	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
4:30 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
6:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	6	0	0	1	7	0	0	0	0	0	0	1	0	0	0	15
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	12.50%	87.50%	0.00%	0.00%					100.00%	0.00%	0.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0	6
PEAK HR FACTOR :	0.00	0.250	0.000	0.000	0.000	0.625	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500
	0.250				0.625												

National Data & Surveying Services Intersection Turning Movement Count

Location: SR-133 & Canyon Acres Dr
City: Laguna Beach

Project ID: 17-01254-001
Date: 11/30/2017

Pedestrians (Crosswalks)

NS/EW Streets:	SR-133		SR-133		Canyon Acres Dr		Canyon Acres Dr		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	1	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	1	1	0	0	2
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	1	0	0	0	1
8:15 AM	0	0	0	0	2	1	0	0	3
8:30 AM	0	0	0	0	1	2	0	0	3
8:45 AM	0	0	0	0	0	1	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	5	6	0	0	11
APPROACH %'s :					45.45%	54.55%			
PEAK HR :	07:45 AM - 08:45 AM								TOTAL
PEAK HR VOL :	0	0	0	0	4	3	0	0	7
PEAK HR FACTOR :					0.500	0.375			0.583
					0.583				

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	1	0	0	0	1
4:15 PM	0	0	0	0	1	2	0	0	3
4:30 PM	0	0	0	0	1	1	0	0	2
4:45 PM	0	0	0	0	1	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	1	0	0	0	0	0	1
5:30 PM	0	0	0	0	1	1	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	1	0	0	1
6:15 PM	0	0	0	0	1	0	0	0	1
6:30 PM	0	0	0	0	1	0	0	0	1
6:45 PM	0	0	0	0	0	1	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	1	0	7	6	0	0	14
APPROACH %'s :			100.00%	0.00%	53.85%	46.15%			
PEAK HR :	04:30 PM - 05:30 PM								TOTAL
PEAK HR VOL :	0	0	1	0	2	1	0	0	4
PEAK HR FACTOR :			0.250		0.500	0.250			0.500
			0.250		0.375				

Prepared by National Data & Surveying Services

SR-133 & Canyon Acres Dr

Peak Hour Turning Movement Count

ID: 17-01254-001
City: Laguna Beach

Day: Thursday
Date: 11/30/2017

	PEAK HOURS	COUNT PERIODS
AM	07:45 AM - 08:45 AM	06:00 AM - 09:00 AM
NOON	NONE	NONE
PM	04:30 PM - 05:30 PM	04:00 PM - 07:00 PM

SR-133
SOUTHBOUND

	↲	↓	↳	↶	⇧
AM	0	1280	9	2	1323
NOON	0	0	0	0	0
PM	0	1191	13	1	1215
	0	2	1	0	

Canyon Acres Dr
WESTBOUND

		PM	NOON	AM
↰	1	13	0	14
←	0	0	0	0
↲	1	18	0	37
↶	0	0	0	0
⇨		41	0	22

Canyon Acres Dr
EASTBOUND

AM	NOON	PM		
0	0	0	⇦	
0	0	0	↶	0
0	0	0	↱	0
0	0	0	→	0
0	0	0	↴	0

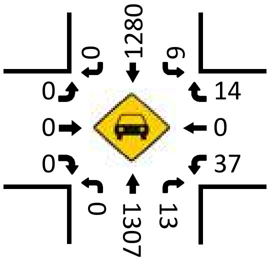
CONTROL
Signalized

	AM	NOON	PM
TEV	2669	0	2476
PHF	0.96		0.94

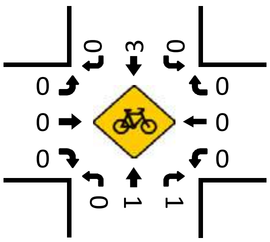
NORTHBOUND
SR-133

	⇩	↶	↰	↑	↱
		0	1	2	1
PM	1220	11	0	1201	28
NOON	0	0	0	0	0
AM	1324	7	0	1307	13

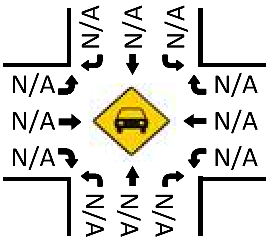
Total Vehicles (AM)



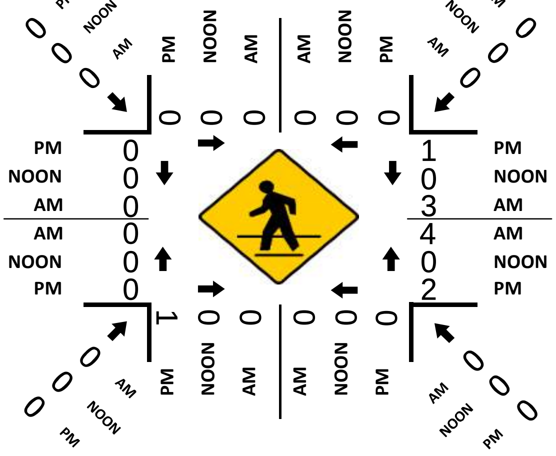
Bikes (AM)



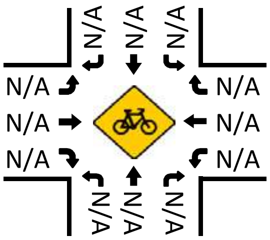
Total Vehicles (Noon)



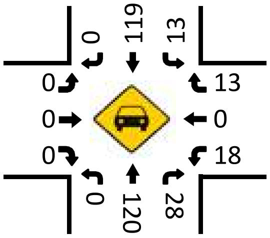
Pedestrians (Crosswalks)



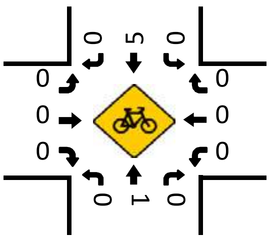
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



National Data & Surveying Services # Intersection Turning Movement Count

Location: SR-133 & Laguna Dog Park intersection
City: Laguna Beach
Control: No Control

Project ID: 17-01254-002
Date: 11/30/2017

Total

NS/EW Streets:	SR-133				SR-133				Laguna Dog Park intersection				Laguna Dog Park intersection				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	75	0	0	1	114	0	0	0	0	0	0	0	0	0	0	190
6:15 AM	0	104	0	0	1	161	0	0	0	0	0	0	0	0	0	0	266
6:30 AM	0	167	0	0	0	244	0	0	0	0	0	0	0	0	0	0	411
6:45 AM	0	198	1	0	0	307	0	0	0	0	0	0	1	0	0	0	507
7:00 AM	0	193	1	0	0	336	0	0	0	0	0	0	1	0	0	0	531
7:15 AM	0	253	1	0	1	341	0	0	0	0	0	0	2	0	0	0	598
7:30 AM	0	310	0	0	2	363	0	0	0	0	0	0	0	0	1	0	676
7:45 AM	0	294	0	0	2	331	0	0	0	0	0	0	1	0	1	0	629
8:00 AM	0	304	2	0	4	308	0	0	0	0	0	0	1	0	1	0	620
8:15 AM	0	290	4	0	2	336	0	0	0	0	0	0	2	0	2	0	636
8:30 AM	0	294	3	0	5	351	0	0	0	0	0	0	5	0	2	0	660
8:45 AM	0	296	2	0	3	346	0	0	0	0	0	0	1	0	6	0	654
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	2778	14	0	21	3538	0	0	0	0	0	0	14	0	13	0	6378
APPROACH %'s :	0.00%	99.50%	0.50%	0.00%	0.59%	99.41%	0.00%	0.00%					51.85%	0.00%	48.15%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	1184	11	0	14	1341	0	0	0	0	0	0	9	0	11	0	2570
PEAK HR FACTOR :	0.000	0.974	0.688	0.000	0.700	0.955	0.000	0.000	0.000	0.000	0.000	0.000	0.450	0.000	0.458	0.000	0.973
	0.976				0.952								0.714				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	312	0	0	0	312	0	0	0	0	0	0	1	0	0	0	625
4:15 PM	0	298	3	0	0	309	0	0	0	0	0	0	2	0	1	0	613
4:30 PM	0	334	1	0	0	303	0	0	0	0	0	0	1	0	0	0	639
4:45 PM	0	328	1	0	1	277	0	0	0	0	0	0	0	0	0	0	607
5:00 PM	0	309	1	0	0	262	0	0	0	0	0	0	0	0	2	0	574
5:15 PM	0	353	2	0	1	305	0	0	0	0	0	0	3	0	1	0	665
5:30 PM	0	301	2	0	0	283	0	0	0	0	0	0	0	0	1	0	587
5:45 PM	0	305	2	0	0	304	0	0	0	0	0	0	0	0	1	0	612
6:00 PM	0	296	0	0	0	276	0	0	0	0	0	0	1	0	0	0	573
6:15 PM	0	219	0	0	2	251	0	0	0	0	0	0	0	0	0	0	472
6:30 PM	0	229	0	0	0	290	0	0	0	0	0	0	1	0	2	0	522
6:45 PM	0	196	0	0	0	281	0	0	0	0	0	0	2	0	1	0	480
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	3480	12	0	4	3453	0	0	0	0	0	0	11	0	9	0	6969
APPROACH %'s :	0.00%	99.66%	0.34%	0.00%	0.12%	99.88%	0.00%	0.00%					55.00%	0.00%	45.00%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	1324	5	0	2	1147	0	0	0	0	0	0	4	0	3	0	2485
PEAK HR FACTOR :	0.000	0.938	0.625	0.000	0.500	0.940	0.000	0.000	0.000	0.000	0.000	0.000	0.333	0.000	0.375	0.000	0.934
	0.936				0.939								0.438				

National Data & Surveying Services Intersection Turning Movement Count

Location: SR-133 & Laguna Dog Park intersection
City: Laguna Beach
Control: No Control

Project ID: 17-01254-002
Date: 11/30/2017

Bikes

NS/EW Streets:	SR-133				SR-133				Laguna Dog Park intersection				Laguna Dog Park intersection				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	6	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7
7:15 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
7:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
8:30 AM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
8:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	8	0	0	0	8	0	0	0	0	0	0	0	0	0	0	16
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	6
PEAK HR FACTOR :	0.000	0.500	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500
	0.500				0.500												

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	5	0	0	1	2	0	0	0	0	0	0	0	0	0	0	8
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	33.33%	66.67%	0.00%	0.00%									
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
PEAK HR FACTOR :	0.00	0.500	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.375
	0.500				0.250												

National Data & Surveying Services Intersection Turning Movement Count

Location: SR-133 & Laguna Dog Park intersection
City: Laguna Beach

Project ID: 17-01254-002
Date: 11/30/2017

Pedestrians (Crosswalks)

NS/EW Streets:	SR-133		SR-133		Laguna Dog Park intersection		Laguna Dog Park intersection		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	1	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	3	1	0	0	4
8:30 AM	0	0	0	0	0	1	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	3	3	0	0	6
APPROACH %'s :					50.00%	50.00%			
PEAK HR :	08:00 AM - 09:00 AM								TOTAL
PEAK HR VOL :	0	0	0	0	3	2	0	0	5
PEAK HR FACTOR :					0.250	0.500			0.313
					0.313				

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	1	1	0	0	2
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	1	0	0	1
5:00 PM	0	0	0	0	1	0	0	0	1
5:15 PM	0	0	0	0	0	1	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	1	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	2	0	0	2
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	2	6	0	0	8
APPROACH %'s :					25.00%	75.00%			
PEAK HR :	04:30 PM - 05:30 PM								TOTAL
PEAK HR VOL :	0	0	0	0	1	2	0	0	3
PEAK HR FACTOR :					0.250	0.500			0.750
					0.750				

Prepared by National Data & Surveying Services

SR-133 & Laguna Dog Park intersection

Peak Hour Turning Movement Count

ID: 17-01254-002
City: Laguna Beach

Day: Thursday
Date: 11/30/2017

PEAK HOURS

AM	08:00 AM - 09:00 AM
NOON	NONE
PM	04:30 PM - 05:30 PM

COUNT PERIODS

AM	06:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 07:00 PM

SR-133
SOUTHBOUND

	↲	↓	↳	↶	⇧
AM	0	1341	14	0	1195
NOON	0	0	0	0	0
PM	0	1147	2	0	1327
	0	1	1	0	

Laguna Dog Park intersection
WESTBOUND

		PM	NOON	AM
0	↰	3	0	11
1	←	0	0	0
0	↙	4	0	9
0	↶	0	0	0
	⇨	7	0	25

Laguna Dog Park intersection
EASTBOUND

AM	NOON	PM		
0	0	0	⇦	
0	0	0	↶	0
0	0	0	↱	0
0	0	0	→	0
0	0	0	↴	0

CONTROL

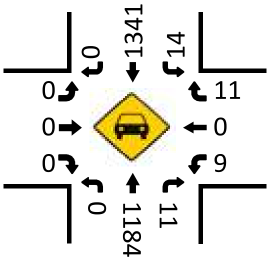
No Control

TEV	2570 AM	0 NOON	2485 PM
PHF	0.97		0.93

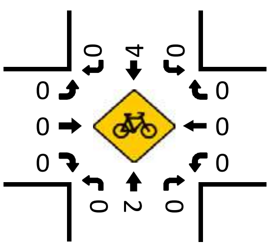
NORTHBOUND
SR-133

		0	0	1	1
	⇩	↶	↰	↑	↱
PM	1151	0	0	1324	5
NOON	0	0	0	0	0
AM	1350	0	0	1184	11

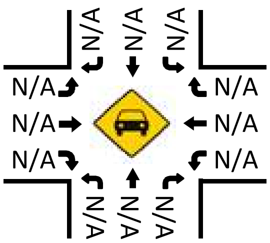
Total Vehicles (AM)



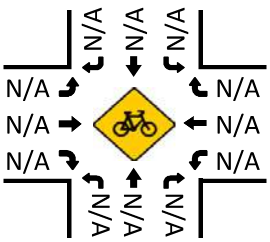
Bikes (AM)



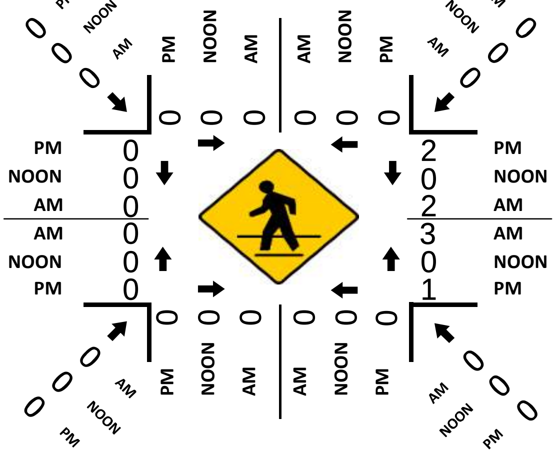
Total Vehicles (Noon)



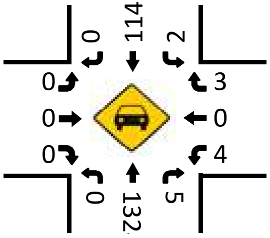
Bikes (NOON)



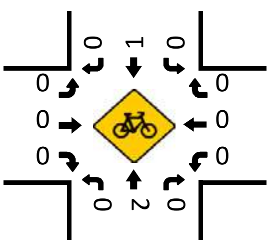
Pedestrians (Crosswalks)



Total Vehicles (PM)



Bikes (PM)



National Data & Surveying Services **Intersection Turning Movement Count**

Location: SR-133 & El Toro Rd and The Anneliese School Entrance
City: Laguna Beach
Control: Signalized

Project ID: 18-01018-001
Date: 1/25/2018

Total

NS/EW Streets:	SR-133				SR-133				El Toro Rd and The Anneliese School Entrance				El Toro Rd and The Anneliese School Entrance				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	1	0	1	2	0	0	0	0	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	56	16	0	1	96	0	0	0	0	0	0	49	0	3	0	221
6:15 AM	0	92	16	0	4	104	0	0	0	0	0	0	75	0	1	0	292
6:30 AM	0	101	28	0	1	149	0	0	0	0	0	0	95	0	2	0	376
6:45 AM	0	109	44	0	2	197	0	0	0	0	0	0	140	0	1	0	493
7:00 AM	0	141	57	0	11	198	0	0	0	0	0	0	175	0	3	0	585
7:15 AM	0	175	73	0	6	202	0	0	0	0	0	0	187	0	3	0	646
7:30 AM	0	189	93	0	3	220	0	0	0	0	0	0	142	0	1	0	648
7:45 AM	0	193	94	0	7	207	0	0	0	0	0	0	153	0	1	0	655
8:00 AM	0	213	138	0	5	219	0	0	0	0	0	0	154	0	1	0	730
8:15 AM	0	224	117	0	3	229	0	0	0	0	0	0	148	0	2	0	723
8:30 AM	0	236	134	0	8	223	0	0	0	0	0	0	180	0	7	0	788
8:45 AM	0	242	122	0	3	224	0	0	0	0	0	0	175	0	2	0	768
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1971	932	0	54	2268	0	0	0	0	0	0	1673	0	27	0	6925
APPROACH %'s :	0.00%	67.90%	32.10%	0.00%	2.33%	97.67%	0.00%	0.00%					98.41%	0.00%	1.59%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	915	511	0	19	895	0	0	0	0	0	0	657	0	12	0	3009
PEAK HR FACTOR :	0.000	0.945	0.926	0.000	0.594	0.977	0.000	0.000	0.000	0.000	0.000	0.000	0.913	0.000	0.429	0.000	0.955
		0.964				0.985								0.894			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	1	0	1	2	0	0	0	0	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	151	172	0	7	156	0	0	0	0	0	0	120	0	3	0	609
4:15 PM	0	159	145	0	5	203	0	0	0	0	0	0	127	0	10	0	649
4:30 PM	0	150	158	0	13	202	0	0	0	0	0	0	127	0	11	0	661
4:45 PM	0	175	170	0	9	202	0	0	0	0	0	0	127	0	9	0	692
5:00 PM	0	172	187	0	4	199	0	0	0	0	0	0	128	0	6	0	696
5:15 PM	0	143	182	0	12	192	0	0	0	0	0	0	121	0	6	0	656
5:30 PM	0	162	160	0	7	196	0	0	0	0	0	0	141	0	8	0	674
5:45 PM	0	174	161	0	10	180	0	0	0	0	0	0	130	0	5	0	660
6:00 PM	0	154	174	0	10	180	0	0	0	0	0	0	113	0	6	0	637
6:15 PM	0	125	131	0	7	163	0	0	0	0	0	0	110	0	3	0	539
6:30 PM	0	98	86	0	4	166	0	0	0	0	0	0	104	0	4	0	462
6:45 PM	0	133	112	0	3	131	0	0	0	0	0	0	95	0	2	0	476
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1796	1838	0	91	2170	0	0	0	0	0	0	1443	0	73	0	7411
APPROACH %'s :	0.00%	49.42%	50.58%	0.00%	4.02%	95.98%	0.00%	0.00%					95.18%	0.00%	4.82%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	652	699	0	32	789	0	0	0	0	0	0	517	0	29	0	2718
PEAK HR FACTOR :	0.000	0.931	0.934	0.000	0.667	0.976	0.000	0.000	0.000	0.000	0.000	0.000	0.917	0.000	0.806	0.000	0.976
		0.941				0.973								0.916			

National Data & Surveying Services Intersection Turning Movement Count

Location: SR-133 & El Toro Rd and The Anneliese School Entrance
City: Laguna Beach
Control: Signalized

Project ID: 18-01018-001
Date: 1/25/2018

Bikes

NS/EW Streets:	SR-133				SR-133				El Toro Rd and The Anneliese School Entrance				El Toro Rd and The Anneliese School Entrance				
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	0	2	1	0	1	2	0	0	0	0	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
7:30 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
8:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	2	0	0	2	0	0	0	0	0	0	4	0	0	0	8
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%					100.00%	0.00%	0.00%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	4
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.750	0.000	0.000	0.000	0.500
					0.250								0.750				

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	0	2	1	0	1	2	0	0	0	0	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	4
4:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	3	0	0	0	0	0	0	0	0	0	3	0	0	0	6
5:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	2	8	0	1	3	0	0	0	0	0	0	3	0	0	0	17
APPROACH %'s :	0.00%	20.00%	80.00%	0.00%	25.00%	75.00%	0.00%	0.00%					100.00%	0.00%	0.00%	0.00%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	0	2	5	0	0	1	0	0	0	0	0	0	3	0	0	0	11
PEAK HR FACTOR :	0.00	0.500	0.417	0.000	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.000	0.458
	0.583				0.250								0.250				

National Data & Surveying Services Intersection Turning Movement Count

Location: SR-133 & El Toro Rd and The Anneliese School Entrance
Project ID: 18-01018-001
City: Laguna Beach
Date: 1/25/2018

Pedestrians (Crosswalks)

NS/EW Streets:	SR-133		SR-133		El Toro Rd and The Anneliese School Entrance		El Toro Rd and The Anneliese School Entrance		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0
APPROACH %'s :									
PEAK HR :	**08:00 AM - 09:00 AM**								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0
APPROACH %'s :									
PEAK HR :	**04:45 PM - 05:45 PM**								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

Prepared by National Data & Surveying Services

SR-133 & El Toro Rd and The Anneliese School Entrance

Peak Hour Turning Movement Count

ID: 18-01018-001
City: Laguna Beach

Day: Thursday
Date: 01/25/2018

PEAK HOURS	
AM	08:00 AM - 09:00 AM
NOON	NONE
PM	04:45 PM - 05:45 PM

COUNT PERIODS	
AM	06:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 07:00 PM

SR-133

SOUTHBOUND

AM	0	895	19	0	927
NOON	0	0	0	0	0
PM	0	789	32	0	681
	↲	↓	↳	↶	⇧
	0	2	1	0	

El Toro Rd and The Anneliese Sc

EASTBOUND

	AM	NOON	PM	
⇦	0	0	0	
↶	0	0	0	0
↱	0	0	0	0
→	0	0	0	0
↴	0	0	0	0

El Toro Rd and The Anneliese Sc

WESTBOUND

		PM	NOON	AM
1	↰	29	0	12
0	←	0	0	0
1	↲	517	0	657
0	↶	0	0	0
	⇨	731	0	530

CONTROL

Signalized

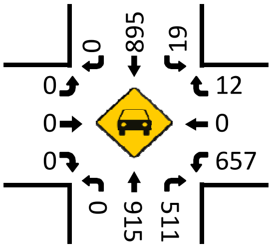
	AM	NOON	PM
TEV	3009	0	2718
PHF	0.95		0.98

NORTHBOUND

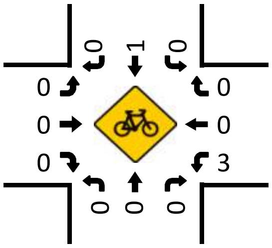
SR-133

		0	0	2	1
	⇩	↶	↰	↑	↱
PM	1306	0	0	652	699
NOON	0	0	0	0	0
AM	1552	0	0	915	511

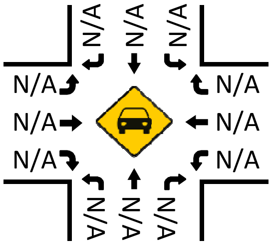
Total Vehicles (AM)



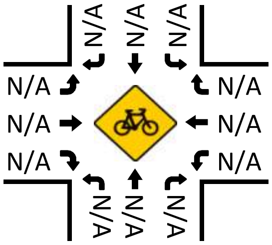
Bikes (AM)



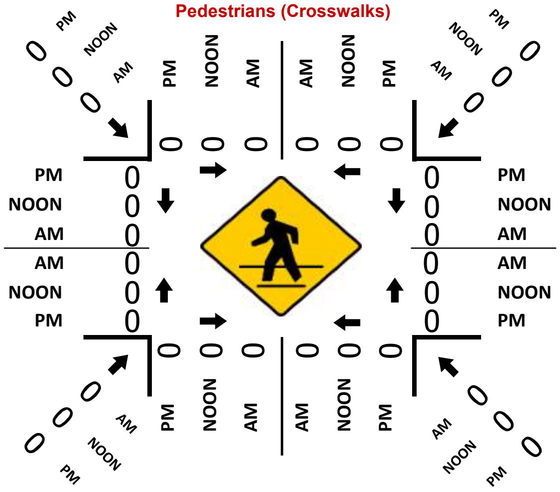
Total Vehicles (Noon)



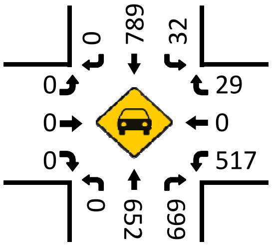
Bikes (NOON)



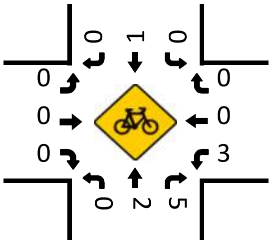
Pedestrians (Crosswalks)



Total Vehicles (PM)



Bikes (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: SR-133 & Anneliese School Entrance
City: Laguna Beach
Control: No Control

Project ID: 18-01018-002
Date: 1/25/2018

Total

NS/EW Streets:	SR-133				SR-133				Anneliese School Entrance				Anneliese School Entrance				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	69	0	0	0	140	0	0	0	0	0	0	0	0	0	0	209
6:15 AM	0	105	0	0	2	174	0	0	0	0	0	0	0	0	0	0	281
6:30 AM	0	135	0	0	2	239	0	0	0	0	0	0	0	0	1	0	377
6:45 AM	0	148	0	0	2	317	0	0	0	0	0	0	0	0	0	0	467
7:00 AM	0	205	2	0	4	366	0	0	0	0	0	0	0	0	3	0	580
7:15 AM	0	230	0	0	8	380	0	1	0	0	0	0	0	0	5	0	624
7:30 AM	0	269	3	0	8	371	0	0	0	0	0	0	1	0	3	0	655
7:45 AM	0	282	8	0	19	344	0	0	0	0	0	0	0	0	9	0	662
8:00 AM	0	333	6	0	41	318	0	0	0	0	0	0	4	0	30	0	732
8:15 AM	0	296	13	0	47	333	0	0	0	0	0	0	8	0	39	0	736
8:30 AM	0	328	2	0	46	364	0	0	0	0	0	0	2	0	39	0	781
8:45 AM	0	335	6	0	31	368	0	0	0	0	0	0	3	0	35	0	778
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	2735	40	0	210	3714	0	1	0	0	0	0	18	0	164	0	6882
APPROACH %'s :	0.00%	98.56%	1.44%	0.00%	5.35%	94.62%	0.00%	0.03%					9.89%	0.00%	90.11%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	1292	27	0	165	1383	0	0	0	0	0	0	17	0	143	0	3027
PEAK HR FACTOR :	0.000	0.964	0.519	0.000	0.878	0.940	0.000	0.000	0.000	0.000	0.000	0.000	0.531	0.000	0.917	0.000	0.969
	0.967				0.944								0.851				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	304	1	0	10	265	0	0	0	0	0	0	1	0	28	0	609
4:15 PM	0	283	3	0	3	321	0	0	0	0	0	0	2	0	13	0	625
4:30 PM	0	305	3	0	11	322	0	0	0	0	0	0	2	0	12	0	655
4:45 PM	0	330	0	0	15	320	0	0	0	0	0	0	2	0	12	0	679
5:00 PM	0	330	2	0	11	313	0	0	0	0	0	0	2	0	20	0	678
5:15 PM	0	317	3	0	12	302	0	0	0	0	0	0	4	0	12	0	650
5:30 PM	0	304	1	0	9	315	0	0	0	0	0	0	1	0	17	0	647
5:45 PM	0	322	1	0	14	310	0	0	0	0	0	0	2	0	15	0	664
6:00 PM	0	322	0	0	0	303	0	0	0	0	0	0	2	0	11	0	638
6:15 PM	0	253	0	0	0	272	0	0	0	0	0	0	1	0	4	0	530
6:30 PM	0	191	0	0	0	261	0	0	0	0	0	0	0	0	0	0	452
6:45 PM	0	233	0	0	0	235	0	0	0	0	0	0	0	0	0	0	468
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	3494	14	0	85	3539	0	0	0	0	0	0	19	0	144	0	7295
APPROACH %'s :	0.00%	99.60%	0.40%	0.00%	2.35%	97.65%	0.00%	0.00%					11.66%	0.00%	88.34%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	1282	8	0	49	1257	0	0	0	0	0	0	10	0	56	0	2662
PEAK HR FACTOR :	0.000	0.971	0.667	0.000	0.817	0.976	0.000	0.000	0.000	0.000	0.000	0.000	0.625	0.000	0.700	0.000	0.980
	0.971				0.975								0.750				

National Data & Surveying Services Intersection Turning Movement Count

Location: SR-133 & Anneliese School Entrance
City: Laguna Beach
Control: No Control

Project ID: 18-01018-002
Date: 1/25/2018

Bikes

NS/EW Streets:	SR-133				SR-133				Anneliese School Entrance				Anneliese School Entrance				
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
AM	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	2	0	0	1	4	0	0	0	0	0	0	0	0	0	0	7
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	20.00%	80.00%	0.00%	0.00%									
PEAK HR :	**08:00 AM - 09:00 AM**																TOTAL
PEAK HR VOL :	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.750
					0.750												

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
PM	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
4:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
4:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:00 PM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	10	0	0	0	6	0	0	0	0	0	0	0	0	0	0	16
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	**04:30 PM - 05:30 PM**																TOTAL
PEAK HR VOL :	0	5	0	0	0	3	0	0	0	0	0	0	0	0	0	0	8
PEAK HR FACTOR :	0.00	0.625	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500
	0.625				0.375												

National Data & Surveying Services Intersection Turning Movement Count

Location: SR-133 & Anneliese School Entrance
City: Laguna Beach

Project ID: 18-01018-002
Date: 1/25/2018

Pedestrians (Crosswalks)

NS/EW Streets:	SR-133		SR-133		Anneliese School Entrance		Anneliese School Entrance		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0
APPROACH %'s :									
PEAK HR :	08:00 AM - 09:00 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0
APPROACH %'s :									
PEAK HR :	04:30 PM - 05:30 PM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

Prepared by National Data & Surveying Services

SR-133 & Anneliese School Entrance

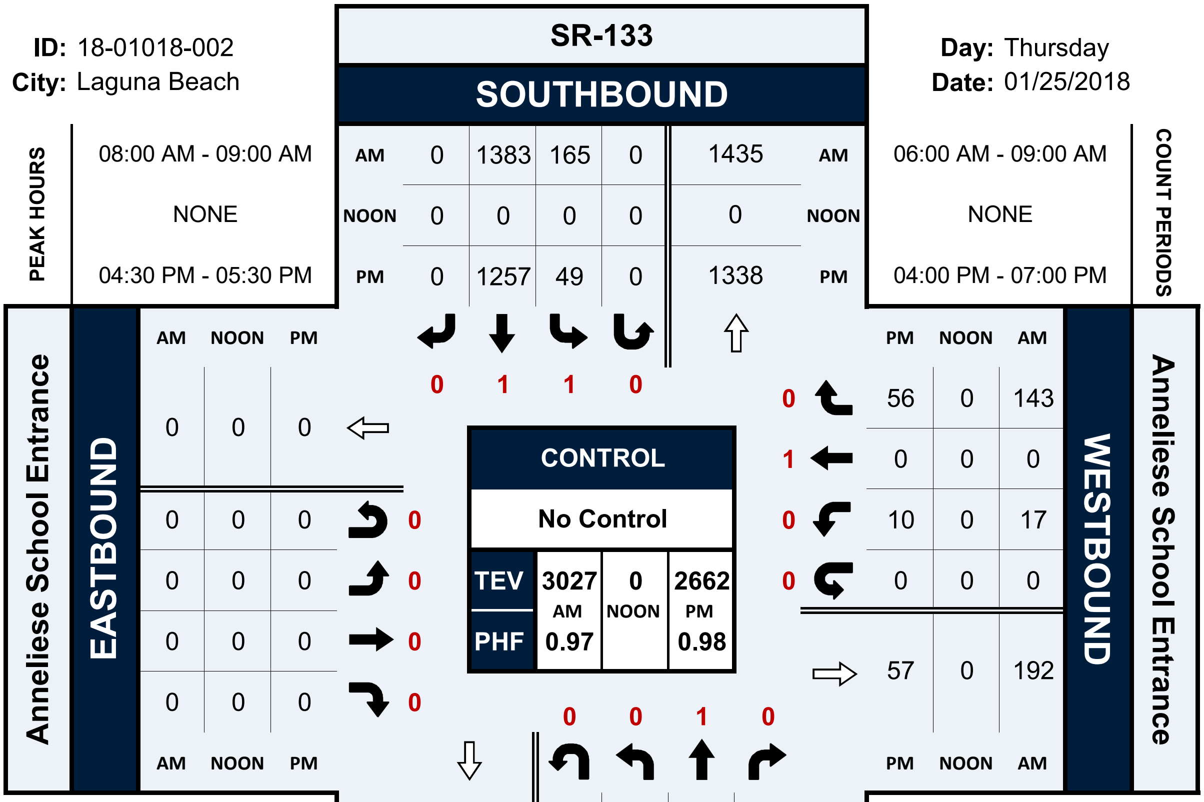
Peak Hour Turning Movement Count

ID: 18-01018-002
City: Laguna Beach

Day: Thursday
Date: 01/25/2018

PEAK HOURS	
AM	08:00 AM - 09:00 AM
NOON	NONE
PM	04:30 PM - 05:30 PM

COUNT PERIODS	
AM	06:00 AM - 09:00 AM
NOON	NONE
PM	04:00 PM - 07:00 PM



SR-133 SOUTHBOUND

	↲	↓	↳	U	⇧
AM	0	1383	165	0	1435
NOON	0	0	0	0	0
PM	0	1257	49	0	1338
	0	1	1	0	

Anneliese School Entrance WESTBOUND

		PM	NOON	AM
0	↰	56	0	143
1	←	0	0	0
0	↱	10	0	17
0	U	0	0	0
	⇨	57	0	192

Anneliese School Entrance EASTBOUND

AM	NOON	PM		
0	0	0	⇦	
0	0	0	U	0
0	0	0	↱	0
0	0	0	→	0
0	0	0	↴	0

CONTROL

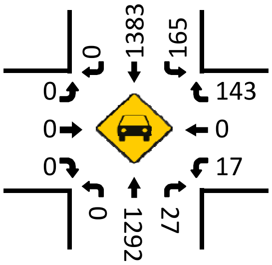
No Control

	AM	NOON	PM
TEV	3027	0	2662
PHF	0.97		0.98

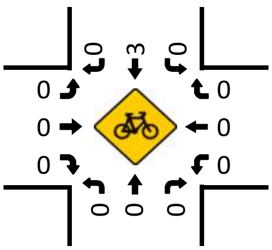
SR-133 NORTHBOUND

	⇩	U	↰	↑	↱
		0	0	1	0
PM	1267	0	0	1282	8
NOON	0	0	0	0	0
AM	1400	0	0	1292	27

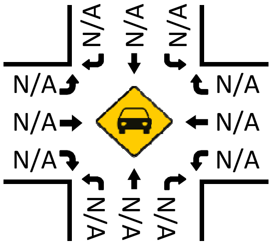
Total Vehicles (AM)



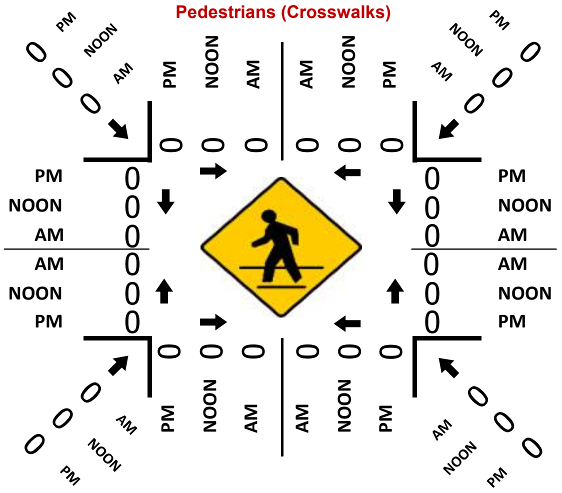
Bikes (AM)



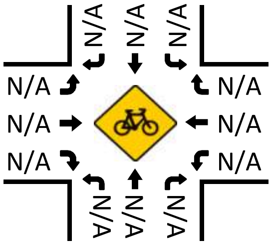
Total Vehicles (Noon)



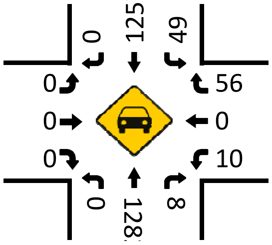
Pedestrians (Crosswalks)



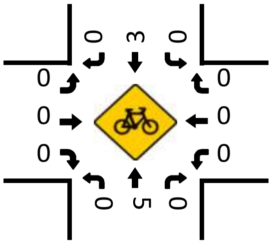
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



Prepared by NDS/ATD

VOLUME

SR 133 & Vicinity of the ACT V Parking Lot

Day: Thursday
Date: 11/30/2017

City: Laguna Beach
Project #: CA17_1253_001

DAILY TOTALS	NB	SB	EB	WB	Total
	17,469	17,668	0	0	35,137

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	0		39				39		**12:00**	337		286				623	
00:15	3		33				36		**12:15**	282		267				549	
00:30	24		28				52		**12:30**	299		249				548	
00:45	17	44	13	113			30	157	**12:45**	287	1205	257	1059			544	2264
01:00	25		12				37		**13:00**	294		286				580	
01:15	11		8				19		**13:15**	288		261				549	
01:30	18		7				25		**13:30**	280		278				558	
01:45	13	67	9	36			22	103	**13:45**	314	1176	257	1082			571	2258
02:00	6		5				11		**14:00**	325		253				578	
02:15	8		2				10		**14:15**	311		277				588	
02:30	9		3				12		**14:30**	327		321				648	
02:45	3	26	6	16			9	42	**14:45**	350	1313	296	1147			646	2460
03:00	4		11				15		**15:00**	316		255				571	
03:15	6		6				12		**15:15**	338		257				595	
03:30	9		9				18		**15:30**	291		284				575	
03:45	7	26	18	44			25	70	**15:45**	283	1228	305	1101			588	2329
04:00	7		12				19		**16:00**	324		317				641	
04:15	10		17				27		**16:15**	301		305				606	
04:30	18		26				44		**16:30**	320		335				655	
04:45	21	56	43	98			64	154	**16:45**	308	1253	274	1231			582	2484
05:00	36		38				74		**17:00**	303		283				586	
05:15	56		48				104		**17:15**	346		295				641	
05:30	68		66				134		**17:30**	318		263				581	
05:45	81	241	95	247			176	488	**17:45**	289	1256	285	1126			574	2382
06:00	75		107				182		**18:00**	239		292				531	
06:15	97		159				256		**18:15**	203		247				450	
06:30	176		213				389		**18:30**	210		287				497	
06:45	224	572	304	783			528	1355	**18:45**	175	827	261	1087			436	1914
07:00	218		348				566		**19:00**	194		230				424	
07:15	240		344				584		**19:15**	156		203				359	
07:30	323		353				676		**19:30**	165		179				344	
07:45	307	1088	337	1382			644	2470	**19:45**	165	680	179	791			344	1471
08:00	324		296				620		**20:00**	149		157				306	
08:15	322		317				639		**20:15**	152		147				299	
08:30	340		304				644		**20:30**	126		141				267	
08:45	336	1322	305	1222			641	2544	**20:45**	111	538	143	588			254	1126
09:00	329		346				675		**21:00**	146		126				272	
09:15	266		340				606		**21:15**	168		121				289	
09:30	330		346				676		**21:30**	132		130				262	
09:45	258	1183	299	1331			557	2514	**21:45**	136	582	100	477			236	1059
10:00	281		248				529		**22:00**	118		92				210	
10:15	241		281				522		**22:15**	112		89				201	
10:30	272		242				514		**22:30**	111		95				206	
10:45	292	1086	265	1036			557	2122	**22:45**	84	425	62	338			146	763
11:00	235		292				527		**23:00**	74		66				140	
11:15	247		293				540		**23:15**	58		47				105	
11:30	264		280				544		**23:30**	62		42				104	
11:45	297	1043	280	1145			577	2188	**23:45**	38	232	33	188			71	420
TOTALS		6754		7453				**14207**	**TOTALS**		10715		10215				**20930**
SPLIT %		47.5%		52.5%				**40.4%**	**SPLIT %**		51.2%		48.8%				**59.6%**

DAILY TOTALS	NB	SB	EB	WB	Total
	17,469	17,668	0	0	35,137

AM Peak Hour	08:15	07:00			**08:15**	**PM Peak Hour**	14:30	15:45			**15:45**
AM Pk Volume	1327	1382			**2599**	**PM Pk Volume**	1331	1262			**2490**
Pk Hr Factor	0.976	0.979			**0.963**	**Pk Hr Factor**	0.951	0.942			**0.950**
7 - 9 Volume	2410	2604	0	0	**5014**	**4 - 6 Volume**	2509	2357	0	0	**4866**
7 - 9 Peak Hour	08:00	07:00			**07:30**	**4 - 6 Peak Hour**	16:30	16:00			**16:00**
7 - 9 Pk Volume	1322	1382	0	0	**2579**	**4 - 6 Pk Volume**	1277	1231	0	0	**2484**
Pk Hr Factor	0.972	0.979	0.000	0.000	**0.954**	**Pk Hr Factor**	0.923	0.919	0.000	0.000	**0.948**

Prepared by NDS/ATD

VOLUME

SR 133 & Vicinity of the ACT V Parking Lot

Day: Saturday
Date: 12/2/2017

City: Laguna Beach
Project #: CA17_1253_001

DAILY TOTALS	NB	SB	EB	WB	Total
	18,536	18,503	0	0	37,039

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	133		49				182		12:00	325		346				671	
00:15	105		49				154		12:15	347		319				666	
00:30	97		48				145		12:30	361		335				696	
00:45	92	427	37	183			129	610	12:45	343	1376	318	1318			661	2694
01:00	79		32				111		13:00	312		339				651	
01:15	65		31				96		13:15	346		351				697	
01:30	58		29				87		13:30	333		334				667	
01:45	49	251	29	121			78	372	13:45	324	1315	364	1388			688	2703
02:00	41		27				68		14:00	333		317				650	
02:15	36		17				53		14:15	299		328				627	
02:30	32		11				43		14:30	332		347				679	
02:45	14	123	9	64			23	187	14:45	322	1286	369	1361			691	2647
03:00	16		8				24		15:00	341		342				683	
03:15	12		12				24		15:15	338		339				677	
03:30	15		14				29		15:30	366		368				734	
03:45	19	62	14	48			33	110	15:45	300	1345	291	1340			591	2685
04:00	11		19				30		16:00	297		325				622	
04:15	8		8				16		16:15	345		343				688	
04:30	12		20				32		16:30	328		353				681	
04:45	20	51	22	69			42	120	16:45	362	1332	350	1371			712	2703
05:00	24		33				57		17:00	294		303				597	
05:15	19		39				58		17:15	351		258				609	
05:30	39		64				103		17:30	330		257				587	
05:45	32	114	92	228			124	342	17:45	327	1302	269	1087			596	2389
06:00	43		73				116		18:00	267		218				485	
06:15	60		93				153		18:15	254		228				482	
06:30	86		159				245		18:30	241		225				466	
06:45	102	291	167	492			269	783	18:45	223	985	220	891			443	1876
07:00	104		151				255		19:00	231		192				423	
07:15	130		217				347		19:15	258		179				437	
07:30	131		226				357		19:30	202		184				386	
07:45	149	514	245	839			394	1353	19:45	161	852	152	707			313	1559
08:00	145		261				406		20:00	125		153				278	
08:15	181		254				435		20:15	145		141				286	
08:30	200		267				467		20:30	151		142				293	
08:45	216	742	305	1087			521	1829	20:45	140	561	141	577			281	1138
09:00	205		265				470		21:00	164		128				292	
09:15	270		308				578		21:15	154		130				284	
09:30	251		334				585		21:30	163		151				314	
09:45	278	1004	320	1227			598	2231	21:45	175	656	159	568			334	1224
10:00	245		306				551		22:00	243		142				385	
10:15	260		352				612		22:15	292		131				423	
10:30	292		314				606		22:30	218		119				337	
10:45	312	1109	369	1341			681	2450	22:45	199	952	110	502			309	1454
11:00	291		347				638		23:00	177		110				287	
11:15	306		325				631		23:15	170		83				253	
11:30	325		353				678		23:30	153		89				242	
11:45	336	1258	331	1356			667	2614	23:45	128	628	56	338			184	966
TOTALS		5946		7055				**13001**	**TOTALS**		12590		11448				**24038**
SPLIT %		45.7%		54.3%				**35.1%**	**SPLIT %**		52.4%		47.6%				**64.9%**

DAILY TOTALS	NB	SB	EB	WB	Total
	18,536	18,503	0	0	37,039

AM Peak Hour	11:45	10:45			**11:45**	**PM Peak Hour**	12:00	14:45			**14:45**
AM Pk Volume	1369	1394			**2700**	**PM Pk Volume**	1376	1418			**2785**
Pk Hr Factor	0.948	0.944			**0.970**	**Pk Hr Factor**	0.953	0.961			**0.949**
7 - 9 Volume	1256	1926	0	0	**3182**	**4 - 6 Volume**	2634	2458	0	0	**5092**
7 - 9 Peak Hour	08:00	08:00			**08:00**	**4 - 6 Peak Hour**	16:45	16:00			**16:00**
7 - 9 Pk Volume	742	1087	0	0	**1829**	**4 - 6 Pk Volume**	1337	1371	0	0	**2703**
Pk Hr Factor	0.859	0.891	0.000	0.000	**0.878**	**Pk Hr Factor**	0.923	0.971	0.000	0.000	**0.949**

Prepared by NDS/ATD

VOLUME

SR 133 & Laguna College of Art and Design

Day: Thursday
Date: 11/30/2017

City: Laguna Beach
Project #: CA17_1253_002

DAILY TOTALS	NB	SB	EB	WB	Total
	17,285	17,651	0	0	34,936

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	26		26				52		12:00	321		286				607	
00:15	19		19				38		12:15	282		269				551	
00:30	23		25				48		12:30	276		246				522	
00:45	16	84	12	82			28	166	12:45	283	1162	266	1067			549	2229
01:00	24		11				35		13:00	275		267				542	
01:15	10		7				17		13:15	278		263				541	
01:30	18		6				24		13:30	283		283				566	
01:45	13	65	7	31			20	96	13:45	285	1121	258	1071			543	2192
02:00	5		5				10		14:00	307		249				556	
02:15	9		3				12		14:15	307		278				585	
02:30	8		2				10		14:30	338		305				643	
02:45	4	26	9	19			13	45	14:45	339	1291	277	1109			616	2400
03:00	4		7				11		15:00	316		262				578	
03:15	6		5				11		15:15	324		245				569	
03:30	7		11				18		15:30	280		299				579	
03:45	7	24	19	42			26	66	15:45	281	1201	317	1123			598	2324
04:00	8		10				18		16:00	284		304				588	
04:15	9		17				26		16:15	308		321				629	
04:30	16		27				43		16:30	319		326				645	
04:45	20	53	39	93			59	146	16:45	321	1232	269	1220			590	2452
05:00	33		39				72		17:00	292		275				567	
05:15	51		60				111		17:15	347		295				642	
05:30	61		74				135		17:30	318		259				577	
05:45	69	214	108	281			177	495	17:45	290	1247	283	1112			573	2359
06:00	74		112				186		18:00	255		304				559	
06:15	103		155				258		18:15	205		239				444	
06:30	172		220				392		18:30	219		295				514	
06:45	208	557	298	785			506	1342	18:45	200	879	271	1109			471	1988
07:00	208		341				549		19:00	191		229				420	
07:15	233		349				582		19:15	169		188				357	
07:30	318		359				677		19:30	166		177				343	
07:45	288	1047	339	1388			627	2435	19:45	162	688	182	776			344	1464
08:00	317		300				617		20:00	154		152				306	
08:15	307		325				632		20:15	157		152				309	
08:30	312		313				625		20:30	129		141				270	
08:45	313	1249	326	1264			639	2513	20:45	114	554	139	584			253	1138
09:00	326		356				682		21:00	143		121				264	
09:15	241		342				583		21:15	195		119				314	
09:30	317		347				664		21:30	149		137				286	
09:45	258	1142	297	1342			555	2484	21:45	153	640	101	478			254	1118
10:00	247		269				516		22:00	137		97				234	
10:15	266		280				546		22:15	118		87				205	
10:30	263		246				509		22:30	105		88				193	
10:45	306	1082	266	1061			572	2143	22:45	92	452	63	335			155	787
11:00	228		284				512		23:00	79		65				144	
11:15	252		273				525		23:15	55		47				102	
11:30	258		270				528		23:30	67		42				109	
11:45	297	1035	263	1090			560	2125	23:45	39	240	35	189			74	429
TOTALS		6578		7478				**14056**	**TOTALS**		10707		10173				**20880**
SPLIT %		46.8%		53.2%				**40.2%**	**SPLIT %**		51.3%		48.7%				**59.8%**

DAILY TOTALS	NB	SB	EB	WB	Total
	17,285	17,651	0	0	34,936

AM Peak Hour	08:15	07:00			**08:15**	**PM Peak Hour**	14:30	15:45			**15:45**
AM Pk Volume	1258	1388			**2578**	**PM Pk Volume**	1317	1268			**2460**
Pk Hr Factor	0.965	0.967			**0.945**	**Pk Hr Factor**	0.971	0.972			**0.953**
7 - 9 Volume	2296	2652	0	0	**4948**	**4 - 6 Volume**	2479	2332	0	0	**4811**
7 - 9 Peak Hour	08:00	07:00			**07:30**	**4 - 6 Peak Hour**	16:30	16:00			**16:00**
7 - 9 Pk Volume	1249	1388	0	0	**2553**	**4 - 6 Pk Volume**	1279	1220	0	0	**2452**
Pk Hr Factor	0.985	0.967	0.000	0.000	**0.943**	**Pk Hr Factor**	0.921	0.936	0.000	0.000	**0.950**

Prepared by NDS/ATD

VOLUME

SR 133 & Laguna College of Art and Design

Day: Saturday
Date: 12/2/2017

City: Laguna Beach
Project #: CA17_1253_002

DAILY TOTALS	NB	SB	EB	WB	Total
	18,169	18,274	0	0	36,443

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	136		49				185		12:00	307		339				646	
00:15	118		48				166		12:15	326		319				645	
00:30	97		48				145		12:30	355		309				664	
00:45	87	438	36	181			123	619	12:45	310	1298	323	1290			633	2588
01:00	86		30				116		13:00	301		315				616	
01:15	63		33				96		13:15	320		337				657	
01:30	58		29				87		13:30	329		337				666	
01:45	45	252	30	122			75	374	13:45	310	1260	348	1337			658	2597
02:00	44		23				67		14:00	328		315				643	
02:15	34		17				51		14:15	295		302				597	
02:30	32		10				42		14:30	335		341				676	
02:45	15	125	7	57			22	182	14:45	314	1272	350	1308			664	2580
03:00	16		8				24		15:00	329		328				657	
03:15	10		11				21		15:15	345		346				691	
03:30	14		14				28		15:30	366		350				716	
03:45	15	55	14	47			29	102	15:45	279	1319	283	1307			562	2626
04:00	13		17				30		16:00	293		320				613	
04:15	9		9				18		16:15	324		338				662	
04:30	12		20				32		16:30	344		345				689	
04:45	19	53	24	70			43	123	16:45	351	1312	340	1343			691	2655
05:00	21		30				51		17:00	284		287				571	
05:15	19		43				62		17:15	354		263				617	
05:30	37		65				102		17:30	321		249				570	
05:45	31	108	90	228			121	336	17:45	334	1293	267	1066			601	2359
06:00	42		77				119		18:00	276		211				487	
06:15	59		96				155		18:15	256		211				467	
06:30	80		159				239		18:30	231		226				457	
06:45	99	280	165	497			264	777	18:45	225	988	215	863			440	1851
07:00	99		159				258		19:00	235		200				435	
07:15	130		223				353		19:15	263		162				425	
07:30	123		228				351		19:30	196		185				381	
07:45	154	506	251	861			405	1367	19:45	165	859	151	698			316	1557
08:00	143		266				409		20:00	117		147				264	
08:15	175		244				419		20:15	147		140				287	
08:30	189		280				469		20:30	153		137				290	
08:45	221	728	320	1110			541	1838	20:45	142	559	142	566			284	1125
09:00	198		274				472		21:00	167		130				297	
09:15	250		307				557		21:15	154		124				278	
09:30	257		332				589		21:30	163		147				310	
09:45	262	967	321	1234			583	2201	21:45	172	656	159	560			331	1216
10:00	247		318				565		22:00	237		149				386	
10:15	238		346				584		22:15	295		129				424	
10:30	263		320				583		22:30	220		115				335	
10:45	291	1039	351	1335			642	2374	22:45	200	952	110	503			310	1455
11:00	291		348				639		23:00	177		111				288	
11:15	286		329				615		23:15	160		84				244	
11:30	319		345				664		23:30	145		85				230	
11:45	322	1218	333	1355			655	2573	23:45	150	632	56	336			206	968
TOTALS		5769		7097				**12866**	**TOTALS**		12400		11177				**23577**
SPLIT %		44.8%		55.2%				**35.3%**	**SPLIT %**		52.6%		47.4%				**64.7%**

DAILY TOTALS	NB	SB	EB	WB	Total
	18,169	18,274	0	0	36,443

AM Peak Hour	11:45	10:45			**11:30**	**PM Peak Hour**	14:45	14:45			**14:45**
AM Pk Volume	1310	1373			**2610**	**PM Pk Volume**	1354	1374			**2728**
Pk Hr Factor	0.923	0.978			**0.983**	**Pk Hr Factor**	0.925	0.981			**0.953**
7 - 9 Volume	1234	1971	0	0	**3205**	**4 - 6 Volume**	2605	2409	0	0	**5014**
7 - 9 Peak Hour	08:00	08:00			**08:00**	**4 - 6 Peak Hour**	16:30	16:00			**16:00**
7 - 9 Pk Volume	728	1110	0	0	**1838**	**4 - 6 Pk Volume**	1333	1343	0	0	**2655**
Pk Hr Factor	0.824	0.867	0.000	0.000	**0.849**	**Pk Hr Factor**	0.941	0.973	0.000	0.000	**0.961**

Prepared by NDS/ATD

VOLUME

SR 133 & Stan Oaks Dr

Day: Thursday
Date: 11/30/2017

City: Laguna Beach
Project #: CA17_1253_003

DAILY TOTALS	NB	SB	EB	WB	Total
	17,651	17,943	0	0	35,594

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	28		28				56		12:00	321		272				593	
00:15	25		18				43		12:15	278		274				552	
00:30	27		22				49		12:30	280		244				524	
00:45	15	95	13	81			28	176	12:45	286	1165	249	1039			535	2204
01:00	31		12				43		13:00	281		275				556	
01:15	12		6				18		13:15	273		287				560	
01:30	20		6				26		13:30	278		287				565	
01:45	13	76	9	33			22	109	13:45	296	1128	269	1118			565	2246
02:00	7		5				12		14:00	304		236				540	
02:15	7		3				10		14:15	323		288				611	
02:30	8		3				11		14:30	328		293				621	
02:45	5	27	8	19			13	46	14:45	354	1309	288	1105			642	2414
03:00	4		7				11		15:00	322		267				589	
03:15	7		5				12		15:15	338		256				594	
03:30	6		14				20		15:30	309		325				634	
03:45	10	27	20	46			30	73	15:45	289	1258	335	1183			624	2441
04:00	6		12				18		16:00	314		320				634	
04:15	11		13				24		16:15	309		310				619	
04:30	16		29				45		16:30	333		302				635	
04:45	22	55	48	102			70	157	16:45	329	1285	274	1206			603	2491
05:00	32		38				70		17:00	303		265				568	
05:15	55		63				118		17:15	354		298				652	
05:30	60		77				137		17:30	313		281				594	
05:45	69	216	116	294			185	510	17:45	303	1273	302	1146			605	2419
06:00	74		110				184		18:00	287		278				565	
06:15	106		163				269		18:15	220		244				464	
06:30	172		245				417		18:30	228		289				517	
06:45	199	551	305	823			504	1374	18:45	194	929	286	1097			480	2026
07:00	200		342				542		19:00	208		230				438	
07:15	255		349				604		19:15	165		181				346	
07:30	315		368				683		19:30	178		180				358	
07:45	296	1066	329	1388			625	2454	19:45	164	715	193	784			357	1499
08:00	316		305				621		20:00	158		145				303	
08:15	300		342				642		20:15	150		153				303	
08:30	303		351				654		20:30	128		143				271	
08:45	301	1220	346	1344			647	2564	20:45	117	553	135	576			252	1129
09:00	334		356				690		21:00	150		126				276	
09:15	245		354				599		21:15	199		121				320	
09:30	310		353				663		21:30	150		130				280	
09:45	249	1138	305	1368			554	2506	21:45	185	684	96	473			281	1157
10:00	238		305				543		22:00	179		99				278	
10:15	266		269				535		22:15	126		90				216	
10:30	275		256				531		22:30	109		84				193	
10:45	292	1071	277	1107			569	2178	22:45	97	511	64	337			161	848
11:00	242		270				512		23:00	75		64				139	
11:15	253		269				522		23:15	66		47				113	
11:30	251		274				525		23:30	72		38				110	
11:45	299	1045	273	1086			572	2131	23:45	41	254	39	188			80	442
TOTALS		6587		7691				**14278**	**TOTALS**		11064		10252				**21316**
SPLIT %		46.1%		53.9%				**40.1%**	**SPLIT %**		51.9%		48.1%				**59.9%**

DAILY TOTALS	NB	SB	EB	WB	Total
	17,651	17,943	0	0	35,594

AM Peak Hour	08:15	08:45			**08:15**	**PM Peak Hour**	14:30	15:30			**15:45**
AM Pk Volume	1238	1409			**2633**	**PM Pk Volume**	1342	1290			**2512**
Pk Hr Factor	0.927	0.989			**0.954**	**Pk Hr Factor**	0.948	0.963			**0.989**
7 - 9 Volume	2286	2732	0	0	**5018**	**4 - 6 Volume**	2558	2352	0	0	**4910**
7 - 9 Peak Hour	07:30	07:00			**07:30**	**4 - 6 Peak Hour**	16:30	16:00			**16:00**
7 - 9 Pk Volume	1227	1388	0	0	**2571**	**4 - 6 Pk Volume**	1319	1206	0	0	**2491**
Pk Hr Factor	0.971	0.943	0.000	0.000	**0.941**	**Pk Hr Factor**	0.931	0.942	0.000	0.000	**0.981**

Prepared by NDS/ATD

VOLUME

SR 133 & Stan Oaks Dr

Day: Saturday
Date: 12/2/2017

City: Laguna Beach
Project #: CA17_1253_003

DAILY TOTALS	NB	SB	EB	WB	Total
	18,577	18,574	0	0	37,151

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	136		46				182		12:00	323		328				651	
00:15	126		48				174		12:15	331		334				665	
00:30	97		50				147		12:30	337		316				653	
00:45	83	442	39	183			122	625	12:45	329	1320	321	1299			650	2619
01:00	90		30				120		13:00	320		325				645	
01:15	70		29				99		13:15	310		341				651	
01:30	66		29				95		13:30	341		349				690	
01:45	52	278	28	116			80	394	13:45	338	1309	348	1363			686	2672
02:00	40		25				65		14:00	335		321				656	
02:15	38		18				56		14:15	286		329				615	
02:30	29		13				42		14:30	342		319				661	
02:45	18	125	8	64			26	189	14:45	321	1284	345	1314			666	2598
03:00	20		11				31		15:00	354		340				694	
03:15	10		11				21		15:15	336		350				686	
03:30	15		12				27		15:30	371		345				716	
03:45	14	59	14	48			28	107	15:45	313	1374	313	1348			626	2722
04:00	15		18				33		16:00	316		319				635	
04:15	9		9				18		16:15	344		340				684	
04:30	9		20				29		16:30	355		333				688	
04:45	23	56	28	75			51	131	16:45	334	1349	330	1322			664	2671
05:00	18		29				47		17:00	330		274				604	
05:15	22		50				72		17:15	361		272				633	
05:30	40		67				107		17:30	333		248				581	
05:45	33	113	88	234			121	347	17:45	346	1370	263	1057			609	2427
06:00	37		75				112		18:00	273		223				496	
06:15	62		104				166		18:15	267		207				474	
06:30	82		160				242		18:30	235		218				453	
06:45	93	274	174	513			267	787	18:45	225	1000	220	868			445	1868
07:00	105		169				274		19:00	226		194				420	
07:15	137		205				342		19:15	262		162				424	
07:30	117		250				367		19:30	192		180				372	
07:45	165	524	254	878			419	1402	19:45	186	866	161	697			347	1563
08:00	144		267				411		20:00	127		142				269	
08:15	185		238				423		20:15	140		142				282	
08:30	186		291				477		20:30	151		141				292	
08:45	234	749	350	1146			584	1895	20:45	148	566	138	563			286	1129
09:00	197		282				479		21:00	163		135				298	
09:15	245		306				551		21:15	152		126				278	
09:30	257		357				614		21:30	162		150				312	
09:45	249	948	348	1293			597	2241	21:45	178	655	158	569			336	1224
10:00	250		355				605		22:00	221		149				370	
10:15	245		356				601		22:15	318		134				452	
10:30	266		331				597		22:30	216		115				331	
10:45	309	1070	345	1387			654	2457	22:45	214	969	104	502			318	1471
11:00	286		353				639		23:00	173		111				284	
11:15	290		349				639		23:15	155		92				247	
11:30	317		344				661		23:30	159		83				242	
11:45	347	1240	348	1394			695	2634	23:45	150	637	55	341			205	978
TOTALS		5878		7331				**13209**	**TOTALS**		12699		11243				**23942**
SPLIT %		44.5%		55.5%				**35.6%**	**SPLIT %**		53.0%		47.0%				**64.4%**

DAILY TOTALS	NB	SB	EB	WB	Total
	18,577	18,574	0	0	37,151

AM Peak Hour	11:45	09:30			**11:30**	**PM Peak Hour**	14:45	14:45			**14:45**
AM Pk Volume	1338	1416			**2672**	**PM Pk Volume**	1382	1380			**2762**
Pk Hr Factor	0.964	0.992			**0.961**	**Pk Hr Factor**	0.931	0.986			**0.964**
7 - 9 Volume	1273	2024	0	0	**3297**	**4 - 6 Volume**	2719	2379	0	0	**5098**
7 - 9 Peak Hour	08:00	08:00			**08:00**	**4 - 6 Peak Hour**	16:30	16:00			**16:00**
7 - 9 Pk Volume	749	1146	0	0	**1895**	**4 - 6 Pk Volume**	1380	1322	0	0	**2671**
Pk Hr Factor	0.800	0.819	0.000	0.000	**0.811**	**Pk Hr Factor**	0.956	0.972	0.000	0.000	**0.971**

Prepared by NDS/ATD

VOLUME

SR 133 Bet. Dog Park & Willow Canyon Rd

Day: Thursday
Date: 11/30/2017

City: Laguna Beach
Project #: CA17_1253_004

DAILY TOTALS	NB	SB	EB	WB	Total
	17,653	17,886	0	0	35,539

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	34		23				57		12:00	317		280				597	
00:15	25		16				41		12:15	279		263				542	
00:30	24		22				46		12:30	289		251				540	
00:45	16	99	12	73			28	172	12:45	278	1163	242	1036			520	2199
01:00	26		13				39		13:00	292		265				557	
01:15	15		6				21		13:15	276		287				563	
01:30	19		5				24		13:30	277		284				561	
01:45	13	73	8	32			21	105	13:45	295	1140	266	1102			561	2242
02:00	6		4				10		14:00	291		242				533	
02:15	7		4				11		14:15	327		294				621	
02:30	10		3				13		14:30	316		288				604	
02:45	5	28	7	18			12	46	14:45	364	1298	290	1114			654	2412
03:00	4		6				10		15:00	317		254				571	
03:15	7		4				11		15:15	328		272				600	
03:30	5		15				20		15:30	305		331				636	
03:45	9	25	15	40			24	65	15:45	294	1244	341	1198			635	2442
04:00	6		12				18		16:00	336		294				630	
04:15	11		14				25		16:15	297		322				619	
04:30	16		29				45		16:30	334		302				636	
04:45	20	53	46	101			66	154	16:45	326	1293	273	1191			599	2484
05:00	33		38				71		17:00	316		254				570	
05:15	52		63				115		17:15	340		315				655	
05:30	61		69				130		17:30	314		296				610	
05:45	65	211	114	284			179	495	17:45	307	1277	306	1171			613	2448
06:00	65		118				183		18:00	308		272				580	
06:15	101		167				268		18:15	223		253				476	
06:30	147		265				412		18:30	222		294				516	
06:45	177	490	325	875			502	1365	18:45	199	952	284	1103			483	2055
07:00	190		352				542		19:00	225		217				442	
07:15	244		352				596		19:15	164		182				346	
07:30	310		358				668		19:30	207		188				395	
07:45	287	1031	327	1389			614	2420	19:45	159	755	198	785			357	1540
08:00	341		293				634		20:00	156		152				308	
08:15	317		326				643		20:15	166		152				318	
08:30	305		354				659		20:30	130		131				261	
08:45	302	1265	348	1321			650	2586	20:45	114	566	136	571			250	1137
09:00	325		332				657		21:00	145		121				266	
09:15	249		355				604		21:15	202		123				325	
09:30	306		351				657		21:30	169		118				287	
09:45	248	1128	298	1336			546	2464	21:45	187	703	97	459			284	1162
10:00	240		300				540		22:00	185		98				283	
10:15	260		270				530		22:15	120		92				212	
10:30	266		255				521		22:30	119		77				196	
10:45	295	1061	268	1093			563	2154	22:45	93	517	64	331			157	848
11:00	242		273				515		23:00	74		59				133	
11:15	253		272				525		23:15	65		43				108	
11:30	259		272				531		23:30	73		38				111	
11:45	276	1030	269	1086			545	2116	23:45	39	251	37	177			76	428
TOTALS		6494		7648				**14142**	**TOTALS**		11159		10238				**21397**
SPLIT %		45.9%		54.1%				**39.8%**	**SPLIT %**		52.2%		47.8%				**60.2%**

DAILY TOTALS	NB	SB	EB	WB	Total
	17,653	17,886	0	0	35,539

AM Peak Hour	08:00	07:00			**08:15**	**PM Peak Hour**	14:30	15:30			**15:30**
AM Pk Volume	1265	1389			**2609**	**PM Pk Volume**	1325	1288			**2520**
Pk Hr Factor	0.927	0.970			**0.990**	**Pk Hr Factor**	0.910	0.944			**0.991**
7 - 9 Volume	2296	2710	0	0	**5006**	**4 - 6 Volume**	2570	2362	0	0	**4932**
7 - 9 Peak Hour	08:00	07:00			**08:00**	**4 - 6 Peak Hour**	16:30	16:00			**16:00**
7 - 9 Pk Volume	1265	1389	0	0	**2586**	**4 - 6 Pk Volume**	1316	1191	0	0	**2484**
Pk Hr Factor	0.927	0.970	0.000	0.000	**0.981**	**Pk Hr Factor**	0.968	0.925	0.000	0.000	**0.976**

Prepared by NDS/ATD

VOLUME

SR 133 Bet. Dog Park & Willow Canyon Rd

Day: Saturday
Date: 12/2/2017

City: Laguna Beach
Project #: CA17_1253_004

DAILY TOTALS	NB	SB	EB	WB	Total
	18,587	18,548	0	0	37,135

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	135		45				180		12:00	321		337				658	
00:15	123		45				168		12:15	339		327				666	
00:30	94		51				145		12:30	326		319				645	
00:45	80	432	36	177			116	609	12:45	327	1313	325	1308			652	2621
01:00	92		31				123		13:00	319		305				624	
01:15	68		27				95		13:15	332		351				683	
01:30	61		28				89		13:30	346		327				673	
01:45	53	274	28	114			81	388	13:45	345	1342	349	1332			694	2674
02:00	43		25				68		14:00	341		300				641	
02:15	37		17				54		14:15	289		345				634	
02:30	28		11				39		14:30	324		314				638	
02:45	19	127	8	61			27	188	14:45	320	1274	341	1300			661	2574
03:00	17		10				27		15:00	360		329				689	
03:15	11		12				23		15:15	330		358				688	
03:30	15		10				25		15:30	362		351				713	
03:45	13	56	14	46			27	102	15:45	330	1382	324	1362			654	2744
04:00	15		14				29		16:00	326		309				635	
04:15	9		8				17		16:15	347		343				690	
04:30	10		19				29		16:30	352		331				683	
04:45	22	56	29	70			51	126	16:45	314	1339	327	1310			641	2649
05:00	18		24				42		17:00	334		282				616	
05:15	22		49				71		17:15	352		264				616	
05:30	34		66				100		17:30	334		252				586	
05:45	31	105	88	227			119	332	17:45	359	1379	265	1063			624	2442
06:00	33		75				108		18:00	291		220				511	
06:15	56		111				167		18:15	275		214				489	
06:30	69		195				264		18:30	223		228				451	
06:45	73	231	214	595			287	826	18:45	227	1016	212	874			439	1890
07:00	107		180				287		19:00	228		203				431	
07:15	137		205				342		19:15	258		185				443	
07:30	123		251				374		19:30	194		192				386	
07:45	158	525	263	899			421	1424	19:45	189	869	168	748			357	1617
08:00	172		246				418		20:00	131		133				264	
08:15	188		221				409		20:15	144		145				289	
08:30	185		281				466		20:30	148		145				293	
08:45	202	747	341	1089			543	1836	20:45	145	568	138	561			283	1129
09:00	213		291				504		21:00	165		130				295	
09:15	241		302				543		21:15	160		127				287	
09:30	253		357				610		21:30	208		133				341	
09:45	231	938	348	1298			579	2236	21:45	178	711	152	542			330	1253
10:00	264		350				614		22:00	215		144				359	
10:15	242		351				593		22:15	325		127				452	
10:30	263		328				591		22:30	214		115				329	
10:45	309	1078	342	1371			651	2449	22:45	210	964	99	485			309	1449
11:00	270		346				616		23:00	175		108				283	
11:15	291		337				628		23:15	155		91				246	
11:30	325		356				681		23:30	164		84				248	
11:45	336	1222	341	1380			677	2602	23:45	145	639	53	336			198	975
TOTALS	5791		7327				**13118**		**TOTALS**	12796		11221				**24017**	
SPLIT %	44.1%		55.9%				**35.3%**		**SPLIT %**	53.3%		46.7%				**64.7%**	

DAILY TOTALS	NB	SB	EB	WB	Total
	18,587	18,548	0	0	37,135

	NB	SB	EB	WB	Total		NB	SB	EB	WB	Total
AM Peak Hour	11:45	09:30			**11:30**	**PM Peak Hour**	15:00	14:45			**14:45**
AM Pk Volume	1322	1406			**2682**	**PM Pk Volume**	1382	1379			**2751**
Pk Hr Factor	0.975	0.985			**0.985**	**Pk Hr Factor**	0.954	0.963			**0.965**
7 - 9 Volume	1272	1988	0	0	**3260**	**4 - 6 Volume**	2718	2373	0	0	**5091**
7 - 9 Peak Hour	08:00	08:00			**08:00**	**4 - 6 Peak Hour**	17:00	16:00			**16:00**
7 - 9 Pk Volume	747	1089	0	0	**1836**	**4 - 6 Pk Volume**	1379	1310	0	0	**2649**
Pk Hr Factor	0.925	0.798	0.000	0.000	**0.845**	**Pk Hr Factor**	0.960	0.955	0.000	0.000	**0.960**

Appendix B. Accident Data

OTM22130
02/02/2022
10:00 AM

California Department of Transportation

Table B - Selective Accident Rate Calculation

Page# 1
Event ID: 4380075

Location Description	Rate Group (RUS)	No. of Accidents / Significance							Pers Kld Inj	ADT Main X-St	Total MV+ or MVM	Accident Rates					
												Actual			Average		
		Tot	Fat	Inj	F+I	Multi Veh	Wet	Dark				Fat	F+I	Tot	Fat	F+I	Tot
12 ORA 133 000.940 - 12 ORA 133 001.573 0001-0001 2016-01-01 2020-12-31 *60 mo.*	**.634 MI** H NORTH U	35 **H99**	0	14 **H95**	14 **H95**	30	2	5	0 15	17.8	20.64	0.000	.68	1.70	0.012	.40	.83
12 ORA 133 000.940 - 12 ORA 133 001.573 0001-0002 2016-01-01 2020-12-31 *60 mo.*	**.634 MI** H SOUTH U	16	0	7	7	10	0	3	0 17	17.8	20.64	0.000	.34	.78	0.012	.40	.83

Accident Rates expressed as: **# of accidents / Million vehicle miles**

+ denotes that **Million Vehicles** (MV) used in accident rates instead (for intersections and ramps).

For Ramps RUS only considers R(Rural) U(Urban)

California Department of Transportation

Table B - Selective Accident Rate Calculation

		No. of Accidents / Significance										Accident Rates					
												Actual			Average		
Location Description	**Rate Group (RUS)**	Tot	Fat	Inj	F+I	Multi Veh	Wet	Dark	**Pers** Kld Inj	**ADT** Main X-St	Total **MV+** or **MVM**	Fat	F+I	Tot	Fat	F+I	Tot
12 ORA 133 001.573 - 12 ORA 133 002.446 0001-0001 2016-01-01 2020-12-31 *60 mo.*	**.874 MI** H 11 NORTH U	30	0	16	16	26	2	13	0 22	18.3	29.17	0.000	.55	1.03	0.013	.40	.82
12 ORA 133 001.573 - 12 ORA 133 002.446 0001-0002 2016-01-01 2020-12-31 *60 mo.*	**.874 MI** H 11 SOUTH U	17	0	10	10	10	1	6	0 16	18.3	29.17	0.000	.34	.58	0.013	.40	.82

Accident Rates expressed as: **# of accidents / Million vehicle miles**

+ denotes that **Million Vehicles** (MV) used in accident rates instead (for intersections and ramps).

For Ramps RUS only considers R(Rural) U(Urban)

OTM22130
02/02/2022
10:17 AM

California Department of Transportation

Table B - Selective Accident Rate Calculation

Page# 1
Event ID: 4380079

Location Description	**Rate Group (RUS)**	**No. of Accidents / Significance**							**Pers** Kld Inj	**ADT** Main X-St	Total **MV+** or **MVM**	**Accident Rates**					
		Tot	Fat	Inj	F+I	Multi Veh	Wet	Dark				**Actual**			**Average**		
												Fat	F+I	Tot	Fat	F+I	Tot
12 ORA 133 002.446 - 12 ORA 133 003.330 0001-0001 2016-01-01 2020-12-31 *60 mo.*	**.885 MI** H 11 NORTH U	36 **H97**	0	20 **H97**	20 **H97**	26	2	10	0 23	18.8	30.37	0.000	.66	1.19	0.013	.40	.82
12 ORA 133 002.446 - 12 ORA 133 003.330 0001-0002 2016-01-01 2020-12-31 *60 mo.*	**.885 MI** H 11 SOUTH U	24	0	17 **H90**	17	14	2	5	0 21	18.8	30.37	0.000	.56	.79	0.013	.40	.82

Accident Rates expressed as: **# of accidents / Million vehicle miles**

+ denotes that **Million Vehicles** (MV) used in accident rates instead (for intersections and ramps).

For Ramps RUS only considers R(Rural) U(Urban)

OTM22130
02/02/2022
10:22 AM

California Department of Transportation

Table B - Selective Accident Rate Calculation

Event ID: 4380080

		No. of Accidents / Significance										Accident Rates					
												Actual			Average		
Location Description	**Rate Group (RUS)**	Tot	Fat	Inj	F+I	Multi Veh	Wet	Dark	**Pers** Kld Inj	**ADT** Main X-St	Total **MV+** or **MVM**	Fat	F+I	Tot	Fat	F+I	Tot
12 ORA 133 003.330 - 12 ORA 133 003.415 0001-0001 2016-01-01 2020-12-31 *60 mo.*	**.086 MI** H 11 NORTH U	2	0	0	0	1	1	1	0 0	17.1	2.69	0.000	.00	.74	0.013	.40	.82
12 ORA 133 003.330 - 12 ORA 133 003.415 0001-0002 2016-01-01 2020-12-31 *60 mo.*	**.086 MI** H 11 SOUTH U	6 **H95**	0	2	2	4	0	1	0 4	17.1	2.69	0.000	.74	2.23	0.013	.40	.82

Accident Rates expressed as: **# of accidents / Million vehicle miles**

+ denotes that **Million Vehicles** (MV) used in accident rates instead (for intersections and ramps).

For Ramps RUS only considers R(Rural) U(Urban)

OTM22140
15-10-09
10:20 AM

Event ID: 3747323

California Department of Transportation

Wet Table C - Potential Investigation Locations

District 12 **WET Accidents**
Confidence Level **99.5** Interval **.2** MI
01-JUL-10 thru 30-JUN-13

Location Description	SCL RMP LNS	R U S	Rate Grp	Total Accidents / Significance 36 mo. ACCS	24 mo. ACCS	12 mo. ACCS	6 mo. ACCS	3 mo. ACCS	AVE ADT 1000 VEH Main	X-St.	36 MOS AVERAGE ACC & RATES NO OF ACC F+I	TOT	RATE/MVM-MV F+I	TOT	Req
133 ORA 008.287 TO 008.487 NORTH	05D	U	H 64	11 Y	5 Y	3 Y	2 Y	0 N	16.6	-	0.04	0.11	0.49	1.57	Req
241 ORA 18.668 241/NB ON FR S MARGARITA PK	O D	U	R 12	10 Y	4 Y	1 N	0 N	0 N	13.2	-	0.22	0.64	0.76	2.21 +	Req
405 ORA 11.438 405/NB ON NB HARBOR BLVD	O L	U	R 40	3 N	3 Y	3 Y	1 N	1 N	7.7	-	0.12	0.42	0.72	2.52 +	Req
405 ORA 9.441 405/SB ON FR BRISTOL ST	O G	U	R 24	14 Y	1 N	1 N	1 N	1 N	17.9	-	0.33	0.98	0.83	2.49 +	Req
405 ORA 011.260 TO 011.660 SOUTH	07D	U	H 67	40	1	1	1	0	153.6	-	1.44	4.71	1.02	3.50	C3
405 ORA 13.664 405/SEG NBOFF SB BROOKHURST	F L	U	R 38	5 Y	4 Y	3 Y	1 N	0 N	9.3	-	0.21	0.72	1.01	3.53 +	Req
405 ORA 13.978 405/SEG NBON NB BROOKHURST	O L	U	R 40	4 Y	4 Y	3 Y	1 N	0 N	9.6	-	0.15	0.53	0.72	2.52 +	Req
405 ORA 16.797 405/SEG NB ON FR NB RTE 39	O L	U	R 72	5 Y	4 Y	3 Y	0 N	0 N	14.9	-	0.24	0.81	0.73	2.49 +	Req
405 ORA 19.415 405/SEG SBTO EB WESTMINSTER	F L	U	R 38	4 Y	4 Y	3 Y	0 N	0 N	1.0	-	0.02	0.08	1.01	3.53 +	Req

\+ denotes MV used in rates.

`Req = investigation required (9, 6 or 3 or more accs. & significant in 36, 24 or 12 months, resp.)`

OTM22140
15-08-18
10:45 AM

California Department of Transportation

Table C - Potential Investigation Locations

Page# 1

Event ID: 3737047

District **12** **ALL** **Accidents**

Confidence Level **99.5** Interval **.2** MI

01-OCT-10 thru 30-SEP-13

				Total Accidents / Significance										AVE ADT 1000 VEH		12 MOS RATE ACCS/MV-MVM ACTUAL		AVERAGE		
Location Description	**SCL RMP LNS**	**R U S**	**Rate Grp**	**36 mo. ACCS**		**24 mo. ACCS**		**12 mo. ACCS**		**6 mo. ACCS**		**3 mo. ACCS**		**Main**	**X-St.**	**F+I**	**TOT**	**F+I**	**TOT**	**Req**
005 ORA 15.028 005/SB ON FROM EB OSO PKWY	O F	U	R 20	13	Y	12	Y	7	Y	3	N	1	N	5.8	-	1.89	3.31	0.18	0.57 +	Req
005 ORA 030.866 TO 031.066 SOUTH	06D	U	H 67	168	Y	117	Y	47	Y	17	Y	5	N	173.3	-	0.95	3.71	0.33	1.15	Req
005 ORA 35.684 005/SBOFF STCOLL/THECITY DR	F D	U	R 10	32	Y	19	Y	10	Y	8	Y	6	Y	7.8	-	3.16	3.51	0.35	1.01 +	Req
005 ORA 35.718 005/SEGNB OFFHOV TO DISNEY	F C	U	R 06	5	Y	4	Y	4	Y	3	Y	2	N	1.5	-	5.48	7.31	0.16	0.49 +	Req
005 ORA 41.745 005/SB ON FROM MAGNOLIA AVE	O D	U	R 12	19	Y	18	Y	8	Y	2	N	1	N	11.1	-	0.99	1.97	0.22	0.63 +	Req
022 ORA R007.738 TO R007.938 EAST	05D	U	H 66	49	Y	31	Y	16	Y	12	Y	4	N	109.5	-	1.13	2.00	0.28	0.94	Req
039 ORA 3.611 TALBERT AVE	XXX	U	I 14	-		35	Y	16	Y	6	N	3	N	65.4	4	0.36	0.63	0.11	0.27 +	Req
055 ORA T002.349 TO R002.549 SOUTH	03D	U	H 65	22	Y	15	Y	7	Y	4	N	2	N	45.1	-	0.61	2.13	0.18	0.58	Req
057 ORA 019.641 TO 019.841 NORTH	05D	U	H 66	115	Y	85	Y	37	Y	9	N	2	N	122.1	-	0.90	4.15	0.31	1.01	Req
073 ORA 21.798 073/NB ON FR NB NEWPORT COAST	O L	U	R 40	6	N	5	N	4	N	4	Y	1	N	4.6	-	1.19	2.37	0.21	0.73 +	Req
091 ORA R001.500 TO R001.700 EAST	05D	U	H 66	25	N	22	N	16	N	13	Y	0	N	129.4	-	0.11	1.69	0.32	1.06	Req
091 ORA R001.700 TO R001.900 WEST	05D	U	H 66	34	N	25	N	19	N	13	Y	3	N	130.2	-	0.42	2.00	0.32	1.06	Req
091 ORA 004.347 TO 004.747 WEST	03D	U	H 65	93		66		41		26		19		128.9	-	0.90	2.18	0.37	1.16	C1
133 ORA 001.050 TO 001.250 NORTH	01D	U	H 11	16	Y	13	Y	5	N	5	Y	4	Y	18.8	-	2.92	3.65	0.54	1.29	Req
133 ORA 001.270 TO 001.470 NORTH	01D	U	H 11	19	Y	16	Y	9	Y	4	N	4	Y	22.5	-	1.22	5.48	0.54	1.29	Req
241 ORA 033.848 TO 034.048 SOUTH	03D	S	H 61	8	Y	8	Y	7	Y	5	Y	5	Y	23.8	-	0.58	4.03	0.11	0.35	Req
405 ORA 011.520 TO 011.720 NORTH	06D	U	H 67	71	Y	50	Y	23	Y	7	N	4	N	156.4	-	0.88	2.02	0.30	1.06	Req
405 ORA 22.705 405/SB OFF SEAL BEACH BLVD	F G	U	R 22	24	Y	18	Y	6	Y	2	N	2	N	3.9	-	2.09	4.18	0.33	1.00 +	Req

\+ denotes MV used in rates.

`Req = investigation required (4 or more accs. & significant in 12, 6, or 3 months)`

OTM22140
16-09-08
12:06 PM

Event ID: 3849861

California Department of Transportation

Table C - Potential Investigation Locations

District **12** **ALL** **Accidents**
Confidence Level **99.5** Interval **.2** MI
01-OCT-11 thru 30-SEP-14

Location Description	SCL RMP LNS	R U S	Rate Grp	36 mo. ACCS	Total Accidents / Significance 24 mo. ACCS	12 mo. ACCS	6 mo. ACCS	3 mo. ACCS	AVE ADT 1000 VEH Main	X-St.	12 MOS RATE ACCS/MV-MVM ACTUAL F+I	ACTUAL TOT	AVERAGE F+I	AVERAGE TOT	Req
091 ORA 001.029 TO 001.229 WEST	03D	U	H 65	51 Y	38 Y	22 Y	12 N	6 N	124.5	-	0.44	2.42	0.35	1.13	Req
091 ORA 003.627 TO 003.827 WEST	03D	U	H 65	46 N	34 N	22 Y	9 N	6 N	133.0	-	0.62	2.27	0.36	1.19	Req
091 ORA 004.287 TO 004.487 WEST	03D	U	H 65	50 Y	40 Y	22 Y	8 N	6 N	129.3	-	0.42	2.33	0.35	1.16	Req
091 ORA 005.383 TO 005.583 WEST	05D	U	H 67	45 Y	30 Y	20 Y	11 Y	7 N	126.9	-	0.54	2.16	0.26	0.91	Req
091 ORA 3.502 091/SEGWB CONN FRONTAGE RD	Z A	U	R 02	22 Y	17 Y	9 Y	8 Y	6 Y	10.5	-	1.83	2.35	0.19	0.72 +	Req
091 ORA R009.810 TO R010.010 WEST	05D	U	H 67	50 N	35 N	20 N	13 N	10 Y	161.0	-	0.34	1.70	0.31	1.09	Req
091 ORA R015.964 TO R016.164 EAST	06D	U	H 67	29 N	24 N	18 Y	9 N	4 N	129.8	-	0.42	1.90	0.27	0.93	Req
133 ORA R 4.173 ON/OFF RAMPS(RTE 73) RT	XXX	U	I 29	14 Y	12 Y	7 Y	5 Y	3 N	21.4	.1	0.38	0.89	0.09	0.21 +	Req
405 ORA 002.655 TO 002.855 NORTH	06D	U	H 67	38 N	25 N	14 N	11 Y	7 N	124.9	-	0.44	1.54	0.26	0.90	Req
405 ORA 010.660 TO 010.860 NORTH	08D	U	H 67	31 N	22 N	17 N	12 N	9 Y	146.1	-	0.47	1.59	0.29	1.01	Req
405 ORA 011.520 TO 011.720 NORTH	06D	U	H 67	79 Y	52 Y	27 Y	14 Y	6 N	156.1	-	0.44	2.37	0.30	1.06	Req
405 ORA 20.277 405/NB OFF GARDEN GROVE/22	F D	U	R 10	43 Y	26 Y	15 Y	13 Y	9 Y	11.6	-	1.42	3.55	0.35	1.01 +	Req
405 ORA 22.705 405/SB OFF SEAL BEACH BLVD	F G	U	R 22	25 Y	13 Y	7 Y	3 N	2 N	3.9	-	2.79	4.88	0.33	1.00 +	Req
405 ORA 013.626 TO 013.826 NORTH	05D	U	H 66	61 Y	38 Y	20 N	12 N	10 Y	143.0	-	0.48	1.92	0.34	1.14	Req
405 ORA 021.088 TO 021.288 SOUTH	05D	U	H 67	64 N	45 N	27 N	18 Y	9 N	188.5	-	0.51	1.96	0.35	1.22	Req
605 ORA R001.175 TO R001.375 SOUTH	04D	U	H 66	53 Y	37 Y	17 Y	6 N	3 N	80.5	-	0.51	2.89	0.23	0.76	Req

\+ denotes MV used in rates.

`Req = investigation required (4 or more accs. & significant in 12, 6, or 3 months)`

OTM22140
14-12-17
11:20 AM

California Department of Transportation

Table C - Potential Investigation Locations

Event ID: 3682267

District 12 **ALL Accidents**
Confidence Level 99.5 Interval .2 MI
01-JAN-10 thru 31-DEC-12

				Total Accidents / Significance					AVE ADT 1000 VEH		12 MOS RATE ACCS/MV-MVM ACTUAL		AVERAGE		
Location Description	**SCL RMP LNS**	**R U S**	**Rate Grp**	**36 mo. ACCS**	**24 mo. ACCS**	**12 mo. ACCS**	**6 mo. ACCS**	**3 mo. ACCS**	**Main**	**X-St.**	**F+I**	**TOT**	**F+I**	**TOT**	**Req**
057 ORA 014.771 TO 014.971 NORTH	05D	U	H 67	46 Y	27 N	18 Y	14 Y	9 Y	125.0	-	0.55	1.97	0.26	0.91	Req
057 ORA 017.366 TO 017.566 SOUTH	05D	U	H 66	46 N	34 Y	20 Y	12 N	5 N	131.6	-	0.31	2.08	0.32	1.07	Req
057 ORA 018.661 TO 018.861 SOUTH	05D	U	H 66	41 N	29 N	18 N	12 Y	9 Y	122.0	-	0.79	2.02	0.31	1.01	Req
057 ORA 019.681 TO 019.881 SOUTH	05D	U	H 66	50 Y	37 Y	23 Y	8 N	2 N	121.6	-	0.90	2.59	0.31	1.01	Req
074 ORA 013.468 TO 013.868	02U	R	H 05	24	16	13	10	8	10.2	-	2.01	8.69	0.72	1.45	C2
091 ORA R002.485 TO R002.685 EAST	05D	U	H 66	60 Y	35 Y	20 Y	12 N	6 N	131.8	-	0.62	2.08	0.32	1.07	Req
091 ORA R 4.031 091/WB OFF TO MAGNOLIA AVE	F D	U	R 10	28 Y	20 Y	10 Y	7 Y	2 N	8.9	-	1.23	3.08	0.35	1.01 +	Req
133 ORA 002.928 TO 003.128 NORTH	01D	U	H 11	13 Y	12 Y	7 Y	1 N	1 N	18.8	-	1.46	5.11	0.54	1.29	Req
133 ORA 008.607 TO 008.807 SOUTH	02D	U	H 64	5 N	5 N	4 Y	3 Y	3 Y	17.0	-	0.81	3.22	0.13	0.43	Req
142 ORA 005.247 TO 005.447	02U	U	H 11	10 N	7 N	7 Y	4 N	2 N	16.1	-	1.70	5.97	0.54	1.29	Req
405 ORA 5.733 405/NB ON SB CULVER DR	O F	U	R 20	13 Y	10 Y	8 Y	6 Y	3 N	8.3	-	0.66	2.64	0.18	0.57 +	Req
405 ORA 15.199 405/SEG NB ON FR WB WARNER	O Z	U	R 50	11 N	8 N	8 Y	6 Y	3 N	8.1	-	1.01	2.71	0.25	0.75 +	Req
405 ORA 20.277 405/NB OFF GARDEN GROVE/22	F D	U	R 10	38 Y	26 Y	13 Y	5 N	3 N	11.6	-	0.71	3.08	0.35	1.01 +	Req
405 ORA 012.470 TO 012.670 NORTH	06D	U	H 67	78 Y	58 Y	37 Y	14 Y	7 N	146.0	-	0.94	3.47	0.29	1.01	Req
405 ORA 23.828 405/NB OFF TO NB RTE 605	F F	U	R 62	28 N	27 Y	17 Y	10 N	4 N	53.1	-	0.26	0.88	0.12	0.38 +	Req
405 ORA 013.626 TO 013.826 NORTH	05D	U	H 66	67 Y	44 Y	28 Y	15 Y	6 N	143.5	-	0.67	2.67	0.34	1.14	Req
405 ORA 022.528 TO 022.728 SOUTH	07D	U	H 67	99 Y	66 Y	34 Y	16 N	10 N	187.2	-	0.51	2.49	0.35	1.22	Req

\+ denotes MV used in rates.

`Req = investigation required (4 or more accs. & significant in 12, 6, or 3 months)`

OTM22140
15-10-09
10:20 AM

California Department of Transportation
Wet Table C - Potential Investigation Locations

Event ID: 3747323

District 12 **WET Accidents**
Confidence Level **99.5** Interval **.2** MI
01-JUL-10 thru 30-JUN-13

Location Description	SCL RMP LNS	R U S	Rate Grp	Total Accidents / Significance					AVE ADT 1000 VEH		36 MOS AVERAGE ACC & RATES				Req
				36 mo. ACCS	24 mo. ACCS	12 mo. ACCS	6 mo. ACCS	3 mo. ACCS	Main	X-St.	NO OF ACC F+I	NO OF ACC TOT	RATE/MVM-MV F+I	RATE/MVM-MV TOT	
039 ORA 008.383 TO 008.583 NORTH	04D	U	H 44	3 N	3 N	3 Y	1 N	0 N	35.9	-	0.36	0.76	2.26	4.82	Req
055 ORA R007.845 TO R008.045 NORTH	09D	U	H 66	7 Y	6 Y	3 N	0 N	0 N	114.1	-	0.49	1.61	0.99	3.22	Req
055 ORA 13.207 055/SB OFF TO WB RTE 22	F F	U	R 62	9 Y	4 N	3 N	3 Y	1 N	34.5	-	0.36	1.10	0.48	1.45 +	Req
055 ORA 17.233 055/SB OFF LINCOLN/TUSTIN	F H	U	R 26	5 Y	3 N	3 Y	1 N	0 N	9.1	-	0.17	0.57	0.83	2.86 +	Req
057 ORA 012.354 TO 012.554 NORTH	10D	U	H 66	10 Y	5 N	2 N	2 N	1 N	123.6	-	0.56	1.85	1.04	3.41	Req
057 ORA 21.204 057/SB OFF LAMBERT RD	F D	U	R 10	9 Y	5 Y	5 Y	3 Y	0 N	17.2	-	0.44	1.27	1.17	3.38 +	Req
073 ORA 024.715 TO 024.915 NORTH	08D	U	H 65	7 Y	6 Y	2 N	1 N	0 N	76.0	-	0.28	0.90	0.84	2.70	Req
074 ORA 011.807 TO 012.007	02U	R	H 08	11 Y	1 N	0 N	0 N	0 N	10.0	-	0.08	0.19	1.83	4.33	Req
074 ORA 013.468 TO 013.868	02U	R	H 05	17	12	10	2	0	10.2	-	0.14	0.42	2.36	4.73	C2
074 ORA 015.508 TO 015.708	02U	R	H 05	4 Y	4 Y	4 Y	2 Y	0 N	10.2	-	0.11	0.21	2.37	4.73	Req
074 ORA 015.968 TO 016.168	02U	R	H 05	9 Y	7 Y	3 Y	0 N	0 N	10.2	-	0.11	0.21	2.37	4.73	Req
091 ORA R002.207 TO R002.407 WEST	06D	U	H 67	6 N	6 Y	2 N	2 N	2 N	131.7	-	0.53	1.82	0.92	3.16	Req
091 ORA R 1.006 091/EB ON VALLEY VIEW ST	O D	U	R 12	11 Y	6 Y	4 Y	2 N	0 N	13.9	-	0.23	0.67	0.76	2.21 +	Req
091 ORA R002.485 TO R002.685 WEST	10D	U	H 66	12 Y	3 N	1 N	1 N	0 N	132.0	-	0.63	2.06	1.09	3.56	Req
091 ORA R002.485 TO R002.685 EAST	10D	U	H 66	10 Y	5 N	2 N	0 N	0 N	132.0	-	0.63	2.06	1.09	3.56	Req
091 ORA 003.367 TO 003.567 WEST	03D	U	H 65	16 Y	10 Y	3 N	2 N	0 N	132.7	-	0.71	2.28	1.22	3.93	Req
091 ORA 006.083 TO 006.283 EAST	09D	U	H 66	10 Y	3 N	1 N	0 N	0 N	114.2	-	0.50	1.63	0.99	3.25	Req
133 ORA 8.32 133/NB ON FR SB RTE 405	O L	U	R 72	12 Y	4 Y	3 Y	1 N	0 N	7.7	-	0.12	0.42	0.73	2.49 +	Req

\+ denotes MV used in rates.

`Req = investigation required (9, 6 or 3 or more accs. & significant in 36, 24 or 12 months, resp.)`

Appendix C. Reversible Lane Operations Concept Memorandum

Technical Memorandum

Date:	Tuesday, December 21, 2021
Project:	SR-133 Laguna Canyon Road PSR/PDS
To:	City of Laguna Beach
From:	Doug Smith, PE Kent Ko, PE, TE
Subject:	**Reversible Lane Operations Concept Memorandum**

1 Introduction

The City of Laguna Beach (City), in cooperation with the California Department of Transportation (Caltrans) District 12, is proposing to construct improvements along the State Route 133 (SR-133) corridor extending approximately 2.5 miles from Canyon Acres Drive (Post Mile [PM] 0.96) to El Toro Road (PM 3.41) in the City of Laguna Beach, Orange County (the Project).

SR-133, also known as Laguna Canyon Road (LCR) in this area, extends further south of Canyon Acres Drive, terminating at Pacific Coast Highway (SR-1) and transitions into unincorporated Orange County (County) north of the junction with El Toro Road. LCR is one of three gateways into the City and provides critical access to adjacent recreational spaces as well as key destinations and activities in the City. As such, ensuring that LCR provides efficient, safe access to the area is vital both to the region and to the City itself.

1.1 Location and Background

The Transportation, Circulation and Growth Management Element of the City's General Plan identifies LCR as a Primary Arterial, serving as a regional access to and from the City, as well as a critical evacuation route. Due to the topographic constraints with the roadway located within an existing canyon and the proximity of the Pacific Ocean to the south, LCR serves as one of only three routes in and out of the City. Pacific Coast Highway (PCH or SR-1) accommodates travelers north and south along the coast, and LCR is oriented inland. As part of the State Highway System, LCR connects SR-1 and the coastal areas within the County to three of the key inland highways including Interstate 5 (I-5), I-405, and the SR-73 toll road.

1.2 Purpose and Need

The purpose and need of the Project are defined below.

The purpose of the Project is to:

- Improve traffic safety and provide room for bicycle and pedestrian facilities by undergrounding the existing overhead utilities located within the Clear Recovery Zone (CRZ)
- Encourage the use of active transportation modes through infrastructure improvements that increase the use of public transit, walking, and biking, and allow for greater connectivity to adjacent residential and commercial land uses, recreational trails and parks within the City of Laguna Beach
- Improve pedestrian and bicycle mobility and safety by separating vehicles, cyclists and pedestrians by incorporating dedicated pedestrian and bicycle paths, sidewalks, Americans with Disabilities Act (ADA) access, and improved shoulders along the corridor

Traffic demand within this corridor already exceeds capacity during weekday AM and PM peak hours and during most summer weekends and holidays due to special events and the proximity to the Pacific Ocean as well as multiple adjacent recreational facilities and trails. The high traffic demand and resulting vehicle queuing, and the lack of traffic breaks, protected left-turn movements and inadequate shoulders contribute to a high concentration of accidents in various locations within the Project limits. In addition, the corridor lacks adequate shoulders and pedestrian and bicycle facilities within the Project limits Without the implementation of traffic improvements and the provision for alternative transportation modes such as bike and pedestrian facilities, quality and level of service of this multi-modal corridor will continue to degrade.

The corridor has multiple constraints including overhead SCE transmission and distribution lines on both sides of the corridor within the CRZ and in close proximity to the edge of travel way. The right-of-way is further constrained by residential and light commercial developments as well as various environmental constraints along the route.

Purpose of this Document:

A reversible lane is being considered part of the overall corridor improvements evaluation in the PSR/PDS. This document presents how a reversible lane would operate. The document also provides a high-level review of traffic volumes and discusses how the reversible lane would serve residents and visitors.

2 Reversible Lane Background

Reversible traffic lanes add peak-direction capacity to a two-way road and decrease congestion by borrowing available lane capacity from the other (off-peak) direction. Reversing lanes reduces congestion for handling special event traffic, during morning and evening commutes, when an incident affects operation, or when construction or maintenance activity is present on the road. Reversible lanes make sense for roadways that experience regular, significant imbalances in traffic demand by direction during peak periods. Roads that may be used as emergency evacuation routes or for special events also benefit from reversible lane strategies.

This section describes the criteria used to develop the reversible lane system (RLS) concept operations along the SR-133 corridor.

2.1 Risk / Safety

Safety concerns are related to a several factors, including conflicts between opposing mainline vehicles, through and turning vehicles, entering of side-street and driveway traffic and general driver confusion associated with unfamiliarity with reversible lane operations, control systems, and movements. Also, in general, as collisions generally occur infrequently, the sound evaluation of safety performance of reversible lane systems requires a long evaluation periods (at least three years after the implementation of the treatment).

There are three primary types of collisions are typically associated with reversible operations; left-turning traffic from reversible lanes, left-turning traffic to reversible lanes, and left-turn from lanes immediately adjacent to reversible lanes. The number of collisions involving a left-turning vehicle would be a critical safety performance of the reversible lane system. The following risk / safety factor should be considered during the design phase.

- Minimize entering traffic from side streets or from reversible lanes
- Provide standard merge / diverge transition zones
- Minimize potential head-on collision

2.2 City / State Policy

Policies on the use of reversible facilities are those associated with the eligibility requirements for particular vehicles. These policies assign reversible lane usage priority to certain vehicle classifications or restrict the RLS usage to others. One of the most common policies used to manage the accessibility of reversible facilities is to limit their use to transit and high occupancy vehicles (HOV). These policies have been in use on freeways in several urban centers in Florida and Texas. The proposed reversible lane along the State Route 133 (SR-133) corridor will have no restriction and operate as a general-purpose lane.

Local businesses and communities may be impacted with the implementation of a reversible lane. A reversible lane may require parking restrictions, limit access to the business, or limit freight access and movements. Access to local communities can also be affected through turning restrictions. Due to the potential impact to local businesses and communities, policies should consider time of day operation of the reversible lane and turn restrictions.

The hours or time period of operations will need reviewed and implemented by the City. Based on the existing peak hour directional flow, the reversible lane would be operational for southbound traffic during the AM peak period and northbound during the PM peak period. Hours of operations may occur between 7 am to 9 am during the AM peak period and 4 pm to 6 pm during the PM peak period. During off-peak periods, the reversible lane may operate as a two-way left turn lane.

3 Proposed Reversible Lane Design & Operations

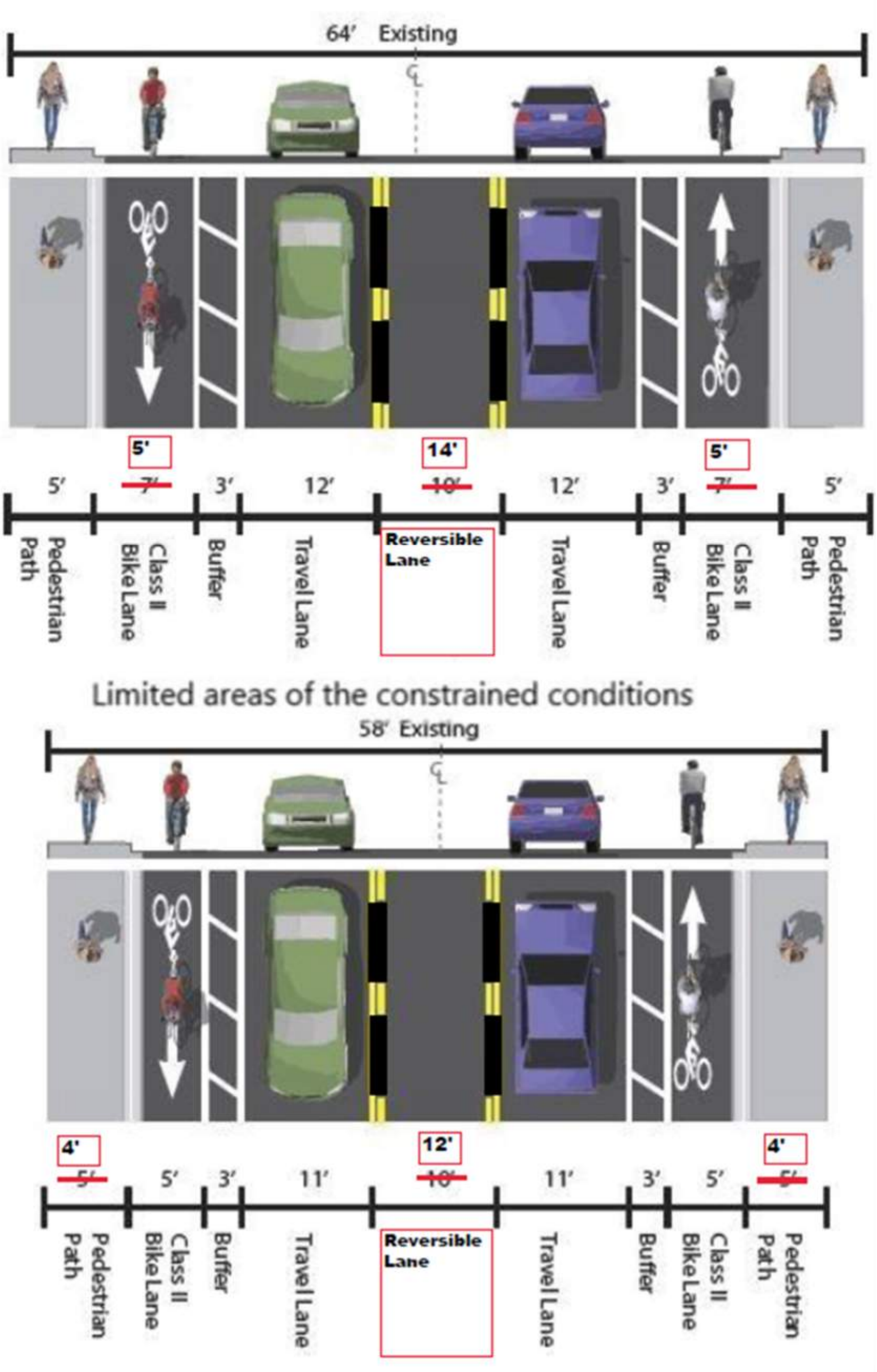
3.1 Geometric Design

3.1.1 Cross-section

The existing cross-section generally consists of a typical width of 64 feet for the majority of the route including the vehicle, pedestrian, and bicycle facilities. With a reversible lane, the cross-section would include 12-foot travel lanes, and a 12- to 14-foot center reversible lane, pedestrian paths/sidewalks on both the NB and SB sides of the roadway, and a 5-foot Class II buffered bike lane/shoulder on both sides of the roadway. During emergencies, the configuration could provide for four outbound evacuation travel lanes and one inbound emergency vehicle lane by utilizing the bike lanes.

A constrained segment existing near the ’Big Bend’ where the bike lane widths would be reduced to five feet and the travel lanes reduced to 11 feet. At this pinch point of 53 feet available ROW width, the pedestrian paths and bike lane buffers on either side of the roadway would be reduced within this short segment. See **Figure 1** for typical cross-section.

Figure 1. Typical Cross-Section



3.1.2 Approach, Departure and Transition Areas

At the southern terminus, the RLS will begin just north of the driveway to the existing Maintenance Yard/Municipal Parking Lot (ACT V Parking Lot). Since the RLS will begin just north of the driveway, access/driveways to ACT V Parking Lot will not be modified from the current configuration and will not be limited to the RLS “time of day” (TOD) operation. The RLS will operate where northbound traffic will transition from the number one lane and merge left onto the center reversible lane. Southbound traffic will transition from the center reversible lane onto the southbound number one through lane. Southbound traffic will not be required to merge and/or maneuver out of the center reversible lane.

At the northern terminus, the RLS will begin at the intersection of El Toro Road. The RLS will operate where southbound traffic will transition from the number one lane and merge left onto the center reversible lane. Northbound traffic will transition from the center reversible lane onto the southbound number one through lane. Northbound traffic will not be required to merge and/or maneuver out of the center reversible lane. Note that further coordination will be required to implement any future projects including the improvements at the Anneliese School driveway.

Ingress and egress will be controlled by traffic control devices that include overhead signage and signals. The subsequent section provides additional information and details on the various traffic control devices.

3.1.3 Intersections

Two signalized intersections at Canyon Acres Drive and El Toro Road are located within the Project limits. In addition, an existing midblock HAWK (High-Intensity Activated crossWalK) signal is located between the Main Campus and East Campus of the Laguna College of Art and Design (LCAD). Signal timing strategies should be reviewed and implemented at these signalized intersections, especially at the north and south terminus of the RLS.

3.2 Operational Assessment

Standard evaluations for intersections, road segments and arterials are as valid for RLS facilities as for any facility. The implementation of a reversal does not fundamentally change the expectations for roadway facilities. Therefore, the various methodologies, as described in the Highway Capacity Manual (HCM), for example, are still valid for use by the City and Caltrans.

The Traffic Engineering Performance Assessment (TEPA) prepared for this Project includes both vehicle traffic demand and operational analysis along the corridor as well as an assessment of complete street elements, such as bike and pedestrian facilities, and transit services. A general comparison of capacity and operations along the roadway are provided in this section. See the TEPA for additional detail and information on the operational assessment.

Under existing conditions, the AM peak direction was determined to occur in the southbound direction with a weighted average of 55 percent. The PM peak direction was determined to occur in the northbound direction with a weighted average of 51 percent. Reversible traffic lanes add peak-direction capacity to a two-way road and decrease congestion by borrowing available lane capacity from the other (off-peak) direction; therefore, reversible lane might be a viable option to help alleviate congestion through the corridor.

Under existing conditions, the Volume-to-capacity ratios (V/C) exceeds capacity with segments to be nearly 50 percent over capacity. With the implementation of the reversible lane configuration for southbound AM peak direction and northbound PM peak direction, there would be nearly a 30 percent reduction in V/C. Table 1 and 2 provide a summary of the V/C for existing and reversible lane configurations, respectively. The RLS facility would provide operational benefits and is considered a viable alternative.

Table 1. Existing Configuration

ID	Segment	Description	Direction	Existing AM Peak Hour	V/C	Existing PM Peak Hour	V/C
1	LCR/SR-133	Between El Toro Road & Sun Valley Drive	Northbound	1,006	1.12	1,348	1.50
			Southbound	1,239	1.38	1,251	1.39
2	LCR/SR-133	Between Sun Valley Drive & Stan Oaks Drive	Northbound	988	1.10	1,350	1.50
			Southbound	1,267	1.41	1,264	1.40
3	LCR/SR-133	Between Stan Oaks Drive & LCAD Driveway	Northbound	989	1.10	1,306	1.45
			Southbound	1,249	1.39	1,282	1.42
4	LCR/SR-133	Between LCAD Driveway & Canyon Acres Drive	Northbound	1,032	1.15	1,307	1.45
			Southbound	1,235	1.37	1,301	1.45

Capacity for existing (1 lane – 900 vehicle per hour)

Table 2. Reversible Lane Configuration

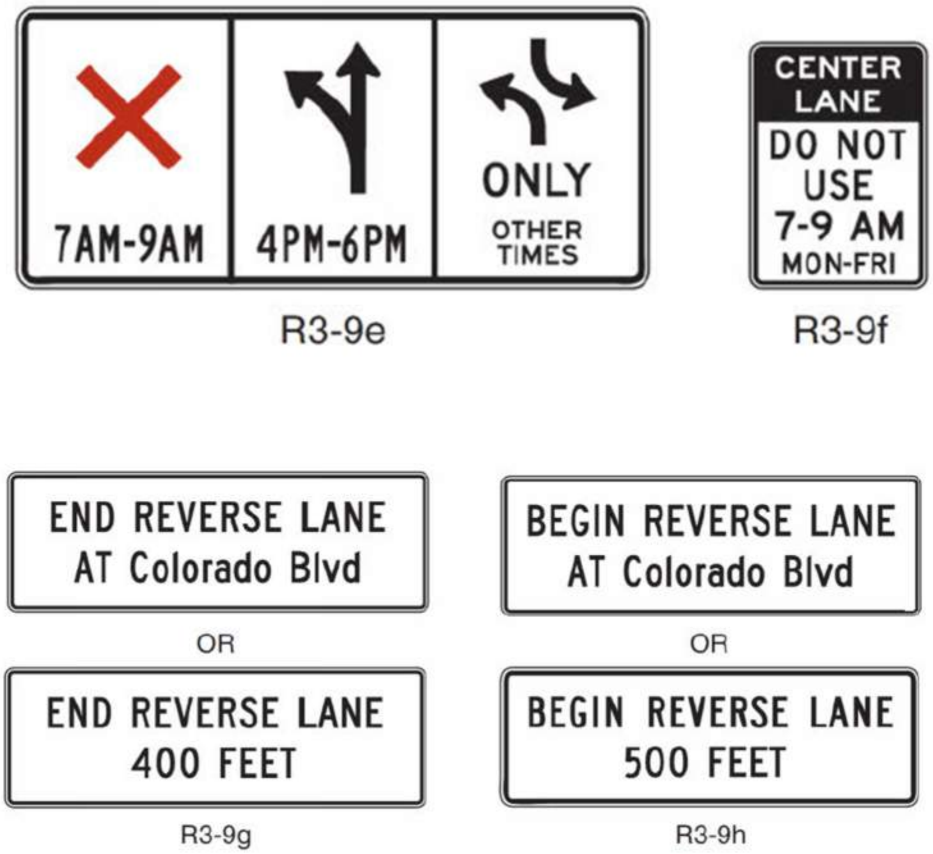
ID	Segment	Description	Direction	Existing AM Peak Hour	V/C	Existing PM Peak Hour	V/C
1	LCR/SR-133	Between El Toro Road & Sun Valley Drive	Northbound	1,006	1.12	1,348	**0.75**
			Southbound	1,239	**0.69**	1,251	1.39
2	LCR/SR-133	Between Sun Valley Drive & Stan Oaks Drive	Northbound	988	1.10	1,350	**0.75**
			Southbound	1,267	**0.70**	1,264	1.40
3	LCR/SR-133	Between Stan Oaks Drive & LCAD Driveway	Northbound	989	1.10	1,306	**0.73**
			Southbound	1,249	**0.69**	1,282	1.42
4	LCR/SR-133	Between LCAD Driveway & Canyon Acres Drive	Northbound	1,032	1.15	1,307	**0.73**
			Southbound	1,235	**0.69**	1,301	1.45

Capacity for reversible lane (2 lane – 1,800 vehicle per hour)

3.3 Traffic Control Devices

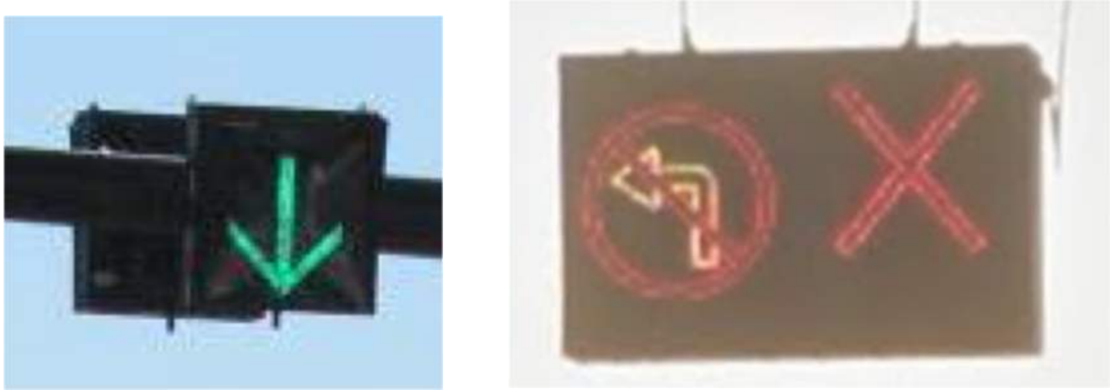
The predominant means of guiding and controlling traffic moving into, out of, and along reversible lane segments are standard roadway signs, signals, and pavement markings per CA MUTCD. Signs for reversible lane segments may be placed either overhead above the lanes or along the roadside. There are a number of other signs as shown in **Figure 2**, to indicate the actual number of lanes in each direction during the associated peak hours. These types of signs are used where the RLS control is TOD. TOD operation is proposed for the reversible lane system (RLS) operations along the State Route 133 (SR-133) corridor.

Figure 2. Typical Reversible Lane Signs



Lane control signals are used to indicate which lanes of a reversible roadway are available (or not available) for use in a particular direction. Lane control signals must feature two types of displays: a downward pointing green arrow, and a red “X”, both on a black background. The red “X” must be capable of both flashing and solid operation. See **Figure 3** for typical lane control signals.

Figure 3. Typical Lane Control Signals

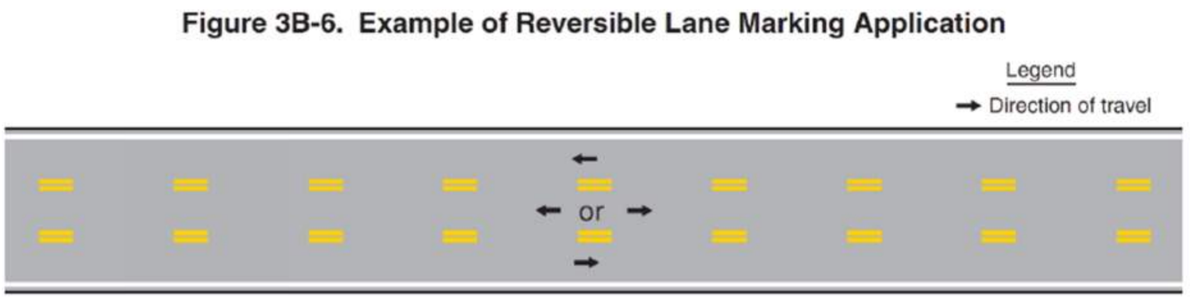


In reversible flow lane applications, the face must be visible to both directions of intended travel. The system must not permit simultaneous display of green down arrow to both directions in any lane. All lanes of an RLS should have a lane control signal to give positive guidance to the driver.

In a reversible lane system, pavement markings are used to guide traffic into and out of the reversible lane. Pavement markings for arterial and freeway RLS are typically permanent markings.

In general, the design of the pavement markings should comply with design standards, the CA MUTCD, and other appropriate published standards. Double yellow broken lines should be used to delineate the directional dividing line for traffic flow at different times of the lane reversal. Markings for reversible lanes should be as per the latest CA MUTCD recommendation of normal broken double yellow line to delineate the edge of a lane. See **Figure 4** for typical lane marking.

Figure 4. Typical Lane Marking



Other reversible lane traffic control devices may include automated barrier gate and swing gates at the terminal areas, traffic cameras, vehicle detectors, permanent and movable barriers, dynamic message signs (DMS), changeable lane designation signs and temporary traffic cones and tubular markers. See **Figure 5** for an example of an existing reversible lane traffic control devices located along 4th in the City of Los Angeles.

Figure 5. City of Los Angeles - 4th Street Reversible Lane Control Signal

3.4 System Detection

If required, detection devices can be the traditional inductive loop detectors, micro-wave detectors or video detectors. In addition to the detectors for RLS operations, CCTV camera may also be used to provide a video link and incident management.

In arterial RLS installations, detection zones are typically mid-block where they can best monitor traffic speed and density (least affected by upstream or downstream intersections). They should be installed in each lane separately to help identify individual lane flows and incidents.

3.5 Reversible Lane System Management

Reversible lane systems need to be planned, designed, and operated as a managed lane system. There are components of the system that are standard traffic control devices noted above, and there are more specialized components that are utilized in specific situations to provide information and guidance to the driver. Intelligent transportation systems (ITS) can be utilized in order to improve efficiency and performance of reversible lanes in an urban area by using technology to engage changeable message signs and to automate the reversal process. The RLS can be monitored and controlled within the City traffic management center (TMC) to provide overall management of the system.

3.6 Transit Operations

Transit operation is allowed for the RLS operations along the State Route 133 (SR-133) corridor which would affect transit routing, headways and stop locations. The RLS may increase the complexity of weaving for transit vehicles, depending on their routing. Transit travel time may serve as a transit related measure of performance for the RLS.

3.7 Monitoring and Enforcement

Traditional enforcement on RLS lanes requires the specific design treatment known as dedicated enforcement areas. These areas are usually located immediately adjacent to the reversible lanes facility and allow enforcement personnel to monitor the facility, pursue and apprehend violators to issue appropriate citations.

The RLS can be monitored and controlled within the City TMC to provide overall management of the system. The ongoing monitoring of system performance measures will help to justify the system in the long term, and also help to identify when changes are required. If the RLS is a fixed time system based on morning and afternoon weekday peak hours, then ongoing traffic flow monitoring will help identify when the system needs to start and stop. Typical performance measures include:

- 15 minute directional traffic flow counts;
- Peak hour directional level of service; and
- Peak hour directional vehicle (person) delay.

Appendix D. Peak Season Traffic Growth Development

CALTRANS AVERAGE DAILY TRAFFIC VOLUME COMPARISONS[1]

SR-133 - Laguna Canyon Road (Northbound + Southbound) at South of El Toro Road

YEARS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average Peak ADT Growth
Average ADT	35,000	35,000	35,000	36,000	45,000	36,000	36,000	40,000	38,000	35,500	36,000	36,000	36,000	36,000	36,000	35,000	35,000	36,000	36,000	36,000	36,000	37,000	37,500	37,600	37,700	37,500	37,500	37,500	35,000	38,700	38,700	
Peak Month ADT	41,500	41,500	41,500	42,500	53,000	42,500	42,500	44,500	42,500	39,500	40,000	40,000	40,000	40,000	40,000	39,000	39,000	40,000	40,000	40,000	40,000	41,000	41,500	42,000	42,000	42,000	42,000	42,000	39,000	39,000	39,000	
Peak Month ADT/Average ADT	19%	19%	19%	18%	18%	18%	18%	11%	12%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	12%	11%	12%	12%	12%	11%	1%	1%	**12%**

[1] Traffic Volumes have been obtained from the Traffic Data Branch of Caltrans (https://dot.ca.gov/programs/traffic-operations/census), the Traffic Volumes (Annual Average Daily Traffic (AADT)) for all vehicles on California State Hwys.

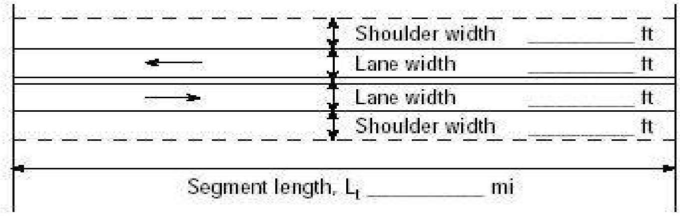
Appendix E. Existing Highway LOS Worksheets

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1006*veh/h

Opposing direction vol., V_o *1239*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2 %*

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/\ (1+ P_T (E_T -1)+P_R (E_R -1)\ )$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1093*	*1347*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/\ f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.8 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$	*28.9 mi/h*
		Percent free flow speed, PFFS	*59.4 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/\ (1+ P_T(E_T-1)+P_R(E_R-1)\ )$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*\ f_{g,PTSF})$	*1093*	*1347*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^{\ b}})$	*83.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*12.3*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{\ np,PTSF}\ *(v_{d,PTSF}\ /\ v_{d,PTSF} + v_{o,PTSF})$	*88.9*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.64*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*59.4*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1093.5*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.37*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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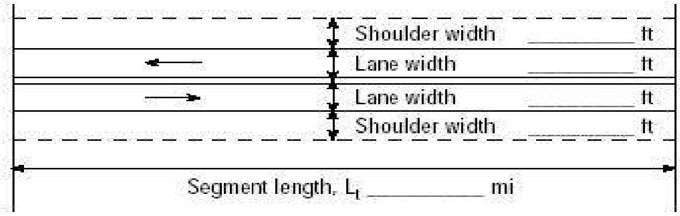
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Analysis direction vol., V_d	*1348*veh/h
Opposing direction vol., V_o	*1251*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.5*
Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF^* f_{g,ATS} * f_{HV,ATS})$	*1465*	*1360*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.8 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*26.0 mi/h*
		Percent free flow speed, PFFS	*53.3 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF^*f_{HV,PTSF}{}^* f_{g,PTSF})$	*1465*	*1360*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*89.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.0*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}{}^*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*94.5*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.86*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*53.3*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1465.2*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.51*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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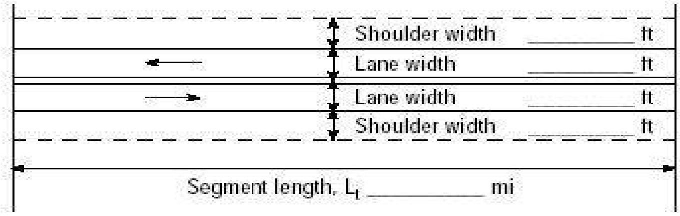
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Analysis direction vol., V_d	*1239*veh/h
Opposing direction vol., V_o	*1006*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.5*
Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*1347*	*1093*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*28.7 mi/h*
		Percent free flow speed, PFFS	*59.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*1347*	*1093*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*86.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*12.3*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*92.9*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.79*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*59.0*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1346.7*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.47*
Bicycle level of service (Exhibit 15-4)	*C*
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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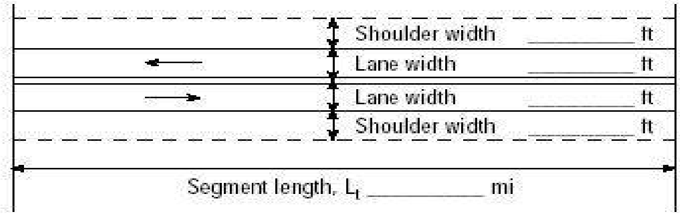
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi
Analysis direction vol., V_d	*1251*veh/h
Opposing direction vol., V_o	*1348*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.5*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF^* f_{g,ATS} {}^* f_{HV,ATS})$	*1360*	*1465*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.7 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*26.1 mi/h*
		Percent free flow speed, PFFS	*53.6 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF^*f_{HV,PTSF}{}^* f_{g,PTSF})$	*1360*	*1465*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*88.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.0*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}{}^*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*93.1*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.80*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*53.6*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1359.8*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.48*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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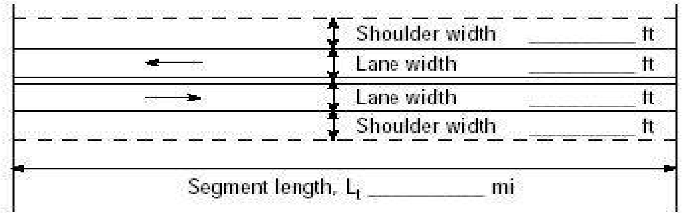
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi
Analysis direction vol., V_d	*988*veh/h
Opposing direction vol., V_o	*1267*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.4*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1074*	*1377*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample^3, S_{FM}		Base free-flow speed^4, BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.8 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*28.9 mi/h*
		Percent free flow speed, PFFS	*59.3 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1074*	*1377*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*83.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*12.1*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*88.5*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.63*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*59.3*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1073.9*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.36*
Bicycle level of service (Exhibit 15-4)	*C*
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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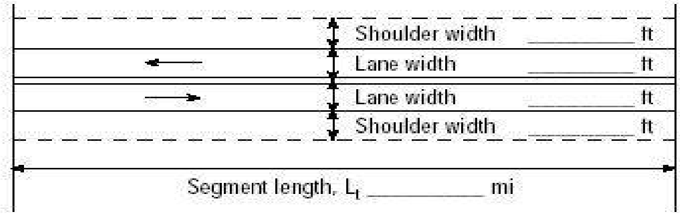
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi
Analysis direction vol., V_d	*1350*veh/h
Opposing direction vol., V_o	*1264*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.4*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1467*	*1374*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample^3, S_{FM}		Base free-flow speed^4, BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.8 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*25.9 mi/h*
		Percent free flow speed, PFFS	*53.1 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1467*	*1374*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*89.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.9*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*94.4*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.86*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*53.1*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1467.4*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.52*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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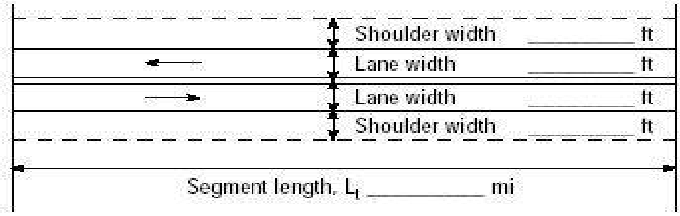
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Analysis direction vol., V_d	*1267*veh/h	
Opposing direction vol., V_o	*988*veh/h	
Shoulder width ft	*5.0*	
Lane Width ft	*12.0*	
Segment Length mi	*0.4*	
Grade Length mi		Up/down
Peak-hour factor, PHF	*0.92*	
No-passing zone	*100%*	
% Trucks and Buses , P_T	*2* %	
% Recreational vehicles, P_R	*0%*	
Access points *mi*	*0*/mi	

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1377*	*1074*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample^3, S_{FM}		Base free-flow speed^4, BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*1.1 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*28.6 mi/h*
		Percent free flow speed, PFFS	*58.8 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1377*	*1074*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*86.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*12.1*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*93.6*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.81*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*58.8*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1377.2*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.48*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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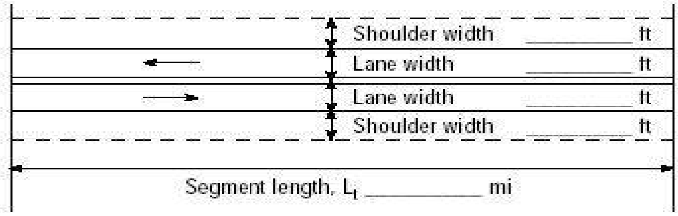
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1264*veh/h

Opposing direction vol., V_o *1350*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF^* f_{g,ATS} * f_{HV,ATS})$	*1374*	*1467*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.7 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*26.0 mi/h*
		Percent free flow speed, PFFS	*53.3 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF^*f_{HV,PTSF}{}^* f_{g,PTSF})$	*1374*	*1467*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*89.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}{}^*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*93.3*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.81*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*53.3*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1373.9*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.48*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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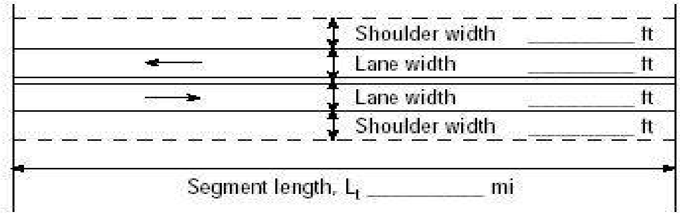
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	KK	Highway / Direction of Travel	SR-133/NB
Agency or Company	HDR	From/To	Stan Oaks Dr/LCAD dwy
Date Performed	1/23/2018	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	Existing 2017

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi	Up/down
Peak-hour factor, PHF	0.92
No-passing zone	100%
% Trucks and Buses , P_T	2 %
% Recreational vehicles, P_R	0%
Access points *mi*	0/mi

Analysis direction vol., V_d	989veh/h
Opposing direction vol., V_o	1249veh/h
Shoulder width ft	5.0
Lane Width ft	12.0
Segment Length mi	1.0

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.0	1.0
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	1.000	1.000
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	1075	1358

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	50.0 mi/h
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	1.3 mi/h
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	0.0 mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	0.8 mi/h	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	48.7 mi/h
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	29.0 mi/h
		Percent free flow speed, PFFS	59.5 %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	1.000	1.000
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	1075	1358
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	82.9	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	12.4	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	88.4	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	E
Volume to capacity ratio, *v/c*	0.63

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*59.5*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1075.0*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.36*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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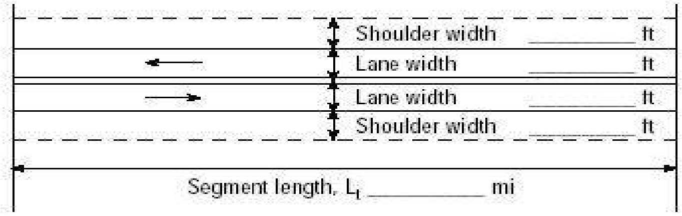
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Analysis direction vol., V_d	*1306*veh/h
Opposing direction vol., V_o	*1282*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*1.0*
Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1420*	*1393*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Total demand flow rate, both directions, *v*		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*26.1 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.8 mi/h*	Percent free flow speed, PFFS	*53.6 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1420*	*1393*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*89.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.9*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*93.9*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.84*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1700
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	53.6
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	1419.6
Effective width, Wv (Eq. 15-29) ft	22.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.50
Bicycle level of service (Exhibit 15-4)	C

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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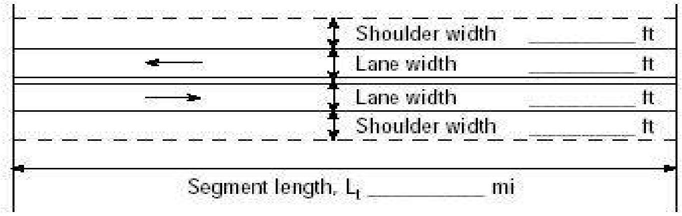
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1249*veh/h

Opposing direction vol., V_o *989*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *1.0*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/ (1+ P_T (E_T -1)+P_R (E_R -1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i / (PHF^* f_{g,ATS} * f_{HV,ATS})$	*1358*	*1075*

Free-Flow Speed from Field Measurement

Mean speed of sample[3], S_{FM}

Total demand flow rate, both directions, *v*

Free-flow speed, $FFS=S_{FM}+0.00776(v/ f_{HV,ATS})$

Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) *1.1 mi/h*

Estimated Free-Flow Speed

Base free-flow speed[4], BFFS	*50.0 mi/h*
Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	*48.7 mi/h*
Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$	*28.8 mi/h*
Percent free flow speed, PFFS	*59.1 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF^*f_{HV,PTSF}{}^* f_{g,PTSF})$	*1358*	*1075*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*86.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*12.4*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}{}^*(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	*93.2*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.80*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*59.1*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1357.6*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.48*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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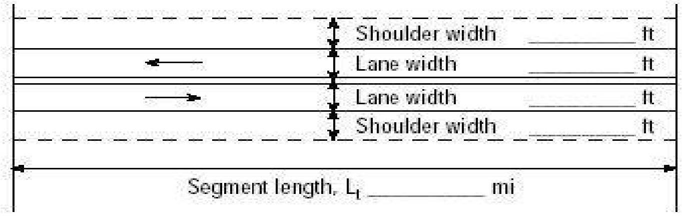
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Analysis direction vol., V_d *1282*veh/h

Opposing direction vol., V_o *1306*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *1.0*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1393*	*1420*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}		Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.7 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*26.1 mi/h*
		Percent free flow speed, PFFS	*53.6 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1393*	*1420*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*89.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.9*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*93.4*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.82*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*53.6*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1393.5*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.49*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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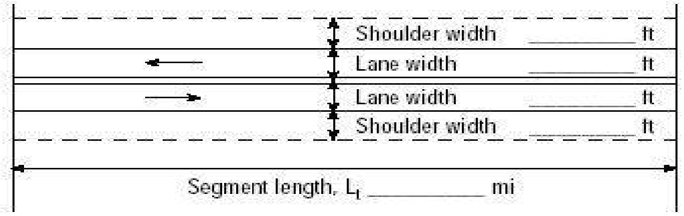
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1032*veh/h

Opposing direction vol., V_o *1235*veh/h

Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1122*	*1342*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed^4, BFFS	*50.0 mi/h*
		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Mean speed of sample^3, S_{FM}		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Total demand flow rate, both directions, *v*		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*28.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.8 mi/h*	Percent free flow speed, PFFS	*59.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1122*	*1342*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*84.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*12.0*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*89.5*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.66*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*59.0*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1121.7*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.38*
Bicycle level of service (Exhibit 15-4)	*C*
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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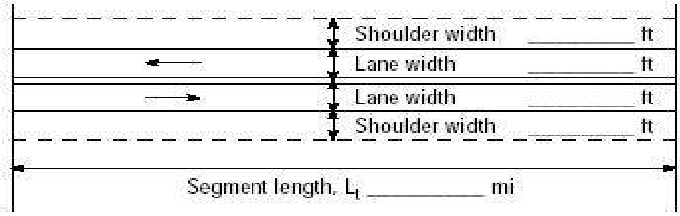
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1307*veh/h

Opposing direction vol., V_o *1301*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1421*	*1414*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Total demand flow rate, both directions, *v*		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*25.9 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.8 mi/h*	Percent free flow speed, PFFS	*53.3 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1421*	*1414*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*89.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.7*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*93.8*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.84*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*53.3*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1420.7*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.50*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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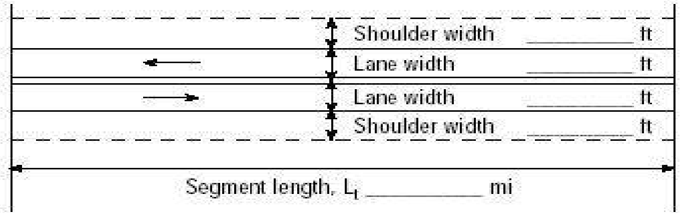
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1235*veh/h

Opposing direction vol., V_o *1032*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T 2 %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/ (1+ P_T (E_T -1)+P_R (E_R -1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1342*	*1122*

Free-Flow Speed from Field Measurement

Mean speed of sample[3], S_{FM}

Total demand flow rate, both directions, *v*

Free-flow speed, $FFS=S_{FM}+0.00776(v/ f_{HV,ATS})$

Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) *1.0 mi/h*

Estimated Free-Flow Speed

Base free-flow speed[4], BFFS *50.0 mi/h*

Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7) *1.3 mi/h*

Adj. for access points[4], f_A (Exhibit 15-8) *0.0 mi/h*

Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A) *48.7 mi/h*

Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ *28.5 mi/h*

Percent free flow speed, PFFS *58.6 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}* f_{g,PTSF})$	*1342*	*1122*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*86.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*12.0*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF} *(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	*93.1*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.79*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1700
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	58.6
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	1342.4
Effective width, Wv (Eq. 15-29) ft	22.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.47
Bicycle level of service (Exhibit 15-4)	C

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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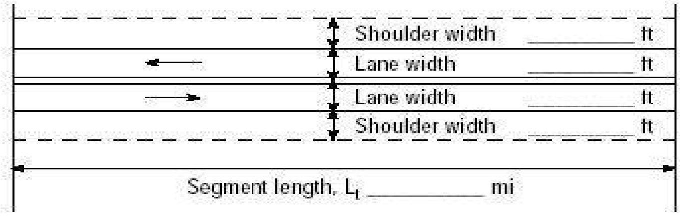
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*1/23/2018*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*Existing 2017*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1301*veh/h

Opposing direction vol., V_o *1307*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1414*	*1421*

Free-Flow Speed from Field Measurement	**Estimated Free-Flow Speed**	
Mean speed of sample[3], S_{FM}	Base free-flow speed[4], BFFS	*50.0 mi/h*
Total demand flow rate, both directions, *v*	Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)	Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) *0.7 mi/h*	Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*26.0 mi/h*
	Percent free flow speed, PFFS	*53.3 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1414*	*1421*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*89.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.7*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*93.6*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*E*
Volume to capacity ratio, *v/c*	*0.83*

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*53.3*
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1414.1*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.50*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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Appendix F. Existing Intersection LOS Worksheets

HCM 2010 Signalized Intersection Summary
1: Laguna Cyn Rd & El Toro Road

03/30/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	657	12	915	511	19	895
Future Volume (veh/h)	657	12	915	511	19	895
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	692	13	963	538	20	942
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	729	650	1615	1373	36	1820
Arrive On Green	0.41	0.41	0.46	0.46	0.02	0.51
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	692	13	963	538	20	942
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	45.2	0.6	24.4	8.2	1.3	21.1
Cycle Q Clear(g_c), s	45.2	0.6	24.4	8.2	1.3	21.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	729	650	1615	1373	36	1820
V/C Ratio(X)	0.95	0.02	0.60	0.39	0.56	0.52
Avail Cap(c_a), veh/h	865	772	1615	1373	74	1820
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.1	21.0	24.4	1.6	58.2	19.3
Incr Delay (d2), s/veh	17.9	0.0	1.6	0.8	12.7	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.7	0.3	12.3	15.0	0.8	10.6
LnGrp Delay(d),s/veh	52.0	21.0	26.0	2.4	71.0	20.4
LnGrp LOS	D	C	C	A	E	C
Approach Vol, veh/h	705		1501			962
Approach Delay, s/veh	51.4		17.5			21.4
Approach LOS	D		B			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.9	59.3				66.2		53.8
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	43.0				52.5		58.5
Max Q Clear Time (g_c+I1), s	3.3	26.4				23.1		47.2
Green Ext Time (p_c), s	0.0	7.7				6.8		2.1

Intersection Summary	
HCM 2010 Ctrl Delay	26.3
HCM 2010 LOS	C

2: Laguna Cyn Rd & Anneliese Dwy

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱		↰	↑
Traffic Volume (veh/h)	17	143	1292	27	165	1383
Future Volume (Veh/h)	17	143	1292	27	165	1383
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	18	147	1332	28	170	1426
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						430
pX, platoon unblocked	0.77					
vC, conflicting volume	3112	1346			1360	
vC1, stage 1 conf vol	1346					
vC2, stage 2 conf vol	1766					
vCu, unblocked vol	3593	1346			1360	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	72	21			66	
cM capacity (veh/h)	65	185			505	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	165	1360	170	1426
Volume Left	18	0	170	0
Volume Right	147	28	0	0
cSH	154	1700	505	1700
Volume to Capacity	1.07	0.80	0.34	0.84
Queue Length 95th (ft)	215	0	37	0
Control Delay (s)	152.2	0.0	15.7	0.0
Lane LOS	F		C	
Approach Delay (s)	152.2	0.0	1.7	
Approach LOS	F			

Intersection Summary			
Average Delay	8.9		
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Volume (veh/h)	4	6	1194	1	2	1351
Future Volume (Veh/h)	4	6	1194	1	2	1351
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	7	1298	1	2	1468
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						1276
pX, platoon unblocked	0.72					
vC, conflicting volume	2770	1298			1299	
vC1, stage 1 conf vol	1298					
vC2, stage 2 conf vol	1472					
vCu, unblocked vol	3274	1298			1299	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	96			100	
cM capacity (veh/h)	123	197			533	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	11	1299	2	1468
Volume Left	4	0	2	0
Volume Right	7	1	0	0
cSH	162	1700	533	1700
Volume to Capacity	0.07	0.76	0.00	0.86
Queue Length 95th (ft)	5	0	0	0
Control Delay (s)	28.8	0.0	11.8	0.0
Lane LOS	D		B	
Approach Delay (s)	28.8	0.0	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Laguna Cyn Rd & LB Dog Park Dwy

03/30/2018

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑	↱	↰	↑
Traffic Volume (veh/h)	9	11	1184	11	14	1341
Future Volume (Veh/h)	9	11	1184	11	14	1341
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	9	11	1221	11	14	1382
Pedestrians	5					5
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	3.5					3.5
Percent Blockage	0					0
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2636	1231			1237	
vC1, stage 1 conf vol	1226					
vC2, stage 2 conf vol	1410					
vCu, unblocked vol	2636	1231			1237	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	95			98	
cM capacity (veh/h)	167	214			560	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	20	1221	11	14	1382
Volume Left	9	0	0	14	0
Volume Right	11	0	11	0	0
cSH	190	1700	1700	560	1700
Volume to Capacity	0.11	0.72	0.01	0.02	0.81
Queue Length 95th (ft)	9	0	0	2	0
Control Delay (s)	26.2	0.0	0.0	11.6	0.0
Lane LOS	D			B	
Approach Delay (s)	26.2	0.0		0.1	
Approach LOS	D				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Laguna Cyn Rd & Stan Oaks Dr

03/30/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Volume (veh/h)	4	6	1189	1	2	1348
Future Volume (Veh/h)	4	6	1189	1	2	1348
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	7	1292	1	2	1465
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2762	1292			1293	
vC1, stage 1 conf vol	1292					
vC2, stage 2 conf vol	1469					
vCu, unblocked vol	2762	1292			1293	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	96			100	
cM capacity (veh/h)	157	199			536	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	11	1293	2	1465
Volume Left	4	0	2	0
Volume Right	7	1	0	0
cSH	181	1700	536	1700
Volume to Capacity	0.06	0.76	0.00	0.86
Queue Length 95th (ft)	5	0	0	0
Control Delay (s)	26.1	0.0	11.7	0.0
Lane LOS	D		B	
Approach Delay (s)	26.1	0.0	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: Laguna Cyn Rd & Castle Rock Rd

03/30/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Volume (veh/h)	6	8	1182	2	3	1349
Future Volume (Veh/h)	6	8	1182	2	3	1349
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	9	1285	2	3	1466
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2758	1286			1287	
vC1, stage 1 conf vol	1286					
vC2, stage 2 conf vol	1472					
vCu, unblocked vol	2758	1286			1287	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	96			99	
cM capacity (veh/h)	157	201			539	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	16	1287	3	1466
Volume Left	7	0	3	0
Volume Right	9	2	0	0
cSH	179	1700	539	1700
Volume to Capacity	0.09	0.76	0.01	0.86
Queue Length 95th (ft)	7	0	0	0
Control Delay (s)	27.1	0.0	11.7	0.0
Lane LOS	D		B	
Approach Delay (s)	27.1	0.0	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Laguna Cyn Rd & LC Arts+Design Dwy

03/30/2018

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑	↱	
Traffic Volume (veh/h)	55	45	52	1129	1313	42
Future Volume (Veh/h)	55	45	52	1129	1313	42
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	49	57	1227	1427	46
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2791	1450	1473			
vC1, stage 1 conf vol	1450					
vC2, stage 2 conf vol	1341					
vCu, unblocked vol	2791	1450	1473			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	59	69	88			
cM capacity (veh/h)	146	161	458			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	109	57	1227	1473
Volume Left	60	57	0	0
Volume Right	49	0	0	46
cSH	152	458	1700	1700
Volume to Capacity	0.72	0.12	0.72	0.87
Queue Length 95th (ft)	106	11	0	0
Control Delay (s)	73.2	14.0	0.0	0.0
Lane LOS	F	B		
Approach Delay (s)	73.2	0.6		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
8: Laguna Cyn Rd & Act V Parking Lot

03/30/2018

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Volume (veh/h)	80	66	76	1101	1296	62
Future Volume (Veh/h)	80	66	76	1101	1296	62
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	72	83	1197	1409	67
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				1221		
pX, platoon unblocked	0.21					
vC, conflicting volume	2772	1409	1476			
vC1, stage 1 conf vol	1409					
vC2, stage 2 conf vol	1363					
vCu, unblocked vol	7567	1409	1476			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	58	82			
cM capacity (veh/h)	65	170	456			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	87	72	83	1197	1409	67
Volume Left	87	0	83	0	0	0
Volume Right	0	72	0	0	0	67
cSH	65	170	456	1700	1700	1700
Volume to Capacity	1.33	0.42	0.18	0.70	0.83	0.04
Queue Length 95th (ft)	181	48	16	0	0	0
Control Delay (s)	330.8	41.0	14.6	0.0	0.0	0.0
Lane LOS	F	E	B			
Approach Delay (s)	199.5		0.9		0.0	
Approach LOS	F					

Intersection Summary			
Average Delay	11.3		
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	⮌	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	37	14	7	1307	13	11	1280
Future Volume (veh/h)	37	14	7	1307	13	11	1280
Number	3	18		2	12	1	6
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			0.98	1.00	
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863		1863	1863	1863	1863
Adj Flow Rate, veh/h	39	15		1361	14	11	1333
Adj No. of Lanes	1	1		2	1	1	2
Peak Hour Factor	0.96	0.96		0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2		2	2	2	2
Cap, veh/h	72	64		2835	1237	24	3054
Arrive On Green	0.04	0.04		0.80	0.80	0.01	0.86
Sat Flow, veh/h	1774	1583		3632	1544	1774	3632
Grp Volume(v), veh/h	39	15		1361	14	11	1333
Grp Sat Flow(s),veh/h/ln	1774	1583		1770	1544	1774	1770
Q Serve(g_s), s	2.0	0.9		11.6	0.2	0.6	7.7
Cycle Q Clear(g_c), s	2.0	0.9		11.6	0.2	0.6	7.7
Prop In Lane	1.00	1.00			1.00	1.00	
Lane Grp Cap(c), veh/h	72	64		2835	1237	24	3054
V/C Ratio(X)	0.54	0.23		0.48	0.01	0.47	0.44
Avail Cap(c_a), veh/h	486	434		2835	1237	124	3054
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.8	43.2		3.0	1.9	45.6	1.4
Incr Delay (d2), s/veh	6.3	1.8		0.6	0.0	13.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.4		5.7	0.1	0.4	3.7
LnGrp Delay(d),s/veh	50.0	45.1		3.6	1.9	59.2	1.9
LnGrp LOS	D	D		A	A	E	A
Approach Vol, veh/h	54			1375			1344
Approach Delay, s/veh	48.7			3.6			2.3
Approach LOS	D			A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	5.7	79.0				84.7		8.3
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	6.5	74.5				74.5		25.5
Max Q Clear Time (g_c+I1), s	2.6	13.6				9.7		4.0
Green Ext Time (p_c), s	0.0	16.0				13.1		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	3.8
HCM 2010 LOS	A

Notes
User approved ignoring U-Turning movement.

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	517	29	652	699	32	789
Future Volume (veh/h)	517	29	652	699	32	789
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	528	30	665	713	33	805
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	568	507	1910	1361	49	2141
Arrive On Green	0.32	0.32	0.54	0.54	0.03	0.60
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	528	30	665	713	33	805
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	34.6	1.6	12.8	13.8	2.2	14.0
Cycle Q Clear(g_c), s	34.6	1.6	12.8	13.8	2.2	14.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	568	507	1910	1361	49	2141
V/C Ratio(X)	0.93	0.06	0.35	0.52	0.67	0.38
Avail Cap(c_a), veh/h	865	772	1910	1361	111	2141
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.5	28.3	15.7	2.1	57.8	12.1
Incr Delay (d2), s/veh	11.9	0.0	0.5	1.4	14.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.7	0.7	6.3	20.2	1.3	7.0
LnGrp Delay(d),s/veh	51.4	28.3	16.2	3.6	72.3	12.6
LnGrp LOS	D	C	B	A	E	B
Approach Vol, veh/h	558		1378			838
Approach Delay, s/veh	50.1		9.7			15.0
Approach LOS	D		A			B

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.8	69.3				77.1		42.9
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	7.5	40.5				52.5		58.5
Max Q Clear Time (g_c+I1), s	4.2	15.8				16.0		36.6
Green Ext Time (p_c), s	0.0	7.7				5.8		1.8

Intersection Summary			
HCM 2010 Ctrl Delay			19.4
HCM 2010 LOS			B

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Volume (veh/h)	10	56	1282	8	49	1257
Future Volume (Veh/h)	10	56	1282	8	49	1257
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	10	57	1308	8	50	1283
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						430
pX, platoon unblocked	0.83					
vC, conflicting volume	2695	1312			1316	
vC1, stage 1 conf vol	1312					
vC2, stage 2 conf vol	1383					
vCu, unblocked vol	2945	1312			1316	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	71			90	
cM capacity (veh/h)	139	194			525	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	67	1316	50	1283
Volume Left	10	0	50	0
Volume Right	57	8	0	0
cSH	183	1700	525	1700
Volume to Capacity	0.37	0.77	0.10	0.75
Queue Length 95th (ft)	39	0	8	0
Control Delay (s)	35.6	0.0	12.6	0.0
Lane LOS	E		B	
Approach Delay (s)	35.6	0.0	0.5	
Approach LOS	E			

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Volume (veh/h)	2	2	1321	6	2	1147
Future Volume (Veh/h)	2	2	1321	6	2	1147
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	2	1436	7	2	1247
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						1276
pX, platoon unblocked	0.79					
vC, conflicting volume	2690	1440			1443	
vC1, stage 1 conf vol	1440					
vC2, stage 2 conf vol	1251					
vCu, unblocked vol	3010	1440			1443	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	149	163			470	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	4	1443	2	1247
Volume Left	2	0	2	0
Volume Right	2	7	0	0
cSH	156	1700	470	1700
Volume to Capacity	0.03	0.85	0.00	0.73
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	28.7	0.0	12.7	0.0
Lane LOS	D		B	
Approach Delay (s)	28.7	0.0	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Laguna Cyn Rd & LB Dog Park Dwy

03/30/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑	↱	↰	↑
Traffic Volume (veh/h)	4	3	1324	5	2	1147
Future Volume (Veh/h)	4	3	1324	5	2	1147
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	4	3	1424	5	2	1233
Pedestrians	5					5
Lane Width (ft)	12.0					12.0
Walking Speed (ft/s)	3.5					3.5
Percent Blockage	0					0
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2666	1434			1434	
vC1, stage 1 conf vol	1429					
vC2, stage 2 conf vol	1237					
vCu, unblocked vol	2666	1434			1434	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			100	
cM capacity (veh/h)	166	163			471	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	1424	5	2	1233
Volume Left	4	0	0	2	0
Volume Right	3	0	5	0	0
cSH	164	1700	1700	471	1700
Volume to Capacity	0.04	0.84	0.00	0.00	0.73
Queue Length 95th (ft)	3	0	0	0	0
Control Delay (s)	27.9	0.0	0.0	12.7	0.0
Lane LOS	D			B	
Approach Delay (s)	27.9	0.0		0.0	
Approach LOS	D				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Laguna Cyn Rd & Stan Oaks Dr

03/30/2018

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Volume (veh/h)	3	2	1327	6	2	1149
Future Volume (Veh/h)	3	2	1327	6	2	1149
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	2	1442	7	2	1249
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2698	1446			1449	
vC1, stage 1 conf vol	1446					
vC2, stage 2 conf vol	1253					
vCu, unblocked vol	2698	1446			1449	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	163	162			467	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	5	1449	2	1249
Volume Left	3	0	2	0
Volume Right	2	7	0	0
cSH	162	1700	467	1700
Volume to Capacity	0.03	0.85	0.00	0.73
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	27.9	0.0	12.7	0.0
Lane LOS	D		B	
Approach Delay (s)	27.9	0.0	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		

6: Laguna Cyn Rd & Castle Rock Rd

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Volume (veh/h)	4	3	1330	8	3	1149
Future Volume (Veh/h)	4	3	1330	8	3	1149
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	3	1446	9	3	1249
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2706	1450			1455	
vC1, stage 1 conf vol	1450					
vC2, stage 2 conf vol	1255					
vCu, unblocked vol	2706	1450			1455	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			99	
cM capacity (veh/h)	162	160			465	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	7	1455	3	1249
Volume Left	4	0	3	0
Volume Right	3	9	0	0
cSH	161	1700	465	1700
Volume to Capacity	0.04	0.86	0.01	0.73
Queue Length 95th (ft)	3	0	0	0
Control Delay (s)	28.3	0.0	12.8	0.0
Lane LOS	D		B	
Approach Delay (s)	28.3	0.0	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑	↱	
Traffic Volume (veh/h)	13	19	4	1325	1143	10
Future Volume (Veh/h)	13	19	4	1325	1143	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	21	4	1440	1242	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2696	1248	1253			
vC1, stage 1 conf vol	1248					
vC2, stage 2 conf vol	1448					
vCu, unblocked vol	2696	1248	1253			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	90	99			
cM capacity (veh/h)	163	212	555			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	35	4	1440	1253
Volume Left	14	4	0	0
Volume Right	21	0	0	11
cSH	189	555	1700	1700
Volume to Capacity	0.19	0.01	0.85	0.74
Queue Length 95th (ft)	17	1	0	0
Control Delay (s)	28.4	11.5	0.0	0.0
Lane LOS	D	B		
Approach Delay (s)	28.4	0.0		0.0
Approach LOS	D			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
8: Laguna Cyn Rd & Act V Parking Lot

03/30/2018

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Volume (veh/h)	19	29	6	1310	1147	15
Future Volume (Veh/h)	19	29	6	1310	1147	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	32	7	1424	1247	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				1221		
pX, platoon unblocked	0.20					
vC, conflicting volume	2685	1247	1263			
vC1, stage 1 conf vol	1247					
vC2, stage 2 conf vol	1438					
vCu, unblocked vol	7461	1247	1263			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	61	85	99			
cM capacity (veh/h)	53	212	550			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	21	32	7	1424	1247	16
Volume Left	21	0	7	0	0	0
Volume Right	0	32	0	0	0	16
cSH	53	212	550	1700	1700	1700
Volume to Capacity	0.39	0.15	0.01	0.84	0.73	0.01
Queue Length 95th (ft)	36	13	1	0	0	0
Control Delay (s)	110.5	25.0	11.6	0.0	0.0	0.0
Lane LOS	F	D	B			
Approach Delay (s)	58.9		0.1		0.0	
Approach LOS	F					

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

HCM 2010 Signalized Intersection Summary
9: Canyon Acres Dr & Laguna Cyn Rd
03/30/2018

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	⮌	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	18	13	11	1201	28	14	1191
Future Volume (veh/h)	18	13	11	1201	28	14	1191
Number	3	18		2	12	1	6
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			0.98	1.00	
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863		1863	1863	1863	1863
Adj Flow Rate, veh/h	19	14		1278	30	15	1267
Adj No. of Lanes	1	1		2	1	1	2
Peak Hour Factor	0.94	0.94		0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2		2	2	2	2
Cap, veh/h	55	49		2845	1241	31	3081
Arrive On Green	0.03	0.03		0.80	0.80	0.02	0.87
Sat Flow, veh/h	1774	1583		3632	1544	1774	3632
Grp Volume(v), veh/h	19	14		1278	30	15	1267
Grp Sat Flow(s),veh/h/ln	1774	1583		1770	1544	1774	1770
Q Serve(g_s), s	1.0	0.8		10.1	0.4	0.8	6.6
Cycle Q Clear(g_c), s	1.0	0.8		10.1	0.4	0.8	6.6
Prop In Lane	1.00	1.00			1.00	1.00	
Lane Grp Cap(c), veh/h	55	49		2845	1241	31	3081
V/C Ratio(X)	0.35	0.28		0.45	0.02	0.49	0.41
Avail Cap(c_a), veh/h	495	442		2845	1241	146	3081
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	43.3		2.7	1.8	44.5	1.2
Incr Delay (d2), s/veh	3.7	3.1		0.5	0.0	11.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.4		5.0	0.2	0.5	3.2
LnGrp Delay(d),s/veh	47.1	46.4		3.3	1.8	56.0	1.6
LnGrp LOS	D	D		A	A	E	A
Approach Vol, veh/h	33			1308			1282
Approach Delay, s/veh	46.8			3.2			2.2
Approach LOS	D			A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.1	78.0				84.1		7.3
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	7.5	73.5				74.5		25.5
Max Q Clear Time (g_c+I1), s	2.8	12.1				8.6		3.0
Green Ext Time (p_c), s	0.0	14.4				12.0		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	3.3
HCM 2010 LOS	A

Notes

User approved ignoring U-Turning movement.

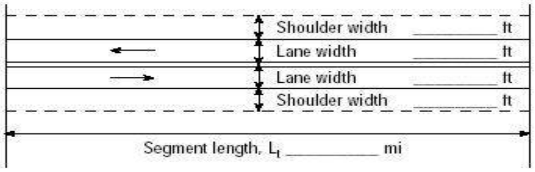
Appendix G. Opening Year (2030) Highway LOS Worksheets

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1310*veh/h
Opposing direction vol., V_o *1720*veh/h
Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway
Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2* %
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1424*	*1870*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*22.6 mi/h*
		Percent free flow speed, PFFS	*46.4 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*1424*	*1870*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*90.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	*94.1*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.84*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*46.4*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1423.9*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.50*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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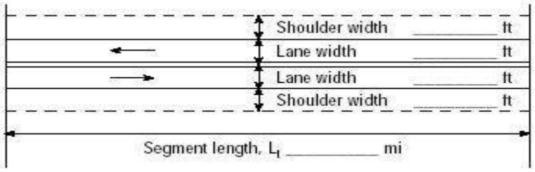
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d	*1920*veh/h
Opposing direction vol., V_o	*1730*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down	
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2087*	*1880*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed^4, BFFS	*50.0 mi/h*
Mean speed of sample^3, S_{FM}		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*17.4 mi/h*
		Percent free flow speed, PFFS	*35.7 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2087*	*1880*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*95.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*7.2*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*99.7*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.23*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*35.7*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2087.0*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.69*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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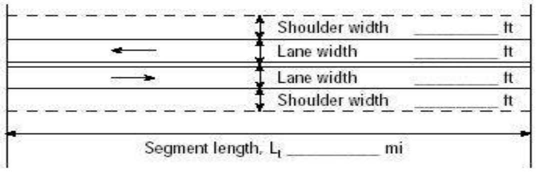
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d	*1720*veh/h
Opposing direction vol., V_o	*1310*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1870*	*1424*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.7 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*22.4 mi/h*
		Percent free flow speed, PFFS	*46.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1870*	*1424*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*94.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.9*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*99.1*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.10*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*46.0*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1869.6*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.64*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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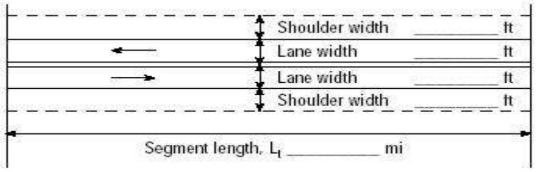
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Analysis direction vol., V_d	*1730*veh/h
Opposing direction vol., V_o	*1920*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.5*
Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*1880*	*2087*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*17.4 mi/h*
		Percent free flow speed, PFFS	*35.7 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*1880*	*2087*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*94.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*7.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*98.1*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.11*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*35.7*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1880.4*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.64*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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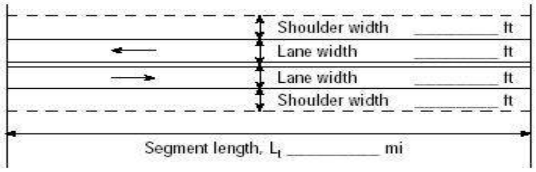
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	KK	Highway / Direction of Travel	SR-133/NB
Agency or Company	HDR	From/To	El Toro/Sun Valley Dr
Date Performed	3/14/2022	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2030 Build/Alt5

Project Description: SR-133 PSR/PDS

Input Data



Analysis direction vol., V_d 735veh/h
Opposing direction vol., V_o 1930veh/h
Shoulder width ft 5.0
Lane Width ft 12.0
Segment Length mi 0.5

☑ Class I highway ☐ Class II highway ☐ Class III highway
Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF 0.92
No-passing zone 100%
% Trucks and Buses , P_T 2 %
% Recreational vehicles, P_R 0%
Access points *mi* 0/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.1	1.0
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.998	1.000
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	801	2098

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed[4], BFFS	50.0 mi/h
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	1.3 mi/h
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	0.0 mi/h
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	48.7 mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	0.5 mi/h	Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	25.7 mi/h
		Percent free flow speed, PFFS	52.7 %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	1.000	1.000
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	799	2098
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	76.7	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	13.6	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	80.5	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	F
Volume to capacity ratio, *v/c*	0.47
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1700
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	52.7

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	798.9
Effective width, Wv (Eq. 15-29) ft	22.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.21
Bicycle level of service (Exhibit 15-4)	C

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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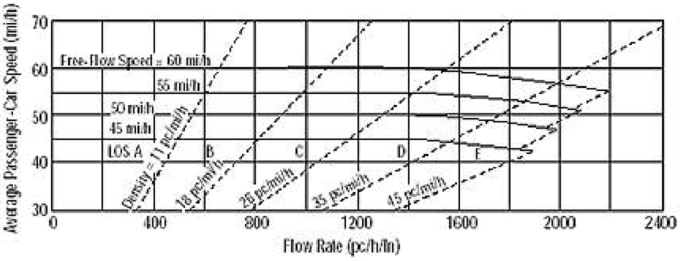
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	PM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/NB
From/To	El Toro/Sun Valley Dr
Jurisdiction	Caltrans
Analysis Year	2030 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2150	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1180
Speed, S (mi/h)	50.0
D (pc/mi/ln)	23.6
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1168.5*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*2.94*
Bicycle level of service (Exhibit 15-4)	*C*

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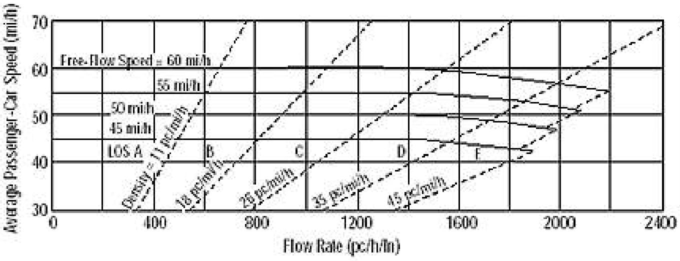
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	AM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/SB
From/To	El Toro/Sun Valley Dr
Jurisdiction	Caltrans
Analysis Year	2030 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	1930	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1059
Speed, S (mi/h)	50.0
D (pc/mi/ln)	21.2
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1048.9*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*2.89*
Bicycle level of service (Exhibit 15-4)	*C*

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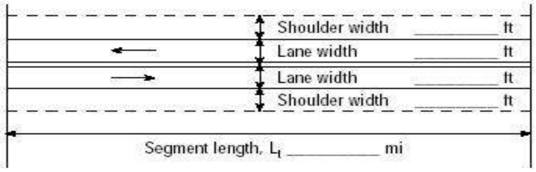
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*03/14/22*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d	*970*veh/h
Opposing direction vol., V_o	*2150*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down	
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1054*	*2337*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed^4, BFFS	*50.0 mi/h*
Mean speed of sample^3, S_{FM}		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*21.9 mi/h*
		Percent free flow speed, PFFS	*44.9 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1054*	*2337*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*83.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*14.0*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*88.3*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.62*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*44.9*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1054.3*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.35*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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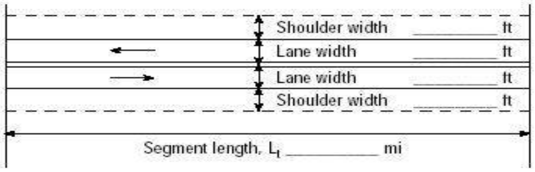
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*BM*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1300*veh/h

Opposing direction vol., V_o *1780*veh/h

Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T 2 %
% Recreational vehicles, P_R 0%
Access points *mi* 0/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1413*	*1935*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed^4, BFFS	*50.0 mi/h*
Mean speed of sample^3, S_{FM}		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*22.2 mi/h*
		Percent free flow speed, PFFS	*45.6 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1413*	*1935*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*90.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.3*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*94.1*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.83*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*45.6*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1413.0*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.50*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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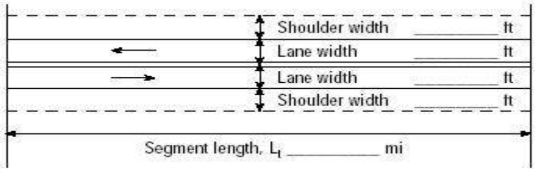
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1960*veh/h

Opposing direction vol., V_o *1730*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☐ Level ☐ Rolling

Grade Length *0.25* mi Up/down *3.0*

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.1*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*0.998*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2135*	*1880*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed^4, BFFS	*50.0 mi/h*
Mean speed of sample^3, S_{FM}		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*17.0 mi/h*
		Percent free flow speed, PFFS	*34.9 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.92*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2316*	*1880*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*96.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*7.4*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+f $_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.36*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1697*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1564*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*34.9*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2130.4*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.70*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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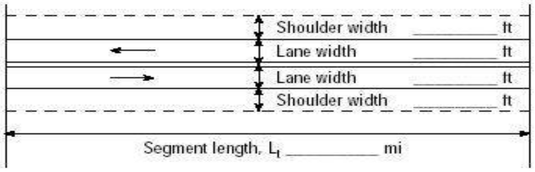
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi
Analysis direction vol., V_d	*1780*veh/h
Opposing direction vol., V_o	*1300*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.4*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1935*	*1413*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.8 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*22.0 mi/h*
		Percent free flow speed, PFFS	*45.1 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1935*	*1413*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*94.5*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.3*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*99.9*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.14*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*45.1*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1934.8*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.66*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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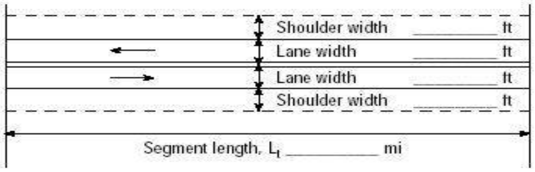
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1730*veh/h

Opposing direction vol., V_o *1960*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/\ (1+ P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1880*	*2130*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*17.1 mi/h*
		Percent free flow speed, PFFS	*35.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/\ (1+ P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*\ f_{g,PTSF})$	*1880*	*2130*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*94.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*7.4*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}\ /\ v_{d,PTSF}+v_{o,PTSF})$	*98.2*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.11*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*35.0*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1880.4*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.64*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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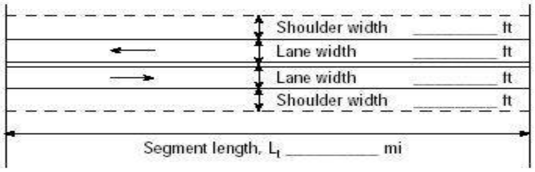
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*BM*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*03/14/22*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *730*veh/h

Opposing direction vol., V_o *1990*veh/h

Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2* %
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.1*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*0.998*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*795*	*2163*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*25.2 mi/h*
		Percent free flow speed, PFFS	*51.8 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*793*	*2163*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*76.5*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*13.3*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*80.1*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.47*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*51.8*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*793.5*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.20*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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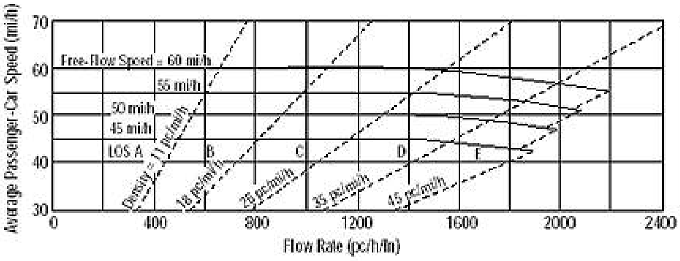
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	PM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/NB
From/To	Sun Valley Dr/Stan Oaks Dr
Jurisdiction	Caltrans
Analysis Year	2030 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2200	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1207
Speed, S (mi/h)	50.0
D (pc/mi/ln)	24.1
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1195.7*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*2.95*
Bicycle level of service (Exhibit 15-4)	*C*

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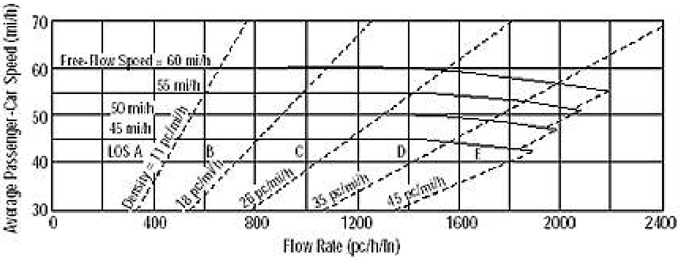
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	AM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/SB
From/To	Sun Valley Dr/Stan Oaks Dr
Jurisdiction	Caltrans
Analysis Year	2030 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	1990	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1092
Speed, S (mi/h)	50.0
D (pc/mi/ln)	21.8
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1081.5*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*2.90*
Bicycle level of service (Exhibit 15-4)	*C*

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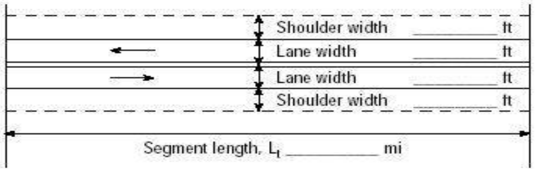
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*03/14/22*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d	*970*veh/h
Opposing direction vol., V_o	*2200*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1054*	*2391*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*21.4 mi/h*
		Percent free flow speed, PFFS	*44.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1054*	*2391*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*83.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*14.2*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*88.2*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.62*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*44.0*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1054.3*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.35*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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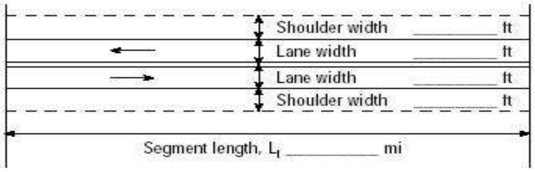
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1350*veh/h

Opposing direction vol., V_o *1770*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *1.0*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1467*	*1924*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*21.9 mi/h*
		Percent free flow speed, PFFS	*44.9 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1467*	*1924*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*90.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.9*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*94.8*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.86*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*44.9*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1467.4*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.52*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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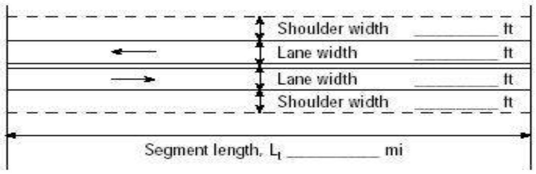
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1890*veh/h
Opposing direction vol., V_o *1790*veh/h
Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *1.0*

☑ Class I highway ☐ Class II highway ☐ Class III highway
Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T-1)+P_R (E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2054*	*1946*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed^4, BFFS	*50.0 mi/h*
Mean speed of sample^3, S_{FM}		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*17.1 mi/h*
		Percent free flow speed, PFFS	*35.2 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2054*	*1946*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*95.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*6.7*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*99.1*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.21*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*35.2*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2054.3*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.69*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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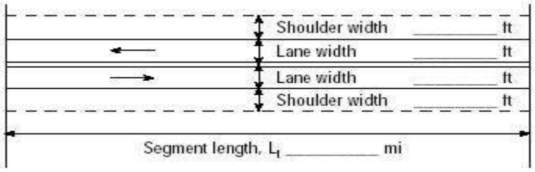
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1770*veh/h

Opposing direction vol., V_o *1350*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *1.0*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1924*	*1467*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed^4, BFFS	*50.0* mi/h
Mean speed of sample^3, S_{FM}		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3* mi/h
Total demand flow rate, both directions, *v*		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0* mi/h
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7* mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.7* mi/h	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*21.7* mi/h
		Percent free flow speed, PFFS	*44.5* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1924*	*1467*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*94.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.9*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*99.6*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.13*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*44.5*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1923.9*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.65*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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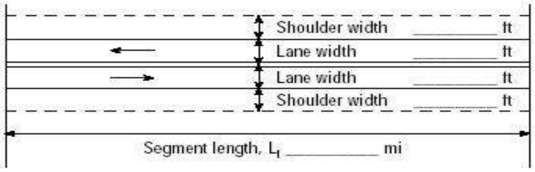
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Analysis direction vol., V_d	*1790*veh/h	
Opposing direction vol., V_o	*1890*veh/h	
Shoulder width ft	*5.0*	
Lane Width ft	*12.0*	
Segment Length mi	*1.0*	
Grade Length	mi	Up/down
Peak-hour factor, PHF	*0.92*	
No-passing zone	*100%*	
% Trucks and Buses , P_T	*2* %	
% Recreational vehicles, P_R	*0%*	
Access points *mi*	*0*/mi	

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1946*	*2054*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*17.1 mi/h*
		Percent free flow speed, PFFS	*35.2 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1946*	*2054*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*95.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*6.7*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*98.4*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.14*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*35.2*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1945.7*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.66*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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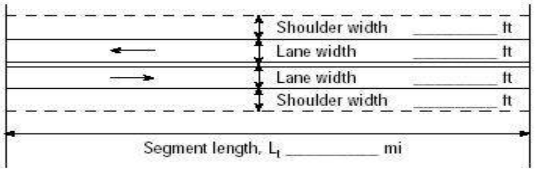
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*03/14/22*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *755*veh/h

Opposing direction vol., V_o *1980*veh/h

Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *1.0*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.1*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*0.998*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*822*	*2152*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*25.1 mi/h*
		Percent free flow speed, PFFS	*51.5 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*821*	*2152*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*77.5*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*13.6*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*81.3*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.48*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*51.5*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*820.7*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.22*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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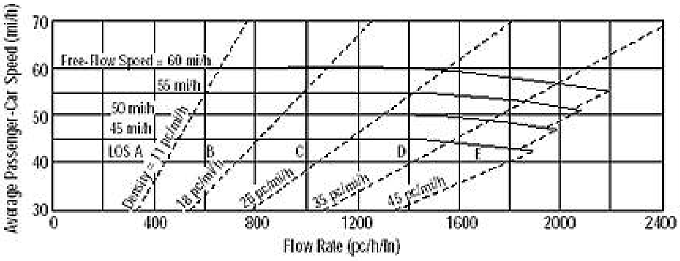
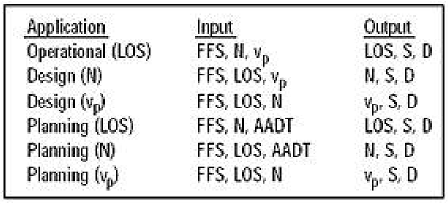
MULTILANE HIGHWAYS WORKSHEET(Direction 1)





Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	PM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/NB
From/To	Stan Oaks Dr/LCAD dwy
Jurisdiction	Caltrans
Analysis Year	2030 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2120	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1163
Speed, S (mi/h)	50.0
D (pc/mi/ln)	23.3
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1152.2*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*2.93*
Bicycle level of service (Exhibit 15-4)	*C*

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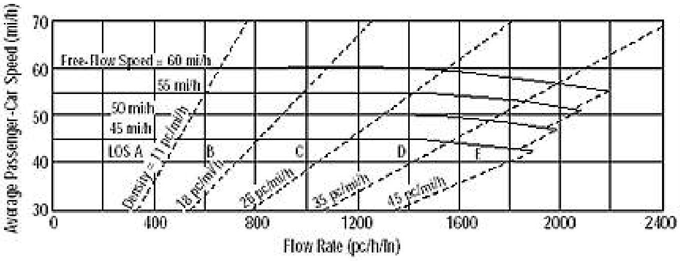
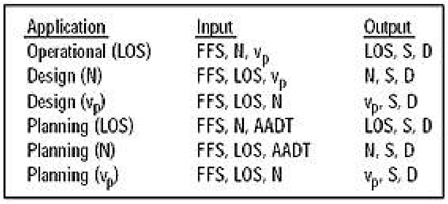
MULTILANE HIGHWAYS WORKSHEET(Direction 1)





Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	AM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/SB
From/To	Stan Oaks Dr/LCAD dwy
Jurisdiction	Caltrans
Analysis Year	2030 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	1980	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1086
Speed, S (mi/h)	50.0
D (pc/mi/ln)	21.7
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1076.1*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*2.90*
Bicycle level of service (Exhibit 15-4)	*C*

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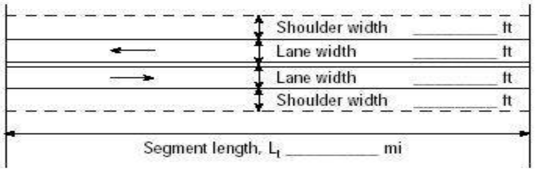
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*03/14/22*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1000*veh/h

Opposing direction vol., V_o *2120*veh/h

Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *1.0*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/ (1+ P_T (E_T -1)+P_R (E_R -1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1087*	*2304*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*21.9 mi/h*
		Percent free flow speed, PFFS	*44.9 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}* f_{g,PTSF})$	*1087*	*2304*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*84.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*13.6*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF} *(v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	*89.1*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.64*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*44.9*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1087.0*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.36*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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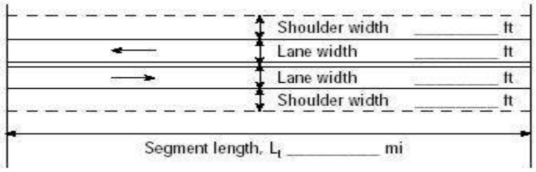
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1370*veh/h

Opposing direction vol., V_o *1760*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2 %*

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1489*	*1913*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed^4, BFFS	*50.0 mi/h*
Mean speed of sample^3, S_{FM}		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*21.8 mi/h*
		Percent free flow speed, PFFS	*44.7 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1489*	*1913*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*91.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.7*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*94.9*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.88*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*44.7*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1489.1*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.52*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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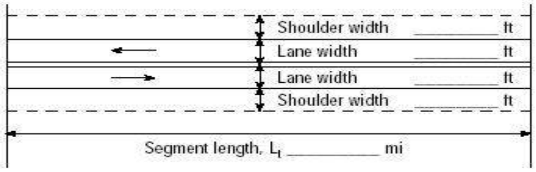
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d	*1890*veh/h
Opposing direction vol., V_o	*1800*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2054*	*1957*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*17.0 mi/h*
		Percent free flow speed, PFFS	*35.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2054*	*1957*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*95.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*6.6*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*99.1*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.21*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*35.0*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2054.3*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.69*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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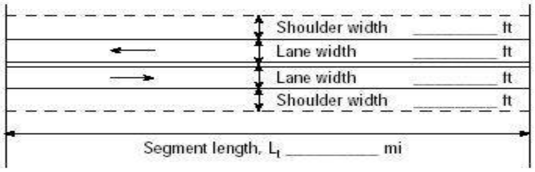
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d	*1760*veh/h
Opposing direction vol., V_o	*1370*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☐ Level ☑ Rolling

Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2 %*
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.3*	*1.3*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*0.994*	*0.994*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1925*	*1498*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.7 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*21.5 mi/h*
		Percent free flow speed, PFFS	*44.1 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1913*	*1489*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*94.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*8.7*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+f $_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*99.5*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.13*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1690*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*44.1*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1913.0*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.65*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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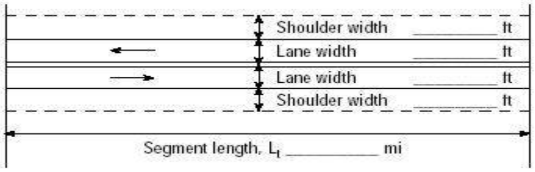
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1800*veh/h

Opposing direction vol., V_o *1890*veh/h

Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2* %
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1957*	*2054*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(v/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*17.0 mi/h*
		Percent free flow speed, PFFS	*35.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1957*	*2054*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*95.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*6.6*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*98.4*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.15*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*35.0*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1956.5*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.66*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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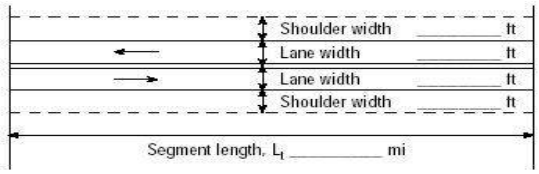
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*03/14/22*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2030 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *765*veh/h

Opposing direction vol., V_o *1970*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2 %*

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.1*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.998*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*833*	*2141*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*25.1 mi/h*
		Percent free flow speed, PFFS	*51.5 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*832*	*2141*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*77.8*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*13.7*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*81.6*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.49*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*51.5*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*831.5*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.23*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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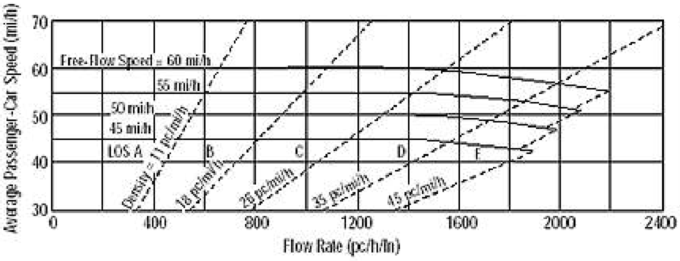
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	PM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/NB
From/To	LCAD dwy/Canyon Acres Dr
Jurisdiction	Caltrans
Analysis Year	2030 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2120	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Rolling
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	2.0
E_T	2.5	f_{HV}	0.971

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1186
Speed, S (mi/h)	50.0
D (pc/mi/ln)	23.7
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1152.2*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*2.93*
Bicycle level of service (Exhibit 15-4)	*C*

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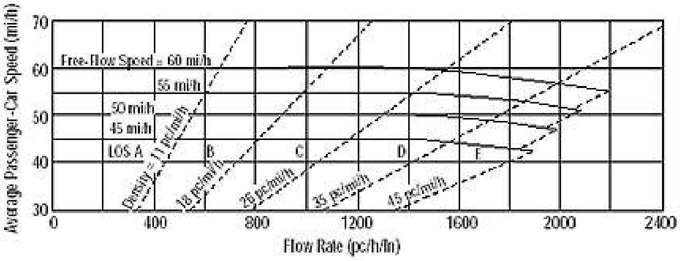
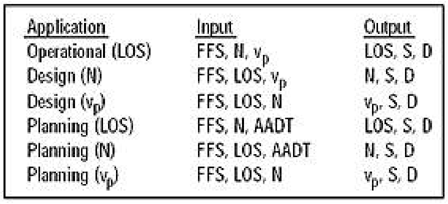
MULTILANE HIGHWAYS WORKSHEET(Direction 1)





Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	AM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/SB
From/To	LCAD dwy/Canyon Acres Dr
Jurisdiction	Caltrans
Analysis Year	2030 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2020	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1108
Speed, S (mi/h)	50.0
D (pc/mi/ln)	22.2
LOS	C

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1097.8*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*2.91*
Bicycle level of service (Exhibit 15-4)	*C*

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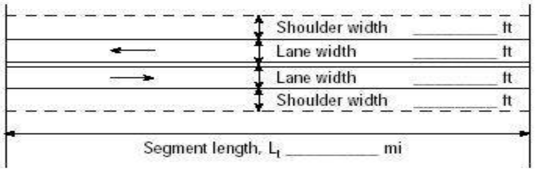
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*03/14/22*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2030 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1010*veh/h

Opposing direction vol., V_o *2120*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T-1)+P_R (E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1098*	*2304*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*21.8 mi/h*
		Percent free flow speed, PFFS	*44.7 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1098*	*2304*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*84.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*13.5*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*89.3*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.65*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*44.7*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1097.8*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.37*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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Appendix H. Opening Year (2030) Intersection LOS Worksheets

HCM 2010 Signalized Intersection Summary
1: Laguna Cyn Rd & El Toro Road

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	815	16	1045	711	28	1079
Future Volume (veh/h)	815	16	1045	711	28	1079
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	858	17	1100	748	29	1136
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	875	781	1304	1364	46	1528
Arrive On Green	0.49	0.49	0.37	0.37	0.03	0.43
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	858	17	1100	748	29	1136
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	57.0	0.7	34.2	14.9	1.9	32.2
Cycle Q Clear(g_c), s	57.0	0.7	34.2	14.9	1.9	32.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	875	781	1304	1364	46	1528
V/C Ratio(X)	0.98	0.02	0.84	0.55	0.63	0.74
Avail Cap(c_a), veh/h	880	785	1304	1364	74	1528
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.8	15.6	34.7	2.2	57.9	28.5
Incr Delay (d2), s/veh	25.5	0.0	6.8	1.6	13.5	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	34.1	0.3	17.9	25.3	1.1	16.3
LnGrp Delay(d),s/veh	55.3	15.6	41.5	3.8	71.4	31.9
LnGrp LOS	E	B	D	A	E	C
Approach Vol, veh/h	875		1848			1165
Approach Delay, s/veh	54.5		26.2			32.8
Approach LOS	D		C			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.6	48.7				56.3		63.7
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	42.0				51.5		59.5
Max Q Clear Time (g_c+I1), s	3.9	36.2				34.2		59.0
Green Ext Time (p_c), s	0.0	4.3				7.1		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	34.6
HCM 2010 LOS	C

HCM 2010 Signalized Intersection Summary
1: Laguna Cyn Rd & El Toro Road

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	680	43	835	824	41	973
Future Volume (veh/h)	680	43	835	824	41	973
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	716	45	879	867	43	1024
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	763	681	1438	1325	61	1711
Arrive On Green	0.43	0.43	0.41	0.41	0.03	0.48
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	716	45	879	867	43	1024
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	40.3	1.7	20.5	20.7	2.5	22.0
Cycle Q Clear(g_c), s	40.3	1.7	20.5	20.7	2.5	22.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	763	681	1438	1325	61	1711
V/C Ratio(X)	0.94	0.07	0.61	0.65	0.71	0.60
Avail Cap(c_a), veh/h	1028	917	1438	1325	93	1711
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	17.4	24.5	3.1	49.9	19.6
Incr Delay (d2), s/veh	12.8	0.0	1.9	2.5	14.2	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.4	0.8	10.4	25.7	1.5	11.0
LnGrp Delay(d),s/veh	41.2	17.5	26.4	5.6	64.1	21.2
LnGrp LOS	D	B	C	A	E	C
Approach Vol, veh/h	761		1746			1067
Approach Delay, s/veh	39.8		16.1			22.9
Approach LOS	D		B			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.1	46.9				55.0		49.4
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.5	40.5				50.5		60.5
Max Q Clear Time (g_c+I1), s	4.5	22.7				24.0		42.3
Green Ext Time (p_c), s	0.0	9.2				7.4		2.7

Intersection Summary		
HCM 2010 Ctrl Delay		23.2
HCM 2010 LOS		C

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	815	16	1232	711	28	1208
Future Volume (veh/h)	815	16	1232	711	28	1208
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	858	17	1297	748	29	1272
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	832	743	1389	1364	46	1613
Arrive On Green	0.47	0.47	0.39	0.39	0.03	0.46
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	858	17	1297	748	29	1272
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	56.3	0.7	42.2	14.9	1.9	36.6
Cycle Q Clear(g_c), s	56.3	0.7	42.2	14.9	1.9	36.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	832	743	1389	1364	46	1613
V/C Ratio(X)	1.03	0.02	0.93	0.55	0.63	0.79
Avail Cap(c_a), veh/h	832	743	1389	1364	74	1613
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.9	17.1	35.0	2.2	57.9	27.7
Incr Delay (d2), s/veh	39.4	0.0	11.7	0.5	13.5	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	36.6	0.3	22.8	24.9	1.1	18.7
LnGrp Delay(d),s/veh	71.2	17.1	46.7	2.6	71.4	31.7
LnGrp LOS	F	B	D	A	E	C
Approach Vol, veh/h	875		2045			1301
Approach Delay, s/veh	70.2		30.6			32.6
Approach LOS	E		C			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	7.6	51.6				59.2		60.8
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	45.2				54.7		56.3
Max Q Clear Time (g_c+I1), s	3.9	44.2				38.6		58.3
Green Ext Time (p_c), s	0.0	0.9				8.5		0.0

Intersection Summary			
HCM 2010 Ctrl Delay			39.4
HCM 2010 LOS			D

HCM 2010 Signalized Intersection Summary
1: Laguna Cyn Rd & El Toro Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	680	43	1012	824	41	1090
Future Volume (veh/h)	680	43	1012	824	41	1090
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	716	45	1065	867	43	1147
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	757	676	1480	1338	59	1741
Arrive On Green	0.43	0.43	0.42	0.42	0.03	0.49
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	716	45	1065	867	43	1147
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	43.0	1.9	27.7	20.8	2.7	27.0
Cycle Q Clear(g_c), s	43.0	1.9	27.7	20.8	2.7	27.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	757	676	1480	1338	59	1741
V/C Ratio(X)	0.95	0.07	0.72	0.65	0.73	0.66
Avail Cap(c_a), veh/h	905	808	1480	1338	82	1741
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.5	18.7	26.8	2.9	53.1	21.1
Incr Delay (d2), s/veh	16.6	0.0	1.7	1.1	18.7	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.4	0.8	13.8	26.7	1.6	13.5
LnGrp Delay(d),s/veh	47.1	18.8	28.5	4.0	71.7	23.1
LnGrp LOS	D	B	C	A	E	C
Approach Vol, veh/h	761		1932			1190
Approach Delay, s/veh	45.4		17.5			24.9
Approach LOS	D		B			C

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.2	50.8				59.0		51.8
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.1	44.9				54.5		56.5
Max Q Clear Time (g_c+I1), s	4.7	29.7				29.0		45.0
Green Ext Time (p_c), s	0.0	10.0				9.6		2.3

Intersection Summary	
HCM 2010 Ctrl Delay	25.3
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	22.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Vol, veh/h	20	146	1610	30	168	1726
Future Vol, veh/h	20	146	1610	30	168	1726
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	151	1660	31	173	1779

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3801	1676	0	0	1691	0
Stage 1	1676	-	-	-	-	-
Stage 2	2125	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 4	~ 118	-	-	377	-
Stage 1	167	-	-	-	-	-
Stage 2	99	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 2	~ 118	-	-	377	-
Mov Cap-2 Maneuver	38	-	-	-	-	-
Stage 1	167	-	-	-	-	-
Stage 2	54	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 483.8	0	2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	94	377	-
HCM Lane V/C Ratio	-	-	1.821	0.459	-
HCM Control Delay (s)	-	-	$ 483.8	22.4	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	14.2	2.3	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱		↰	↑
Traffic Vol, veh/h	11	60	1599	10	51	1602
Future Vol, veh/h	11	60	1599	10	51	1602
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	62	1648	10	53	1652

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3411	1653	0	0	1658	0
Stage 1	1653	-	-	-	-	-
Stage 2	1758	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 8	122	-	-	388	-
Stage 1	171	-	-	-	-	-
Stage 2	152	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 7	122	-	-	388	-
Mov Cap-2 Maneuver	71	-	-	-	-	-
Stage 1	171	-	-	-	-	-
Stage 2	131	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	86.8	0	0.5
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	110	388	-
HCM Lane V/C Ratio	-	-	0.665	0.136	-
HCM Control Delay (s)	-	-	86.8	15.7	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	3.4	0.5	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	30

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑↑
Traffic Vol, veh/h	20	146	1873	30	168	1931
Future Vol, veh/h	20	146	1873	30	168	1931
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	151	1931	31	173	1991

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3289	1947	0	0	1962	0
Stage 1	1947	-	-	-	-	-
Stage 2	1342	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	~ 8	~ 80	-	-	294	-
Stage 1	121	-	-	-	-	-
Stage 2	209	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 3	~ 80	-	-	294	-
Mov Cap-2 Maneuver	47	-	-	-	-	-
Stage 1	121	-	-	-	-	-
Stage 2	86	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 720.3	0	2.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	74	294	-
HCM Lane V/C Ratio	-	-	2.313	0.589	-
HCM Control Delay (s)	-	-	$ 720.3	33.4	-
HCM Lane LOS	-	-	F	D	-
HCM 95th %tile Q(veh)	-	-	16.1	3.5	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 2010 TWSC
2: Laguna Cyn Rd & Anneliese Dwy

2030 Build Alt5 PM Peak

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱		↰	↑↑
Traffic Vol, veh/h	11	60	1794	10	51	1737
Future Vol, veh/h	11	60	1794	10	51	1737
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	62	1849	10	53	1791

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2856	930	0	0	1859	0
Stage 1	1854	-	-	-	-	-
Stage 2	1002	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	13	269	-	-	321	-
Stage 1	109	-	-	-	-	-
Stage 2	316	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 11	269	-	-	321	-
Mov Cap-2 Maneuver	75	-	-	-	-	-
Stage 1	109	-	-	-	-	-
Stage 2	264	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	34.9	0	0.5
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	192	321	-
HCM Lane V/C Ratio	-	-	0.381	0.164	-
HCM Control Delay (s)	-	-	34.9	18.4	-
HCM Lane LOS	-	-	D	C	-
HCM 95th %tile Q(veh)	-	-	1.7	0.6	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Vol, veh/h	4	6	1444	1	2	1694
Future Vol, veh/h	4	6	1444	1	2	1694
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	7	1570	1	2	1841

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3416	1571	0	0	1571	0
Stage 1	1571	-	-	-	-	-
Stage 2	1845	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	8	136	-	-	420	-
Stage 1	188	-	-	-	-	-
Stage 2	137	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	8	136	-	-	420	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	188	-	-	-	-	-
Stage 2	136	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	44	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	103	420	-
HCM Lane V/C Ratio	-	-	0.106	0.005	-
HCM Control Delay (s)	-	-	44	13.6	-
HCM Lane LOS	-	-	E	B	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱		↰	↑
Traffic Vol, veh/h	2	2	1644	6	2	1494
Future Vol, veh/h	2	2	1644	6	2	1494
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	1787	7	2	1624

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3419	1791	0	0	1794	0
Stage 1	1791	-	-	-	-	-
Stage 2	1628	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	8	100	-	-	344	-
Stage 1	146	-	-	-	-	-
Stage 2	176	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	8	100	-	-	344	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	146	-	-	-	-	-
Stage 2	175	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	49.1	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	86	344	-
HCM Lane V/C Ratio	-	-	0.051	0.006	-
HCM Control Delay (s)	-	-	49.1	15.5	-
HCM Lane LOS	-	-	E	C	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

HCM 2010 TWSC
3: Laguna Cyn Rd & Sun Valley Dr

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑↑
Traffic Vol, veh/h	0	10	1703	3	0	1901
Future Vol, veh/h	0	10	1703	3	0	1901
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	1851	3	0	2066

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1853	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	92	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	92	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	49.3	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	92	-
HCM Lane V/C Ratio	-	-	0.118	-
HCM Control Delay (s)	-	-	49.3	-
HCM Lane LOS	-	-	E	-
HCM 95th %tile Q(veh)	-	-	0.4	-

HCM 2010 TWSC
3: Laguna Cyn Rd & Sun Valley Dr

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	4	1837	8	0	1631
Future Vol, veh/h	0	4	1837	8	0	1631
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	4	1997	9	0	1773

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1003	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	241	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	241	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	241	-
HCM Lane V/C Ratio	-	-	0.018	-
HCM Control Delay (s)	-	-	20.2	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑	↱	↰	↑
Traffic Vol, veh/h	10	15	1430	15	15	1683
Future Vol, veh/h	10	15	1430	15	15	1683
Conflicting Peds, #/hr	0	5	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	165	205	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	15	1474	15	15	1735

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3244	1484	0	0	1494	0
Stage 1	1479	-	-	-	-	-
Stage 2	1765	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 10	153	-	-	449	-
Stage 1	209	-	-	-	-	-
Stage 2	151	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 10	152	-	-	447	-
Mov Cap-2 Maneuver	83	-	-	-	-	-
Stage 1	208	-	-	-	-	-
Stage 2	146	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	45.6	0	0.1
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	114	447	-
HCM Lane V/C Ratio	-	-	0.226	0.035	-
HCM Control Delay (s)	-	-	45.6	13.3	-
HCM Lane LOS	-	-	E	B	-
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑	↱	↰	↑
Traffic Vol, veh/h	5	5	1645	6	5	1491
Future Vol, veh/h	5	5	1645	6	5	1491
Conflicting Peds, #/hr	0	5	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	165	205	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	1696	6	5	1537

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3248	1706	0	0	1707	0
Stage 1	1701	-	-	-	-	-
Stage 2	1547	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	10	113	-	-	372	-
Stage 1	162	-	-	-	-	-
Stage 2	193	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	10	112	-	-	370	-
Mov Cap-2 Maneuver	84	-	-	-	-	-
Stage 1	161	-	-	-	-	-
Stage 2	190	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	47	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	96	370	-
HCM Lane V/C Ratio	-	-	0.107	0.014	-
HCM Control Delay (s)	-	-	47	14.9	-
HCM Lane LOS	-	-	E	B	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑	↱		↑↑
Traffic Vol, veh/h	0	25	1681	30	0	1901
Future Vol, veh/h	0	25	1681	30	0	1901
Conflicting Peds, #/hr	0	5	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	165	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	26	1733	31	0	1960

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1743	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	107	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	106	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	49.5	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	106	-
HCM Lane V/C Ratio	-	-	0.243	-
HCM Control Delay (s)	-	-	49.5	-
HCM Lane LOS	-	-	E	-
HCM 95th %tile Q(veh)	-	-	0.9	-

HCM 2010 TWSC
4: Laguna Cyn Rd & LB Dog Park Dwy

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑	↱		↑
Traffic Vol, veh/h	0	10	1835	11	0	1631
Future Vol, veh/h	0	10	1835	11	0	1631
Conflicting Peds, #/hr	0	5	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	165	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	10	1892	11	0	1681

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	956	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	259	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	257	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB		NB		SB
HCM Control Delay, s	19.6		0		0
HCM LOS	C				

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	257	-
HCM Lane V/C Ratio	-	-	0.04	-
HCM Control Delay (s)	-	-	19.6	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱		↰	↑
Traffic Vol, veh/h	4	6	1439	1	2	1691
Future Vol, veh/h	4	6	1439	1	2	1691
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	7	1564	1	2	1838

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3407	1565	0	0	1565	0
Stage 1	1565	-	-	-	-	-
Stage 2	1842	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	8	137	-	-	422	-
Stage 1	189	-	-	-	-	-
Stage 2	138	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	8	137	-	-	422	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	189	-	-	-	-	-
Stage 2	137	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	43.6	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	104	422	-
HCM Lane V/C Ratio	-	-	0.105	0.005	-
HCM Control Delay (s)	-	-	43.6	13.6	-
HCM Lane LOS	-	-	E	B	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Vol, veh/h	3	2	1649	6	2	1494
Future Vol, veh/h	3	2	1649	6	2	1494
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	2	1792	7	2	1624

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3424	1796	0	0	1799	0
Stage 1	1796	-	-	-	-	-
Stage 2	1628	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	8	100	-	-	343	-
Stage 1	145	-	-	-	-	-
Stage 2	176	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	8	100	-	-	343	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	145	-	-	-	-	-
Stage 2	175	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	50.8	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	84	343	-
HCM Lane V/C Ratio	-	-	0.065	0.006	-
HCM Control Delay (s)	-	-	50.8	15.6	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

HCM 2010 TWSC
5: Laguna Cyn Rd & Stan Oaks Dr

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↱			↑↑
Traffic Vol, veh/h	0	10	1701	3	0	1901
Future Vol, veh/h	0	10	1701	3	0	1901
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	1849	3	0	2066

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1851	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	92	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	92	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	49.3	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	92	-
HCM Lane V/C Ratio	-	-	0.118	-
HCM Control Delay (s)	-	-	49.3	-
HCM Lane LOS	-	-	E	-
HCM 95th %tile Q(veh)	-	-	0.4	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	5	1841	8	0	1631
Future Vol, veh/h	0	5	1841	8	0	1631
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	2001	9	0	1773

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1005	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	240	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	240	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	240	-
HCM Lane V/C Ratio	-	-	0.023	-
HCM Control Delay (s)	-	-	20.3	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Vol, veh/h	6	8	1432	2	3	1692
Future Vol, veh/h	6	8	1432	2	3	1692
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	9	1557	2	3	1839

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3403	1558	0	0	1559	0
Stage 1	1558	-	-	-	-	-
Stage 2	1845	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	8	139	-	-	424	-
Stage 1	191	-	-	-	-	-
Stage 2	137	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	8	139	-	-	424	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	191	-	-	-	-	-
Stage 2	136	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	45.9	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	103	424	-
HCM Lane V/C Ratio	-	-	0.148	0.008	-
HCM Control Delay (s)	-	-	45.9	13.6	-
HCM Lane LOS	-	-	E	B	-
HCM 95th %tile Q(veh)	-	-	0.5	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Vol, veh/h	4	3	1652	8	3	1494
Future Vol, veh/h	4	3	1652	8	3	1494
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	3	1796	9	3	1624

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3431	1801	0	0	1805	0
Stage 1	1801	-	-	-	-	-
Stage 2	1630	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	8	99	-	-	341	-
Stage 1	145	-	-	-	-	-
Stage 2	176	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	8	99	-	-	341	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	145	-	-	-	-	-
Stage 2	174	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	52.1	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	84	341	-
HCM Lane V/C Ratio	-	-	0.091	0.01	-
HCM Control Delay (s)	-	-	52.1	15.7	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑↑
Traffic Vol, veh/h	0	14	1690	5	0	1901
Future Vol, veh/h	0	14	1690	5	0	1901
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	15	1837	5	0	2066

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1840	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	93	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	93	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	51.1	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	93	-
HCM Lane V/C Ratio	-	-	0.164	-
HCM Control Delay (s)	-	-	51.1	-
HCM Lane LOS	-	-	F	-
HCM 95th %tile Q(veh)	-	-	0.6	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	7	1842	11	0	1631
Future Vol, veh/h	0	7	1842	11	0	1631
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	8	2002	12	0	1773

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1007	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	240	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	240	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	240	-
HCM Lane V/C Ratio	-	-	0.032	-
HCM Control Delay (s)	-	-	20.5	-
HCM Lane LOS	-	-	C	-
HCM 95th %tile Q(veh)	-	-	0.1	-

HCM 2010 TWSC
7: Laguna Cyn Rd & LC Arts+Design Dwy

Intersection	
Int Delay, s/veh	10.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱		↰	↑	↑↱	
Traffic Vol, veh/h	55	45	52	1379	1656	42
Future Vol, veh/h	55	45	52	1379	1656	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	49	57	1499	1800	46

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3436	1823	1846	0	-	0
Stage 1	1823	-	-	-	-	-
Stage 2	1613	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 8	96	329	-	-	-
Stage 1	141	-	-	-	-	-
Stage 2	179	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 7	96	329	-	-	-
Mov Cap-2 Maneuver	68	-	-	-	-	-
Stage 1	117	-	-	-	-	-
Stage 2	179	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 331.5	0.7	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	329	-	78	-	-
HCM Lane V/C Ratio	0.172	-	1.394	-	-
HCM Control Delay (s)	18.2	-	$ 331.5	-	-
HCM Lane LOS	C	-	F	-	-
HCM 95th %tile Q(veh)	0.6	-	8.6	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
7: Laguna Cyn Rd & LC Arts+Design Dwy

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑	↱	
Traffic Vol, veh/h	13	19	4	1647	1488	10
Future Vol, veh/h	13	19	4	1647	1488	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	21	4	1790	1617	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3421	1623	1628	0	-	0
Stage 1	1623	-	-	-	-	-
Stage 2	1798	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 8	127	399	-	-	-
Stage 1	177	-	-	-	-	-
Stage 2	145	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 8	127	399	-	-	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	175	-	-	-	-	-
Stage 2	145	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	59.1		0		0	
HCM LOS	F					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	399	-	100	-	-
HCM Lane V/C Ratio	0.011	-	0.348	-	-
HCM Control Delay (s)	14.1	-	59.1	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0	-	1.4	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary
7: Laguna Cyn Rd & LC Arts+Design Dwy

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑	↱	
Traffic Volume (veh/h)	55	45	52	1379	1656	42
Future Volume (veh/h)	55	45	52	1379	1656	42
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	1863	1900
Adj Flow Rate, veh/h	60	49	57	1499	1800	46
Adj No. of Lanes	0	0	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	74	60	198	1574	1258	32
Arrive On Green	0.08	0.08	0.11	0.84	0.70	0.70
Sat Flow, veh/h	919	750	1774	1863	1808	46
Grp Volume(v), veh/h	110	0	57	1499	0	1846
Grp Sat Flow(s),veh/h/ln	1684	0	1774	1863	0	1855
Q Serve(g_s), s	7.7	0.0	3.5	76.7	0.0	83.5
Cycle Q Clear(g_c), s	7.7	0.0	3.5	76.7	0.0	83.5
Prop In Lane	0.55	0.45	1.00			0.02
Lane Grp Cap(c), veh/h	135	0	198	1574	0	1290
V/C Ratio(X)	0.82	0.00	0.29	0.95	0.00	1.43
Avail Cap(c_a), veh/h	253	0	198	1574	0	1290
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	54.3	0.0	48.9	7.4	0.0	18.3
Incr Delay (d2), s/veh	11.2	0.0	0.8	13.9	0.0	198.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	1.8	44.0	0.0	113.0
LnGrp Delay(d),s/veh	65.6	0.0	49.7	21.3	0.0	216.5
LnGrp LOS	E		D	C		F
Approach Vol, veh/h	110			1556	1846	
Approach Delay, s/veh	65.6			22.3	216.5	
Approach LOS	E			C	F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		105.9		14.1	17.9	88.0		
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		
Max Green Setting (Gmax), s		93.0		18.0	5.0	83.5		
Max Q Clear Time (g_c+I1), s		78.7		9.7	5.5	85.5		
Green Ext Time (p_c), s		11.4		0.1	0.0	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	125.7
HCM 2010 LOS	F

HCM 2010 Signalized Intersection Summary
7: Laguna Cyn Rd & LC Arts+Design Dwy

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑	↱	
Traffic Volume (veh/h)	13	19	4	1647	1488	10
Future Volume (veh/h)	13	19	4	1647	1488	10
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	1863	1900
Adj Flow Rate, veh/h	14	21	4	1790	1617	11
Adj No. of Lanes	0	0	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	20	30	9	1646	1544	11
Arrive On Green	0.03	0.03	0.01	0.88	0.84	0.84
Sat Flow, veh/h	645	968	1774	1863	1848	13
Grp Volume(v), veh/h	36	0	4	1790	0	1628
Grp Sat Flow(s),veh/h/ln	1660	0	1774	1863	0	1861
Q Serve(g_s), s	2.3	0.0	0.2	93.0	0.0	87.9
Cycle Q Clear(g_c), s	2.3	0.0	0.2	93.0	0.0	87.9
Prop In Lane	0.39	0.58	1.00			0.01
Lane Grp Cap(c), veh/h	51	0	9	1646	0	1555
V/C Ratio(X)	0.70	0.00	0.43	1.09	0.00	1.05
Avail Cap(c_a), veh/h	284	0	84	1646	0	1555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.5	0.0	52.2	6.1	0.0	8.7
Incr Delay (d2), s/veh	15.9	0.0	28.4	50.1	0.0	36.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.2	67.7	0.0	58.9
LnGrp Delay(d),s/veh	66.4	0.0	80.6	56.2	0.0	44.9
LnGrp LOS	E		F	F		F
Approach Vol, veh/h	36			1794	1628	
Approach Delay, s/veh	66.4			56.3	44.9	
Approach LOS	E			E	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		97.5		7.8	5.1	92.4		
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		
Max Green Setting (Gmax), s		93.0		18.0	5.0	83.5		
Max Q Clear Time (g_c+I1), s		95.0		4.3	2.2	89.9		
Green Ext Time (p_c), s		0.0		0.0	0.0	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	51.0
HCM 2010 LOS	D

HCM 2010 TWSC
7: Laguna Cyn Rd & LC Arts+Design Dwy

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑	↑↱	
Traffic Vol, veh/h	0	100	0	1695	1807	94
Future Vol, veh/h	0	100	0	1695	1807	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	109	0	1842	1964	102

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1033	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	230	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	230	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	33.9	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	230	-	-
HCM Lane V/C Ratio	-	0.473	-	-
HCM Control Delay (s)	-	33.9	-	-
HCM Lane LOS	-	D	-	-
HCM 95th %tile Q(veh)	-	2.3	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↱	
Traffic Vol, veh/h	0	32	0	1853	1617	14
Future Vol, veh/h	0	32	0	1853	1617	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	35	0	2014	1758	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1766	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	103	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	103	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	56.8	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	103	-	-
HCM Lane V/C Ratio	-	0.338	-	-
HCM Control Delay (s)	-	56.8	-	-
HCM Lane LOS	-	F	-	-
HCM 95th %tile Q(veh)	-	1.3	-	-

HCM 2010 TWSC
8: Laguna Cyn Rd & Act V Parking Lot

Intersection	
Int Delay, s/veh	10.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Vol, veh/h	80	66	76	1351	1639	62
Future Vol, veh/h	80	66	76	1351	1639	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	72	83	1468	1782	67

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3416	1782	1849	0	-	0
Stage 1	1782	-	-	-	-	-
Stage 2	1634	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 8	102	328	-	-	-
Stage 1	148	-	-	-	-	-
Stage 2	175	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 6	102	328	-	-	-
Mov Cap-2 Maneuver	~ 65	-	-	-	-	-
Stage 1	111	-	-	-	-	-
Stage 2	175	-	-	-	-	-

Approach	EB		NB		SB
HCM Control Delay, s	227.7		1		0
HCM LOS	F				

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	328	-	65	102	-	-
HCM Lane V/C Ratio	0.252	-	1.338	0.703	-	-
HCM Control Delay (s)	19.6	-	$ 334.2	98.5	-	-
HCM Lane LOS	C	-	F	F	-	-
HCM 95th %tile Q(veh)	1	-	7.2	3.6	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Vol, veh/h	19	29	6	1632	1492	15
Future Vol, veh/h	19	29	6	1632	1492	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	32	7	1774	1622	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3410	1622	1638	0	-	0
Stage 1	1622	-	-	-	-	-
Stage 2	1788	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 8	127	395	-	-	-
Stage 1	177	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 8	127	395	-	-	-
Mov Cap-2 Maneuver	76	-	-	-	-	-
Stage 1	174	-	-	-	-	-
Stage 2	147	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	53.1	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	395	-	76	127	-	-
HCM Lane V/C Ratio	0.017	-	0.272	0.248	-	-
HCM Control Delay (s)	14.3	-	69.2	42.5	-	-
HCM Lane LOS	B	-	F	E	-	-
HCM 95th %tile Q(veh)	0.1	-	1	0.9	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	17.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑↑	↱
Traffic Vol, veh/h	80	66	76	1615	1845	62
Future Vol, veh/h	80	66	76	1615	1845	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	72	83	1755	2005	67

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3926	1003	2072	0	-	0
Stage 1	2005	-	-	-	-	-
Stage 2	1921	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	~ 3	241	267	-	-	-
Stage 1	91	-	-	-	-	-
Stage 2	125	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 2	241	267	-	-	-
Mov Cap-2 Maneuver	~ 39	-	-	-	-	-
Stage 1	~ 63	-	-	-	-	-
Stage 2	125	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 442.1	1.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	267	-	39	241	-	-
HCM Lane V/C Ratio	0.309	-	2.23	0.298	-	-
HCM Control Delay (s)	24.4	-	$ 785.3	26.1	-	-
HCM Lane LOS	C	-	F	D	-	-
HCM 95th %tile Q(veh)	1.3	-	9.4	1.2	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Vol, veh/h	19	29	6	1834	1634	15
Future Vol, veh/h	19	29	6	1834	1634	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	32	7	1993	1776	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3783	1776	1792	0	-	0
Stage 1	1776	-	-	-	-	-
Stage 2	2007	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 5	103	345	-	-	-
Stage 1	149	-	-	-	-	-
Stage 2	114	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 5	103	345	-	-	-
Mov Cap-2 Maneuver	61	-	-	-	-	-
Stage 1	146	-	-	-	-	-
Stage 2	114	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	69.3	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	345	-	61	103	-	-
HCM Lane V/C Ratio	0.019	-	0.339	0.306	-	-
HCM Control Delay (s)	15.6	-	91.7	54.7	-	-
HCM Lane LOS	C	-	F	F	-	-
HCM 95th %tile Q(veh)	0.1	-	1.2	1.2	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary
9: Laguna Cyn Rd & Canyon Acres Dr

	↙	↖	↶	↑	↗	↘	↓
Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↶	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	40	16	18	1555	15	16	1511
Future Volume (veh/h)	40	16	18	1555	15	16	1511
Number	3	18		2	12	1	6
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			0.98	1.00	
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863		1863	1863	1863	1863
Adj Flow Rate, veh/h	42	17		1620	16	17	1574
Adj No. of Lanes	1	1		2	1	1	2
Peak Hour Factor	0.96	0.96		0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2		2	2	2	2
Cap, veh/h	74	66		2814	1228	34	3051
Arrive On Green	0.04	0.04		0.79	0.79	0.02	0.86
Sat Flow, veh/h	1774	1583		3632	1544	1774	3632
Grp Volume(v), veh/h	42	17		1620	16	17	1574
Grp Sat Flow(s),veh/h/ln	1774	1583		1770	1544	1774	1770
Q Serve(g_s), s	2.2	1.0		16.2	0.2	0.9	10.4
Cycle Q Clear(g_c), s	2.2	1.0		16.2	0.2	0.9	10.4
Prop In Lane	1.00	1.00			1.00	1.00	
Lane Grp Cap(c), veh/h	74	66		2814	1228	34	3051
V/C Ratio(X)	0.57	0.26		0.58	0.01	0.50	0.52
Avail Cap(c_a), veh/h	483	431		2814	1228	123	3051
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.1	43.5		3.6	2.0	45.5	1.6
Incr Delay (d2), s/veh	6.6	2.0		0.9	0.0	11.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.5		8.0	0.1	0.5	5.1
LnGrp Delay(d),s/veh	50.6	45.5		4.5	2.0	56.6	2.2
LnGrp LOS	D	D		A	A	E	A
Approach Vol, veh/h	59			1636			1591
Approach Delay, s/veh	49.2			4.5			2.8
Approach LOS	D			A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.3	79.0				85.3		8.4
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	6.5	74.5				74.5		25.5
Max Q Clear Time (g_c+I1), s	2.9	18.2				12.4		4.2
Green Ext Time (p_c), s	0.0	21.6				17.7		0.1

Intersection Summary		
HCM 2010 Ctrl Delay		4.5
HCM 2010 LOS		A

Notes

9: Laguna Cyn Rd & Canyon Acres Dr

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	⮌	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	20	16	0	1473	30	20	1488
Future Volume (veh/h)	20	16	0	1473	30	20	1488
Number	3	18		2	12	1	6
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			0.98	1.00	
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863		1863	1863	1863	1863
Adj Flow Rate, veh/h	21	17		1534	31	21	1550
Adj No. of Lanes	1	1		2	1	1	2
Peak Hour Factor	0.96	0.96		0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2		2	2	2	2
Cap, veh/h	60	53		2828	1234	40	3079
Arrive On Green	0.03	0.03		0.80	0.80	0.02	0.87
Sat Flow, veh/h	1774	1583		3632	1544	1774	3632
Grp Volume(v), veh/h	21	17		1534	31	21	1550
Grp Sat Flow(s),veh/h/ln	1774	1583		1770	1544	1774	1770
Q Serve(g_s), s	1.1	1.0		14.3	0.4	1.1	9.5
Cycle Q Clear(g_c), s	1.1	1.0		14.3	0.4	1.1	9.5
Prop In Lane	1.00	1.00			1.00	1.00	
Lane Grp Cap(c), veh/h	60	53		2828	1234	40	3079
V/C Ratio(X)	0.35	0.32		0.54	0.03	0.53	0.50
Avail Cap(c_a), veh/h	485	433		2828	1234	124	3079
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.1	44.0		3.3	1.9	45.1	1.4
Incr Delay (d2), s/veh	3.5	3.4		0.8	0.0	10.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.5		7.1	0.2	0.7	4.6
LnGrp Delay(d),s/veh	47.6	47.4		4.1	2.0	55.4	2.0
LnGrp LOS	D	D		A	A	E	A
Approach Vol, veh/h	38			1565			1571
Approach Delay, s/veh	47.5			4.0			2.7
Approach LOS	D			A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.6	79.0				85.6		7.6
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	6.5	74.5				76.0		25.5
Max Q Clear Time (g_c+I1), s	3.1	16.3				11.5		3.1
Green Ext Time (p_c), s	0.0	19.9				17.3		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	3.9
HCM 2010 LOS	A

Notes

HCM 2010 Signalized Intersection Summary
9: Laguna Cyn Rd & Canyon Acres Dr

2030 Build Alt5 AM Peak

	↙	↖	⮌	↑	↗	↘	↓
Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	⮌	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	40	16	18	1742	15	93	1640
Future Volume (veh/h)	40	16	18	1742	15	93	1640
Number	3	18		2	12	1	6
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			0.97	1.00	
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863		1863	1863	1863	1863
Adj Flow Rate, veh/h	42	17		1815	16	97	1708
Adj No. of Lanes	1	1		2	1	1	2
Peak Hour Factor	0.96	0.96		0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2		2	2	2	2
Cap, veh/h	74	66		2643	1153	124	3057
Arrive On Green	0.04	0.04		0.75	0.75	0.07	0.86
Sat Flow, veh/h	1774	1583		3632	1544	1774	3632
Grp Volume(v), veh/h	42	17		1815	16	97	1708
Grp Sat Flow(s),veh/h/ln	1774	1583		1770	1544	1774	1770
Q Serve(g_s), s	2.2	1.0		25.3	0.3	5.1	12.1
Cycle Q Clear(g_c), s	2.2	1.0		25.3	0.3	5.1	12.1
Prop In Lane	1.00	1.00			1.00	1.00	
Lane Grp Cap(c), veh/h	74	66		2643	1153	124	3057
V/C Ratio(X)	0.57	0.26		0.69	0.01	0.79	0.56
Avail Cap(c_a), veh/h	467	416		2643	1153	196	3057
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.7	44.1		6.3	3.1	43.5	1.7
Incr Delay (d2), s/veh	6.8	2.1		1.5	0.0	10.4	0.7
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.5		12.6	0.1	2.9	6.0
LnGrp Delay(d),s/veh	51.5	46.2		7.7	3.1	53.9	2.4
LnGrp LOS	D	D		A	A	D	A
Approach Vol, veh/h	59			1831			1805
Approach Delay, s/veh	50.0			7.7			5.2
Approach LOS	D			A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.1	75.5				86.6		8.4
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	10.5	71.0				76.0		25.0
Max Q Clear Time (g_c+I1), s	7.1	27.3				14.1		4.2
Green Ext Time (p_c), s	0.1	23.6				24.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.2
HCM 2010 LOS	A

Notes

HCM 2010 Signalized Intersection Summary
9: Laguna Cyn Rd & Canyon Acres Dr

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	⮌	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	20	16	0	1650	30	45	1605
Future Volume (veh/h)	20	16	0	1650	30	45	1605
Number	3	18		2	12	1	6
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			0.98	1.00	
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863		1863	1863	1863	1863
Adj Flow Rate, veh/h	21	17		1719	31	47	1672
Adj No. of Lanes	1	1		2	1	1	2
Peak Hour Factor	0.96	0.96		0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2		2	2	2	2
Cap, veh/h	60	53		2772	1209	67	3077
Arrive On Green	0.03	0.03		0.78	0.78	0.04	0.87
Sat Flow, veh/h	1774	1583		3632	1544	1774	3632
Grp Volume(v), veh/h	21	17		1719	31	47	1672
Grp Sat Flow(s),veh/h/ln	1774	1583		1770	1544	1774	1770
Q Serve(g_s), s	1.1	1.0		19.0	0.4	2.4	10.9
Cycle Q Clear(g_c), s	1.1	1.0		19.0	0.4	2.4	10.9
Prop In Lane	1.00	1.00			1.00	1.00	
Lane Grp Cap(c), veh/h	60	53		2772	1209	67	3077
V/C Ratio(X)	0.35	0.32		0.62	0.03	0.70	0.54
Avail Cap(c_a), veh/h	477	426		2772	1209	166	3077
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.9	43.9		4.2	2.2	44.2	1.5
Incr Delay (d2), s/veh	3.5	3.4		1.1	0.0	12.4	0.7
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.5		9.5	0.2	1.4	5.4
LnGrp Delay(d),s/veh	47.4	47.3		5.3	2.3	56.6	2.2
LnGrp LOS	D	D		A	A	E	A
Approach Vol, veh/h	38			1750			1719
Approach Delay, s/veh	47.3			5.2			3.7
Approach LOS	D			A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.0	77.3				85.3		7.6
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	8.7	72.8				76.5		25.0
Max Q Clear Time (g_c+I1), s	4.4	21.0				12.9		3.1
Green Ext Time (p_c), s	0.0	23.5				23.7		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	4.9
HCM 2010 LOS	A

Notes

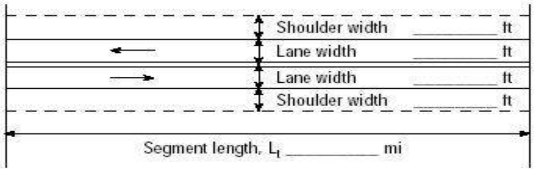
Appendix I. Horizon Year (2050) Highway LOS Worksheets

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1680*veh/h
Opposing direction vol., V_o *2310*veh/h
Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway
Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2* %
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1826*	*2511*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed[4], BFFS	*50.0* mi/h
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3* mi/h
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0* mi/h
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7* mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5* mi/h	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*14.5* mi/h
		Percent free flow speed, PFFS	*29.8* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i$/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1826*	*2511*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*94.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.3*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*98.2*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.07*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*29.8*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1826.1*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.63*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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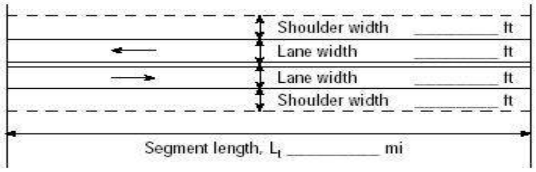
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *2625*veh/h

Opposing direction vol., V_o *2310*veh/h

Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2* %
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2853*	*2511*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*6.5 mi/h*
		Percent free flow speed, PFFS	*13.4 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2853*	*2511*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*98.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*7.4*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.68*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*13.4*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2853.3*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.85*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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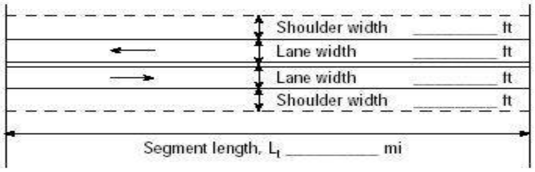
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *2310*veh/h

Opposing direction vol., V_o *1680*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2 %*

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2511*	*1826*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0* mi/h
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3* mi/h
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0* mi/h
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7* mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5* mi/h	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*14.5* mi/h
		Percent free flow speed, PFFS	*29.8* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2511*	*1826*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*97.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.3*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.48*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*29.8*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2510.9*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.79*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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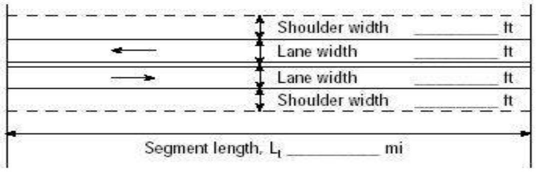
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Analysis direction vol., V_d	*2310*veh/h
Opposing direction vol., V_o	*2625*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.5*
Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2511*	*2853*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0* *mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3* *mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0* *mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7* *mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5* *mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*6.5* *mi/h*
		Percent free flow speed, PFFS	*13.4* *%*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i$/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2511*	*2853*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*97.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*7.4*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.48*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*13.4*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2510.9*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.79*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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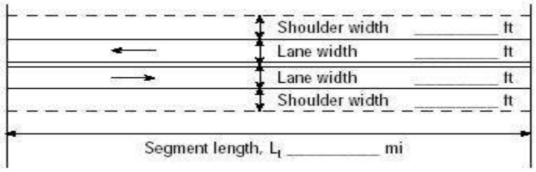
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2050 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *940*veh/h
Opposing direction vol., V_o *2590*veh/h
Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway
Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1022*	*2815*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*18.4 mi/h*
		Percent free flow speed, PFFS	*37.8 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1022*	*2815*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*83.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*13.2*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*86.7*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.60*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*37.8*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1021.7*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.33*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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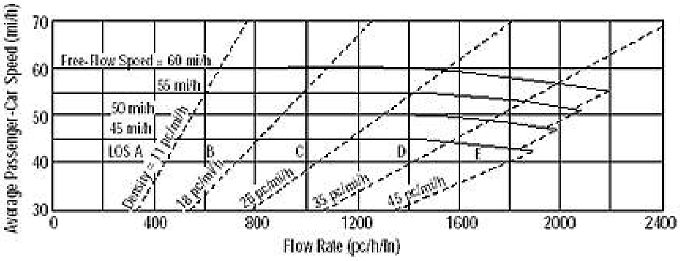
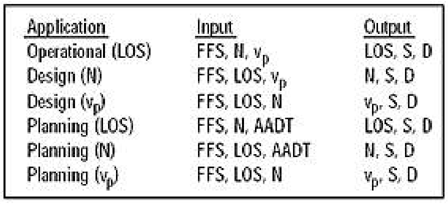
MULTILANE HIGHWAYS WORKSHEET(Direction 1)





Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	PM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/NB
From/To	El Toro/Sun Valley Dr
Jurisdiction	Caltrans
Analysis Year	2050 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2940	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1613
Speed, S (mi/h)	49.1
D (pc/mi/ln)	32.9
LOS	D

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1597.8*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.10*
Bicycle level of service (Exhibit 15-4)	*C*

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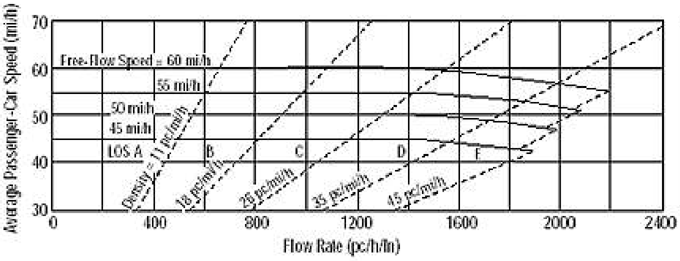
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	AM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/SB
From/To	El Toro/Sun Valley Dr
Jurisdiction	Caltrans
Analysis Year	2050 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2590	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1421
Speed, S (mi/h)	50.0
D (pc/mi/ln)	28.4
LOS	D

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1407.6*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.03*
Bicycle level of service (Exhibit 15-4)	*C*

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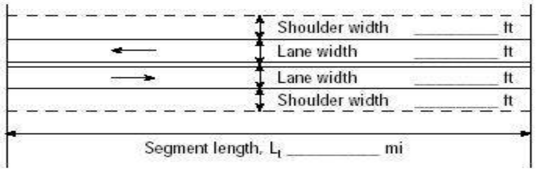
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*El Toro/Sun Valley Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2050 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1295*veh/h

Opposing direction vol., V_o *2940*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1408*	*3196*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*12.4 mi/h*
		Percent free flow speed, PFFS	*25.6 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1408*	*3196*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*90.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*14.3*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+f $_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*94.5*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.83*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*25.6*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1407.6*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.49*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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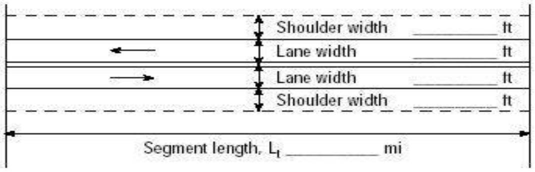
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*BM*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1680*veh/h
Opposing direction vol., V_o *2415*veh/h
Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway
Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2* %
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T-1)+P_R (E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1826*	*2625*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*13.6 mi/h*
		Percent free flow speed, PFFS	*28.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1826*	*2625*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*94.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.8*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*98.3*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.07*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*28.0*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1826.1*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.63*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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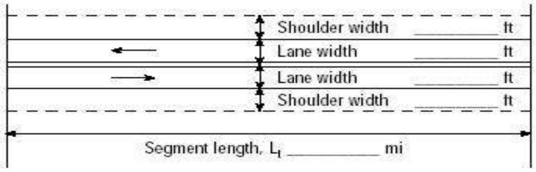
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *2730*veh/h
Opposing direction vol., V_o *2310*veh/h
Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway
Terrain ☐ Level ☐ Rolling
Grade Length *0.25* mi Up/down *3.0*
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2* %
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.1*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.998*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	*2973*	*2511*

Free-Flow Speed from Field Measurement

Mean speed of sample^3, S_{FM}
Total demand flow rate, both directions, v
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) *0.5 mi/h*

Estimated Free-Flow Speed

Base free-flow speed^4, BFFS *50.0 mi/h*
Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7) *1.3 mi/h*
Adj. for access points^4, f_A (Exhibit 15-8) *0.0 mi/h*
Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$ *48.7 mi/h*
Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$ *5.6 mi/h*
Percent free flow speed, PFFS *11.5 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.92*	*1.00*
Directional flow rate^2, v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*3225*	*2511*
Base percent time-spent-following^4, $BPTSF_d(\%)=100(1-e^{av_d^b})$	*99.0*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*7.8*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.90*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1697*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1564*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*11.5*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2967.4*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.87*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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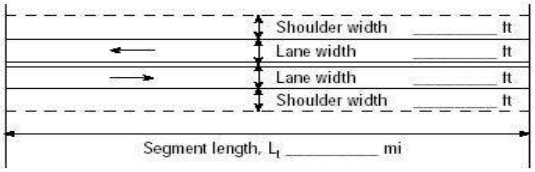
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *2415*veh/h
Opposing direction vol., V_o *1680*veh/h
Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2 %*
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2625*	*1826*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*13.6 mi/h*
		Percent free flow speed, PFFS	*28.0 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2625*	*1826*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*97.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.8*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.54*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*28.0*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2625.0*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.81*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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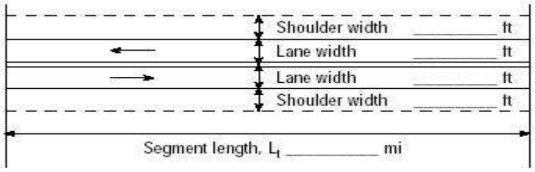
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *2310*veh/h

Opposing direction vol., V_o *2730*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2 %*

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2511*	*2967*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*5.7 mi/h*
		Percent free flow speed, PFFS	*11.6 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2511*	*2967*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*97.6*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*7.8*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.48*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*11.6*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2510.9*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.79*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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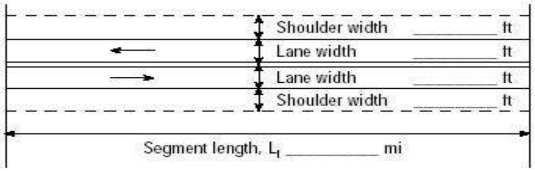
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2050 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *940*veh/h

Opposing direction vol., V_o *2700*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1022*	*2935*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed^4, BFFS	*50.0* mi/h
Mean speed of sample^3, S_{FM}		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3* mi/h
Total demand flow rate, both directions, *v*		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0* mi/h
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7* mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5* mi/h	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*17.5* mi/h
		Percent free flow speed, PFFS	*35.9* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1022*	*2935*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*83.2*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*12.9*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*86.5*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.60*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*35.9*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1021.7*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.33*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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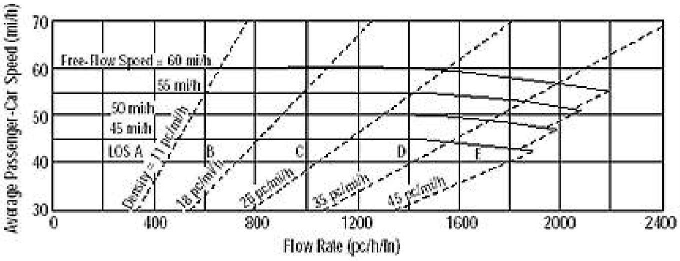
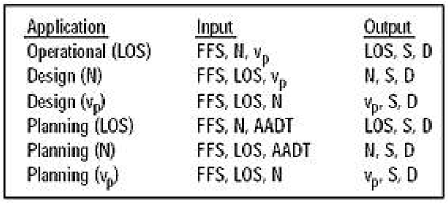
MULTILANE HIGHWAYS WORKSHEET(Direction 1)





Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	PM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/NB
From/To	Sun Valley Dr/Stan Oaks Dr
Jurisdiction	Caltrans
Analysis Year	2050 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	3060	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1679
Speed, S (mi/h)	48.7
D (pc/mi/ln)	34.5
LOS	D

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1663.0*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.12*
Bicycle level of service (Exhibit 15-4)	*C*

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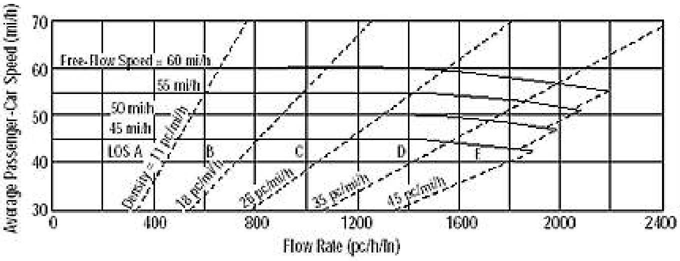
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	AM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/SB
From/To	Sun Valley Dr/Stan Oaks Dr
Jurisdiction	Caltrans
Analysis Year	2050 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2700	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1482
Speed, S (mi/h)	49.7
D (pc/mi/ln)	29.8
LOS	D

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1467.4*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.06*
Bicycle level of service (Exhibit 15-4)	*C*

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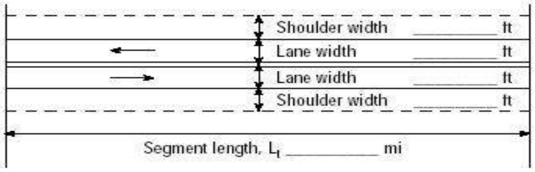
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Sun Valley Dr/Stan Oaks Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2050 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d	*1295*veh/h
Opposing direction vol., V_o	*3060*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*0.4*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1408*	*3326*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*11.4 mi/h*
		Percent free flow speed, PFFS	*23.5 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ $P_T(E_T$-1)+$P_R(E_R$-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i$/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1408*	*3326*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*90.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*14.4*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*94.4*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.83*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*23.5*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1407.6*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.49*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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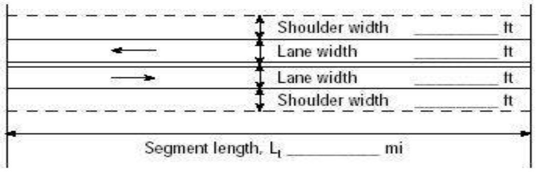
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Analysis direction vol., V_d	*1785*veh/h
Opposing direction vol., V_o	*2415*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*1.0*
Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T-1)+P_R (E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1940*	*2625*

Free-Flow Speed from Field Measurement

Mean speed of sample^3, S_{FM}

Total demand flow rate, both directions, *v*

Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)

Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) *0.5 mi/h*

Estimated Free-Flow Speed

Base free-flow speed^4, BFFS	*50.0 mi/h*
Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*12.7 mi/h*
Percent free flow speed, PFFS	*26.2 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1940*	*2625*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*95.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.2*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*99.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.14*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*26.2*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1940.2*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.66*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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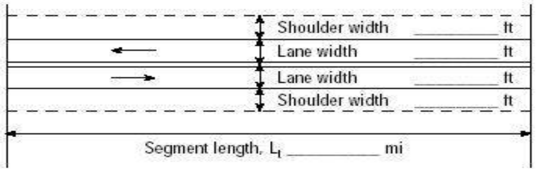
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	KK	Highway / Direction of Travel	SR-133/NB
Agency or Company	HDR	From/To	Stan Oaks Dr/LCAD dwy
Date Performed	3/14/2022	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2050 No Build/Alt1-Alt4

Project Description: SR-133 PSR/PDS

Input Data



Analysis direction vol., V_d 2625veh/h

Opposing direction vol., V_o 2415veh/h

Shoulder width ft 5.0
Lane Width ft 12.0
Segment Length mi 1.0

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF 0.92
No-passing zone 100%
% Trucks and Buses , P_T 2 %
% Recreational vehicles, P_R 0%
Access points *mi* 0/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.0	1.0
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	1.000	1.000
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	2853	2625

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed[4], BFFS	50.0 mi/h
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	1.3 mi/h
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	0.0 mi/h
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	48.7 mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	0.5 mi/h	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	5.7 mi/h
		Percent free flow speed, PFFS	11.6 %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	1.000	1.000
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	2853	2625
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	98.4	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	7.0	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	100.0	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	F
Volume to capacity ratio, *v/c*	1.68
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1700
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	11.6

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	2853.3
Effective width, Wv (Eq. 15-29) ft	22.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.85
Bicycle level of service (Exhibit 15-4)	D

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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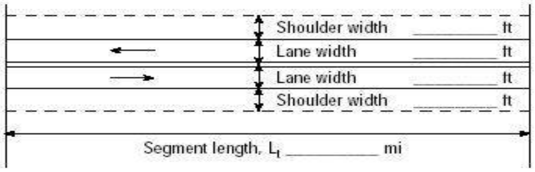
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *2415*veh/h

Opposing direction vol., V_o *1785*veh/h

Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *1.0*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2* %
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2625*	*1940*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Free-flow speed, FFS ($FSS=BFFS-f_{LS}-f_A$)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*12.7 mi/h*
		Percent free flow speed, PFFS	*26.2 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*2625*	*1940*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*97.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.2*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.54*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*26.2*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2625.0*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.81*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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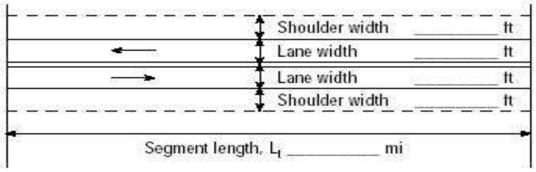
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi	Up/down
Peak-hour factor, PHF	*0.92*
No-passing zone	*100%*
% Trucks and Buses , P_T	*2* %
% Recreational vehicles, P_R	*0%*
Access points *mi*	*0*/mi

Analysis direction vol., V_d	*2415*veh/h
Opposing direction vol., V_o	*2625*veh/h
Shoulder width ft	*5.0*
Lane Width ft	*12.0*
Segment Length mi	*1.0*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i/(PHF^* f_{g,ATS} * f_{HV,ATS})$	*2625*	*2853*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0* mi/h
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3* mi/h
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0* mi/h
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	*48.7* mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5* mi/h	Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*5.7* mi/h
		Percent free flow speed, PFFS	*11.6* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF^*f_{HV,PTSF}^* f_{g,PTSF})$	*2625*	*2853*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*97.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*7.0*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}{}^*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.54*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*11.6*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2625.0*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.81*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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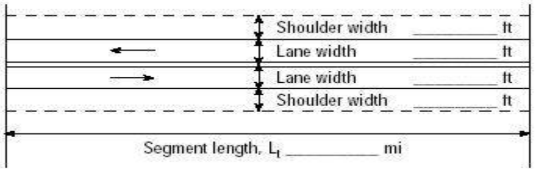
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2050 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2 %*

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Analysis direction vol., V_d *1000*veh/h

Opposing direction vol., V_o *2700*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *1.0*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1087*	*2935*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*17.0 mi/h*
		Percent free flow speed, PFFS	*34.8 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1087*	*2935*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*84.7*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*13.4*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*88.3*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.64*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*34.8*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1087.0*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.36*
Bicycle level of service (Exhibit 15-4)	*C*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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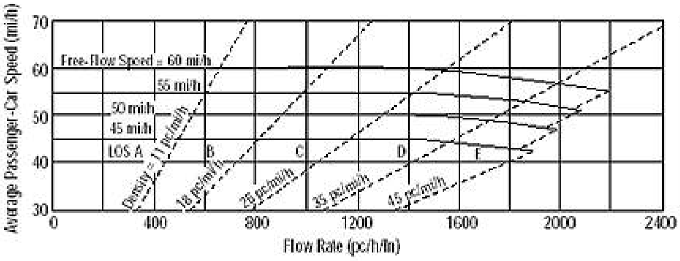
MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	PM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/NB
From/To	Stan Oaks Dr/LCAD dwy
Jurisdiction	Caltrans
Analysis Year	2050 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2940	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1613
Speed, S (mi/h)	49.1
D (pc/mi/ln)	32.9
LOS	D

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1597.8*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.10*
Bicycle level of service (Exhibit 15-4)	*C*

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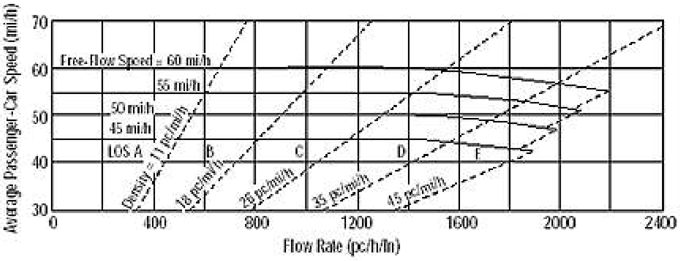
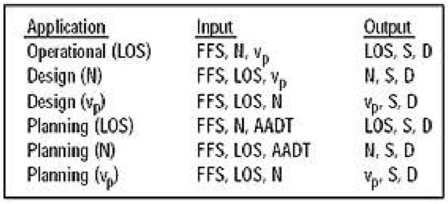
MULTILANE HIGHWAYS WORKSHEET(Direction 1)





Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	AM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/SB
From/To	Stan Oaks Dr/LCAD dwy
Jurisdiction	Caltrans
Analysis Year	2050 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2700	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1482
Speed, S (mi/h)	49.7
D (pc/mi/ln)	29.8
LOS	D

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1467.4*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.06*
Bicycle level of service (Exhibit 15-4)	*C*

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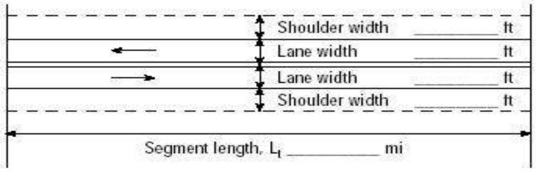
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*Stan Oaks Dr/LCAD dwy*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2050 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1350*veh/h

Opposing direction vol., V_o *2940*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *1.0*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☐ Level ☐ Rolling

Grade Length *0.25* mi Up/down *3.0*

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T 2 %

% Recreational vehicles, P_R 0%

Access points *mi* 0/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.1*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/\,(1+P_T(E_T-1)+P_R(E_R-1))$	*0.998*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i\,/\,(PHF*f_{g,ATS}*f_{HV,ATS})$	*1470*	*3196*

Free-Flow Speed from Field Measurement

Mean speed of sample[3], S_{FM}

Total demand flow rate, both directions, *v*

Free-flow speed, $FFS=S_{FM}+0.00776(v/\,f_{HV,ATS})$

Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) *0.5 mi/h*

Estimated Free-Flow Speed

Base free-flow speed[4], BFFS	*50.0 mi/h*
Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS $(FSS=BFFS-f_{LS}-f_A)$	*48.7 mi/h*
Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$	*12.0 mi/h*
Percent free flow speed, PFFS	*24.6 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/\,(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.92*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	*1595*	*3196*
Base percent time-spent-following[4], $BPTSF_d(\%)=100(1-e^{av_d^b})$	*92.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*13.9*	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}\,/\,v_{d,PTSF}+v_{o,PTSF})$	*96.9*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.94*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1697*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1564*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*24.6*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1467.4*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.52*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If $v_i(v_d$ or $v_o)$ >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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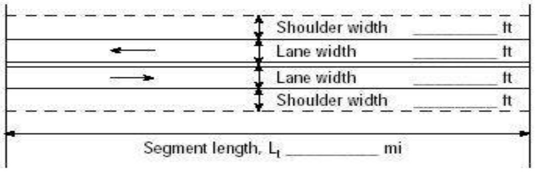
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2* %
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Analysis direction vol., V_d *1785*veh/h
Opposing direction vol., V_o *2415*veh/h
Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.5*

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1940*	*2625*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*12.7 mi/h*
		Percent free flow speed, PFFS	*26.2 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1940*	*2625*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*95.1*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.2*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+f $_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*99.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.14*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*26.2*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1940.2*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.66*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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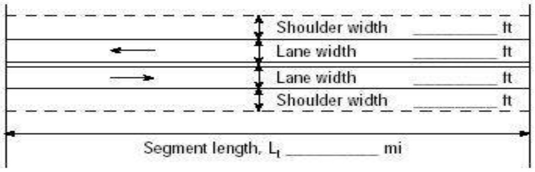
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/NB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *2625*veh/h

Opposing direction vol., V_o *2415*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2853*	*2625*

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed[4], BFFS	*50.0* mi/h
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3* mi/h
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0* mi/h
Free-flow speed, FFS=S_{FM}+0.00776(v/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7* mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5* mi/h	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*5.7* mi/h
		Percent free flow speed, PFFS	*11.6* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2853*	*2625*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*98.4*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*7.0*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.68*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*11.6*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2853.3*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.85*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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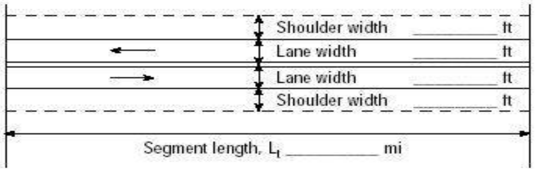
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*AM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *2415*veh/h

Opposing direction vol., V_o *1785*veh/h

Shoulder width ft *5.0*
Lane Width ft *12.0*
Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☐ Level ☑ Rolling
Grade Length mi Up/down
Peak-hour factor, PHF *0.92*
No-passing zone *100%*
% Trucks and Buses , P_T *2* %
% Recreational vehicles, P_R *0%*
Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.3*	*1.3*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.1*	*1.1*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*0.994*	*0.994*
Grade adjustment factor^1, $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate^2, v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2641*	*1952*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed^4, BFFS	*50.0 mi/h*
Mean speed of sample^3, S_{FM}		Adj. for lane and shoulder width,^{4} f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points^4, f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*12.5 mi/h*
		Percent free flow speed, PFFS	*25.7 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor^1, $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate^2, v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2625*	*1940*
Base percent time-spent-following^4, $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*97.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*9.2*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.55*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1690*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*25.7*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2625.0*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.81*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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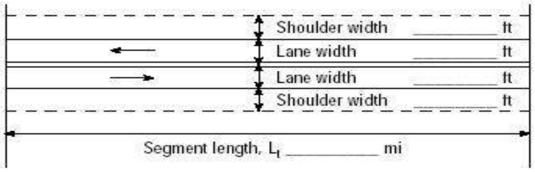
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		***Site Information***	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2050 No Build/Alt1-Alt4*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *2415*veh/h

Opposing direction vol., V_o *2625*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T (E_T -1)+P_R (E_R -1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*2625*	*2853*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0 mi/h*
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3 mi/h*
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0 mi/h*
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7 mi/h*
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5 mi/h*	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*5.7 mi/h*
		Percent free flow speed, PFFS	*11.6 %*

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*1.00*	*1.00*
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*2625*	*2853*
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	*97.9*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*7.0*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*100.0*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*1.54*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1700*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1700*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*11.6*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*2625.0*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.81*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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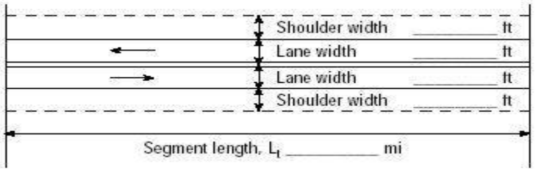
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		Site Information	
Analyst	KK	Highway / Direction of Travel	SR-133/NB
Agency or Company	HDR	From/To	LCAD dwy/Canyon Acres Dr
Date Performed	3/14/2022	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2050 Build/Alt5

Project Description: SR-133 PSR/PDS

Input Data



Analysis direction vol., V_d 1000veh/h

Opposing direction vol., V_o 2700veh/h

Shoulder width ft 5.0

Lane Width ft 12.0

Segment Length mi 0.5

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☑ Level ☐ Rolling

Grade Length mi Up/down

Peak-hour factor, PHF 0.92

No-passing zone 100%

% Trucks and Buses , P_T 2 %

% Recreational vehicles, P_R 0%

Access points *mi* 0/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.0	1.0
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS}$=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	1.000	1.000
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00
Demand flow rate[2], v_i (pc/h) v_i=V_i / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	1087	2935

Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed[4], BFFS	50.0 mi/h
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	1.3 mi/h
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	0.0 mi/h
Free-flow speed, FFS=S_{FM}+0.00776(*v*/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	48.7 mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	0.5 mi/h	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	17.0 mi/h
		Percent free flow speed, PFFS	34.8 %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	1.0	1.0
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, f_{HV}=1/ (1+ P_T(E_T-1)+P_R(E_R-1))	1.000	1.000
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate[2], v_i(pc/h) v_i=V_i/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	1087	2935
Base percent time-spent-following[4], $BPTSF_d$(%)=100(1-$e^{av_d^b}$)	84.7	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	13.4	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	88.3	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	F
Volume to capacity ratio, *v/c*	0.64
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1700
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	34.8

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	1087.0
Effective width, Wv (Eq. 15-29) ft	22.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.36
Bicycle level of service (Exhibit 15-4)	C

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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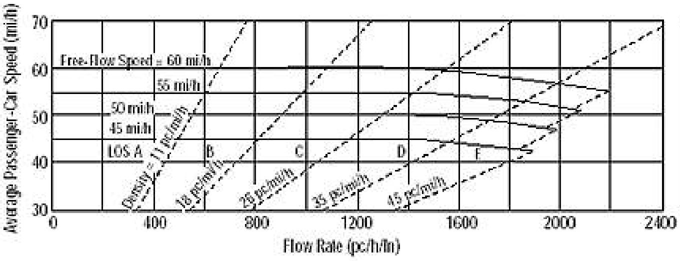
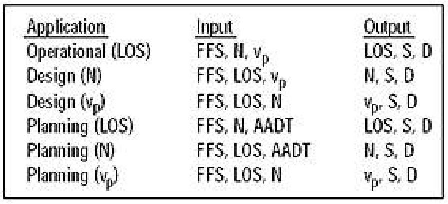
MULTILANE HIGHWAYS WORKSHEET(Direction 1)





Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	PM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/NB
From/To	LCAD dwy/Canyon Acres Dr
Jurisdiction	Caltrans
Analysis Year	2050 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2940	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1613
Speed, S (mi/h)	49.1
D (pc/mi/ln)	32.9
LOS	D

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1597.8*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.10*
Bicycle level of service (Exhibit 15-4)	*C*

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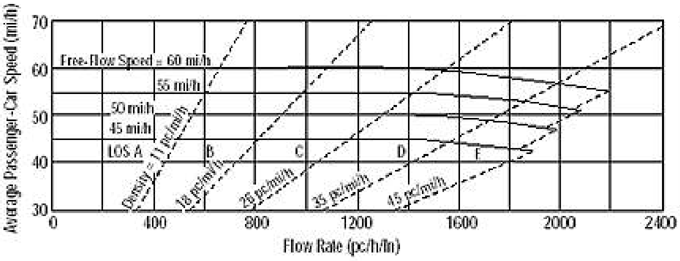
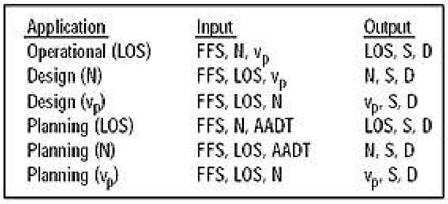
MULTILANE HIGHWAYS WORKSHEET(Direction 1)





Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p, S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p, S, D

General Information

Analyst	KK
Agency or Company	HDR
Date Performed	3/15/2022
Analysis Time Period	AM Peak Hour

Site Information

Highway/Direction to Travel	SR-133/SB
From/To	LCAD dwy/Canyon Acres Dr
Jurisdiction	Caltrans
Analysis Year	2050 Build/Alt5

Project Description SR-133 PSR/PDS

☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)

Flow Inputs

Volume, V (veh/h)	2700	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.990

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	0
Median Type, M	
FFS (measured)	48.7
Base Free-Flow Speed, BFFS	

Calc Speed Adj and FFS

f_{LW} (mi/h)	
f_{LC} (mi/h)	
f_A (mi/h)	
f_M (mi/h)	
FFS (mi/h)	48.7

Operations

Operational (LOS)

Flow Rate, v_p (pc/h/ln)	1482
Speed, S (mi/h)	49.7
D (pc/mi/ln)	29.8
LOS	D

Design

Design (N)

Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1467.4*
Effective width, W_v (Eq. 15-29) ft	*24.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.06*
Bicycle level of service (Exhibit 15-4)	*C*

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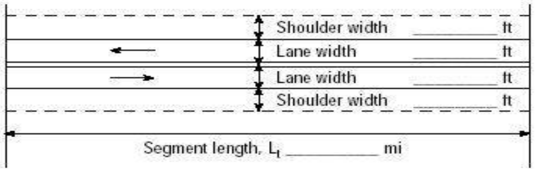
DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET

General Information		**Site Information**	
Analyst	*KK*	Highway / Direction of Travel	*SR-133/SB*
Agency or Company	*HDR*	From/To	*LCAD dwy/Canyon Acres Dr*
Date Performed	*3/14/2022*	Jurisdiction	*Caltrans*
Analysis Time Period	*PM Peak Hour*	Analysis Year	*2050 Build/Alt5*

Project Description: *SR-133 PSR/PDS*

Input Data



Analysis direction vol., V_d *1350*veh/h

Opposing direction vol., V_o *2940*veh/h

Shoulder width ft *5.0*

Lane Width ft *12.0*

Segment Length mi *0.5*

☑ Class I highway ☐ Class II highway ☐ Class III highway

Terrain ☐ Level ☐ Rolling

Grade Length *0.25* mi Up/down *3.0*

Peak-hour factor, PHF *0.92*

No-passing zone *100%*

% Trucks and Buses , P_T *2* %

% Recreational vehicles, P_R *0%*

Access points *mi* *0*/mi

Average Travel Speed

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	*1.1*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*0.998*	*1.000*
Grade adjustment factor[1], $f_{g,ATS}$ (Exhibit 15-9)	*1.00*	*1.00*
Demand flow rate[2], v_i (pc/h) $v_i=V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$)	*1470*	*3196*

Free-Flow Speed from Field Measurement		**Estimated Free-Flow Speed**	
		Base free-flow speed[4], BFFS	*50.0* mi/h
Mean speed of sample[3], S_{FM}		Adj. for lane and shoulder width,[4] f_{LS}(Exhibit 15-7)	*1.3* mi/h
Total demand flow rate, both directions, *v*		Adj. for access points[4], f_A (Exhibit 15-8)	*0.0* mi/h
Free-flow speed, FFS=S_{FM}+0.00776(v/ $f_{HV,ATS}$)		Free-flow speed, FFS (FSS=BFFS-f_{LS}-f_A)	*48.7* mi/h
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)	*0.5* mi/h	Average travel speed, ATS_d=FFS-0.00776($v_{d,ATS}$ + $v_{o,ATS}$) - $f_{np,ATS}$	*12.0* mi/h
		Percent free flow speed, PFFS	*24.6* %

Percent Time-Spent-Following

	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E_T(Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	*1.0*	*1.0*
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	*1.000*	*1.000*
Grade adjustment factor[1], $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	*0.92*	*1.00*
Directional flow rate[2], v_i(pc/h) $v_i=V_i$/(PHF*$f_{HV,PTSF}$* $f_{g,PTSF}$)	*1595*	*3196*
Base percent time-spent-following[4], $BPTSF_d$(%)=100($1-e^{av_d^b}$)	*92.3*	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	*13.9*	
Percent time-spent-following, $PTSF_d$(%)=$BPTSF_d$+$f_{np,PTSF}$ *($v_{d,PTSF}$ / $v_{d,PTSF}$ + $v_{o,PTSF}$)	*96.9*	

Level of Service and Other Performance Measures

Level of service, LOS (Exhibit 15-3)	*F*
Volume to capacity ratio, *v/c*	*0.94*
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	*1697*
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	*1564*
Percent Free-Flow Speed $PFFS_d$(Equation 15-11 - Class III only)	*24.6*

Bicycle Level of Service

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	*1467.4*
Effective width, Wv (Eq. 15-29) ft	*22.00*
Effective speed factor, S_t (Eq. 15-30)	*4.79*
Bicycle level of service score, BLOS (Eq. 15-31)	*3.52*
Bicycle level of service (Exhibit 15-4)	*D*

Notes

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.
2. If v_i(v_d or v_o) >=1,700 pc/h, terminate analysis--the LOS is F.
3. For the analysis direction only and for v>200 veh/h.
4. For the analysis direction only
5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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Appendix J. Horizon Year (2050) Intersection LOS Worksheets

HCM 2010 Signalized Intersection Summary
1: Laguna Cyn Rd & El Toro Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	1035	21	1225	976	38	1334
Future Volume (veh/h)	1035	21	1225	976	38	1334
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1089	22	1289	1027	40	1404
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	909	811	1219	1357	54	1460
Arrive On Green	0.51	0.51	0.34	0.34	0.03	0.41
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	1089	22	1289	1027	40	1404
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	61.5	0.8	41.3	31.7	2.7	46.4
Cycle Q Clear(g_c), s	61.5	0.8	41.3	31.7	2.7	46.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	909	811	1219	1357	54	1460
V/C Ratio(X)	1.20	0.03	1.06	0.76	0.73	0.96
Avail Cap(c_a), veh/h	909	811	1219	1357	74	1460
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	14.5	39.3	3.5	57.7	34.3
Incr Delay (d2), s/veh	99.7	0.0	42.5	4.0	21.7	16.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	55.0	0.4	27.3	35.5	1.7	25.9
LnGrp Delay(d),s/veh	128.9	14.5	81.9	7.5	79.4	50.4
LnGrp LOS	F	B	F	A	E	D
Approach Vol, veh/h	1111		2316			1444
Approach Delay, s/veh	126.7		48.9			51.2
Approach LOS	F		D			D

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.2	45.8				54.0		66.0
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	40.0				49.5		61.5
Max Q Clear Time (g_c+I1), s	4.7	43.3				48.4		63.5
Green Ext Time (p_c), s	0.0	0.0				0.9		0.0

Intersection Summary			
HCM 2010 Ctrl Delay			67.3
HCM 2010 LOS			E

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	900	53	1095	999	46	1223
Future Volume (veh/h)	900	53	1095	999	46	1223
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	947	56	1153	1052	48	1287
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	909	811	1204	1350	62	1460
Arrive On Green	0.51	0.51	0.34	0.34	0.03	0.41
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	947	56	1153	1052	48	1287
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	61.5	2.1	38.3	35.0	3.2	40.3
Cycle Q Clear(g_c), s	61.5	2.1	38.3	35.0	3.2	40.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	909	811	1204	1350	62	1460
V/C Ratio(X)	1.04	0.07	0.96	0.78	0.78	0.88
Avail Cap(c_a), veh/h	909	811	1204	1350	74	1460
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	14.8	38.7	3.9	57.5	32.5
Incr Delay (d2), s/veh	41.2	0.0	17.5	4.5	34.5	8.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	40.2	0.9	21.5	36.5	2.2	21.3
LnGrp Delay(d),s/veh	70.5	14.8	56.3	8.4	91.9	40.5
LnGrp LOS	F	B	E	A	F	D
Approach Vol, veh/h	1003		2205			1335
Approach Delay, s/veh	67.4		33.4			42.4
Approach LOS	E		C			D

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.7	45.3				54.0		66.0
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	40.0				49.5		61.5
Max Q Clear Time (g_c+I1), s	5.2	40.3				42.3		63.5
Green Ext Time (p_c), s	0.0	0.0				4.5		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	43.5
HCM 2010 LOS	D

HCM 2010 Signalized Intersection Summary
1: Laguna Cyn Rd & El Toro Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	1035	21	1452	976	38	1494
Future Volume (veh/h)	1035	21	1452	976	38	1494
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1089	22	1528	1027	40	1573
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	850	759	1337	1357	54	1578
Arrive On Green	0.48	0.48	0.38	0.38	0.03	0.45
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	1089	22	1528	1027	40	1573
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	57.5	0.9	45.3	31.7	2.7	53.2
Cycle Q Clear(g_c), s	57.5	0.9	45.3	31.7	2.7	53.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	850	759	1337	1357	54	1578
V/C Ratio(X)	1.28	0.03	1.14	0.76	0.73	1.00
Avail Cap(c_a), veh/h	850	759	1337	1357	74	1578
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.3	16.5	37.3	3.5	57.7	33.2
Incr Delay (d2), s/veh	135.5	0.0	73.8	2.5	21.7	21.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	60.1	0.4	35.8	34.9	1.7	30.6
LnGrp Delay(d),s/veh	166.7	16.5	111.2	6.0	79.4	55.1
LnGrp LOS	F	B	F	A	E	E
Approach Vol, veh/h	1111		2555			1613
Approach Delay, s/veh	163.8		68.9			55.7
Approach LOS	F		E			E

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.2	49.8				58.0		62.0
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	44.0				53.5		57.5
Max Q Clear Time (g_c+I1), s	4.7	47.3				55.2		59.5
Green Ext Time (p_c), s	0.0	0.0				0.0		0.0

Intersection Summary			
HCM 2010 Ctrl Delay			84.8
HCM 2010 LOS			F

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	900	53	1316	999	46	1370
Future Volume (veh/h)	900	53	1316	999	46	1370
Number	3	18	2	12	1	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	947	56	1385	1052	48	1442
Adj No. of Lanes	1	1	2	1	1	2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	835	745	1352	1350	62	1607
Arrive On Green	0.47	0.47	0.38	0.38	0.03	0.45
Sat Flow, veh/h	1774	1583	3632	1583	1774	3632
Grp Volume(v), veh/h	947	56	1385	1052	48	1442
Grp Sat Flow(s),veh/h/ln	1774	1583	1770	1583	1774	1770
Q Serve(g_s), s	56.5	2.3	45.8	35.0	3.2	45.0
Cycle Q Clear(g_c), s	56.5	2.3	45.8	35.0	3.2	45.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	835	745	1352	1350	62	1607
V/C Ratio(X)	1.13	0.08	1.02	0.78	0.78	0.90
Avail Cap(c_a), veh/h	835	745	1352	1350	74	1607
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.8	17.4	37.1	3.9	57.5	30.2
Incr Delay (d2), s/veh	74.9	0.0	30.9	3.0	34.5	8.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	45.0	1.0	28.1	35.9	2.2	23.7
LnGrp Delay(d),s/veh	106.6	17.5	68.0	6.9	91.9	38.4
LnGrp LOS	F	B	F	A	F	D
Approach Vol, veh/h	1003		2437			1490
Approach Delay, s/veh	101.6		41.6			40.2
Approach LOS	F		D			D

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.7	50.3				59.0		61.0
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	45.0				54.5		56.5
Max Q Clear Time (g_c+I1), s	5.2	47.8				47.0		58.5
Green Ext Time (p_c), s	0.0	0.0				5.4		0.0

Intersection Summary						
HCM 2010 Ctrl Delay			53.4			
HCM 2010 LOS			D			

Intersection	
Int Delay, s/veh	62.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱		↰	↑
Traffic Vol, veh/h	20	151	2050	30	178	2191
Future Vol, veh/h	20	151	2050	30	178	2191
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	156	2113	31	184	2259

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	4756	2129	0	0	2144	0
Stage 1	2129	-	-	-	-	-
Stage 2	2627	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 1	~ 63	-	-	251	-
Stage 1	99	-	-	-	-	-
Stage 2	55	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	0	~ 63	-	-	251	-
Mov Cap-2 Maneuver	~ 12	-	-	-	-	-
Stage 1	99	-	-	-	-	-
Stage 2	~ 15	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	$ 1634.4		0		3.8	
HCM LOS	F					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	42	251	-
HCM Lane V/C Ratio	-	-	4.197	0.731	-
HCM Control Delay (s)	-	-	$ 1634.4	50.4	-
HCM Lane LOS	-	-	F	F	-
HCM 95th %tile Q(veh)	-	-	20.1	5.1	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

2: Laguna Cyn Rd & Anneliese Dwy

Intersection	
Int Delay, s/veh	6.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Vol, veh/h	16	60	2034	10	56	2067
Future Vol, veh/h	16	60	2034	10	56	2067
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	62	2097	10	58	2131

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	4349	2102	0	0	2107	0
Stage 1	2102	-	-	-	-	-
Stage 2	2247	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 2	65	-	-	260	-
Stage 1	102	-	-	-	-	-
Stage 2	86	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 2	65	-	-	260	-
Mov Cap-2 Maneuver	38	-	-	-	-	-
Stage 1	102	-	-	-	-	-
Stage 2	67	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	$ 367.3		0		0.6	
HCM LOS	F					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	57	260	-
HCM Lane V/C Ratio	-	-	1.375	0.222	-
HCM Control Delay (s)	-	-	$ 367.3	22.8	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	6.9	0.8	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
2: Laguna Cyn Rd & Anneliese Dwy

Intersection	
Int Delay, s/veh	168.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱		↰	↑↑
Traffic Vol, veh/h	20	151	2353	30	178	2427
Future Vol, veh/h	20	151	2353	30	178	2427
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	156	2426	31	184	2502

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	4061	2442	0	0	2457	0
Stage 1	2442	-	-	-	-	-
Stage 2	1619	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	~ 2	~ 40	-	-	188	-
Stage 1	68	-	-	-	-	-
Stage 2	148	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	0	~ 40	-	-	188	-
Mov Cap-2 Maneuver	~ 3	-	-	-	-	-
Stage 1	68	-	-	-	-	-
Stage 2	~ 3	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 4973.3	0	7.6
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	16	188	-
HCM Lane V/C Ratio	-	-	11.018	0.976	-
HCM Control Delay (s)	-		$ 4973.3	110.6	-
HCM Lane LOS	-	-	F	F	-
HCM 95th %tile Q(veh)	-	-	22.9	8	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 2010 TWSC
2: Laguna Cyn Rd & Anneliese Dwy

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱		↰	↑↑
Traffic Vol, veh/h	16	60	2273	10	56	2232
Future Vol, veh/h	16	60	2273	10	56	2232
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	62	2343	10	58	2301

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3615	1177	0	0	2353	0
Stage 1	2348	-	-	-	-	-
Stage 2	1267	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	~ 4	184	-	-	205	-
Stage 1	58	-	-	-	-	-
Stage 2	228	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 3	184	-	-	205	-
Mov Cap-2 Maneuver	40	-	-	-	-	-
Stage 1	58	-	-	-	-	-
Stage 2	163	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	103.7	0	0.7
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	105	205	-
HCM Lane V/C Ratio	-	-	0.746	0.282	-
HCM Control Delay (s)	-	-	103.7	29.3	-
HCM Lane LOS	-	-	F	D	-
HCM 95th %tile Q(veh)	-	-	4	1.1	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
3: Laguna Cyn Rd & Sun Valley Dr

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Vol, veh/h	4	6	1784	1	2	2164
Future Vol, veh/h	4	6	1784	1	2	2164
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	7	1939	1	2	2352

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	4296	1940	0	0	1940	0
Stage 1	1940	-	-	-	-	-
Stage 2	2356	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 2	82	-	-	302	-
Stage 1	123	-	-	-	-	-
Stage 2	75	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 2	82	-	-	302	-
Mov Cap-2 Maneuver	43	-	-	-	-	-
Stage 1	123	-	-	-	-	-
Stage 2	74	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	77.8	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	60	302	-
HCM Lane V/C Ratio	-	-	0.181	0.007	-
HCM Control Delay (s)	-	-	77.8	17	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.6	0	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱		↰	↑
Traffic Vol, veh/h	2	2	2084	6	2	1959
Future Vol, veh/h	2	2	2084	6	2	1959
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	2	2265	7	2	2129

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	4402	2269	0	0	2272	0
Stage 1	2269	-	-	-	-	-
Stage 2	2133	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 2	51	-	-	224	-
Stage 1	84	-	-	-	-	-
Stage 2	98	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 2	51	-	-	224	-
Mov Cap-2 Maneuver	42	-	-	-	-	-
Stage 1	84	-	-	-	-	-
Stage 2	97	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	91.3	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	46	224	-
HCM Lane V/C Ratio	-	-	0.095	0.01	-
HCM Control Delay (s)	-	-	91.3	21.2	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↱			↑↑
Traffic Vol, veh/h	0	10	2083	3	0	2402
Future Vol, veh/h	0	10	2083	3	0	2402
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	2264	3	0	2611

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	2266	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	51	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	51	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	93.8	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	51	-
HCM Lane V/C Ratio	-	-	0.213	-
HCM Control Delay (s)	-	-	93.8	-
HCM Lane LOS	-	-	F	-
HCM 95th %tile Q(veh)	-	-	0.7	-

HCM 2010 TWSC
3: Laguna Cyn Rd & Sun Valley Dr

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	4	2321	8	0	2126
Future Vol, veh/h	0	4	2321	8	0	2126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	4	2523	9	0	2311

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1266	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	161	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	161	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	161	-
HCM Lane V/C Ratio	-	-	0.027	-
HCM Control Delay (s)	-	-	28	-
HCM Lane LOS	-	-	D	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	⑂		↑	↱	↰	↑
Traffic Vol, veh/h	10	15	1770	15	15	2153
Future Vol, veh/h	10	15	1770	15	15	2153
Conflicting Peds, #/hr	0	5	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	165	205	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	15	1825	15	15	2220

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	4080	1835	0	0	1845	0
Stage 1	1830	-	-	-	-	-
Stage 2	2250	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 3	94	-	-	329	-
Stage 1	140	-	-	-	-	-
Stage 2	86	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 3	93	-	-	327	-
Mov Cap-2 Maneuver	48	-	-	-	-	-
Stage 1	139	-	-	-	-	-
Stage 2	82	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	87.2	0	0.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	68	327	-
HCM Lane V/C Ratio	-	-	0.379	0.047	-
HCM Control Delay (s)	-	-	87.2	16.6	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	1.4	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 2010 TWSC
4: Laguna Cyn Rd & LB Dog Park Dwy

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑	↱	↰	↑
Traffic Vol, veh/h	5	5	2085	11	5	1956
Future Vol, veh/h	5	5	2085	11	5	1956
Conflicting Peds, #/hr	0	5	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	165	205	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	5	2149	11	5	2016

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	4180	2159	0	0	2165	0
Stage 1	2154	-	-	-	-	-
Stage 2	2026	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 2	60	-	-	247	-
Stage 1	96	-	-	-	-	-
Stage 2	111	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 2	59	-	-	246	-
Mov Cap-2 Maneuver	48	-	-	-	-	-
Stage 1	96	-	-	-	-	-
Stage 2	109	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	88.6	0	0.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	53	246	-
HCM Lane V/C Ratio	-	-	0.195	0.021	-
HCM Control Delay (s)	-	-	88.6	19.9	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑	↱		↑↑
Traffic Vol, veh/h	0	25	2061	30	0	2402
Future Vol, veh/h	0	25	2061	30	0	2402
Conflicting Peds, #/hr	0	5	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	165	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	26	2125	31	0	2476

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	2135	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	62	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	61	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	101.7	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	61	-
HCM Lane V/C Ratio	-	-	0.423	-
HCM Control Delay (s)	-	-	101.7	-
HCM Lane LOS	-	-	F	-
HCM 95th %tile Q(veh)	-	-	1.6	-

HCM 2010 TWSC
4: Laguna Cyn Rd & LB Dog Park Dwy

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑	↱		↑
Traffic Vol, veh/h	0	10	2319	16	0	2126
Future Vol, veh/h	0	10	2319	16	0	2126
Conflicting Peds, #/hr	0	5	0	5	5	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	165	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	10	2391	16	0	2192

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1206	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	176	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	174	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	27	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	174	-
HCM Lane V/C Ratio	-	-	0.059	-
HCM Control Delay (s)	-	-	27	-
HCM Lane LOS	-	-	D	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱		↰	↑
Traffic Vol, veh/h	4	6	1779	1	2	2161
Future Vol, veh/h	4	6	1779	1	2	2161
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	7	1934	1	2	2349

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	4288	1935	0	0	1935	0
Stage 1	1935	-	-	-	-	-
Stage 2	2353	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 2	82	-	-	303	-
Stage 1	124	-	-	-	-	-
Stage 2	76	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 2	82	-	-	303	-
Mov Cap-2 Maneuver	44	-	-	-	-	-
Stage 1	124	-	-	-	-	-
Stage 2	75	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	76.4	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	61	303	-
HCM Lane V/C Ratio	-	-	0.178	0.007	-
HCM Control Delay (s)	-	-	76.4	17	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.6	0	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Vol, veh/h	3	2	2094	6	2	1959
Future Vol, veh/h	3	2	2094	6	2	1959
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	2	2276	7	2	2129

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	4413	2280	0	0	2283	0
Stage 1	2280	-	-	-	-	-
Stage 2	2133	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 2	51	-	-	222	-
Stage 1	83	-	-	-	-	-
Stage 2	98	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 2	51	-	-	222	-
Mov Cap-2 Maneuver	42	-	-	-	-	-
Stage 1	83	-	-	-	-	-
Stage 2	97	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	95.7	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	45	222	-
HCM Lane V/C Ratio	-	-	0.121	0.01	-
HCM Control Delay (s)	-	-	95.7	21.4	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑↑
Traffic Vol, veh/h	0	10	2081	3	0	2402
Future Vol, veh/h	0	10	2081	3	0	2402
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	2262	3	0	2611

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	2264	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	51	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	51	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	93.8	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	51	-
HCM Lane V/C Ratio	-	-	0.213	-
HCM Control Delay (s)	-	-	93.8	-
HCM Lane LOS	-	-	F	-
HCM 95th %tile Q(veh)	-	-	0.7	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	5	2330	8	0	2126
Future Vol, veh/h	0	5	2330	8	0	2126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	2533	9	0	2311

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1271	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	159	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	159	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.4	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	159	-
HCM Lane V/C Ratio	-	-	0.034	-
HCM Control Delay (s)	-	-	28.4	-
HCM Lane LOS	-	-	D	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱		↰	↑
Traffic Vol, veh/h	6	8	1772	2	3	2162
Future Vol, veh/h	6	8	1772	2	3	2162
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	9	1926	2	3	2350

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	4283	1927	0	0	1928	0
Stage 1	1927	-	-	-	-	-
Stage 2	2356	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 2	83	-	-	305	-
Stage 1	125	-	-	-	-	-
Stage 2	75	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 2	83	-	-	305	-
Mov Cap-2 Maneuver	43	-	-	-	-	-
Stage 1	125	-	-	-	-	-
Stage 2	74	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	86		0		0	
HCM LOS	F					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	59	305	-
HCM Lane V/C Ratio	-	-	0.258	0.011	-
HCM Control Delay (s)	-	-	86	16.9	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.9	0	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
6: Laguna Cyn Rd & Castle Rock Rd

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱		↰	↑
Traffic Vol, veh/h	4	3	2097	8	3	1959
Future Vol, veh/h	4	3	2097	8	3	1959
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	3	2279	9	3	2129

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	4419	2284	0	0	2288	0
Stage 1	2284	-	-	-	-	-
Stage 2	2135	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 2	50	-	-	221	-
Stage 1	82	-	-	-	-	-
Stage 2	98	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 2	50	-	-	221	-
Mov Cap-2 Maneuver	41	-	-	-	-	-
Stage 1	82	-	-	-	-	-
Stage 2	97	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	103.2	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	44	221	-
HCM Lane V/C Ratio	-	-	0.173	0.015	-
HCM Control Delay (s)	-	-	103.2	21.5	-
HCM Lane LOS	-	-	F	C	-
HCM 95th %tile Q(veh)	-	-	0.6	0	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection						
Int Delay, s/veh	0					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↱			↑
Traffic Vol, veh/h	0	7	2331	11	0	2126
Future Vol, veh/h	0	7	2331	11	0	2126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	8	2534	12	0	2311

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	1273	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	159	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	159	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	28.8		0		0	
HCM LOS	D					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	159	-
HCM Lane V/C Ratio	-	-	0.048	-
HCM Control Delay (s)	-	-	28.8	-
HCM Lane LOS	-	-	D	-
HCM 95th %tile Q(veh)	-	-	0.1	-

HCM 2010 TWSC
6: Laguna Cyn Rd & Castle Rock Rd

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↳			↑↑
Traffic Vol, veh/h	0	14	2070	5	0	2402
Future Vol, veh/h	0	14	2070	5	0	2402
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	15	2250	5	0	2611

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	2253	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	52	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	52	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	100.7	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	52	-
HCM Lane V/C Ratio	-	-	0.293	-
HCM Control Delay (s)	-	-	100.7	-
HCM Lane LOS	-	-	F	-
HCM 95th %tile Q(veh)	-	-	1	-

Intersection	
Int Delay, s/veh	24.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱		↰	↑	↑↱	
Traffic Vol, veh/h	55	45	52	1719	2126	42
Future Vol, veh/h	55	45	52	1719	2126	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	49	57	1868	2311	46

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	4316	2334	2357	0	-	0
Stage 1	2334	-	-	-	-	-
Stage 2	1982	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 2	~ 47	207	-	-	-
Stage 1	77	-	-	-	-	-
Stage 2	117	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 1	~ 47	207	-	-	-
Mov Cap-2 Maneuver	~ 35	-	-	-	-	-
Stage 1	~ 56	-	-	-	-	-
Stage 2	117	-	-	-	-	-

Approach	EB		NB		SB
HCM Control Delay, s	$ 990.7		0.8		0
HCM LOS	F				

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	207	-	40	-	-
HCM Lane V/C Ratio	0.273	-	2.717	-	-
HCM Control Delay (s)	28.8	-	$ 990.7	-	-
HCM Lane LOS	D	-	F	-	-
HCM 95th %tile Q(veh)	1.1	-	12	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱		↰	↑	↱	
Traffic Vol, veh/h	13	19	4	2092	1953	10
Future Vol, veh/h	13	19	4	2092	1953	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	21	4	2274	2123	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	4411	2129	2134	0	-	0
Stage 1	2129	-	-	-	-	-
Stage 2	2282	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 2	63	254	-	-	-
Stage 1	99	-	-	-	-	-
Stage 2	82	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 2	63	254	-	-	-
Mov Cap-2 Maneuver	41	-	-	-	-	-
Stage 1	97	-	-	-	-	-
Stage 2	82	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	162.2	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	254	-	52	-	-
HCM Lane V/C Ratio	0.017	-	0.669	-	-
HCM Control Delay (s)	19.4	-	162.2	-	-
HCM Lane LOS	C	-	F	-	-
HCM 95th %tile Q(veh)	0.1	-	2.7	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱		↰	↑	↱	
Traffic Volume (veh/h)	55	45	52	1719	2126	42
Future Volume (veh/h)	55	45	52	1719	2126	42
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	1863	1900
Adj Flow Rate, veh/h	60	49	57	1868	2311	46
Adj No. of Lanes	0	0	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	74	61	73	1561	1377	27
Arrive On Green	0.08	0.08	0.04	0.84	0.76	0.76
Sat Flow, veh/h	919	750	1774	1863	1820	36
Grp Volume(v), veh/h	110	0	57	1868	0	2357
Grp Sat Flow(s),veh/h/ln	1684	0	1774	1863	0	1856
Q Serve(g_s), s	7.1	0.0	3.5	93.0	0.0	83.9
Cycle Q Clear(g_c), s	7.1	0.0	3.5	93.0	0.0	83.9
Prop In Lane	0.55	0.45	1.00			0.02
Lane Grp Cap(c), veh/h	136	0	73	1561	0	1404
V/C Ratio(X)	0.81	0.00	0.78	1.20	0.00	1.68
Avail Cap(c_a), veh/h	273	0	80	1561	0	1404
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.2	0.0	52.7	9.0	0.0	13.5
Incr Delay (d2), s/veh	10.7	0.0	35.2	95.0	0.0	308.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	2.4	87.2	0.0	162.5
LnGrp Delay(d),s/veh	60.9	0.0	87.9	104.0	0.0	322.1
LnGrp LOS	E		F	F		F
Approach Vol, veh/h	110			1925	2357	
Approach Delay, s/veh	60.9			103.5	322.1	
Approach LOS	E			F	F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		97.5		13.5	9.1	88.4		
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		
Max Green Setting (Gmax), s		93.0		18.0	5.0	83.5		
Max Q Clear Time (g_c+I1), s		95.0		9.1	5.5	85.9		
Green Ext Time (p_c), s		0.0		0.2	0.0	0.0		

Intersection Summary			
HCM 2010 Ctrl Delay			219.8
HCM 2010 LOS			F

HCM 2010 Signalized Intersection Summary
7: Laguna Cyn Rd & LC Arts+Design Dwy

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑	↱	
Traffic Volume (veh/h)	13	19	4	2092	1953	10
Future Volume (veh/h)	13	19	4	2092	1953	10
Number	7	14	5	2	6	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	1863	1900
Adj Flow Rate, veh/h	14	21	4	2274	2123	11
Adj No. of Lanes	0	0	1	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	2	2	2	2
Cap, veh/h	20	30	9	1646	1547	8
Arrive On Green	0.03	0.03	0.01	0.88	0.84	0.84
Sat Flow, veh/h	645	968	1774	1863	1851	10
Grp Volume(v), veh/h	36	0	4	2274	0	2134
Grp Sat Flow(s),veh/h/ln	1660	0	1774	1863	0	1861
Q Serve(g_s), s	2.3	0.0	0.2	93.0	0.0	87.9
Cycle Q Clear(g_c), s	2.3	0.0	0.2	93.0	0.0	87.9
Prop In Lane	0.39	0.58	1.00			0.01
Lane Grp Cap(c), veh/h	51	0	9	1646	0	1555
V/C Ratio(X)	0.70	0.00	0.43	1.38	0.00	1.37
Avail Cap(c_a), veh/h	284	0	84	1646	0	1555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	50.5	0.0	52.2	6.1	0.0	8.7
Incr Delay (d2), s/veh	15.9	0.0	28.4	175.6	0.0	171.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.2	125.1	0.0	117.4
LnGrp Delay(d),s/veh	66.4	0.0	80.6	181.7	0.0	180.4
LnGrp LOS	E		F	F		F
Approach Vol, veh/h	36			2278	2134	
Approach Delay, s/veh	66.4			181.6	180.4	
Approach LOS	E			F	F	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		97.5		7.8	5.1	92.4		
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		
Max Green Setting (Gmax), s		93.0		18.0	5.0	83.5		
Max Q Clear Time (g_c+I1), s		95.0		4.3	2.2	89.9		
Green Ext Time (p_c), s		0.0		0.0	0.0	0.0		

Intersection Summary	
HCM 2010 Ctrl Delay	180.1
HCM 2010 LOS	F

HCM 2010 TWSC
7: Laguna Cyn Rd & LC Arts+Design Dwy

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑	↑↱	
Traffic Vol, veh/h	0	100	0	2075	2308	94
Future Vol, veh/h	0	100	0	2075	2308	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	109	0	2255	2509	102

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1306	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.93	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	151	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	151	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	74	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	151	-	-
HCM Lane V/C Ratio	-	0.72	-	-
HCM Control Delay (s)	-	74	-	-
HCM Lane LOS	-	F	-	-
HCM 95th %tile Q(veh)	-	4.3	-	-

7: Laguna Cyn Rd & LC Arts+Design Dwy

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↱	
Traffic Vol, veh/h	0	32	0	2342	2112	14
Future Vol, veh/h	0	32	0	2342	2112	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	35	0	2546	2296	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	2304	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.23	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.319	-	-	-	-
Pot Cap-1 Maneuver	0	49	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	49	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	179.7	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	49	-	-
HCM Lane V/C Ratio	-	0.71	-	-
HCM Control Delay (s)	-	179.7	-	-
HCM Lane LOS	-	F	-	-
HCM 95th %tile Q(veh)	-	2.8	-	-

HCM 2010 TWSC
8: Laguna Cyn Rd & Act V Parking Lot

Intersection	
Int Delay, s/veh	27.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Vol, veh/h	80	66	76	1691	2109	62
Future Vol, veh/h	80	66	76	1691	2109	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	72	83	1838	2292	67

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	4296	2292	2359	0	-	0
Stage 1	2292	-	-	-	-	-
Stage 2	2004	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 2	~ 50	207	-	-	-
Stage 1	~ 81	-	-	-	-	-
Stage 2	114	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 1	~ 50	207	-	-	-
Mov Cap-2 Maneuver	~ 32	-	-	-	-	-
Stage 1	~ 49	-	-	-	-	-
Stage 2	114	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 755.7	1.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	207	-	32	50	-	-
HCM Lane V/C Ratio	0.399	-	2.717	1.435	-	-
HCM Control Delay (s)	33.5	-	$ 1039.5	$ 411.6	-	-
HCM Lane LOS	D	-	F	F	-	-
HCM 95th %tile Q(veh)	1.8	-	10.1	6.7	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 2010 TWSC
8: Laguna Cyn Rd & Act V Parking Lot

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Vol, veh/h	19	29	6	2077	1957	15
Future Vol, veh/h	19	29	6	2077	1957	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	32	7	2258	2127	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	4399	2127	2143	0	-	0
Stage 1	2127	-	-	-	-	-
Stage 2	2272	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 2	63	252	-	-	-
Stage 1	99	-	-	-	-	-
Stage 2	83	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 2	63	252	-	-	-
Mov Cap-2 Maneuver	42	-	-	-	-	-
Stage 1	96	-	-	-	-	-
Stage 2	83	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	127.6	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	252	-	42	63	-	-
HCM Lane V/C Ratio	0.026	-	0.492	0.5	-	-
HCM Control Delay (s)	19.7	-	155.4	109.4	-	-
HCM Lane LOS	C	-	F	F	-	-
HCM 95th %tile Q(veh)	0.1	-	1.8	2	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	44.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑↑	↱
Traffic Vol, veh/h	80	66	76	1995	2346	62
Future Vol, veh/h	80	66	76	1995	2346	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	72	83	2168	2550	67

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	4884	1275	2617	0	-	0
Stage 1	2550	-	-	-	-	-
Stage 2	2334	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	~ 1	158	162	-	-	-
Stage 1	~ 45	-	-	-	-	-
Stage 2	~ 77	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	0	158	162	-	-	-
Mov Cap-2 Maneuver	~ 16	-	-	-	-	-
Stage 1	~ 22	-	-	-	-	-
Stage 2	~ 77	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 1374.7	1.8	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	162	-	16	158	-	-
HCM Lane V/C Ratio	0.51	-	5.435	0.454	-	-
HCM Control Delay (s)	48.3		$ 2471.2	45.5	-	-
HCM Lane LOS	E	-	F	E	-	-
HCM 95th %tile Q(veh)	2.5	-	11.7	2.1	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Vol, veh/h	19	29	6	2323	2129	15
Future Vol, veh/h	19	29	6	2323	2129	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	100	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	32	7	2525	2314	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	4853	2314	2330	0	-	0
Stage 1	2314	-	-	-	-	-
Stage 2	2539	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 1	48	212	-	-	-
Stage 1	79	-	-	-	-	-
Stage 2	61	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 1	48	212	-	-	-
Mov Cap-2 Maneuver	31	-	-	-	-	-
Stage 1	76	-	-	-	-	-
Stage 2	61	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	200.9	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	212	-	31	48	-	-
HCM Lane V/C Ratio	0.031	-	0.666	0.657	-	-
HCM Control Delay (s)	22.5	-	247.2	170.5	-	-
HCM Lane LOS	C	-	F	F	-	-
HCM 95th %tile Q(veh)	0.1	-	2.2	2.6	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Summary
9: Laguna Cyn Rd & Canyon Acres Dr

2050 No Build AM Peak

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↶	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	40	21	0	1895	15	21	1836
Future Volume (veh/h)	40	21	0	1895	15	21	1836
Number	3	18		2	12	1	6
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			0.98	1.00	
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863		1863	1863	1863	1863
Adj Flow Rate, veh/h	42	22		1974	16	22	1912
Adj No. of Lanes	1	1		2	1	1	2
Peak Hour Factor	0.96	0.96		0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2		2	2	2	2
Cap, veh/h	75	67		2811	1226	41	3058
Arrive On Green	0.04	0.04		0.79	0.79	0.02	0.86
Sat Flow, veh/h	1774	1583		3632	1544	1774	3632
Grp Volume(v), veh/h	42	22		1974	16	22	1912
Grp Sat Flow(s),veh/h/ln	1774	1583		1770	1544	1774	1770
Q Serve(g_s), s	2.2	1.3		25.0	0.2	1.2	15.4
Cycle Q Clear(g_c), s	2.2	1.3		25.0	0.2	1.2	15.4
Prop In Lane	1.00	1.00			1.00	1.00	
Lane Grp Cap(c), veh/h	75	67		2811	1226	41	3058
V/C Ratio(X)	0.56	0.33		0.70	0.01	0.54	0.63
Avail Cap(c_a), veh/h	460	411		2811	1226	92	3058
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.2	44.8		4.6	2.1	46.5	1.9
Incr Delay (d2), s/veh	6.3	2.8		1.5	0.0	10.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.6		12.4	0.1	0.7	7.6
LnGrp Delay(d),s/veh	51.5	47.5		6.1	2.1	57.0	2.9
LnGrp LOS	D	D		A	A	E	A
Approach Vol, veh/h	64			1990			1934
Approach Delay, s/veh	50.1			6.1			3.5
Approach LOS	D			A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.7	81.0				87.7		8.6
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	76.5				76.5		25.0
Max Q Clear Time (g_c+I1), s	3.2	27.0				17.4		4.2
Green Ext Time (p_c), s	0.0	28.9				25.8		0.1

Intersection Summary			
HCM 2010 Ctrl Delay			5.5
HCM 2010 LOS			A

Notes

HCM 2010 Signalized Intersection Summary
9: Laguna Cyn Rd & Canyon Acres Dr

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	⮌	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	20	21	0	1843	30	20	1898
Future Volume (veh/h)	20	21	0	1843	30	20	1898
Number	3	18		2	12	1	6
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			0.98	1.00	
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863		1863	1863	1863	1863
Adj Flow Rate, veh/h	21	22		1920	31	21	1977
Adj No. of Lanes	1	1		2	1	1	2
Peak Hour Factor	0.96	0.96		0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2		2	2	2	2
Cap, veh/h	63	56		2834	1236	40	3080
Arrive On Green	0.04	0.04		0.80	0.80	0.02	0.87
Sat Flow, veh/h	1774	1583		3632	1544	1774	3632
Grp Volume(v), veh/h	21	22		1920	31	21	1977
Grp Sat Flow(s),veh/h/ln	1774	1583		1770	1544	1774	1770
Q Serve(g_s), s	1.1	1.3		22.6	0.4	1.1	15.7
Cycle Q Clear(g_c), s	1.1	1.3		22.6	0.4	1.1	15.7
Prop In Lane	1.00	1.00			1.00	1.00	
Lane Grp Cap(c), veh/h	63	56		2834	1236	40	3080
V/C Ratio(X)	0.33	0.39		0.68	0.03	0.53	0.64
Avail Cap(c_a), veh/h	464	414		2834	1236	93	3080
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.0	45.1		4.1	1.9	46.2	1.8
Incr Delay (d2), s/veh	3.0	4.3		1.3	0.0	10.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.6		11.2	0.2	0.7	7.9
LnGrp Delay(d),s/veh	48.0	49.4		5.5	2.0	56.7	2.9
LnGrp LOS	D	D		A	A	E	A
Approach Vol, veh/h	43			1951			1998
Approach Delay, s/veh	48.7			5.4			3.4
Approach LOS	D			A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	6.6	81.0				87.6		7.9
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	76.5				76.5		25.0
Max Q Clear Time (g_c+I1), s	3.1	24.6				17.7		3.3
Green Ext Time (p_c), s	0.0	28.4				27.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	4.9
HCM 2010 LOS	A

Notes

HCM 2010 Signalized Intersection Summary
9: Laguna Cyn Rd & Canyon Acres Dr

2050 Build Alt5 AM Peak

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↶	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	40	21	0	2122	15	98	1996
Future Volume (veh/h)	40	21	0	2122	15	98	1996
Number	3	18		2	12	1	6
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			0.97	1.00	
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863		1863	1863	1863	1863
Adj Flow Rate, veh/h	42	22		2210	16	102	2079
Adj No. of Lanes	1	1		2	1	1	2
Peak Hour Factor	0.96	0.96		0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2		2	2	2	2
Cap, veh/h	74	66		2651	1156	128	3068
Arrive On Green	0.04	0.04		0.75	0.75	0.07	0.87
Sat Flow, veh/h	1774	1583		3632	1544	1774	3632
Grp Volume(v), veh/h	42	22		2210	16	102	2079
Grp Sat Flow(s),veh/h/ln	1774	1583		1770	1544	1774	1770
Q Serve(g_s), s	2.3	1.3		41.2	0.3	5.6	18.7
Cycle Q Clear(g_c), s	2.3	1.3		41.2	0.3	5.6	18.7
Prop In Lane	1.00	1.00			1.00	1.00	
Lane Grp Cap(c), veh/h	74	66		2651	1156	128	3068
V/C Ratio(X)	0.56	0.33		0.83	0.01	0.80	0.68
Avail Cap(c_a), veh/h	450	401		2651	1156	137	3068
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	45.9		8.3	3.1	45.1	2.1
Incr Delay (d2), s/veh	6.6	2.9		3.3	0.0	25.9	1.2
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.6		20.8	0.1	3.7	9.2
LnGrp Delay(d),s/veh	52.9	48.8		11.5	3.2	70.9	3.3
LnGrp LOS	D	D		B	A	E	A
Approach Vol, veh/h	64			2226			2181
Approach Delay, s/veh	51.5			11.5			6.5
Approach LOS	D			B			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	11.6	78.4				90.0		8.6
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	7.6	73.9				76.5		25.0
Max Q Clear Time (g_c+I1), s	7.6	43.2				20.7		4.3
Green Ext Time (p_c), s	0.0	24.0				33.5		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	9.6
HCM 2010 LOS	A

Notes

HCM 2010 Signalized Intersection Summary
9: Laguna Cyn Rd & Canyon Acres Dr

Movement	WBL	WBR	NBU	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↶	↑↑	↱	↰	↑↑
Traffic Volume (veh/h)	20	21	0	2064	30	45	2045
Future Volume (veh/h)	20	21	0	2064	30	45	2045
Number	3	18		2	12	1	6
Initial Q (Qb), veh	0	0		0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00			0.98	1.00	
Parking Bus, Adj	1.00	1.00		1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863		1863	1863	1863	1863
Adj Flow Rate, veh/h	21	22		2150	31	47	2130
Adj No. of Lanes	1	1		2	1	1	2
Peak Hour Factor	0.96	0.96		0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2		2	2	2	2
Cap, veh/h	63	56		2791	1217	66	3086
Arrive On Green	0.04	0.04		0.79	0.79	0.04	0.87
Sat Flow, veh/h	1774	1583		3632	1544	1774	3632
Grp Volume(v), veh/h	21	22		2150	31	47	2130
Grp Sat Flow(s),veh/h/ln	1774	1583		1770	1544	1774	1770
Q Serve(g_s), s	1.1	1.3		31.8	0.4	2.5	18.8
Cycle Q Clear(g_c), s	1.1	1.3		31.8	0.4	2.5	18.8
Prop In Lane	1.00	1.00			1.00	1.00	
Lane Grp Cap(c), veh/h	63	56		2791	1217	66	3086
V/C Ratio(X)	0.33	0.39		0.77	0.03	0.72	0.69
Avail Cap(c_a), veh/h	457	408		2791	1217	91	3086
HCM Platoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00		1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	45.8		5.5	2.2	46.2	2.0
Incr Delay (d2), s/veh	3.1	4.4		2.1	0.0	14.7	1.3
Initial Q Delay(d3),s/veh	0.0	0.0		0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.6		15.8	0.2	1.5	9.1
LnGrp Delay(d),s/veh	48.8	50.2		7.7	2.3	61.0	3.3
LnGrp LOS	D	D		A	A	E	A
Approach Vol, veh/h	43			2181			2177
Approach Delay, s/veh	49.5			7.6			4.5
Approach LOS	D			A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2				6		8
Phs Duration (G+Y+Rc), s	8.1	81.0				89.1		7.9
Change Period (Y+Rc), s	4.5	4.5				4.5		4.5
Max Green Setting (Gmax), s	5.0	76.5				76.5		25.0
Max Q Clear Time (g_c+I1), s	4.5	33.8				20.8		3.3
Green Ext Time (p_c), s	0.0	29.8				34.8		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	6.5
HCM 2010 LOS	A

Notes

ATTACHMENT E

TRANSPORTATION MANAGEMENT PLAN (TMP)
DATA SHEETS

TRANSPORTATION MANAGEMENT PLAN DATA SHEET
(Preliminary TMP Elements and Costs)

Co/Rte/PM 12-ORA-133 (PM 0.9-3.4)

Project ID No. 1217000086 EA 12-0Q670K Alternatives No. 2,3,4, & 5

Project Limit SR-133 from Canyon Acres Drive (PM 0.9) to El Toro Road (PM 3.4)

Project Description Laguna Canyon Road (SR-133) PSR-PDS

1) Public Information

☒ a. Brochures and Mailers	$ 30,000
☒ b. Press Release	$ 0
☒ c. Paid Advertising	$ 20,000
☐ d. Public Information Center/Kiosk	$ 0
☒ e. Public Meeting/Speakers Bureau	$ 40,000
☐ f. Telephone Hotline	$ 0
☒ g. Internet	$ 30,000
☐ h. Others	$ 0

2) Motorists Information Strategies

☐ a. Changeable Message Signs (Fixed)	$ 0
☒ b. Changeable Message Signs (Portable)	$ 100,000
☒ c. Ground Mounted Signs	$ 48,000
☐ d. Highway Advisory Radio	$ 0
☐ e. Caltrans Highway Information Network (CHIN)	$ 0
☐ f. Others	$ 0

3) Incident Management

☒a. Construction Zone Enhanced Enforcement Program(COZEEP)	$ 200,000
☒b. Freeway Service Patrol	$ 250,000
☐c. Traffic Management Team	$ 0
☐d. Helicopter Surveillance	$ 0
☐e. Traffic Surveillance Stations (Loop Detector and CCTV)	$ 0
☐f. Others____________________________	$ 0

4) Construction Strategies

☒a. Lane Closure Chart	$ 0
☒b. Reversible Lanes	$ 0
☐c. Total Facility Closure	$ 0
☐d. Contra Flow	$ 0
☐e. Truck Traffic Restrictions	$ 0
☐f. Reduced Speed Zone	$ 0
☐g. Connector and Ramp Closures	$ 0
☐h. Incentive and Disincentive	$ 0
☐i. Movable Barrier	$ 0
☐j. Others____________________________	$ 0

5) Demand Management

☐a. HOV Lanes/Ramps (New or Convert)	$ 0
☐b. Park and Ride Lots	$ 0
☐c. Rideshare Incentives	$ 0
☐d. Variable Work Hours	$ 0
☐e. Telecommute	$ 0
☐f. Ramp Metering (Temporary Installation)	$ 0
☐g. Ramp Metering (Modify Existing)	$ 0
☐h. Others____________________________	$ 0

6) Alternative Route Strategies

☐a. Add Capacity to Freeway Connector	$ 0
☒b. Street Improvement (widening, traffic signal... etc.)	$ 300,000
☐c. Traffic Control Officers	$ 0
☐d. Parking Restrictions	$ 0
☐e. Others____________________________	$ 0

7) Other Strategies

☐a. Application of New Technology	$ 0
☐b. Others____________________________	$ 0

TOTAL ESTIMATED COST OF TMP ELEMENTS = $ 988,000

TMP Notes:

PUBLIC INFORMATION

BROCHURES AND MAILERS:

Send courtesy notices by direct mail to the project neighborhood to inform them of construction and work zone information. The information provided will include the project's start date, schedules and alternative routes. It is anticipated that 10,000 brochures and mailers will be needed at $3 each = $30,000.

PRESS RELEASE:

Provide press release whenever any facilities are closed for construction. During any closures necessitated for construction, Caltrans will implement the press release upon receiving closure information from the Project Resident Engineer. No costs are associated with press releases.

PAID ADVERTISING:

Paid advertising includes additional advertising through other media means and may include local television advertising, social media advertising, newspaper advertising, cost for these types of advertisements are expected to be approximately $20,000.

PUBLIC MEETING:

It is anticipated that public meetings will be held at the project start and at the beginning of each stage to present the project information to the community. It is anticipated that the meetings will be held in one location. This yields a total of 4 meetings at $10,000 = $40,000.

INTERNET:

A project website will be designed to provide real-time interactive information on project plans and progress. The cost to develop and maintain the website for two years is expected to be $30,000.

MOTORISTS INFORMATION STRATEGIES

PORTABLE CHANGEABLE MESSAGE SIGNS:

PCMS will be placed at key locations to notify motorists of construction activities, road closures and detours. It is assumed that a total of 10 PCMS at a cost of $10,000 each = $100,000 would be used as a TMP measure to be used for all stages of construction. The PCMS will be moved for each stage as needed. Additional PCMSs may be specified as part of the project signing.

GROUND MOUNTED SIGNS:

Temporary ground mounted signs will provide traveler information to guide motorists through the work zone.

Each stage will require up to 40 signs at $400 per sign = $16,000 per stage X 3 Stages = $48,000

INCIDENT MANAGEMENT

COZEEP:

It is assumed that CHP or similar agency enforcement will be used during setting of K-rail and general construction for a total of 100 working days at 10 hours per shift including travel time to and from the project site.

$100/Officer/Hour (2 officers): $100 x 2 x 1,000 hours = $200,000

FREEWAY SERVICE PATROL:

It is assumed that Freeway Service Patrol (FSP) will be required. FSP will include tow truck service that will be needed during construction when the shoulders are reduced in width or temporarily eliminated. Currently OCTA manages the Orange County FSP program. Laguna Canyon Road is not one of the highways that is serviced by FSP. It is assumed that the FSP would be used for peak hours (6-10 AM and 3-7 PM) during the week for two years.

$80/Truck/Hour (1 truck): $80 x 1 trucks x 4,160 hours = $332,800 use $335,000

CONSTRUCTION STRATEGIES

STAGE CONSTRUCTION:

Construction is to be completed in multiple stages with multiple phases within each major stage of the Project. Detailed staging for this alternative will be considered in the next project phase.

STAGE CONSTRUCTION AND TRAFFIC HANDLING PLANS:

As part of the PS&E package, Construction Staging Plans shall be prepared that shows the sequence of construction activities. The construction staging approach for this Project is to be completed in a specific sequence to minimize impacts to the traveling public.

In addition to the construction staging plans, traffic handling plans shall be included. The traffic handling plans shall contain sufficient alignment detail, profiles and typical cross-sections to guide traffic through the work zone in the sequence shown in the stage construction plans.

ALTERNATE ROUTE STRATEGIES

STREET IMPROVEMENTS

Temporary traffic signals may be needed to provide access to properties within the project area. It is anticipated that a total of three temporary signals for three stages of construction may be needed at a cost of approximately $100,000 for each temporary signal. This would total up to be $300,000.

PREPARED BY ______________________________ **DATE** ________________

Steve Crouch, P.E.

ATTACHMENT F

STORM WATER DATA REPORT (SWDR)

Dist-County-Route: 12-ORA-133

Post Mile Limits: 0.96/3.41

Type of Work: Bike and Pedestrian Path Addition and Utility Undergounding

Project ID (EA): 12-0Q670K

Program Identification: 20.10.800.100

Phase: ☒ PID (PIR) PSR/PDS

Regional Water Quality Control Board(s): San Diego, Region 9

Total Disturbed Soil Area: 6.81 acres PCTA: 6.81 acres

Estimated Const. Start Date: 07-01-28 Estimated Const. Completion Date: 2-28-30

Is the Project within a TMDL watershed? Yes ☒ No ☐

This Report has been prepared under the direction of the following Licensed Person. The Licensed Person attests to the technical information contained herein and the date upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E only.

Stephen P.A. Crouch

7-22-2022

Stephen P.A. Crouch, Registered Project Engineer Date

I have reviewed the stormwater quality design issues and find this report to be complete, current and accurate:

8/8/2022

[Stamp Required for PS&E only)

Grace Pina-Garrett, District/Regional Design SW Coordinator or Designee *Date*

STORMWATER DATA INFORMATION

1. Project Description

- The City of Laguna Beach (City), in cooperation with the California Department of Transportation (Caltrans) District 12, is proposing to construct improvements along the State Route (SR) 133 corridor extending approximately 2.5 miles from Canyon Acres Drive (PM 0.96) to El Toro Road (PM 3.41) in Orange County (the Project).This segment of SR-133 consists of a two-lane highway with a center turn lane, limited shoulders, and sporadic off-street angled and parallel parking located along the north bound side of the roadway. The 34-foot roadway section is comprised of two 12-foot travel lanes and a 10-foot center turn lane. Two signalized intersections at Canyon Acres Drive and El Toro Road are located within this segment of Laguna Canyon Road (LCR). In addition, an existing midblock pedestrian crossing of SR-133 is located at the Laguna College of Art and Design. The right-of-way is constrained by residential and light commercial developments as well as various environmental constraints and open space preserve along the route. The route is further constrained by Southern California Edison's (SCE) overhead transmission and distribution line poles in close proximity to the travel way.The proposed improvements to LCR within this segment generally consist of a Class II and Class IV bicycle lane(s), pedestrian pathways/sidewalks, improving access to transit facilities, improved shoulders, undergrounding of the SCE transmission and distribution lines outside the travel way, and the introduction of additional signalized intersections at select locations and cross streets. Four alternatives are being analyzed for the Project: a no build alternative and three build alternatives, which include a combination of the above elements. No additional travel lanes are proposed for the Project.

  At the PID and PA/ED phases, the DSA should consider all areas where ground disturbance is anticipated. Alternative 5 with the largest impact/footprint was evaluated for the purpose of this study (Figure 1-1). The total disturbed soil area (DSA) for the project is estimated to be 6.81 acres. The area was estimated using limited data and includes areas for construction, access, and staging. DSA will be recalculated when the project survey is complete.

- The post construction treatment area (PCTA) for the project is estimated to be 6.81 acres. The areas in Table 1-1 were calculated in Microstation based on Alternative 5 in Figure 1-1 and according to the typical section in Figure 1-2 below. A similar exercised was completed for Alternative 3. Alternative 3's areas are included in Table 1-1 for comparison.

- Since there are no existing BMPs within the project footprint are impacted (removed or modified), by the proposed project, Additional Treated Area (ATA#1) condition is zero. Also, since Net New Impervious area (NNI) is less than 50% of the total post project impervious area, thus ATA#2 is zero.

- The project site is very constrained with no space to be able to locate BMPs for post construction treatment. As a result, it was decided early in the development of this project to propose a porous pavement material type call Open Graded Friction Course (OGFC) for the bike lanes.

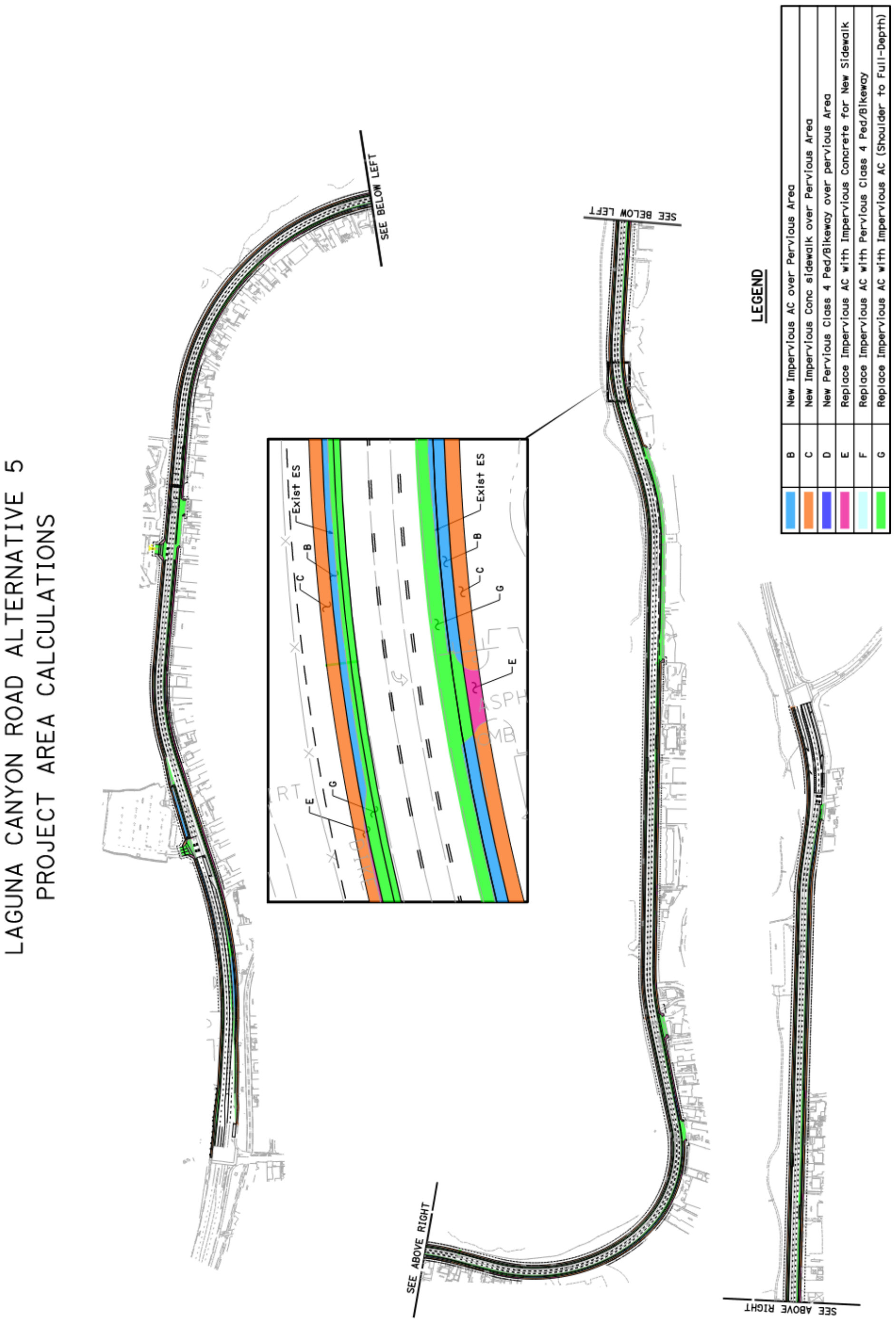


Figure 1-1. Alternative 5 with the largest impact/footprint

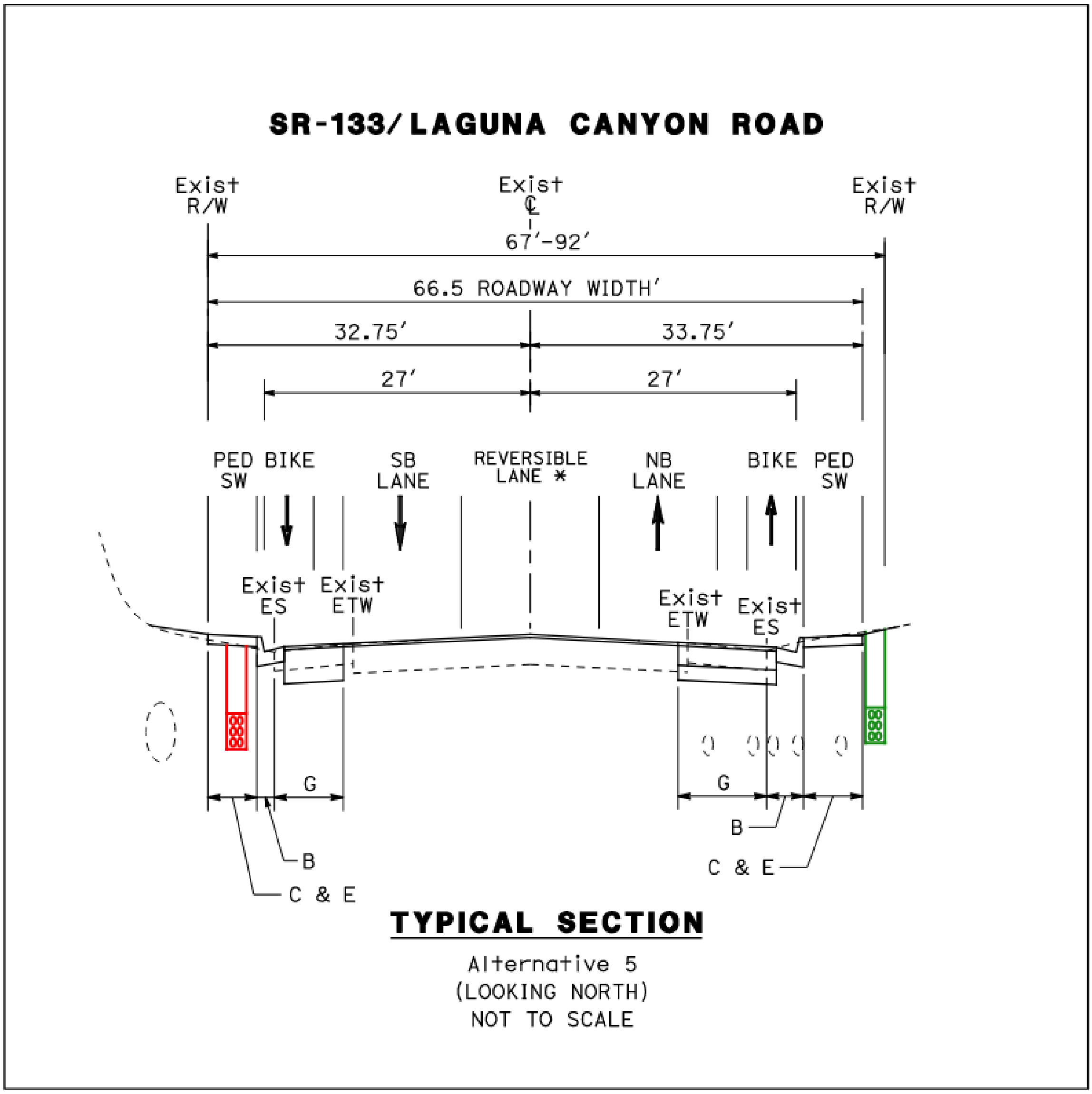


Figure 2-2. Alternative 5 Typical Section

	Table 1-1 Project Area Calculations for Alternatives 3 and 5		
Variable	Areas	Alt 3 Acres	Alt 5 Acres
A	**Existing Impervious Area**	**17.92**	**17.92**
B	**New Impervious AC over Pervious Area**	**0.97**	**1.14**
C	**New Impervious Concrete Sidewalk over Pervious Area**	**0.78**	**2.56**
D	**New Pervious Class 1 Ped/ Bikeway (eg. Open Grade Friction Course (OGFC)) over Pervious Area****	**1.50**	**0.00**
E	**Replace Impervious AC w/ Impervious Concrete for New Sidewalk (AB remains in place*)****	**0.63**	**0.76**
F	**Replace Impervious AC w/ Pervious Class 4 Ped/ Bikeway (eg. OGFC)**	**3.86**	**0.00**
G	**Replace Impervious AC w/ Impervious AC (shoulder to full-depth)**	**2.52**	**5.67**
DSA	**Disturbed Soil Area**	**7.23**	**6.81**

*Remove existing AC up to AB layer **For Information Only (Not used in the calculations in table below)

	Table 1-2	PCTA Calculations for Alternatives 3 and 5		
Variable	Impervious Areas	Arithmetic	Alt 3 Acres	Alt 5 Acres
M	**Pre-project Impervious Area**	**A**	**17.92**	**17.92**
EIA	**Excluded Impervious Areas**	**C**	**0.78**	**2.56**
N	**Post-project Impervious Area**	**M+B+C-F**	**15.03**	**21.62**
NNI	**Net New Impervious area**	**N-M-EIA**	**-2.89**	**1.14**
RIS	**Replaced Impervious Surface**	**G**	**2.52**	**5.67**
NIS	**New Impervious Surface**	**NNI+RIS**	**0**	**6.81**
ATA#1	**Additional Treated Area (condition 1)**	**-**	**0**	**0.00**
ATA#2	**Additional Treated Area (condition 2)**	**-**	**0**	**0.00**
PCTA	**Post Construction Treatment Area**	**NIS+ ATA#1+ ATA#2**	**0**	**6.81**

2. Site Data and Stormwater Quality Design Issues

- A 401 Water Quality Certification is anticipated.
- According to the Caltrans Water Quality Planning Tool (WQPT), the project is located within an unincorporated portion of the Orange County and within San Diego Municipal Separate Storm Sewer System (MS4) area. Directly south of State Route 133 (SR-133) is the City of Laguna Beach; however, there are no major incorporated cities or towns within the project area.
- The project is located within the San Juan Hydrologic Unit (HU) [901.00], the Laguna Hydrologic Area (HA) [901.10], and the Laguna Beach Hydrologic Sub-Area (HSA) [901.12],

which is under the jurisdiction of the San Diego Regional Water Quality Control Board (RWQCB).

- The recieving water body within the project limit is Laguna Canyon Channel which is not listed as an impaired water body in the RWQCB 2020/2022 303(d) list. Laguna Canyon Channel ultimately drains to Pacific Ocean which is approximately 1 mile south of Canyon Acres Drive. The outlet of Laguna Canyon Channel to the Pacific Ocean is within the TMDL "Project I - Revised Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek) (Indicator Bacteria)", per the Caltrans Stormwater Portal and TMDL Reach Proritaztion Ranking & PM D12 (Table 2-1).

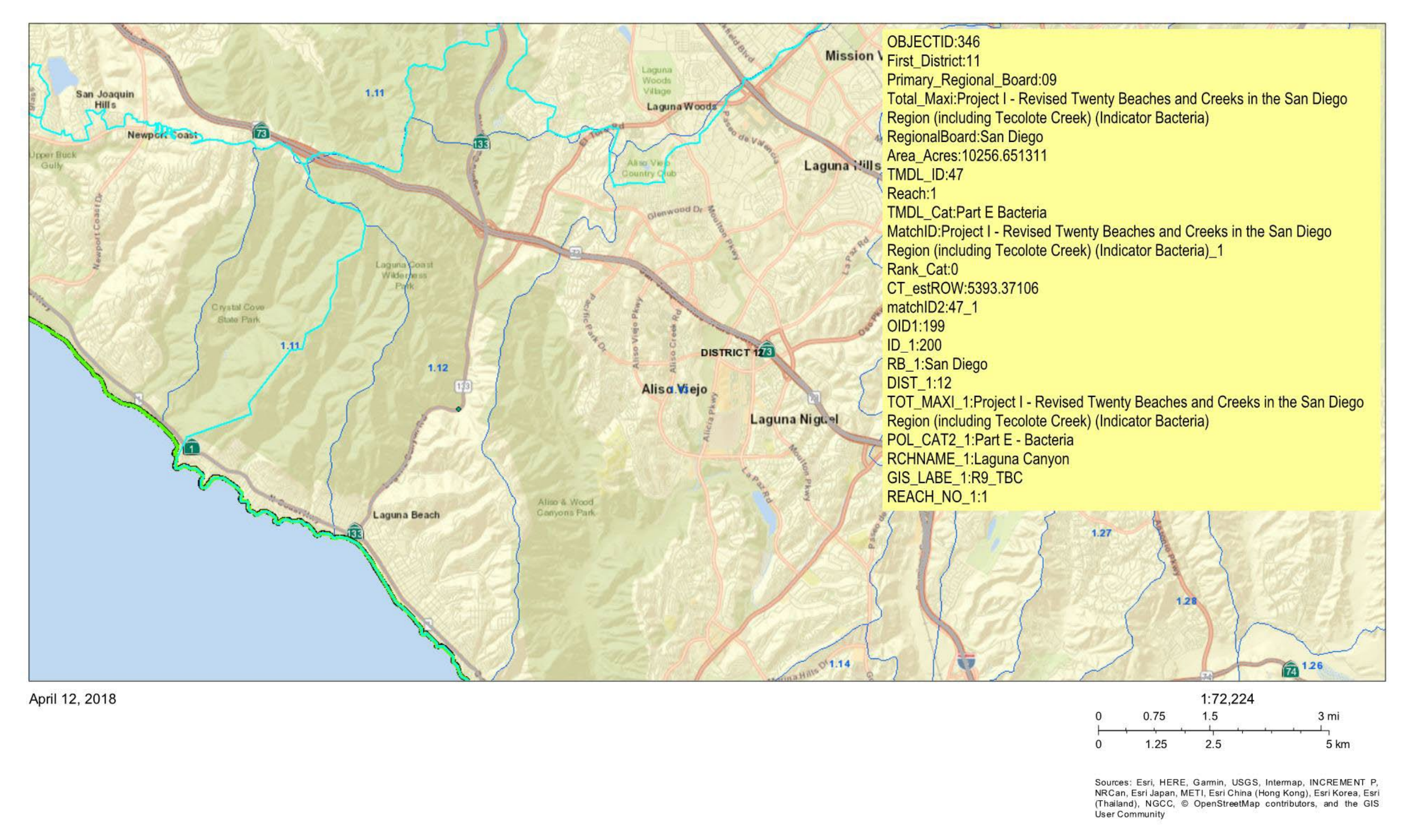
Table 2-1. TMDLs within the project limits

Regional Board	District	County	TMDL	Reach	Route	BPM	EPM	Final Ranking
8	12	ORA	Project I- Twenty Beaches and Creeks in the San Diego Region including Tecolote Creek (indicator bacteria)	1	133	0.00	6.469	200

Source: Caltrans, Oct.28, 2015. "TMDL Reach Proritaztion Ranking & PM D12"

- Figures 2-1, and 2-2 represent snapshots of the TMDL analysis of the receiving water bodies per Caltrans Stormwater Portal and SWRCB 2014/2016 California Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report).

Figure 2-1A, Snapshot of the TMDL analysis of the receiving water bodies (Caltrans Stormwater Portal).



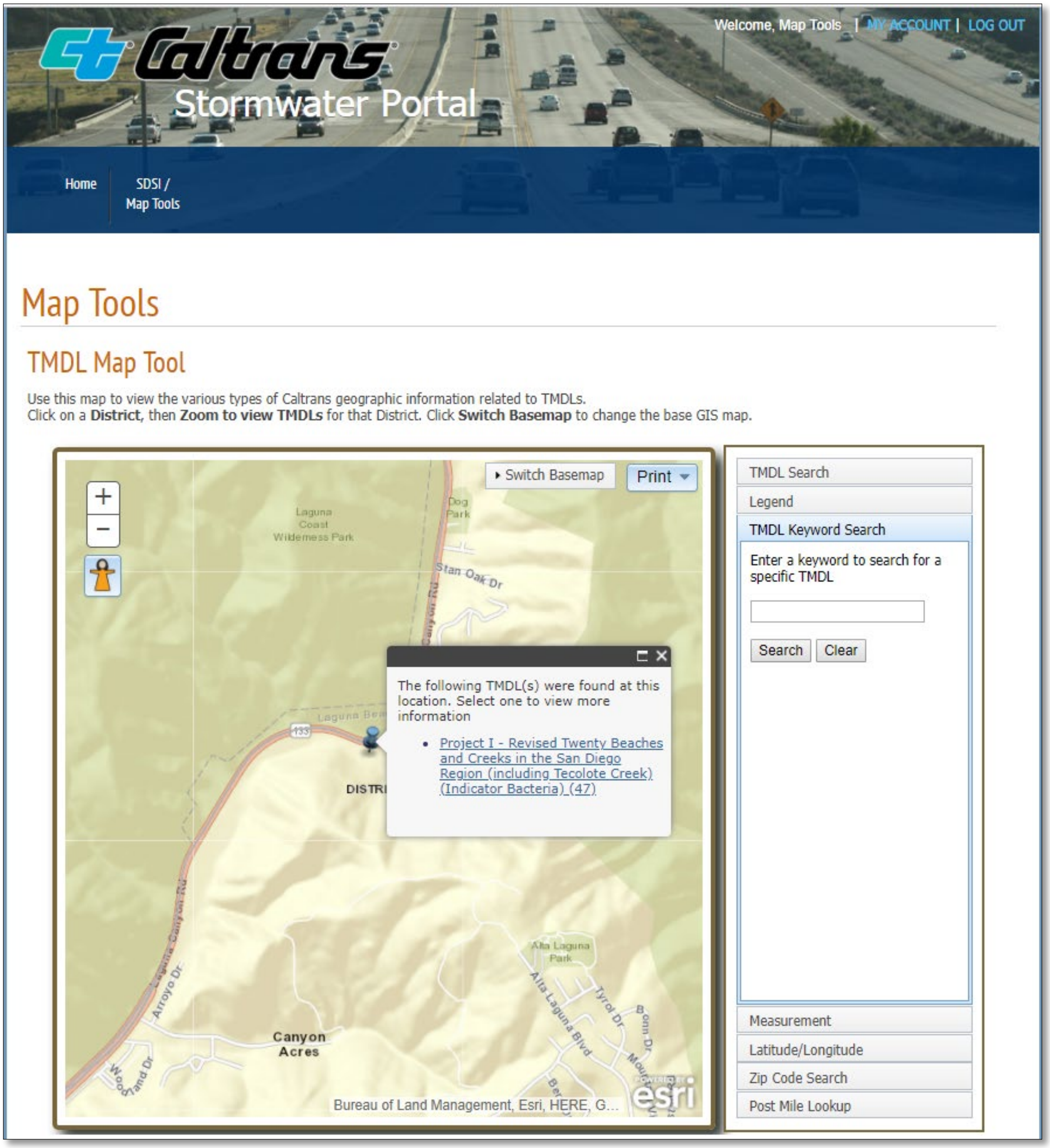
OBJECTID:346
First_District:11
Primary_Regional_Board:09
Total_Maxi:Project I - Revised Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek) (Indicator Bacteria)
RegionalBoard:San Diego
Area_Acres:10256.651311
TMDL_ID:47
Reach:1
TMDL_Cat:Part E Bacteria
MatchID:Project I - Revised Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek) (Indicator Bacteria)_1
Rank_Cat:0
CT_estROW:5393.37106
matchID2:47_1
OID1:199
ID_1:200
RB_1:San Diego
DIST_1:12
TOT_MAXI_1:Project I - Revised Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek) (Indicator Bacteria)
POL_CAT2_1:Part E - Bacteria
RCHNAME_1:Laguna Canyon
GIS_LABE_1:R9_TBC
REACH_NO_1:1

April 12, 2018

1:72,224

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

Figure 2-2B, Snapshot of the TMDL analysis of the receiving water bodies (Caltrans Stormwater Portal).



Map Tools

TMDL Map Tool

Use this map to view the various types of Caltrans geographic information related to TMDLs.
Click on a **District**, then **Zoom to view TMDLs** for that District. Click **Switch Basemap** to change the base GIS map.

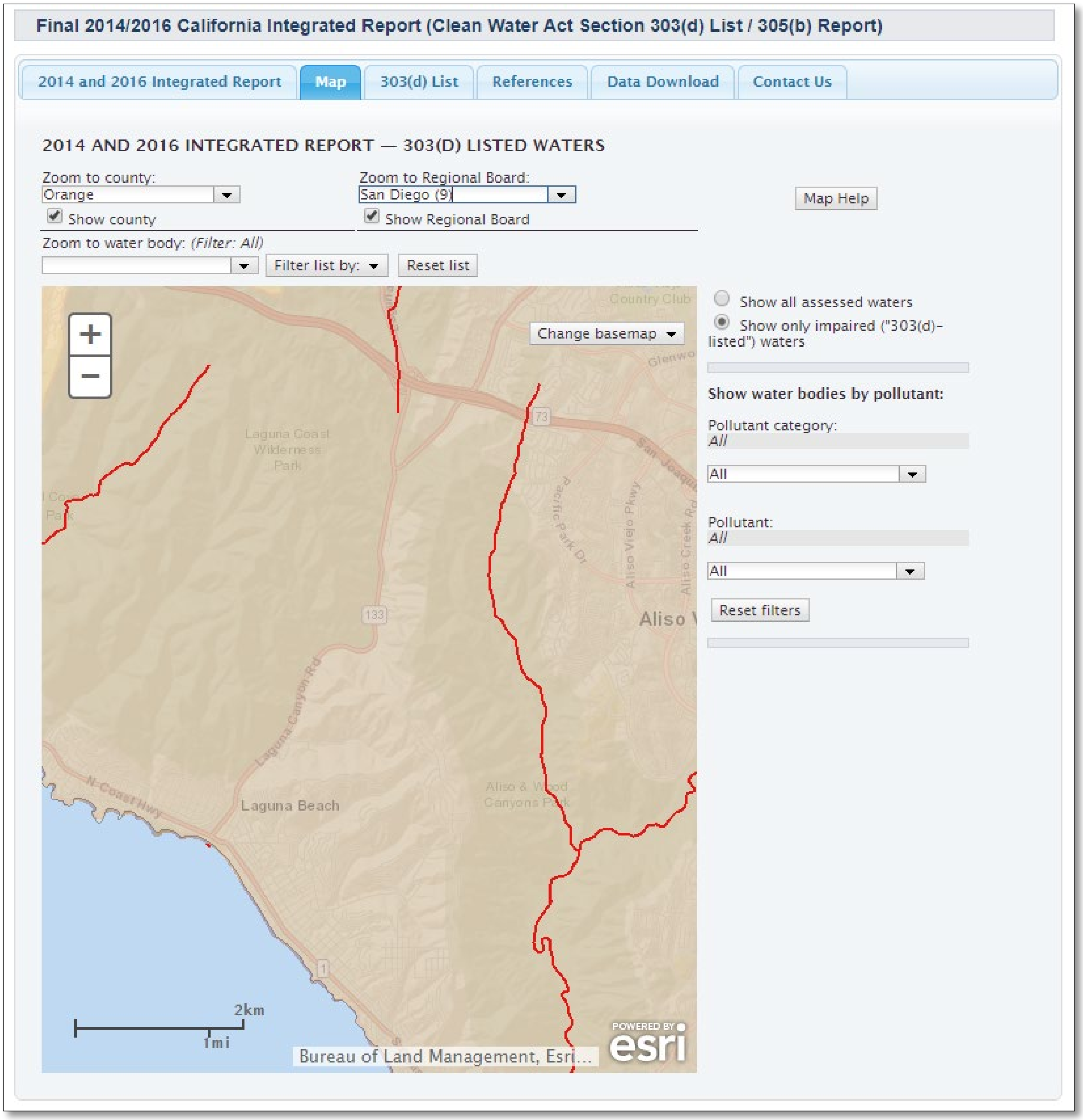
The following TMDL(s) were found at this location. Select one to view more information

- Project I - Revised Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek) (Indicator Bacteria) (47)

Enter a keyword to search for a specific TMDL

Source: Caltrans Stormwater Portal, < https://caltransesp.com/tmdlsearch/index.html >

Figure 2-3, Snapshot of the TMDL analysis of the receiving water bodies (SWRCB: 2014/2016 California Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report))



Final 2014/2016 California Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report)

2014 AND 2016 INTEGRATED REPORT — 303(D) LISTED WATERS

Zoom to county: Orange
☑ Show county
Zoom to Regional Board: San Diego (9)
☑ Show Regional Board
Zoom to water body: *(Filter: All)*

○ Show all assessed waters
● Show only impaired ("303(d)-listed") waters

Show water bodies by pollutant:
Pollutant category: *All*
All
Pollutant: *All*
All

Source: SWRCB, Final 2014/2016 California Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report) <https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml >

Geotechnical Data

- The predominant soil type in the project area is Capistrano Sandy Loam (2 to 9 percent slopes) and identified as Hydraologic Soil Group (HSG) B. A short segment of the project area is in Chino Silty Clay Loam and identified as HSG C. More geotechnical information will be available in the next project phase. The soil erodibility of the site (erosion factor K) within the project area is 0.32.

Topographic Data

- The United States Geological Survey (USGS) topography map of the area shows the elevation of the project area ranging from 80 ft to 240 ft.

Hydraulic Data

- According to the NRCS Web Soil Survey, the groundwater is about 7 feet below ground. The Log of Test Borings will be performed in later phases of the project.

Climate

- The historic climate data is based on information obtained from Laguna Beach Station (ID 044647), which is located approximately 1 miles south of the project site. The average temperature ranges from 55.1^{0}F to 70.2^{0}F at the Laguna Beach Station. The average annual rainfall depth is 13.81 inches. The 85th percentile 24-hour storm (daily rainfall total) is 0.85 inches per Basin Sizer (Ver 1.47).

3. Construction Site BMPs to be used on Project

- Project BMP measures will be specified and quantified during later phases of the project.

Risk Assessment

- This project was determined to be Risk Level 2 based on Method 1, GIS Map Method, Appendix 1, 2009 CGP. The Risk Level documentation is attached to this report.

Construction Site BMP Strategy

- The construction work for this project is scheduled to cover approximately 3 years. This project will disturb more than one acre of soil, so a Storm Water Pollution Prevention Plan (SWPPP) is required. DSA will be protected in accordance with the project's approved SWPPP. The BMP categories suitable for controlling potential pollutants to be considered for this project will be detailed during the design phase and include: Soil Stabilization, Sediment Control, Tracking Control, Wind Erosion Control, Non-storm Water Management, Waste

Management and Materials Pollution Control. Project specific BMP measures will be specified and quantified during the design phase.

4. Maintenance BMPs

- Drain inlet stenciling is required to be installed on inlets and catch basins since pedestrian traffic is expected along the highway.

5. Other Water Quality Requirements and Agreements

- Not applicable

6. Permanent BMPs

- Permanent BMPs are strategies and measures to minimize and avoid water quality impacts in the post construction condition. Permanent BMPs include Design Pollution Prevention and Treatment BMP strategies. Based upon Alternative 5, which is the largest footprint for the project, permanent BMPs may be required for the project depending on which Alternative is selected during the PA/ED phase of the project.

Rapid Stability Assessment

- This project potentially requires an RSA based on the algorithm (items listed below) provided in Section 2 of Caltrans Hydromodification Guidance dated February 2015. An RSA is potentially required based on all 4 bullets.
  - This project includes stream crossings.
  - This project does include 1 acre or more of net new impervious (NNI) surface.
  - The NNI is within the stream threshold drainage areas.
  - Stream crossings are “Water of the US” as defined by Army Corps of Engineers latest guidance on determination of jurisdiction for CWA section 404.

Design Pollution Prevention (DPP) BMP Strategy

Design Pollution Prevention BMPs will be incorporated into the project where appropriate to minimize impacts to water quality by preventing downstream erosion and stabilizing disturbed soil areas. These BMPs can provide water quality benefits including settling of solids and other pollutants and increasing detention time by incorporating and preserving vegetated surfaces. Further investigation will be provided during the PA/ED and PS&E phases of the project to determine which treatment

Treatment BMP Strategy

Depending upon the Alternative selected Treatment BMPs may be required. For example, Alternative 2 and 3 provide bikepath facilities that are proposed to be constructed with Open Grade Friction Course (OGFC) pavement thus increasing pervious area. If either of these alternatives are chosen, the New Net Impervious may be less than zero thus preventing any additional Treatment BMPs. The applicability of this Treatment BMP will be reviewed and studied along with others during the PA/ED and PS&E phases of the project.

Required Attachments

- Vicinity Map

- Evaluation Documentation Form
- Risk Level Determination Documentation
- SWDR Summary Spreadsheets

Vicinity Map

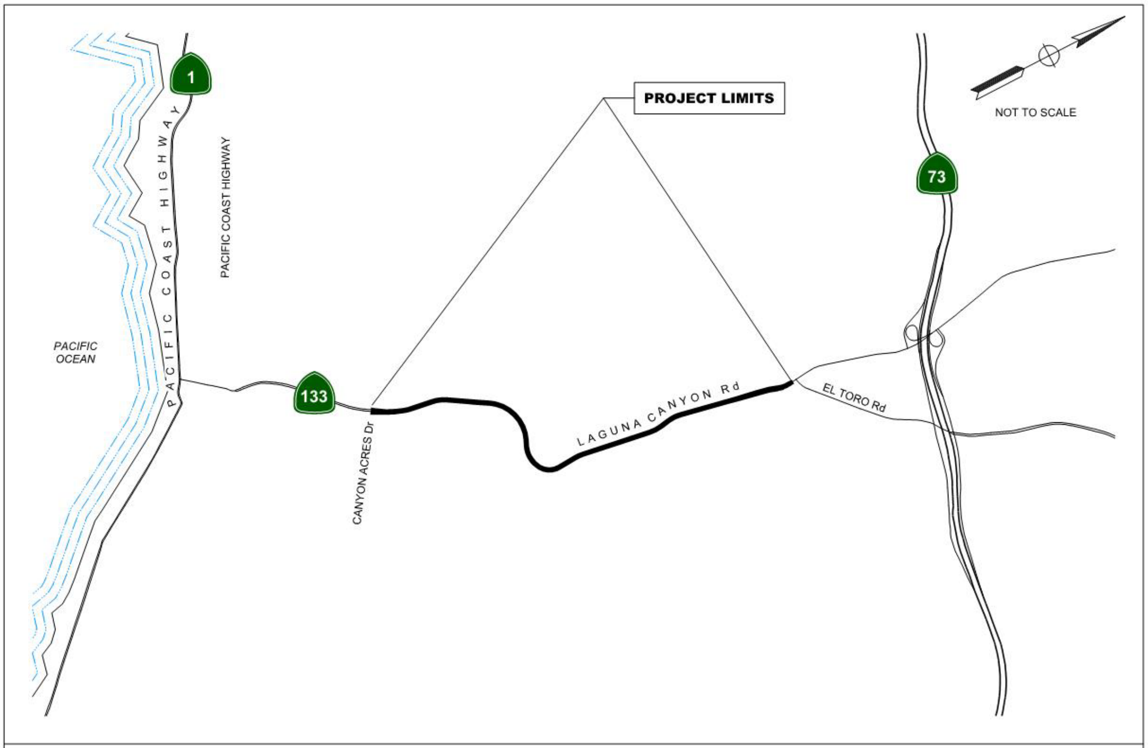


FIGURE 2
PROJECT LOCATION
LAGUNA CANYON ROAD / SR-133

Evaluation Documentation Form

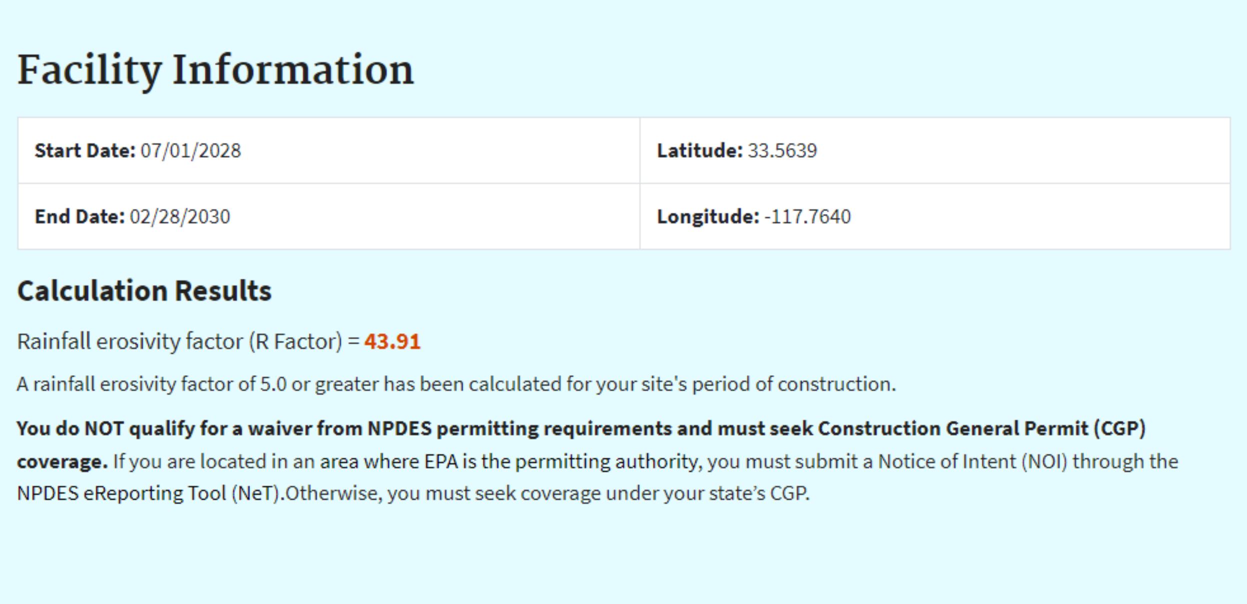
DATE: 05-26-22______________________

Project ID (EA): __0Q670______________________

No.	Criteria	Yes ✓	No ✓	Supplemental Information for Evaluation
1.	Begin Project evaluation regarding requirement for implementation of Treatment BMPs	✓		See Figure 4-1, Project Evaluation Process for Consideration of Treatment BMPs. Continue to 2.
2.	Is the scope of the Project to install Treatment BMPs (e.g., Alternative Compliance or TMDL Compliance Units)?		✓	If **Yes**, go to 8. If **No**, continue to 3.
3.	Is there a direct or indirect discharge to surface waters?	✓		If **Yes**, continue to 4. If **No**, go to 9.
4.	As defined in the WQAR or ED, does the project: a. discharge to areas of Special Biological Significance (ASBS), or		✓	If **Yes to any**, contact the District/Regional Design Stormwater Coordinator or District/Regional NPDES Coordinator to discuss the Department's obligations, go to 8 or 5. _________*(Dist./Reg. Coordinator initials)* If **No** to all, continue to 5.
	b. discharge to a TMDL watershed where Caltrans is named stakeholder, or	✓		
	c. have other pollution control requirements for surface waters within the project limits?		✓	
5.	Are any existing Treatment BMPs partially or completely removed? (ATA condition #1, Section 4.4.1)		✓	If **Yes**, go to 8 **AND** continue to 6. If **No**, continue to 6.
6.	Is this a Routine Maintenance Project?		✓	If **Yes**, go to 9. If **No**, continue to 7.
7.	Does the project result in an increase of <u>one acre or more</u> of new impervious surface (NIS)?	✓		If **Yes**, go to 8. If **No**, go to 9.
8.	Project is required to implement Treatment BMPs.	Complete Checklist T-1, Part 1. (To be completed in PA/ED Phase)		
9.	Project is not required to implement Treatment BMPs. ____*(Dist./Reg. Design SW Coord. Initials)* __*(Project Engineer Initials)* *(Date)*	Document for Project Files by completing this form and attaching it to the SWDR.		

Risk Level Determination Documentation

Figure 1. R factor (Value = 43.91)



Facility Information

Start Date: 07/01/2028	**Latitude:** 33.5639
End Date: 02/28/2030	**Longitude:** -117.7640

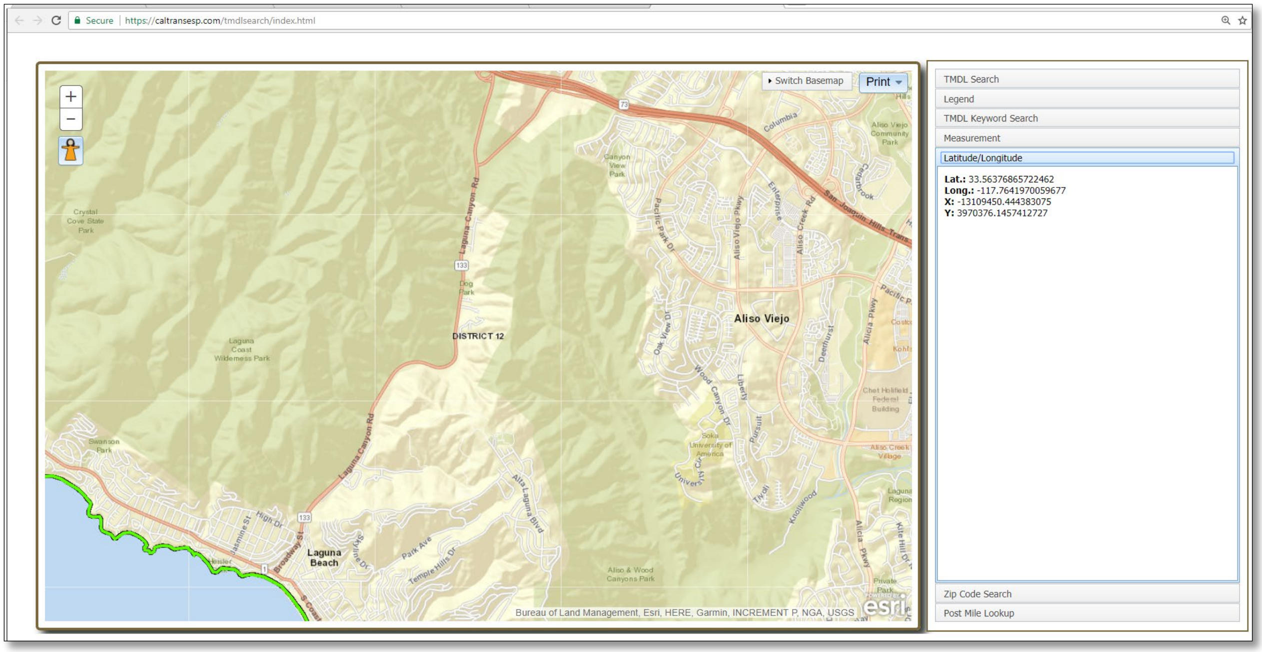
Calculation Results

Rainfall erosivity factor (R Factor) = **43.91**

A rainfall erosivity factor of 5.0 or greater has been calculated for your site's period of construction.

You do NOT qualify for a waiver from NPDES permitting requirements and must seek Construction General Permit (CGP) coverage. If you are located in an area where EPA is the permitting authority, you must submit a Notice of Intent (NOI) through the NPDES eReporting Tool (NeT).Otherwise, you must seek coverage under your state's CGP.

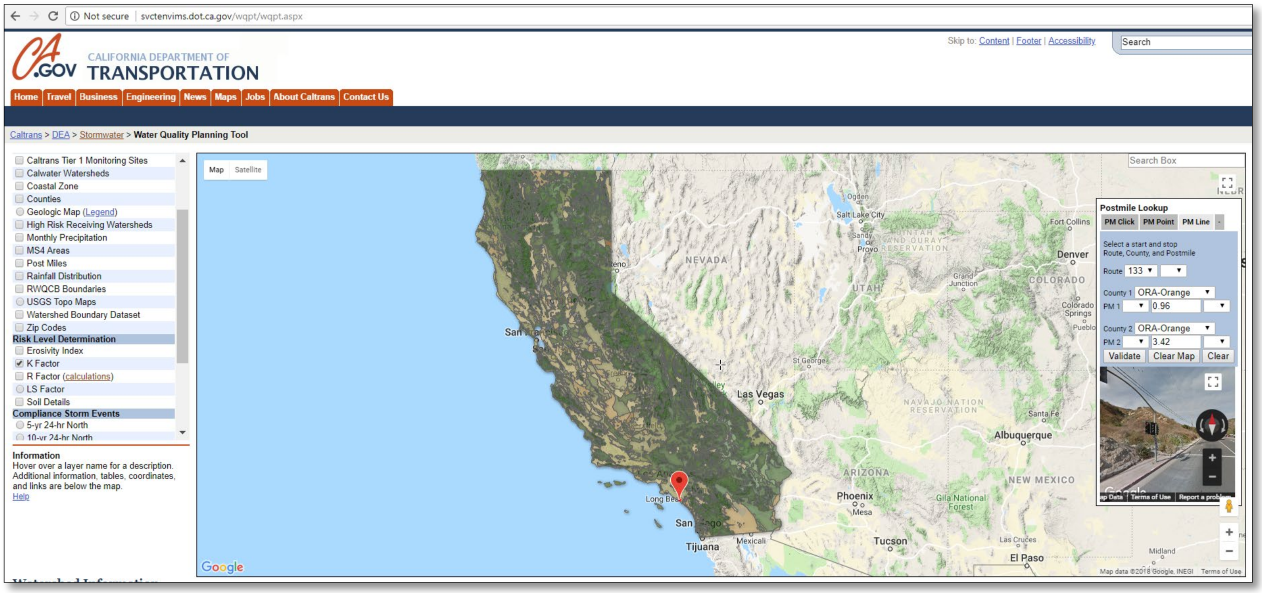
Source: https://www.epa.gov/npdes/rainfall-erosivity-factor-calculator-small-construction-sites



Lat.: 33.56376865722462
Long.: -117.7641970059677
X: -13109450.444383075
Y: 3970376.1457412727

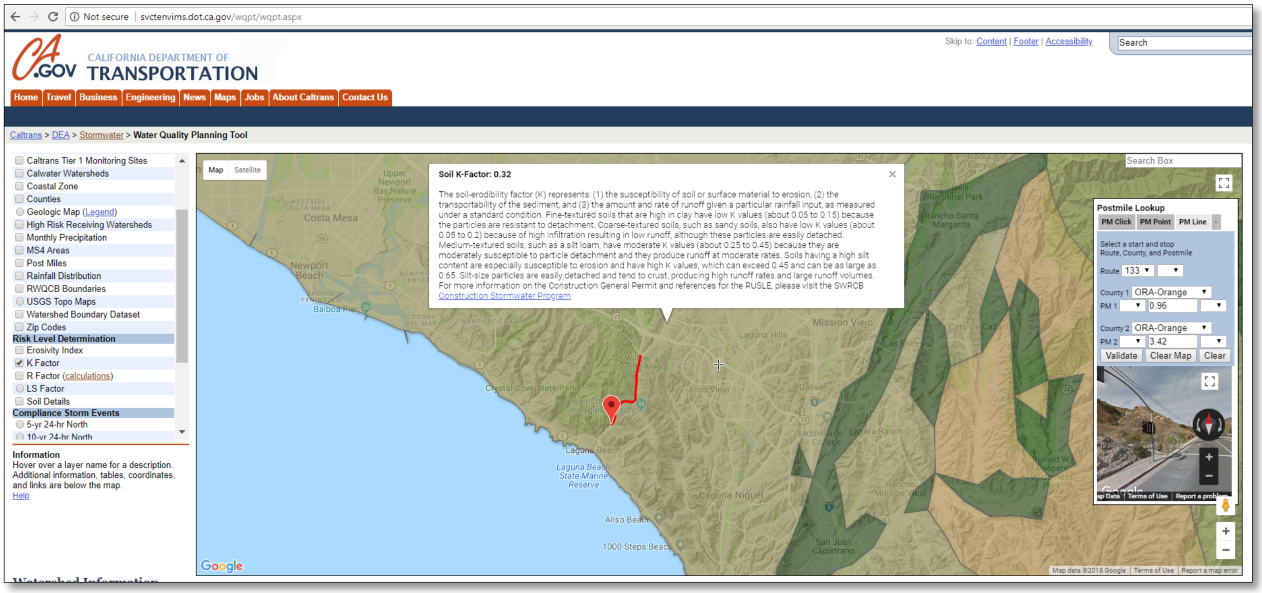
Source: : http://caltransesp.com/stormdrainsysteminventory-q10348-TMDL_Map_Tool.aspx

Figure 2. K factor from GIS Map (Value = 0.32)



Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help

Select a start and stop Route, County, and Postmile
Route 133
County 1 ORA-Orange
PM 1 0.96
County 2 ORA-Orange
PM 2 3.42



Soil K-Factor: 0.32

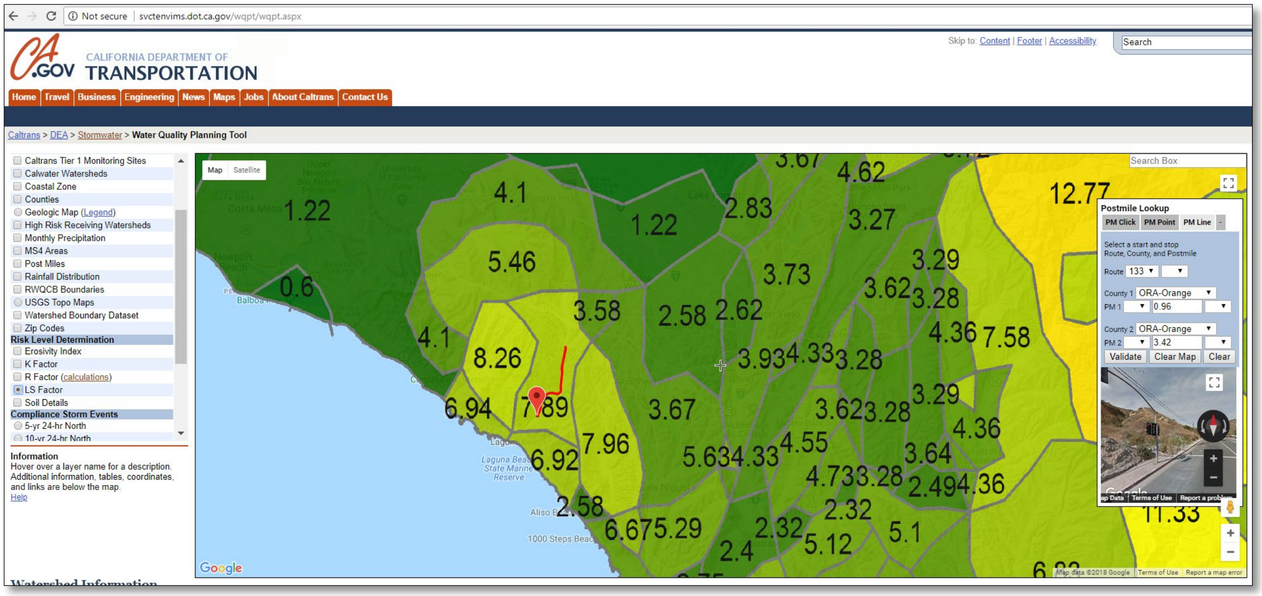
The soil-erodibility factor (K) represents: (1) the susceptibility of soil or surface material to erosion, (2) the transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff, although these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high runoff rates and large runoff volumes. For more information on the Construction General Permit and references for the RUSLE, please visit the SWRCB Construction Stormwater Program

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help

Select a start and stop Route, County, and Postmile
Route 133
County 1 ORA-Orange
PM 1 0.96
County 2 ORA-Orange
PM 2 3.42

Source: http://svctenvims.dot.ca.gov/wqpt/wqpt.aspx

Figure 3. LS factor from GIS Map (Value = 7.89)



☑ LS Factor

Select a start and stop Route, County, and Postmile

Route 133

County 1 ORA-Orange

PM 1 0.96

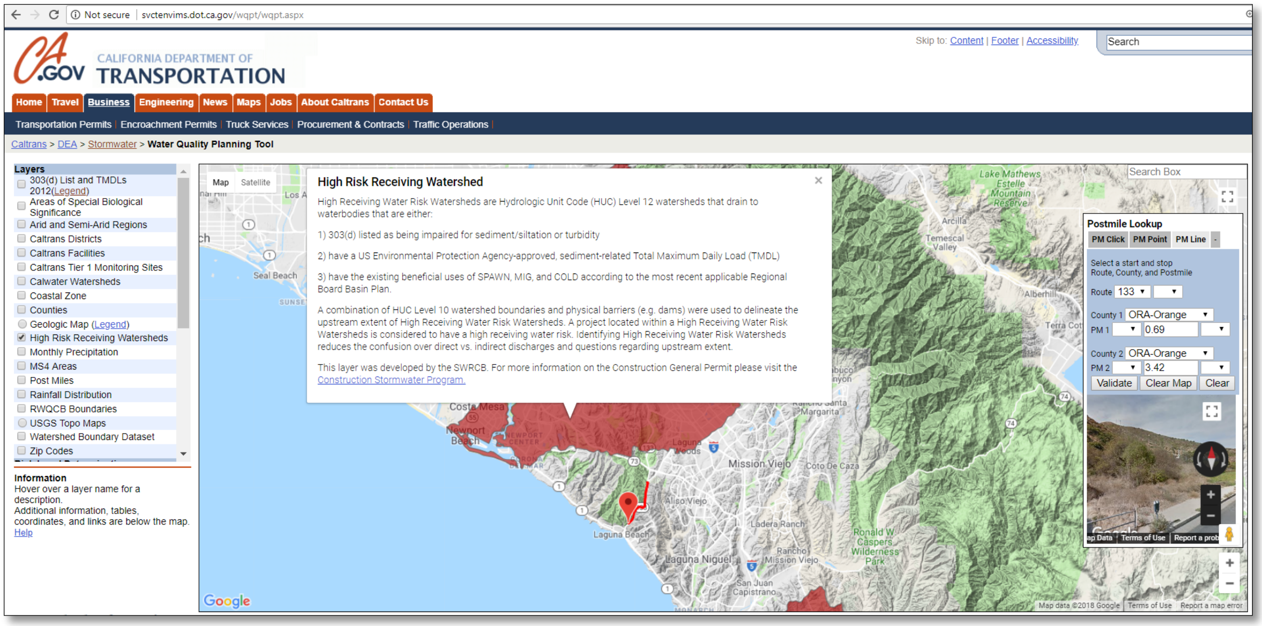
County 2 ORA-Orange

PM 2 3.42

Information
Hover over a layer name for a description. Additional information, tables, coordinates, and links are below the map.
Help

Source: http://svctenvims.dot.ca.gov/wqpt/wqpt.aspx

Figure 4. Receiving Water Risk GIS Map



Layers

- ☐ 303(d) List and TMDLs 2012(Legend)
- ☐ Areas of Special Biological Significance
- ☐ Arid and Semi-Arid Regions
- ☐ Caltrans Districts
- ☐ Caltrans Facilities
- ☐ Caltrans Tier 1 Monitoring Sites
- ☐ Calwater Watersheds
- ☐ Coastal Zone
- ☐ Counties
- ○ Geologic Map (Legend)
- ☑ High Risk Receiving Watersheds
- ☐ Monthly Precipitation
- ☐ MS4 Areas
- ☐ Post Miles
- ☐ Rainfall Distribution
- ☐ RWQCB Boundaries
- ○ USGS Topo Maps
- ☐ Watershed Boundary Dataset
- ☐ Zip Codes

Information
Hover over a layer name for a description.
Additional information, tables, coordinates, and links are below the map.
Help

High Risk Receiving Watershed

High Receiving Water Risk Watersheds are Hydrologic Unit Code (HUC) Level 12 watersheds that drain to waterbodies that are either:

1) 303(d) listed as being impaired for sediment/siltation or turbidity

2) have a US Environmental Protection Agency-approved, sediment-related Total Maximum Daily Load (TMDL)

3) have the existing beneficial uses of SPAWN, MIG, and COLD according to the most recent applicable Regional Board Basin Plan.

A combination of HUC Level 10 watershed boundaries and physical barriers (e.g. dams) were used to delineate the upstream extent of High Receiving Water Risk Watersheds. A project located within a High Receiving Water Risk Watersheds is considered to have a high receiving water risk. Identifying High Receiving Water Risk Watersheds reduces the confusion over direct vs. indirect discharges and questions regarding upstream extent.

This layer was developed by the SWRCB. For more information on the Construction General Permit please visit the Construction Stormwater Program.

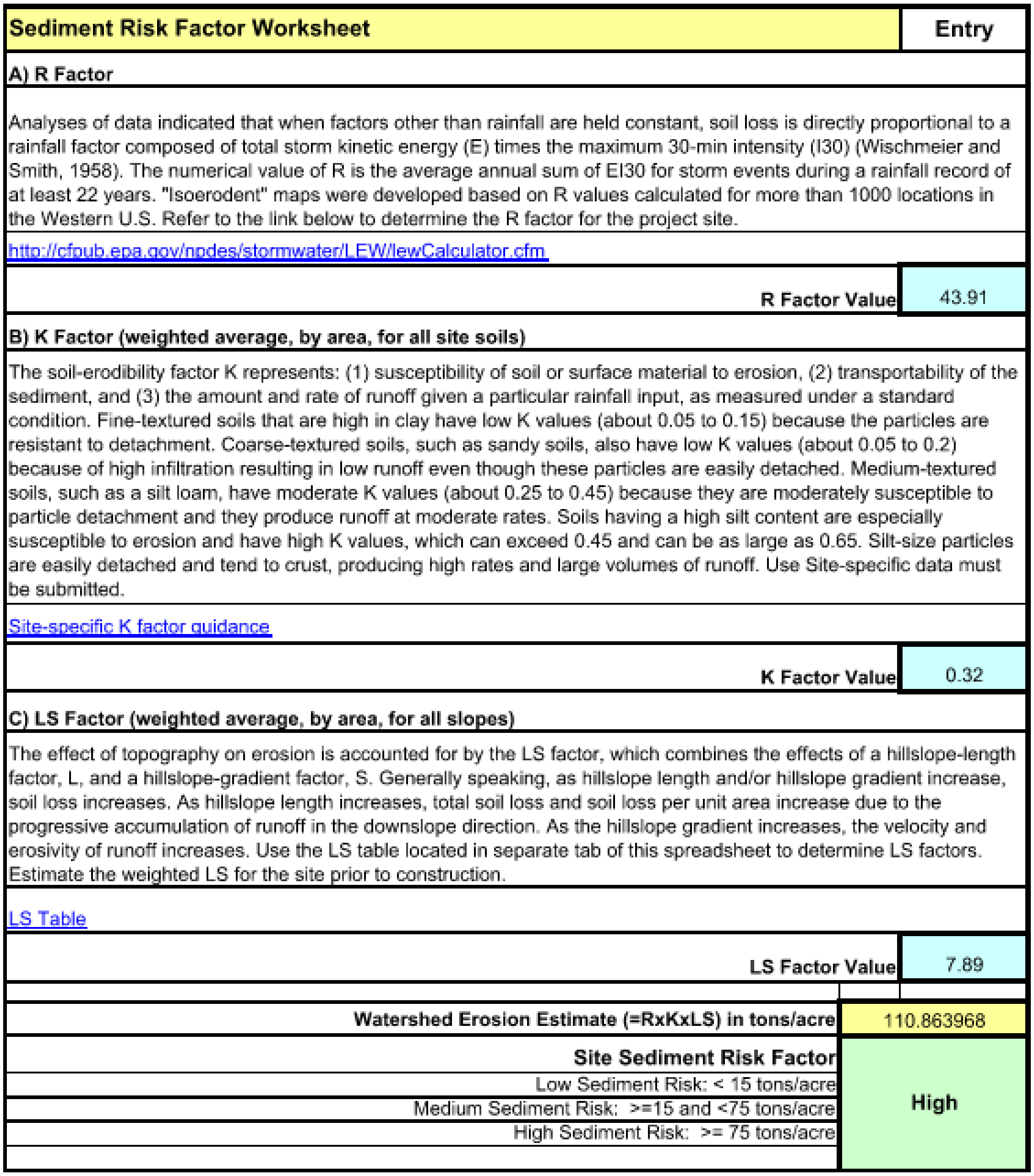
Postmile Lookup

Select a start and stop Route, County, and Postmile

Route 133
County 1 ORA-Orange
PM 1 0.69
County 2 ORA-Orange
PM 2 3.42

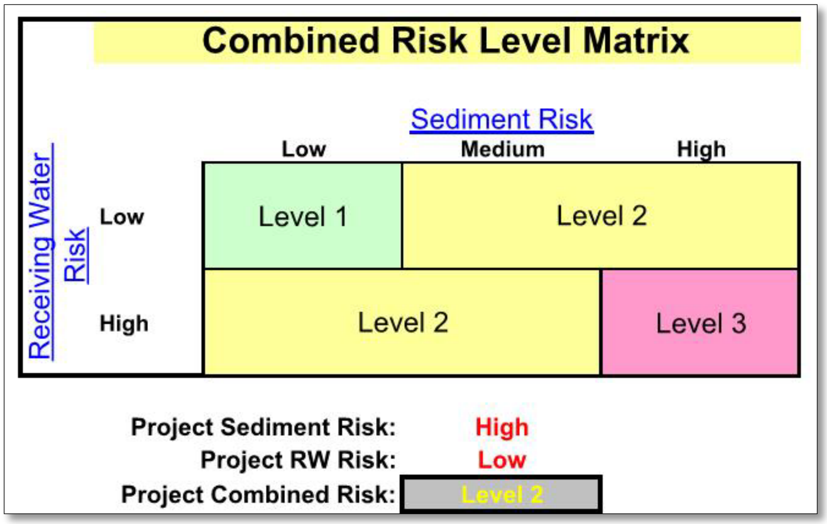
Source: http://svctenvims.dot.ca.gov/wqpt/wqpt.aspx

Figure 5. Sediment Risk factor Worksheet



Sediment Risk Factor Worksheet		**Entry**
A) R Factor		
Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.		
http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm		
R Factor Value		43.91
B) K Factor (weighted average, by area, for all site soils)		
The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.		
Site-specific K factor guidance		
K Factor Value		0.32
C) LS Factor (weighted average, by area, for all slopes)		
The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.		
LS Table		
LS Factor Value		7.89
Watershed Erosion Estimate (=RxKxLS) in tons/acre	110.863968	
Site Sediment Risk Factor	**High**	
Low Sediment Risk: < 15 tons/acre		
Medium Sediment Risk: >=15 and <75 tons/acre		
High Sediment Risk: >= 75 tons/acre		

Figure 6. Risk Level Determination (Value = Risk Level 2)

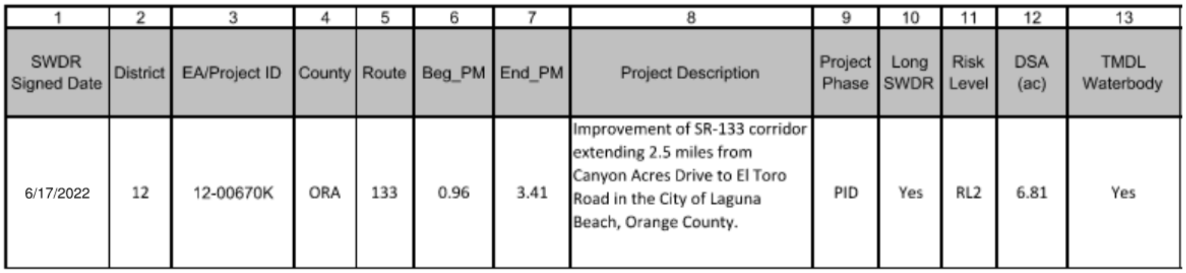


Combined Risk Level Matrix

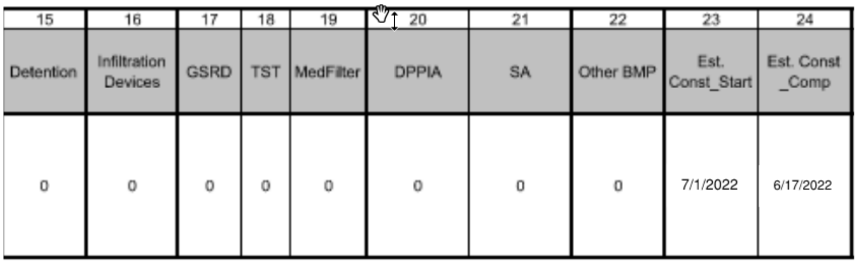
		Sediment Risk		
		Low	**Medium**	**High**
Receiving Water Risk	**Low**	Level 1	Level 2	
	High	Level 2		Level 3

Project Sediment Risk: High
Project RW Risk: Low
Project Combined Risk: Level 2

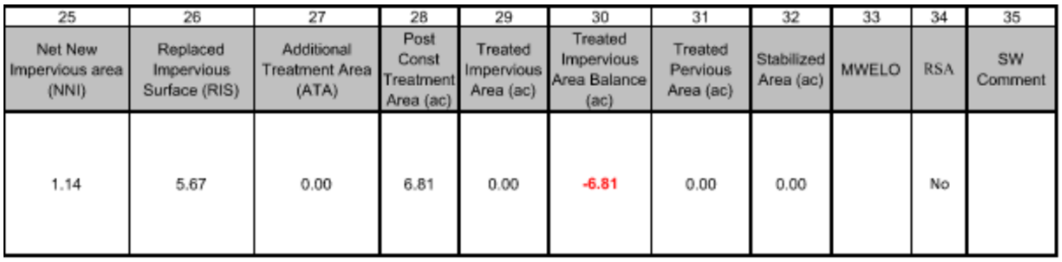
SWDR Summary Spreadsheets



1	2	3	4	5	6	7	8	9	10	11	12	13
SWDR Signed Date	District	EA/Project ID	County	Route	Beg_PM	End_PM	Project Description	Project Phase	Long SWDR	Risk Level	DSA (ac)	TMDL Waterbody
6/17/2022	12	12-00670K	ORA	133	0.96	3.41	Improvement of SR-133 corridor extending 2.5 miles from Canyon Acres Drive to El Toro Road in the City of Laguna Beach, Orange County.	PID	Yes	RL2	6.81	Yes



15	16	17	18	19	20	21	22	23	24
Detention	Infiltration Devices	GSRD	TST	MedFilter	DPPIA	SA	Other BMP	Est. Const_Start	Est. Const _Comp
0	0	0	0	0	0	0	0	7/1/2022	6/17/2022



25	26	27	28	29	30	31	32	33	34	35
Net New Impervious area (NNI)	Replaced Impervious Surface (RIS)	Additional Treatment Area (ATA)	Post Const Treatment Area (ac)	Treated Impervious Area (ac)	Treated Impervious Area Balance (ac)	Treated Pervious Area (ac)	Stabilized Area (ac)	MWELO	RSA	SW Comment
1.14	5.67	0.00	6.81	0.00	-6.81	0.00	0.00		No	

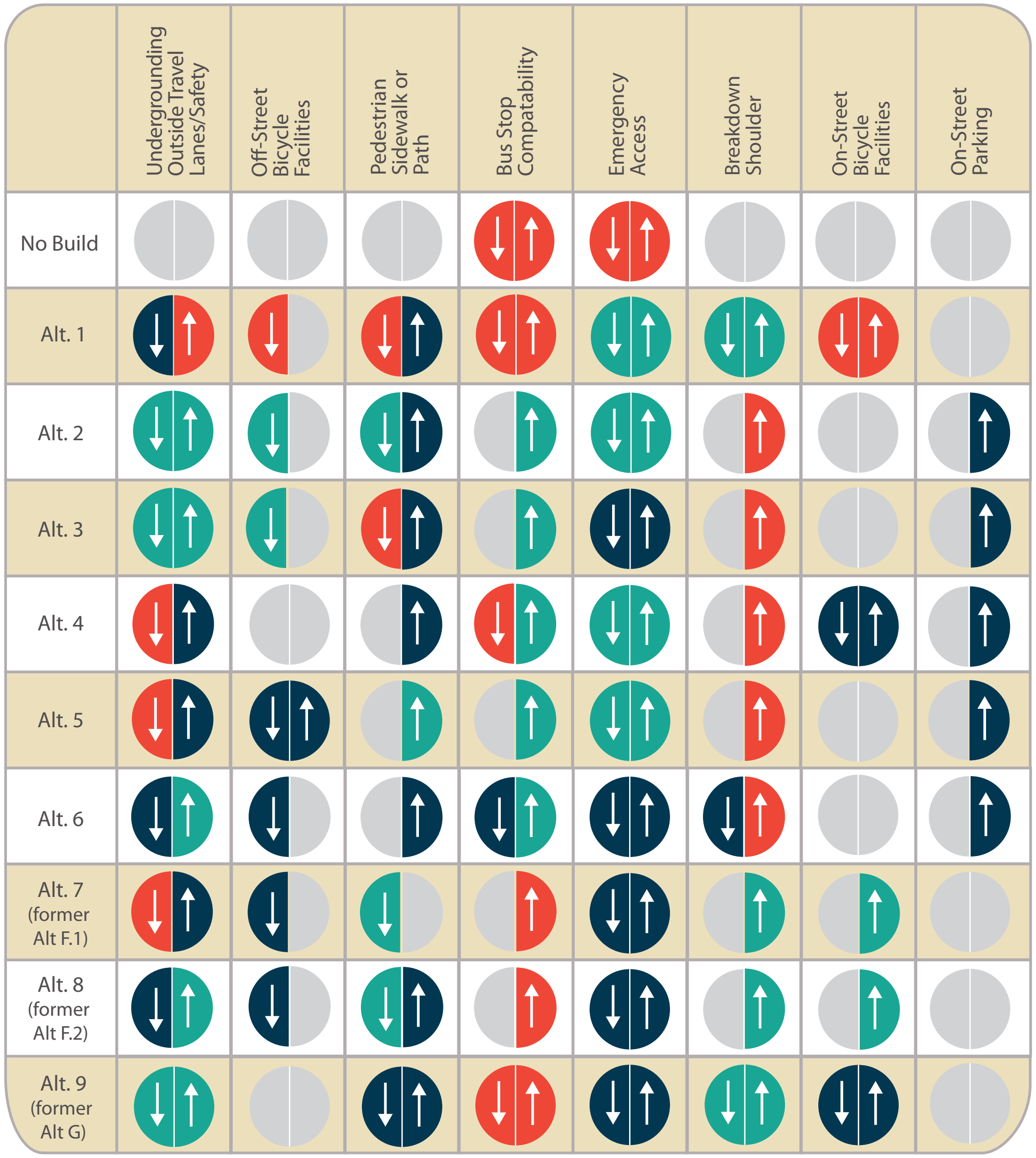
ATTACHMENT G

ALTERNATIVES SCREENING PROCESS AND EVALUATION MATRIX

LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)

Evaluation Criteria

Southbound ↓ ↑ Northbound



	Undergrounding Outside Travel Lanes/Safety	Off-Street Bicycle Facilities	Pedestrian Sidewalk or Path	Bus Stop Compatability	Emergency Access	Breakdown Shoulder	On-Street Bicycle Facilities	On-Street Parking
No Build	⬜⬜	⬜⬜	⬜⬜	🟥🟥	🟥🟥	⬜⬜	⬜⬜	⬜⬜
Alt. 1	🟦🟥	🟥⬜	🟥🟦	🟥🟥	🟩🟩	🟩🟩	🟥🟥	⬜⬜
Alt. 2	🟩🟩	🟩⬜	🟩🟦	⬜🟩	🟩🟩	⬜🟥	⬜⬜	⬜🟦
Alt. 3	🟩🟩	🟩⬜	🟥🟦	⬜🟩	🟦🟦	⬜🟥	⬜⬜	⬜🟦
Alt. 4	🟥🟦	⬜⬜	⬜🟦	🟥🟩	🟩🟩	⬜🟥	🟦🟦	⬜🟦
Alt. 5	🟥🟦	🟦🟦	⬜🟩	⬜🟩	🟩🟩	⬜🟥	⬜⬜	⬜🟦
Alt. 6	🟦🟩	🟦⬜	⬜🟦	🟦🟩	🟦🟦	🟦🟥	⬜⬜	⬜🟦
Alt. 7 (former Alt F.1)	🟥🟦	🟦⬜	🟩⬜	⬜🟥	🟦🟦	⬜🟩	⬜🟩	⬜⬜
Alt. 8 (former Alt F.2)	🟦🟩	🟦⬜	🟩🟦	⬜🟥	🟦🟦	⬜🟩	⬜🟩	⬜⬜
Alt. 9 (former Alt G)	🟩🟩	⬜⬜	🟦🟦	🟥🟥	🟦🟦	🟩🟩	🟦🟦	⬜⬜

⬜ Grey icons indicate the alternative does not meet criteria

Evaluation Criteria

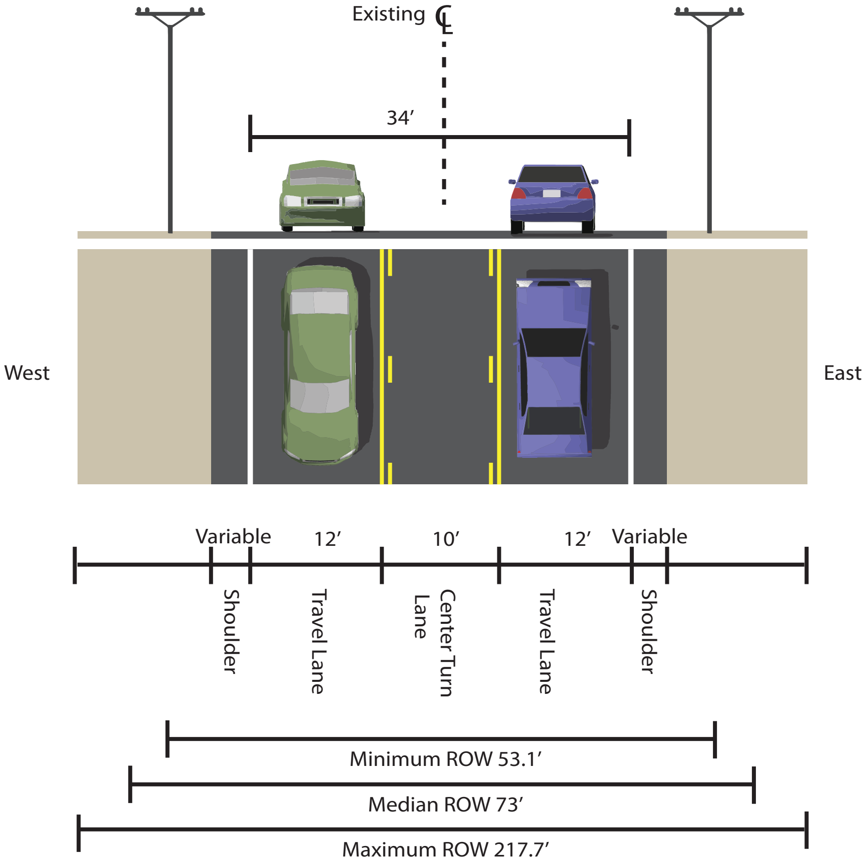
	🟦 High	🟩 Medium	🟥 Low
Undergrounding Outside Travel Lanes/Safety	Greater than 19′	Between 12′ and 19′	Less than 12′
Off-Street Bicycle Facilities	Bicycle Only	Greater than 12′ shared-use path	12′ shared-use path
Pedestrian Sidewalk or Path	Dedicated, separate pedestrian path	Bike facility-adjacent pedestrian path	Shared-use path
Bus Stop Compatability	Dedicated bus stop	Remove parking to accommodate bus stop	Shared bus stop with bike lane
Emergency Access	Greater than 3 evacuation lanes, 1 emergency lane	3 evacuation lanes, 1 emergency lane	Less than 3 evacuation lanes, 1 emergency lane
Breakdown Shoulder	Dedicated Shoulder	Bike lane	Parking lane
On-Street Bicycle Facilities	Painted Buffer	Greater than 5'	5'
On-Street Parking	Maximum	Medium	Minimum

LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)

No Build

Evaluation Summary:

Alternative	Undergrounding Outside Travel Lanes/Safety	Off-Street Bicycle Facilities	Pedestrian Sidewalk or Path	Bus Stop Compatibility	Emergency Access	Breakdown Shoulder	On-Street Bicycle Facilities	On-Street Parking
No-Build	◐	◐	◐	⇅	⇅	◐	◐	◐



Description:
The existing condition on Laguna Canyon Road between El Toro Road and Canyon Acres Drive is a 34′ roadway comprised of two 12′ travel lanes and a 10′ center turn lane. Some segments have a paved shoulder which varies throughout. The right-of-way (ROW) varies from a minimum of 53′, in the vicinity of the "Big Bend" area, to a maximum of 218′, but the median ROW is 73′. Currently the roadway is bordered on both the northbound and southbound sides of the road by utility poles.

The following alternative alignments for Laguna Canyon Rd - SR 133 assume that the utility poles on both the northbound and southbound sides of the road would be undergrounded to allow full use of the ROW.

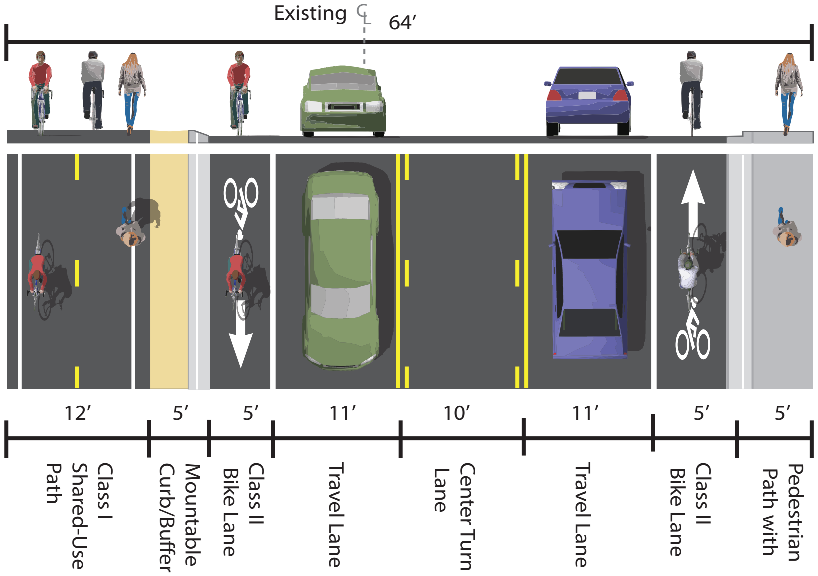
LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)

Alternative 1

Evaluation Summary:

Alternative	Undergrounding Outside Travel Lanes/Safety	Off-Street Bicycle Facilities	Pedestrian Sidewalk or Path	Bus Stop Compatibility	Emergency Access	Breakdown Shoulder	On-Street Bicycle Facilities	On-Street Parking
Alt. 1	🟦↓ 🟥↑	🟥↓ ⬜	🟥↓ 🟦↑	🟥↓ 🟥↑	🟩↓ 🟩↑	🟩↓ 🟩↑	🟥↓ 🟥↑	⬜ ⬜

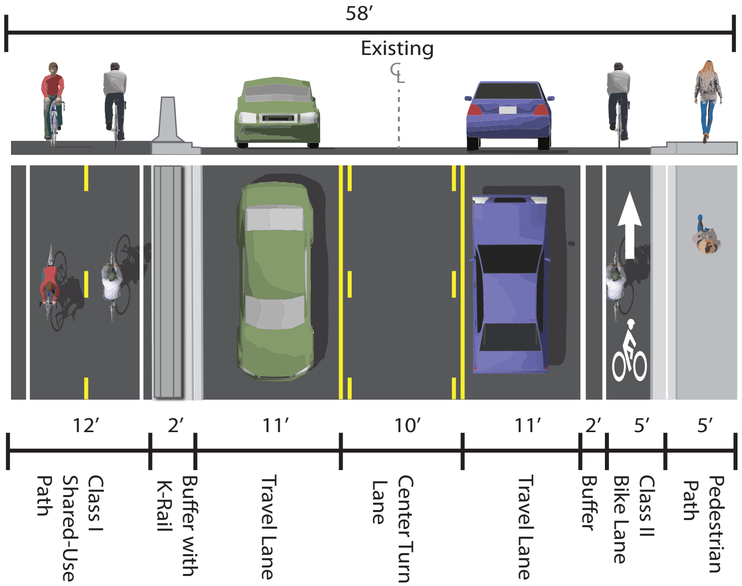
Alternative 1.1
(TYPICAL)



Typical Features:

This alternative proposes a typical width of 64′ including the vehicle, pedestrian and bicycle facilities. The alternative includes narrowed 11′ travel lanes, for traffic calming, and a 10′ center turn lane, a pedestrian path on the northbound side of the road, and a Class I shared-use path on the southbound side. The option also includes on-street Class II bike lanes on both the northbound and southbound side, and during emergencies there is space for 3 outbound evacuation travel lanes and 1 inbound emergency vehicle lane.

Alternative 1.2
(CONSTRAINED)



Constrained Features:

The constrained 58′ condition reduces the width of the buffer on the southbound side, requiring the addition of a k-rail or other vertical barrier. The northbound Class II bike lane will receive a 2′ buffer, while the southbound Class II bike lane will end during the constrained condition, requiring cyclists to enter the shared-use path or take the travel lane. At the pinch point of 53.1′ the northbound pedestrian path and buffer could be removed, and replaced by a small 2′ shoulder outside the bike lane.

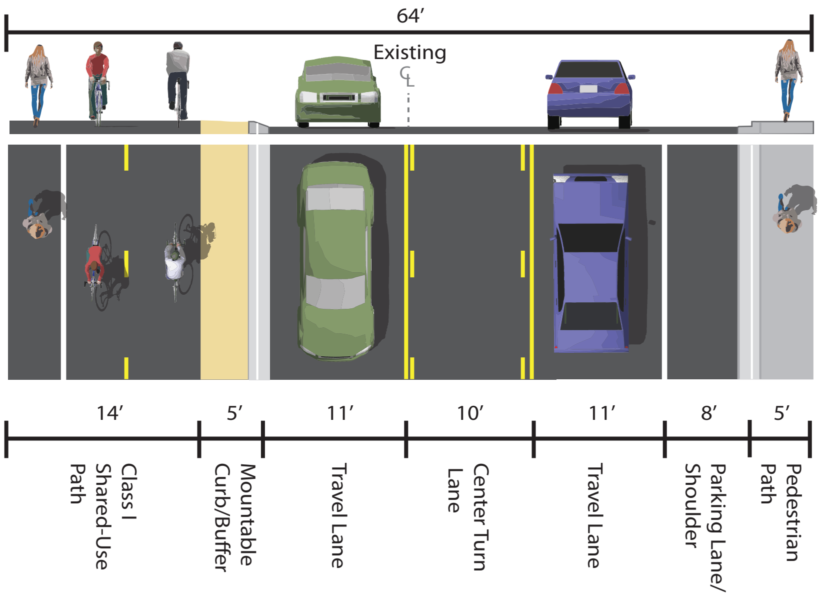
LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)

Alternative 2

Evaluation Summary:

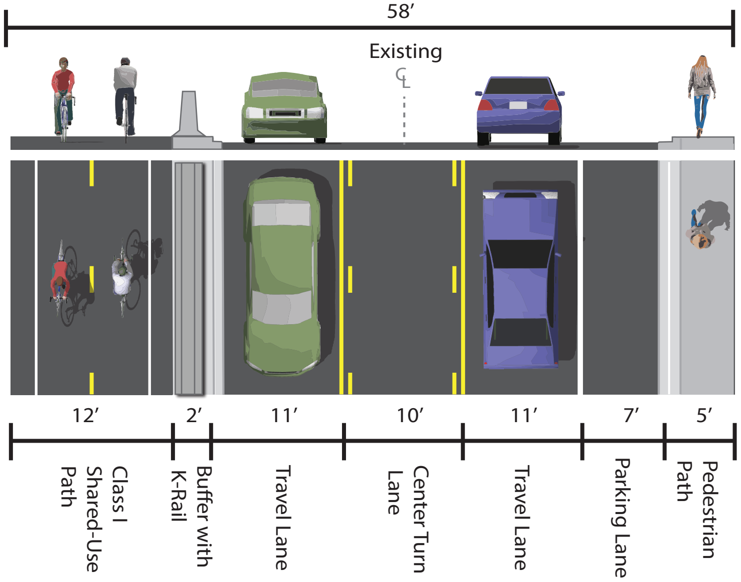
Alternative	Undergrounding Outside Travel Lanes/Safety	Off-Street Bicycle Facilities	Pedestrian Sidewalk or Path	Bus Stop Compatibility	Emergency Access	Breakdown Shoulder	On-Street Bicycle Facilities	On-Street Parking
Alt. 2	↓↑	↓	↓↑	↑	↓↑	↑		↑

Alternative 2.1
(TYPICAL)



Typical Features:
This alternative proposes a typical width of 64′ including the vehicle, pedestrian and bicycle facilities. The alternative includes narrowed 11′ travel lanes, for traffic calming, and a 10′ center turn lane, a pedestrian path on the northbound side of the road, and a Class I shared-use path on the southbound side. The option provides a parking lane/shoulder on the northbound side of the road, and during emergencies there is space for 3 outbound evacuation travel lanes and 1 inbound emergency vehicle lane.

Alternative 2.2
(CONSTRAINED)



Constrained Features:
The constrained condition reduces widths of the pedestrian path, the parking lane, and the shared-use path. The buffer on the southbound side is narrowed and includes a K-Rail or other vertical barrier. At the pinch point of 53.1′ the pedestrian path on the northbound side could be removed.

7/9/2018

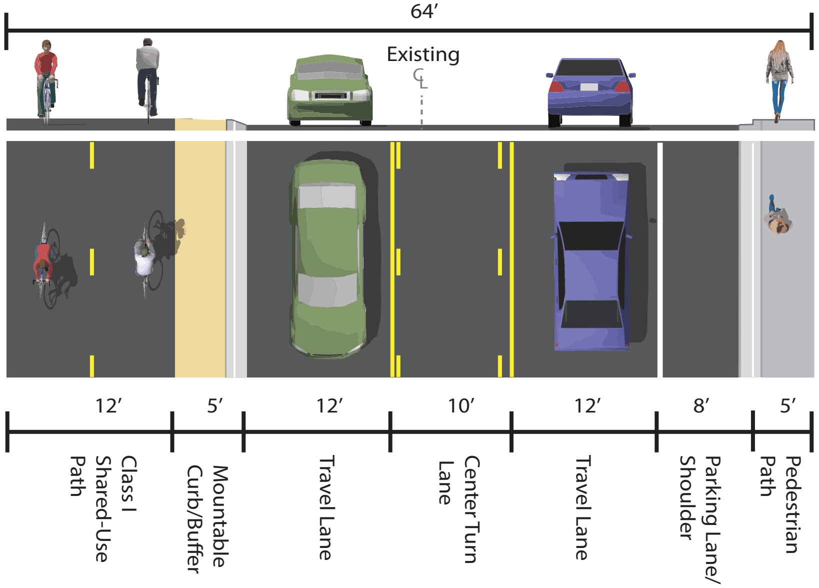
LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)

Alternative 3

Evaluation Summary:

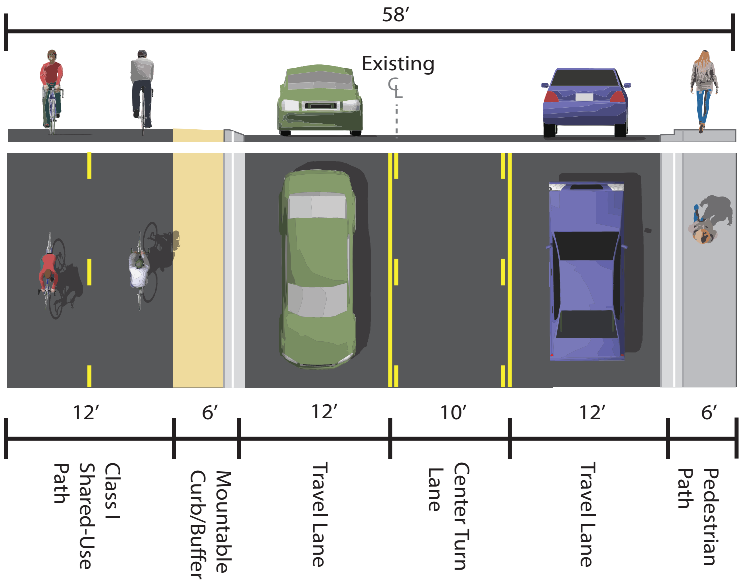
Alternative	Undergrounding Outside Travel Lanes/Safety	Off-Street Bicycle Facilities	Pedestrian Sidewalk or Path	Bus Stop Compatibility	Emergency Access	Breakdown Shoulder	On-Street Bicycle Facilities	On-Street Parking
Alt. 3	↓↑	↓	↓↑	↑	↓↑	↑		↑

Alternative 3.1
(TYPICAL)



Typical Features:
This alternative proposes a typical width of 64' including the vehicle, pedestrian and bicycle facilities. The alternative has 12' travel lanes, and a 10' center turn lane, a pedestrian path on the northbound side of the road, and a Class I shared-use path on the southbound side. This option includes a parking lane/shoulder and during emergencies there is space for 3 outbound evacuation lanes and 1 inbound emergency vehicle lane, additionally the shared-use path on the southbound side has a mountable curb and could be used in emergencies as an emergency vehicle lane.

Alternative 3.2
(CONSTRAINED)



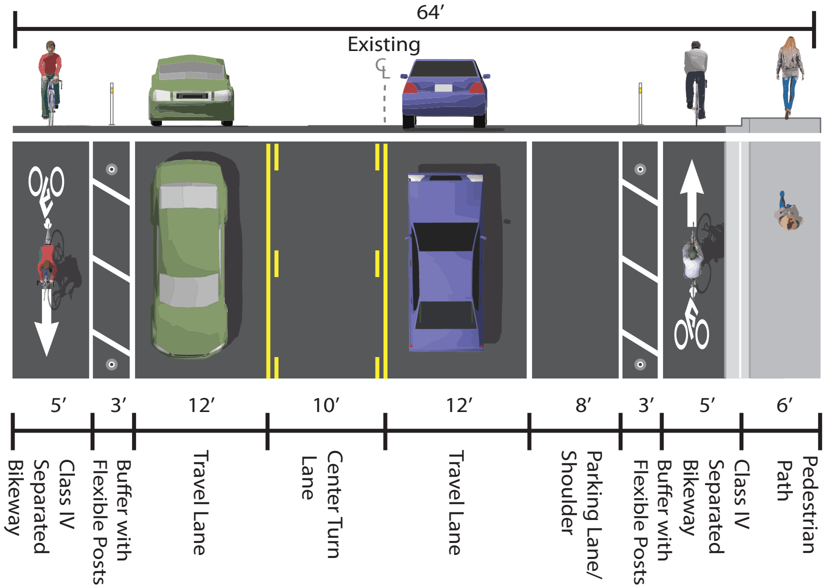
Constrained Features:
The constrained condition removes the parking lane and widens the northbound pedestrian path and widens the buffer along the southbound shared-use path. At the pinch point of 53.1' the width of the shared-use path and the pedestrian path on the northbound side could be reduced.

LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)
Alternative 4

Evaluation Summary:

Alternative	Undergrounding Outside Travel Lanes/Safety	Off-Street Bicycle Facilities	Pedestrian Sidewalk or Path	Bus Stop Compatibility	Emergency Access	Breakdown Shoulder	On-Street Bicycle Facilities	On-Street Parking
Alt. 4	↓↑	○	↑	↓↑	↓↑	↑	↓↑	↑

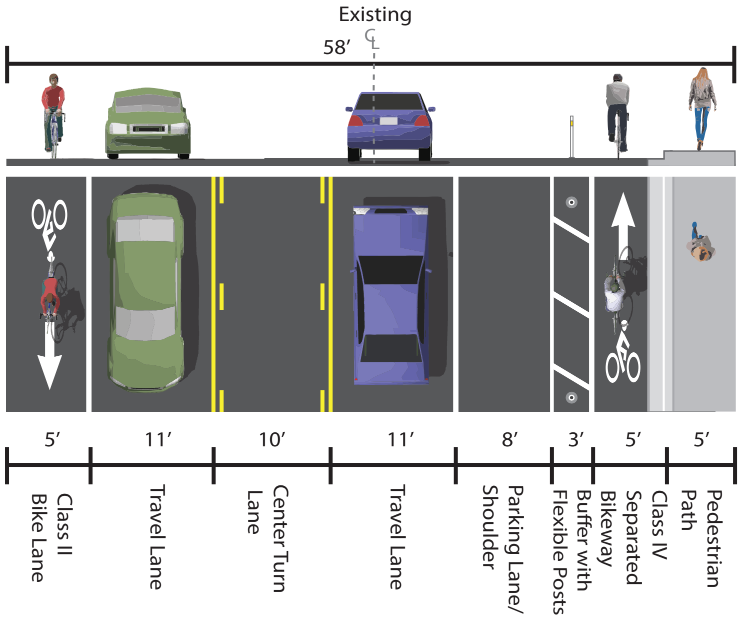
Alternative 4.1
(TYPICAL)



Typical Features:

This alternative proposes a typical width of 64′ including the vehicle, pedestrian and bicycle facilities. The alternative includes 12′ travel lanes, and a 10′ center turn lane, a pedestrian path on the northbound side of the road, and one-directional Class IV separated bikeways with buffers with flexible posts on both sides. The option provides a parking lane/shoulder on the north bound side of the road, and during emergencies there is space for 3 outbound evacuation lanes and 1 inbound emergency vehicle lane.

Alternative 4.2
(CONSTRAINED)



Constrained Features:

The constrained condition removes the southbound bike lane buffer, leaving a Class II bike lane, and narrows the travel lanes to 11′. At the pinch point of 53.1′ the parking could be removed, or alternatively the northbound bike lane buffer could be removed, and the pedestrian path could transition to a more narrow paved shoulder outside the bike lane.

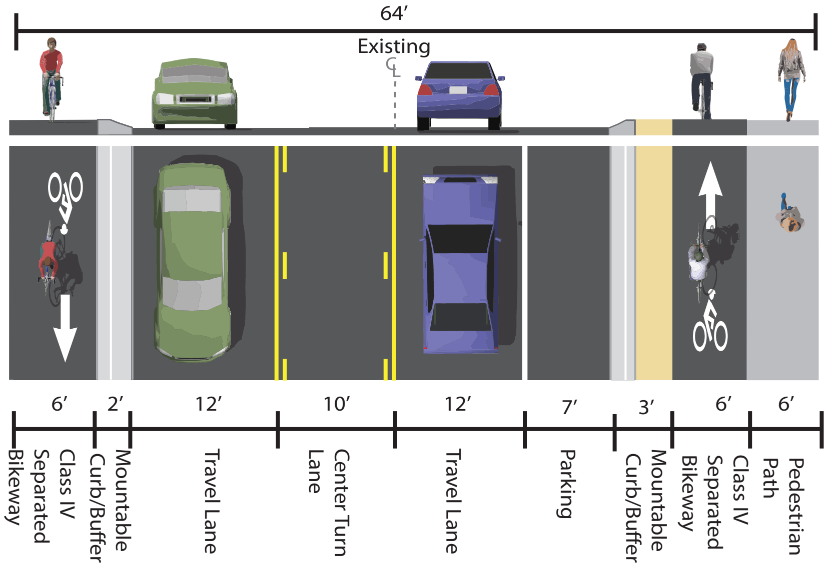
LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)

Alternative 5

Evaluation Summary:

Alternative	Undergrounding Outside Travel Lanes/Safety	Off-Street Bicycle Facilities	Pedestrian Sidewalk or Path	Bus Stop Compatibility	Emergency Access	Breakdown Shoulder	On-Street Bicycle Facilities	On-Street Parking
Alt. 5	↓↑	↓↑	↑	↑	↓↑	↑	○	↑

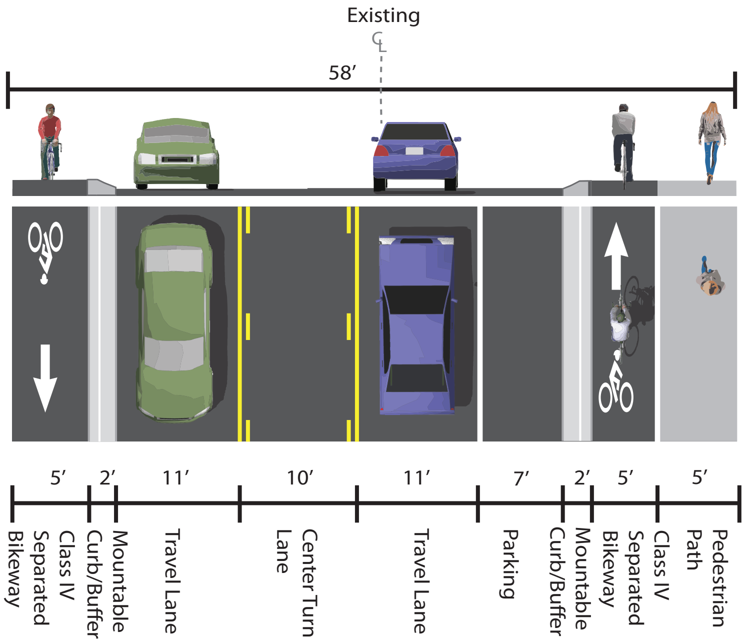
Alternative 5.1
(TYPICAL)



Typical Features:

This alternative proposes a typical width of 64′ including the vehicle, pedestrian and bicycle facilities. The alternative includes 12′ travel lanes, and a 10′ center turn lane, and a pedestrian path on the northbound side of the road. The option includes one-directional Class IV separated bikeways on both sides of the road, and provides a parking lane on the north bound side of the road. During emergencies there is space for 3 outbound evacuation travel lanes and 1 inbound emergency vehicle lane.

Alternative 5.2
(CONSTRAINED)



Constrained Features:

The constrained condition narrows the travel lanes to 11′ and narrows the Class IV bikeways as well as the buffer on the northbound side. At the pinch point of 53.1′ the parking lane on the northbound side would be removed.

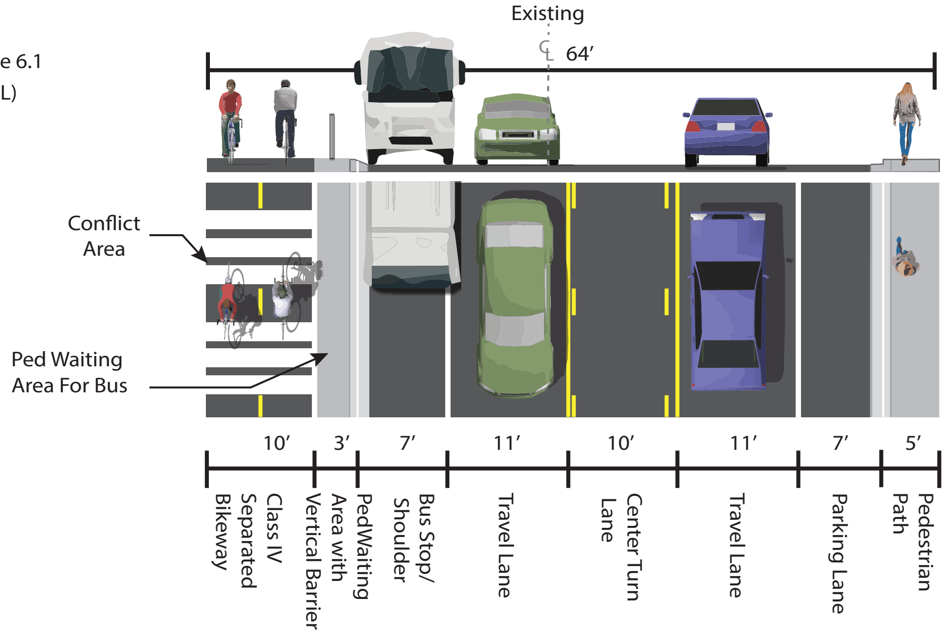
LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)

Alternative 6

Evaluation Summary:

Alternative	Undergrounding Outside Travel Lanes/Safety	Off-Street Bicycle Facilities	Pedestrian Sidewalk or Path	Bus Stop Compatibility	Emergency Access	Breakdown Shoulder	On-Street Bicycle Facilities	On-Street Parking
Alt. 6	↓↑	↓	↑	↓↑	↓↑	↓↑	○	↑

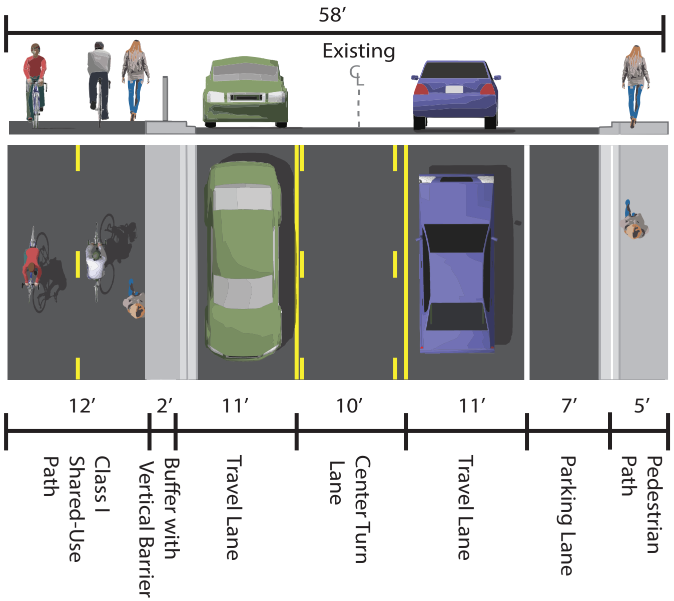
Alternative 6.1
(TYPICAL)



Typical Features:

This alternative proposes a typical width of 64′ including the vehicle, pedestrian and bicycle facilities. The alternative includes narrowed 11′ travel lanes for traffic calming, and a 10′ center turn lane. The option includes a Class IV separated bikeway on the southbound side of the roadway, buffered with a flexible post or other vertical barrier. Adjacent to the separated bikeway is a bus stop/shoulder lane. During emergencies there is space for 4 outbound evacuation travel lanes on the roadway and 1 inbound emergency vehicle lane.

Alternative 6.2
(CONSTRAINED)



Constrained Features:

The constrained condition removes the southbound bus stop/shoulder and the adjacent bikeway becomes Class I shared-use path with a more narrow buffer with a flexible post or other vertical barrier. At the pinch point of 53.1′ the northbound parking lane would end.

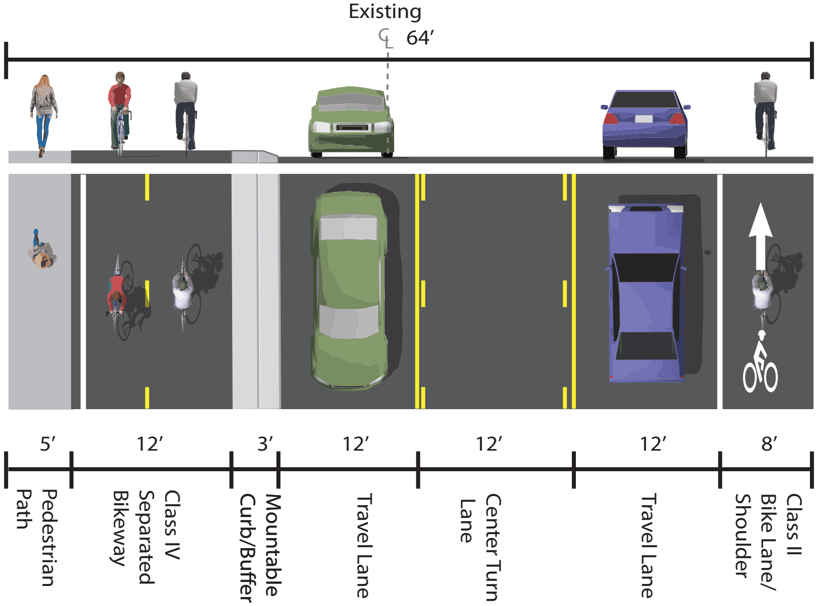
LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)

Alternative 7 *(Former Alt. F.1)*

Evaluation Summary:

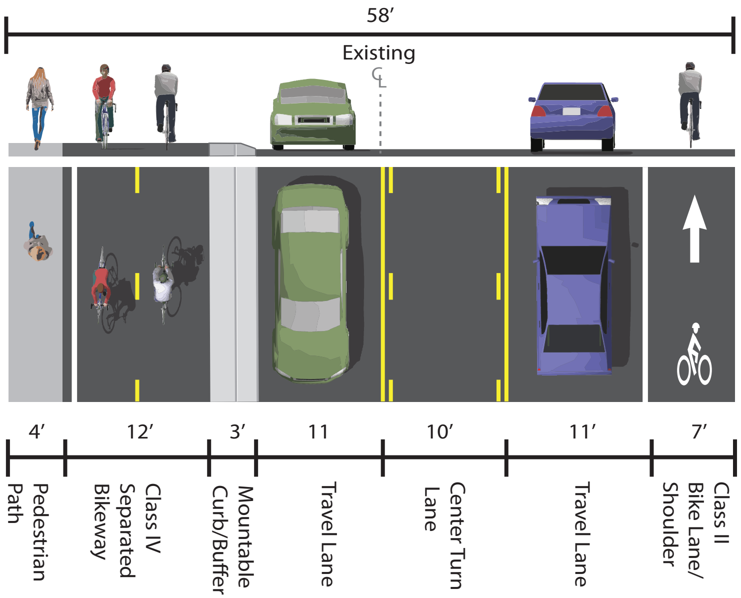
Alternative	Undergrounding Outside Travel Lanes/Safety	Off-Street Bicycle Facilities	Pedestrian Sidewalk or Path	Bus Stop Compatibility	Emergency Access	Breakdown Shoulder	On-Street Bicycle Facilities	On-Street Parking
Alt. 7 (former Alt. F.1)	↓↑	↓	↓	↑	↓↑	↑	↑	○

Alternative 7.1
(TYPICAL)



Typical Features:
This alternative proposes a typical width of 64′ including the vehicle, pedestrian and bicycle facilities. The alternative has 12′ travel lanes, and provides a 12′ center turn lane. On the southbound side is a Class IV separated bikeway with an adjacent pedestrian path. The option provides a Class II bike lane/shoulder on the northound side. During emergencies there is space for 3 outbound evacuation travel lanes and 1 inbound emergency vehicle lane. Additionally the bikeway and pedestrian path on the southbound side have a mountable curb and could be used in emergencies as an emergency vehicle lane.

Alternative 7.2
(CONSTRAINED)



Constrained Features:
The constrained condition reduces widths of the pedestrian path, the travel lanes and the center turn lane. At the pinch point of 53.1′ the center turn lane could be removed, or alternatively the northbound bike lane could be narrowed and the southbound pedestrian path could be removed, making the Class IV bikeway a shared-use path, requiring the addition of a K-Rail or vertical barrier in the buffer area.

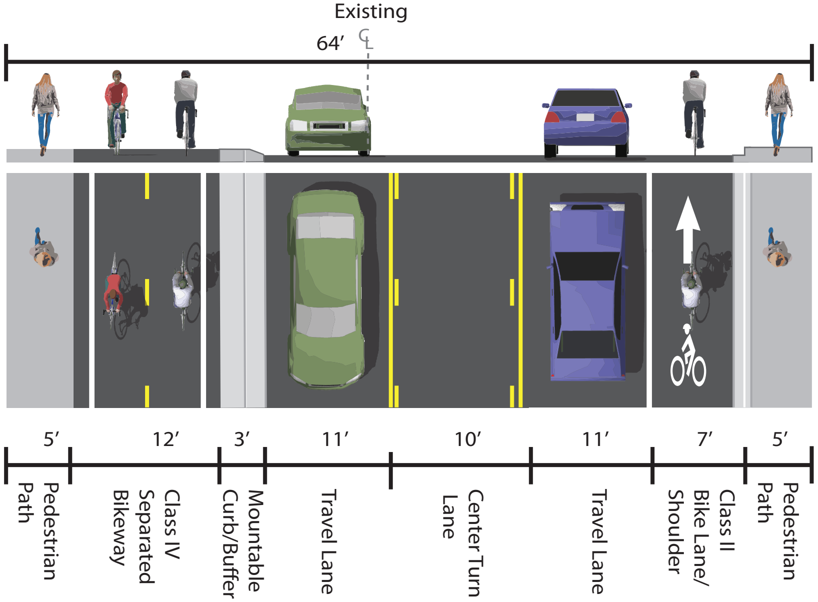
LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)

Alternative 8 *(Former Alt. F.2)*

Evaluation Summary:

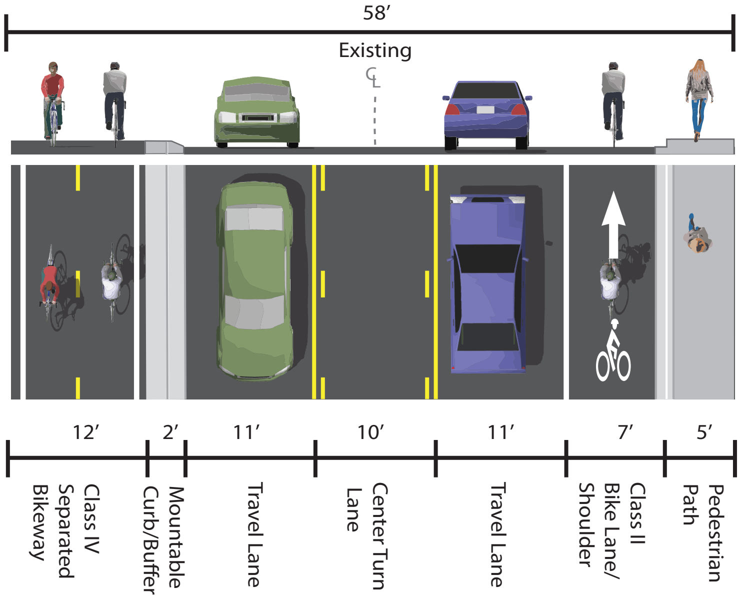
Alternative	Undergrounding Outside Travel Lanes/Safety	Off-Street Bicycle Facilities	Pedestrian Sidewalk or Path	Bus Stop Compatibility	Emergency Access	Breakdown Shoulder	On-Street Bicycle Facilities	On-Street Parking
Alt. 8 (former Alt. F.2)	↓↑	↓	↓↑	↑	↓↑	↑	↑	○

Alternative 8.1
(TYPICAL)



Typical Features:
This alternative proposes a typical width of 64′ including the vehicle, pedestrian and bicycle facilities. The alternative includes narrowed 11′ travel lanes for traffic calming, and a 10′ center turn lane, as well there is a pedestrian path on the northbound side of the road. The option includes a Class IV separated bikeway with adjacent pedestrian path on the southbound side. The option also provides a Class II bike lane on the northbound side of the road. During emergencies there is space for 3 outbound evacuation travel lanes and 1 inbound emergency vehicle lane, additionally the bikeway and pedestrian path on the southbound side have a mountable curb and could be used in emergencies as an emergency vehicle lane.

Alternative 8.2
(CONSTRAINED)



Constrained Features:
The constrained condition removes the pedestrian path on the southbound side. At the pinch point of 53.1′ the pedestrian path on the northbound side could be removed.

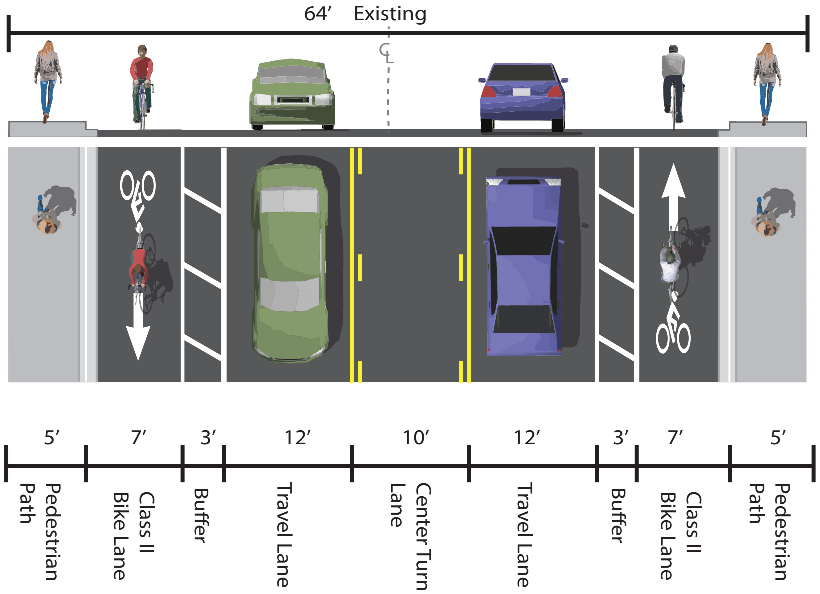
LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)

Alternative 9 *(Former Alt. G)*

Evaluation Summary:

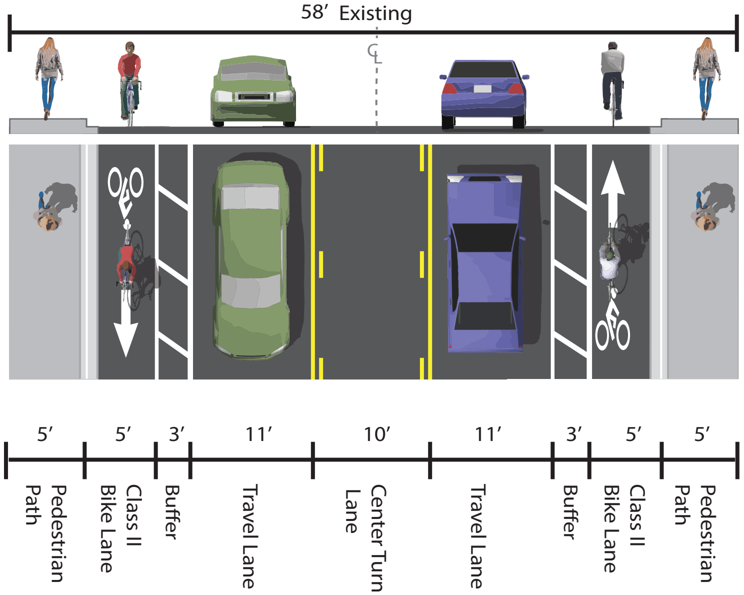
Alternative	Undergrounding Outside Travel Lanes/Safety	Off-Street Bicycle Facilities	Pedestrian Sidewalk or Path	Bus Stop Compatibility	Emergency Access	Breakdown Shoulder	On-Street Bicycle Facilities	On-Street Parking
Alt. 9 (former Alt. G)	🟢	⚪	🔵	🔴	🔵	🟢	🔵	⚪

Alternative 9.1
(TYPICAL)



Typical Features:
This alternative proposes a typical width of 64' including the vehicle, pedestrian and bicycle facilities. The alternative includes 12' travel lanes, and a 10' center turn lane, a pedestrian path on both sides of the road, and a Class II buffered bike lane on both sides. During emergencies there is space for 4 outbound evacuation travel lanes and 1 inbound emergency vehicle lane.

Alternative 9.2
(CONSTRAINED)



Constrained Features:
The constrained condition reduces widths bike lanes as well as the travel lanes. At the pinch point of 53.1' a pedestrian path on the either side could be removed, or alternatively the bike lane buffers could be removed.

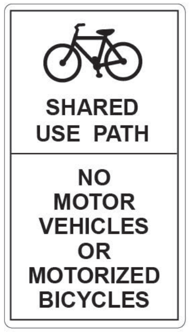
LAGUNA CANYON ROAD COMPLETE STREETS (El Toro Road to Canyon Acres Drive)

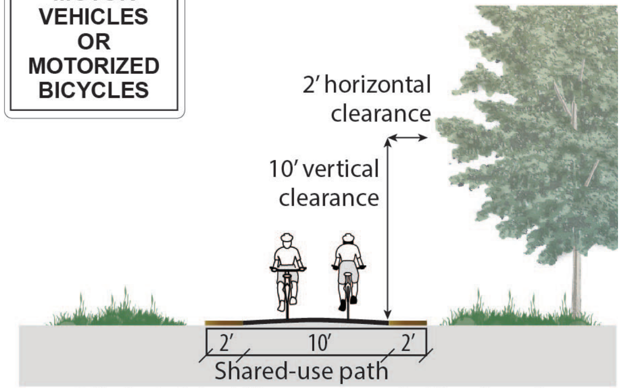
Bicycle Path Classifications

CLASS I

Shared -Use Path

Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow minimized.



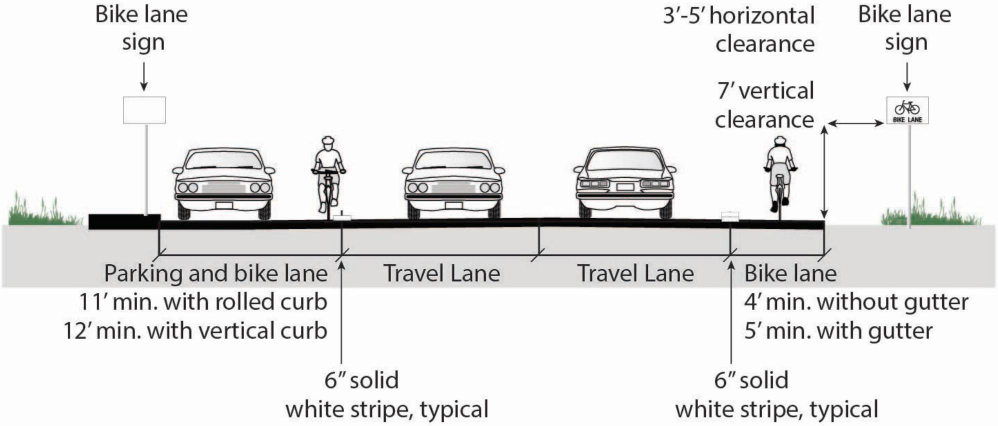


14′min. total width recommended/preferred
(10′ paved width, 2′ clear shoulders)
8′ min. paved width required
2′ gravel shoulders required
12′ min. total width required

CLASS II

Bike Lane

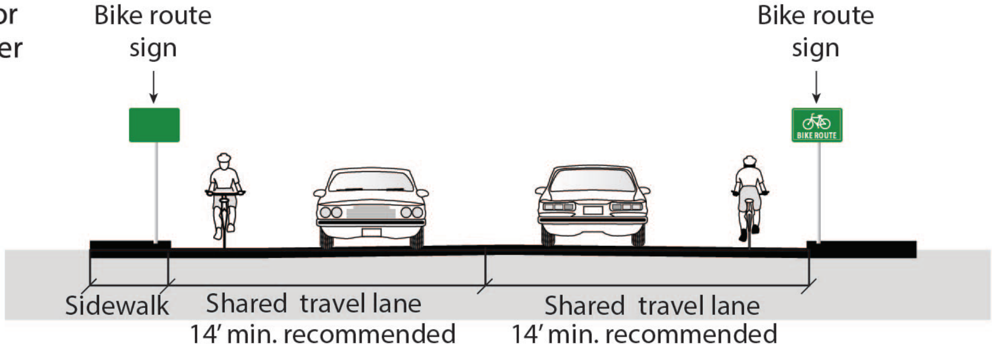
Provides a striped lane for one-way bike travel on a street or highway.



Bicycle Path Classifications

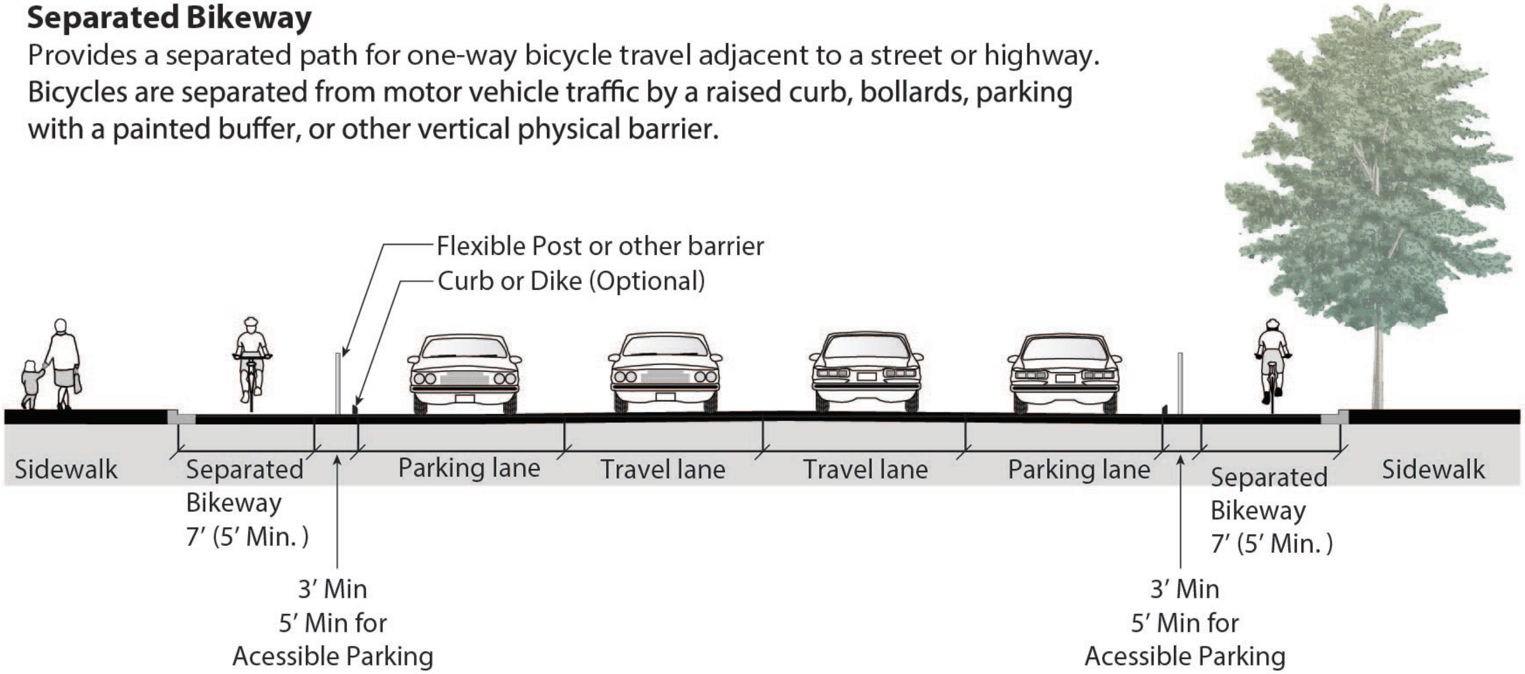
CLASS III
Bike Route

Provides for shared use with pedestrian or motor vehicle traffic, typically on lower volume roadways.



CLASS IV
Separated Bikeway

Provides a separated path for one-way bicycle travel adjacent to a street or highway. Bicycles are separated from motor vehicle traffic by a raised curb, bollards, parking with a painted buffer, or other vertical physical barrier.



ATTACHMENT H

RIGHT-OF-WAY DATA SHEETS

To: Jennifer Pham
Office Chief
Office of Right of Way and Right of Way Engineering

Date: 6-17-22

Co. ORA Rte. 133

Attention: Linda Lundblad
District Branch Chief
R/W Local Programs

Expense Authorization 0Q670K
Project ID #1217000086

Subject: **RIGHT OF WAY DATA SHEET - LOCAL PUBLIC AGENCIES**

Project Description: Improve SR-133 (Laguna Canyon Road) between Canyon Acres Drive & El Toro Road
Alternative 1 – No Build

Right of way necessary for the subject project will be the responsibility of City of Laguna Beach

The information in this data sheet was developed by HDR Engineering, Inc.

I. ***Right of Way Engineering***

Will Right of Way Engineering be required for this project alternative?

- No X
- Yes ____

II. ***Engineering Surveys***

1. Is any surveying or photogrammetric mapping required?

No X Yes ____ (Complete the following.)

2. Datum Requirements

Yes ____ Project will adhere to the following criteria:

No X Provide an explanation on additional page.

No Build alternative. No R/W work.

3. Will land survey monument perpetuation be scoped into the project, if required?

Yes ____

No X Provide explanation on additional page.

No Build alternative. No R/W work.

III. ***Parcel Information (Land and Improvements)***

Are there any property rights required within the proposed project limits?

No X Yes ____ (Complete the following.)

	Part Take	Full Take	Estimate $
A. Number of Vacant Land Parcels			$
B. Number of Single Family Residential Units			$
C. Number of Multifamily Residential Units			$
D. Number of Commercial/Industrial Parcels			$
E. Number of Farm/Agricultural Parcels			$
F. Permanent and/or Temporary Easements			$
G. Other Parcels (define in “Remarks” section)			$
Totals	0	0	$ 0

Provide a general description of the right of way and excess lands required (zoning, use, improvements, critical, or sensitive parcels, etc.).

No Build alternative. No right of way required.

IV. ***Dedications***

Are there any property rights which have been acquired, or anticipate will be acquired, through the “dedication” process for the Project?

No X Yes _____ (Complete the following.)

Number of dedicated parcels 0

Have the dedication parcel(s) been accepted by the municipality involved? No dedications.

V. ***Excess Lands / Relinquishments***

Are there Caltrans property rights which may become excess lands or potential relinquishment areas?

No X Yes _____ (Provide an explanation on additional page.)

VI. ***Relocation Information***

Are relocation displacements anticipated?

No _X___ Yes _____ (Complete the following.)

A. Number of Single Family Residential Units __________________
Estimated RAP Payments $ __________________

B. Number of Multifamily Residential Units __________________
Estimated RAP Payments $ __________________

C. Number of Business/Nonprofit __________________
Estimated RAP Payments $ __________________

D. Number of Farms __________________
Estimated RAP Payments $ __________________

E. Other (define in the "Remarks" section) __________________
Estimated RAP Payments $ __________________

Totals __________________ $ __________________

VII. ***Utility Relocation Information***

Do you anticipate any utility facilities or utility rights of way to be affected?

No __X___ Yes __X___ (Complete the following.)

		Estimated Relocation Expense (Thousands)*		
Facility	Owner	State Obligation	Local Obligation*	Utility Owner Obligation
A. Electrical (Transmission)		$0	$0	$0
B. Electrical (Distribution)		$0	$0	$0
C. Gas		$0	$0	$0
D. Sewer		$0	$0	$0
E. Water		$0	$0	$0
F. Fiber Optics / Telephone / Wireless (combined)		$0	$0	$0
G. Streetlight conduits		$0	$0	$0
Totals		$0	$0	$0

Number of facilities	0	0	0

Any additional information concerning utility involvement on this project?
No Build alternative. No right of way required

VIII. ***Rail Information***

Are railroad facilities or railroad rights of way affected?

No _X___ Yes _____ (Complete the following.)

Describe railroad facilities or railroad rights of way affected.

Owner's Name	Transverse Crossing	Longitudinal Encroachment
A.		
B.		

Discuss types of agreements and rights required from the railroads. Are grade crossings that require services contracts, or grade separations that require construction and maintenance agreements involved?

IX. ***Clearance Information***

Are there improvements that require clearance?

No _X___ Yes _____ (Complete the following.)

A. Number of Structures to be Demolished ____________
Estimated Cost of Demolition $ ______________________

X. ***Hazardous Materials/Waste***

Are there any site(s) and/or improvements(s) in the Project Limits that are known to contain

hazardous materials? None __X___ Yes _____ (Explain in the "Remarks" section.)

Are there any site(s) and/or improvement(s) in the Project Limits that are suspected to contain

hazardous waste? None __X___ Yes ____ (Explain in the "Remarks" section.)

XI. ***Project Scheduling***

	Proposed lead time	Completion date
* Preliminary Engineering, Surveys	0 (months)	N/A
* R/W Engineering Submittals	0 (months)	N/A
* R/W Appraisals/Acquisition	0 (months)	N/A
Proposed Environmental Clearance		N/A
Proposed R/W Certification		N/A

XII. *Proposed Funding*

NOTE: Potential funding sources to be determined.

	Local	State	Federal	Other*
Acquisition				$ 0
Utilities				$ 0
Relocation Assistance Program				$ 0
R/W Support				$ 0
Other Costs (Env. Review, Demo, etc.)				$ 0

XIII. *Remarks*

None

Project Sponsor Consultant
HDR Engineering, Inc.
Prepared by:

Stephen P.A. Crouch

Stephen P.A. Crouch, PE; Project Engineer,
HDR Engineering, Inc.

Jill Craig

Jill Craig, ROW Agent, HDR Engineering,
Inc.

06/17/2022
Date

Project Sponsor
City of Laguna Beach
Reviewed and Approved by:

Thomas Perez; Capital Program Manager;
City of Laguna Beach Public Works

06/17/2022
Date

Caltrans
Reviewed and approved based on information provided to date:

Linda Lundblad, Branch Chief
Right of Way – Appraisals,
Condemnation & Local Programs

08/09/2022
Date

To: Jennifer Pham
Office Chief
Office of Right of Way and Right of Way Engineering

Date: 6-17-22

Co. ORA Rte. 133

Attention: Linda Lundblad
District Branch Chief
R/W Local Programs

Expense Authorization 0Q670K
Project ID #1217000086

Subject: **RIGHT OF WAY DATA SHEET - LOCAL PUBLIC AGENCIES**

Project Description: Improve SR-133 (Laguna Canyon Road) between Canyon Acres Drive & El Toro Road – **Alternative 2**

Right of way necessary for the subject project will be the responsibility of City of Laguna Beach

The information in this data sheet was developed by HDR Engineering, Inc.

I. ***Right of Way Engineering***

Will Right of Way Engineering be required for this project?

- No _____
- Yes X
    - Hard copy (base map) X
    - Appraisal map X
    - Acquisition Documents X
    - Property Transfer Documents X
    - R/W Record Map X
    - Record of Survey X

II. ***Engineering Surveys***

1. Is any surveying or photogrammetric mapping required?

No _____ Yes X (Complete the following.)

2. Datum Requirements

Yes X Project will adhere to the following criteria:

- Horizontal - datum policy is NAD 83, CA-HPGN, EPOCH 1991.35 and English system of units and measures.
- Vertical - datum policy is NAVD 88.
- Units - metric is not required.

No _____ Provide an explanation on additional page.

3. Will land survey monument perpetuation be scoped into the project, if required?

Yes X

No _____ Provide explanation on additional page.

III. ***Parcel Information (Land and Improvements)***

Are there any property rights required within the proposed project limits?

No _____ Yes __X___ (Complete the following.)

	Part Take	Full Take	Estimate $
A. Number of Vacant Land Parcels			$
B. Number of Single Family Residential Units			$
C. Number of Multifamily Residential Units			$
D. Number of Commercial/Industrial Parcels			$
E. Number of Farm/Agricultural Parcels			$
F. Permanent Easements	2		$ 560,956
G. Other Parcels/Temporary Easements	83		$ 1,970,384
Totals	85		$ 2,531,340

Provide a general description of the right of way and excess lands required (zoning, use, improvements, critical, or sensitive parcels, etc.).

In Alternative 2 there are a total of two permanent easements and 83 temporary easements needed for the project. The two permanent easements consist of approximately 5,100 sf. of highway easement from the County of Orange and Laguna College of Art & Design. The temporary easements consist of approximately 188,898 sf. needed from commercial, industrial, single family and multiple residential, and government owned properties. Parcels own by the City of Laguna Beach are not included in this measurement. These temporary easements are expected to be needed for construction purposes. For estimating purposes, it is assumed that the temporary easement will need a width of 10' of each parcel's frontage adjacent to proposed sidewalk. It is also assumed that the easements will be needed for a three-year period. The government owned properties needed for construction purposes (excluding the City of Laguna Beach) are proposed to be procured through each government entities' permitting process and not by fee. Costs for these properties include only the services needed to obtain the permits.

IV. ***Dedications***

Are there any property rights which have been acquired, or anticipate will be acquired, through the "dedication" process for the Project?

No __X___ Yes _____ (Complete the following.)

Number of dedicated parcels __0___

Have the dedication parcel(s) been accepted by the municipality involved? N/A

V. ***Excess Lands / Relinquishments***

Are there Caltrans property rights which may become excess lands or potential relinquishment areas?

No __X____ Yes _____ (Provide an explanation on additional page.)

VI. ***Relocation Information***

Are relocation displacements anticipated?

No __X___ Yes _____ (Complete the following.)

A. Number of Single Family Residential Units	__________________		
Estimated RAP Payments		$	__________________
B. Number of Multifamily Residential Units	__________________		
Estimated RAP Payments		$	__________________
C. Number of Business/Nonprofit	__________________		
Estimated RAP Payments		$	__________________
D. Number of Farms	__________________		
Estimated RAP Payments		$	__________________
E. Other (define in the "Remarks" section)	__________________		
Estimated RAP Payments		$	__________________
Totals	__________________	$	__________________

VII. ***Utility Relocation Information***

Do you anticipate any utility facilities or utility rights of way to be affected?

No _____ Yes __X__ (Complete the following.)

		Estimated Relocation Expense (Thousands)*		
Facility	Owner	State Obligation	Local Obligation*	Utility Owner Obligation
A. Electrical (Transmission)	SOUTHERN CALIFORNIA EDISON	$0	$22,600	$
B. Electrical (Distribution)	SOUTHERN CALIFONIA EDISON	$0	$23,700	$
C. Gas	SOUTHERN CALIFORNIA GAS	$0	$2,500	$
D. Sewer	CITY OF LAGUNA BEACH	$0	$1,750	$
E. Water	LAGUNA BEACH COUNTY WATER DIST	$0	$1,750	$
F. Fiber Optics / Telephone / Wireless (combined)	CROWN CASTLE- LA & VEN SPRINT T-MOBILE USA FRONTIER COX COMMUNICATIONS EXTENET SYSTEMS, INC	$0	$3,000	$
G. Streetlight conduits	SOUTHERN CALIFONIA EDISON	$0	$750	$
Totals		$0	$56,050	$
Number of facilities		TBD	7	TBD

***NOTE: Share of obligation is unknown at this time. Estimate totals placed in Local Obligation until further investigation.**

Any additional information concerning utility involvement on this project?

This project undergrounds overhead utilities within the right-of-way to outside of the travel lanes where feasible.

<u>SCE Transmission</u>
SCE has approximately 2.5 pole-miles of 66-kV single circuit and double circuit transmission lines. The transmission lines are on wood poles and for the most part located on the southbound side of Laguna Canyon Road with sections also located on the northbound side of the roadway.

<u>SCE Distribution</u>
SCE also has 2.5 pole-miles of overhead distribution lines placed as underbuild on the same poles as the 66-kV transmission lines although at some locations the distribution lines are on separate poles.

Telecommunications
It is proposed that all overhead telecommunication lines be undergrounded in conjunction with the electrical lines as part of the project so that all overhead poles can be removed to improve safety. It is likely that the various owners' lines could be located within a joint trench within the new roadway section. Other potential conflicts such as with wireless communication towers will have to be investigated.

Streetlights
The City will take ownership of the streetlights within the project limits and will install them under a separate project concurrent with the proposed undergrounding.

SCG Gas
SCG has a gas line that exists along northbound side of the roadway for the length of the project. It is assumed that the existing gas lines will have to be relocated outside of the proposed roadway for the length of the project.

City of Laguna Beach Sewer
The City of Laguna Beach has a sewer line along northbound side of the roadway for the length of the project. For this stage of the project it is unknown if the sewer line can remain in place. As such it is assumed that the sewer line will be relocated.

Laguna Beach County Water District
The Laguna Beach County Water District has water lines on both sides of the project. It is assumed that the waterline located on the southbound side of the roadway will not require relocation because there are no apparent conflicts; however, further investigation will be required. For the northbound side of the roadway it uncertain if the water lines can remain in place. As such, it is assumed that the waterline on the northbound side of the roadway will be relocated.

VIII. ***Rail Information***

Are railroad facilities or railroad rights of way affected?

No _X___ Yes _____ (Complete the following.)

Describe railroad facilities or railroad rights of way affected.

Owner's Name	Transverse Crossing	Longitudinal Encroachment
A.		
B.		

Discuss types of agreements and rights required from the railroads. Are grade crossings that require services contracts, or grade separations that require construction and maintenance agreements involved?

IX. ***Clearance Information***

Are there improvements that require clearance?

No __X__ Yes _____ (Complete the following.)

A. Number of Structures to be Demolished ____________
Estimated Cost of Demolition $ ______________________

X. ***Hazardous Materials/Waste***

Are there any site(s) and/or improvements(s) in the Project Limits that are known to contain *hazardous materials*? None __X__ Yes _____ (Explain in the "Remarks" section.)

Are there any site(s) and/or improvement(s) in the Project Limits that are suspected to contain *hazardous waste*? None _____ Yes__X__ (Explain in the "Remarks" section.)

XI. ***Project Scheduling***

	Proposed lead time	Completion date
* Preliminary Engineering, Surveys	24 (months)	July 2023
* R/W Engineering Submittals	16 (months)	January 2024
* R/W Appraisals/Acquisition	16 (months)	January 2024
Proposed Environmental Clearance		January 2025
Proposed R/W Certification		April 2027

XII. ***Proposed Funding***

NOTE: Potential funding sources to be determined.

	Local	State	Federal	Other*
Acquisition				$ 2,531,340
Utilities				$56,050,000
Relocation Assistance Program				$ 0
R/W Support**				$ 2,177,500
Other Costs (Env. Review, Demo, etc.)				$ 60,000

**Proposed funding to be determined. Purpose of PSR is to obtain funding and potential funding sources.*
***R/W Support costs include costs for engineering, appraisals, etc.*
ROW cost estimate is assumed to be probable to optimistic.

XIII. *Remarks*

The ISA Checklist for hazardous waste was completed in June 2018 and is included as Attachment J in the PSR/PDS. Potential hazardous waste/materials issues associated with the proposed Project include aerially-deposited lead (ADL) in previously undisturbed soil areas or unpaved areas within Caltrans right-of-way along the shoulders of SR-133, lead chromate in yellow traffic striping and pavement marking materials along SR-133, polychlorinated biphenyls (PCB) in utility pole- and pad mounted electrical transformers, and creosote and pentachlorophenol in wooden utility poles. A full ISA for all right-of-way acquisition properties and Preliminary Site Investigations (PSI) will be conducted during PA/ED phase.

Project Sponsor Consultant
Prepared by:

Stephen P.A. Crouch

Stephen P.A. Crouch, PE; Project Engineer,
HDR Engineering, Inc.

Jill Craig

Jill Craig, ROW Agent, HDR Engineering, Inc.

6/17/2022
Date

Project Sponsor
City of Laguna Beach
Reviewed and Approved by:

Thomas Perez; Capital Program Manager;
City of Laguna Beach Public Works

6/17/2022
Date

Caltrans
Reviewed and accept based on information provided to date:

Linda Lundblad, Branch Chief
Right of Way – Appraisals,
Condemnation & Local Programs

08/09/2022
Date

RIGHT OF WAY DATA SHEET FOR LOCAL PUBLIC AGENCIES (Cont.)
(Form #)

To: Jennifer Pham
Office Chief
Office of Right of Way and Right of Way Engineering

Date: 6-17-22

Co. ORA Rte. 133

Attention: Linda Lundblad
District Branch Chief
R/W Local Programs

Expense Authorization 0Q670K
Project ID #1217000086

Subject: **RIGHT OF WAY DATA SHEET - LOCAL PUBLIC AGENCIES**

Project Description: Improve SR-133 (Laguna Canyon Road) between Canyon Acres Drive & El Toro Road – **Alternative 3**

Right of way necessary for the subject project will be the responsibility of City of Laguna Beach

The information in this data sheet was developed by HDR Engineering, Inc.

I. ***Right of Way Engineering***

Will Right of Way Engineering be required for this project?

- No _____
- Yes X

Hard copy (base map)	X
Appraisal map	X
Acquisition Documents	X
Property Transfer Documents	X
R/W Record Map	X
Record of Survey	X

II. ***Engineering Surveys***

1. Is any surveying or photogrammetric mapping required?

   No _____ Yes X (Complete the following.)

2. Datum Requirements

   Yes X Project will adhere to the following criteria:
   - Horizontal - datum policy is NAD 83, CA-HPGN, EPOCH 1991.35 and English system of units and measures.
   - Vertical - datum policy is NAVD 88.
   - Units - metric is not required.

   No _____ Provide an explanation on additional page.

3. Will land survey monument perpetuation be scoped into the project, if required?

   Yes X

   No _____ Provide explanation on additional page.

III. ***Parcel Information (Land and Improvements)***

Are there any property rights required within the proposed project limits?

No _____ Yes __X___ (Complete the following.)

	Part Take	Full Take	Estimate $
A. Number of Vacant Land Parcels			$
B. Number of Single Family Residential Units			$
C. Number of Multifamily Residential Units			$
D. Number of Commercial/Industrial Parcels			$
E. Number of Farm/Agricultural Parcels			$
F. Temporary Easements	2		$ 2,170,491
G. Other Parcels / Temporary Easements	85		$ 743,578
Totals	87		$ 2,914,089

Provide a general description of the right of way and excess lands required (zoning, use, improvements, critical, or sensitive parcels, etc.).

In Alternative 3 there are a total of two permanent easements and 85 temporary easements needed for the project. The two permanent easements consist of approximately 6,760 sf. of highway easement from the County of Orange and Laguna College of Art & Design. The temporary easements consist of approximately 195,708 sf. needed from commercial, industrial, single family and multiple residential, and government owned properties Parcels own by the City of Laguna Beach are not included in this measurement. These temporary easements are expected to be needed for construction purposes. For estimating purposes, it is assumed that the temporary easement will need a width of 10’ of each parcel’s frontage adjacent to proposed sidewalk. It is also assumed that the easements will be needed for a three-year period. The government owned properties needed for construction purposes (excluding the City of Laguna Beach) are proposed to be procured through each government entities’ permitting process and not by fee. Costs for these properties include only the services needed to obtain the permits.

IV. ***Dedications***

Are there any property rights which have been acquired, or anticipate will be acquired, through the “dedication” process for the Project?

No __X_____ Yes _____ (Complete the following.)

Number of dedicated parcels _____

Have the dedication parcel(s) been accepted by the municipality involved? No dedications expected.

V. ***Excess Lands / Relinquishments***

Are there Caltrans property rights which may become excess lands or potential relinquishment areas?

No __X___ Yes _____ (Provide an explanation on additional page.)

VI. ***Relocation Information***

Are relocation displacements anticipated?

No __X___ Yes _____ (Complete the following.)

A. Number of Single Family Residential Units	________	
Estimated RAP Payments		$ ________
B. Number of Multifamily Residential Units	________	
Estimated RAP Payments		$ ________
C. Number of Business/Nonprofit	________	
Estimated RAP Payments		$ ________
D. Number of Farms	________	
Estimated RAP Payments		$ ________
E. Other (define in the "Remarks" section)	________	
Estimated RAP Payments		$ ________
Totals	________	$ ________

VII. ***Utility Relocation Information***

Do you anticipate any utility facilities or utility rights of way to be affected?

No _____ Yes __X__ (Complete the following.)

Facility	Owner	Estimated Relocation Expense (Thousands)* State Obligation	Local Obligation*	Utility Owner Obligation
A. Electrical (Transmission)	SOUTHERN CALIFORNIA EDISON	$0	$22,600	$
B. Electrical (Distribution)	SOUTHERN CALIFONIA EDISON	$0	$23,700	$
C. Gas	SOUTHERN CALIFORNIA GAS	$0	$2,500	$
D. Sewer	CITY OF LAGUNA BEACH	$0	$1,750	$
E. Water	LAGUNA BEACH COUNTY WATER DIST	$0	$1,750	$
F. Fiber Optics / Telephone / Wireless (combined)	CROWN CASTLE- LA & VEN SPRINT T-MOBILE USA FRONTIER COX COMMUNICATIONS EXTENET SYSTEMS, INC	$0	$3,000	$
G. Streetlight conduits	SOUTHERN CALIFONIA EDISON	$0	$750	$
Totals		$0	$56,050	$
Number of facilities		TBD	7	TBD

***NOTE: Share of obligation is unknown at this time. Estimate totals placed in Local Obligation until further investigation.**

Any additional information concerning utility involvement on this project?

This project undergrounds overhead utilities within the right-of-way to outside of the travel lanes where feasible.

SCE Transmission
SCE has approximately 2.5 pole-miles of 66-kV single circuit and double circuit transmission lines. The transmission lines are on wood poles and for the most part located on the southbound side of Laguna Canyon Road with sections also located on the northbound side of the roadway.

SCE Distribution

SCE also has 2.5 pole-miles of overhead distribution lines placed as underbuild on the same poles as the 66-kV transmission lines although at some locations the distribution lines are on separate poles.

Telecommunications
It is proposed that all overhead telecommunication lines be undergrounded in conjunction with the electrical lines as part of the project so that all overhead poles can be removed to improve safety. It is likely that the various owners' lines could be located within a joint trench within the new roadway section. Other potential conflicts such as with wireless communication towers will have to be investigated.

Streetlights
The City will take ownership of the streetlights within the project limits and will install them under a separate project concurrent with the proposed undergrounding.

SCG Gas
SCG has a gas line that exists along northbound side of the roadway for the length of the project. It is assumed that the existing gas lines will have to be relocated outside of the proposed roadway for the length of the project.

City of Laguna Beach Sewer
The City of Laguna Beach has a sewer line along northbound side of the roadway for the length of the project. For this stage of the project it is unknown if the sewer line can remain in place. As such it is assumed that the sewer line will be relocated.

Laguna Beach County Water District
The Laguna Beach County Water District has water lines on both sides of the project. It is assumed that the waterline located on the southbound side of the roadway will not require relocation because there are no apparent conflicts; however, further investigation will be required. For the northbound side of the roadway it uncertain if the water lines can remain in place. As such, it is assumed that the waterline on the northbound side of the roadway will be relocated.

VIII. ***Rail Information***

Are railroad facilities or railroad rights of way affected?

No _X__ Yes _____ (Complete the following.)

Describe railroad facilities or railroad rights of way affected.

Owner's Name	Transverse Crossing	Longitudinal Encroachment
A.		
B.		

Discuss types of agreements and rights required from the railroads. Are grade crossings that require services contracts, or grade separations that require construction and maintenance agreements involved?

IX. ***Clearance Information***

Are there improvements that require clearance?

No _X__ Yes _____ (Complete the following.)

A. Number of Structures to be Demolished ____________

Estimated Cost of Demolition ______ $ ______

X. ***Hazardous Materials/Waste***

Are there any site(s) and/or improvements(s) in the Project Limits that are known to contain

hazardous materials? None __X__ Yes _____ (Explain in the "Remarks" section.)

Are there any site(s) and/or improvement(s) in the Project Limits that are suspected to contain

hazardous waste? None _____ Yes __X__ (Explain in the "Remarks" section.)

XI. ***Project Scheduling***

	Proposed lead time	Completion date
* Preliminary Engineering, Surveys	24 (months)	July 2023
* R/W Engineering Submittals	16 (months)	January 2024
* R/W Appraisals/Acquisition	16 (months)	January 2024
Proposed Environmental Clearance		January 2025
Proposed R/W Certification		April 2027

XII. ***Proposed Funding***

NOTE: Potential funding sources to be determined.

	Local	State	Federal	Other*
Acquisition				$ 2,914,089
Utilities				$56,050,000
Relocation Assistance Program				$ 0
R/W Support**				$ 2,228,500
Other Costs (Env. Review, Demo, etc.)				$ 60,000

**Proposed funding to be determined. Purpose of PSR is to obtain funding and potential funding sources.*
***R/W Support costs include costs for engineering, appraisals, etc.*
ROW cost estimate is assumed to be probable to optimistic.

XIII. ***Remarks***

The ISA Checklist for hazardous waste was completed in June 2018 and is included as Attachment J in the PSR/PDS. Potential hazardous waste/materials issues associated with the proposed Project include aerially-deposited lead (ADL) in previously undisturbed soil areas or unpaved areas within Caltrans right-of-way along the shoulders of SR-133, lead chromate in yellow traffic striping and pavement marking materials along SR-133, polychlorinated biphenyls (PCB) in utility pole- and padmounted electrical transformers, and creosote and pentachlorophenol in wooden utility poles. A full ISA for all right-of-way acquisition properties and Preliminary Site Investigations (PSI) will be conducted during PA/ED phase.

Project Sponsor Consultant
HDR Engineering, Inc.
Prepared by:

Stephen P.A. Crouch

Stephen P.A. Crouch, PE; Project Engineer,
HDR Engineering, Inc.

Jill Craig

Jill Craig, ROW Agent, HDR Engineering, Inc.

06/17/2022
Date

Project Sponsor
City of Laguna Beach
Reviewed and Approved by:

Thomas Perez; Capital Program Manager;
City of Laguna Beach Public Works

6/17/2022
Date

Caltrans
Reviewed and accept based on information provided to date:

Linda Lundblad, Branch Chief
Right of Way – Appraisals,
Condemnation & Local Programs

08/09/2022
Date

To: Jennifer Pham
Office Chief
Office of Right of Way and Right of Way Engineering

Date: 6-17-22

Co. ORA Rte. 133

Attention: Linda Lundblad
District Branch Chief
R/W Local Programs

Expense Authorization 0Q670K
Project ID #1217000086

Subject: **RIGHT OF WAY DATA SHEET - LOCAL PUBLIC AGENCIES**

Project Description: Improve SR-133 (Laguna Canyon Road) between Canyon Acres Drive & El Toro Road – **Alternative 4**

Right of way necessary for the subject project will be the responsibility of City of Laguna Beach

The information in this data sheet was developed by HDR Engineering, Inc.

I. ***Right of Way Engineering***

Will Right of Way Engineering be required for this project?

- No _____
- Yes X

Hard copy (base map)	X
Appraisal map	X
Acquisition Documents	X
Property Transfer Documents	X
R/W Record Map	X
Record of Survey	X

II. ***Engineering Surveys***

1. Is any surveying or photogrammetric mapping required?

   No _____ Yes X (Complete the following.)

2. Datum Requirements

   Yes X Project will adhere to the following criteria:
   - Horizontal - datum policy is NAD 83, CA-HPGN, EPOCH 1991.35 and English system of units and measures.
   - Vertical - datum policy is NAVD 88.
   - Units - metric is not required.

   No _____ Provide an explanation on additional page.

3. Will land survey monument perpetuation be scoped into the project, if required?

   Yes X

   No _____ Provide explanation on additional page.

III. ***Parcel Information (Land and Improvements)***

Are there any property rights required within the proposed project limits?

No _____ Yes __X___ (Complete the following.)

	Part Take	Full Take	Estimate $
A. Number of Vacant Land Parcels			$
B. Number of Single Family Residential Units			$
C. Number of Multifamily Residential Units			$
D. Number of Commercial/Industrial Parcels			$
E. Number of Farm/Agricultural Parcels			$
F. Permanent Easements	18		$ 793,300
G. Temporary Easements	78		$ 1,932,491
Totals	96		$ 2,725,791

Provide a general description of the right of way and excess lands required (zoning, use, improvements, critical, or sensitive parcels, etc.).

In Alternative 4 there are a total of 18 permanent easements and 78 temporary easements needed for the project. The 18 permanent easements consist of approximately 6,760 sf. of highway easement. The temporary easements consist of approximately 186,954 sf. needed from commercial, industrial, single family and multiple residential, and government owned properties. Parcels own by the City of Laguna Beach are not included in this measurement. These temporary easements are expected to be needed for construction purposes. For estimating purposes, it is assumed that the temporary easement will need a width of 10’ of each parcel’s frontage adjacent to proposed sidewalk. It is also assumed that the easements will be needed for a three-year period. The government owned properties needed for construction purposes (excluding the City of Laguna Beach) are proposed to be procured through each government entities’ permitting process and not by fee. Costs for these properties include only the services needed to obtain the permits.

IV. ***Dedications***

Are there any property rights which have been acquired, or anticipate will be acquired, through the “dedication” process for the Project?

No __X_____ Yes _____ (Complete the following.)

Number of dedicated parcels __0__

Have the dedication parcel(s) been accepted by the municipality involved? N/A

V. ***Excess Lands / Relinquishments***

No X Yes _____ (Provide an explanation on additional page.)

VI. ***Relocation Information***

Are relocation displacements anticipated?

No X Yes _____ (Complete the following.)

A. Number of Single Family Residential Units __________
Estimated RAP Payments $ __________

B. Number of Multifamily Residential Units __________
Estimated RAP Payments $ __________

C. Number of Business/Nonprofit __________
Estimated RAP Payments $ __________

D. Number of Farms __________
Estimated RAP Payments $ __________

E. Other (define in the “Remarks” section) __________
Estimated RAP Payments $ __________

Totals __________ $ __________

VII. ***Utility Relocation Information***

Do you anticipate any utility facilities or utility rights of way to be affected?

No _____ Yes X (Complete the following.)

		Estimated Relocation Expense (Thousands)*		
Facility	Owner	State Obligation	Local Obligation*	Utility Owner Obligation
A. Electrical (Transmission)	SOUTHERN CALIFORNIA EDISON	$0	$22,600	$
B. Electrical (Distribution)	SOUTHERN CALIFONIA EDISON	$0	$23,700	$
C. Gas	SOUTHERN CALIFORNIA GAS	$0	$2,500	$
D. Sewer	CITY OF LAGUNA BEACH	$0	$1,750	$
E. Water	LAGUNA BEACH COUNTY WATER DIST	$0	$1,750	$
F. Fiber Optics / Telephone / Wireless(combined)	CROWN CASTLE- LA & VEN SPRINT	$0	$3,000	$

	T-MOBILE USA FRONTIER COX COMMUNICATIONS EXTENET SYSTEMS, INC			
G. Streetlight conduits	SOUTHERN CALIFONIA EDISON	$0	$750	$
Totals		$0	$56,050	$
Number of facilities		TBD	7	TBD

***NOTE: Share of obligation is unknown at this time. Estimate totals placed in Local Obligation until further investigation.**

Any additional information concerning utility involvement on this project?

This project undergrounds overhead utilities within the right-of-way to outside of the travel lanes where feasible.

SCE Transmission
SCE has approximately 2.5 pole-miles of 66-kV single circuit and double circuit transmission lines. The transmission lines are on wood poles and for the most part located on the southbound side of Laguna Canyon Road with sections also located on the northbound side of the roadway.

SCE Distribution
SCE also has 2.5 pole-miles of overhead distribution lines placed as underbuild on the same poles as the 66-kV transmission lines although at some locations the distribution lines are on separate poles.

Telecommunications
It is proposed that all overhead telecommunication lines be undergrounded in conjunction with the electrical lines as part of the project so that all overhead poles can be removed to improve safety. It is likely that the various owners' lines could be located within a joint trench within the new roadway section. Other potential conflicts such as with wireless communication towers will have to be investigated.

Streetlights
The City will take ownership of the streetlights within the project limits and will install them under a separate project concurrent with the proposed undergrounding.

SCG Gas
SCG has a gas line that exists along northbound side of the roadway for the length of the project. It is assumed that the existing gas lines will have to be relocated outside of the proposed roadway for the length of the project.

City of Laguna Beach Sewer
The City of Laguna Beach has a sewer line along northbound side of the roadway for the length of the project. For this stage of the project it is unknown if the sewer line can remain in place. As such it is assumed that the sewer line will be relocated.

Laguna Beach County Water District
The Laguna Beach County Water District has water lines on both sides of the project. It is assumed that the waterline located on the southbound side of the roadway will not require relocation because there are no apparent conflicts; however, further investigation will be required. For the northbound side of the roadway it uncertain if the water lines can remain in place. As such, it is assumed that the waterline on the northbound side of the roadway will be relocated.

VIII. ***Rail Information***

Are railroad facilities or railroad rights of way affected?

No _X___ Yes _____ (Complete the following.)

Describe railroad facilities or railroad rights of way affected.

Owner's Name	Transverse Crossing	Longitudinal Encroachment
A.		
B.		

Discuss types of agreements and rights required from the railroads. Are grade crossings that require services contracts, or grade separations that require construction and maintenance agreements involved?

IX. ***Clearance Information***

Are there improvements that require clearance?

No X Yes ____ (Complete the following.)

A. Number of Structures to be Demolished ________
Estimated Cost of Demolition $ ________

X. ***Hazardous Materials/Waste***

Are there any site(s) and/or improvements(s) in the Project Limits that are known to contain *hazardous materials*? None X Yes ____ (Explain in the "Remarks" section.)

Are there any site(s) and/or improvement(s) in the Project Limits that are suspected to contain *hazardous waste*? None ____ Yes X (Explain in the "Remarks" section.)

XI. ***Project Scheduling***

	Proposed lead time	Completion date
* Preliminary Engineering, Surveys	24 (months)	July 2023
* R/W Engineering Submittals	16 (months)	January 2024
* R/W Appraisals/Acquisition	16 (months)	January 2024
Proposed Environmental Clearance		January 2025
Proposed R/W Certification		April 2027

XII. ***Proposed Funding***

NOTE: Potential funding sources to be determined.

	Local	State	Federal	Other*
Acquisition				$ 2,725,791
Utilities				$56,050,000
Relocation Assistance Program				$ 0
R/W Support				$2,543,000**
Other Costs (Envir. Review, Demo, etc.)				$ 60,000

**Proposed funding to be determined. Purpose of PSR is to obtain funding and potential funding sources.*
***R/W Support costs include costs for engineering, appraisals, etc.*
ROW cost estimate is assumed to be probable to optimistic.

XIII. ***Remarks***

The ISA Checklist for hazardous waste was completed in June 2018 and is included as Attachment J in the PSR/PDS. Potential hazardous waste/materials issues associated with the proposed Project include aerially-deposited lead (ADL) in previously undisturbed soil areas or unpaved areas within Caltrans right-of-way along the shoulders of SR-133, lead chromate in yellow traffic striping and pavement marking materials along SR-133, polychlorinated biphenyls (PCB) in utility pole- and pad mounted electrical transformers, and creosote and pentachlorophenol in wooden utility poles. A full ISA for all right-of-way acquisition properties and Preliminary Site Investigations (PSI) will be conducted during PA/ED phase.

Project Sponsor Consultant
HDR Engineering, Inc.
Prepared by:

Stephen P.A. Crouch

Stephen P.A. Crouch, PE; Project Engineer,
HDR Engineering, Inc.

Jill Craig

Jill Craig, ROW Agent, HDR Engineering, Inc.

Date 6/17/2022

Project Sponsor
City of Laguna Beach
Reviewed and Approved by:

Thomas Perez; Capital Program Manager;
City of Laguna Beach Public Works

6/17/2022
Date

Caltrans
Reviewed and accept based on information provided to date:

Linda Lundblad, Branch Chief
Right of Way – Appraisals,
Condemnation & Local Programs

08/09/2022
Date

To: Jennifer Pham
Office Chief
Office of Right of Way and Right of Way Engineering

Date: _6-17-2022________________

Co. _ORA____ Rte. ____133______

Attention: Linda Lundblad
District Branch Chief
R/W Local Programs

Expense Authorization _0Q670K_____
Project ID #1217000086

Subject: **RIGHT OF WAY DATA SHEET - LOCAL PUBLIC AGENCIES**

Project Description: Improve SR-133 (Laguna Canyon Road) between Canyon Acres Drive & El Toro Road – **Alternative 5**

Right of way necessary for the subject project will be the responsibility of ____City of Laguna Beach__________.

The information in this data sheet was developed by _____HDR Engineering, Inc.___________________.

I. ***Right of Way Engineering***

Will Right of Way Engineering be required for this project?

- No _____
- Yes _X___
  - Hard copy (base map) _X__
  - Appraisal map _X__
  - Acquisition Documents _X__
  - Property Transfer Documents _X__
  - R/W Record Map _X__
  - Record of Survey _X__

II. ***Engineering Surveys***

1. Is any surveying or photogrammetric mapping required?

   No _____ Yes _X___ (Complete the following.)

2. Datum Requirements

   Yes _X___ Project will adhere to the following criteria:
   - Horizontal - datum policy is NAD 83, CA-HPGN, EPOCH 1991.35 and English system of units and measures.
   - Vertical - datum policy is NAVD 88.
   - Units - metric is not required.

   No _____ Provide an explanation on additional page.

3. Will land survey monument perpetuation be scoped into the project, if required?

   Yes _X___

   No _____ Provide explanation on additional page.

III. ***Parcel Information (Land and Improvements)***

Are there any property rights required within the proposed project limits?

No ____ Yes X (Complete the following.)

	Part Take	Full Take	Estimate $
A. Number of Vacant Land Parcels		N/A	$
B. Number of Single Family Residential Units		N/A	$
C. Number of Multifamily Residential Units		N/A	$
D. Number of Commercial/Industrial Parcels		N/A	$
E. Number of Farm/Agricultural Parcels		N/A	$
F. Permanent Easements	29	N/A	$ 2,488,019
G. Temporary Easements/ Other Parcels	86	N/A	$ 2,013,158
Totals	115	N/A	$ 4,501,177

Provide a general description of the right of way and excess lands required (zoning, use, improvements, critical, or sensitive parcels, etc.).

In Alternative 5 there are a total of 29 permanent easements and 86 temporary easements needed for the project. The 29 permanent easements consist of approximately 19,672 sf. of highway easement. The temporary easements consist of approximately 192,688 sf. needed from commercial, industrial, single family and multiple residential, and government owned properties. Parcels own by the City of Laguna Beach are not included in this measurement. These temporary easements are expected to be needed for construction purposes. For estimating purposes, it is assumed that the temporary easement will need a width of 10’ of each parcel’s frontage adjacent to proposed sidewalk. It is also assumed that the easements will be needed for a three-year period. The government owned properties needed for construction purposes (excluding the City of Laguna Beach) are proposed to be procured through each government entities’ permitting process and not by fee. Costs for these properties include only the services needed to obtain the permits.

IV. ***Dedications***

Are there any property rights which have been acquired, or anticipate will be acquired, through the “dedication” process for the Project?

No X Yes ____ (Complete the following.)

Number of dedicated parcels 0

Have the dedication parcel(s) been accepted by the municipality involved? N/A

V. ***Excess Lands / Relinquishments***

Are there Caltrans property rights which may become excess lands or potential relinquishment areas?

No _X___ Yes _____ (Provide an explanation on additional page.)

VI. ***Relocation Information***

Are relocation displacements anticipated?

No _X___ Yes _____ (Complete the following.)

A. Number of Single Family Residential Units Estimated RAP Payments	N/A	$	
B. Number of Multifamily Residential Units Estimated RAP Payments	N/A	$	
C. Number of Business/Nonprofit Estimated RAP Payments	N/A	$	
D. Number of Farms Estimated RAP Payments	N/A	$	
E. Other (define in the "Remarks" section) Estimated RAP Payments	N/A	$	
Totals	-0-		

VII. ***Utility Relocation Information***

Do you anticipate any utility facilities or utility rights of way to be affected?

No _____ Yes _X__ (Complete the following.)

		Estimated Relocation Expense (Thousands)*		
Facility	Owner	State Obligation	Local Obligation*	Utility Owner Obligation
A. Electrical (Transmission)	SOUTHERN CALIFORNIA EDISON	$0	$22,600	$
B. Electrical (Distribution)	SOUTHERN CALIFONIA EDISON	$0	$23,700	$
C. Gas	SOUTHERN CALIFORNIA GAS	$0	$2,500	$
D. Sewer	CITY OF LAGUNA BEACH	$0	$1,750	$
E. Water	LAGUNA BEACH COUNTY WATER DIST	$0	$1,750	$

F. Fiber Optics / Telephone / Wireless (combined)	CROWN CASTLE- LA & VEN SPRINT T-MOBILE USA FRONTIER COX COMMUNICATIONS EXTENET SYSTEMS, INC	$0	$3,000	$
G. Streetlight conduits	SOUTHERN CALIFONIA EDISON	$0	$750	$
Totals		$0	$56,050	$
Number of facilities		TBD	7	TBD

***NOTE: Share of obligation is unknown at this time. Estimate totals placed in Local Obligation until further investigation.**

Any additional information concerning utility involvement on this project?

This project undergrounds overhead utilities within the right-of-way to outside of the travel lanes where feasible.

SCE Transmission
SCE has approximately 2.5 pole-miles of 66-kV single circuit and double circuit transmission lines. The transmission lines are on wood poles and for the most part located on the southbound side of Laguna Canyon Road with sections also located on the northbound side of the roadway.

SCE Distribution
SCE also has 2.5 pole-miles of overhead distribution lines placed as underbuild on the same poles as the 66-kV transmission lines although at some locations the distribution lines are on separate poles.

Telecommunications
It is proposed that all overhead telecommunication lines be undergrounded in conjunction with the electrical lines as part of the project so that all overhead poles can be removed to improve safety. It is likely that the various owners' lines could be located within a joint trench within the new roadway section. Other potential conflicts such as with wireless communication towers will have to be investigated.

Streetlights
The City will take ownership of the streetlights within the project limits and will install them under a separate project concurrent with the proposed undergrounding.

SCG Gas
SCG has a gas line that exists along northbound side of the roadway for the length of the project. It is assumed that the existing gas lines will have to be relocated outside of the proposed roadway for the length of the project.

City of Laguna Beach Sewer
The City of Laguna Beach has a sewer line along northbound side of the roadway for the length of the project. For this stage of the project it is unknown if the sewer line can remain in place. As such it is assumed that the sewer line will be relocated.

Laguna Beach County Water District
The Laguna Beach County Water District has water lines on both sides of the project. It is assumed that the waterline located on the southbound side of the roadway will not require relocation because there are no apparent conflicts; however, further investigation will be required. For the northbound side of the roadway it uncertain if

the water lines can remain in place. As such, it is assumed that the waterline on the northbound side of the roadway will be relocated.

VIII. ***Rail Information***

Are railroad facilities or railroad rights of way affected?

No _X___ Yes _____ (Complete the following.)

Describe railroad facilities or railroad rights of way affected.

Owner's Name	Transverse Crossing	Longitudinal Encroachment
A.		
B.		

Discuss types of agreements and rights required from the railroads. Are grade crossings that require services contracts, or grade separations that require construction and maintenance agreements involved?

IX. ***Clearance Information***

Are there improvements that require clearance?

No _X___ Yes _____ (Complete the following.)

A. Number of Structures to be Demolished ____________
Estimated Cost of Demolition $ _______________________

X. ***Hazardous Materials/Waste***

Are there any site(s) and/or improvements(s) in the Project Limits that are known to contain

hazardous materials? None __X___ Yes _____ (Explain in the "Remarks" section.)

Are there any site(s) and/or improvement(s) in the Project Limits that are suspected to contain

hazardous waste? None _____ Yes__X__ (Explain in the "Remarks" section.)

XI. ***Project Scheduling***

	Proposed lead time	Completion date
* Preliminary Engineering, Surveys	24 (months)	July 2023
* R/W Engineering Submittals	16 (months)	January 2024
* R/W Appraisals/Acquisition	16 (months)	January 2024
Proposed Environmental Clearance		January 2025
Proposed R/W Certification		April 2027

XII. ***Proposed Funding***

NOTE: Potential funding sources to be determined.

RIGHT OF WAY DATA SHEET FOR LOCAL PUBLIC AGENCIES (Cont.)
(Form #)

	Local	State	Federal	Other*
Acquisition				$10,427,297
Utilities				$56,050,000
Relocation Assistance Program				$0
R/W Support				$3,077,500**
Other Costs (Envir. Review, Demo, etc.)				$60,000

**Proposed funding to be determined. Purpose of PSR is to obtain funding and potential funding sources.*
***R/W Support costs include costs for engineering, appraisals, etc.*
ROW cost estimate is assumed to be probable to optimistic.

XIII. ***Remarks***

The ISA Checklist for hazardous waste was completed in June 2018 and is included as Attachment J in the PSR/PDS. Potential hazardous waste/materials issues associated with the proposed Project include aerially-deposited lead (ADL) in previously undisturbed soil areas or unpaved areas within Caltrans right-of-way along the shoulders of SR-133, lead chromate in yellow traffic striping and pavement marking materials along SR-133, polychlorinated biphenyls (PCB) in utility pole- and padmounted electrical transformers, and creosote and pentachlorophenol in wooden utility poles. A full ISA for all right-of-way acquisition properties and Preliminary Site Investigations (PSI) will be conducted during PA/ED phase.

Project Sponsor Consultant
HDR Engineering, Inc.
Prepared by:

Stephen P.A. Crouch

Stephen P.A. Crouch, PE; Project Engineer,
HDR Engineering, Inc.

Jill Craig

Jill Craig, ROW Agent, HDR Engineering,
Inc.

6-17-2022
Date

Project Sponsor
City of Laguna Beach
Reviewed and Approved by:

Thomas Perez; Capital Program Manager;
City of Laguna Beach Public Works

6/17/2022
Date

Caltrans
Reviewed and accept based on information provided to date:

Linda Lundblad, Branch Chief
Right of Way – Appraisals,
Condemnation & Local Programs

08/09/2022
Date

ATTACHMENT I

PRELIMINARY ENVIRONMENTAL ANALYSIS REPORT (PEAR)

(With Attachments)

PRELIMINARY ENVIRONMENTAL ANALYSIS REPORT

1. Project Information

DIST-CO-RTE: 12-OR-133	**PM/PM:** 0.96/3.41	
EA: 0Q670K	**EFIS Project ID:**	
Project Title: State Route 133 (SR-133) Laguna Canyon Road (LCR) Improvement Project		
Project Manager: Lorica Subida		**Phone:**
Project Engineer: Raouf Fam		**Phone:** (657) 328-6269
Environmental Office Chief/Manager: Smita Deshpande		**Phone:** (657) 328-6151
PEAR Preparer: Angie Kung, HDR		**Phone:** (949) 241-6192

2. Project Description

Purpose and Need

Project Purpose

The purpose of the Project is to:

- Improve vehicular safety along the existing corridor;
- Improve pedestrian and bicycle mobility and safety; and
- Encourage the use of active transportation along the corridor.

Project Need

- Overhead Southern California Edison (SCE) transmission and distribution lines currently exist along both sides of the State Route 133 (SR-133) corridor within the Clear Recovery Zone (CRZ) and in close proximity to the edge of travel way. Coupled with high traffic demand, vehicle queuing during both peak and non-peak periods, the lack of traffic breaks or protected left-turn movements, and inadequate shoulders, there is a high concentration of accidents that occur at various locations within the Project limits.
- The corridor currently lacks adequate shoulders and pedestrian and bicycle facilities within the Project limits. Dedicated pedestrian and bicycle paths, sidewalks with Americans with Disabilities Act (ADA) access, and improved shoulders along the corridor would improve access, connectivity, and safety for pedestrians and bicyclists.
- Due to special events and the proximity to the Pacific Ocean as well as multiple adjacent recreational facilities and trails within the Project limits, traffic demand within this corridor already exceeds capacity during weekday AM and PM peak hours and during most summer weekends and holidays. Without the provision for alternative transportation modes such as public transit, walking, and biking to improve connectivity and access to adjacent residential and commercial land uses,

recreational trails, and parks within the City of Laguna Beach (City) this multi-modal corridor will continue to degrade.

Description of work

The City, in cooperation with the California Department of Transportation (Caltrans), is proposing to improve a 2.5-mile corridor of the SR-133 in the City of Laguna Beach, California. The regional location of the proposed Project (Figure 1. Regional Location) is provided in Attachment A of this Preliminary Environmental Analysis Report (PEAR). The Project limits on SR-133, also known as Laguna Canyon Road (LCR), extend from Canyon Acres Drive (PM 0.96) to El Toro Road (PM 3.41) in Orange County (Project).

LCR is one of three gateways to Laguna Beach and provides critical access to adjacent recreational spaces as well as activities in the City. As such, ensuring that LCR provides efficient, safe access to the area is vital both to the region and to the City itself. LCR within the Project limits consists of a two-lane conventional highway with a center turn lane, limited shoulders, and sporadic off-street angled and parallel parking located along the northbound (NB) side of the roadway. The right-of-way (ROW) is constrained by residential and light commercial land uses, as well as various trails, park uses, institutional uses, and open space preservation areas. This portion of LCR is further constrained by Southern California Edison's (SCE) overhead transmission and distribution line poles in close proximity to the travel way within the CRZ that pose potential safety concerns.

The proposed improvements to LCR within the Project limits generally consist of a Class I and Class II bicycle lane(s), pedestrian pathways/sidewalks, improved access to transit facilities, improved shoulders and undergrounding of the SCE transmission and distribution lines outside the travel way.

Alternatives

Alternative 1 - No-Build Alternative

The No-Build Alternative would maintain LCR in its current condition. No improvements would be implemented at this time; therefore, no capital costs are associated with this alternative. Utility poles on both the northbound and southbound sides of the road would not be undergrounded to allow full use of the State ROW for complete street elements to be incorporated into the corridor that encourage increased use of active modes of transportation. As the traffic demand increases, traffic operational characteristics will further deteriorate which may result in an increase in congestion, vehicle queuing, vehicle delay, and safety issues. This alternative would not satisfy the purpose and need of the Project.

Alternative 2

Alternative 2 generally consists of a typical width of 64 feet (ft) including the vehicle, pedestrian and bicycle facilities. This alternative includes narrowed 11-ft. travel lanes for majority of the Project limits that would be widened to 12-ft. from approximately Phillips Street to El Toro Road, a 10-ft. center dual turn lane, 7-ft. shoulders, and a pedestrian path on the NB side. Alternative 2 also includes a Class I separated bikeway on the southbound side of the roadway. During emergencies there is space for four outbound evacuation travel lanes on the roadway and one inbound emergency vehicle lane.

Alternative 3

Alternative 3 generally consists of a typical width of 64 ft. including the vehicle, pedestrian and bicycle facilities. This alternative includes narrowed 11-ft. travel lanes for majority of the Project limits that would be widened to 12-ft. from approximately Phillips Street to El Toro Road, a 10-ft. center turn lane, and 7-ft. shoulders and a pedestrian path on the NB side of the roadway. Alternative 3 also includes a Class I separated bikeway with adjacent pedestrian path on the southbound (SB) side and a Class II bike lane on the NB side of the roadway. During emergencies there is space for three outbound evacuation travel lanes and one inbound emergency vehicle lane. Additionally, the bikeway and pedestrian path on the SB side of the roadway will have a mountable curb, which could be used as an emergency vehicle lane.

Alternative 4

Alternative 4 generally consists of a typical width of 64-ft. including the vehicle, pedestrian and bicycle facilities. This alternative includes 12-foot travel lanes, and a 10-foot center dual left-turn lane, pedestrian paths/sidewalks on both the NB and SB sides of the roadway, and a 7-foot Class II buffered bike lane on both sides of the roadway. During emergencies, there is space for four outbound evacuation travel lanes and one inbound emergency vehicle lane by utilizing the bike lanes.

Alternative 5

Alternative 5 introduces a reversible lane that would provide a peak-direction capacity to a two-way road and decrease congestion by borrowing available lane capacity from the other (off-peak) direction. This alternative generally consists of a typical width of 64-ft. including the vehicle, pedestrian, and bicycle facilities. It would include 12-foot travel lanes and a 12- to 14- foot center reversible lane, pedestrian paths/sidewalks on both the NB and SB sides of the roadway, and a 5-foot Class II buffered bike lane on both sides of the roadway. During emergencies, there is space for four outbound evacuation travel lanes and one inbound emergency vehicle lane by utilizing the bike lanes.

Summary of Alternatives

The primary difference between the Build Alternatives (Alternatives 2 through 5) consist of the width of the travel lanes and the type of proposed bicycle and pedestrian facilities. Alternatives 2 and 3 would propose primarily 11-ft. travel lanes, while Alternative 4 would propose a mix of 11-ft. and 12-ft. travel lanes. Alternative 5, with its reversible lane, would also propose a mix of 11-ft. and 12-ft. travel lanes.

All of the Build Alternatives would include a pedestrian path along the NB side of LCR. However, Alternatives 2 and 3 would propose a Class I separated bikeway on the SB of LCR and Alternative 3 would also include a Class II bike lane on the NB side of LCR. Alternatives 4 and 5 would construct an additional pedestrian path on the SB side of LCR and a Class II bicycle lane on both sides of LCR. These differences would result in the same impacts to adjacent parcels for Alternatives 2 to 4 but would vary in the amount of acreage needed for each partial acquisition or temporary construction easement (TCE). Alternative 5 would result in additional impacts to adjacent parcels because slither partial acquisitions would be required.

3. Anticipated Environmental Approval

CEQA (choose one):

☐ Exemption
  ☐ Statutory ☐ Categorical ☐ Common Sense
☒ Initial Study or Focused Initial Study with proposed Negative Declaration (ND) or Mitigated ND
☐ Environmental Impact Report

NEPA (choose one):

☐ Categorical Exclusion
☒ Environmental Assessment with Finding of No Significant Impact
  ☒ Routine ☐ Complex
☐ Environmental Impact Statement

CEQA Lead Agency (if determined): Caltrans District 12
Estimated length of time (months) to obtain environmental approval: 18 to 24
Estimated person hours to complete identified tasks: TBD

4. Special Environmental Considerations

Based on the preliminary assessment of the four Build Alternatives (Alternatives 2 through 5) proposed, a number of environmental impacts have been identified which require special considerations. These following issues are discussed below.

Community Impacts

Build Alternatives 2 through 5 would require two permanent partial acquisitions from City and privately-owned parcels for turn pocket, a local roadway intersection and private driveway reconstruction. In addition, Alternative 5 would also require 27 additional permanent partial acquisitions. These ROW requirements are not anticipated to affect access to the property. Highway Easements and TCEs would also be required during construction throughout the proposed Project limits. It is not anticipated that the highway easements or TCEs will result in impacts to access during construction. Permanent and temporary impacts to City-permitted on-street parking may occur along LCR within the Project limits. A Traffic Study will identify parking and driveway impacts under each Build Alternative (Alternatives 2 through 5).

The undergrounding of existing overhead SCE utilities and various traffic and safety improvements proposed under the Build Alternatives (Alternatives 2 through 5) would result in an overall permanent net benefit to the communities adjacent to the Project limits. Impacts to the community during construction of the proposed Project would occur, however, a transportation management plan (TMP) would be implemented to avoid and minimize temporary impacts related to access and circulation. Early and ongoing public outreach efforts will be undertaken to educate and inform the public and stakeholders.

Under the Build Alternatives (Alternatives 2 through 5), the proposed Project would require a TCE and work within the Laguna Coast Wilderness Park, Laguna Beach Dog Park, and Laguna Beach Batting Cages. In addition, Alternative 5 would also require partial acquisition of the Laguna Beach Batting Cages. Orange County Parks is the owner with jurisdiction (OWJ) of the Laguna Coast Wilderness Park, and the City is the OWJ of the Laguna Beach Dog Park and the Laguna Beach Batting Cages. Any impacts to these properties would need to be evaluated under Section 4(f) and would require compliance with Section 4(f) of the Department of Transportation Act.

Biological Resources

The biological study area (BSA) for the proposed Project includes the Project limits plus a 50-ft. buffer for assessing direct impacts.

Available literature resources, including the California Department of Fish and Wildlife’s California Natural Diversity Database RareFind 5 program (Online CDFW 2018), California Native Plant Society’s (CNPS) Inventory of Rare and Endangered Plants of California (Online Edition, v. 8.2; CNPS 2018), Consortium of California Herbaria (Jepson Flora Project 2018), and USFWS online Information for Planning and Consultation Environmental Conservation Online System were reviewed to identify special-status plant and wildlife species and designated Critical Habitat with the potential to occur in the vicinity of the Project limits. Searches of the California Natural Diversity Database and

CNPS databases were conducted for the six U.S. Geological Survey 7.5' quadrangles surrounding the Project, which include *Newport Beach, Tustin, El Toro, Laguna Beach, San Juan Capistrano,* and *Dana Point, California*.

Additional resources used to characterize existing site conditions included: U.S. Geologic Survey topographic maps at a minimum 1:24,000 scale, USFWS National Wetland Inventory dataset, Natural Resource Conservation Service Soil Mapping, aerial imagery available on Google Earth, and a field visit to conduct vegetation mapping and a habitat assessment for special-status species with potential to occur in the vicinity of the proposed Project. The consultant biologist also identified all aquatic features with the potential to be regulated by the US Army Corps of Engineers and RWQCB pursuant to Sections 401 and 404 of the Clean Water Act, respectively, and by CDFW pursuant to Section 1600 of California Fish and Game Code. This assessment did not include a delineation of jurisdictional boundaries or wetland determination. Vegetation units were defined based on methodology defined in the online Manual of California Vegetation (CNPS 2018).

The proposed Project activities are covered by the County of Orange Central/Coastal Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) that was adopted on July 17, 1996, and for which an Implementing Agreement was executed between the federal and state wildlife agencies (US Fish and Wildlife Service [USFWS] and California Department of Fish and Wildlife [CDFW]) and participating entities, including the City. The measures incorporated in the NCCP/HCP satisfy the federal, state, and local project-specific mitigation requirements for the species and habitats addressed in the NCCP/HCP under the Federal Endangered Species Act, California Endangered Species Act, CEQA, NEPA, and the Migratory Bird Treaty Act. Impacts to coastal California gnatcatcher (*Polioptila californica californica,* CAGN) are covered by the NCCP/HCP and impacts to Least Bell's Vireo (*Vireo bellii pusillus*, LBVI) and Southwestern Willow Flycatcher (*Empidonax traillii* extimus, SWFL) are conditionally covered by the NCCP/HCP. Therefore, Section 7 Consultation with USFWS is not required as long as the project complies with the NCCP/HCP.

Pursuant to the Implementing Agreement, the following protocol presence/absence surveys may be required:

- Least Bell's Vireo
- Southwestern Willow Flycatcher

If these species are found within the BSA during presence/absence surveys, a biological monitor would be required during Project construction. Other special-status species, including burrowing owl (*Athene cunicularia*), American badger (*Taxidea taxus*), and nesting migratory birds, are expected to require avoidance, minimization or compensatory mitigation due to the potential for direct impacts. Therefore, the following focused species habitat assessments or surveys may be required:

- Burrowing Owl breeding season surveys and pre-construction surveys
- American badger pre-construction surveys
- Avoiding impacts to migratory bird breeding habitat during the breeding season, typically defined as February 15 through August 31.
- If removal of nesting habitat is necessary during the breeding season, pre-construction nesting bird surveys would be required. If nesting birds are detected, appropriate no-construction buffers would be required to prevent take of the nest.

A jurisdictional delineation (JD) is required and will be conducted to support regulatory permitting, if needed. Build Alternatives (Alternatives 2 through 5) may directly impact aquatic features that would require coordination and permits from other agencies, which would result in an extended environmental process. The expected review/permits associated with improvements to aquatic features are as follows:

- California Department of Fish and Wildlife 1602 Streambed Alternation Agreement
- Regional Water Quality Control Board (RWQCB) Section 401 Water Quality Certification
- US Army Corps of Engineers Section 404 Nationwide Permit (unless more than 300 linear ft. of streambed is impacted)

Coastal Zone

The proposed Project is located within the Coastal Zone. A Coastal Development Permit (CDP) issued by the City will be required prior to the start of construction.

Cultural Resources

The proposed Project under the Build Alternatives (Alternatives 2 through 5) has the potential to impact significant cultural and historic resources. The Native American Heritage Commission (NAHC) indicated that the area is sensitive for cultural resources as did several Native American groups. 12 prehistoric and six historic cultural resources are recorded within 0.25 miles of the proposed Project limits. A cultural monitor will be required during construction.

Paleontological Resources

The proposed Project area is underlain by multiple geologic units and contain areas of high potential/sensitivity for paleontological resources throughout the Project limits. Build Alternatives (Alternatives 2 through 5) have the potential to impact the young axial-channel deposits, Topanga Group, and Vaqueros Formation all of which have high potential of containing paleontological resources. A paleontological monitor will be required during construction.

Section 4(f) Resources

Laguna Coast Wilderness Park, Laguna Beach Dog Park, and Laguna Beach Batting Cages are identified as eligible Section 4(f) resources within the Project limits. Temporary occupancy of all three Section 4(f) facilities would occur during construction under all Build Alternatives (Alternatives 2 through 5) as a result of TCEs. In addition, Alternative 5 would also require partial acquisition of the Laguna Beach Batting Cages. Coordination with OWJs over Section 4(f) resources will be conducted, and any findings and recommendations will be included in the Section 4(f) Evaluation.

5. Anticipated Environmental Commitments

Project specific avoidance, mitigation, and/or minimization measures as well as the associated costs were not determined at this time because technical studies recommended in this Preliminary Environmental Analysis Report (PEAR) for the proposed Project have not been initiated. Anticipated environmental commitments for the proposed Project have been identified below. Additional environmental concerns and required environmental commitments may be identified during the Project Approval/Environmental Document (PA/ED) phase.

5.1 Community Impacts

5.1.1 Community Impacts

The proposed Project under the Build Alternatives (Alternatives 2 through 5) would result in impacts to the surrounding community as discussed below. Therefore, a Community Impact Assessment (CIA) is recommended during the PA/ED phase to identify additional impacts related to land use and community resources as a result of the proposed Project.

During and throughout construction, the TMP will address short-term impacts related to traffic and circulation during construction, including access to existing ADA-compliant cross walks, sidewalks, bus stops as well as existing handicapped/ADA parking spaces and parking spaces on public and private (including commercial) property within the Project limits.

5.1.2 Traffic and Transportation

The undergrounding of existing overhead utilities and various traffic and safety improvements proposed under the Build Alternatives (Alternatives 2 through 5) would result in an overall permanent net benefit to the communities adjacent to the Project limits. However, impacts to the community during construction of the proposed Project would occur. During the PA/ED phase, a Traffic Operations Analysis Report (TOAR) would be prepared to identify temporary impacts and construction staging requirements.

5.1.3 Utilities

Any disruptions to utility service under the Build Alternatives (Alternatives 2 through 5) would be scheduled and coordinated to ensure they would not adversely affect the surrounding community during construction of the proposed Project. As a result of the proposed Project, overhead transmission and distribution line poles on both the NB and SB directions of the LCR will be removed as the utility power lines will be underground as a result of the Project. Some of these distribution line poles include pole-mounted transformers. A utility substation is located on the southwest end of the Project, approximately 0.2 miles north of Laguna Bowl Road. Water and telecommunication (Verizon) lines are located to the east of the Project and would not be affected. These new underground utilities will connect to the SCE Morro Substation and require new tie-ins and minor work at the SCE Morro Substation.

5.1.4 Emergency Services and Transportation Management Plan

Coordination with emergency service providers and communication with the surrounding community, as part of the TMP, would minimize any adverse impacts to the adjacent community under the Build Alternatives (Alternatives 2 through 5). A TMP would be developed for implementation during construction activities to avoid and minimize temporary impacts related to access and circulation. The TMP would include, but not be limited to, information regarding any temporary lane closures, detours, signage, and a coordination plan with the local community and emergency service providers during construction activities.

5.1.5 Real Property Acquisitions

5.1.5.1 Partial Acquisitions

Partial acquisitions would be required of two parcels under all Build Alternatives (Alternatives 2 through 5). These parcels requiring partial acquisitions are identified as APNs 495-021-30 (City Corporation Yard) and 495-021-09 (Laguna College of Art and Design). Alternatives 2, 3, and 5 would also require a partial acquisition of these two parcels; whereas, Alternative 4 would only require a permanent easement. Alternative 4 would require 16 additional permanent partial acquisitions and Alternative 5 would require 27 additional permanent partial acquisitions, as identified in Table 1. Right-of-Way Impacts –Partial Acquisitions.

The proposed Project, under the Build Alternatives (Alternatives 2 through 5), is not anticipated to require full parcel acquisitions or relocation of properties. Full functional use of the property would remain and its structures would remain intact. Compensation to property owners due to property acquisition would be required in accordance with Caltrans and Federal Highway Administration (FHWA) policies and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

5.1.5.2 Temporary Construction Easements

The proposed Project under the Build Alternatives (Alternatives 2 through 5) is anticipated to require TCEs. The TCEs are comprised of private residential and business parcels, County parcels, and City parcels necessary to accommodate driveway relocations, construction of a new intersection, turn pockets, and other proposed Project improvements. Full functional use of the properties would remain and all associated structures would remain intact.

5.1.5.3 Staging Areas

Two potential staging areas have been identified within the Project limits (see Figure 2. Project Limits in Attachment A of this document), Staging Area 1 located at the City of Laguna Beach Maintenance Facility Parking Lot 16 and Staging Area 2 located on a City lot, adjacent to Friendship Shelter.

Table 1. Right-of-Way Impacts – Partial Acquisitions

Location	APN	Owner	Right-of-Way Requirements (Sq. Ft)			
			Alternative 2	**Alternative 3**	**Alternative 4**	**Alternative 5**
City Maintenance Yard	495-021-30	City of Laguna Beach	4,246	6,361	4,520*	10,119
Laguna College of Art & Design	495-021-09	Laguna College of Art & Design	854	399	1,438*	1,455
	496-061-20	City Of Laguna Beach	-	-	-	62
	496-061-38	County of Orange	-	-	-	3,721
21080 Laguna Canyon Rd	632-071-16	Oeath Gavin	-	-	80	406
21094 Laguna Canyon Rd	632-071-19	3501 W Segerstrom LLC	-	-	76	388
3015 Laguna Canyon Rd	632-071-20	3501 W Segerstrom LLC	-	-	74	377
2999 Laguna Canyon Rd	632-071-21	Patrick & Glenda Curran	-	-	54	275
2955 Laguna Canyon Rd	632-071-23	Sagebrush Properties LLC	-	-	116	596
	632-071-25	City of Laguna Beach	-	-	85	437
	632-081-10	City of Laguna Beach	-	-	309	1,554
2515 Laguna Canyon Rd	632-091-09	Dennis Upchurch & Rc Upchurch Investment Trust	-	-	-	94
2515 Laguna Canyon Rd	632-091-10	Dennis Upchurch & Rc Upchurch Investment Trust	-	-	-	61
2621 Laguna Canyon Rd	632-091-18	Dirk & Katherin Maes	-	-	-	148
21000 Laguna Canyon Rd	632-091-19	Laguna College of Art & Design	-	-	-	261
2655 Laguna Canyon Rd	632-091-20	Ronald Ellis	-	-	82	608
2675 Laguna Canyon Rd	632-091-21	Kids Love LLC	-	-	198	710
2715 Laguna Canyon Rd	632-091-24	Gordy & Nelly Buslach	-	-	40	340

Table 1. Right-of-Way Impacts – Partial Acquisitions

Location	APN	Owner	Right-of-Way Requirements (Sq. Ft)			
			Alternative 2	Alternative 3	Alternative 4	Alternative 5
2735 Laguna Canyon Rd	632-091-25	Caroline Brooks & The Caroline Maxine Separate	-	-	52	352
2795 Laguna Canyon Rd	632-091-29	Arden Smith Jr & Antonio Oliveira	-	-	-	212
2711 Laguna Canyon Rd	632-091-31	Starts LLC	-	-	116	54,418
2695 Laguna Canyon Rd	632-091-32	Andrew & Stephanie Chapel	-	-	177	612
2605 Laguna Canyon Rd	632-091-34	Funke-Kaiser Kurt Trust & Funke-Kaiser Family Trust	-	-	-	30
2761 Laguna Canyon Rd	632-091-35	Valbeach Garfield LLC	-	-	84	390
2775 Laguna Canyon Rd	632-091-36	Ajmer & Sunita Singh	-	-	37	333
2745 Laguna Canyon Rd	632-091-38	Mark & Susan Bolick			68	
2075 Laguna Canyon Rd	632-111-05	Dolores Warner & The Emanuel Weiner Election Trust	-	-	-	12.95
2055 Broadway	632-111-06	Laguna Canyon Road Commercial LLC	-	-	-	68
2003 Laguna Canyon Rd	632-111-07	School Laguna Beach Unified District	-	-	-	423
1975 Laguna Canyon Rd	632-111-10	Anthony & Irma Shaffer	-	-	-	83
Total			**5,100**	**6,760**	**1,648**	**78,546**

*Permanent easement only.
APN=Assessor's Parcel Number

5.1.6 Visual Resources

Visual impacts are discussed in Section 8.5. A Visual Impact Assessment (VIA) Technical Memorandum will be prepared during the PA/ED phase.

5.1.7 Coastal Zone

The proposed Project is located within the Coastal Zone and would need to comply and address The Coastal Act goals and policies as they relate to aesthetics, safety, water quality, landscape plans and preservation, endangered species, cultural resources, Environmentally Sensitive Habitat Areas (ESHA), and public access. The proposed Project will also require a coastal development permit (CDP) issued by the City prior to the start of construction.

5.1.8 Section 4(f) Resources

Laguna Coast Wilderness Park is identified as an eligible Section 4(f) resource within the Project limits. No permanent acquisition of the park would occur; however, the proposed Project under all Build Alternatives (Alternatives 2 through 5) would require a TCE along the park property directly adjacent to LCR. The existing driveways of the Big Bend Staging Area and Willow Canyon Staging Area will remain open throughout construction to allow for full use of the parking lot and continued access to the park. No parking spaces are anticipated to be impacted as a result of construction activities.

Laguna Beach Dog Park and Laguna Beach Batting Cages are also identified as eligible Section 4(f) resources within the Project limits. TCEs would be required of these two properties under all Build Alternatives (Alternatives 2 through 5). In addition, Alternative 5 would also require a partial acquisition of the Laguna Beach Batting Cages. Access to the park and batting cages will remain open during construction. No parking spaces are anticipated to be impacted as a result of construction activities.

The Project's temporary impacts under the Build Alternatives (Alternatives 2 through 5) to both parks and the batting cages, and the permanent impacts to the batting cages under Alternative 5 only, would not affect the activities, features, or attributes of the Section 4(f) resource. Therefore, the temporary occupancy and/or partial acquisition of these properties (depending on the Build Alternative) are anticipated to result in a *de minimis* finding.

A Section 4(f) Evaluation will be necessary to document findings and recommendations of the Section 4(f) properties during the PA/ED phase. The anticipated finding of the Section 4(f) Evaluation is *De Minimis* for all three properties due to the limited nature of impacts to Laguna Coast Wilderness Park, Laguna Beach Dog Park, and Laguna Beach Batting Cages.

5.2 Noise

Although the Project under Build Alternatives 2 through 4, would not construct a highway on a new location, physically alter an existing highway either horizontally or vertically, propose the addition of a through-traffic lane, auxiliary lane, or restriping existing pavement for the purpose of adding a through traffic lane or auxiliary lane, Build Alternative 5 would propose the additional traffic lane (although only at peak hour conditions along LCR). As a result of Alternative 5, the proposed Project would be classified as a Type I project under Title 23, Part 772, Code of Federal Regulations and thus, be subject to long-term operational noise analysis.

Additionally, the proposed Project under the Build Alternatives (Alternatives 2 through 5) would experience construction related noise impacts. These impacts are considered temporary. Therefore, A Noise Study Report (NSR) is recommended to address short-term construction impacts, and long-term operation impacts related to noise with the proposed Project.

5.3 Biological Resources

The Biological Study Area (BSA) supports Habitats of High Concern as determined by the Open Space – Conservation Element of the City's General Plan and five habitats the California Department of Fish and Game (CDFW) considers special-status. Project approval could be affected by the cost of compensatory mitigation for direct impacts to non-covered habitats.

Available literature resources, including the California Department of Fish and Wildlife's California Natural Diversity Database RareFind 5 program (Online CDFW 2018), California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants of California (Online Edition, v. 8.2; CNPS 2018), Consortium of California Herbaria (Jepson Flora Project 2018), and the United States Fish and Wildlife Service (USFWS) online Information for Planning and Consultation Environmental Conservation Online System were reviewed to identify special-status plant and wildlife species and designated Critical Habitat with the potential to occur in the vicinity of the Project limits. Searches of the California Natural Diversity Database and CNPS databases were conducted for the six U.S. Geological Survey 7.5' quadrangles surrounding the Project, which include *Newport Beach, Tustin, El Toro, Laguna Beach, San Juan Capistrano,* and *Dana Point, California*.

Additional resources used to characterize existing site conditions included: U.S. Geologic Survey topographic maps at a minimum 1:24,000 scale, USFWS National Wetland Inventory dataset, Natural Resource Conservation Service Soil Mapping, aerial imagery available on Google Earth, and a field visit to conduct vegetation mapping and a habitat assessment for special-status species with potential to occur in the vicinity of the proposed Project. The consultant biologist also identified all aquatic features with the potential to be regulated by the US Army Corps of Engineers and RWQCB pursuant to Sections 401 and 404 of the Clean Water Act, respectively, and by CDFW pursuant to Section 1600 of California Fish and Game Code. This assessment did not include a delineation of jurisdictional boundaries or wetland determination. Vegetation units were defined based on methodology defined in the online Manual of California Vegetation (CNPS 2018).

Species listed under the federal and/or California Endangered Species Acts with potential to occur in and/or adjacent to the BSA include the federally threatened CAGN, federally and state-endangered least bells vireo (LBVI), and federally and state-endangered southwestern willow fly catcher (SWFL). No other federally or state-listed species are expected to occur within or adjacent to the BSA. No critical habitat occurs within the BSA.

Build Alternatives (Alternatives 2 through 5) may directly impact all three listed species through habitat removal and may indirectly impact these species through temporary disturbance from construction noise, dust, or lighting during the breeding season. No direct impacts to these species are anticipated after implementation of avoidance and minimization measures. The proposed Project activities are covered by the NCCP/HCP. Impacts to CAGN are covered the Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) and impacts to LBVI and SWFL are conditionally covered by the NCCP/HCP. Compliance with the NCCP/HCP may require protocol presence/absence surveys for LVBI and SWFL. Should either species be present, a Species-Specific Mitigation and Monitoring Plan (Plan) would be required. The Plan would include avoidance and minimization measures such as 1) prohibiting the removal of suitable habitat during the breeding season, 2) conducting pre-construction surveys, and 3) establishing no-construction buffers. After implementation of these measures, direct impacts to LBVI or SWFL are not anticipated. However, compensatory mitigation may be required for indirect impacts to these species, should they be present, as a result of the loss or modification of suitable habitat.

The BSA may support 10 special-status plant species, none of which are federally or state-listed. However, only a small amount of potentially suitable habitat for these species (generally less than 0.25 acre of any single native vegetation community) would be directly impacted by the Project and these areas occur in narrow disturbed strips (generally less than 0.1 acre in size) and no more than 30-ft. of the edge of LCR pavement. As a result, it is unlikely, even if one of these species was present, that the number of plants in the impact area would constitute a significant local population. Therefore, no compensatory mitigation would be anticipated for potential impacts to special-status plant species. General avoidance and minimization measures such as 1) installing high-visibility fencing at authorized work limits in the vicinity of suitable habitat, 2) implementing water quality Best Management Practices (BMPs) and 3) implementing dust control BMPs would limit potential indirect impacts to these special-status plant species.

The Project has the potential to directly and indirectly impact other special-status amphibian, reptile, and mammal species. However, only a small quantity of potentially suitable habitat falls within the actual Project limits. As a result, it is unlikely, with the exception of American badger, that even if one of these species was present, that measures beyond avoidance and minimization of impacts beyond the Project limits would be required. Species-specific pre-construction surveys may be required to avoid direct impacts to American badger.

Migratory birds, including NCCP/HCP covered species, could nest throughout the Project limits. Direct impacts to migratory bird breeding habitat should be avoided during the breeding season, typically defined as February 15 through August 31. If removal of nesting habitat is necessary during the breeding season, pre-construction nesting bird surveys would be required. If nesting birds were detected, appropriate no-construction buffers would be required to prevent take of the nest.

Build Alternatives (Alternatives 2 through 5) have the potential to directly impact nesting migratory bird species and other special-status plant and wildlife species. In order to avoid and/or minimize direct impacts, the following measures should be included in the Project:

- Avoid impacts to migratory bird breeding habitat during the breeding season, typically defined as February 15 through August 31.
- If nesting habitat removal is necessary during the breeding season, pre-construction nesting bird surveys would be required. If nesting birds are detected, appropriate no-construction buffers would be required to prevent take of the nest.
- Conduct American badger and burrowing owl pre-construction surveys,
- Implement BMPs to prevent construction debris, invasive species, and dust from entering waterways or adjacent preserve areas,
- Install Environmentally Sensitive Area fencing to clearly delineate work authorized limits,
- Reduce work areas to the extent feasible,
- Provide Worker Environmental Awareness Training

The BSA includes linear aquatic features that have the potential to be regulated by US Army Corps of Engineers and RWQCB as non-wetland Waters of the U.S, by CDFW as unvegetated streambed, and by California Coastal Commission (CCC) as wetlands. A Jurisdictional Delineation (JD) is required and will be conducted to support regulatory permitting, if needed. Additionally, CDFW and CCC may regulate special-status or riparian habitats where they occur within the Project limits. Compensatory mitigation is likely to be required if the Project results in the loss of aquatic features.

The Project is anticipated to be of limited scope and impact to biological resources, and is anticipated to have a “no effect’ or “may affect, not likely to adversely affect” determination for impacts to federally listed species. Additional avoidance, minimization, and/or mitigation measures may be identified in the Natural Environmental Study (Minimal Impacts) (NES[MI]) and JD during the PA/ED phase.

5.4 Water Quality and Erosion

Construction work under the Build Alternatives (Alternatives 2 through 5) would disturb over one acre of soil and would require Stormwater Pollution Prevention Plan (SWPPP). BMPs identified in the SWPPP would be implemented to address potential impacts to water quality and soil erosion. Construction and maintenance BMPs are anticipated. Maintenance BMPs would include the installation of drain inlet stenciling on all inlet and catch basins. Construction BMP categories would include soil stabilization, sediment control, tracking control, wind erosion control, non-storm water management, waste management, and materials pollution control. Project specific BMPs would be determined during the final design phase of the proposed Project. A Water Quality Technical Memorandum will be prepared during the PA/ED phase.

5.5 Air Quality

During construction of the proposed Project under the Build Alternatives (Alternative 2 through 5), short-term degradation of air quality may occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and other construction-related activities. Emissions from construction equipment are also expected and would include CO, NOX, volatile organic compounds (VOCs), directly-emitted particulate matter (PM_{10} and $PM_{2.5}$), and toxic air contaminants such as diesel exhaust particulate matter. A construction emission analysis would be required to determine what mitigation, if any, would be required to meet the local South Coast Air Quality Management District (SCAQMD) California Environmental Quality Act (CEQA) thresholds.

Build Alternatives (Alternatives 2 through 5) are anticipated to require avoidance, minimization, and/or mitigation measures including any activities involving ground disturbance be required to follow the Caltrans Standard Specifications for Construction, the South Coast Air Quality Management District Rule 403 relating to controlling dust emissions and maintain engines to ensure good condition to limit ozone precursor emissions. Due to the inclusion of a reversible lane option under Alternative 5, the Project is also subject to regional conformity and must be modeled in the Regional Transportation Plan (RTP) and the FTIP. An Air Quality Assessment Report (AQAR) is recommended during the PA/ED phase.

5.6 Cultural Resources

The area within the Project limits under the Build Alternatives (Alternatives 2 through 5) may adversely affect archeological sites and historic resources. To adequately evaluate impacts of the proposed Project under Alternatives 2 through 5 on archaeological resources, a Caltrans format Archaeological Survey Report (ASR) is recommended. Depending on the results of the ASR and if the Project boundaries change to include any archaeological resources an Extended Phase I Survey may become necessary. Caltrans has recently evaluated the segment of SR-133/LCR between PM 0.0/7.8 for another project as ineligible for the NRHP/CRHR or as a CHL; SHPO concurred 7/24/18. Due to the presence of the Laguna Canyon Historic District, that is considered locally eligible, a Historical Resource Evaluation Report (HRER) may also be necessary. Each of these studies would be appended to a Caltrans format Historic Property Survey Report (HPSR). Under Section 106 of the National Historic Preservation Act (NHPA) consultation will be necessary with local Indian Tribes. Caltrans will be the CEQA lead agency and will need to conduct consultation with California Native American groups, per Assembly Bill 52 (AB 52). Additional measures identified in HPSR, ASR, and HRER (if necessary) may be determined in the PA/ED phase.

5.7 Paleontological Resources

The proposed Project is underlain by multiple geologic units, most of which have a high potential to contain significant paleontological resources based on previously recorded fossil localities, field surveying, and literature searches. Impacts to paleontological resources are a possibility. A combined Paleontological Identification Report/Paleontological Evaluation Report (PIR/PER) will be prepared during the PA/ED phase, and if potential impacts to significant paleontological resources may occur based on proposed construction activities, a Paleontological Mitigation Plan (PMP) will be completed during the PS&E phase to outline mitigation measures to reduce impacts. Measures to reduce impacts under the Build Alternatives (Alternatives 2 through 5) would include, but not be not limited to, the preparation of a paleontological mitigation plan and training for onsite personnel by a Principal Paleontologist and the presence of a qualified Paleontological Monitor onsite during construction activities. Should any paleontological resources be discovered during construction, requirements approved by Caltrans outlined in the PMP would be followed. Additional measures may be determined during the preparation of the PMP and would be adhered to.

5.8 Hazardous Waste/Materials

Under the Build Alternatives (Alternatives 2 through 5), no recognized environmental conditions (REC), based on the ASTM standard definition of RECs, have been identified for the proposed Project. However, the following environmental conditions may be encountered during Project construction activities:

- **Aerially-Deposited Lead.** Previously undisturbed soil areas and any unpaved areas within Caltrans ROW along the shoulders of SR-133 has the potential to contain aerially-deposited lead (ADL) soils.
- **Paint and Thermoplastic Striping.** Yellow paint used for lane striping and pavement marking along SR-133 may contain lead chromate.
- **Polychlorinated Biphenyls.** Utility pole- and pad-mounted electrical transformers within the Project limits may contain polychlorinated biphenyls (PCB).
- **Creosote and Pentachlorophenol.** Wooden utility poles within the Project limits may contain creosote and pentachlorophenol.

A full ISA is recommended for the PA/ED phase. Avoidance, minimization, and/or mitigation measures will be identified within the ISA prepared during the PA/ED phase. These measures are anticipated to include, but would not limited to, Preliminary Site Investigations (PSI) such as an ADL investigation in areas with undisturbed soil or unpaved shoulder areas, a PCB investigation associated with utility lines and electrical transformers, and a lead investigation for yellow paint used for lane striping or pavement marking. Additional measures may be identified within the ISA during the PA/ED phase.

6. Permits and Approvals

It is anticipated that the proposed Project will require the following permits and approvals identified in Table 2. Required Project Permits and Approvals.

Table 2. Required Project Permits and Approvals

Required Permit/Approval	Approval Timeframe
California Statewide National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Associated with Construction Activity (Order No. 2009-0009-DWG, NPDES No. CAS000002).	3 to 6 months
San Diego RWQCB: Section 401 Water Quality Certification	8 to 12 months
U.S. Army Corps of Engineers: Section 404 Nationwide Permit	3 to 6 months
California Department of Fish and Wildlife 1602 Streambed Alteration Agreement	3 to 6 months
California Coastal Commission/City of Laguna Beach: Coastal Development Permit (State and Local Jurisdiction)	3 to 6 months
State Water Resources Board: Construction General Permit	3 to 6 months
State Historic Preservation Office Consultation	4 to 5 months
De minimis finding from Orange County Parks and City of Laguna Beach	3 to 6 months
Approval of permanent partial acquisitions and/or easements	3 to 6 months

7. Level of Effort: Risks and Assumptions

The proposed Project contains multiple risks factors and assumptions. These risks factors and assumptions, discussed below, could add additional time, due to preparation and agency review and concurrence/approval, to the schedule and increase costs.

- If significant impacts are identified, it could elevate the environmental document from an IS/MND to an EIR, increasing the Project cost and schedule;
- Uncertainty in regulatory permitting timelines;
- Public controversy could delay the schedule;
- Unanticipated seasonal special status species surveys;
- Partial acquisitions will be required under all Build Alternatives (Alternatives 2 through 5). If difficulties arise during acquisitions, a delay of schedule may occur.

8. PEAR Technical Summaries

8.1 **Land Use:** Land uses within the Project limits are generally rural in character and include Permanent Open Space, Open Space, Residential/Hillside Protection, Public/Institutional, Light Industrial, Village Low Density and Medium Density, and Central Business District, per the City's General Plan Land Use Map (2009). The Project is also located within the Residential Hillside Protection Zone (R/HP) and

Village Community Zone (VC), per the City of Laguna Beach General Plan Zoning Map (2009) and is located within the CCC jurisdiction.

Table 1. Right-of-Way Impacts –Partial Acquisitions in Section 5.1.4 summarizes the ROW impacts for permanent partial acquisitions. The proposed Project under Alternatives 2 through 5 would require the partial acquisition of two parcels (APN 495-021-30 City Corporation Yard and APN 495-021-09 Laguna College of Art and Design). Alternatives 2, 3, and 5 would also require a partial acquisition of these two parcels; whereas, Alternative 4 would only require a permanent easement. Alternative 4 would require 16 additional permanent partial acquisitions and Alternative 5 would require 27 additional permanent partial acquisitions. TCEs are anticipated for the proposed Project for turn pockets, a local roadway intersection, private driveway reconstruction, and other proposed Project improvements. The partial acquisitions, permanent easements, and TCEs are for both privately and publicly owned property.

Although the land use designation of parcels requiring permanent partial acquisition would change to a transportation public ROW, the Build Alternatives (Alternatives 2 through 5) would not change the existing function and use of these properties. The surrounding lands would also continue to remain the same.

8.2 **Growth:** The proposed Project would not induce growth within the City. The proposed Project is intended to be make safety and operational improvements to the highway, not increase the capacity. It is recommended that growth impacts related to the proposed Project be documented in the environmental document during the PA/ED phase.

8.3 **Farmlands/Timberlands:** Based on the information from the Land Use Element of the City's General Plan (2012), there are no designated farmlands within the proposed Project limits. In addition, as designated by the California Department of Conservation no land has been classified as prime farmland, farmland of statewide importance, or unique farmland. No timberlands have been identified in the Project limits or in the vicinity of the proposed Project. Therefore, no impacts would occur to designated farmlands or timberlands as a result of the proposed Project and no further studies for this topic would be recommended during the PA/ED phase.

8.4 **Community Impacts:** The proposed Project proposes to relocate existing utility lines underground and to install traffic signalization at the intersection located at the Laguna College of Art and Design's main campus driveway. Temporary noise, dust, and traffic circulation and access issues to the community, in particular to nearby residential properties, businesses, schools, and recreational users, are anticipated during construction. However, these impacts are considered temporary, and would cease upon the completion of construction.

Additionally, as shown in Table 3. Consistency with Regional and Local Plans, the Build Alternatives (Alternatives 2 through 5) are consistent with existing regional and local plans. In addition, the Build Alternatives (Alternatives 2 through 5) are consistent with applicable City General Plan goals and policies to provide a safe circulation system for all users while protecting and encouraging bicycle and pedestrian travel. Table 3. Consistency with Regional and Local Plans summarizes the Project's consistency with adopted regional and local plans.

Table 3. Consistency with Regional and Local Plans

Goals and Policies	Project Consistency
Southern California Association of Governments - Regional Transportation Plan 2012-2035[1]	
Challenge Area 7 - Local jurisdictions should incorporate signalization at problem non-signalized intersections.	**Consistent**
Challenge Area 8 - Local jurisdictions should consider pedestrian needs in all roadway and transit projects	**Consistent**
Challenge Area 13 - Local jurisdictions should fund and install dedicated bicycle facilities where appropriate and safe.	**Consistent**
County of Orange General Plan – Recreational Element[2]	
Policy 1.3 - Regional riding and hiking trails shall, to the extent possible, be designed and constructed to enhance public safety by affording access to law enforcement, fire, emergency, public utility and maintenance vehicles.	**Consistent**
Policy 2.3 - Trail closures shall be kept to a minimum and, if a trail is closed, efforts should be made to have alternative trail routes available.	**Consistent**
City of Laguna Beach General Plan – Land Use Element[3]	
Policy 2.1 - Maintain the diversity and uniqueness of individual neighborhoods. Development standards and design review guidelines shall minimize the scale and bulk of new construction and/or renovation and require development to be compatible with the surrounding residences.	**Consistent**
Policy 2.3 - Preserve and enhance the qualities that contribute to the character of the residential community, including quiet neighborhoods, pedestrian use of streets, and appropriate levels of illumination and nighttime activity and seek to mitigate the effects of high-volume thru-traffic.	**Consistent**
Policy 3.1 - Promote development that is compatible with the pedestrian-oriented village character of the downtown (e.g., small lot sizes and height limitations).	**Consistent**
Policy 3.5 - Promote safe and adequate pedestrian access to and within commercial areas.	**Consistent**
Policy 3.8 - Encourage pedestrian access and orientation in all commercial areas.	**Consistent**
Policy 4.3 - Maintain and enhance access to coastal resource areas, particularly the designated public beaches, by ensuring that access points are safe, attractive, and pedestrian friendly.	**Consistent**
Policy 6.9 - Provide public access to designated public areas wherever safe and legally and environmentally appropriate.	**Consistent**
Policy 7.2 - Maintain the General Plan designation of Permanent Open Space and the Zoning designations of Open Space/Conservation and Open Space/Passive as a method of protecting natural resources.	**Consistent**
Policy 8.1 - Encourage a pedestrian-oriented, non-motorized community by developing a system of bikeways and pedestrian paths and discouraging high-speed traffic along City streets.	**Consistent**

Table 3. Consistency with Regional and Local Plans

Goals and Policies	Project Consistency
Policy 8.2 - Maintain a pedestrian-oriented community while facilitating the movement of traffic in a safe and uncongested manner.	**Consistent**
Policy 8.3 - Provide walking and biking opportunities to link residential and commercial neighborhoods through improvements such as sidewalks, bicycle lanes and multi-use trails.	**Consistent**
Policy 8.5 - Require the construction of sidewalks and pathways and/or sidewalk widening on streets that carry significant pedestrian traffic.	**Consistent**
Policy 9.5 - Ensure that streetscapes are designed or modified to facilitate safe transit and bicycle and pedestrian movement.	**Consistent**
Policy 9.8 - Avoid the extension of community facilities, roads, and other infrastructures into environmentally sensitive areas when surplus capacities could facilitate or discourage extension of new development detrimental to those areas. Avoid the extension of roads and other infrastructure for the support of cellular/radio communication towers into environmentally sensitive areas and to protect public coastal views whenever feasible.	**Consistent**
City of Laguna Beach General Plan – Transportation, Circulation and Growth Management Element[4]	
Policy 1D – Discourage new roads and the extension or widening of existing roadways, since traffic almost always expands to fill available road capacity.	**Consistent**
Policy 2B - Discourage driveway access on Pacific Coast Highway and Laguna Canyon Road so interruptions to traffic flow are minimized.	**Consistent**
Policy 2H - Promote the safe and efficient movement of both local and through traffic, including the improvement of “bottleneck” intersections where feasible	**Consistent**
Policy 2I - Promote a local circulation system which serves the community and provides linkages to neighborhoods and regional transit facilities.	**Consistent**
Policy 2M - Avoid extending roads and utilities to identified Environmentally Sensitive Areas and unincorporated County lands.	**Consistent**
Policy 2P - Require proposals for major road improvements, alterations or major public works projects in Laguna Canyon to provide sufficient information on environmental impacts and on design and construction alternatives to enable the City to evaluate the proposal for conformance with all applicable general plan policies. Ensure that any such project is the least environmentally damaging alternatives and is approved only if sized, sited and designed in a manner that will not degrade environmentally sensitive areas, scenic resources, significant natural landforms, parks or recreation areas.	**Consistent**
Policy 6G - To enhance and increase public access, pursue funding for planning and development of a peripheral parking program for parking, increased access to the beaches and transit opportunities. Specifically, study the Pacific Coast Highway corridor, Laguna Canyon Road, El Moro school and the downtown area for parking and transit opportunities, including appropriate locations for parking structures.	**Consistent**
Policy 9C - Support and coordinate the development and maintenance of bikeways in conjunction with the county of Orange Master Plan of Countywide Bikeways to assure that local bicycle routes will be compatible with routes of neighboring jurisdictions. In particular, these bikeways include	**Consistent**

Table 3. Consistency with Regional and Local Plans

Goals and Policies	Project Consistency
Route 67 through Laguna Laurel Regional Park, Route 71 along Laguna Canyon Road, Route 75 along El Toro Road and Route 25 along Pacific Coast Highway.	
Policy 9E - Encourage the safe utilization of easements and/or rights-of-way along flood control channels, public utility rights-of-way and street rights-of-way wherever possible for use by bicyclists and/or hikers.	**Consistent**
Policy 9F - Encourage pedestrian access and orientation in the Central Business District.	**Consistent**
Policy 10A - Improve and maintain the transportation system to further enhance adequate emergency access to all developed areas.	**Consistent**
City of Laguna Beach General Plan – Transportation, Circulation and Growth Management Element[5]	
Policy 1P - Inform utility companies of potential conflicts between the location of their facilities and the currently identified high or extreme hazard areas and encourage them to program for relocation or undergrounding of potentially impacted facilities, especially along designated primary emergency routes.	**Consistent**
Policy 1S - Continue to encourage the undergrounding of utilities in existing developed areas of the City and require any new development to underground utilities.	**Consistent**
Laguna Canyon Annexation Area Specific Plan[6]	
Goal B - Balance the need for street improvements against the objective to protect the existing rural character of the Canyon annexation area.	**Consistent**
Downtown Specific Plan[7]	
Goal 1 - Preserve and enhance the village character of the downtown.	**Consistent**
Goal 5 - Improve the traffic circulation and parking congestion in the downtown.	**Consistent**

[1] SCAG, 2012

[2] County of Orange, 2005

[3] City of Laguna Beach, 2012

[4] City of Laguna Beach, 1999

[5]-City of Laguna Beach, 1995

[6] City of Laguna Beach, 2008a

[7] City of Laguna Beach, 2008b

Environmental Justice

The proposed Project is located within Census Tracts 626.04, Block Group 2, and Census Tract 626.32, Block Group 1. Census data block group data from the 2012-2016 United States Census Bureau American Community Survey (ACS) 5-Year Estimates was used to gather demographic and economic information. Based on the census data, no environmental justice communities were identified.

The area within the Project limits consist of a predominately White population (72 percent). This is below the City's White population of 90 percent, but is higher than the County's White population of 63 percent. The area within the Project limits is not considered an environmental justice community because the non-white population and other non-white race groups within the area within the Project limits do not exceed 50 percent of the affected area. In addition, when analyzing the two census tracts (Census Tract 626.04, Block Group 2 and Census Tract 626.32, Block Group 1) that comprises of the area within the Project limits individually, both census tracts have a predominately White population ranging from 58 and 87 percent. Therefore, these census tracts are not considered an environmental justice community because the non-white population and other non-white race groups within these census tracts do not exceed 50 percent of the affected area.

The average median household income of $97,486 for a household of 2.34 persons is well above the 2018 Health and Human Services (HHS) poverty threshold of $20,780 for a household of three persons. As such, the area within the Project limits is not considered a low-income population. The median household income for each of the individual census tracts that comprises the area within the Project limits are also well above the 2018 HHS poverty threshold, ranging from $74,435 to $120,536 for a household of 2.26 to 2.41 persons, respectively. Therefore, these census tracts are not considered to be low-income populations.

Real Property Acquisition

The proposed Project would improve the existing roadway and would not alter existing communities. It will improve existing traffic, pedestrian, and bicycle facilities along LCR, a major transportation corridor for adjacent communities. Partial acquisition of two parcels would be required under all Build Alternatives (Alternatives 2 through 5). These parcels are identified as APNs 495-021-30 (City Corporation Yard) and 495-021-09 (Laguna College of Art and Design). Alternatives 2, 3, and 5 would also require a partial acquisition of these two parcels; whereas, Alternative 4 would only require a permanent easement. Alternative 4 would require 16 additional permanent partial acquisitions and Alternative 5 would require 27 additional permanent partial acquisitions, as identified in Table 1. Right-of-Way Impacts –Partial Acquisitions.

Although no relocations are anticipated at this time, should a change in Project design occur during the PA/ED phase where relocation is found to be required, then preparation of a Relocation Impact Memorandum would be recommended. Relocations would be subject to the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and Title 49 Code of Federal Regulations (CFR), Part 24. Relocations and ROW acquisitions would be processed through the Caltrans' Relocation Assistance program, and costs associated with the property acquisitions and assistance would be included in the Project cost estimates.

Traffic and Transportation/Pedestrian and Bicycle Facilities

The Orange County Transportation Authority (OCTA) operates Bus Route 89 which provides transit service from inland areas to downtown Laguna Beach via El Toro Road and LCR - terminating at the downtown Laguna Beach Bus Station. Ten bus stops are located within the Project limits, as follows:

- Anneliese's School (in the NB direction of LCR)
- Willow Canyon Staging Area/Laguna Coast Wilderness Park, located just south of El Toro Road in the SB direction of LCR)
- Vicinity of Stans Lane and Phillips Street, located just north of Sun Valley Drive (in the NB and SB directions of LCR)
- Vicinity of Stan Oaks Drive (in NB and SB directions of LCR)
- Laguna Canyon of Art & Design Main Campus (in NB and SB directions of LCR)
- Vicinity of Canyon Acres Drive (in NB and SB directions of LCR)

The City also operates a trolley bus service during the summer months to help relieve the traffic demand associated with beachgoers and other visitors heading to Laguna Beach for special events. This trolley service provides a shuttle between the City Maintenance Yard/Municipal Parking Lot (ACT V Parking Lot), which is heavily used as a park-and-ride lot, and other points downtown. In addition, a weekend Summer Breeze service (OC Bus Route 689) operates during the peak summer months providing bus service from a parking lot near the intersection of SR-133/I-405 to the downtown Laguna Beach Bus Station with intermediate stops at key destinations along LCR. During construction of the proposed Project, there may be potential impacts to bus and trolley service times and routes.

The existing roadway within the Project limits lacks pedestrian paths or sidewalks, or a designated bikeway, forcing pedestrians and bicyclists to use the limited shoulders to gain access to the various businesses, schools, recreational areas and trails, and transit stops along LCR. The proposed Project would improve pedestrian and bicycle mobility and safety and encourage the use of active transportation along the corridor by adding Class I and Class II bicycle lane(s), pedestrian pathways, and sidewalks with ADA access; improving access to transit facilities; and improving shoulders along the corridor.

Parking

City of Laguna Beach Maintenance Facility Parking Lot 16 (ACT V Lot)

Temporary impacts are anticipated at the City's Maintenance Facility Parking Lot 16. The Project anticipates to utilize the City's Parking Lot 16 as a potential staging area (identified as Staging Area 1 on Figure 2. Project Limits in Attachment A) during construction. The use of the parking lot as a staging area is considered a temporary impact and will cease upon completion of construction. Additionally, after construction, the parking lot will be returned to its existing condition. Access to the City's Maintenance Facility Parking Lot 16 will remain accessible throughout construction. No temporary or permanent loss of parking spaces are anticipated as a result of the Project.

Laguna College of Art & Design Main Campus

Temporary impacts are anticipated at the Laguna College of Art & Design Main Campus with regards to the entrance to the parking lot off of LCR. Access to the parking lot will remain accessible throughout construction. No temporary or permanent loss of parking spaces are anticipated as a result of the Project.

Laguna Coast Wilderness Park

Temporary impacts will occur to the existing parking lot at Laguna Coast Wilderness Park specifically in the areas of entrance to the Big Bend Staging Area and Willow Staging Area. A TCE is required in the existing driveways of the staging areas. However, access to these two driveways will remain open throughout construction to allow for full use of the parking lot. No temporary or permanent loss of parking spaces are anticipated as a result of the Project.

Although no impacts to parking spaces are anticipated at the City's Maintenance Facility Parking Lot 16, Laguna College of Art & Design Main Campus, and Laguna Coast Wilderness Park, permanent and temporary impacts to City-permitted on-street parking may occur along LCR within the Project limits. A parking study will be conducted during the PA/ED phase as part of the Traffic Study to further analyze these impacts, and to provide measures to reduce and minimize these impacts.

A CIA is recommended to be prepared during the PA/ED phase to further analyze the impacts discussed above, and to provide measures to reduce and minimize these environmental impacts. A Relocation Impact Memorandum is only recommended if during the PA/ED phase there are Project design changes where relocation is found to be required.

Section 4(f) Resources

Funding for the proposed Project is being sought from federal, state, and local sources. If the Project involves the use of federal funds, then the Project would be subject to Section 4(f) evaluation. There are parks and a recreational facility located within the Project limits, including the Laguna Coast Wilderness Park, Laguna Beach Dog Park, and Laguna Beach Batting Cages. The Build Alternatives (Alternatives 2 through 5) would require a TCE which would result in the temporary occupancy of the Laguna Coast Wilderness Park property, Laguna Beach Dog Park property, and Laguna Beach Batting Cages property that are located directly adjacent to the roadway improvements. In addition, Alternative 5 would also require a partial acquisition of the Laguna Beach Batting Cages. Orange County Parks is the OWJ of the Laguna Coast Wilderness Park, and the City is the OWJ of the Laguna Beach Dog Park and the Laguna Beach Batting Cages. The existing use of both parks and the batting cages will remain unchanged and access to the parking area would not be impacted during construction. Areas affected by the TCEs will be restored upon completion of construction. The Project's temporary impacts under the Build Alternatives (Alternatives 2 through 5) to both parks and the batting cages, and the permanent impacts to the parking area of the batting cages under Alternative 5, would not affect the existing activities, features, or attributes of these Section 4(f) resources. Therefore, the temporary occupancy of these properties (depending on the Build Alternative) are anticipated to result in a *de minimis* finding. A Section 4(f) Evaluation will also be prepared during the PA/ED phase to evaluate the requirements of Section 4(f) and to document the use finding, and coordination and concurrence from Orange County Parks and the City.

8.5 Visual/Aesthetics: The proposed Project under the Build Alternatives (Alternatives 2 through 5) would not include features that will visually degrade the view of LCR or views from LCR to neighboring businesses and hillsides. The Project would underground the overhead transmission lines within the Project limits along LCR. Undergrounding the transmission lines would remove vertical intrusions allowing less obstructions to scenic hillside resources from LCR within the Project limits. Thus, prominent ridgelines will not be impacted as a result of the proposed Project. If impacts were to occur, avoidance, minimization, and/or mitigation measures would be implemented to ensure the integrity of these features and remain consistent with the City's General Plan and the City's LCP. A VIA Technical Memorandum is recommended to be prepared during the PA/ED phase.

8.6 Cultural Resources: On April 18, 2018, a records search at the South Central Coastal Information Center, a part of the California Historical Resources Informational System, located at California State University Fullerton was conducted. The literature search revealed two historic cultural resources within the proposed Project limits:

30-177470, Historical route of LCR constructed prior to 1896; Caltrans has recently evaluated the segment of SR-133/LCR between PM 0.0/7.8 for another project as ineligible for the NRHP/CRHR or as a CHL. SHPO concurred on July 24, 2018.

30-177656, Laguna Canyon Historic District comprised of pre-1940s residential homes including homes located along LCR and in the Canyon Acres neighborhood adjacent to the LCR located at the southern end of the proposed Project. This resource is listed in the Historic Properties Data File (HPDF) and the City's local Historic Resources Inventory (2014) as not eligible for the NRHP/CRHR but determined to be a contributor to a district that is eligible for local listing or designation (NRHP Status Code: 5D2).

Additionally, twelve prehistoric and six historic cultural resources are recorded within ¼ mile of the proposed Project limits. One of these resources, 30-000285, is a prehistoric burial consisting of a human cranium that was exposed by a road grader in 1935. This resource is thought to be associated with the nearby Hogan Site, 30-000286, a nearby rock shelter containing two manos and a broken awl, as well as shell midden.

There have been approximately forty previous cultural resources studies conducted within ¼ mile of the proposed Project limits. Of these, twenty-seven are located within the Project limits or a portion thereof. Fifteen of the studies within ¼ mile of the Project limits had large study areas greater than ten acres; twenty-one had study areas of less than ten acres; and four were linear surveys. The entire Project limits has been previously surveyed for cultural resources.

A reconnaissance-level windshield survey was conducted on April 23, 2018. The survey confirmed that the majority of the immediate Project limits can be categorized as a built environment consisting of the paved highway SR-133/LCR. Laguna Coast Wilderness Park runs along the west side of Highway SR-133/LCR. This area is primarily undeveloped; however, the main recreational portion of the park it is not within the Project limits. A TCE is estimated to be required for the construction of the proposed road and adjacent sidewalks along LCR, and would be located on the outer most edge of the park's property that is directly adjacent to LCR.

The east side of SR-133/LCR is primarily developed with commercial businesses and residential properties. Ground visibility is poor in most areas of the Project due to the built environment, developed shoulders, and dense grasses and vegetation. Nearly all visible soils adjacent to LCR within the Project limits or the existing ROW appear disturbed due to road construction or other modern disturbances. The exception is an approximately 1,500-square-foot area of land on the east side of LCR, east of the Laguna College of Art & Design, which is indicated as being within the Project limits on the PSR/PDS Project description maps. This land is signed as a habitat restoration area, and is overgrown with vegetation and appears undisturbed. There are also several small slivers of land within the existing ROW on the west side of LCR near the southern Project limits boundary that appear undisturbed.

The records search identified prehistoric and historic archaeological resources within 0.25 miles of the proposed Project limits, including the presence of prehistoric human remains. These sites are not within the Project limits. There is a historic residential district immediately adjacent to the Project which has been determined not eligible for the NRHP/CRHR but is considered locally significant and may be impacted by the Project (30-177656). Caltrans has recently evaluated the segment of SR-133/LCR between PM 0.0/7.8 for another project as ineligible for the NRHP/CRHR or as a CHL. SHPO concurred on July 24, 2018.

Additionally, the NAHC indicated that the area is sensitive for cultural resources as did several Native American groups. Development of the area has likely disturbed and/or obscured prehistoric and historic archaeological resources, making it difficult to accurately predict the potential for impacting archaeological resources within the majority of the proposed Project limits. However, the survey identified several areas within the proposed Project limits and/or existing ROW which may not have been previously disturbed.

The potential for the Project under the Build Alternatives (Alternatives 2 through 5) to impact previously undisturbed soils, along with the presence of human remains in close proximity to the proposed Project limits, indicates a high sensitivity for cultural resources when working in previously undisturbed sediments. Therefore, it is recommended that an ASR, HRER, APE Map be prepared and appended to an HPSR for the PA/ED phase.

8.7 Hydrology and Floodplain: The proposed Project is within the Laguna Canyon Channel Watershed within the San Juan Hydrologic Unit (901.12) within the San Diego RWQCB jurisdiction. According to the Safety Element of the City's General Plan (June 1995) the entire Project is located within a 100-year flood zone. Further, based on the information from the Federal Emergency Management Agency (FEMA) Map Nos. 06059C0417J and 06059C0409J, the proposed Project is located within FEMA flood designations "AE" and identified as a Floodway Area within Zone AE. Areas located within "Zone AE" have a 1 percent probability of flooding every year, or within a 100-year floodplain. "Floodway Areas in Zone AE indicates that the floodway is the channel of a stream and includes any adjacent floodplain areas that must be kept free of encroachment so that the 1 percent annual chance flood can be carried without substantial increases in flood heights.

Although these designations are identified as high-risk flood areas, the projected increase in impervious area and disturbed soil area as a result of the proposed Project under the Build Alternatives (Alternatives 2 through 5) would not be sufficient enough to trigger a Conditional Letter of Map Revision (CLOMR) or Letter of Map Revision (LOMR). In addition, the proposed Project under the Build Alternatives (Alternatives 2 through 5) is located within the Coastal Zone and as such, will need to address water quality issues not only related to City and Caltrans, but Coastal Zone standards, as stipulated in the CDP.

Therefore, a Location Hydrologic Study (LHS) is recommended to be prepared for the Project during the PA/ED phase. This LHS would evaluate potential impacts related to hydrology and floodplain and provide the appropriate avoidance, minimization, and/or mitigation measures.

8.8 **Water Quality and Storm Water Runoff:** Caltrans' MS4 Permit, NPDES No. CAS000003, State Water Resources Control Board (SWRCB) Order No. 2012-0011-DWQ (adopted on September 19, 2012, and effective on July 1, 2013), as amended by Order No. 2014-0006-EXEC (effective January 17, 2014), Order No. 2014-0077-DWQ (effective May 20, 2014) and Order No. 2015-0036-EXEC (conformed and effective April 7, 2015) contains three basic requirements:

1. Caltrans must comply with the requirements of the CGP (see below);
2. Caltrans must implement a year-round program in all parts of the State to effectively control stormwater and non-stormwater discharges; and
3. Caltrans stormwater discharges must meet water quality standards through implementation of permanent and temporary (construction) BMPs to the Maximum Extent Practicable, and other measures deemed necessary by the SWRCB and/or other agency having authority reviewing the stormwater component of the project.

To comply with the permit, Caltrans developed the Statewide Storm Water Management Plan (SWMP) to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within Caltrans for implementing stormwater management procedures and practices as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes the minimum procedures and practices Caltrans uses to reduce pollutants in stormwater and non-stormwater discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The proposed Project will be programmed to follow the guidelines and procedures outlined in the latest Storm Water Management Plan (SWMP) to address storm water runoff. The Project will also comply with the Construction General Permit (NPDES No. CAS000002, SWRCB Order No. 2009-0009-DWQ, adopted on November 16, 2010) became effective on February 14, 2011 and was amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ (effecting July 17, 2012) which regulates storm water discharges from construction sites which result in a Disturbed Soil Area (DSA) of one acre or greater, and/or are smaller sites that are part of a larger common plan of development.

The anticipated storm water project risk level is Level 2. Implementation of treatment BMPs are recommended to treat the Project targeted design pollutants. It is anticipated that post-project state ROW will provide adequate area for BMPs. This will be confirmed during the PA/ED and PS&E phases. During the PA/ED phase, water quality impacts will be analyzed in detail within the water quality report. The water quality report will discuss the Caltrans BMP requirements, including treatment BMPs, as well as compliance with applicable laws and permits. It is assumed, during PS&E and outlined during PA/ED within the water quality report, the construction contractor will prepare and implement a SWPPP to address construction site BMPs during construction.

The Project is located within the Aliso Creek-Frontal-Gulf of Santa Catalina watershed and Salt Creek-Frontal Gulf of Santa Catalina sub-watershed. The Project is located within the San Juan Hydrologic Unit (HU) [901.00], the Laguna Hydrologic Area (HA) [901.10], and the Laguna Beach Hydrologic Sub-Area (HSA) [901.12] under the San Diego Regional Water Quality Control Board (San Diego RWQCB) jurisdiction. The receiving water body within the Project limits is Laguna Canyon Channel. Based on the Final 2014/2016 California Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report) approved by the SWRCB and United States Environmental Protection Agency (USEPA), Laguna Canyon Channel is not listed on the 303(d) list for Total Maximum Daily Load requirements. There are no 303(d) listed waters within the Project limits. Laguna Canyon Channel ultimately drains to Pacific Ocean. A small portion of the Pacific Ocean near the Laguna Canyon Channel outlet to the Pacific Ocean has been identified on the 303(d) list for indicator bacteria.

Beneficial surface water uses for Laguna Canyon Channel as identified within the San Diego RWQCB Basin Plan are:

- Municipal and Domestic Supply (MUN) waters are used for community, military, municipal, or individual water supply systems. These uses may include, but are not limited to, drinking water supply. Laguna Canyon Channel has been excepted from the MUN beneficial use.
- Agricultural Supply (AGR) waters are used for farming, horticulture or ranching. These uses may include, but are not limited to, irrigation, stock watering, and support of vegetation for range grazing.
- Non-contact Water Recreation (REC2: Secondary Contact Recreation) waters are used for recreational activities involving proximity to water, but not normally involving body contact with water where ingestion of water would be reasonably possible. These uses may include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, and aesthetic enjoyment in conjunction with the above activities.
- Warm Freshwater Habitat (WARM) uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.
- Wildlife Habitat (WILD) waters support wildlife habitats that may include, but are not limited to, the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.

Laguna Canyon Channel also has the potential beneficial surface water use of:

- Water Contact Recreation (REC1: Primary Contact Recreation) waters are used for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses may include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and use of natural hot springs.

The San Diego RWQCB Basin Plan has designated the following beneficial uses for groundwater in the Laguna Beach (HSA 901.12) as:

- Municipal and Domestic Supply (MUN) waters are used for community, military, municipal, or individual water supply systems. These uses may include, but are not limited to, drinking water supply. Laguna Canyon Channel is excepted from the MUN beneficial use.
- Agricultural Supply (AGR) waters are used for farming, horticulture or ranching. These uses may include, but are not limited to, irrigation, stock watering, and support of vegetation for range grazing.

The DSA for the Project is anticipated to be about 7 acres which includes areas for construction, access, and staging. Groundwater is estimated at approximately 7-ft. below ground surface (bgs). Test borings will be performed in later phases of the Project to confirm depth to groundwater. Potential temporary impacts to water quality that can be anticipated during construction include sediments caused by the temporary access of construction equipment, excavation and grading for the new roadway, vegetation removal, concrete waste from the construction, trash from workers and construction waste, petroleum products from construction equipment and/or vehicles, sanitary wastes from portable toilets and any other chemicals used for construction such as coolants used for equipment and/or concrete curing compounds.

Since the Project causes a DSA greater than 1.0 acre, the Project would need to comply with the NPDES Construction General Permit. The Project would be required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would identify temporary BMPs to address the potential temporary impacts to water quality. Project specific BMP measures will be specified and quantified during the final design. Design Pollution Prevention BMPs will be incorporated into the Project where appropriate to minimize impacts to water quality by preventing downstream erosion and stabilizing disturbed soil areas.

The Project is anticipated to result in a net impervious surface area less than the existing condition if the Alternatives are selected that result in a Class I bikeway and pedestrian walkway. The Class I bikeway and pedestrian walkway would be constructed utilizing impervious surfaces allowing water infiltration in those areas. This would lessen the net impervious surfaces to a negative number. As such, the Project would not be required to implement permanent BMPs for water quality. The Project is anticipated to result in a net negative impervious surface reducing the amount of storm water and runoff from the Project limits. The existing stream thresholds would not be exceeded as a result of the Project.

The Project will require a Section 401 Water Quality Certification, a Section 404 Nationwide Permit, a Construction General Permit, and a CDP. A Water Quality Technical Memorandum is recommended for the PA/ED phase.

8.9 **Geology, Soils, Seismic and Topography:** The proposed Project is located in Southern California, a seismically active region with numerous faults in the area. Seismic activity is common throughout Southern California. According to the Safety Element of the City's General Plan, the proposed Project is located within a geomorphic subarea, Major Canyons. The Newport-Inglewood fault is the closest dominant fault located three miles to the west. These faults have the potential to cause moderate to severe earthquakes. According to the City's GIS database[1], the Project limits are susceptible to liquefaction, a phenomenon caused when ground shaking causes the earth or soil to behave as a liquid. Impacts to geology, soils, seismic and topography will be discussed further in the environmental document during the PA/ED phase.

8.10 **Paleontology:** The proposed Project is located in the edge of the Peninsular Ranges geomorphic province. The Peninsular Ranges province is distinguished by northwest trending mountain ranges and valleys following faults branching from the San Andreas Fault. The Peninsular Ranges are bound to the east by the Colorado Desert and extend north locally to the Santa Monica Mountains (Yerkes and Campbell, 2005; Hillhouse, 2010), west into the submarine continental shelf, and south to the California state line.

Locally, the area within the Project limits is located in the San Joaquin Hills which is part of the Coastal Province of Orange County. The Coastal Province also includes Capistrano Hills, mesa areas, and coastal deposits on the western border of the county (Babilonia, et al., 2013). Laguna Canyon represents two disparate episodes of geologic history: the canyon walls are composed of sedimentary deposits from various marine environments in the Miocene Epoch (23 to 5.3 million years ago), while the canyon was cut into the San Joaquin Hills, and the sediments of the canyon floor deposited, during a low stand of global sea level during the Pleistocene Epoch (2.5 million years ago to 11,700 years ago).

A combined vehicular ("windshield") and pedestrian field survey of the Project limits was conducted on April 23, 2018, to verify the geology summarized in published reports and geological maps and to document any unrecorded paleontological localities. As a result, a determination can be made for the existence of paleontological material prior to the beginning of ground-disturbing activities, and areas can be located within the Project area that might contain paleontological resources.

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[1] http://gisweb.lagunabeachcity.net/Html5Viewer/index.html?configBase=http://gisweb.lagunabeachcity.net/Geocortex/Essentials/REST/sites/GISMap3/viewers/HTML5_22/virtualdirectory/Resources/Config/Default. Accessed May 25, 2018.

The proposed Project is underlain by multiple geological units, most of which have a high potential to contain significant paleontological resources based on known fossil collecting localities, field surveying, and information from published paleontological and geological literature. The geologic units with a high potential are the young axial-channel deposits, Topanga Group, and Vaqueros Formation. These findings apply to the Build Alternatives (Alternatives 2 through 5). In order to minimize impacts to potentially fossiliferous deposits, a combined PIR/PER, following the Caltrans SER, should be prepared by a Principal Paleontologist for the PA/ED phase. If a potential to impact significant paleontological resources is determined in the PIR/PER, a PMP is required during the August PS&E phase that outlines paleontological mitigation to reduce impacts during construction.

8.11 Hazardous Waste/Materials: The Project has the potential to encounter hazardous waste and materials during construction activities. Four environmental conditions were identified that would warrant PSIs during PA/ED to determine proper handling and disposal requirements. The four environmental conditions pertain to ADL, paint and thermoplastic striping (PTS), PCBs, and creosote and pentachlorophenol. PSIs are recommended during PA/ED to sample for the presence of ADL, PTS, and PCBs.

In addition to the PSIs identified above, a full ISA for all ROW acquisition properties would be prepared during PA/ED that would comply with ASTM E1527-21 to meet “innocent landowner” provisions under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), which establish a defense for the purchase of real property. The full ISA would include an environmental database search, review of historical land use records, field reconnaissance, interviews with knowledgeable individuals, and agency records review.

The Project would also be required to comply with the California Statewide NPDES General Permit for Discharges of Storm Water Associated with Construction Activity (Order No. 2009-0009-DWG, NPDES No. CAS000002). NPDES permit compliance would entail preparation and implementation of a SWPPP, which would include BMPs to address potential impacts related to the use and potential discharge of construction-related hazardous waste and materials such as oil, grease, paint, solvents, and sediment. There is also a potential earth-moving activity during construction may uncover unknown underground fuel storage tanks or contaminated soil and groundwater.

In addition, it is recommended that a full ISA be prepared during the PA/ED phase to identify pertinent plans that would be prepared prior to construction to protect worker health and safety and the environment in the event known and unknown hazards are encountered during construction. These plans may include a Construction Health and Safety Plan, Construction Contaminant Management Plan, and Construction Contingency Plan.

8.12 Air Quality: The proposed Project is located in Orange County, an area within the South Coast Air Basin (SCAB), which includes Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. Air quality regulation in the SCAB is administered by the SCAQMD, a regional agency created for the Basin. The U.S. EPA has classified the SCAB as attainment/maintenance for the CO, PM_{10}, and NO_2 federal standards and nonattainment for the O_3 and $PM_{2.5}$ federal standards. Under the California Clean Air Act (CCAA), the Orange County portion of the SCAB is designated as a nonattainment area for the O_3, $PM_{2.5}$, and PM_{10} State standards.

A site survey of the Project limits was conducted using aerial mapping and site photographs. Sensitive land uses, including residences, restaurants, college and school buildings, a marine mammal center, and a boys and girls club, were identified along LCR.

During construction, short-term degradation of air quality may occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and other construction-related activities. Emissions from construction equipment are also expected and would include CO, NO_X, VOCs, directly-emitted particulate matter (PM_{10} and $PM_{2.5}$), and toxic air contaminants such as diesel exhaust particulate matter. A construction emission analysis would be required to determine what mitigation, if any, would be required to meet the local SCAQMD CEQA thresholds. Due to the inclusion of a reversible lane option under Alternative 5, the Project is also subject to regional conformity and must be modeled in the Regional Transportation Plan (RTP) and the FTIP. An Air Quality Assessment Report (AQAR) is recommended for the proposed Project during the PA/ED phase. Coordination with the Transportation Conformity Working Group (TCWG) is necessary to assess conformity for particulate matter and determine if the proposed Project is a "Project of Air Quality Concern."

8.13 Noise and Vibration: During construction, heavy equipment, haul trucks, and employee commutes could generate high noise and vibration levels that would affect the sensitive land uses described above. A construction noise impact analysis would be required to determine what mitigation, if any, would be required to meet the local and State standards.

Although the Project under Build Alternatives 2 through 4, would not construct a highway on a new location, physically alter an existing highway either horizontally or vertically, propose the addition of a through-traffic lane, auxiliary lane, or restriping existing pavement for the purpose of adding a through traffic lane or auxiliary lane, Build Alternative 5 would propose the additional traffic lane (although only at peak hour conditions along LCR). As a result of Alternative 5, the proposed Project would be classified as a Type I project under Title 23, Part 772, Code of Federal Regulations and thus, be subject to long-term operational noise analysis.

Therefore, a Noise Study Report (NSR) is recommended to address short-term construction impacts, and long-term operation impacts related to noise with the proposed Project under the Build Alternatives (Alternatives 2 through 5).

8.14 **Energy and Climate Change:** The proposed Project under the Build Alternatives (Alternatives 2 through 5) would underground utilities. It is not anticipated that construction of the Build Alternatives (Alternatives 2 through 5) would alter the energy consumption in the City. In addition, the proposed Project would not increase the number of through lanes on LCR under Alternatives 2 through 4 and only proposes a reversible through travel lane in one direction along LCR during peak hours. Therefore unlikely to have an effect on regional traffic volumes. The proposed Project's effect on regional criteria pollutant greenhouse gas emissions and mobile source air toxics (MSAT) can be evaluated qualitatively. Energy impacts will be evaluated further within the environmental document during the PA/ED phase.

8.15 **Biological Environment:** Available literature resources, including the California Department of Fish and Wildlife's California Natural Diversity Database RareFind 5 program (Online CDFW 2018), California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants of California (Online Edition, v. 8.2; CNPS 2018), Consortium of California Herbaria (Jepson Flora Project 2018), and USFWS online Information for Planning and Consultation Environmental Conservation Online System were reviewed to identify special-status plant and wildlife species and designated Critical Habitat with the potential to occur in the vicinity of the Project limits. Searches of the California Natural Diversity Database and CNPS databases were conducted for the six U.S. Geological Survey 7.5' quadrangles surrounding the Project, which include *Newport Beach, Tustin, El Toro, Laguna Beach, San Juan Capistrano,* and *Dana Point, California*. Appendix B includes the USFWS Species List, California Natural Diversity Database, and CNPS record search results.

Additional resources used to characterize existing site conditions included: U.S. Geologic Survey topographic maps at a minimum 1:24,000 scale, USFWS National Wetland Inventory dataset, Natural Resource Conservation Service Soil Mapping, aerial imagery available on Google Earth, and a field visit to conduct vegetation mapping and a habitat assessment for special-status species with potential to occur in the vicinity of the proposed Project. The consultant biologist also identified all aquatic features with the potential to be regulated by the US Army Corps of Engineers and RWQCB pursuant to Sections 401 and 404 of the Clean Water Act, respectively, and by CDFW pursuant to Section 1600 of California Fish and Game Code. This assessment did not include a delineation of jurisdictional boundaries or wetland determination. Vegetation units were defined based on methodology defined in the online Manual of California Vegetation (CNPS 2018).

Habitats of high concern, as determined by the Open Space – Conservation Element of the City's General Plan, would be impacted as a result of the proposed Build Alternatives, specifically in the proposed location for Staging Area 2. In addition, the BSA supports five special-status communities: are covered and fully mitigated through participation in the NCCP/HCP. Therefore, Project approval could be affected by the cost of compensatory mitigation for direct impacts to non-covered habitats.

No federally or state-listed plant species are expected within the BSA, as detailed below. Based on the records search, eight federally and/or state-listed plant species were evaluated for the potential to occur within the BSA. These include:

- Thread-leaved brodiaea (Brodiaea filifolia) – Sage scrub and grassland where suitable mesic or clay soils occur (between Castle Rock Road and 3275 Laguna Canyon Rd) have a long history of disturbance. Not Expected.
- Salt marsh bird's beak (Chloropyron maritimum) – no coastal marsh or coastal dune habitat within the BSA. Not Expected.
- Slender horned spine-flower (Dodecahema leptoceras) – BSA is outside of known elevation range for the species. Not Expected.
- Laguna Beach dudleya (Dudleya stolonifera) – BSA does not include north-facing San Onofre or Miocene sandstone rock-outcrops. Not Expected.
- San Diego button celery (Eryngium aristulatum var. parishii) – BSA does not include the necessary vernal pool or mesic sage scrub or grassland habitat. Not Expected.
- Gambell's water cress (Nasturtium gambelii) – BSA does not include necessary marsh habitat. Not Expected.
- California Orcutt's grass (Orcuttia californica) – BSA does not include necessary vernal pool habitat. Not Expected.
- Big-leaved crown beard (Verbesina dissita) – BSA does not include suitable San Onofre brecca substrate or steep, rocky north-west facing slopes.

Based on the records search results, known species' range, and presence of California Sagebrush Scrub and California Buckwheat Scrub within and adjacent to the BSA, the federally threatened CAGN has the potential to occur within or immediately adjacent to the proposed Project limits. Similarly, based on the records search results, known species' range, and presence of Black Willow Thickets and Arroyo Willow Thickets within and adjacent to the BSA, the federally and state-endangered LBVI and SWFL have the potential to occur within or immediately adjacent to the BSA. No critical habitat occurs within the BSA. No other federally or state-listed wildlife species are expected to occur within or adjacent to the BSA, as detailed below.

Based on the records search results, federally and/or state-listed wildlife species that were evaluated for their potential for occurrence within the BSA, but that are not expected to occur include:

- San Diego fairy shrimp (*Branchinecta sandiegonensis*) – The BSA does not include suitable seasonal pond habitat
- Quino checkerspot butterfly (*Euphydryas editha quino*) – The BSA is outside of the known range for this species

- Vernal pool fairy shrimp (*Branchinecta lynchi*) – The BSA does not include suitable seasonal pond habitat
- Tidewater goby (*Eucyclogobius newberryi*) – The BSA does not support suitable brackish estuarine habitat
- Arroyo toad *(Anaxyrus californicus*) – The BSA does not include slow moving streams with shallow pools, nearby sandbars and adjacent undeveloped stream terraces.
- Tricolored blackbird (*Agelaius tricolor*) – The BSA does not include emergent marsh for breeding
- Western snowy plover (*Charadrius nivosus nivosus*) – The BSA does not include required beach, sand spit, or salt flat nesting habitat
- Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) – The riparian corridor associated with Laguna Canyon Creek does not meet the minimum width or acreage requirements for breeding
- Ridgway's rail (*Rallus obsoletus*) – The BSA does not include required salt marsh and mudflat habitat
- Bank swallow (*Riparia riparia*) – The BSA does not include the necessary riparian areas with sandy, vertical bluffs or riverbanks.
- California least tern (*Sterna antillarum browni*) – The BSA does not include the necessary beach and estuarine habitat
- Pacific pocket mouse (*Perognathus longimembris pacificus*) – The BSA does not include the necessary fine, sand substrate in sage scrub or grassland habitat

Build Alternatives (Alternatives 2 through 5) may directly impact all three-listed species through habitat removal and may indirectly impact all three-listed species through temporary disturbance from construction noise, dust, or lighting during the breeding season. No direct impacts to these species are anticipated after implementation of avoidance and minimization measures. The proposed Project activities are covered by the NCCP/HCP.

Based on the elevation range of the BSA (80-ft. above mean sea level at the southwest end of the BSA to 240-ft. above mean sea level at the northeast end of the BSA), soils in the undeveloped portions of the BSA (primarily Capistrano sandy loam with a small amount of Chino silty clay loam in the vicinity of Castle Rock road and small amounts of Anaheim loam, Cienaba-Rock Outcrop Complex and Rock-Outcrop Cieneba Complex protruding into the lateral margins of the BSA upslope from the road), known plant species' ranges, and the presence of California Sagebrush Scrub and California Buckwheat Scrub in the BSA, the following 10 special-status plant species, none of which are federally or state-listed, have the potential to occur in the BSA:

- South Coast saltscale (*Atriplex pacifica*);
- Catalina mariposa lily (*Calochortus catalinae*);
- Lewis' evening-primrose (*Camissoniopsis lewisii*);
- Cliff spurge (*Euphorbia misera*);

- Mesa horkelia (*Horkelia cuneata* var. *puberula*);
- Decumbent goldenbush (*Isocoma menziesii* var. *decumbens*);
- Allen's pentachaeta (*Pentachaeta aurea*);
- South coast branching phacelia (*Phacelia ramosissima* var. *austrolitoralis*);
- White rabbit-tobacco(*Pseudognaphalium leucocephalum*); and
- Nuttall's scrub oak (*Quercus dumosa*)
- Catalina mariposa lily, Lewis' evening-primrose, mesa horkelia, white rabbit-tobacco, and chaparral ragwort may also occur in Coast Live Oak Woodland (*Quercus agrifolia* Alliance). Catalina mariposa lily, Lewis' evening-primrose, and Allen's pentachaeta may occur in Mediterranean California Naturalized Annual and Perennial Grassland Group (primarily *Bromus diandrus* Alliance). White-rabbit tobacco may also occur in riparian woodland (Black Willow Thickets and Arroyo Willow Thickets).

Of the 10 special-status species with the potential to occur in the BSA, only Catalina mariposa lily is covered by the NCCP/HCP. Since most of the Project area is developed, only a small amount of potentially suitable habitat for these species (generally less than 0.25 acre of any single native vegetation community) falls within the actual Project limits and these areas occur in narrow disturbed strips (generally less than 0.1 acre in size) no more than 30-ft. of the edge of LCR pavement. The small areas of native habitat that would be directly impacted by the Project are not large enough to support significant local populations of these species that, if lost, would contribute to their listing on the state or federal endangered species lists. No compensatory mitigation would be anticipated for potential impacts to special-status plant species even if these species were present and focused surveys are not necessary.

Other special-status wildlife species with the potential to occur within the BSA and covered by the NCCP/HCP include arboreal salamander (*Aneides lugubris*), black-bellied slender salamander (*Batrachoseps nigriventris*), coastal whiptail (*Cnemidophorus tigris*), red-diamond rattlesnake (*Crotalus ruber*), San Bernardino ringneck snake (*Diadophis punctatus modestus*), coast horned lizard (*Phrynosoma coronatum*), Coronado skink (*Plestiodon skiltonianus interparietalis*), sharp-shinned hawk (*Accipiter striatus*), southern California rufous-crowned sparrow (*Aimophila ruficeps*), golden eagle (*Aquila chrysaetos*), rough-legged hawk (*Buteo lagopus*), red-shouldered hawk (*Buteo lineatus*), coastal cactus wren (*Campylorhynchus brunneicapillus*), northern harrier (*Circus hudsonius*), prairie falcon (*Falco mexicanus*), peregrine falcon (*Falco peregrinus*) and San Diego desert woodrat (*Neotoma lepida intermidia*).

Non-covered special-species wildlife species with the potential to occur within the BSA include California glossy snake (*Arizona elegans*), coast patch-nosed snake (*Salvadora hexalepis*), grasshopper sparrow (*Ammodramus savannarum*), long-eared owl (*Asio otus*), burrowing owl, white-tailed kite (*Elanus leucurus*), yellow-breasted chat (*Icteria virens*), yellow warbler (*Setophaga petechial*), pallid bat (*Antrozous pallidus*), Dulzura pocket mouse (*Perognathus californicus femoralis*), northwestern San Diego pocket mouse (*Chaetodipus fallax*), western mastiff bat (*Eumops perotis*), western red bat (*Lasiurus blossevillii*) and American badger. For these other special-status wildlife species, including those covered by the NCCP/HCP, only a small amount of potentially suitable habitat (generally less than 0.25 acre of any single native vegetation community) would be directly impacted by the Project and these areas occur in narrow disturbed strips (generally less than 0.1 acre in size) and no more than 30-ft. of the edge of LCR pavement. Compensatory mitigation would not be anticipated for potential impacts to these special-status wildlife species even if these species were present and focused surveys are not necessary. Species-specific pre-construction surveys for American badger and burrowing owl and measures for avoidance of direct impacts may be required should these species be present.

August 29, 2022

Migratory birds, including all of the special-status bird species described above, could nest throughout the Project limits. Direct impacts to migratory bird breeding habitat should be avoided during the breeding season, typically defined as February 15 through August 31. If nesting habitat removal is necessary during the breeding season, pre-construction nesting bird surveys would be required. If nesting birds were detected, appropriate no-construction buffers would be required to prevent take of the nest.

Although the Project occurs within primarily developed habitat, it abuts native habitat. Several invasive plant species with either Limited or Moderate ratings from the California Invasive Plant Council[2] were identified during the site visit including Brazilian pepper tree (*Schinus terebinthifolius*, Moderate), Peruvian pepper tree (*Schinus molle*, Limited), ripgut brome (*Bromus diandrus*, Moderate) and wild oats (*Avena fatua*, Moderate).

The BSA includes linear aquatic features that have the potential to be regulated by USFWS and RWQCB as non-wetland Waters of the U.S., by CDFW as unvegetated streambed, and by the CCC as wetlands. Additionally, CDFW and CCC may regulate Arroyo Willow Thickets and Black Willow Thickets where they occur within the BSA.

The Project is anticipated to be of limited scope and impact to biological resources and is anticipated to have a “no effect’ or “may affect, not likely to adversely affect” determination for impacts to federally listed species. To further evaluate Project

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[2] Moderate – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

impacts to biological resources and linear aquatic features, a NESMI and JD are recommended to be prepared during the PA/ED Phase.

8.16 **Cumulative Impacts:** Project related cumulative impacts would occur under all Build Alternatives (Alternatives 2 through 5). The cumulative impacts are not anticipated to be considered significant under CEQA or adverse under NEPA. The impacts may be seen as adverse or significant when viewed with other projects along SR-133. Three Caltrans projects have been identified within a half mile of the proposed Project, State Route 133 Safety Project PM 3.1/3.6, State Route 133 Canyon Acres Drive Safety Project PM 0.86/1.2 (SR-133 Canyon Acres Safety Project), and SR-133 Shoulder Widening Project. The SR-133 Safety Project and SR-133 Canyon Acres Safety Project are currently in the design phase. SR-133 Shoulder Widening Project is currently in the design Phase. The environmental document prepared during the PA/ED phase will analyze the cumulative impacts.

8.17 **Context Sensitive Solutions:** Context Sensitive Solutions (CSS) was developed by the FHWA and is used by Caltrans as its approach to include all stakeholders to design, plan, construct, maintain, and operate its transportation system. CSS may be included within aesthetic, historic, and community elements within the proposed Project. Further design during the PA/ED phase would include public outreach so the community can provide input for the proposed Project. Some of these solutions may be incorporated as design features or as avoidance, minimization, and/or mitigation measures during the PA/ED phase.

9. Summary Statement for PID

To identify environmental constraints, cost and potential mitigation needed, a Preliminary Environmental Analysis Report (PEAR) was prepared. As part of this effort, minimal field reviews, such as windshield surveys, were performed. Further in-depth analysis has been deferred to the PA/ED phase.

The anticipated document for compliance with CEQA and NEPA is an Initial Study/Environmental Assessment (IS/EA). Caltrans will be the lead agency under CEQA and NEPA. The IS/EA timeline could require up to 24 months to prepare from the start of the environmental studies to the approval of the environmental document.

Potential constraints and special considerations include:

- Under Build Alternatives (Alternatives 2 through 5), traffic circulation and access to businesses and residences along LCR may be impacted temporarily during construction of the proposed Project. A CIA is recommended to evaluate these potential community impacts.
- Under Build Alternatives (Alternatives 2 through 5), the proposed Project would require a TCE and work within an Orange County park, Laguna Coast Wilderness Park. Any impacts to the facility would need to be evaluated under Section 4(f) and

would require compliance with Section 4(f) of the Department of Transportation Act.

- The proposed Project, under the Bulid Alternatives, would require a NES(MI) and a JD to evaluate impacts on biological resources and identify any necessary avoidance, minimization, or mitigation measures. The proposed Project limits is primarily developed, roadway, but would require focused surveys for Least Bell's Vireo and Southern Willow Flycatcher and a Burrowing Owl Habitat Assessment/Breeding Season Survey.
- The proposed Project, under the Build Atlernatives, will require a Water Quality Technical Memorandum to address water quality issues in the area. A SWPPP would also be required because the proposed Project will disturb more than one acre of soil. BMPs will be identified within both the Water Quality Technical Memorandum and SWPPP to address water quality, sediment, and erosion control during construction.
- The proposed Project is within a 100-year flood plain. A Location Hydraulic Study is recommended.
- The proposed Project, under the Build Alternatives, would require an ASR to identify any archaeological resources within the Project area. If the Project limits were to change and include any archaeological resources, an Extended Phase 1 survey may be required. The portion of LCR within the project limits was determined not eligible for the NRHP/CRHR by the SHPO on 7/24/18, and the Laguna Canyon Historic District is locally eligible. An HRER may be required to evaluate the built environment or any historical resources in the APE. The ASR and HRER would be appended to the HPSR. Consultation with Native Americans will be required under Section 106 of the NHPA with Caltrans as the lead agency for NEPA, and for AB52 as the lead agency for CEQA.
- The proposed Project, under the Build Alternatives, will require excavations exceeding 6-ft. below ground surface, and potentially impact paleontological resources. A combined PIR/PER is required during PA/ED, and a PMP will be prepared during PS&E to outline a mitigation program during construction if it is determined that potentially significant paleontological resources may be impacted.
- The proposed Project, under the Build Alternatives, will require an ISA to address any hazardous waste concerns within the area, as well as potential impacts to water quality.
- The proposed Project, under the Build Alternatives, will require an AQAR to address air quality concerns within the Project limits due to a new signalized intersection. The AQAR would address PM and CO hot-spot analyses for local

transportation conformity. The Project would also require coordination with the Transportation Conformity Working Group to assess conformity for particulate matter and determine if the proposed Project is a “Project of Air Quality Concern.” In addition, a quantitative analysis of greenhouse gas emissions will be required.

- The proposed Project, under the Build Alternatives, will require a short-term and long-term noise and vibration analysis. With the inclusion of a reversible lane under Alternative 5, the proposed Project would be classified as a Type I project under Title 23, Part 772, Code of Federal Regulations, and thus, be subject to long-term operational noise analysis, as well. Therefore, a NSR would be required.
- The proposed Project would require the following permits: Coastal Development Permit, a Section 401 Water Quality Certification, a Section 404 Nationwide Permit, and a California Fish and Game 1602 Streambed Alteration Agreement.

10. Disclaimer

This Preliminary Environmental Analysis Report (PEAR) provides information to support programming of the proposed project. It is not an environmental determination or document. Preliminary analysis, determinations, and estimates of mitigation costs are based on the project description provided in the PID. The estimates and conclusions in the PEAR are approximate and are based on cursory analyses of probable effects. A reevaluation of the PEAR will be needed for changes in project scope or alternatives, or in environmental laws, regulations, or guidelines.

11. List of Preparers

Cultural Resources specialist: Ben Volta	Date: 5/27/2022
Biologist: Sarah Barrera	Date: 5/27/2022
Community Impacts specialist: Uyenlan Vu	Date: 5/27/2022
Noise and Vibration specialist: Angie Kung	Date: 5/27/2022
Air Quality specialist: Angie Kung	Date: 5/27/2022
Paleontology specialist/liaison: Curt Duke	Date: 5/27/2022
Water Quality specialist: Natalie Brim	Date: 5/27/2022
Hydrology and Floodplain specialist: Natalie Brim	Date: 5/27/2022
Hazardous Waste/Materials specialist: Uyenlan Vu	Date: 5/27/2022
Visual/Aesthetics specialist: Natalie Brim	Date: 5/27/2022
Energy and Climate Change specialist: Angie Kung	Date: 5/27/2022
Other:	Date: 5/27/2022
PEAR Preparer: Angie Kung, Environmental Section Manager	Date: 5/27/2022

12. Review and Approval

I confirm that environmental cost, scope, and schedule have been satisfactorily completed and that the PEAR meets all Caltrans requirements. Also, if the project is scoped as a routine EA, complex EA, or EIS, I verify that the HQ DEA Coordinator has concurred in the Class of Action.

Smita Deshpande
Environmental Branch Chief

Aug 18, 2022
Date

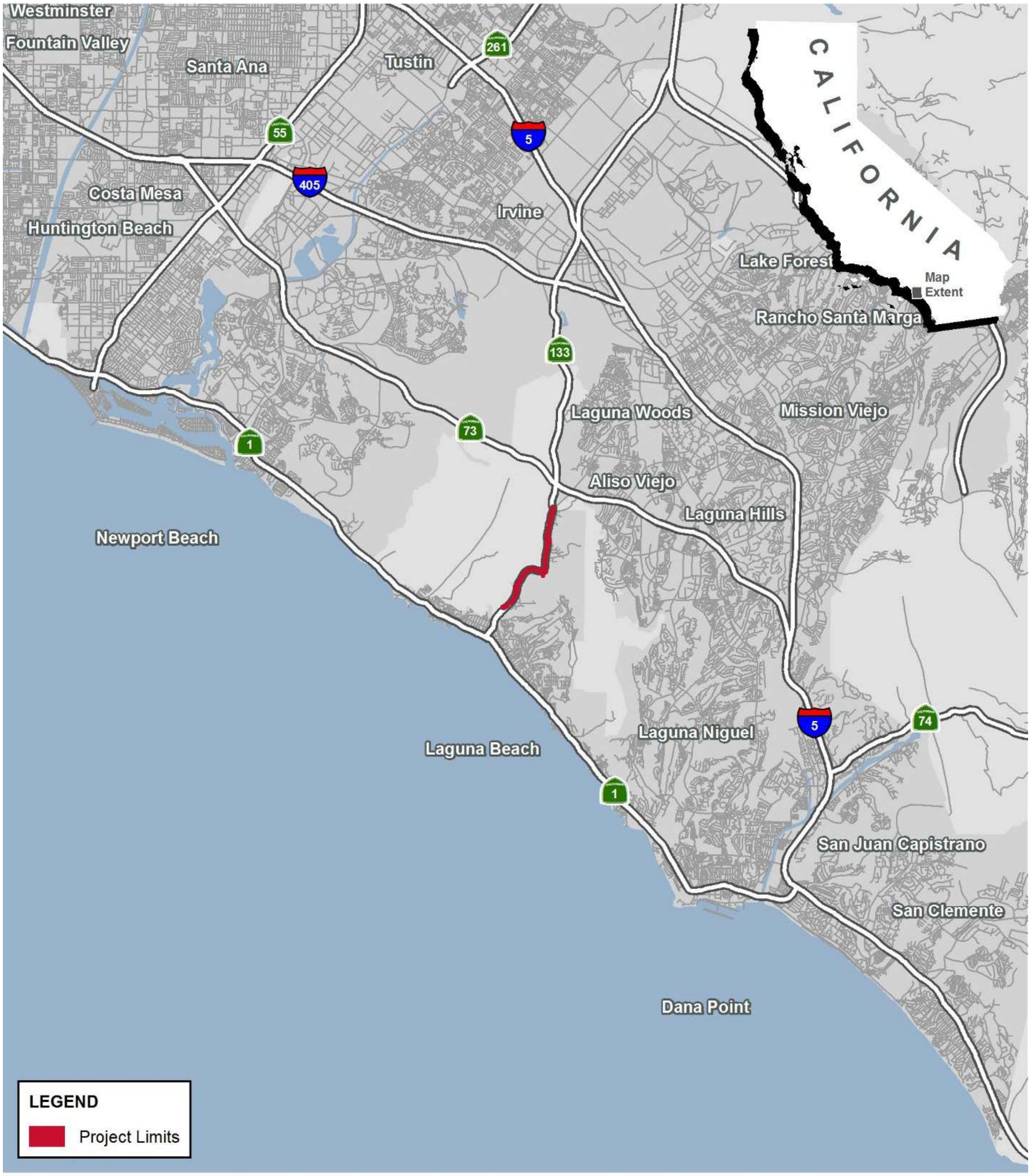
Project Manager

August 29, 2022
Date

ATTACHMENTS:

Attachment A: Figures
Attachment B: PEAR Environmental Studies Checklist
Attachment C: Mitigation and Compliance Cost Estimate (MCCE) (not required for PSR-PDS)
Attachment D: Schedule (Gantt Chart)
Attachment E: Caltrans staff should use the "Bottom Up Tool." External partners should contact their local Caltrans district office for direction.

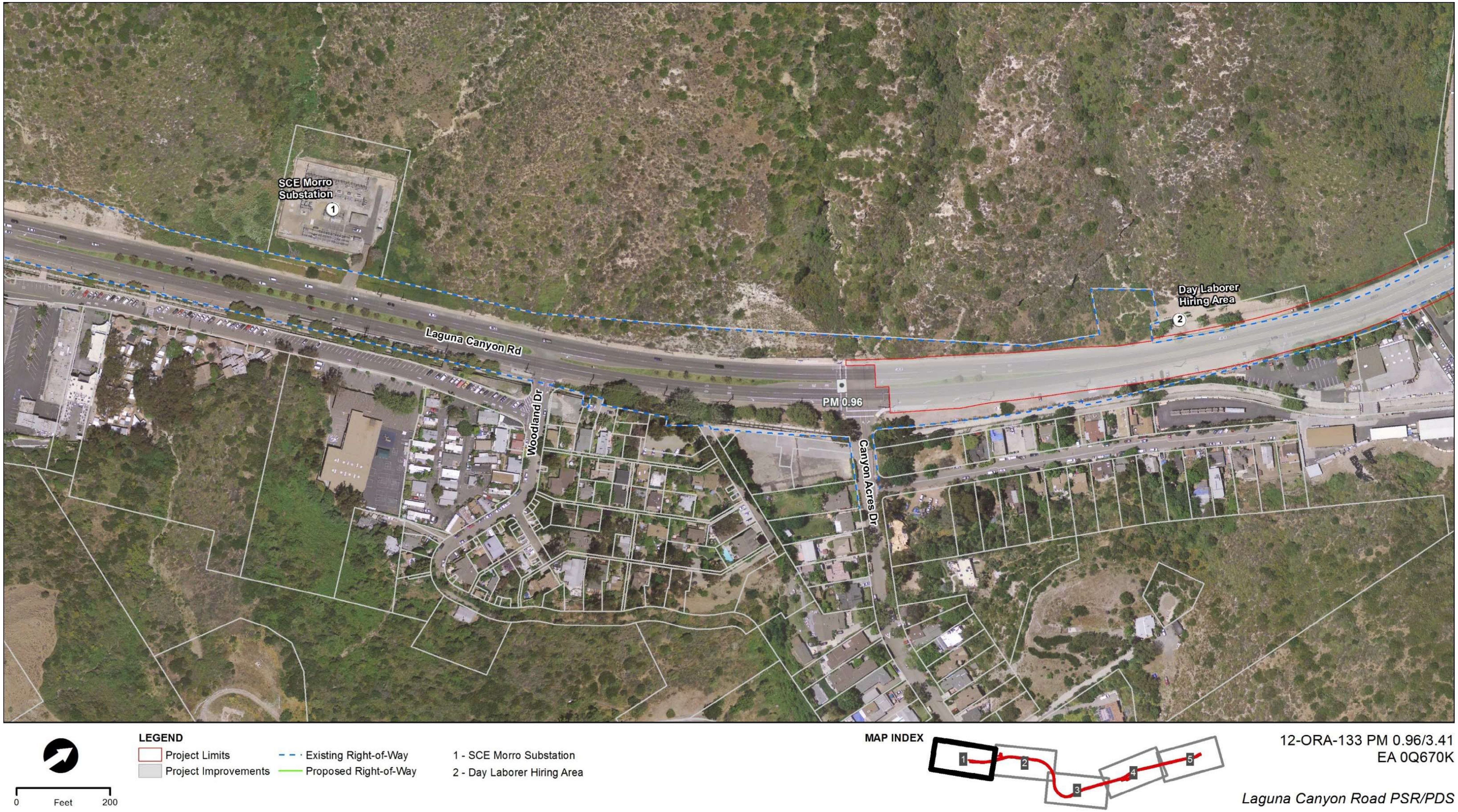
Attachment A: Figures



12-ORA-133 PM 0.96/3.42
EA 0Q670

Laguna Canyon Road PSR/PDS

Figure 1. Regional Location



12-ORA-133 PM 0.96/3.41
EA 0Q670K

Laguna Canyon Road PSR/PDS

Figure 2. Project Limits
Sheet 1 of 5

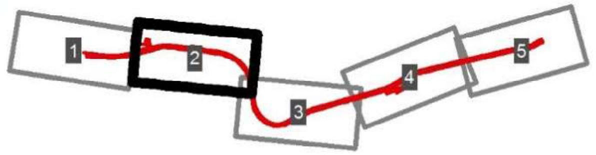
0 Feet 200

LEGEND

- ▭ Project Limits
- ▨ Project Improvements
- ▨ Construction Staging Area 1
- - - Existing Right-of-Way
- — Proposed Right-of-Way
- ▭ Laguna Coast Wilderness Park Trails
- ▭ Trails on Private Property
- ▭ Trails on Public Property

3 - City of Laguna Beach Maintenance Facility Parking Lot 16 (ACT V Lot)
4 - Laguna College of Art & Design Main Campus
5 - Laguna College of Art & Design East Campus: Senior Studios
6 - Laguna College of Art & Design Administration Building

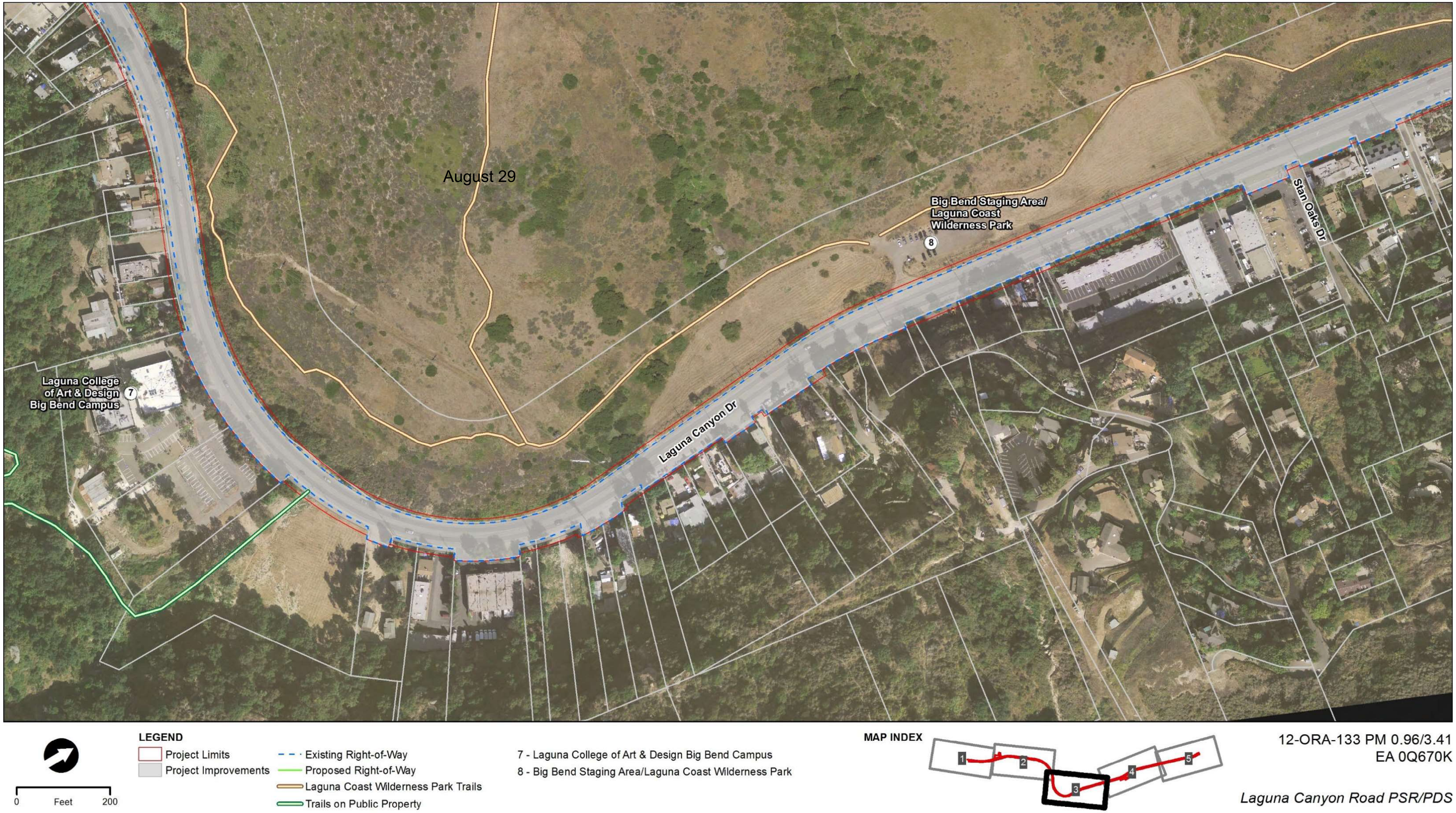
MAP INDEX



12-ORA-133 PM 0.96/3.41
EA 0Q670K

Laguna Canyon Road PSR/PDS

Figure 2. Project Limits
Sheet 2 of 5



12-ORA-133 PM 0.96/3.41
EA 0Q670K

Laguna Canyon Road PSR/PDS

Figure 2. Project Limits
Sheet 3 of 5

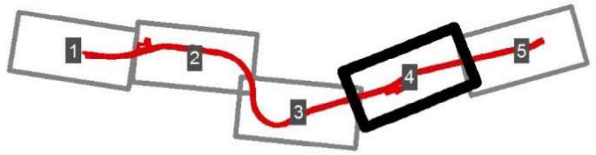
0 Feet 200

LEGEND

- ☐ Project Limits
- ▨ Project Improvements
- 🟩 Construction Staging Area 2 (20652 Laguna Canyon Rd)
- - - Existing Right-of-Way
- — Proposed Right-of-Way
- — Laguna Coast Wilderness Park Trails
- — Trails on Private Property
- — Trails on Public Property

9 - Laguna Beach Dog Park
10 - Laguna Food Pantry
11 - Alternative Sleeping Location

MAP INDEX



12-ORA-133 PM 0.96/3.41
EA 0Q670K

Laguna Canyon Road PSR/PDS

Figure 2. Project Limits
Sheet 4 of 5

12-ORA-133 PM 0.96/3.41
EA 0Q670K

Laguna Canyon Road PSR/PDS

Figure 2. Project Limits
Sheet 5 of 5

Attachment B: PEAR Environmental Studies Checklist

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Attachment B: PEAR Environmental Studies Checklist

Rev. 11/08

Environmental Studies for PA&ED Checklist

	Not anticipated	Memo to file	Report required	Risk* L M H	Comments
Land Use	☐	☐	☒	**L**	New ROW required (potential conversion of existing land uses to transportation). Included in CIA.
Growth	☒	☐	☐	**L**	Project related impacts not anticipated. Discussed in ED.
Farmlands/Timberlands	☒	☐	☐	**L**	
Community Impacts	☐	☐	☒	**M**	CIA, include parking survey
Community Character and Cohesion	☐	☐	☒	**L**	Included in CIA Technical Memorandum
Relocations	☒	☐	☐	**L**	Relocation Impact Memorandum, only if there are Project design changes during PA/ED where relocations are found to be required.
Environmental Justice	☐	☐	☒	**L**	Included in CIA.
Utilities/Emergency Services	☐	☐	☒	**M**	Included in CIA.
Visual/Aesthetics	☐	☐	☒	**L**	VIA Technical Memorandum.
Cultural Resources:	☐	☐	☒	**M**	HPSR, ASR, HRER.
Archaeological Survey Report	☐	☐	☒	**M**	
Historic Resources Evaluation Report	☐	☐	☒	**M**	
Historic Property Survey Report	☐	☐	☒	**M**	
Historic Resource Compliance Report	☒	☐	☐	**M**	Included in HPSR.
Section 106 / PRC 5024 & 5024.5	☐	☐	☒	**M**	Included in HPSR.
Native American Coordination	☐	☐	☒	**M**	Included in HPSR.
Finding of Effect	☒	☐	☐	**L**	
Data Recovery Plan	☒	☐	☐	**L**	
Memorandum of Agreement	☒	☐	☐	**L**	
Other:	☒	☐	☐	**L**	
Hydrology and Floodplain	☐	☐	☒	**L**	Discussed in LHS.
Water Quality and Stormwater Runoff	☐	☐	☒	**L**	Water Quality Technical Memorandum.
Geology, Soils, Seismic and Topography	☒	☐	☐	**L**	Discussed in ED.
Paleontology	☐	☐	☒	**H**	
PER	☐	☐	☒	**H**	
PMP	☐	☐	☒	**H**	Recommended during PS&E.

Environmental Studies for PA&ED Checklist

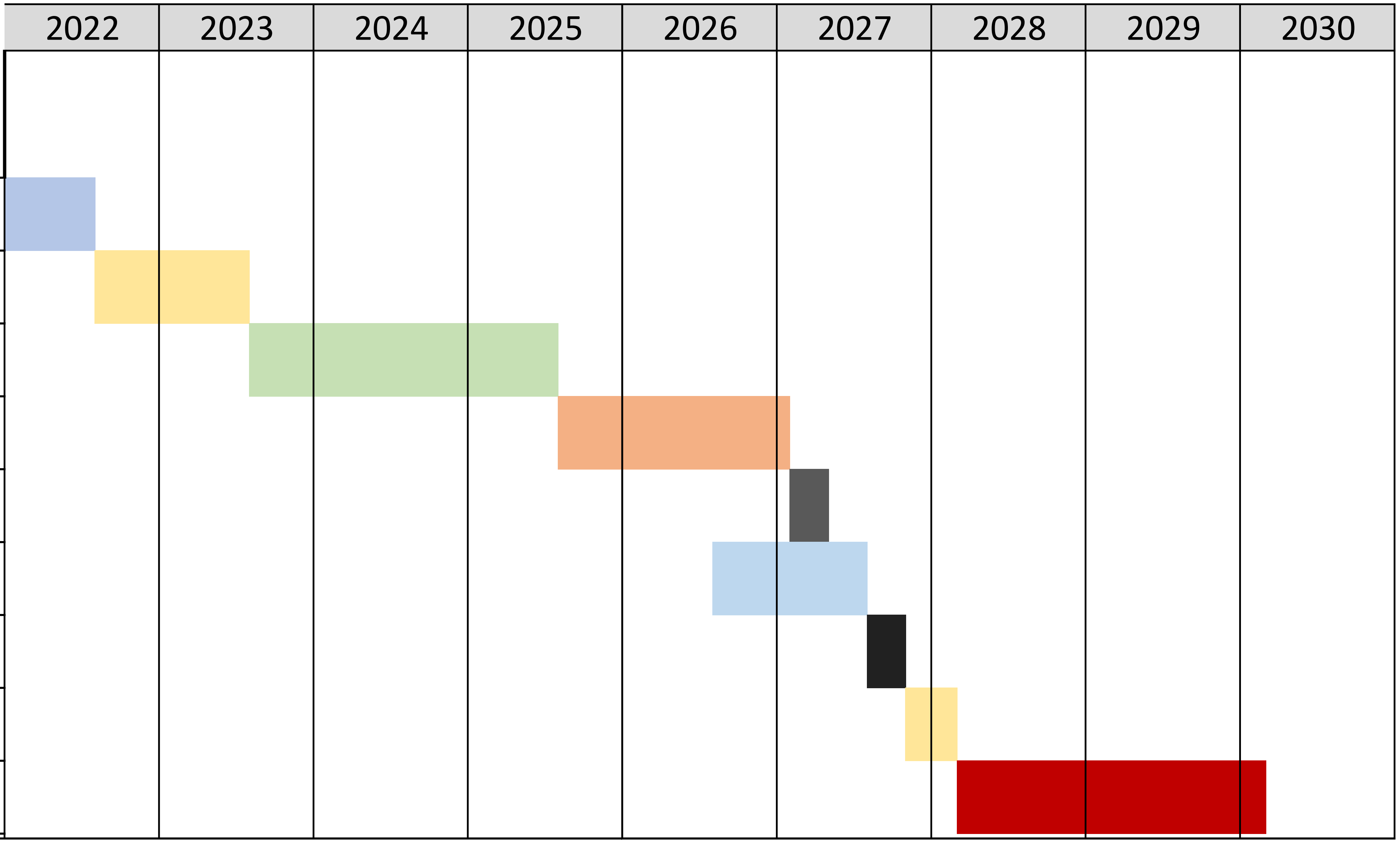
	Not anticipated	Memo to file	Report required	Risk* L M H	Comments
Hazardous Waste/Materials:	☐	☐	☒	**M**	
ISA (Additional)	☐	☐	☒	**M**	
PSI	☐	☐	☒	**M**	
Other:	☐	☐	☐		
Air Quality	☐	☐	☒	**L**	Air Quality Assessment Report.
Noise and Vibration	☐	☐	☒	**L**	Noise Study Report.
Energy and Climate Change	☒	☐	☐	**L**	Discussed in ED.
Biological Environment	☐	☐	☒	**M**	
Natural Environment Study	☐	☐	☒	**M**	NES(MI).
Section 7:	☒	☐	☐	**L**	
Formal	☒	☐	☐	**L**	
Informal	☒	☐	☐	**L**	
No effect	☒	☐	☐	**L**	
Section 10	☒	☐	☐	**L**	
USFWS Consultation	☒	☐	☐	**L**	
NMFS Consultation	☒	☐	☐	**L**	
Species of Concern (CNPS, USFS, BLM, S, F)	☐	☐	☒	**M**	
Wetlands & Other Waters/Delineation	☐	☐	☒	**M**	JD.
404(b)(1) Alternatives Analysis	☒	☐	☐	**L**	
Invasive Species	☐	☐	☒	**M**	Included in NES(MI).
Wild & Scenic River Consistency	☒	☐	☐	**L**	
Coastal Management Plan	☐	☐	☒	**M**	Included in NES(MI).
HMMP	☐	☐	☒	**M**	Included in NES(MI).
DFG Consistency Determination	☒	☐	☐	**L**	
2081	☒	☐	☐	**L**	
Other:	☒	☐	☐	**L**	
Cumulative Impacts	☒	☐	☐	**L**	Discussed in ED.
Context Sensitive Solutions	☒	☐	☐	**L**	Discussed in ED.
Section 4(f) Evaluation	☐	☐	☒	**M**	Section 4(f) Evaluation.
Permits:					
401 Certification Coordination	☐	☐	☒	**M**	
404 Permit Coordination, IP, NWP, or LOP	☐	☐	☒	**M**	
1602 Agreement Coordination	☐	☐	☒	**M**	
Local Coastal Development Permit Coordination	☐	☐	☒	**M**	
State Coastal Development Permit Coordination	☐	☐	☒	**M**	
NPDES Coordination	☐	☐	☒	**L**	
US Coast Guard (Section 10)	☒	☐	☐	**L**	
TRPA	☒	☐	☐	**L**	
BCDC	☒	☐	☐	**L**	

Attachment C: Mitigation and Compliance Cost Estimate (MCCE) (not required for PSR-PDS)

Attachment D: Schedule (Gantt Chart)

Laguna Canyon Road - Schedule

Project Milestones	**Mile stone**	**Scheduled Delivery Date (Month /Year)**	**Duration (Months)**
PSR/PDS Approval	M010	Jul-22	
Program Project	M015	Jul-23	12
Project Report/Env. Document Approval	M200	Jul-25	24
Complete PS&E	M377	Jan-27	18
Right-of-way Certification	M410	Apr-27	3
Obtain Coastal Development Permit		Jul-27	12
Ready-to-list	M460	Oct-27	3
Advertise/Bid/Award Contract	M495	Feb-28	4
Construction Contract Complete	M800	Feb-30	24



Base year	2022
Opening Year	2030
Horizon Year	2050

Attachment E: Caltrans staff should use the "Bottom Up Tool." External partners should contact their local Caltrans district office for direction.

Resources by WBS Code

Project ID: 1217000086
EA: 0Q670
Description: LCR

Cost Center				2985	2987	2987	3015		2999			3015								
WBS Task Activity Code	Division Chief	Office Chief	Senior	Generalist	Biology	Cultural	Haz Waste	Socio-Economic	Storm Water	ECL	Steward-ship	Noise/Air	Sup Svcs	Design	Hydraulics	Landscape	Planning	Right of Way	Surveys	Total
Assigned Unit																				
Project Management																				
100.10 – Project Management - PA&ED																				-
100.15 – Project Management - PS&E																				-
100.20 – Project Management - Construction																				-
100.25 – Project Management - Right of Way																				-
Total Project Management	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Develop Project Initiation Document (PID)																				
150.20.60 - PEAR Preparation				20	10	10	10		10			10								
Perform Preliminary Engineering Studies and Draft Project Report																				
160.05 – Updated Project Information																				-
160.10 – Engineering Studies																				-
160.15 – Draft Project Report																				-
160.30 – Environmental Study Request																				-
160.40 – NEPA Assignment																				-
Total Perform Prelim Eng Studies & Draft PR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perform Environmental Studies and Prepare Draft Environmental Document - Task Management Activitie																				
165.05 – Env Scoping of Alternatives																				-
165.10 – General Env Studies																				-
165.15 – Biological Studies																				-
165.20 – Cultural Resource Studies																				-
165.25 – Draft Env Document																				-
165.30 – NEPA Assignment																				-
Total Perform Env Studies & Prepare DED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Obtain Permits, Licenses, Agreements and Certifications (PLACs) and Route Adoptions during PA&ED Component - Task Management Activitie																				
170.05 – Reqired PLACs																				-
170.10 – PLACs																				-
170.15 – Railroad Agreements																				-
170.20 – Freeway Agreements																				-
170.25 – Agreement for Material Sites																				-
170.30 – Executed Maintenance Agreements																				-
170.40 – Route Adoptions																				-
170.45 – MOU from TERO																				-
170.55 – NEPA Assignment																				-
Obtain PLACS & Rte Adoptions during PA&ED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Circulate Draft Environmental Document and Select Preferred Project Alternative - Task Management Activitie																				
175.05 – DED Circulation																				-
175.10 – Public Hearing																				-
175.15 – Public Comment Responses & Corr																				-
175.20 – Project Preferred Alternative																				-
175.25 – NEPA Assignment																				-
Total Circ DED & Select Preferred Proj Alt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prepare and Approve Project Report and Final Environmental Documen																				
180.05 – Final Project Report				5																5
180.10 – Final Env Document				20	5	5	5		5			5								45
180.15 – Completed Env Document																				-
180.20 – NEPA Assignment																				-
Total Prep and Approve PR & FED	-	-	-	25	5	5	5	-	5	-	-	5	-	-	-	-	-	-	-	50

Project ID: **1217000086**
EA: 0Q670
Description: **LCR**

Cost Center				2985	2987	2987	3015		2999			3015								
WBS Task Activity Code	**Division Chief**	**Office Chief**	**Senior**	**Generalist**	**Biology**	**Cultural**	**Haz Waste**	**Socio-Economic**	**Storm Water**	**ECL**	**Steward-ship**	**Noise/Air**	**Sup Svcs**	**Design**	**Hydraulics**	**Landscape**	**Planning**	**Right of Way**	**Surveys**	**Total**
Assigned Unit																				
Prepare Base Maps and Plan Sheets for PS&E Development																				
185.05 – Updated Project Information																				-
185.15 – Preliminary Design																				-
Total Prep Base Maps & Plan Sheets	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Project ID: **1217000086**
EA: 0Q670
Description: **LCR**

Cost Center				2985	2987	2987	3015		2999			3015								
WBS Task Activity Code	**Division Chief**	**Office Chief**	**Senior**	**Generalist**	**Biology**	**Cultural**	**Haz Waste**	**Socio-Economic**	**Storm Water**	**ECL**	**Steward-ship**	**Noise/Air**	**Sup Svcs**	**Design**	**Hydraulics**	**Landscape**	**Planning**	**Right of Way**	**Surveys**	**Total**
Assigned Unit																				
Right of Way Property Management and Excess Land																				
195.40 – Property Management																				-
195.45 – Excess Land																				-
Total RW Property Mgmt and Excess Land	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Utility Relocation																				
200.15 – Approved Utility Relocation Plan																				-
200.20 – Utility Relocation Package																				-
Total Utility Coordination	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Obtain Permits, Licenses, Agreements, and Certifications (PLACs) during PS&E Component - Task Management Activities																				
205.05 – PLACs Determination																				-
205.10 – PLACs																				-
205.15 – Railroad Agreements																				-
205.25 – Agreement for Material Sites																				-
205.30 – Executed Maintenance Agreements																				-
205.45 – MOU from TERO																				-
205.55 – NEPA Delegation																				-
Total Permits & Agreements during PS&E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Obtain Right of Way Interests for Project Right of Way Certification																				
225.75 – Right of Way Clearance																				-
Total Obtain RW Interests for Proj RW Cert	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prepare Draft PS&E																				
230.05 – Draft Roadway Plans																				-
230.10 – Draft Highway Planting Plans																				-
230.30 – Draft Drainage Plans																				-
230.35 – Draft Specifications																				-
230.60 – Updated Project Info for PS&E Pkg																				-
230.90 – NEPA Assignment																				-
230.99 – Other Draft PS&E Products																				-
Total Prepare Draft PS&E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mitigate Environmental Impacts and Clean-up Hazardous Waste - Task Management Actitivities																				
235.05 – Environmental Mitigation																				-
235.10 – Detailed Site Investigation for HW																				-
235.15 – HW Management Plan																				-
235.20 – HW PS&E																				-
235.25 – HW Clean-up																				-
235.30 – Haz Substances Disclosure Doc																				-
235.35 – Long Term Mitigation Monitoring																				-
235.40 – Updated Env Commitments Record																				-
235.45 – NEPA Assignment																				-
Total Mit Env Impacts & Clean-up HW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Post Right of Way Certification Work																				
245.75 – Right of Way Clearance																				-
Total Post RW Clearance Work	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Circulate, Review and Prepare Final District PS&E Package																				
255.05 – Circ. & Rev. Draft Dist PS&E Package				20	5	5	5		5			5								45
255.10 – Updated PS&E Package																				-
255.15 – Environmental Reevaluation				10	5	5	5		5			5								35

Project ID: **1217000086**
EA: 0Q670
Description: **LCR**

Cost Center				2985	2987	2987	3015		2999			3015								
WBS Task Activity Code	**Division Chief**	**Office Chief**	**Senior**	**Generalist**	**Biology**	**Cultural**	**Haz Waste**	**Socio-Economic**	**Storm Water**	**ECL**	**Steward-ship**	**Noise/Air**	**Sup Svcs**	**Design**	**Hydraulics**	**Landscape**	**Planning**	**Right of Way**	**Surveys**	**Total**
Assigned Unit																				
255.20 – Final District PS&E Package																				-
255.40 – Resident Engineer's Pending File																				-
255.45 – NEPA Assignment																				-
Total Circ, Rev and Prepare Final Dist PS&E Pkg	-	-	-	30	10	10	10	-	10	-	-	10	-	-	-	-	-	-	-	80

August

Project ID: **1217000086**
EA: 0Q670
Description: **LCR**

Cost Center				**2985**	**2987**	**2987**	**3015**		**2999**			**3015**								
WBS Task Activity Code	**Division Chief**	**Office Chief**	**Senior**	**Generalist**	**Biology**	**Cultural**	**Haz Waste**	**Socio-Economic**	**Storm Water**	**ECL**	**Steward-ship**	**Noise/Air**	**Sup Svcs**	**Design**	**Hydraulics**	**Landscape**	**Planning**	**Right of Way**	**Surveys**	**Total**
Assigned Unit																				
Contract Bid Documents "Ready to List"																				
260.75 - Env Cert at RTL				5																5
Total Contract Bid Documents "RTL"	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction Engineering and General Contract Administration																				
270.15 – Construction Stakes																				-
270.33 – Construction Inspection																				-
270.66 – Technical Support																				-
Total Const Engineering & Gen Contract Admin.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Administration of Permits, Licenses, Agreements and Certifications (PLACs) and Environmental Stewardship																				
280.10 – PLAC Compliance																				-
280.40 – PLAC Violations																				-
280.50 – Other Environmental Compliance																				-
280.60 – Other Environmental Violations																				-
280.70 – Updated ECR																				-
280.75 – Environmental Reevaluation																				-
280.80 – Updated PLACs																				-
Total Admin of PLACs and Env Stewardship	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Change Order Administration																				
285.05 – Change Order Process																				-
285.10 – Functional Support																				-
Total Change Order Administration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Disputes and Claims																				
290.40 – Potential Claim Record																				-
Total Disputes and Claims	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Accept Contract/Prepare Final Construction Estimate and Final Report																				
295.35 – Certificate of Environmental Compliance				5																5
295.40 – Long Term Env Mit/Mont after CCA																				-
Total Accept Contract	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Total Project Hours	-	-	-	65	15	15	15	-	15	-	-	15	-	-	-	-	-	-	-	135

ATTACHMENT J

INITIAL SITE ASSESSMENT (ISA) CHECKLIST

Initial Site Assessment (ISA) Checklist

Project Information

District 12 County OC Route 133 Kilometer Post PM 0.9/PM 3.4 EA 0Q670K
(Post Mile)

Description The City of Laguna Beach (City), in cooperation with the California Department of Transportation (Caltrans), is proposing to improve a 2.5 mile corridor of the State Route 133 (SR-133) in the City of Laguna Beach, California. SR-133, also known as Laguna Canyon Road (LCR), extends from approximately Canyon Acres Drive (PM 0.9) to El Toro Road (PM 3.4) in Orange County, California (Project). The proposed roadway improvements include bicycle lanes, pedestrian pathways, improving access to transit facilities, and compliant lane widths and shoulders. Due to limited space within the existing right-of-way, the undergrounding of existing transmission and distribution lines owned by Southern California Edison would be required to accommodate the proposed improvements.

Is the project on the HW Study Minimal-Risk Projects List (HW1)? No
Project Manager Lorica Subida, Caltrans phone #
Project Engineer Raouf Fam, Caltrans phone # (657) 328-6269

Project Screening

Attach the project location map to this checklist to show location of all known and/or potential HW sites identified.
(Refer to the ISA for project and site-specific location maps.)

1. Project Features: New R/W? Yes Excavation? Yes Railroad Involvement? No

   Structure demolition/modification? No Subsurface utility relocation? Yes

2. Project Setting Rural area with primarily light-industrial, commercial and residential development, along with transportation and utility facilities.

   Rural or Urban Rural

   Current land uses State, County, City, and private right-of-way.

   Adjacent land uses Light-industrial, commercial, residential, and recreational.
   (industrial, light industry, commercial, agricultural, residential, etc.)

3. Check federal, State, and local environmental and health regulatory agency records as necessary to see if any known hazardous waste site is in or near the project area. If a known site is identified, show its location on the attached map and attach additional sheets, as needed, to provide pertinent information for the proposed project. *(Refer to the ISA Memorandum for site-specific information.)*

4. Conduct Field Inspection. Date 5/23/2018 Refer to the ISA Memorandum to locate potential or known HW sites.

   STORAGE STRUCTURES / PIPELINES:

   Underground tanks Yes Surface tanks Yes

   Sumps None found Ponds None found

   Drums Yes Basins None found

   Transformers Yes Landfill Yes

   Other

Initial Site Assessment (ISA) Checklist (continued)

CONTAMINATION: (spills, leaks, illegal dumping, etc.)

Surface staining Yes (minor) Oil sheen None found

Odors None found Vegetation damage None found

Other De minimis pavement oil staining at Laguna Beach Unified School District Maintenance Yard.

HAZARDOUS MATERIALS: (asbestos, lead, etc.)

Buildings Unknown Spray-on fireproofing Unknown

Pipe wrap Unknown Friable tile Unknown

Acoustical plaster Unknown Serpentine Unknown

Paint Unknown

Other Potential for aerially-deposited lead (ADL) in previously undisturbed soil areas or unpaved areas within Caltrans right-of-way along the shoulders of SR-133, lead chromate in yellow traffic striping and pavement marking materials along SR-133, polychlorinated biphenyls (PCB) in utility pole- and pad-mounted electrical transformers, and creosote and pentachlorophenol in wooden utility poles.

5. Additional record search, as necessary, of subsequent land uses that could have resulted in a hazardous waste site. *(Refer to the ISA Memorandum for site-specific information.)*

6. Other comments and/or observations: ________________________

ISA Determination

Does the project have any potential hazardous waste involvement? Yes If there is known or potential hazardous waste involvement, is additional ISA work needed before task orders can be prepared for the Preliminary Site Investigation? No If "YES," explain; then give an estimate of additional time required:

During PA/ED, a full ISA for all right-of-way acquisition properties is recommended to comply with ASTM E1527-21 to meet "innocent landowner" provisions under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), which establish a defense for the purchase of real property. In addition, Preliminary Site Investigations (PSI) are also recommended to be conducted during PA/ED for the following:

- ADL in previously undisturbed soil areas or unpaved areas within Caltrans right-of-way along the shoulders of SR-133
- Lead chromate in yellow traffic striping and pavement materials along SR-133
- PCB in utility pole- and pad-mounted electrical transformers and in soil surrounding the transformers
- Creosote and pentachlorophenol in wooden utility poles and in soil surrounding the poles

The full ISA can be prepared simultaneously when the PSIs are conducted during PA/ED.

A brief memo should be prepared to transmit the ISA conclusions to the Project Manager and Project Engineer.

ISA Conducted by ________________ **Date** **5/23/2022**

ATTACHMENT K

RISK REGISTER

LAGUNA CANYON ROAD (SR-133) IMPROVEMENT PROJECT - PSR/PDS

LEVEL 2 - RISK REGISTER						Project Name:	SR-133 PSR/PDS		DIST- EA	12-0Q670	Project Manager:	Girair Kotchian						
Risk Identification									Risk Assessment						Risk Response			
Status	ID #	Type	Category	Date Risk Identified	Cost or Schedule Risk?	Title	Risk Statement	Current status/assumptions	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Risk Owner	Updated
Active	1	Threat	Environmental	10/3/2017	Both	Local community stakeholder groups pose objections to the Project	Public objections to the project may occur. Could require additional public meetings to address concerns, which could delay the schedule.	The City is holding on-going outreach meetings with stakeholder groups. City created a local Task Force to review and provide recommendations to improve Laguna Canyon Road. Recommendation of the Task Force have been incorporated into the PSR/PDS Document.	4-High	8 -High	32	8 -High	32	Some opposition has been heard from local community groups.	Mitigate	The City of Laguna Beach and Caltrans to maintain a proactive public outreach effort by providing up-to-date project information through public meetings, City Council meetings, and other community outreach opportunities.	City of Laguna Beach	
Active	2	Threat	Environmental	10/3/2017	Schedule	Challenge to Environmental Document	Potential lawsuits may challenge the environmental document, delaying the start of construction or threatening loss of funding.	Mitigated during PA&ED Phase. Triggered during public review.	3-Moderate	8 -High	24	8 -High	24	If opposition to the project is significant and the environmental document doesn't address mitigation, a challenge may occur.	Mitigate	Maintain good communications with community during PA&ED phase to ensure concerns and impacts are addressed in ED.	Environmental PDT	
Active	3	Threat	PM	10/3/2017	Schedule	Delay or withdrawal of funding	If funding for the project is not available, project may be delayed or cancelled.		3-Moderate	4 -Moderate	12	4 -Moderate	12	Priorities for other project in the County may take the place of this project. Available Active Transportation Program (ATP) Funding is limited.	Mitigate	Produce Project Initiation Document (PID) and include Project in local and regional programming documents. Pursue wide range of funding opportunities from local, State, and Federal sources.	City of Laguna Beach/Caltrans	4/27/2022
Active	4	Threat	Design	10/3/2017	Schedule	Project Cost is too high	If the estimated cost of the project is determined to be higher that available, foreseeable funding, the project could be delayed or cancelled.		3-Moderate	4 -Moderate	12	8 -High	24	Too high of an estimated cost could cause delay in being able to program the project.	Mitigate	Develop accurate cost estimates for the project early and update cost estimate periodically.	PDT	
Active	5	Threat	ROW	10/3/2017	Schedule	Additional R/W	Due to the complex nature of the project, additional right of way, construction easements, or permanent easements may be required to complete the work as contemplated, resulting in additional cost to the project.		3-Moderate	4 -Moderate	12	4 -Moderate	12	Right of way issues require a long lead time to resolve. Available additional right of way outside the existing State right-of-way is minimal.	Mitigate	Early detection of right of way needs is key. Justification of right of way needs must be well documented. Work with Caltrans and SCE to locate undergrounded utilities within existing State right-of-way.	PDT	5/12/2022
Active	6	Threat	ROW	10/3/2017	Both	Residential Encroachments into Existing ROW	At various locations, existing residential improvements encroach into existing State R/W.	Mitigated during PA/ED Phase.	3-Moderate	4 -Moderate	12	4 -Moderate	12	Although a concern, impact is anticipated to be moderate. Proposed project improvements are generally within existing State Right-of-way.	Mitigate	Advance right-of-way documentation in PA/ED phase. Initiate early communication with property owners.	PDT	5/12/2022
Active	7	Threat	ROW	10/3/2017	Schedule	Proposed pedestrian path requires R/W	The proposed pedestrian path encroaches into adjacent open space at select locations; environmental issues will need to be addressed.	May be resolved with design and PDT concurrence.	2-Low	4 -Moderate	8	4 -Moderate	8	Evaluate mitigation options in PA/ED phase.	Mitigate	Review locations early in the PA/ED phase to determine environmental concerns and mitigation options.	PDT	
Active	8	Threat	PM	10/3/2017	Schedule	Agency Permits	Delay due to permits or agreements, from Federal, State, or local agencies not received in a timely manner	Mitigated during PA/ED Phase.	2-Low	4 -Moderate	8	8 -High	16	This has been an issue on past projects which affects both budget and schedule.	Mitigate	Meet early and often with resource agencies to ensure that their concerns are addressed.	PDT	
Active	9	Threat	Environmental	10/3/2017	Schedule	Environmental Impacts	As part of the PEAR it is discovered that significant impacts may cause delays or higher than expected mitigation costs.	Initial finding of PEAR show less than significant impact with exception of Cultural Resources and Paleontology. Cost and Time impacts would mostly be during construction.	2-Low	8 -High	16	4 -Moderate	8	Environmental impacts (Cultural, Palentology) may cause additional mitigation costs or schedule delays during construction	Mitigate	Get accurate environmental assessment with Preliminary Environmental Assessment Report (PEAR) now and with Cultural and Palentology studies during PA/ED.	PDT	4/27/2022
Active	10	Threat	PM	10/3/2017	Schedule	SCE Coordination for undergrounding	Coordination with SCE is key during design and construction. Plan approvals, funding, construction staging etc. must be well coordinated throughout project.		3-Moderate	8 -High	24	8 -High	24	The ability to engage SCE staff throughout the design process is critical to avoid receiving large numbers of comments.	Mitigate	Engage SCE throughout design process to solicit input and comments in order to minimize impacts.	PDT	
Active	11	Threat	Design	10/3/2017	Schedule	Costal Zone Requirements	The project is located within the Coastal Zone which triggers stricter development requirements and policies.		2-Low	8 -High	16	8 -High	16	Probability is reduced with clear understanding of coastal development requirements but impact of cost and time is high if not followed.	Mitigate	Understand additional requirements of Coastal Zone development; especially, water quality requirements and requirements during construction.	PDT	
Active	12	Threat	Environmental	5/27/2022	Cost	Costs to mitigate impacts to CDFW and OC Flood may be high	Impacts not apparent in preliminary environmental assessment repot		2-Low	8 -High	16	4 -Moderate	8	Probability is reduced with clear understanding of coastal development requirements but impact of cost and time is high if not followed.	Mitigate	Environmental review will be provided during PA/ED. Design will consider avoiding impacts.	PDT	
Active	13	Threat	ROW	5/27/2022	Both	Property acquisition	Objections to loss of property rigths may lead to Resolution of Necessity (RON)		2-Low	4 -Moderate	8	4 -Moderate	8	Acquisitions are all partial and most are slither area where current use is minimal	Mitigate	Public Outreach	PDT	
Active	13	Threat	Environmental	5/27/2022	Cost	Additional Stakeholder outreach	Additional Reporting and participation in local information distribution may increase Project Development Costs		3-Moderate	4 -Moderate	12	4 -Moderate	12	Costs included in estimate for public participation	Mitigate	Investigate waterline; provide innovative designs.	Design PDT	
Active	14	Threat	Design	5/27/2022	Both	Waterline adjacent to roadway	Waterline is fragile; it may need to be designed around		3-Moderate	4 -Moderate	12	4 -Moderate	12	Costs included in estimate to include this potential relocation	Mitigate	Investigate waterline; provide innovative designs.	Design PDT	