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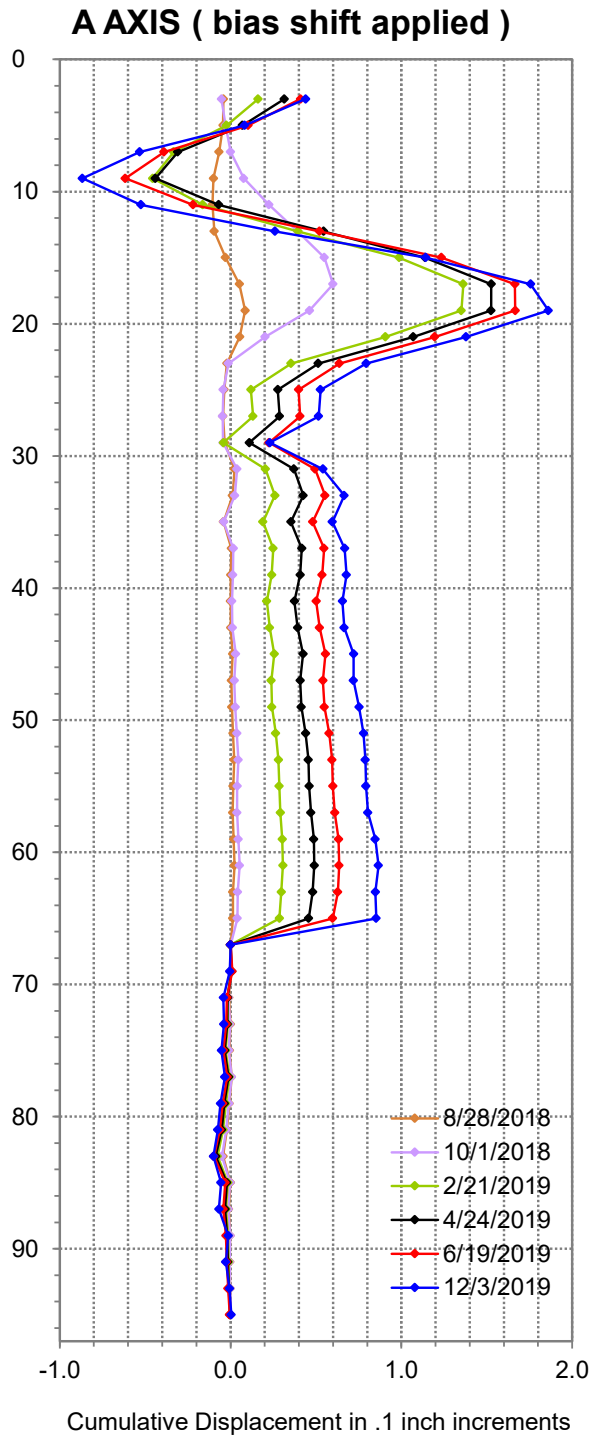
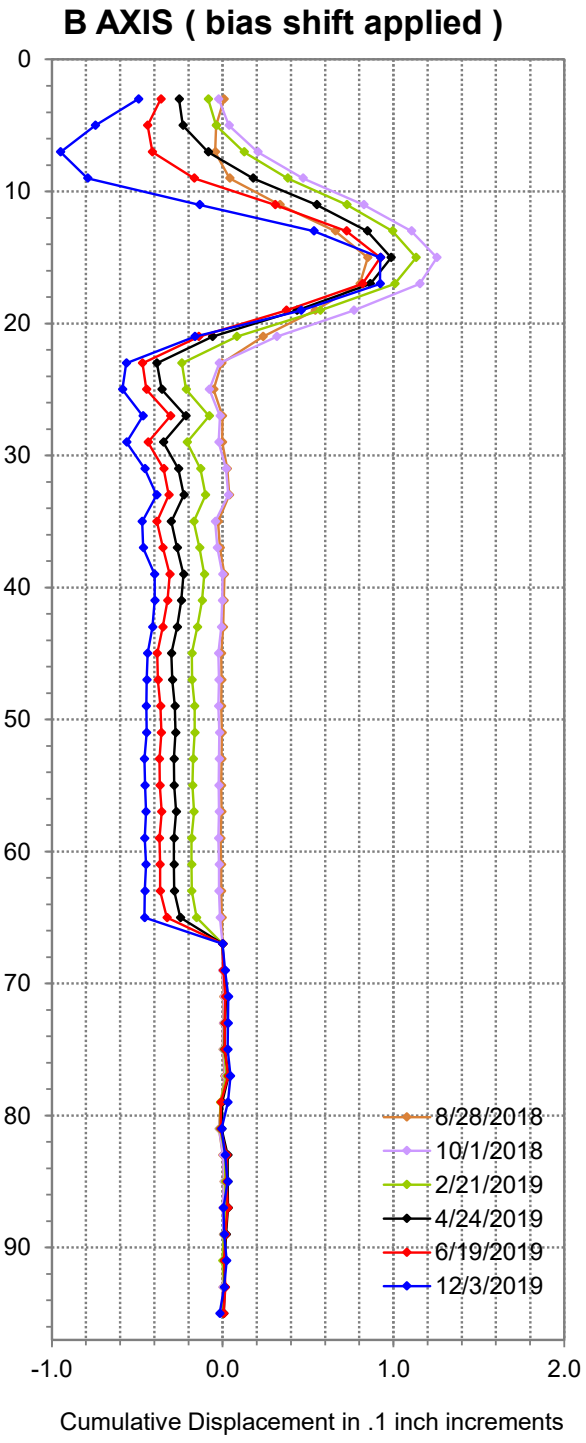
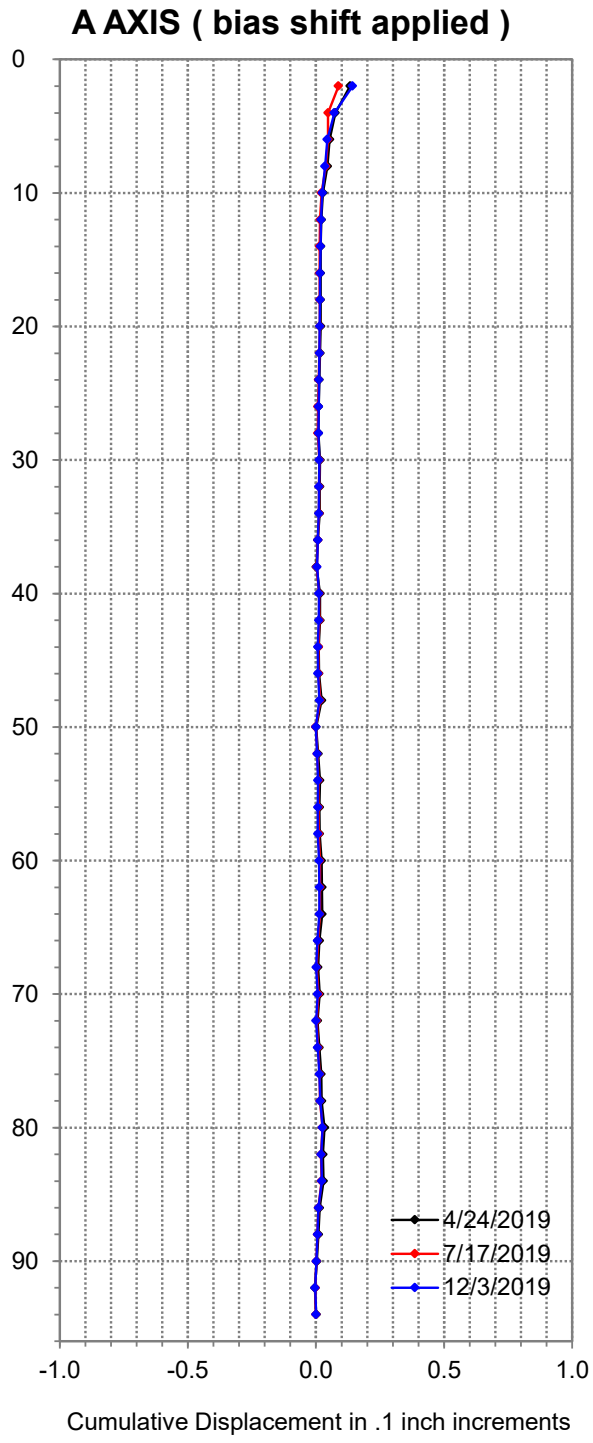


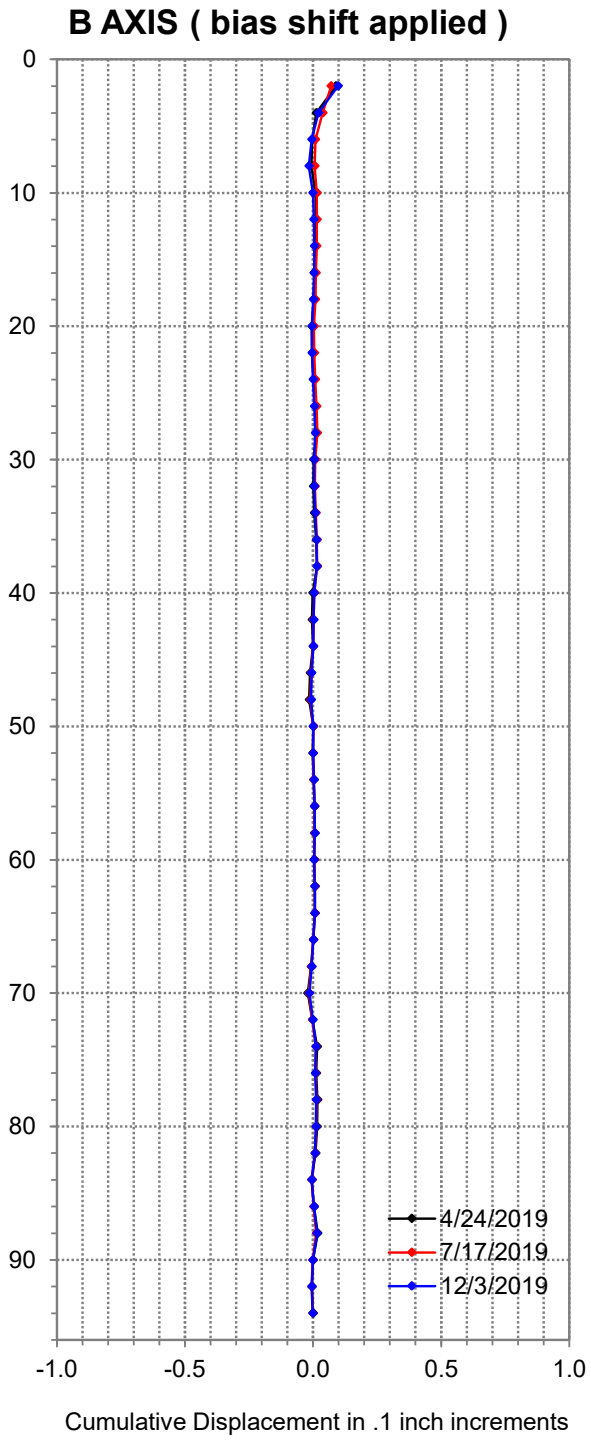


RC-18-002
LCGA
01-DN-101-PM 13.5

CA-Department of Transportation
DES-OGDW Orinda Field Station
15 Camino Pablo (925) 254-6504

Cumulative Displacement (inches) since 10/2/2018

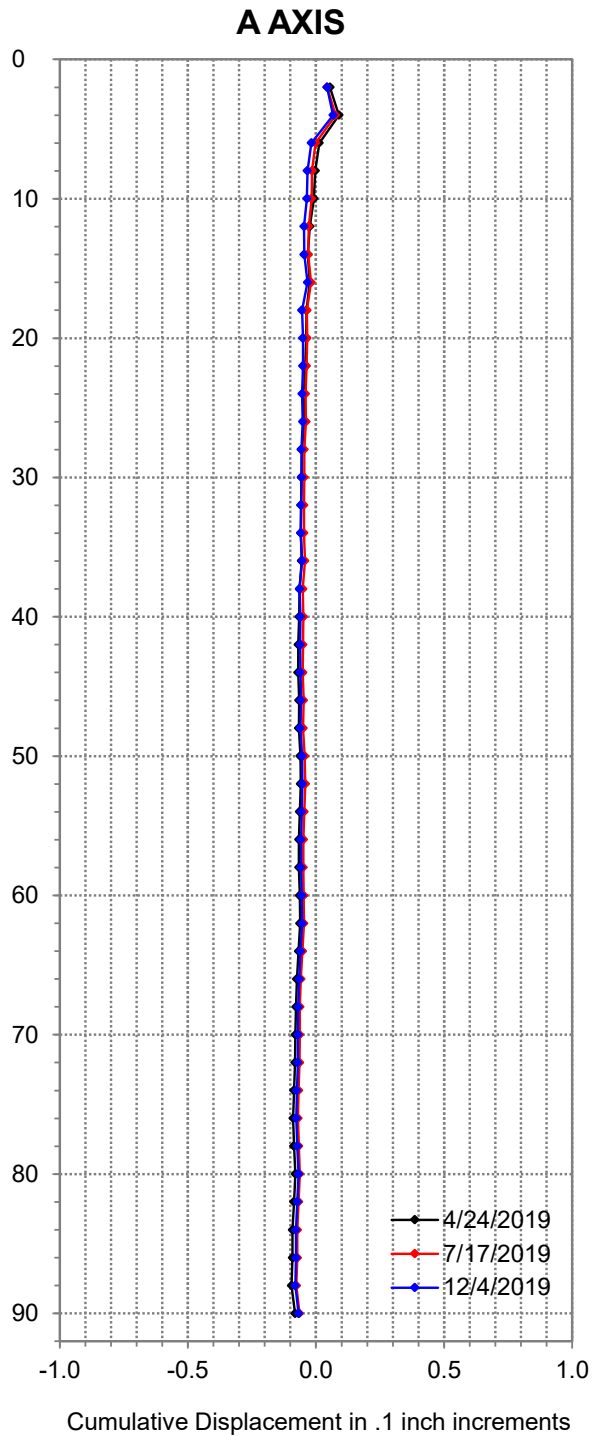


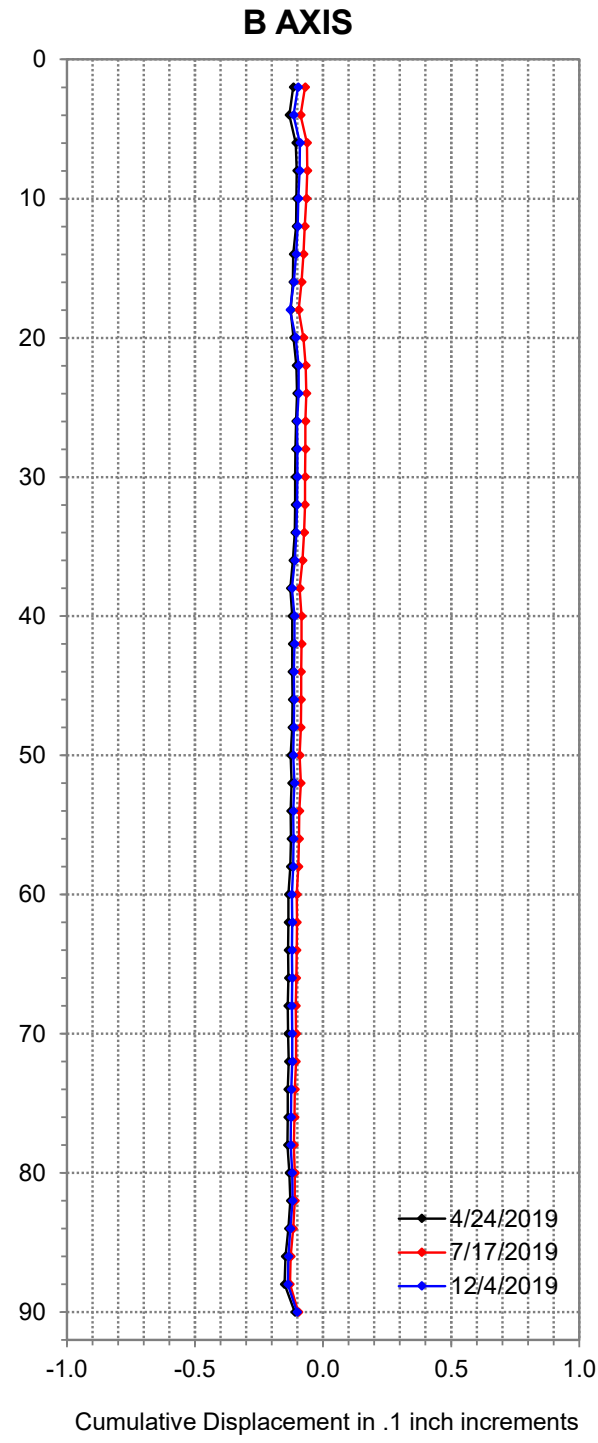


RC-18-005
LCGA
01-DN-101-GREEN DIAMOND

CA-Department of Transportation
DES-OGDW Orinda Field Station
15 Camino Pablo (925) 254-6504

Cumulative Displacement (inches) since 10/2/2018

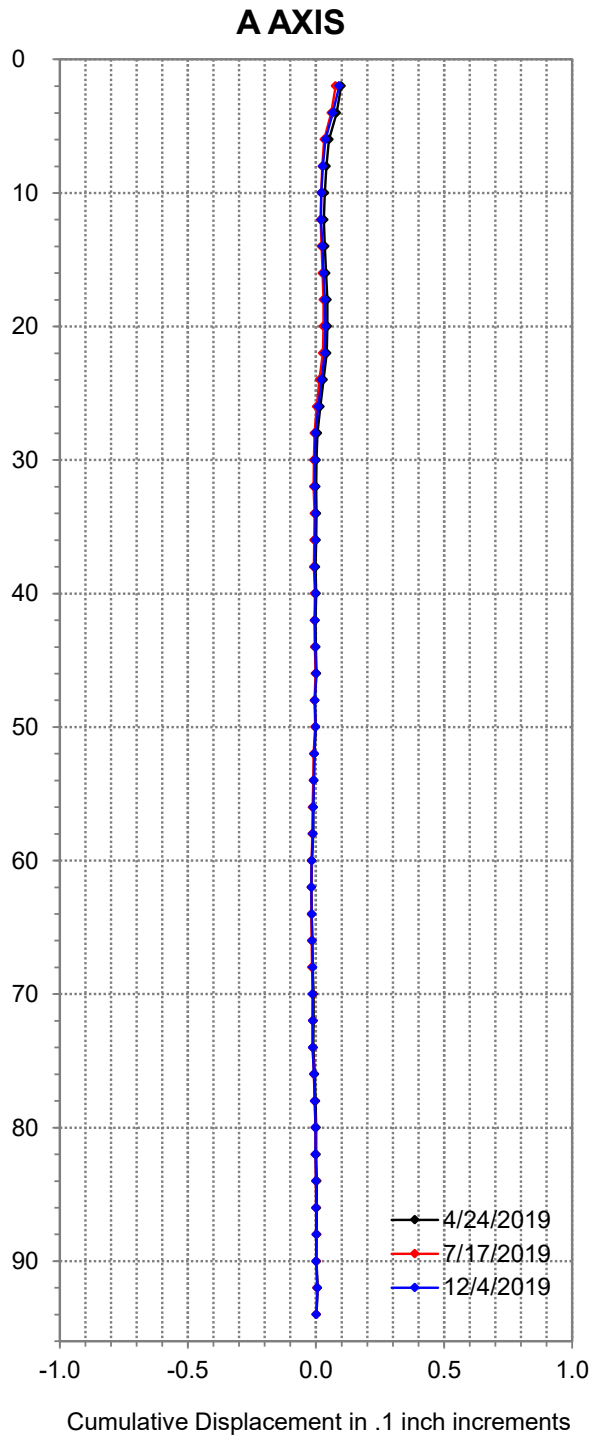


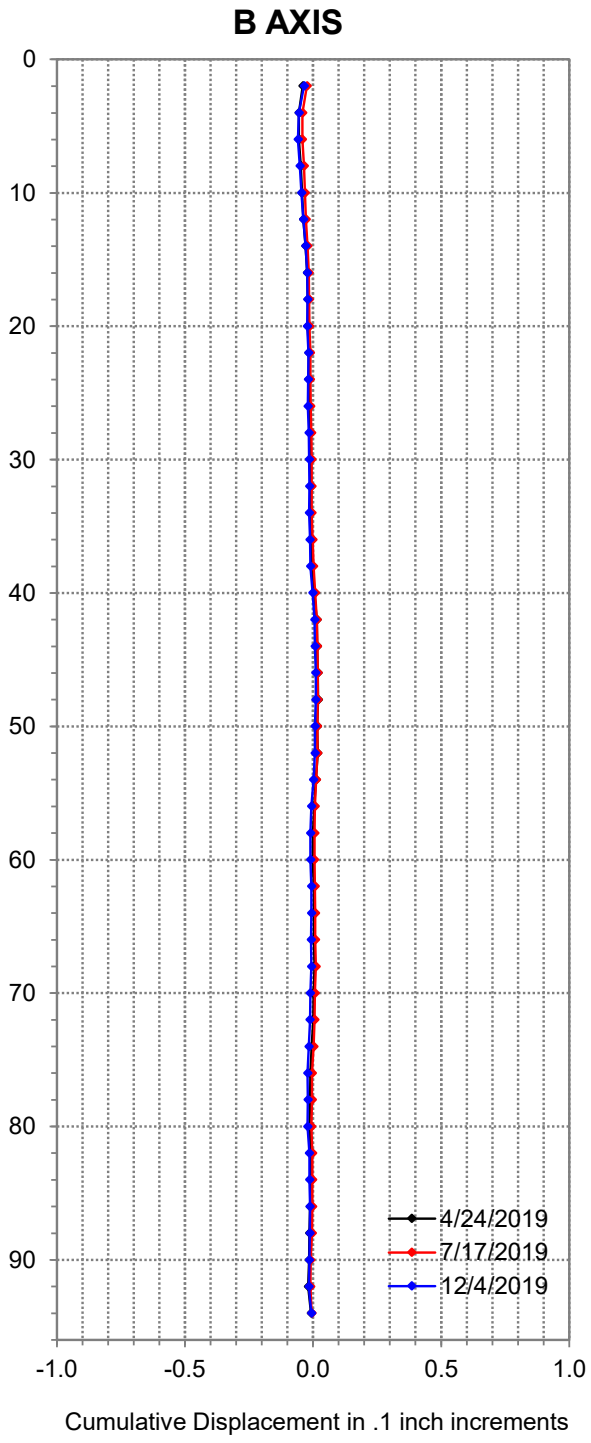


RC-18-007
LCGA
01-DN-101-GREEN DIAMOND

CA-Department of Transportation
DES-OGDW Orinda Field Station
15 Camino Pablo (925) 254-6504
NO BIAS SHIFT APPLIED

Cumulative Displacement (inches) since 10/2/2018

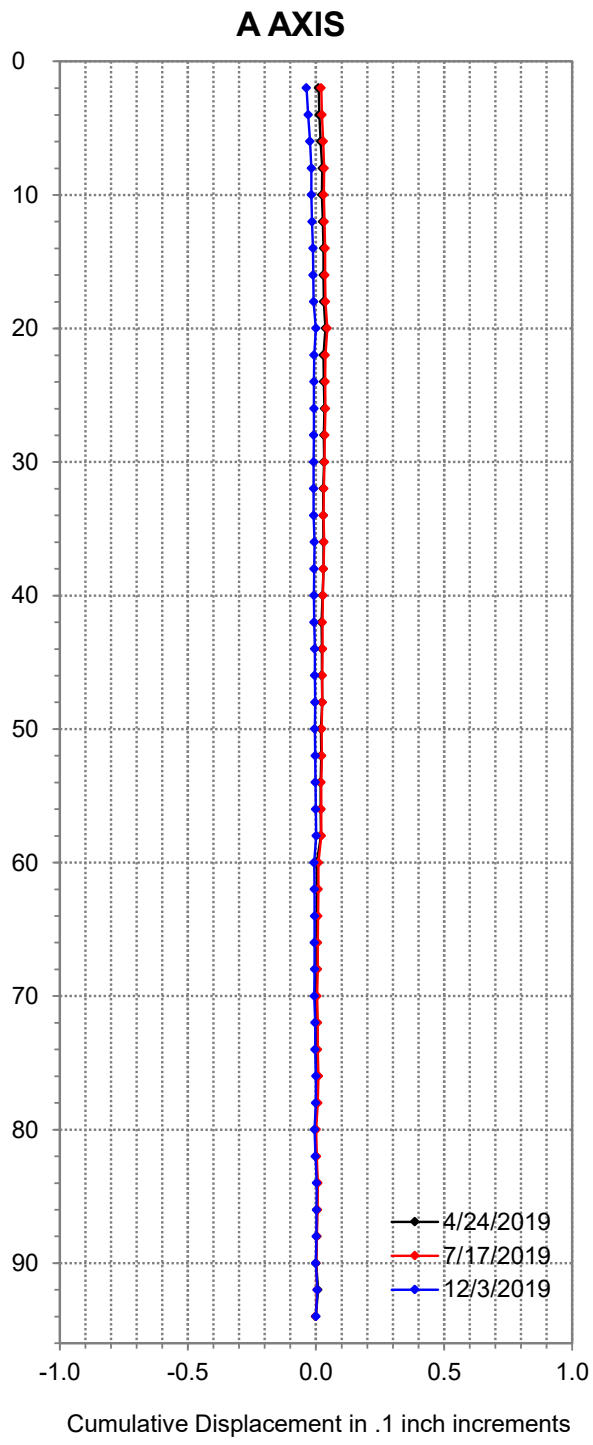


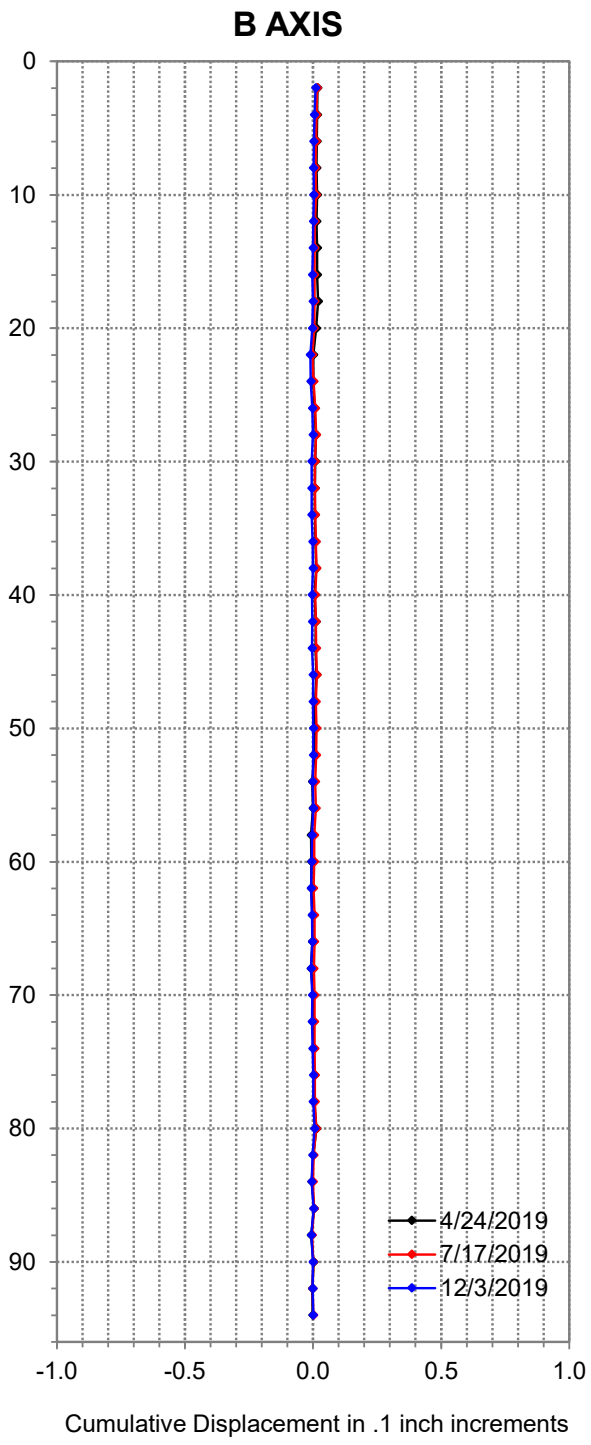


RC-18-009
LCGA
01-DN-101-GREEN DIAMOND

CA-Department of Transportation
DES-OGDW Orinda Field Station
15 Camino Pablo (925) 254-6504
NO BIAS SHIFT APPLIED

Cumulative Displacement (inches) since 10/2/2018

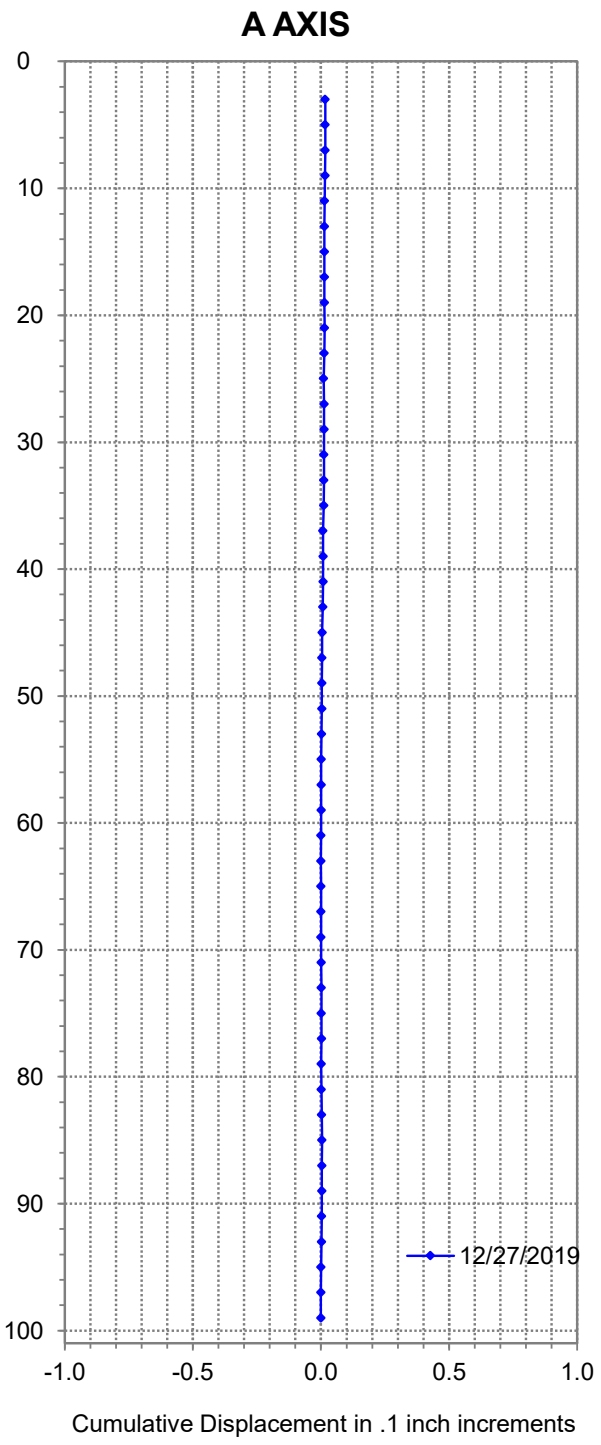


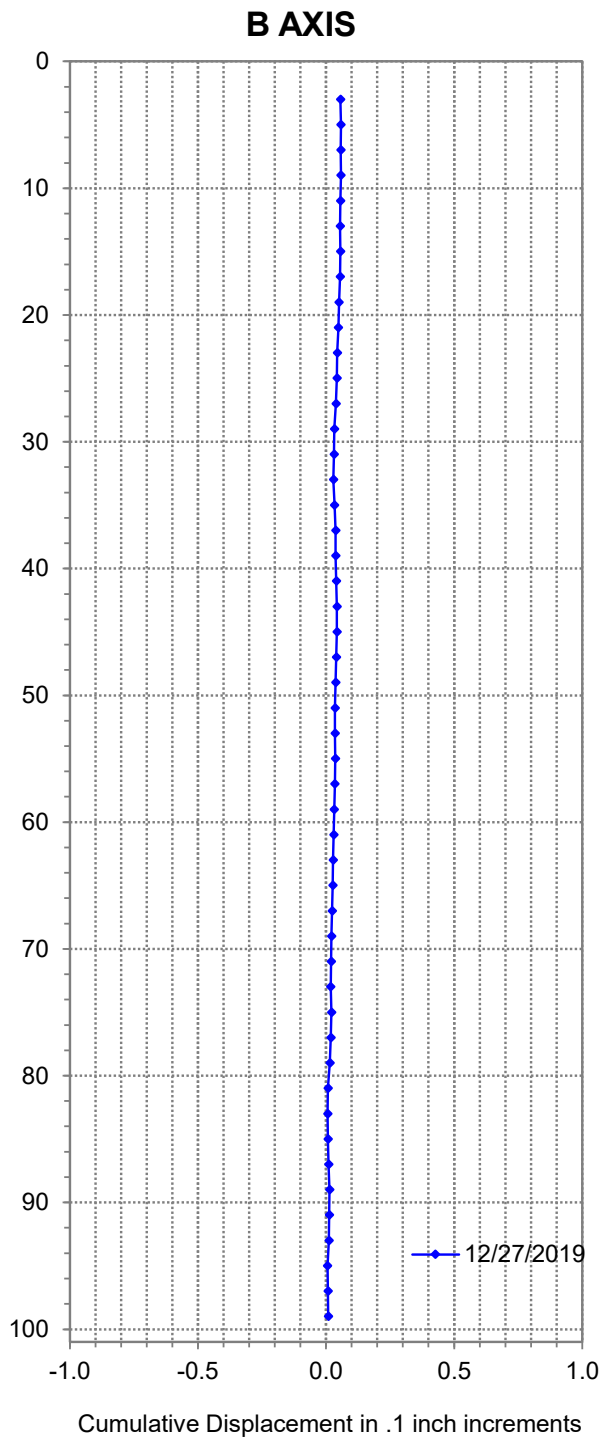


RC-18-011
LCGA
01-DN-101-GREEN DIAMOND

CA-Department of Transportation
DES-OGDW Orinda Field Station
15 Camino Pablo (925) 254-6504
NO BIAS SHIFT APPLIED

Cumulative Displacement (inches) since 12/4/2019

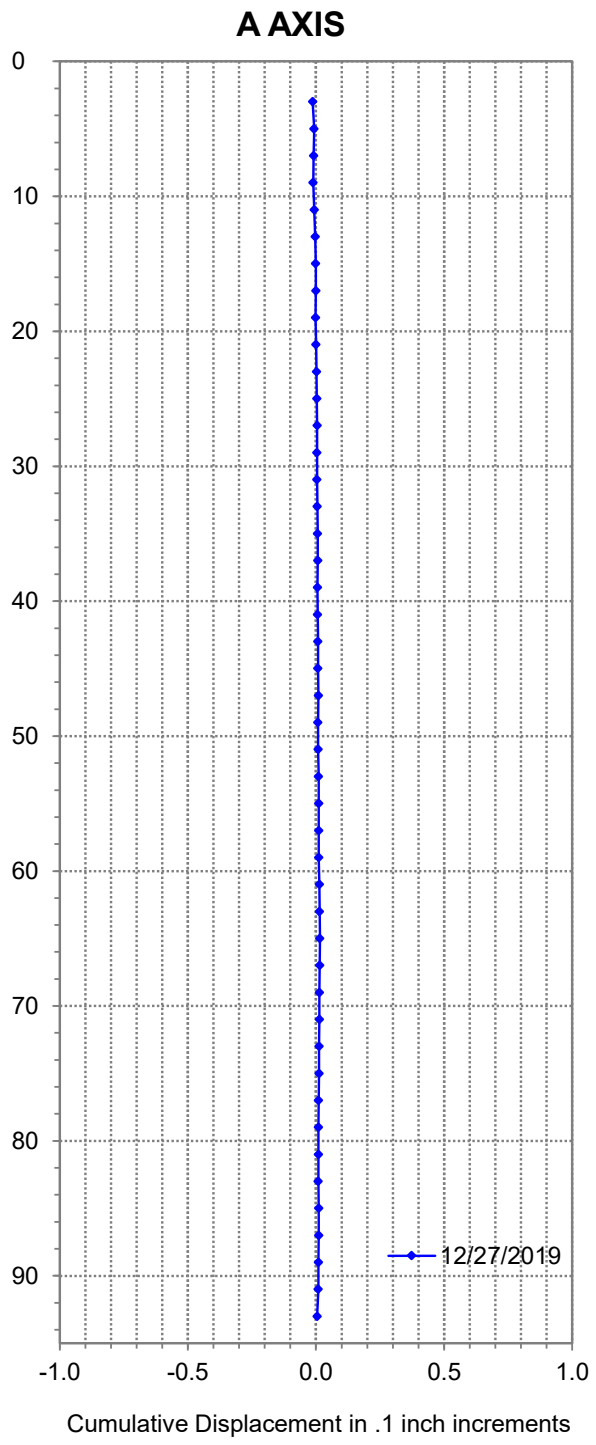


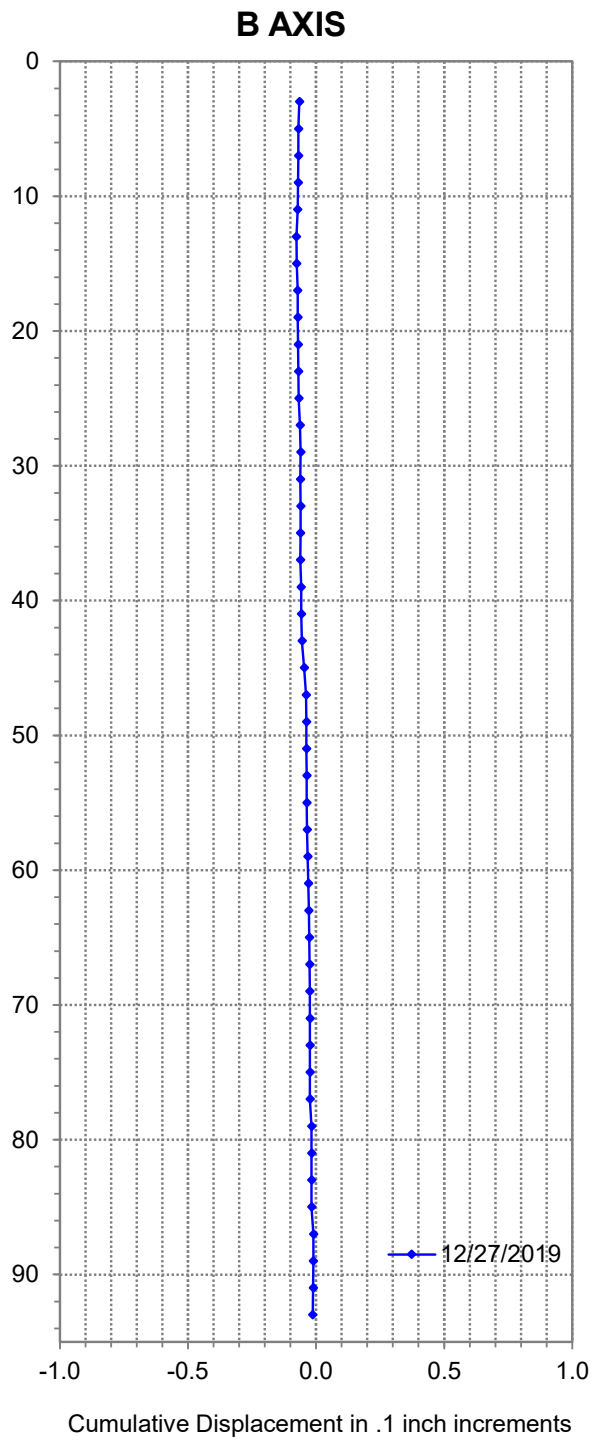


SI-19-001
LCGA Phase II
01-DN-101-PM 14.34

CA-Department of Transportation
DES-OGDW Orinda Field Station
15 Camino Pablo (925) 254-6504
NO BIAS SHIFT APPLIED

Cumulative Displacement (inches) since 12/4/2019

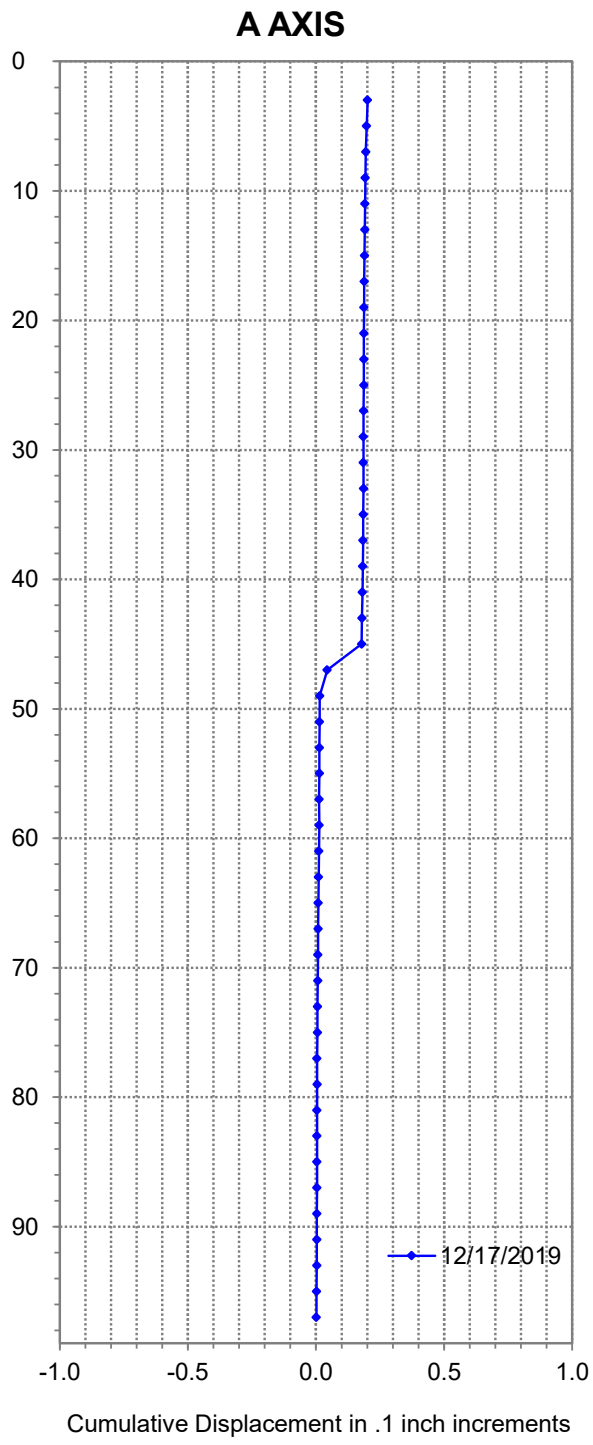


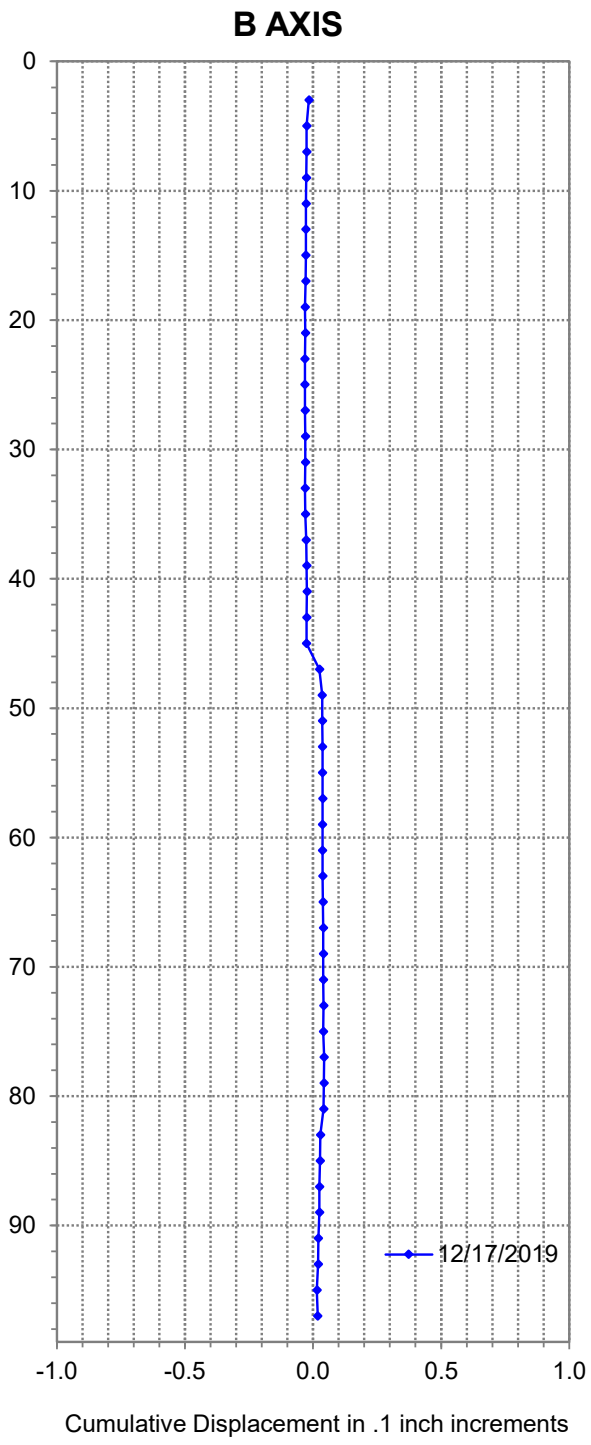


SI-19-003
LCGA Phase II
01-DN-101-PM 15.58

CA-Department of Transportation
DES-OGDW Orinda Field Station
15 Camino Pablo (925) 254-6504
NO BIAS SHIFT APPLIED

Cumulative Displacement (inches) since 12/4/2019





SI-19-004
LCGA Phase II
01-DN-101-PM 13.36

CA-Department of Transportation
DES-OGDW Orinda Field Station
15 Camino Pablo (925) 254-6504
NO BIAS SHIFT APPLIED

APPENDIX A4 *Project Study Report, Permanent Restoration, Last Chance Grade*

(Caltrans District 1, 2016)

PROJECT STUDY REPORT
Permanent Restoration

Last Chance Grade

01-DN-101 PM 12.0/15.5
EA 01-0F280K/EFIS
0115000099
Program Code 20.XX.201.131
June 2016

I have reviewed the right of way information contained in this Project Study Report and the R/W Data Sheet attached hereto, and find the data to be complete, and accurate:

FOR

Karen E. Hawkins
Assistant Chief, North Region Right of Way

Approval Recommended:

for

Sebastian Cohen
Project Manager

FOR

Brad Mettam
District Program Manager

Approved By:

6/30/16

For

CHARLES C. FIELDER
District Director

Date

This Project Study Report has been prepared under the direction of the following registered engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

JEFFREY L. PIMENTEL, P.E.
REGISTERED CIVIL ENGINEER

6/30/16
Date

1. INTRODUCTION

Project Description:

The District 1 Advance Planning Unit has prepared this Project Study Report (PSR) for a Permanent Restoration Project (201.131). The project is located on a segment of US Highway 101 (US 101) known as Last Chance Grade (LCG), which is in southern Del Norte County, between Wilson Creek and Crescent City (PM 12.0 – 15.5). See Attachment A for a Location Map.

This PSR proposes seven alternatives in response to landslides and roadway failures at LCG, which have caused damage for decades. Six of the seven proposed alternatives would include realignment of US 101 with the goal of avoiding the unstable portions of LCG. One of the proposed alternatives to maintain the existing roadway on its current alignment does not meet the purpose and need of the project, but is included to provide a baseline for comparison. The realignment Alternatives (A1, A2, C3, C4, C5 and F) vary between 1 mile and 14 miles in length. A detailed description of each alternative is included in Section 6 of this PSR.

Project Limits	01-DN-101 PM 12.0/15.5	
Number of Alternatives	7 (Including Maintain Existing/No Build)	
Programmable Project Alternative	Alternative C5	
Capital Outlay Support	$141,790,000	
	Current Cost Estimate (2016):	**Escalated Cost Estimate (2031):**
Capital Outlay Construction	$957,253,000	$1,603,733,000
Capital Outlay Right-of-Way	$44,900,000	$89,516,000
Funding Source	20.XX.201.131	
Funding Year	2031	
Type of Facility	Conventional 2-lane rural highway	
Number of Structures	13 bridges and 1 tunnel	
SHOPP Project Output	1 Location	
Anticipated Environmental Determination or Document	EIR/EIS (CEQA/NEPA)	
Legal Description	On Route 101 in Del Norte County, 10 miles south of Crescent City from PM 12.0 – 15.5	
Project Development Category	Category 1	

A project report will serve as approval of the "selected" alternative. Additional studies are needed to determine which of the proposed alternatives will best meet the purpose and need of the project. The alternative recommended for programming has not been identified as preferred in a CEQA/NEPA document or as superior or preferred in any other regard.

Alternative C5 is recommended for programming project cost only, for the following reasons. This alternative is the longest bypass alternative, and much of its alignment and associated structures are common to all alternatives, with the exception of Alternative F. As such, it has the second highest estimated cost and is sufficient to fund Alternatives A1, A2, C3, C4, and C5, as well as 94% of Alternative F. Alternative F is still a serious option, having unique advantages, such as minimum environmental impact and fewer overall long-term maintenance needs. It likely also has a greater risk of being found infeasible due to geologic conditions. Cost estimates are based on the best current information and the relative position between Alternatives F and C5 may change. This project is currently proposed to be amended into the 2016 State Highway Operation

and Protection Program (SHOPP) and funded in the 2031/32 fiscal year through the 201.131 Permanent Restoration Program. The 2016 Construction and Right of Way capital costs are $957.3 million and $44.9 million respectively for a total Capital Cost of $1,002.2 million. Capital costs greatly exceed the programming capacity for the California Department of Transportation 201.131 Permanent Restoration Program, thus a special allocation will be required from FHWA's Federal Emergency Response program or other applicable federal funding.

2. BACKGROUND

Existing Facility:

US 101 between PM 12.0 to 15.5 (LCG) is classified as conventional rural two to four lane highway. Beginning at the southern project limits along US 101 at Wilson Creek Road the roadway transitions from two to four lanes and begins ascending on a 6.3% grade. At PM 13.3 there is a scenic overlook, and the roadway is reduced to three lanes (two northbound lanes and one southbound lane), which exists until PM 14.2 where the roadway is reduced to two lanes. Within the project limits there are intermittent flat areas that span 300 feet to 500 feet along with segments where the roadway grade reaches slopes as high as 7.5%. The average grade of US 101 within the project limits is 5.2% from Wilson Creek Bridge to PM 15.5; however, US 101 within the project limits exhibits slope undulations throughout due to slide movement. The horizontal alignment is curvilinear, with tangents up to 700 feet in length. Horizontal curve radii varies between 300 feet to 1,200 feet. At PM 15.5, US 101 shifts east away from the coast and begins a 1400 foot long tangent section continuing at a 6% grade through dense redwood forest. In order to keep US 101 open to the traveling public there are a series of existing retaining walls within the project limits supporting the existing roadway. Existing roadway and retaining wall locations are shown in Attachment B.

Since a 2010 Federally Declared Storm event, US 101 at LCG has experienced continued movement and deformation resulting in five federal Emergency Repair (ER) approved Damage Assessment Forms (DAFs). These DAFs appropriated a total of $20 million in ER funds for three Emergency Opening contracts and two Permanent Restoration (PR) projects at three locations. The work associated with these projects is considered temporary due to the deep-seated nature of the landslide. A summary of these actions follow:

Disaster No.	DAF	EO (Executive Order)	PR
11-3	CEP-CT01-001-0		$ 3,146,000
11-3	CEP-CT01-002-0		$ 3,898,000
12-3	CEP-CT01-002-0	$ 630,000	
12-3	CEP-CT01-012-0	$ 1,260,000	$4,200,000
12-3	CEP-CT01-013-0	$ 6,850,000	

As a result of storm damage and increased landslide activity and emergency response efforts, Caltrans installed a surface monitoring network and multiple slope indicators and has measured movement of LCG since July, 2012. Current subsurface investigations reveal that the landslide complex is failing as deep as 260' with multiple nesting shallower landslides. Since October of 2014, roadway deformation has accelerated at a much faster rate than previously experienced at the grade. Subsurface boring data at the area of greatest roadway deformation reflects movement occurring at approximate depths of 100', 75', 40' and 35'. Recent photography also indicates ocean erosion at the bluff base is contributing to instability.

The accelerated movement has required Caltrans Maintenance to fill and level scarps in the roadway surface with pavement as they develop. The paving is needed on average at least once a

month. The scarps that appear are typically between 2 and 4 inches across with depths ranging from a few inches to many feet with voids developing under the roadway surface.

In 2016, Caltrans issued two additional Emergency Projects for $4 million to temporarily address the safety issue that has developed due to the accelerated movement. The emergency contract installed a GPS monitoring and notification system and performed roadway repairs.

US 101 at LCG has been moving westward and downward progressively in response to storm events since the roadway was constructed. Since the roadway right of way was purchased the road has moved 50 feet horizontally with portions of the roadway now outside Caltrans right of way. The significance of this movement is that the roadway has moved to a position where it is now at the edge of the bluffs that are subject to active coastal erosion. In addition, US 101 passes through Redwood National and State Parks, a designated World Heritage Site. Constructing a route around the slide has the potential to affect an iconic old growth redwood forest and to remove old growth trees that are protected in these state and national parks. Caltrans cannot construct a full retreat away from the eroding bluffs into the hillside without the potential removal of between 275 and 542 old growth redwood trees. At the rates of movement currently being experienced, it is likely that at least a small retreat will be necessary to keep US 101 open to the traveling public while a more permanent solution can be developed. Keeping the roadway on its current alignment is not a fiscally feasible option given a landslide complex that is over a mile long and at its deepest 260' deep.

Since the March 2012 storm event, there has been an increase in appeals from the public and elected officials to Caltrans to address the instability and progressive loss of the roadway. Caltrans initiated an Engineered Feasibility Study (EFS) to address the public's concerns and determine and define feasible alternatives. The EFS, completed in June 2015, provides seven alternatives ranging in cost from $300 million to $1.2 billion dollars (Year-of-Construction dollars). In addition, Caltrans prepared an Economic Impact Study to determine if a project would be economically justifiable. The Economic Impact Study concluded that a project costing up to $1 billion (2015 dollars) would be a sound investment for the State of California (Appendix E). The PID delivery has been accelerated to be delivered July 2016. At that time, Caltrans would like to pursue Federal ER funds to environmentally clear, design and construct a roadway relocation at Last Chance Grade.

The costs to Caltrans and the FHWA ER Program for emergency repairs associated with maintaining US 101 at LCG are expected to escalate as retreats and repairs become more difficult. The ultimate risk of not relocating US 101 away from Last Chance Grade is complete loss of the roadway and the continuity of coastal US 101. The alternate route would increasing travel distance up to 320 miles.

3. PURPOSE AND NEED STATEMENT

Purpose:

The purpose of this project is to develop a permanent solution to the instability and potential roadway failure at LCG. The project will consider alternatives that provide a more reliable connection, reduce maintenance costs and protect the economy, natural resources, and cultural landscapes.

Need:

Landslides and road failures at LCG have been an ongoing problem for decades. A geologic study in 2000 conducted for Caltrans by the California Geological Survey mapped over 200 historical and active landslides (both deep-seated and shallow) within the corridor between Wilson Creek and

Crescent City. Over the years, Caltrans has conducted a considerable number of construction projects and maintenance activities in the LCG area in order to keep the roadway open. Since 1981, landslide mitigation projects, including retaining walls, drainage improvements, and roadway repairs have cost over $54 million ($33 million Emergency Response Projects, $21 million Non-Emergency Response Projects). A long-term sustainable solution at LCG is needed for many reasons, including the following:

- Economic ramifications of a long-term failure and closure;
- Risk of delay/detour to traveling public;
- Increasing maintenance and emergency project costs; and
- Increase in frequency and severity of large storm events caused by climate change

4. DEFICIENCIES

The segment of US 101 known as LCG, as well as US 101 north to Hamilton Road, was constructed in 1937. LCG has a history of geologic instability, including deep seated landslides and slipouts, which presents a long-term challenge with roadway stability and maintenance costs. Surveys conducted by Caltrans have shown the landslides have shifted the roadway centerline by over 50 feet horizontally from the original roadway centerline constructed in 1937.

The following sections describe the importance of beginning the process to study and environmentally clear a realignment of Route 101 at this location. Contributing to the sense of urgency for a realignment project are the accelerating movement of the roadway, toe erosion impacts to the nested landslides, frequency of repairs, lack of geometric resiliency, and increasing risk to and concerns of the traveling public.

Instability

Since the 1970s, the number of projects required to keep the roadway open, and the associated cost have increased due to roadway movement. Between 1981 and 2012, a total of $36.2 million was spent on emergency and repair projects, with $29.3 million spent between 1997 and 2012. The trend of increased maintenance, emergency projects and capital expenditures has continued to the present time.

The roadway traverses two large landslides: the LCG Landslide (PM 14.85-15.34) and the Wilson Creek Wall Landslide (PM 14.39-14.85). The LCG Landslide and Wilson Creek Wall Landslides are within a Franciscan Complex Broken Formation. The Broken Formation consists mainly of thickly bedded sandstone with siltstone and shale interbeds. The massive and hard sandstone blocks, bounded by weak sheared zones, leads to steep slopes and slides of large intact blocks of rock. South of the Wilson Creek Wall Landslide the roadway traverses a large active earthflow within a Franciscan Melange.

The LCG Landslide is composed of two major landslides, the Southern LCG Slide (PM 14.85–15.2) and the Northern LCG Landslide (PM 15.2–15.34). The SLCG slide is between 125–260 feet deep and approximately 1500 feet wide at roadway elevation. The NLCG Landslide is between 125-160 feet deep and is approximately 700 feet wide at roadway elevation. A more active and faster moving shallow (approximately 40 feet deep) landslide exists within the limits of the Northern LCG Landslide. The rate of movement at the Northern LCG Slide is two times that of the Southern LCG Slide. Slide movement monitoring between July 2012 and April 2015 measured a vertical movement of 2.59 feet, and a horizontal movement of 3.26 feet. This movement has resulted in visible damage to retaining walls at the Northern LCG and Southern LCG slide interface resulting in Emergency Opening projects. Also contributing to the slide movement is tidal erosion at the toe of the Wilson Creek Bluffs.

The geologic instability in the area is often exacerbated by storm events. Two federally declared storm events in 2011 and 2012 required emergency projects to maintain the highway alignment for the traveling public. The 2011 storm event resulted in three slipouts along the roadway, closing the southbound shoulder, and requiring resurfacing of the roadway and the extension of an existing retaining wall. The 2012 storm event resulted in a new slipout and accelerated an existing slipout from the prior year. This storm required an emergency soil nail wall to prevent further loss of the roadway. The LCG Engineered Feasibility Study completed in June 2015 provides additional information on slide movements and storm damage emergency relief projects at this location.

The size, depth, and instability of the known slide planes, combined with the erosion of the bluffs, make maintaining the roadway alignment difficult, extremely costly, and is expected to continue. Movement at Last Chance Grade has continued to accelerate.

During the last 80 years, the roadway at this location has moved 50-feet outward as a result of the deep-seated landslide and surf erosion at the toe of the slope. This historic continuous movement equates to a rate of approximately 7.5 inches per year; however, the recent rate of movement at this location averages approximately 17 inches per year. This accelerated landslide movement in combination with surf erosion limits extending up to the outboard edge of the roadway result in a loss of the routes resiliency in the event of rainfall events. In the near future, this loss of resiliency is predicted to result in a roadway failure requiring an emergency contract to construct a large roadway retreat or realignment of the roadway around the landslide. The retreat is unlikely to be a supported alternative given the associated removal of up to 200 old growth redwood trees.

Existing Geometrics

From PM 12.0 to PM 12.3, Route 101 consists of two 12’ southbound lanes, a 4’ separation with two double yellow delineations, and two 12’ northbound lanes. Left shoulders vary from 2’ to 8’ and right shoulders vary from 4’ to 8’. Between PM 12.3 and PM 14.4, the roadway consists of one 12’ southbound lane and two 12’ northbound lanes with no center separation. Left shoulders vary from 2’ to 8’ and right shoulders vary from 4’ to 8’. From PM 14.4 to PM 14.8 the roadway consists of one 12’ northbound and one 12’ southbound lane and left and right shoulders that vary from 0’ to 3’.

From PM 14.8 to PM 15.5, the roadway was constructed with 12’ left (SB) and right (NB) lanes, an 8’ left shoulder, and a 4’ right shoulder. Subsequent embankment loss (and placement of temporary k-rail) has reduced the existing roadway width.

Structures

At the current time, retaining walls at the NLCG and SLCG slide interface show deformation and cracking. A permanent restoration projects is scheduled to begin construction in 2016 under the Emergency Repair Program. One is a Soil Nail Wall at PM 15.1, which is needed to repair a failure of a portion of the roadway shoulder and loss of embankment fill beneath it. The other is a Soldier Pile Tieback Wall at PM 15.0, which replaces an existing soil nail wall to regain roadway shoulder. Other future projects in the Last Chance Grade area are identified in the following section.

Vehicle Traffic Data

The current and forecasted traffic data is listed in the table below. The data was provided in a memorandum from the Office of Travel Forecasting and Modeling on December 7th, 2015.

Year	Annual ADT	Peak Hour		
Base (2014)	4,200	640	Directional %	60
Current (2015)	4,210	640	DH Truck %	8.0
2031	4,410	670	10-yr. TI	9.0
2041	4,540	690	20-yr. TI	9.5
2051	4,670	710		

Collision Data

A collision analysis dated February 2, 2016 for the most recent 3-year period (01/01/2011 to 12/31/2013) was prepared by the District 1 Office of Traffic Safety for the segments of US 101 between the tie-in locations of each of the six realignment alternatives, as well as, all segments combined. The intent of analyzing in segments was to allow for comparison of the potential safety benefits of the various alternatives.

Segment 1: DN 101 PM 13.4/14.24

This highway segment is between the southern tie-in location common to Alternatives A1, A2, C3, C4, and C5 and the southern tie-in location of Alternative F. It has an actual total collision rate and actual fatal + injury collision rate that are less than the statewide average for similar facilities. There were no fatal collisions. TASAS Table B collision rates are summarized as follows:

TASAS Table B Collision Rates for DN 101 PM 13.4/14.24					
Actual (MV)			State Average (MV)		
Fatal	F+I	Total	Fatal	F+I	Total
0.000	0.25	0.51	0.028	0.48	1.05

Of the 2 reported collisions, 1 resulted in injury and 1 resulted in property damage only (PDO). Primary collision factors (PCF) were Improper Turn and Speeding. Types of collisions (TOC) were Hit Object and Overturn. Both collisions occurred in the northbound direction of travel.

Segment 2: DN 101 PM 14.24/15.62

This highway segment is between the southern tie-in location of Alternative F and the northern tie-in location of Alternative A1. It has an actual total collision rate and actual fatal + injury collision rate that are less than the statewide average for similar facilities. There were no fatal collisions. TASAS Table B collision rates are summarized as follows:

TASAS Table B Collision Rates for DN 101 PM 14.24/15.62					
Actual (MV)			State Average (MV)		
Fatal	F+I	Total	Fatal	F+I	Total
0.000	0.35	1.30	0.033	0.74	1.49

Of the 15 reported collisions, 4 resulted in injury and 11 were PDO. PCF were Speeding (9 of 15), Improper Turn (5 of 15), and Unknown (1 of 15). TOC were Hit Object (10 of 15), Rear End (4 of 15), and Head-On (1 of 15). The majority of the collisions occurred in the northbound direction of travel (12 of 15) and in wet roadway conditions (10 of 15). Dark conditions existed in 5 of 15 collisions.

Segment 3: DN 101 PM 15.62/15.92

This highway segment is between the northern tie-in location of Alternative F and the northern tie-in of Alternative A2. It has an actual total collision rate and actual fatal + injury collision rate that

are less than the statewide average for similar facilities. There were no fatal collisions. TASAS Table B collision rates are summarized as follows:

TASAS Table B Collision Rates for DN 101 PM 15.62/15.92					
Actual (MV)			State Average (MV)		
Fatal	F+I	Total	Fatal	F+I	Total
0.000	0.00	0.21	0.016	0.31	0.64

The one reported collision was PDO under wet roadway conditions in the northbound direction. The PCF was Speeding and the TOC was Rear End.

Segment 4: DN 101 PM 15.92/19.81

This highway segment is between the northern tie-in for Alternative A2 and the northern tie-in for Alternative C3. It has an actual total collision rate that is 1.1 times the statewide average for similar facilities. The actual fatal + injury collision rate is 1.4 times the statewide average for similar facilities. The actual fatal collision rate is 5.5 times the statewide average for similar facilities. TASAS Table B collision rates are summarized as follows:

TASAS Table B Collision Rates for DN 101 15.92/19.81					
Actual (MV)			State Average (MV)		
Fatal	F+I	Total	Fatal	F+I	Total
0.159	0.69	1.22	0.029	0.51	1.11

Of the reported 23 collisions, 3 resulted in fatality, 10 resulted in injury, and 10 were PDO. PCF were Improper Turn (12 of 23), Speeding (6 of 23), Other Than Driver (2 of 23), Influence of Alcohol (1 of 23), Failure to Yield (1 of 23), and Other Violations (1 of 23). TOC were Hit Object (17 of 23), Overturn (2 of 23), Head-On (1 of 23), Sideswipe (1 of 23), Broadside (1 of 23), and Other (1 of 23).

Segment 5: DN 101 PM 19.81/20.82

This highway segment is between the northern tie-ins of Alternative C3 and Alternative C4. It has an actual total collision rate and actual fatal + injury collision rate that are less than the statewide average for similar facilities. There were no fatal collisions. TASAS Table B collision rates are summarized as follows:

TASAS Table B Collision Rates for DN 101 PM 19.81/20.82					
Actual (MV)			State Average (MV)		
Fatal	F+I	Total	Fatal	F+I	Total
0.000	0.40	0.60	0.031	0.61	1.26

Of the reported 3 collisions, 2 resulted in injury and 1 was PDO. PCF were Improper Turn, Speeding, and Other Than Driver. TOC were Rear End, Hit Object, and Overturn.

Segment 6: DN 101 PM 20.82/22.73

This highway segment is between the northern tie-ins for Alternative C3 and Alternative C5. It has an actual total collision rate that is 4.1 times the statewide average similar facilities. The actual fatal + injury collision rate is 4.5 times the statewide average for similar facilities. There were no fatal collisions. TASAS Table B collision rates are summarized as follows:

TASAS Table B Collision Rates for DN 101 PM 20.82/22.73					
Actual (MV)			State Average (MV)		
Fatal	F+I	Total	Fatal	F+I	Total
0.000	2.18	4.37	0.028	0.48	1.05

Of the reported 42 collisions, 21 resulted in Injury and 21 were PDO. PCF were Speeding (31 of 42), Improper Turn (5 of 42), Other Violations (3 of 42), Influence of Alcohol (1 of 42), Improper Driving (1 of 42), and Other Than Driver (1 of 42). The majority of collisions occurred under wet roadway conditions (33 0f 42).

Segment 7: DN 101 PM 13.4/22.73

This highway segment encompasses the entire project limits and is between the southernmost and the northernmost tie-in locations of all proposed alternatives. The actual total collision rate is 1.6 times the statewide average similar facilities. The actual fatal + injury collision rate is 1.6 times the statewide average for similar facilities. There actual fatal collision rate is 2.2 times the statewide average for similar facilities. TASAS Table B collision rates are summarized as follows:

TASAS Table B Collision Rates for DN 101 PM 13.4/22.73					
Actual (MV)			State Average (MV)		
Fatal	F+I	Total	Fatal	F+I	Total
0.066	0.91	1.91	0.030	0.55	1.17

Of the reported 86 collisions, 3 resulted in fatality, 38 resulted in injury, and 45 were PDO. PCF were Speeding (49 of 86), Improper Turn (24 of 86), Other Violations (4 of 86), Other Than Driver (4 of 86), Influence of Alcohol (2 of 86), Failure to Yield (1 of 86), Improper Driving (1 of 42), and Unknown (1 of 86). TOC were Hit Object (58 of 86), Rear End (10 of 86), Overturn (8 of 86), Head-On (3 of 86), Sideswipe (2 of 86), Broadside (2 of 86), and Other (2 of 86).

5. CORRIDOR AND SYSTEM COORDINATION

In District 1, Route 101 is the primary north-south transportation corridor, the most important route, and the economic lifeline of the north coast. Route 101 traverses the entire length of District 1, including the counties of Mendocino, Humboldt, and Del Norte. It is a principle arterial serving interregional and interstate traffic, with relatively high volumes of truck and tourist traffic. Route 101 is of interregional and interstate significance and is designated as a Priority Interregional Highway in the 2015 State Interregional Transportation Strategic Plan. The route serves other modes of transportation including port access at Humboldt Bay and Crescent City Harbor, and commercial airport access to the California Redwood Coast - Humboldt County Airport. It is the principle route for the movement of goods into and out of the region and to recreational areas including Redwood National Park and twelve State Parks.

The Concept for Route 101, from Big Lagoon in Humboldt County through Crescent City in Del Norte County, is to maintain the existing facilities, including realignment if necessary to avoid unstable areas. The project alternatives are consistent with the current route concept.

The following future projects are scheduled for the area in or near Last Chance Grade:

EA (EFIS #)	DN-101 Post Mile	Project Name	Program Year	Approve Contract	Accept Contract
01-0B27U4 (01 1500 0111)	**14.9-15.3**	Repair Storm Damage (Last Chance Slips)	2016	5/27/16	6/01/17
01-0B280 (01 1200 0112)	**17.4-17.4**	Reconstruct Roadway (Log Crossing Repair)	2016	7/13/16	12/01/17
01-0B290 (01 1200 0113)	**21.7-22.9**	Construct Soldier Pile Wall (Hamilton 2 Retaining Wall)	2016	7/18/16	11/01/17
01-0B300 (01 1200 0116)	**22.0-22.0**	Stabilize Roadway (South Hamilton Slipout)	2015	10/14/15	12/31/16
01-49350 (01 1500 0116)	**12.94-21.23**	Reconstruct Drainage - 11 Locations (DN 101 Reconstruct Drainage)	2018	7/15/18	11/01/19
01-0G210 (01 1600 0137)	**21.23-21.23**	Permanent Restoration at Cushing Creek	K-Phase	5/24/22	12/22/23

Complete Streets

Caltrans' Complete Streets Directive promotes a multimodal transportation system that safely accommodates bicyclists, pedestrians, transit and vehicular users. This portion of US 101 is part of the Pacific Coast Bike Route and provides access to the California Coastal Trail (CCT). This project will improve utility for vehicles, and bicyclists, by increasing shoulder width and sight distance. Design consideration will be given to improving access and safety for pedestrians utilizing the CCT and other park facilities, once an alternative route has been selected.

Context Sensitive Solutions

The project is adjacent to Redwood National and State Parks, which are designated as a World Heritage Site and an International Biosphere Site. The project is also located within the ancestral territories of four federally recognized tribes, the Yurok Tribe, Elk Valley Rancheria, Tolowa Dee-ni' Nation and Resighini Rancheria. Park representatives and tribal members have participated in the selection and development of the project alternatives and will provide additional future consultation.

Sea Level Rise and Climate Change

Last Chance Grade is highly susceptible to the impacts of sea level rise and climate change. The alternatives developed result in facilities that have greater resiliency to the effects of sea level rise and climate change. For more information see EFS Section 9.1under "Sea Level Rise and Climate Change".

6. ALTERNATIVES

Fourteen alternative alignments were studied for this project and eight have been eliminated from further study. This PSR consists of seven alternatives and includes one alternative to maintain the existing alignment (referred to as the No Build alternative). All build alternatives propose a two-lane highway with an intermittent truck-climbing/passing lane. Each lane would be 12 feet wide, with 8 foot shoulders (10 foot shoulders in tunnels). There are three proposed roadway widths among the six proposed build alternatives: 40 feet (12 foot lanes, 8 foot shoulders), 44 feet (12 foot lanes, 10 foot shoulders in tunnels) and 52 feet (12 foot lanes, 8 foot shoulders and a 12 foot truck-climbing/passing lane). For alternatives in old-growth redwood forests, shoulders may be as narrow as four feet, and a viaduct will likely be proposed to reduce impacts to old-growth redwoods. All alternatives were developed with vertical grades not to exceed 7%, a design speed of 55 mph, a minimum horizontal curve radius of 1,000 feet (with minor exceptions, where noted),

and superelevation rates that meet current design standards. At this phase in the project cut slopes of 1.5:1 (H:V) were assumed, with fill slopes that vary between 1.5:1 to 2:1 (flatter fill slopes were assumed in locations where the terrain would allow additional fill placement). At the present time, no special facilities, such as a vista point or rest area, are identified for any of the project alternatives. However, the existing overlook at PM 13.2 will remain functional. Determination of which portions of the existing alignment will be used or restored will need to be evaluated in an additional planning effort with State and National Parks and the community, and will depend on the alternative selected for construction. The current cost estimate does not account for restoration of the bypassed existing alignment. Layouts & Profiles, Typical Cross Sections are included as Attachments B and C, respectively.

6A. Viable Alternatives

Alternative A1 (PM 13.47 to PM 15.56): Rudisill Road to LCG Tunnel

This alternative departs US 101 with an 850 foot radius horizontal curve at Rudisill Road (PM 13.47) and enters Redwood National Park (RNP) at an elevation of 380 feet. The alignment crosses the California Coastal Trail (CCT), exits RNP after 500 feet, and gains approximately 900 feet of elevation as it climbs the back side of the LCG hill. Connectivity to the CCT will need to be reestablished, possibly with an undercrossing where the fill prism is shallow and narrow. At 2.3 miles along the alignment it heads west and utilizes a 125 foot high bridge (Bridge 1a) over an ephemeral tributary of Wilson Creek, and enters a tunnel (Tunnel 1) before reaching the eastern boundary of Del Norte Coast Redwoods State Park. Tunnel 1 is 2,425 feet long with a 2.6% grade and a northern portal near US 101 at PM 15.56. The alignment ties back into US 101 on a 900 foot radius horizontal curve. The alignment is 3.2 miles in length and eliminates a 2.1 mile long segment of existing US 101.

Alternative A1 Summary				
Length (miles)	Roadway Cost (2016)	Structure Cost (2016)	Right of Way Cost (2016)	Total Capital Cost (2016)
3.2	$189,214,000	$464,472,000	$17,919,000	$671,605,000

Alternative A2 (PM 13.47 to PM 15.92): Rudisill Road to Damnation Trailhead

Alternative A2 is common to Alternative A1 for the initial 2.3 miles of the alignment, where the alignment then continues northeast from mile 2.3 and enters a large cut section before crossing an ephemeral tributary of Wilson Creek on a proposed 115 foot high bridge (Bridge 2a). The alignment continues on a side-hill ascent through a small cut, and enters a 1,100 foot long bridge with a 7% grade (Bridge 2b) just prior to Del Norte Coast Redwoods State Park's eastern boundary and then passes through old growth forest. The alignment reconnects with existing US 101 within 450 feet of the viaduct at PM 15.92, prior to the Damnation Creek Trailhead pull-out. The alignment is also 3.2 miles in length and eliminates a 2.5 mile long segment of existing US 101.

Alternative A2 Summary				
Length (miles)	Roadway Cost (2016)	Structure Cost (2016)	Right of Way Cost (2016)	Total Capital Cost (2016)
3.2	$170,744,000	$26,677,000	$42,392,000	$239,813,000

Alternative F (PM 14.24 to PM 15.56): Full Tunnel

Alternative F proposes a complete tunnel option to realign US 101. The alternative departs US 101 at PM 14.24 with a northeast bearing in order to go behind the landslide failure planes. The

alignment extends 750 feet before entering the southern tunnel portal (Tunnel 2) at an elevation of approximately 610 feet. The tunnel maintains a grade of 4% until reaching its northern portal at an elevation of approximately 840 feet. Upon leaving the northern portal, the alignment extends approximately 450 feet while ascending at a grade of 5.6% before reconnecting to existing US 101 at PM 15.56. The proposed tunnel is 5,600 feet in length and would generate approximately 200,000 cubic yards of excess excavation material. In the event a location near the alignment cannot be identified, an off-site location will need to be found. The alignment is 1.3 miles in length and eliminates a 1.3 mile segment of US 101. The tunnel's feasibility has not yet been proven, and is complicated by the fact that it passes between the boundary separating the Franciscan Complex Broken Formation and the Melange. Extensive geotechnical studies will be needed to determine if this is a viable alternative.

Alternative F Summary				
Length (miles)	Roadway Cost (2016)	Structure Cost (2016)	Right of Way Cost (2016)	Total Capital Cost (2016)
1.3	$69,972,000	$978,070,000	$13,585,000	$1,061,627,000

Alternative C3 (PM 13.47 to PM 19.81): Rudisill Road to South of Mill Creek Access

Alternative C3 is common to Alternatives A1 & A2 for the initial 2.3 miles of the alignment. At mile 2.3 the alignment continues north while remaining east of the Del Norte Coast Redwoods State Park and crosses three ephemeral tributaries of Wilson Creek utilizing two bridges (Bridge C1 & C2). At mile 3.25 the alignment enters the southern portal of a 1,680 foot long tunnel (Tunnel 3) with a 3.9% grade. The tunnel in this alternative is used to avoid a significant cut section through an unavoidable 1100 foot high ridge. From the northern tunnel portal, the alignment continues north for 3,000 feet, crossing one ephemeral tributary of Wilson Creek on a bridge (Bridge C3), then swings to the east to avoid old growth forest within the State Park. Through this section, north of the tunnel, estimated cut and fill lines appear close to the Park boundary. Once survey information is available and design work begun, the alignment and/or profile will be adjusted, as necessary, to avoid direct impact to the Park. The alignment crosses two more ephemeral tributaries of Wilson Creek, turns north, and at mile 4.9, enters previously harvested State Park forest land. At mile 5.4, the alignment extends through a low gap in the ridge while transitioning from the Wilson Creek watershed to the West Branch (WB) Mill Creek / Smith River watershed. The alignment continues northwest crossing a tributary of WB Mill Creek with a bridge (Bridge C4) at mile 6.6. It continues northwest crossing another tributary (no bridge) to mile 6.7. Bridge C4 was added to the alternative after completion of the Advance Planning Study as discussed in Section 14.4. At mile 6.7, at an elevation of approximately 800 feet, the alignment extends northwest and crosses a drainage of WB Mill Creek on a 1,100 foot long bridge (Bridge 3a) before ascending at 6.9% through a large cut. At mile 7.8, the alignment reconnects with existing US 101 at PM 19.81, approximately 0.4 miles south of the Mill Creek Campground Road intersection, at an elevation of 1,100 feet. The alignment is 7.8 miles in length and eliminates a 6.3 mile long segment of existing US 101.

Alternative C3 Summary				
Length (miles)	Roadway Cost (2016)	Structure Cost (2016)	Right of Way Cost (2016)	Total Capital Cost (2016)
7.8	$358,009,000	$401,461,000	$38,087,000	$797,557,000

Alternative C4 (PM 13.47 to PM 20.82): Rudisill Road to North of Mill Creek Access

Alternative C4 is common to Alternative C3 for the initial 6.7 miles of the alignment. From mile 6.7, Alternative C4 extends northwest and crosses a drainage of WB Mill Creek on a 564 foot long

bridge (Bridge 4a). At mile 7.5, the alignment crosses Mill Creek Campground Road near its mid-point and continues on a long tangent section. A required public connection to the Mill Creek Campground appears to be feasible at this location. The alignment then crosses a drainage of WB Mill Creek on a 150 foot high bridge (Bridge 4b). At mile 7.7, the alignment begins ascending at 5.9% and crosses two more WB Mill Creek drainages (without bridges). At mile 8.6, the alignment reconnects with existing US 101 at PM 20.82. The alignment is 8.6 miles in length and eliminates a 7.4 mile long segment of existing US 101.

Alternative C4 Summary				
Length (miles)	Roadway Cost (2016)	Structure Cost (2016)	Right of Way Cost (2016)	Total Capital Cost (2016)
8.6	$413,047,000	$395,591,000	$38,678,000	$847,316,000

Alternative C5 (PM 13.47 to PM 22.73): Rudisill Road to Hamilton Road (Alternative Recommended for Programming)

Alternative C5 is common to Alternative C4 for the initial 7.7 miles of the alignment. From mile 7.7, the alignment extends northeast and crosses a tributary of WB Mill Creek (without a bridge) and enters a large side-hill through-cut. At mile 8.0, the alignment crosses a WB Mill Creek tributary with a 94 foot high bridge (Bridge 5b). Upon departure from Bridge 5b, the alignment enters a large through-cut, and at mile 8.4 enters a final decent. At mile 9.4 an ephemeral tributary of WB Mill Creek is crossed by 66' high bridge (Bridge 5c). At mile 9.9, a larger tributary of WB Mill Creek is crossed by a 12' high bridge (Bridge 5d) while the alignment intersects Hamilton Road and extends west. From this point, the alignment follows the general course of Hamilton Road on a relatively flat grade to its intersection with existing US 101 at PM 22.73. Three smaller bridges (Bridge 5e-5g) are anticipated for this last section. The alignment is 11.7 miles in length and eliminates a 9.3 mile segment of existing US 101, including the Cushing Creek area.

Alternative C5 Summary				
Length (miles)	Roadway Cost (2016)	Structure Cost (2016)	Right of Way Cost (2016)	Total Capital Cost (2016)
11.7	$533,147,000	$424,106,000	$44,897,000	$1,002,150,000

Alternative M (PM 12.0 to PM 15.5): Maintain Existing (No Build)

This alternative will have no planned construction, and US 101 will continue on its existing alignment. Regular maintenance and operations will continue with this alternative, with emergency restoration projects as needed to address changing conditions. Current annual maintenance costs of $2 million with a projected cost of approximately $26 million by 2034 (District 1 Climate Change Vulnerability Assessment and Pilot Studies). Engineering solutions such as retaining walls have not been able to provide long-term stability, but will continue to be necessary to provide an adequate highway facility. As the landslides move, the road will require costly repairs and maintenance with potential environmental impacts including old-growth redwood impacts associated with roadway retreats to keep US 101 open. The potential for a slide movement which is deep and large enough could result in a major roadway failure requiring complete closure of the roadway indefinitely. A major roadway failure would have economic impacts and require a significant detour that is outlined in the LCG Engineered Feasibility Study, *9.2.3 Economic Impact Study*.

6B. Rejected Alternatives

The Last Chance Grade Feasibility Study evaluated a total of fourteen build alternatives and eliminated eight from further study. The criteria used for alternative exclusion includes

geotechnical, environmental, engineering, and planning criteria. These alternatives when compared to the viable alternatives provided no unique advantage to necessitate further study. See *Engineered Feasibility Study* (June 2015) for further details.

6C. Other Considerations

Right of Way

The right of way corridor for US 101 in the vicinity of the project is approximately 100 foot wide. When the right of way was originally acquired the roadway was centered within the 100 foot wide right of way corridor. Portions of the roadway have since moved downward toward the ocean resulting in sections of roadway located outside of Caltrans right of way into State and National Parks Right of Way. Right of Way Data Sheets were prepared for each of the six realignment alternatives and are included as Attachments D.

Design Exceptions

Alternatives A1, A2, C3, C4, C5, and F are preliminary designs conforming to current geometric design standards for horizontal curve radius, shoulder width, superelevation, and maximum grade, except for two needed exceptions for horizontal curve radius. Alternatives A1, A2, C3, C4, and C5 have alignments that are common to each other when departing from existing US 101 at PM 13.4. The first two curves on this alignment have radii of 850 feet and 900 feet, respectively (current design standard is 1000 feet). The reduced curve radii would be required to accommodate the alignments to the natural terrain while conforming to existing US 101. Conforming to the natural terrain in these two locations significantly reduces the magnitude of cut / fill as well as the environmental impact to surrounding Park land. In the event design assumptions change upon the availability of additional data, there may be additional design exceptions needed for a selected alternative.

Advance Planning Study

The Division of Engineering Services (DES) Structure Design provided an Advance Planning Study (APS) for each of the proposed alternatives and is included as Attachment E.

Hazardous Waste

A preliminary Initial Site Assessment (ISA) was prepared for this project and is included in the project file. The ISA found that there are no *Hazardous Waste and Substance Site List* ("Cortese List") sites along the proposed alignments. A "Cortese site" is, however, present at the former mill site east of the project. The only likely hazardous waste issue is the presence of Aerially Deposited Lead at tie-in locations with existing US 101.

Transportation Management Plan

A Transportation Management Plan (TMP) was prepared for this project and is included as Attachment F. The TMP indicates that significant traffic impacts are not anticipated if its recommendations and requirements are incorporated.

Preliminary Hydraulics Report

A Preliminary Drainage Recommendation was prepared by North Region Hydraulics, and is included in the project file. The recommendation indicates that fish passage is addressed by the use of bridges in the project, but that an additional bridge at mile 6.2 along Alternatives C3, C4, and C5 should be included for a tributary of Mill Creek, where stream channel slopes appear suitable for fish habitat (confirmed by fish count data). Project funds were added to cost estimates to account for the additional bridge recommendation, which was not included in the APS completed by DES.

The drainage recommendation provided a cost estimate for drainage items associated with each of the proposed alternatives:

Alternative	Estimated Capital Drainage (Geotechnical)	Estimated Capital Drainage (Hydraulics)	Estimated Capital Drainage (Total)
A1	$5,493,700	$5,247,500	$10,741,000
A2	$6,673,300	$4,923,000	$11,596,000
C3	$15,603,000	$11,510,000	$27,113,000
C4	$17,087,000	$16,321,000	$33,408,000
C5	$23,229,000	$17,746,000	$40,976,000
F	$500,000	$370,000	$870,000

Storm Water Data Report

North Region Office of Engineering Services prepared a Preliminary Storm Water Data Report (SWDR) which is included in the project file. The SWDR recommends Construction Site Best Management Practices (BMPs) costs should be estimated at 1.25% of the total construction cost. As the project is not located within a TMDL watershed, no Treatment BMPs to address TMDLs are required. Permanent Treatment BMPs are expected to be required and must be incorporated into the project to treat new impervious surfaces.

Geotechnical Report

The Office of Geotechnical Design West prepared a Preliminary Geotechnical Report (PGR) and is included as Attachment G. The PGR provides an overview of on-site geotechnical investigation work that will be required during the next phase of the project. It also indicates that the existing alignment, between PM 12.7 and PM 14.4, is located within the limits of an active earth flow. The first several hundred feet of Alternatives A1-A2 and C3-C5 are also located within this earth flow, as is the southern portal and a portion of the tunnel in Alternative F. Options to mitigate the earth flow will need to be evaluated for all alternatives. Additionally, Alternatives A1-A2 and C3-C5 extend through probable mapped dormant mature landslides over the next mile beyond the earth flow.

Materials

District 1 Materials Lab provided a preliminary Materials Recommendation which is included in the project file. The report indicates that as no landform samples are currently available, its recommendations are conservative and based on known or extrapolated data at tie-in points and estimated conditions in the alignment area. A twenty year traffic index from an adjacent project (2015) was used. All structural section alternatives include subgrade enhancement geotextile (SEG) or SEG in conjunction with Bi-axial Geogrid. Underdrains are recommended for the base of all cut slopes.

7. COMMUNITY INVOLVEMENT

During the development of the Last Chance Grade Feasibility Study (completed June 2015) Caltrans partnered with agencies and Tribal Governments with a vested interest and land management responsibilities near US 101 at Last Chance Grade. The partnership consists of Caltrans, California Department of Parks and Recreation, National Park Service, Yurok Tribe, Elk Valley Rancheria, and the Tolowa Dee-ni' Nation (collectively, "the Partners.") The goal of creating the partnership was to study and develop permanent solutions to the instability at Last Chance Grade.

Caltrans and the Partners recognized the need for extensive public participation during the development of this Project Study Report. In March 2016, Caltrans and the Partners hosted three

community town hall meetings to inform the community on the status of the project. The community town hall meetings were held in Crescent City, Klamath and Eureka. A Community Outreach Summary and Public Engagement Plan is included as Attachment H and provides information regarding meeting methodology, format, results, meeting material and public comment.

8. ENVIRONMENTAL DETERMINATION/DOCUMENT

A Preliminary Environmental Assessment Report (PEAR) was prepared for the project and is included as Attachment I. The PEAR identifies the anticipated environmental documents for all alternatives as being an Environmental Impact Report and Environmental Impact Statement under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), respectively. The estimated length of time to obtain environmental approval is between 5 and 9 years. This project will require the following permits, agreements, and consultations:

- US Army Corps of Engineers: Section 404 Individual or Nationwide Permit
- North Coast Regional Water Quality Control Board: Section 401 Water Quality Certification
- California Department of Fish and Wildlife:
    - Stream and Lakebed Alteration Agreement (1600)
    - California Endangered Species Act consistency determinations for threatened and endangered species determinations, and other consultations for species listed only by California
- California Coastal Commission: Coastal Development Permit: State and Local jurisdictions. Consolidating permit jurisdiction is possible.
- California Department of Forestry and Fire Protection: Timberland Conversion Permit or Public Utility Right of Way Exemption
- US Fish and Wildlife Service: Endangered Species Act, Consultation for impacts to marbled murrelet, and northern spotted owl
- US National Marine Fisheries Service Endangered Species Act and Essential Fish Habitat: Consultation for impacts to Southern Oregon/Northern California Coast coho Evolutionarily Significant Unit
- State Water Resources Board: Construction General Permit
- Redwood National and State Parks:
    - Section 4(f) Agreement
    - Permit to Enter
    - Transfer of Jurisdiction
- Tribal Consultations
- State Historic Preservation Office Consultation

All proposed alternatives have the potential for impact to environmental resources, including the loss of native habitat and increased impervious surface. During project development extensive cultural and biological surveys will be required. Consultation and coordination with the Partners as well as resource/regulatory agencies will be required throughout project development.

9. FUNDING /PROGRAMMING

Funding

It has been determined that this project is eligible for Federal-aid funding. This project is proposing special funding through the Federal Emergency Response Program.

Cost Estimates

A large percentage of project cost for all alternatives is the construction of bridges (most are large) and tunnels. All project alternatives, with the exception of Alternative A2, include a tunnel, with lengths of 2,425', 5,600' and 1,680' for Alternatives A1, F, and C3-C5, respectively. The project alternatives have structure costs that range from approximately $26.7 million for Alternative A2 to $980 million for Alternative F.

All project alternatives, with the exception of Alternative F, have significant to very large excavation quantities and costs, which range from approximately $47 million for Alternative A1, to $288 million for Alternative C5. For all project alternatives, with the exception of Alternative F, it is anticipated that excess excavation material (that which is beyond what is required for fill sections) can be placed along the alternative alignments, especially the first 1.2-mile common portion of the alignments. This material would take the form of permanent and stable engineered fill prisms (terraces) along both sides of the highway. They will need to be tied into the landscape as visually acceptable features that are amenable to revegetation with native species. For Alternative F, off-site disposal is assumed to be necessary for approximately 200,000 cubic yards of excess material from tunnel excavation. An estimated amount of $5 million has been included for disposal, with the assumption that a disposal site can be found no further than the general Crescent City area. Beneficial use(s) for this material (rock) may be identified at a later time.

The project alternatives have significant right of way purchase and utility relocation costs, which range from approximately $13.6 million for Alternative F, to $44.9 million for Alternative C5. High utility relocation costs, especially for the C3 to C5 Alternatives, result from the need to relocate a number of large transmission line towers that run near to and generally parallel to the alignments. Cost estimates for acquisition of private timber production land is also significant for all project alternatives, with the exception of Alternative F. Estimated new right of way acquisition area ranges from approximately 164 acres for Alternative A1, to 581 acres for Alternative C5. The Alternative F estimate is approximately 13 acres.

The current cost estimate does not include funds for removal or restoration of any part of the bypassed highway. After final selection of an alternative for construction in the next project phase, further consultation with the project partners will be needed to determine the scope and cost for this work.

Estimated environmental mitigation costs for all alternatives are very large. All alternatives impact to varying degrees old growth redwood forest within Del Norte Coast Redwoods State Park, a part of Redwood National and State Parks. Mitigation cost estimates (acquisition and construction) vary from $50.6 million for Alternative F, to $98.4 million for Alternative C5. The cost estimate for each alternative are included in Attachment J.

10. DELIVERY SCHEDULE

Project Milestones	Project Milestone	Scheduled Delivery Date (Month, Day, Year)
Program Project	M015	01/16/2017
Begin Environmental Document (ED)	M020	09/14/2017
PA & ED	M200	02/16/2026
Right of Way REQTS	M224	08/19/2024
PS&E To DOE	M377	03/15/2029
PROJECT PS&E	M380	04/15/2030
Right of Way Certification	M410	07/01/2030
Ready to List	M460	09/02/2030
HQ Advertise	M480	12/02/2030
Award	M495	04/14/2031
Approve Contract	M500	06/16/2031
Contract Acceptance	M600	10/14/2039
End Project	M800	09/29/2042

A Programming Sheet has been prepared for the project and is included as Attachment K.

11. RISKS

A Level 2 Risk Register has been prepared for the project. A Level 2 Risk register was selected based upon the limited resources available during the Project Initiation Phase. It is recommended that a Level 3 Risk Register be prepared during the future phases of this proposed project. The major possible risks to project completion time schedule, cost, and alternative viability include: existing geology of proposed realignments, sensitivity of natural environment, opposing environmental activism, complicated permitting and mitigation strategies, and tunnel constructability. The Risk Register is included as Attachment L.

12. FHWA COORDINATION

Caltrans has completed many Federal Emergency Relief (ER) Program Projects on Last Chance Grade within the last five years. The two transportation agencies have communicated throughout that period as the roadway continues to fail and movement worsens over time. In June 2015, a Last Chance Grade Issue Paper was submitted to FHWA documenting the need for ER funding for Last Chance Grade. Multiple meetings have since occurred including a visit from FHWA geologists to the site in April 2016. March 2016 resulted in another Federal Disaster Declaration for the County of Del Norte. A new Damage Assessment Form for damage repairs to the roadway and walls along the grade will be submitted to FHWA for approval prior to approval of this document in June.

Caltrans coordination with FHWA during project development and construction is likely to be extensive in a project of this size and scope. Discussions regarding the structure and form this coordination will take have yet to be determined.

PROJECT REVIEWS

Name	Reviewer	Date
Field Review	PDT	7/10/15
Advance Planning	Talitha Hodgson	5/27/16
Project Management	Sebastian Cohen	5/27/16
Environmental	Rosalind Litzky	5/27/16
Program Advisor	Tom Fitzgerald	5/27/16
District Safety Review	Mark Sobota	5/27/16

13. PROJECT PERSONNEL

Name	Title	Phone Number
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Talitha Hodgson	Chief, Advance Planning	(707) 441-3969
Kevin Church	Chief, Traffic Operations	(707) 445-6377
David Morgan	Chief, Traffic Safety	(707) 445-6376
Rosalind Litzky	Environmental Senior	(707) 445-5222
Jason Meyer	Environmental Coordinator	(707) 445-6322
Jeremiah Joyner	Senior Right of Way Agent	(707) 445-6424

14. ATTACHMENTS

A. Project Location Map (1)
B. Layouts & Profile (8)
C. Typical Cross Sections (1)
D. Right of Way Data Sheets (30)
E. Advance Planning Study (39)
F. Transportation Management Plan (7)
G. Preliminary Geotechnical Report (Less Layout Attachments) - April 8, 2016 (6)
H. Community Outreach Summary & Public Engagement Plan (77)
I. Preliminary Environmental Assessment Report (23)
J. Cost Estimates (18)
K. Programming Sheet (1)
L. Risk Register (2)

ATTACHMENT A
Project Location Map

DESIGN STUDY ONLY

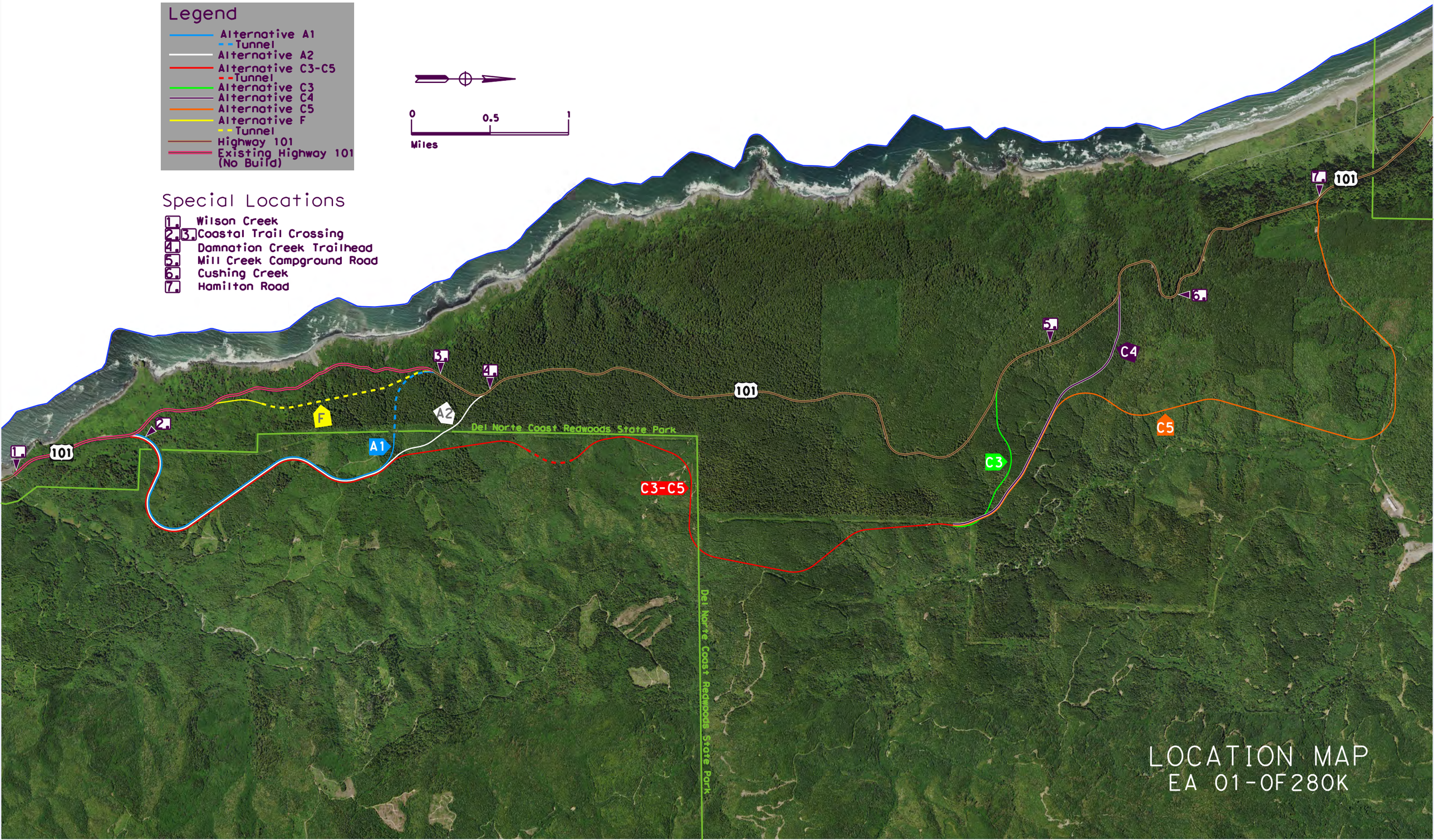
Legend

- Alternative A1
- Tunnel
- Alternative A2
- Alternative C3-C5
- Tunnel
- Alternative C3
- Alternative C4
- Alternative C5
- Alternative F
- Tunnel
- Highway 101
- Existing Highway 101 (No Build)

0 0.5 1
Miles

Special Locations

1. Wilson Creek
2. 3. Coastal Trail Crossing
4. Damnation Creek Trailhead
5. Mill Creek Campground Road
6. Cushing Creek
7. Hamilton Road

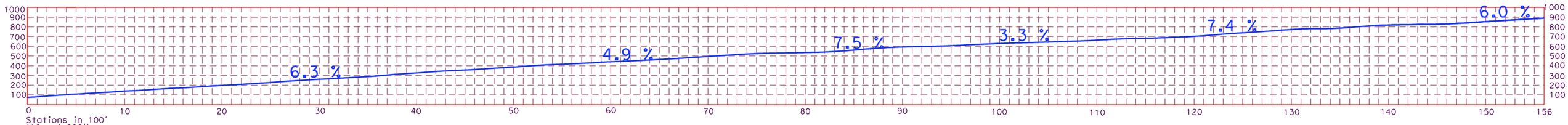


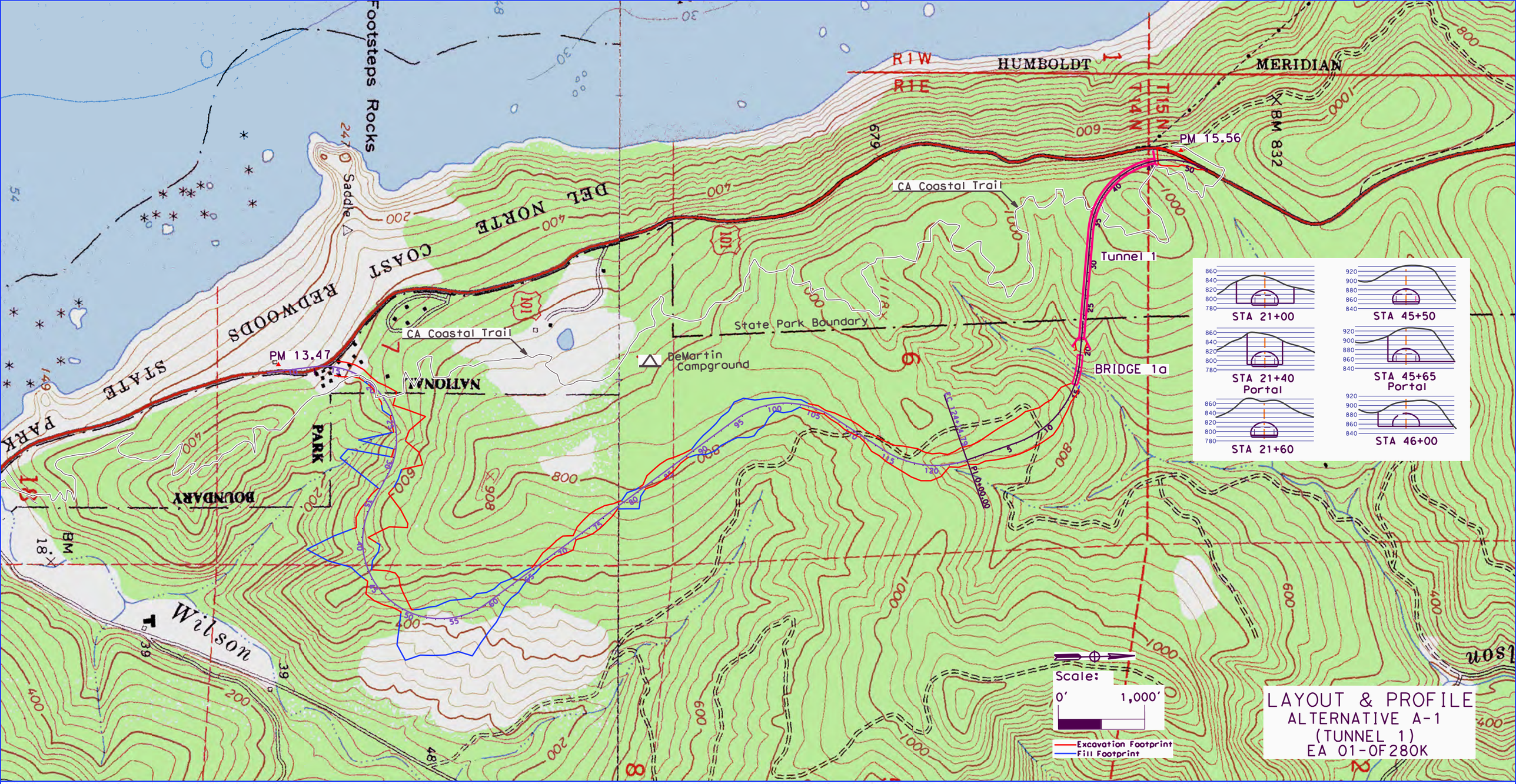
LOCATION MAP
EA 01-0F280K

ATTACHMENT B
Layouts & Profiles

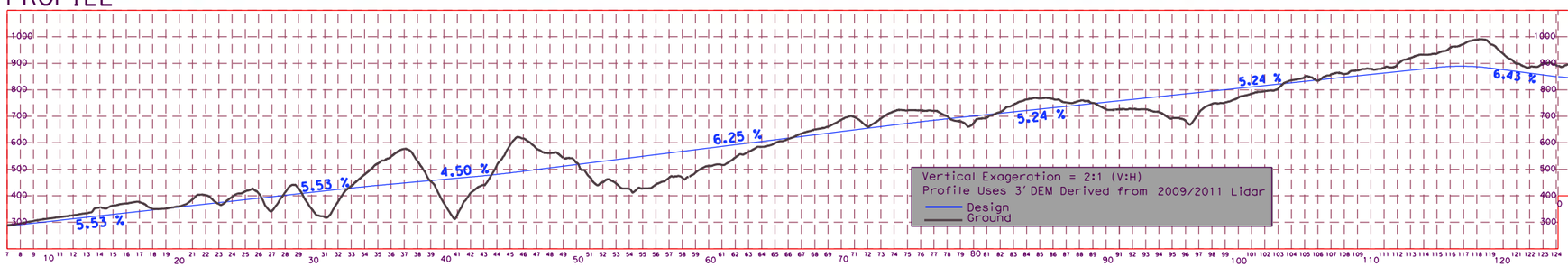
LAYOUT & PROFILE
EXISTING GRADE
EA 01-0F280K

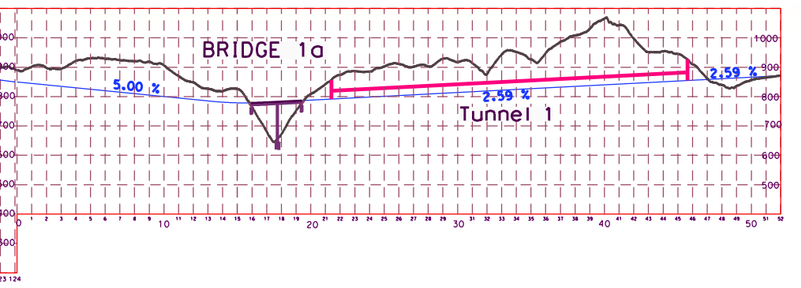
PROFILE

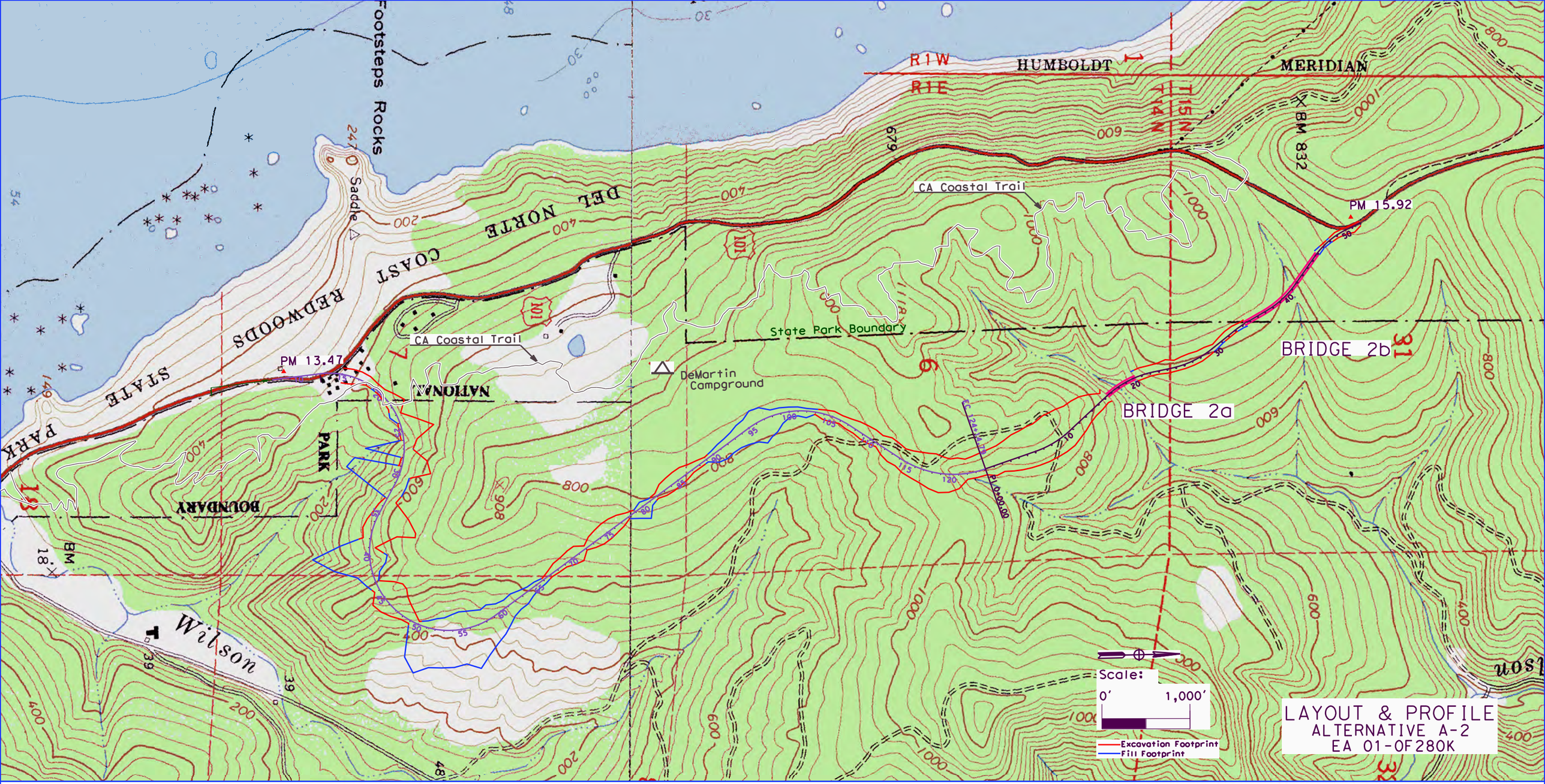



Footsteps Rocks
Saddle
DEL NORTE COAST REDWOODS STATE PARK
NATIONAL
PARK
BOUNDARY
CA Coastal Trail
PM 13.47
PM 15.56
State Park Boundary
DeMartin Campground
Tunnel 1
BRIDGE 1a
HUMBOLDT MERIDIAN
T15N
R1W
R1E
BM 832
Wilson
Scale:
0'
1,000'
Excavation Footprint
Fill Footprint
LAYOUT & PROFILE
ALTERNATIVE A-1
(TUNNEL 1)
EA 01-0F280K
STA 21+00
STA 21+40 Portal
STA 21+60
STA 45+50
STA 45+65 Portal
STA 46+00

PROFILE

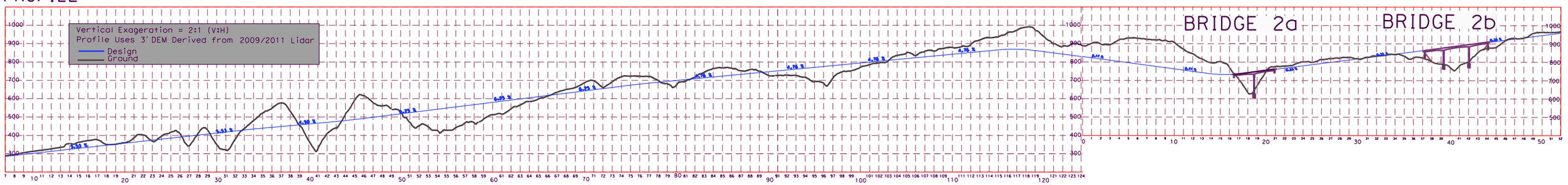

5.53 %
4.50 %
6.25 %
5.24 %
5.24 %
6.43 %
Vertical Exageration = 2:1 (V:H)
Profile Uses 3' DEM Derived from 2009/2011 Lidar
Design
Ground


BRIDGE 1a
5.00 %
2.59 %
2.59 %
Tunnel 1

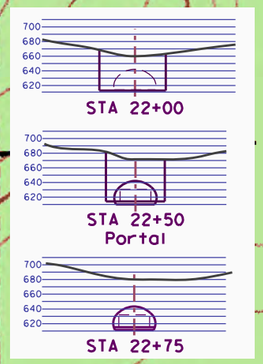


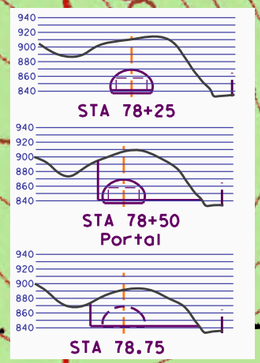
LAYOUT & PROFILE
ALTERNATIVE A-2
EA 01-0F280K

PROFILE



R1W
HUMBOLDT
MERIDIAN
R1E
T4N
T5N
PM 14.24
PM 15.56
Tunnel 2
DEL NORTE
NATION
101
679
400
009
008
1000
1118'
XBM 832

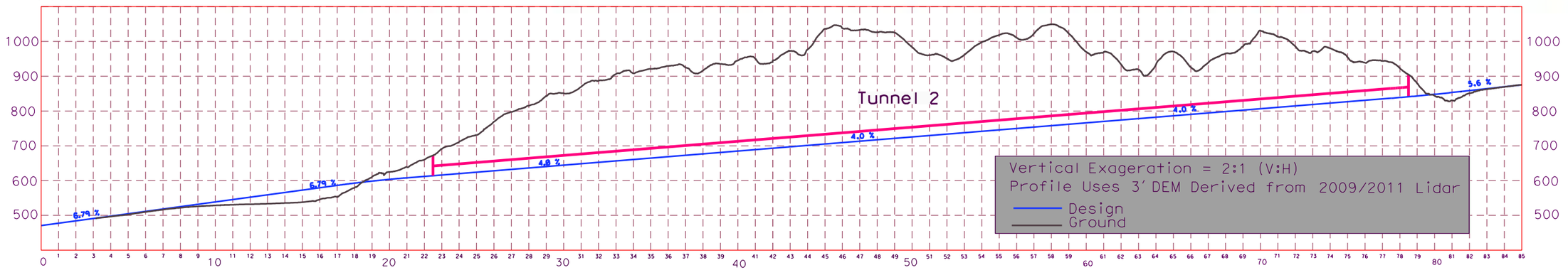


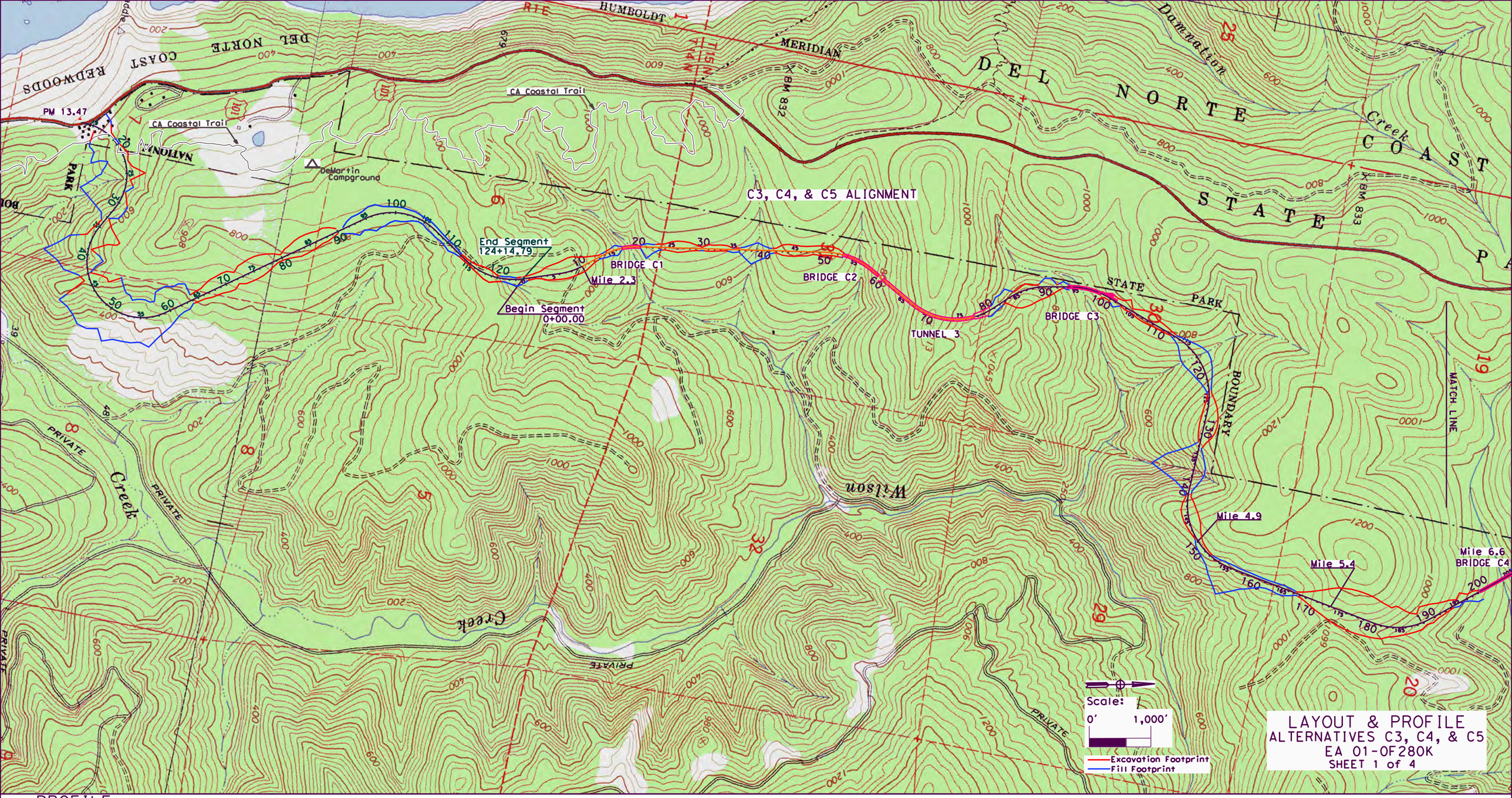


Scale:
0' 600'
Excavation Footprint
Fill Footprint

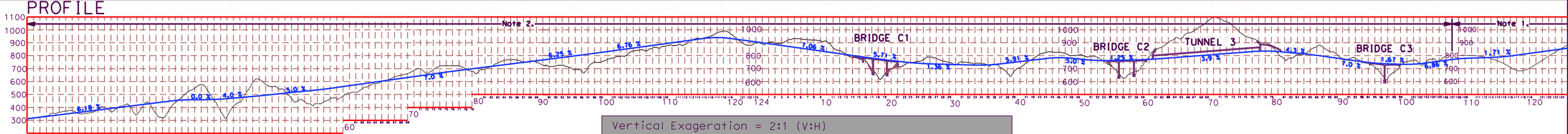
LAYOUT & PROFILE
ALTERNATIVE F
(TUNNEL 2)
EA 01-0F280K

PROFILE

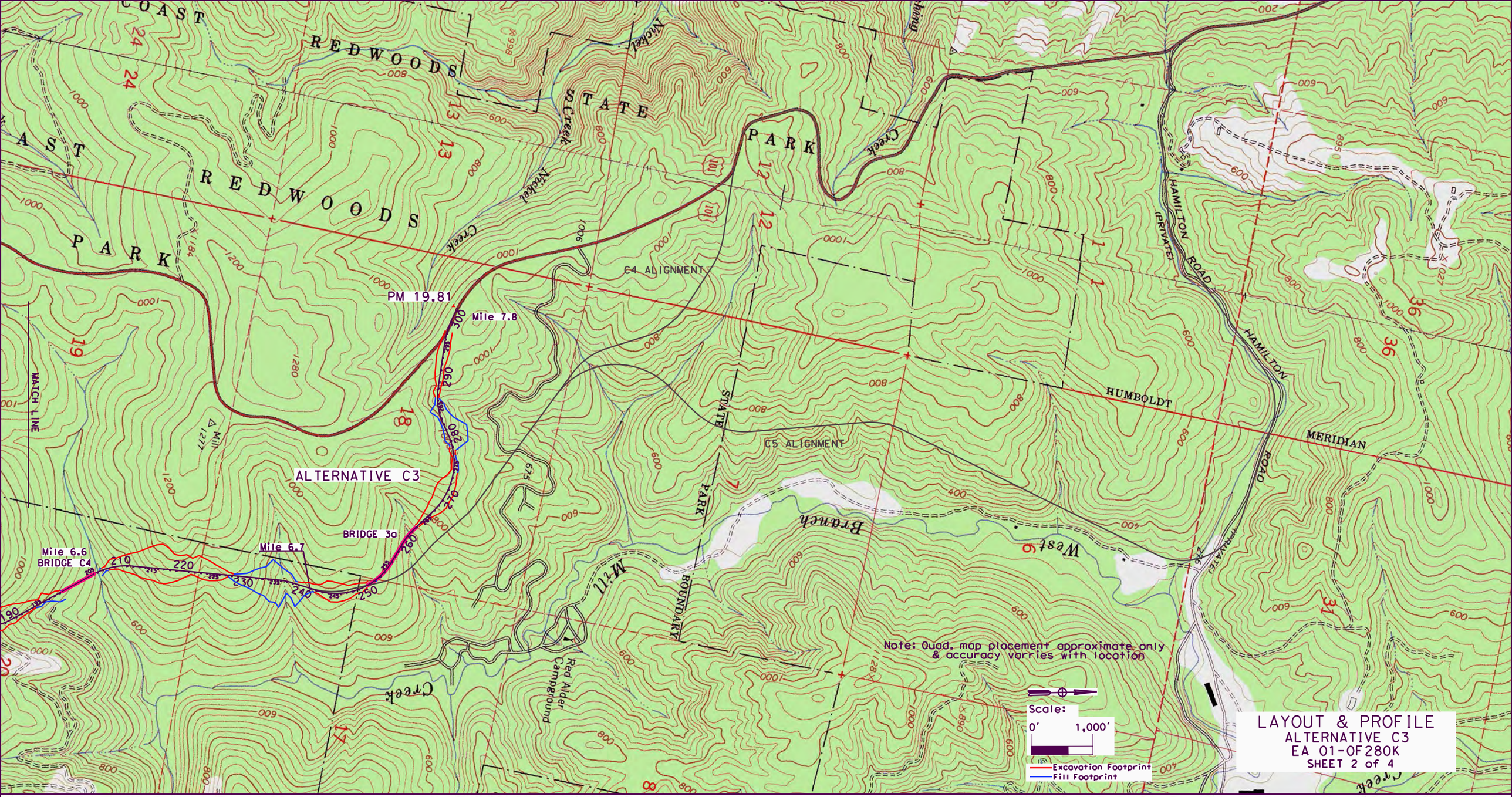




PROFILE



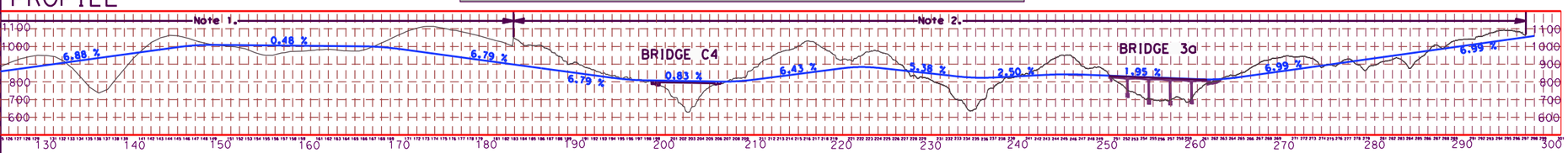
Vertical Exageration = 2:1 (V:H)
Note 1: Profile Uses 98' DEM Derived from Quad. Map
Note 2: Profile Uses 3' DEM Derived from 2009/2011 Lidar
Design
Ground

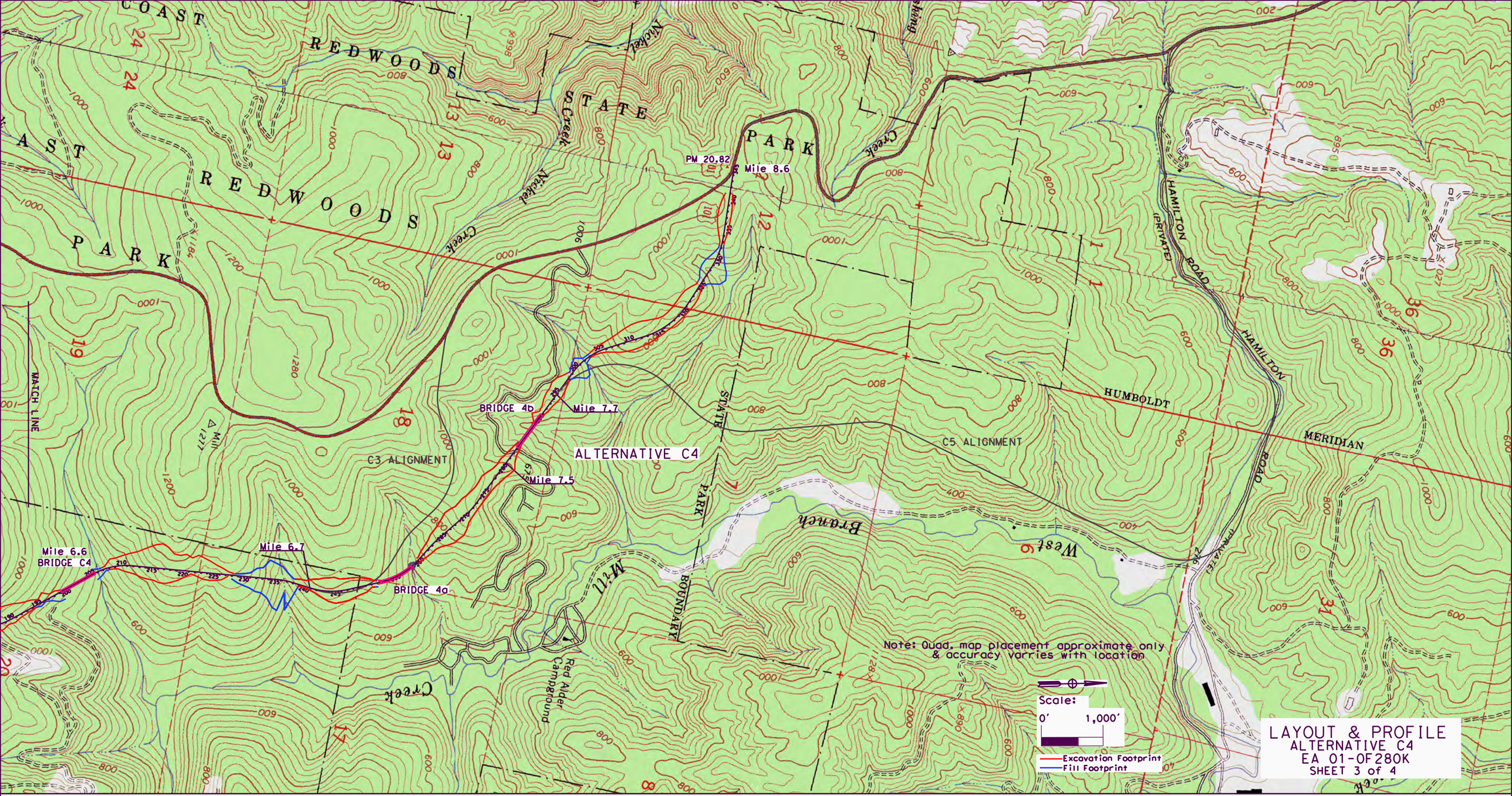


LAYOUT & PROFILE
ALTERNATIVE C3
EA 01-0F280K
SHEET 2 of 4

Vertical Exageration = 2:1 (V:H)
Note 1: Profile Uses 98' DEM Derived from Quad. Map
Note 2: Profile Uses 3' DEM Derived from 2009/2011 Lidar
Design
Ground

PROFILE

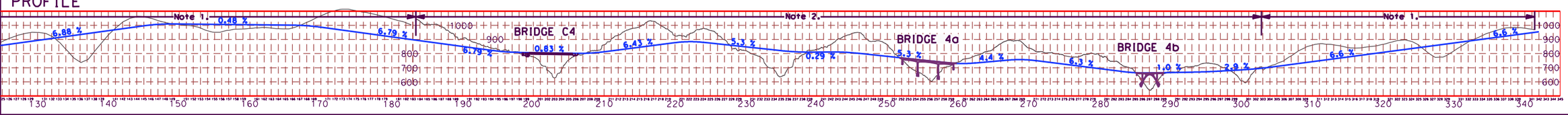


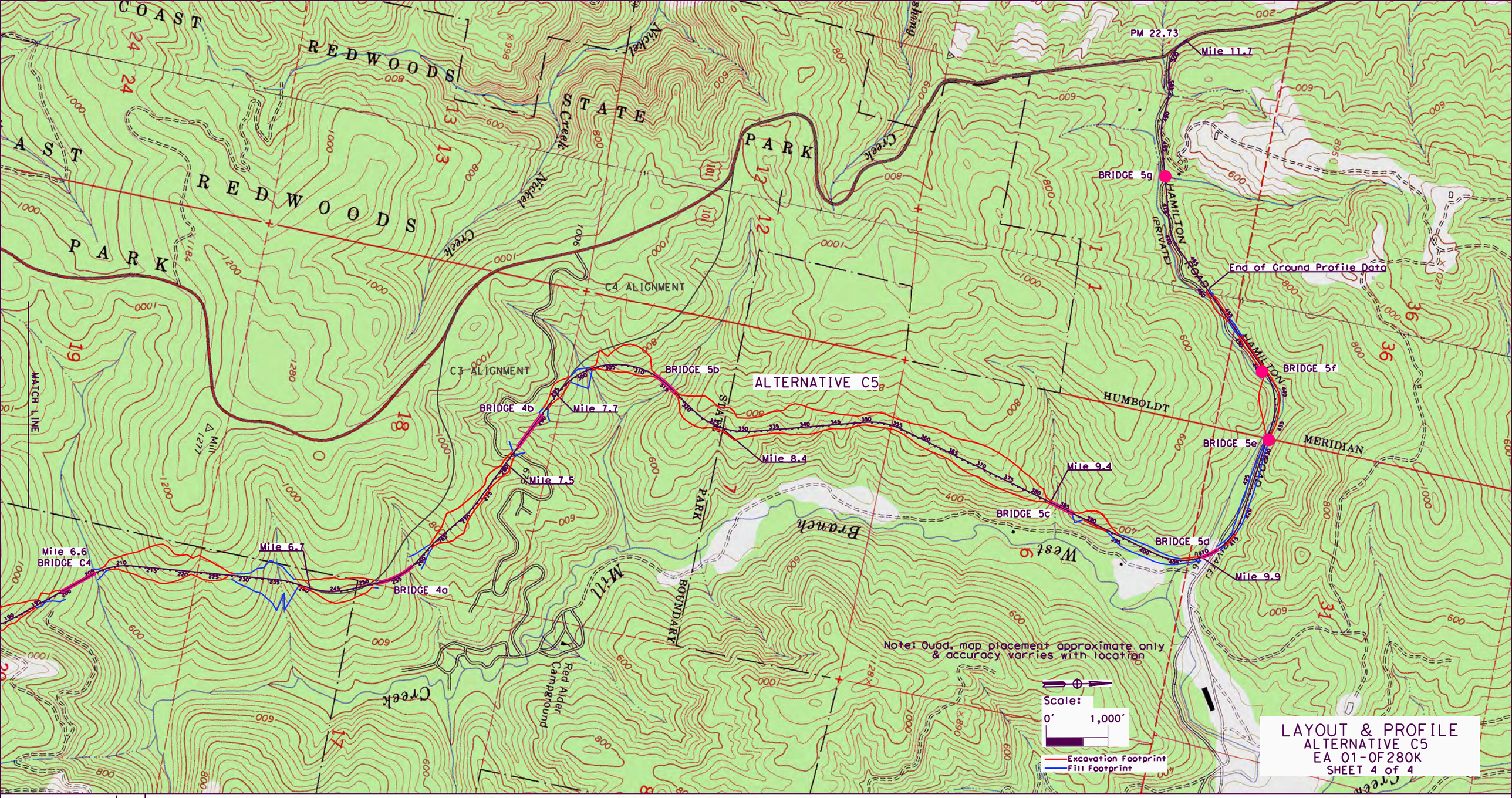


LAYOUT & PROFILE
ALTERNATIVE C4
EA 01-0F280K
SHEET 3 of 4

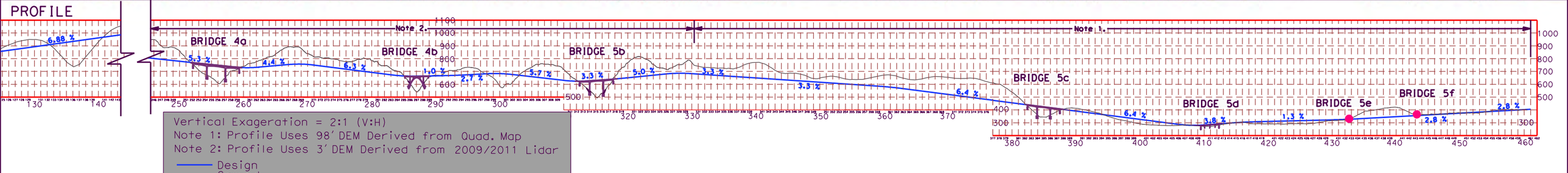
Vertical Exageration = 2:1 (V:H)
Note 1: Profile Uses 98' DEM Derived from Quad. Map
Note 2: Profile Uses 3' DEM Derived from 2009/2011 Lidar
Design
Ground

PROFILE



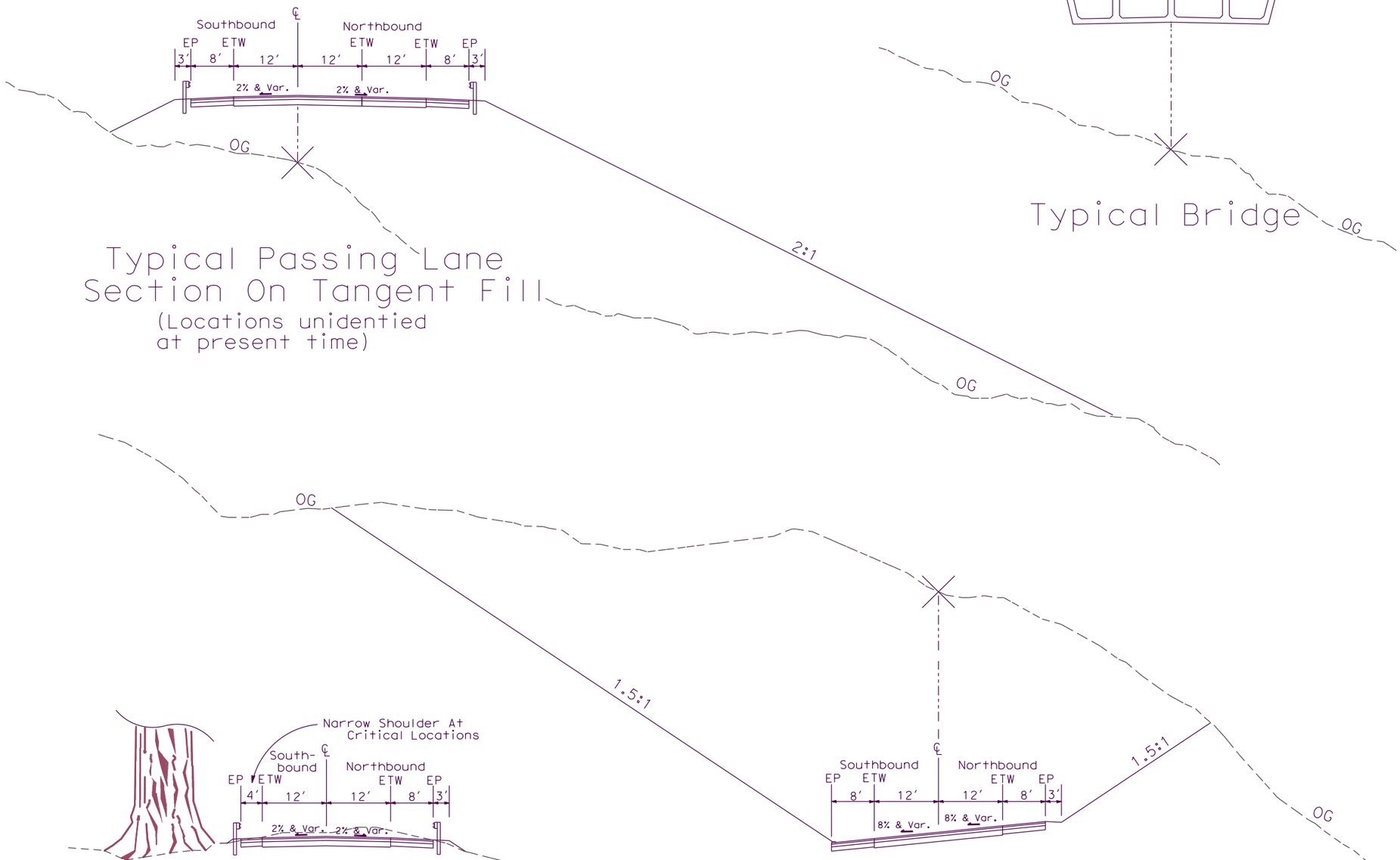


PROFILE

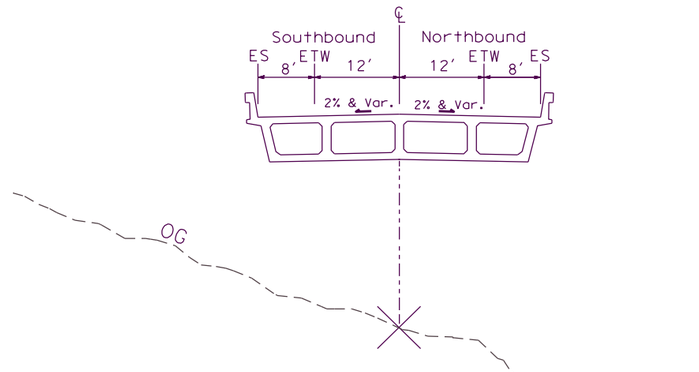


Vertical Exageration = 2:1 (V:H)
Note 1: Profile Uses 98' DEM Derived from Quad. Map
Note 2: Profile Uses 3' DEM Derived from 2009/2011 Lidar
Design
Ground

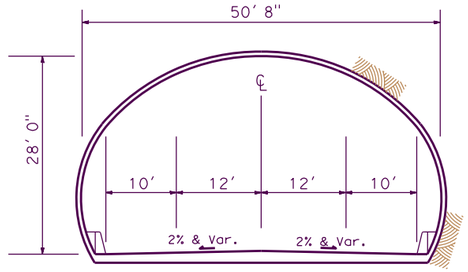
ATTACHMENT C
Typical Cross Sections



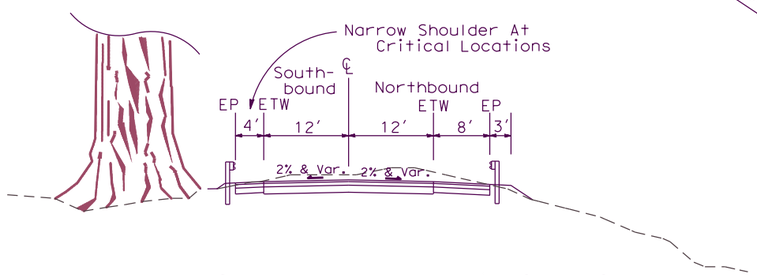
Typical Passing Lane
Section On Tangent Fill
(Locations unidentied
at present time)



Typical Bridge



Typical Tunnel



Typical Near 'Tie-in'

Typical 'Through-Cut'
On Curve

TYPICAL CROSS SECTIONS
(ALL ALTERNATIVES)
EA 01-0F280K

ATTACHMENT D
Right of Way Data Sheets

State of California
Department of Transportation

CALIFORNIA STATE TRANSPORTATION AGENCY

MEMORANDUM

Serious Drought.
Help Save Water!

To: TALITHA HODGSON
Design Engineer
Department of Transportation

Attention: CARLON SCHRIEVE
Project Engineer

Date: May 11, 2016

File: 01-DN-101-PM 12.0-15.5
EFIS No.: 01 1500 0099
EA: 0F280K
Alternate: A-1 (2 of 6)

From: KAREN E. HAWKINS
North Region Right of Way Assistant Manager,
Project Delivery
Eureka/Redding

Subject: CURRENT ESTIMATED RIGHT OF WAY COSTS

Project Description: In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

Alternate Description: A-1

We have completed an estimate of the right of way costs for the above referenced project based on information received from you on October 23, 2015 .

Right of Way Lead Time will require a minimum of 36 months after receipt of appraisal maps, utility conflict maps, environmental clearances (HMDD) and Certificate of Sufficiency (COS). A minimum of 36 months prior to certification will be required from receipt of the last map revision. Shorter lead times may require additional support resources and may adversely affect delivery of Right of Way Certification.

Robert C Rose for

KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
EUREKA/REDDING

Attachments:
Right of Way Data Sheet

cc. Sebastian Cohen

State of California - Department of Transportation
RIGHT OF WAY DATASHEET

EA: 0F280K
PROJECT NO.: 01 1500 0099
LOCATION: 01-DN-101-PM 12.0-15.5
Description: Repair slides, construct bypass In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

ALTERNATE: A-1 (2 of 6)
DATE: 5/11/2016
Datasheet Type: Revision

1. Right of Way Cost Estimate:

	Current Value Future Use	Escalation Rate	Escalated Value
A. Total Acquisition Cost	$954,250	5%	$1,903,037
B. Appraisal Fees Estimate	$5,000	N/A	$5,000
C. Mitigation Acquisition & Credits	$15,750,000	5%	$31,409,831
D. Project Development Permit Fees	$453,000	5%	$903,407
Subtotal	$17,162,250		$34,221,275
E. Utility Relocation (State's Share)	$755,000	5%	$1,505,678
(Owner's Share: $0)			
F. Relocation Assistance (RAP)	$0		$0
G. Clearance/Demolition	$0		$0
H. Title & Escrow	$1,000	5%	$1,994
I. Total Estimated Right of Way Cost	$17,918,250	**Rounded**	**$35,729,000** *
J. Construction Contract Work	$0		

2. Current Date of Right of Way Certification July 1, 2030

3. Parcel Data:

Type		Dual/Appr
X	0	
A	0	
B	0	
C	3	1
D	0	0
RR	0	
Total	**3**	

Excess 0

Utilities	
U4 - 1	0
- 2	1
- 3	0
- 4	0
U5 - 7	6
- 8	0
- 9	1

Railroad	
C&M Agreement	0
Service Contract	0
Easements	0
Rights of Entry	0
Clauses	0

Areas:

R/W	163.6 AC
TCE	N/A
Excess	N/A
Mitigation	N/A

Mitigation

Impacts	2
Parcels	0
Credits	1

Misc. R/W Work

RAP Displacees	N/A
Clear/Demo	N/A
Permit to Enters	N/A
Condemnation	0
USA Involvement	Yes

4. **Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).**

152.3 acres will be required from Green Diamond Resource Company, and 10.3 acres will be required from Redwood National Parks. Additional parcels were added for the utility relocations that will be at State expense.

5. **Are any properties acquired for this project expected to be rented, leased, or sold?**

Yes _____ No __X__

6. **Are RAP displacements required?**

Yes _____ No __X__

No. of single family __N/A__ No. of business/nonprofit __N/A__

No. of multi-family __N/A__ No. of farms __N/A__

Based on Draft/Final Relocation Impact Statement/Study dated N/A

__N/A__ Sufficient replacement housing will be available without last resort housing.

__N/A__ Sufficient replacement housing will not be available without last resort housing.

7. **Is there an effect on assessed valuation?**

Yes _____ No __X__ Not Significant _____

8. **Are there any items of Construction Contract Work?**

Yes _____ No __X__

There is no Construction Contract Work associated with the project.

9. **Are utility facilities or rights of way affected?**

Yes __X__ No _____

Names of Utility Companies requiring verification only.

Blue Star Gas (Propane), Charter Communication (Communication), County of Del Norte (Water, Sewer), City of Crescent City (Water, Sewer), Frontier Communication (Water, Sewer), Pacific Power and Light (Electric Distribution)

Names of Utility Companies requiring involvements.

Pacific Power and Light (Electric Transmission)

Additional information concerning Utility Involvement on this project.

Alt "A-1" has potential conflict with 1 aerial Electric Transmission facility and PP&L. State expense. A replacement easement may be required for this relocation. As additional information becomes available, this estimate may need to be revised.

10. Are railroad facilities or rights of way affected?

Yes _____ No ___X___ Phase 4 Capital ___$0___

11. Are USA Lands or Rights Affected?

Yes ___X___ No _____ Phase 4 Capital ___$0___

Agencies Involved:

US Forest Service _____	BLM _____	Army Corps of Engineers _____
National Parks ___X___	BIA _____	Vetrans Administration _____
US Fish & Wildlife _____	GSA _____	_____

Rights or Permissions to acquire:

Easement ___X___	Special Use Permit _____	Courtesy Letter _____
Right of Way Grant _____	Cooperative Work Agreement _____	Cost Recovery X
Mineral Agreement _____	Letter of Concurrence ___X___	Timber Sale _____
		_____

Acquisition of rights required will be heavily dependent on getting the federal agencies involved to accept Caltran's NEPA Document. Early consultation with Feds on their NEPA requirements for the Document is critical.

12. Is an RE Office required for the project?

Yes ___X___ No _____

Type of RE Office

Modular ___X___ Move In _____

13. Were any previously unidentified sites with hazardous waste and/or material found?

Yes _____ None Evident ___X___

14. Are there material borrow and/or disposal sites required?

No _____ Optional _____ Manditory ___X___

On-site disposal is within estimated R/W

15. Are there potential relinquishments and/or abandonments?

Yes ___X___ No _____

Unknown at present

16. Are there any existing and/or potential airspace sites?

Yes _____ No ___X___

17. What type of mitigation is required for the project?

Mitigation estimates are very preliminary. Per Jason Meyer they are being calculated as a percentage of the Alternatives total cost. Of that total, another percentage is broken out for R/W for the acquisition on needed mitigation property.

18. Is it anticipated that Caltrans will perform all Right of Way work?

Yes _____ No _____

19. Indicate the anticipated Right of Way schedule and lead time requirements.

Right of Way Lead Time will require a minimum of **36** months after we receive first appraisal maps, utility conflict maps, necessary environmental clearances and freeway agreements have been approved and obtained. Additionally a minimum of **36** months will be required after receiving the last appraisal map to Right of Way for certification.

20. Assumptions and limiting Conditions: (Check boxes that apply.)

- ☐ Mapping did not provide sufficient detail to determine the limits of the right of way required.
- ☐ Transportation facilities have not been sufficiently designed to determine the damages to any of the remainder parcels affected by the project.
- ☐ Additional right of way requirements are anticipated, but are not defined due to the preliminary nature of the early design requirements.
- ☐ Design will secure necessary encroachment permits from local agencies.
- ☐ Project permits are not required for the project.
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Evaluation Prepared By:

Right of Way Natalie Morris Date 5/19/2016

NATALIE MORRIS

Reviewed By

RW Project Coordinator _____ Date 5-19-16

SAM GENTLE

I have personally reviewed this Right of Way Data Sheet and all supporting information. I certify that the probable Highest and Best Use, estimated values, escalation rates and assumptions are reasonable and proper, subject to the limiting conditions set forth, and I find this Data Sheet to be complete and current.

for Joyce M. Stellenberg

JEREMIAH JOYNER
Senior Right of Way Agent
Project Delivery Branch
Eureka

5/19/16
Date

Robert C Rose for

KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
Eureka/Redding

5/23/16
Date

State of California
Department of Transportation

CALIFORNIA STATE TRANSPORTATION AGENCY

MEMORANDUM

Serious Drought.
Help Save Water!

To: TALITHA HODGSON
Design Engineer
Department of Transportation

Attention: CARLON SCHRIEVE
Project Engineer

Date: May 11, 2016

File: 01-DN-101-PM 12.0-15.5
EFIS No.: 01 1500 0099
EA: 0F280K
Alternate: A-2 (3 of 6)

From: KAREN E. HAWKINS
North Region Right of Way Assistant Manager,
Project Delivery
Eureka/Redding

Subject: CURRENT ESTIMATED RIGHT OF WAY COSTS

Project Description: In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

Alternate Description: A-2

We have completed an estimate of the right of way costs for the above referenced project based on information received from you on October 23, 2015 .

Right of Way Lead Time will require a minimum of 36 months after receipt of appraisal maps, utility conflict maps, environmental clearances (HMDD) and Certificate of Sufficiency (COS). A minimum of 36 months prior to certification will be required from receipt of the last map revision. Shorter lead times may require additional support resources and may adversely affect delivery of Right of Way Certification.

Robert C Close for

KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
EUREKA/REDDING

Attachments:
Right of Way Data Sheet

cc. Sebastian Cohen

State of California - Department of Transportation
RIGHT OF WAY DATASHEET

EA: 0F280K
PROJECT NO.: 01 1500 0099
LOCATION: 01-DN-101-PM 12.0-15.5
Description: Repair slides, construct bypass In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

ALTERNATE: A-2 (3 of 6)
DATE: 5/11/2016
Datasheet Type: Revision

1. Right of Way Cost Estimate:

	Current Value Future Use	Escalation Rate	Escalated Value
A. Total Acquisition Cost	$1,046,750	5%	$2,087,507
B. Appraisal Fees Estimate	$10,000	N/A	$10,000
C. Mitigation Acquisition & Credits	$39,375,000	5%	$78,524,578
D. Project Development Permit Fees	$453,000	5%	$903,407
Subtotal	$40,884,750		$81,525,492
E. Utility Relocation (State's Share)	$1,505,000	5%	$3,001,384
(Owner's Share: $0)			
F. Relocation Assistance (RAP)	$0		$0
G. Clearance/Demolition	$0		$0
H. Title & Escrow	$2,000	5%	$3,989
I. Total Estimated Right of Way Cost	$42,391,750	**Rounded**	**$84,531,000** *
J. Construction Contract Work	$0		

2. Current Date of Right of Way Certification July 1, 2030

3. Parcel Data:

Type		Dual/Appr
X	0	
A	0	
B	2	
C	2	0
D	0	0
RR	0	
Total	**4**	
Excess	0	

Utilities	
U4 - 1	0
- 2	1
- 3	0
- 4	0
U5 - 7	6
- 8	0
- 9	1

Railroad	
C&M Agreement	0
Service Contract	0
Easements	0
Rights of Entry	0
Clauses	0

Areas:	
R/W	175.3 AC
TCE	N/A
Excess	N/A
Mitigation	N/A

Mitigation	
Impacts	2
Parcels	0
Credits	1

Misc. R/W Work	
RAP Displacees	N/A
Clear/Demo	N/A
Permit to Enters	N/A
Condemnation	0
USA Involvement	Yes

4. **Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).**

164 acres will be required from Green Diamond Resource Company, and 9.3 acres will be required from Redwood National Parks. Additional parcels were added for the utility relocations that will be at State expense.

5. **Are any properties acquired for this project expected to be rented, leased, or sold?**

Yes _____ No __X__

6. **Are RAP displacements required?**

Yes _____ No __X__

No. of single family __N/A__ No. of business/nonprofit __N/A__

No. of multi-family __N/A__ No. of farms __N/A__

Based on Draft/Final Relocation Impact Statement/Study dated N/A

__N/A__ Sufficient replacement housing will be available without last resort housing.

__N/A__ Sufficient replacement housing will not be available without last resort housing.

7. **Is there an effect on assessed valuation?**

Yes _____ No __X__ Not Significant _____

8. **Are there any items of Construction Contract Work?**

Yes _____ No __X__

There is no Construction Contract Work associated with the project.

9. **Are utility facilities or rights of way affected?**

Yes __X__ No _____

Names of Utility Companies requiring verification only.

Blue Star Gas (Propane), Charter Communication (Communication), County of Del Norte (Water, Sewer), Frontier Communication (Communication), City of Crescent City (Water, Sewer), Pacific Power and Light (Electric Distribution)

Names of Utility Companies requiring involvements.

Pacific Power and Light (Electric Transmission)

Additional information concerning Utility Involvement on this project.

Alt "A-2" has potential utility conflicts with 2 aerial Electric Transmission facilities. State Expense. 2 replacement easements may be required for this relocation. As additional information becomes available, this estimate may need to be revised.

10. Are railroad facilities or rights of way affected?

Yes _____ No **X** Phase 4 Capital **$0**

11. Are USA Lands or Rights Affected?

Yes **X** No _____ Phase 4 Capital **$0**

Agencies Involved:

US Forest Service X	BLM _____	Army Corps of Engineers _____
National Parks _____	BIA _____	Vetrans Administration _____
US Fish & Wildlife _____	GSA _____	_____

Rights or Permissions to acquire:

Easement X	Special Use Permit _____	Courtesy Letter _____
Right of Way Grant _____	Cooperative Work Agreement _____	Cost Recovery X
Mineral Agreement _____	Letter of Concurrence _____	Timber Sale _____
		_____

Acquisition of rights required will be heavily dependent on getting the federal agencies involved to accept Caltran's NEPA Document. Early consultation with Feds on their NEPA requirements for the Document is critical.

12. Is an RE Office required for the project?

Yes **X** No _____

Type of RE Office

Modular **X** Move In _____

13. Were any previously unidentified sites with hazardous waste and/or material found?

Yes _____ None Evident **X**

14. Are there material borrow and/or disposal sites required?

No _____ Optional _____ Manditory **X**

On-site disposal is within estimated R/W

15. Are there potential relinquishments and/or abandonments?

Yes **X** No _____

Unknown at present

16. Are there any existing and/or potential airspace sites?

Yes _____ No **X**

17. What type of mitigation is required for the project?

Mitigation estimates are very preliminary. Per Jason Meyer they are being calculated as a percentage of the Alternatives total cost. Of that total another percentage is broken out for R/W for the acquisition on needed mitigation property.

18. Is it anticipated that Caltrans will perform all Right of Way work?

Yes _____ No _____

19. Indicate the anticipated Right of Way schedule and lead time requirements.

Right of Way Lead Time will require a minimum of **36** months after we receive first appraisal maps, utility conflict maps, necessary environmental clearances and freeway agreements have been approved and obtained. Additionally a minimum of **36** months will be required after receiving the last appraisal map to Right of Way for certification.

20. Assumptions and limiting Conditions: (Check boxes that apply.)

- ☐ Mapping did not provide sufficient detail to determine the limits of the right of way required.
- ☐ Transportation facilities have not been sufficiently designed to determine the damages to any of the remainder parcels affected by the project.
- ☐ Additional right of way requirements are anticipated, but are not defined due to the preliminary nature of the early design requirements.
- ☐ Design will secure necessary encroachment permits from local agencies.
- ☐ Project permits are not required for the project.
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Evaluation Prepared By:

Right of Way Natalie Morris Date 5/19/16

NATALIE MORRIS

Reviewed By

RW Project Coordinator _____ Date 9-5-16

SAM GENTLE

I have personally reviewed this Right of Way Data Sheet and all supporting information. I certify that the probable Highest and Best Use, estimated values, escalation rates and assumptions are reasonable and proper, subject to the limiting conditions set forth, and I find this Data Sheet to be complete and current.

for Lisa M. Sullenberger

JEREMIAH JOYNER
Senior Right of Way Agent
Project Delivery Branch
Eureka

9/19/16
Date

Robert C Close for

KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
Eureka/Redding

5/23/16
Date

State of California
Department of Transportation

CALIFORNIA STATE TRANSPORTATION AGENCY

MEMORANDUM

Serious Drought.
Help Save Water!

To: TALITHA HODGSON
Design Engineer
Department of Transportation

Attention: CARLON SCHRIEVE
Project Engineer

Date: May 11, 2016

File: 01-DN-101-PM 12.0-15.5
EFIS No.: 01 1500 0099
EA: 0F280K
Alternate: F (1-6)

From: KAREN E. HAWKINS
North Region Right of Way Assistant Manager,
Project Delivery
Eureka/Redding

Subject: CURRENT ESTIMATED RIGHT OF WAY COSTS

Project Description: In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

Alternate Description: F

We have completed an estimate of the right of way costs for the above referenced project based on information received from you on October 23, 2015 .

Right of Way Lead Time will require a minimum of 36 months after receipt of appraisal maps, utility conflict maps, environmental clearances (HMDD) and Certificate of Sufficiency (COS). A minimum of 36 months prior to certification will be required from receipt of the last map revision. Shorter lead times may require additional support resources and may adversely affect delivery of Right of Way Certification.

Rebecca Close for

KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
EUREKA/REDDING

Attachments:
Right of Way Data Sheet

cc. Sebastian Cohen

State of California - Department of Transportation
RIGHT OF WAY DATASHEET

EA: 0F280K
PROJECT NO.: 01 1500 0099
LOCATION: 01-DN-101-PM 12.0-15.5
Description: Repair slides, construct bypass In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

ALTERNATE: F (1-6)
DATE: 5/11/2016
Datasheet Type: Revision

1. Right of Way Cost Estimate:

	Current Value Future Use	Escalation Rate	Escalated Value
A. Total Acquisition Cost	$1,125	5%	$2,244
B. Appraisal Fees Estimate	$0	N/A	$0
C. Mitigation Acquisition & Credits	$13,125,000	5%	$26,174,859
D. Project Development Permit Fees	$453,000	5%	$903,407
Subtotal	$13,579,125		$27,080,509
E. Utility Relocation (State's Share)	$5,000	5%	$9,971
(Owner's Share: $0)			
F. Relocation Assistance (RAP)	$0		$0
G. Clearance/Demolition	$0		$0
H. Title & Escrow	$0		$0
I. Total Estimated Right of Way Cost	$13,584,125	**Rounded**	**$27,090,000** *
J. Construction Contract Work	$0		

2. Current Date of Right of Way Certification July 1, 2030

3. Parcel Data:

Type		Dual/Appr	Utilities		Railroad	
X	0		U4 - 1	0	C&M Agreement	0
A	0		- 2	0	Service Contract	0
B	0		- 3	0	Easements	0
C	1	0	- 4	0	Rights of Entry	0
D	0	0	U5 - 7	7	Clauses	0
RR	0		- 8	0		
Total	**1**		- 9	0		
Excess	0					

Areas:		Mitigation		Misc. R/W Work	
R/W	12.7 AC	Impacts	2	RAP Displacees	N/A
TCE	N/A	Parcels	0	Clear/Demo	N/A
Excess	N/A	Credits	1	Permit to Enters	N/A
Mitigation	N/A			Condemnation	0
				USA Involvement	Yes

4. **Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).**

Approximately 12.7 acres will be required from Redwood National Park for a tunnel.

5. **Are any properties acquired for this project expected to be rented, leased, or sold?**

Yes _____ No ___X___

6. **Are RAP displacements required?**

Yes _____ No ___X___

No. of single family ___N/A___ No. of business/nonprofit ___N/A___

No. of multi-family ___N/A___ No. of farms ___N/A___

Based on Draft/Final Relocation Impact Statement/Study dated N/A

___N/A___ Sufficient replacement housing will be available without last resort housing.

___N/A___ Sufficient replacement housing will not be available without last resort housing.

7. **Is there an effect on assessed valuation?**

Yes _____ No ___X___ Not Significant _____

8. **Are there any items of Construction Contract Work?**

Yes _____ No ___X___

There is no Construction Contract Work associated with the project.

9. **Are utility facilities or rights of way affected?**

Yes ___X___ No _____

Names of Utility Companies requiring verification only.

Blue Star Gas (Propane), Charter Communication (Communication), County of Del Norte (Water, Sewer), Frontier Communication (Communication), Pacific Power and Light (Electric Transmission), Pacific Power and Light (Electric Distribution), City of Crescent City (Water, Sewer)

Names of Utility Companies requiring involvements.

None Anticipated

Additional information concerning Utility Involvement on this project.

Alt. "F" has no utility conflicts anticipated. As additional information becomes available, this estimate may need to be revised.

10. Are railroad facilities or rights of way affected?

Yes _____ No ___X___ Phase 4 Capital ___$0___

11. Are USA Lands or Rights Affected?

Yes ___X___ No _____ Phase 4 Capital ___$0___

Agencies Involved:

US Forest Service _____	BLM _____	Army Corps of Engineers _____
National Parks ___X___	BIA _____	Vetrans Administration _____
US Fish & Wildlife _____	GSA _____	FHWA ___X___

Rights or Permissions to acquire:

Easement ___X___	Special Use Permit _____	Courtesy Letter _____
Right of Way Grant _____	Cooperative Work Agreement _____	Cost Recovery X
Mineral Agreement _____	Letter of Concurrence ___X___	Timber Sale _____
		_____

Acquisition of rights required will be heavily dependent on getting the federal agencies involved to accept Caltran's NEPA Document. Early consultation with Feds on their NEPA requirements for the Document is critical.

12. Is an RE Office required for the project?

Yes ___X___ No _____

Type of RE Office

Modular ___X___ Move In _____

13. Were any previously unidentified sites with hazardous waste and/or material found?

Yes _____ None Evident ___X___

14. Are there material borrow and/or disposal sites required?

No _____ Optional _____ Manditory ___X___

On-site disposal is within estimated R/W

15. Are there potential relinquishments and/or abandonments?

Yes ___X___ No _____

Unknown at present

16. Are there any existing and/or potential airspace sites?

Yes _____ No ___X___

17. What type of mitigation is required for the project?

Mitigation estimates are very preliminary. Per Jason Meyer they are being calculated as a percentage of the Alternatives total cost. Of that total, another percentage is broken out for R/W for the acquisition on needed mitigation property.

18. Is it anticipated that Caltrans will perform all Right of Way work?

Yes _____ No _____

19. Indicate the anticipated Right of Way schedule and lead time requirements.

Right of Way Lead Time will require a minimum of **36** months after we receive first appraisal maps, utility conflict maps, necessary environmental clearances and freeway agreements have been approved and obtained. Additionally a minimum of **36** months will be required after receiving the last appraisal map to Right of Way for certification.

20. Assumptions and limiting Conditions: (Check boxes that apply.)

- ☐ Mapping did not provide sufficient detail to determine the limits of the right of way required.
- ☐ Transportation facilities have not been sufficiently designed to determine the damages to any of the remainder parcels affected by the project.
- ☐ Additional right of way requirements are anticipated, but are not defined due to the preliminary nature of the early design requirements.
- ☐ Design will secure necessary encroachment permits from local agencies.
- ☐ Project permits are not required for the project.
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Evaluation Prepared By:

Right of Way Natalie Morris — Date 5/19/2016

NATALIE MORRIS

Reviewed By

RW Project Coordinator — Date 5-19-16

SAM GENTLE

I have personally reviewed this Right of Way Data Sheet and all supporting information. I certify that the probable Highest and Best Use, estimated values, escalation rates and assumptions are reasonable and proper, subject to the limiting conditions set forth, and I find this Data Sheet to be complete and current.

for Jon M. Spellenberg

JEREMIAH JOYNER
Senior Right of Way Agent
Project Delivery Branch
Eureka

5/19/16
Date

Rebecca Close for

KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
Eureka/Redding

5/23/16
Date

State of California
Department of Transportation

CALIFORNIA STATE TRANSPORTATION AGENCY

MEMORANDUM

Serious Drought.
Help Save Water!

To: TALITHA HODGSON
Design Engineer
Department of Transportation

Attention: CARLON SCHRIEVE
Project Engineer

Date: May 11, 2016

File: 01-DN-101-PM 12.0-15.5
EFIS No.: 01 1500 0099
EA: 0F280K
Alternate: C-3 (4 of 6)

From: KAREN E. HAWKINS
North Region Right of Way Assistant Manager,
Project Delivery
Eureka/Redding

Subject: CURRENT ESTIMATED RIGHT OF WAY COSTS

Project Description: In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

Alternate Description: C-3

We have completed an estimate of the right of way costs for the above referenced project based on information received from you on October 23, 2015 .

Right of Way Lead Time will require a minimum of 36 months after receipt of appraisal maps, utility conflict maps, environmental clearances (HMDD) and Certificate of Sufficiency (COS). A minimum of 36 months prior to certification will be required from receipt of the last map revision. Shorter lead times may require additional support resources and may adversely affect delivery of Right of Way Certification.

Robert Close for

KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
EUREKA/REDDING

Attachments:
Right of Way Data Sheet

cc. Sebastian Cohen

State of California - Department of Transportation
RIGHT OF WAY DATASHEET

EA: 0F280K
PROJECT NO.: 01 1500 0099
LOCATION: 01-DN-101-PM 12.0-15.5
Description: Repair slides, construct bypass In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

ALTERNATE: C-3 (4 of 6)
DATE: 5/11/2016
Datasheet Type: Revision

1. Right of Way Cost Estimate:

	Current Value Future Use	Escalation Rate	Escalated Value
A. **Total Acquisition Cost**	$2,504,625	5%	$4,994,911
B. **Appraisal Fees Estimate**	$20,000	N/A	$20,000
C. **Mitigation Acquisition & Credits**	$28,350,000	5%	$56,537,696
D. **Project Development Permit Fees**	$453,000	5%	$903,407
Subtotal	$31,327,625		$62,456,013
E. **Utility Relocation (State's Share)**	$6,755,000	5%	$13,471,328
(Owner's Share: $0)			
F. **Relocation Assistance (RAP)**	$0		$0
G. **Clearance/Demolition**	$0		$0
H. **Title & Escrow**	$4,000	5%	$7,977
I. **Total Estimated Right of Way Cost**	$38,086,625	**Rounded**	**$75,935,000** *
J. **Construction Contract Work**	$0		

2. Current Date of Right of Way Certification July 1, 2030

3. Parcel Data:

Type		Dual/Appr	Utilities		Railroad	
X	0		U4 - 1	0	C&M Agreement	0
A	0		- 2	1	Service Contract	0
B	4		- 3	0	Easements	0
C	2	0	- 4	0	Rights of Entry	0
D	0	0	U5 - 7	6	Clauses	0
RR	0		- 8	0		
Total	**6**		- 9	1		
Excess	0					

Areas:		Mitigation		Misc. R/W Work	
R/W	484.9 AC	Impacts	2	RAP Displacees	N/A
TCE	N/A	Parcels	0	Clear/Demo	N/A
Excess	N/A	Credits	1	Permit to Enters	N/A
Mitigation	N/A			Condemnation	1
				USA Involvement	Yes

4. **Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).**

336.3 acres will be required from Green Diamond Resource Company, 101.6 acres will be required from Del Norte Coast Redwoods State Park, and 44 acres will be required from Redwood National Parks. This alternative may leave some parcels landlocked. Additional parcels were added for the utility relocations that will be at State expense.

5. **Are any properties acquired for this project expected to be rented, leased, or sold?**

Yes _____ No ___X___

6. **Are RAP displacements required?**

Yes _____ No ___X___

No. of single family ___N/A___ No. of business/nonprofit ___N/A___

No. of multi-family ___N/A___ No. of farms ___N/A___

Based on Draft/Final Relocation Impact Statement/Study dated N/A

___N/A___ Sufficient replacement housing will be available without last resort housing.

___N/A___ Sufficient replacement housing will not be available without last resort housing.

7. **Is there an effect on assessed valuation?**

Yes _____ No ___X___ Not Significant _____

8. **Are there any items of Construction Contract Work?**

Yes _____ No ___X___

There is no Construction Contract Work associated with the project.

9. **Are utility facilities or rights of way affected?**

Yes ___X___ No _____

Names of Utility Companies requiring verification only.

Blue Star Gas (Propane), Charter Communication (Communication), County of Del Norte (Water, Sewer), Frontier Communication (Communication), City of Crescent City (Water, Sewer), Pacific Power and Light (Electric Distribution)

Names of Utility Companies requiring involvements.

Pacific Power and Light (Electric Transmission)

Additional information concerning Utility Involvement on this project.

Alt "C-3" has potential utility conflicts with 9 Electric Transmission facilities. State Expense. 3 replacement utility easements may be required. As additional information becomes available, this estimate may need to be revised.

10. Are railroad facilities or rights of way affected?

Yes _____ No ____X____ Phase 4 Capital ____$0____

11. Are USA Lands or Rights Affected?

Yes ___X___ No _____ Phase 4 Capital ____$0____

Agencies Involved:

US Forest Service _____	BLM _____	Army Corps of Engineers _____
National Parks ___X___	BIA _____	Vetrans Administration _____
US Fish & Wildlife _____	GSA _____	_____

Rights or Permissions to acquire:

Easement ____X____	Special Use Permit _____	Courtesy Letter _____
Right of Way Grant _____	Cooperative Work Agreement _____	Cost Recovery X
Mineral Agreement _____	Letter of Concurrence ___X___	Timber Sale _____
		_____

Acquisition of rights required will be heavily dependent on getting the federal agencies involved to accept Caltran's NEPA Document. Early consultation with Feds on their NEPA requirements for the Document is critical.

12. Is an RE Office required for the project?

Yes ___X___ No _____

Type of RE Office

Modular ___X___ Move In _____

13. Were any previously unidentified sites with hazardous waste and/or material found?

Yes _____ None Evident ____X____

14. Are there material borrow and/or disposal sites required?

No _____ Optional _____ Manditory ___X___

On-site disposal is within estimated R/W

15. Are there potential relinquishments and/or abandonments?

Yes ___X___ No _____

Unknown at present

16. Are there any existing and/or potential airspace sites?

Yes _____ No ____X____

17. What type of mitigation is required for the project?

Mitigation estimates are very preliminary. Per Jason Meyer they are being calculated as a percentage of the Alternatives total cost. Of that total another percentage is broken out for R/W for the acquisition on needed mitigation property.

18. Is it anticipated that Caltrans will perform all Right of Way work?

Yes _____ No ____X____

19. Indicate the anticipated Right of Way schedule and lead time requirements.

Right of Way Lead Time will require a minimum of **36** months after we receive first appraisal maps, utility conflict maps, necessary environmental clearances and freeway agreements have been approved and obtained. Additionally a minimum of **36** months will be required after receiving the last appraisal map to Right of Way for certification.

20. Assumptions and limiting Conditions: (Check boxes that apply.)

- ☐ Mapping did not provide sufficient detail to determine the limits of the right of way required.
- ☐ Transportation facilities have not been sufficiently designed to determine the damages to any of the remainder parcels affected by the project.
- ☐ Additional right of way requirements are anticipated, but are not defined due to the preliminary nature of the early design requirements.
- ☐ Design will secure necessary encroachment permits from local agencies.
- ☐ Project permits are not required for the project.
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Evaluation Prepared By:

Right of Way Natalie Morris Date 5/19/2016

NATALIE MORRIS

Reviewed By

RW Project Coordinator _____ Date 5-19-2016

SAM GENTLE

I have personally reviewed this Right of Way Data Sheet and all supporting information. I certify that the probable Highest and Best Use, estimated values, escalation rates and assumptions are reasonable and proper, subject to the limiting conditions set forth, and I find this Data Sheet to be complete and current.

Jeremiah M. Silenberg

JEREMIAH JOYNER
Senior Right of Way Agent
Project Delivery Branch
Eureka

5/19/16
Date

Robert C Case for

KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
Eureka/Redding

5/23/16
Date

State of California
Department of Transportation

CALIFORNIA STATE TRANSPORTATION AGENCY

MEMORANDUM

Serious Drought.
Help Save Water!

To: TALITHA HODGSON
Design Engineer
Department of Transportation

Attention: CARLON SCHRIEVE
Project Engineer

Date: May 11, 2016

File: 01-DN-101-PM 12.0-15.5
EFIS No.: 01 1500 0099
EA: 0F280K
Alternate: C-4 (5 of 6)

From: KAREN E. HAWKINS
North Region Right of Way Assistant Manager,
Project Delivery
Eureka/Redding

Subject: CURRENT ESTIMATED RIGHT OF WAY COSTS

Project Description: In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

Alternate Description: C-4

We have completed an estimate of the right of way costs for the above referenced project based on information received from you on October 23, 2015 .

Right of Way Lead Time will require a minimum of 36 months after receipt of appraisal maps, utility conflict maps, environmental clearances (HMDD) and Certificate of Sufficiency (COS). A minimum of 36 months prior to certification will be required from receipt of the last map revision. Shorter lead times may require additional support resources and may adversely affect delivery of Right of Way Certification.

Robert Close for
KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
EUREKA/REDDING

Attachments:
Right of Way Data Sheet

cc. Sebastian Cohen

State of California - Department of Transportation
RIGHT OF WAY DATASHEET

EA: 0F280K
PROJECT NO.: 01 1500 0099
LOCATION: 01-DN-101-PM 12.0-15.5
Description: Repair slides, construct bypass In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

ALTERNATE: C-4 (5 of 6)
DATE: 5/11/2016
Datasheet Type: Revision

1. Right of Way Cost Estimate:

	Current Value Future Use	Escalation Rate	Escalated Value
A. Total Acquisition Cost	$2,504,625	5%	$4,994,911
B. Appraisal Fees Estimate	$20,000	N/A	$20,000
C. Mitigation Acquisition & Credits	$28,940,625	5%	$57,715,565
D. Project Development Permit Fees	$453,000	5%	$903,407
Subtotal	$31,918,250		$63,633,882
E. Utility Relocation (State's Share)	$6,755,000	5%	$13,471,328
(Owner's Share: $50,000)			
F. Relocation Assistance (RAP)	$0		$0
G. Clearance/Demolition	$0		$0
H. Title & Escrow	$4,000	5%	$7,977
I. Total Estimated Right of Way Cost	$38,677,250	**Rounded**	**$77,113,000** *
J. Construction Contract Work	$0		

2. Current Date of Right of Way Certification July 1, 2030

3. Parcel Data:

Type		Dual/Appr	Utilities		Railroad	
X	0		U4 - 1	1	C&M Agreement	0
A	0		- 2	1	Service Contract	0
B	4		- 3	0	Easements	0
C	2	0	- 4	0	Rights of Entry	0
D	0	0	U5 - 7	5	Clauses	0
RR	0		- 8	0		
Total	**6**		- 9	2		
Excess	0					

Areas:		Mitigation		Misc. R/W Work	
R/W	500.3 AC	Impacts	2	RAP Displacees	N/A
TCE	N/A	Parcels	0	Clear/Demo	N/A
Excess	N/A	Credits	1	Permit to Enters	N/A
Mitigation	N/A			Condemnation	1
				USA Involvement	Yes

4. **Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).**

336.3 acres will be required from Green Diamond Resource Company, 101.6 acres will be required from Del Norte Coast Redwoods State Park, and 59.4 acres will be required from Redwood National Parks. Additional parcels were added for the utility relocations that will be at State expense.

5. **Are any properties acquired for this project expected to be rented, leased, or sold?**

Yes _____ No ___X___

6. **Are RAP displacements required?**

Yes _____ No ___X___

No. of single family ___N/A___ No. of business/nonprofit ___N/A___

No. of multi-family ___N/A___ No. of farms ___N/A___

Based on Draft/Final Relocation Impact Statement/Study dated N/A

___N/A___ Sufficient replacement housing will be available without last resort housing.

___N/A___ Sufficient replacement housing will not be available without last resort housing.

7. **Is there an effect on assessed valuation?**

Yes _____ No ___X___ Not Significant _____

8. **Are there any items of Construction Contract Work?**

Yes _____ No ___X___

There is no Construction Contract Work associated with the project.

9. **Are utility facilities or rights of way affected?**

Yes ___X___ No _____

Names of Utility Companies requiring verification only.

Blue Star Gas (Propane), Charter Communication (Communication), County of Del Norte (Water, Sewer), Frontier Communication (Communication), City of Crescent City (Water, Sewer)

Names of Utility Companies requiring involvements.

Pacific Power and Light (Electric Distribution), Pacific Power and Light (Electric Transmission)

Additional information concerning Utility Involvement on this project.

Alt "C-4" has potential conflicts with 9 aerial Electric Transmission facilities and 1 underground Electric Distribution facility. The Transmission will be at State Expense, and the Distribution appears to be Owner Expense. 3 replacement easements may be required. As additional information becomes available, this estimate may need to be revised.

10. Are railroad facilities or rights of way affected?

Yes _____ No ___X___ Phase 4 Capital ___$0___

11. Are USA Lands or Rights Affected?

Yes ___X___ No _____ Phase 4 Capital ___$0___

Agencies Involved:

US Forest Service _____	BLM _____	Army Corps of Engineers _____
National Parks ___X___	BIA _____	Vetrans Administration _____
US Fish & Wildlife _____	GSA _____	_____

Rights or Permissions to acquire:

Easement ___X___	Special Use Permit _____	Courtesy Letter _____
Right of Way Grant _____	Cooperative Work Agreement _____	Cost Recovery X
Mineral Agreement _____	Letter of Concurrence ___X___	Timber Sale _____
		_____

Acquisition of rights required will be heavily dependent on getting the federal agencies involved to accept Caltran's NEPA Document. Early consultation with Feds on their NEPA requirements for the Document is critical.

12. Is an RE Office required for the project?

Yes ___X___ No _____

Type of RE Office

Modular ___X___ Move In _____

13. Were any previously unidentified sites with hazardous waste and/or material found?

Yes _____ None Evident ___X___

14. Are there material borrow and/or disposal sites required?

No _____ Optional _____ Manditory ___X___

On-site disposal is within estimated R/W.

15. Are there potential relinquishments and/or abandonments?

Yes ___X___ No _____

Unknown at present

16. Are there any existing and/or potential airspace sites?

Yes _____ No ___X___

17. What type of mitigation is required for the project?

Mitigation estimates are very preliminary. Per Jason Meyer they are being calculated as a percentage of the Alternatives total cost. Of that total, another percentage is broken out for R/W for the acquisition on needed mitigation property.

18. Is it anticipated that Caltrans will perform all Right of Way work?

Yes _____ No _____

19. Indicate the anticipated Right of Way schedule and lead time requirements.

Right of Way Lead Time will require a minimum of **36** months after we receive first appraisal maps, utility conflict maps, necessary environmental clearances and freeway agreements have been approved and obtained. Additionally a minimum of **36** months will be required after receiving the last appraisal map to Right of Way for certification.

20. Assumptions and limiting Conditions: (Check boxes that apply.)

- ☐ Mapping did not provide sufficient detail to determine the limits of the right of way required.
- ☐ Transportation facilities have not been sufficiently designed to determine the damages to any of the remainder parcels affected by the project.
- ☐ Additional right of way requirements are anticipated, but are not defined due to the preliminary nature of the early design requirements.
- ☐ Design will secure necessary encroachment permits from local agencies.
- ☐ Project permits are not required for the project.
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Evaluation Prepared By:

Right of Way Natalie Morris Date _____

NATALIE MORRIS

Reviewed By

RW Project Coordinator _____ Date 5-19-16

SAM GENTLE

I have personally reviewed this Right of Way Data Sheet and all supporting information. I certify that the probable Highest and Best Use, estimated values, escalation rates and assumptions are reasonable and proper, subject to the limiting conditions set forth, and I find this Data Sheet to be complete and current.

for Joan M. Sollenberger

JEREMIAH JOYNER
Senior Right of Way Agent
Project Delivery Branch
Eureka

5/19/16
Date

Robert Close for

KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
Eureka/Redding

5/23/16
Date

State of California
Department of Transportation

CALIFORNIA STATE TRANSPORTATION AGENCY

MEMORANDUM

Serious Drought.
Help Save Water!

To: TALITHA HODGSON
Design Engineer
Department of Transportation

Attention: CARLON SCHRIEVE
Project Engineer

Date: May 11, 2016

File: 01-DN-101-PM 12.0-15.5
EFIS No.: 01 1500 0099
EA: 0F280K
Alternate: C-5 (6 of 6)

From: KAREN E. HAWKINS
North Region Right of Way Assistant Manager,
Project Delivery
Eureka/Redding

Subject: CURRENT ESTIMATED RIGHT OF WAY COSTS

Project Description: In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

Alternate Description: C-5

We have completed an estimate of the right of way costs for the above referenced project based on information received from you on October 23, 2015 .

Right of Way Lead Time will require a minimum of 36 months after receipt of appraisal maps, utility conflict maps, environmental clearances (HMDD) and Certificate of Sufficiency (COS). A minimum of 36 months prior to certification will be required from receipt of the last map revision. Shorter lead times may require additional support resources and may adversely affect delivery of Right of Way Certification.

Robert Close for

KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
EUREKA/REDDING

Attachments:
Right of Way Data Sheet

cc. Sebastian Cohen

State of California - Department of Transportation

RIGHT OF WAY DATASHEET

EA: 0F280K
PROJECT NO.: 01 1500 0099
LOCATION: 01-DN-101-PM 12.0-15.5
Description: Repair slides, construct bypass In Del Norte Co. from Wilson Creek Bridge to 3.8 miles north of Wilson Creek Bridge

ALTERNATE: C-5 (6 of 6)
DATE: 5/11/2016
Datasheet Type: Revision

1. Right of Way Cost Estimate:

	Current Value Future Use	Escalation Rate	Escalated Value
A. Total Acquisition Cost	$2,852,125	5%	$5,687,922
B. Appraisal Fees Estimate	$20,000	N/A	$20,000
C. Mitigation Acquisition & Credits	$33,862,500	5%	$67,531,137
D. Project Development Permit Fees	$453,000	5%	$903,407
Subtotal	$37,187,625		$74,142,465
E. Utility Relocation (State's Share)	$7,705,000	5%	$15,365,889
(Owner's Share: $0)			
F. Relocation Assistance (RAP)	$0		$0
G. Clearance/Demolition	$0		$0
H. Title & Escrow	$4,000	5%	$7,977
I. Total Estimated Right of Way Cost	$44,896,625	**Rounded**	**$89,516,000 ***
J. Construction Contract Work	$0		

2. Current Date of Right of Way Certification July 1, 2030

3. Parcel Data:

Type		Dual/Appr	Utilities		Railroad	
X	0		U4 - 1	0	C&M Agreement	0
A	0		- 2	2	Service Contract	0
B	4		- 3	0	Easements	0
C	2	0	- 4	0	Rights of Entry	0
D	0	0	U5 - 7	5	Clauses	0
RR	0		- 8	0		
Total	**6**		- 9	2		
Excess	0					

Areas:		Mitigation		Misc. R/W Work	
R/W	581.4 AC	Impacts	2	RAP Displacees	N/A
TCE	N/A	Parcels	0	Clear/Demo	N/A
Excess	N/A	Credits	1	Permit to Enters	N/A
Mitigation	N/A			Condemnation	1
				USA Involvement	Yes

4. **Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.).**

336.3 acres will be required from Green Diamond Resource Company, 101.6 acres will be required from Del Norte Coast Redwoods State Park, and 44 acres will be required from Redwood National Parks. This alternative may leave some parcels landlocked. Additional parcels were added for the utility relocations that will be at State expense.

5. **Are any properties acquired for this project expected to be rented, leased, or sold?**

Yes _____ No ___X___

6. **Are RAP displacements required?**

Yes _____ No ___X___

No. of single family ___N/A___ No. of business/nonprofit ___N/A___

No. of multi-family ___N/A___ No. of farms ___N/A___

Based on Draft/Final Relocation Impact Statement/Study dated N/A

___N/A___ Sufficient replacement housing will be available without last resort housing.

___N/A___ Sufficient replacement housing will not be available without last resort housing.

7. **Is there an effect on assessed valuation?**

Yes _____ No ___X___ Not Significant _____

8. **Are there any items of Construction Contract Work?**

Yes _____ No ___X___

There is no Construction Contract Work associated with the project.

9. **Are utility facilities or rights of way affected?**

Yes ___X___ No _____

Names of Utility Companies requiring verification only.

Blue Star Gas (Propane), Charter Communication (Communication), County of Del Norte (Water, Sewer), Frontier Communication (Communication), City of Crescent City (Water, Sewer)

Names of Utility Companies requiring involvements.

Pacific Power and Light (Electric Transmission), Pacific Power and Light (Electric Distribution)

Additional information concerning Utility Involvement on this project.

Alt "C-5" has potential utility conflicts with 9 aerial Electric Transmission facilities and 19 aerial Electric Distribution facilities. State expense. 4 replacement utility easements may be required. As additional information becomes available, this estimate may need to be revised.

10. Are railroad facilities or rights of way affected?

Yes _____ No ____X____ Phase 4 Capital ____$0____

11. Are USA Lands or Rights Affected?

Yes ___X___ No _____ Phase 4 Capital ____$0____

Agencies Involved:

US Forest Service ___X___	BLM _____	Army Corps of Engineers _____
National Parks _____	BIA _____	Vetrans Administration _____
US Fish & Wildlife _____	GSA _____	_____

Rights or Permissions to acquire:

Easement ____X____	Special Use Permit _____	Courtesy Letter _____
Right of Way Grant _____	Cooperative Work Agreement _____	Cost Recovery X
Mineral Agreement _____	Letter of Concurrence ___X___	Timber Sale _____
		_____

Acquisition of rights required will be heavily dependent on getting the federal agencies involved to accept Caltran's NEPA Document. Early consultation with Feds on their NEPA requirements for the Document is critical.

12. Is an RE Office required for the project?

Yes ___X___ No _____

Type of RE Office

Modular ___X___ Move In _____

13. Were any previously unidentified sites with hazardous waste and/or material found?

Yes _____ None Evident ____X____

14. Are there material borrow and/or disposal sites required?

No _____ Optional _____ Manditory ___X___

On-site disposal is within estimated R/W.

15. Are there potential relinquishments and/or abandonments?

Yes ___X___ No _____

Unknown at present

16. Are there any existing and/or potential airspace sites?

Yes _____ No ____X____

17. What type of mitigation is required for the project?

Mitigation estimates are very preliminary. Per Jason Meyer they are being calculated as a percentage of the Alternatives total cost. Of that total, another percentage is broken out for R/W for the acquisition on needed mitigation property.

18. Is it anticipated that Caltrans will perform all Right of Way work?

Yes _____ No _____

19. Indicate the anticipated Right of Way schedule and lead time requirements.

Right of Way Lead Time will require a minimum of **36** months after we receive first appraisal maps, utility conflict maps, necessary environmental clearances and freeway agreements have been approved and obtained. Additionally a minimum of **36** months will be required after receiving the last appraisal map to Right of Way for certification.

20. Assumptions and limiting Conditions: (Check boxes that apply.)

- ☐ Mapping did not provide sufficient detail to determine the limits of the right of way required.
- ☐ Transportation facilities have not been sufficiently designed to determine the damages to any of the remainder parcels affected by the project.
- ☐ Additional right of way requirements are anticipated, but are not defined due to the preliminary nature of the early design requirements.
- ☐ Design will secure necessary encroachment permits from local agencies.
- ☐ Project permits are not required for the project.
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Evaluation Prepared By:

Right of Way Natalie Morris Date 5/19/2016

NATALIE MORRIS

Reviewed By

RW Project Coordinator _____ Date 5-19-16

SAM GENTLE

I have personally reviewed this Right of Way Data Sheet and all supporting information. I certify that the probable Highest and Best Use, estimated values, escalation rates and assumptions are reasonable and proper, subject to the limiting conditions set forth, and I find this Data Sheet to be complete and current.

Tina M Stalnberg

JEREMIAH JOYNER
Senior Right of Way Agent
Project Delivery Branch
Eureka

_____
Date

Robert Close for

KAREN E. HAWKINS
Assistant Chief
North Region Right of Way
Eureka/Redding

5/23/16
Date

ATTACHMENT E
Advance Planning Study

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: TALITHA HODGSON, Chief
Advance Planning Branch
DISTRICT 01

Attn: Sebastian Cohen
Jeff Pimentel

Date: March 1, 2016

File: 01-DN-101-PM12.57/22.7
01-98710K
01 1400 0066
Last Chance Grade Bypass
Various Bridges and
Tunnels

From: GARY JOE
Bridge Design Branch 17
Office of Bridge Design North/Central
Structure Design
Division of Engineering Services

Subject: Advance Planning Study / Preliminary Cost Estimate Transmittal

Attached is the Advance Planning Study / Preliminary Cost Estimate for the above referenced project as submitted to the Division of Engineering Services by your request memo dated June 10, 2015.

The Preliminary Cost Estimate is tabulated below. The Results are organized according to the various alternative alignment segments.

The forecasted structure and tunnel costs shown below include time related overhead (10%), mobilization (10%) and contingencies (25%). Working Days were not developed for this preliminary cost estimate. Except for Bridges 2b and 3a, the bridges have been categorized into one of three categories based primarily on span length. The Categories are described on the APS plan sheets. All the bridges in a category are assigned the same square foot unit price based on a detailed cost estimate performed on one bridge representative of the category. Bridges 2a and 3b were estimated separately (not categorized) due to their long length and unique framing requirements. Tunnel costs were developed primarily by analyzing the recently completed Caldecott Tunnel project in District 4 and selecting applicable items of work and unit costs.

ALIGNMENT SEGMENT 1

Structure	Description	Structure Length (ft)	Estimated Cost
Bridge 1a	2-span CIP/PS Box Girder (Category 1)	347	$ 6,028,000
Tunnel 1	Mined Tunnel	2425	$ 458,444,000
TOTAL STRUCTURE COST SEGMENT 1			$ 464,472,000

ALIGNMENT SEGMENT 2

Structure	Description	Structure Length (ft)	Estimated Cost
Bridge 2a	2-span CIP/PS Box Girder (Category 1)	344	$ 5,978,000
Bridge 2b	7-span CIP/PS Box Girder	1106	$ 20,699,000
TOTAL STRUCTURE COST SEGMENT 2			$ 26,677,000

ALIGNMENT SEGMENT C

Structure	Description	Structure Length (ft)	Estimated Cost
Bridge C-1	3-span CIP/PS Box Girder (Category 2)	544	$ 10,708,000
Bridge C-2	3-span CIP/PS Box Girder (Category 2)	596	$ 11,199,000
Tunnel 3	Mined Tunnel	1666	$ 335,962,000
Bridge C-3	2-span CIP/PS Box Girder (Category 2)	466	$ 10,262,000
TOTAL STRUCTURE COST SEGMENT C			$ 368,129,000

ALIGNMENT SEGMENT 3

Structure	Description	Structure Length (ft)	Estimated Cost
Bridge 3a	5-span CIP/PS Box Girder	1098	$ 22,300,000

ALIGNMENT SEGMENT 4

Structure	Description	Structure Length (ft)	Estimated Cost
Bridge 4a	4-span CIP/PS Box Girder (Category 1)	560	$ 9,985,000
Bridge 4b	3-span CIP/PS Box Girder (Category 1)	371	$ 6,445,000
TOTAL STRUCTURE COST SEGMENT 4			$16,430,000

ALIGNMENT SEGMENT 5

Structure	Description	Structure Length (ft)	Estimated Cost
Bridge 5b	3-span CIP/PS Box Girder (Category 2)	539	$ 10,128,000
Bridge 5c	3-span CIP/PS Box Girder (Category 2)	510	$ 9,933,000
Bridge 5d	4-span RC Box Girder (Category 3)	286	$ 3,288,000

Bridge 5e	2-span RC Box Girder (Category 3)	150	$ 1,722,000
Bridge 5f	2-span RC Box Girder (Category 3)	150	$ 1,722,000
Bridge 5g	2-span RC Box Girder (Category 3)	150	$ 1,722,000
TOTAL STRUCTURE COST SEGMENT 5			$ 28,511,000

ALIGNMENT SEGMENT F

Structure	Description	Structure Length (ft)	Estimated Cost
Tunnel 2	Mined Tunnel	5600	$ 978,070,000

The following tables summarize the projected total structure cost based on a variable escalation rate. The escalated structure cost is provided for informational purposes only and does not replace annual cost updates as required by Department policy.

Escalated Costs

Category 1 Bridges

Structure	Years Beyond Midpoint				
	1	2	3	4	5
1a	$6,181,000	$6,379,000	$6,596,000	$6,794,000	$6,957,000
2a	$6,233,000	$6,432,000	$6,651,000	$6,851,000	$7,015,000
4a	$10,324,000	$10,654,000	$11,016,000	$11,346,000	$11,618,000
4b	$6,664,000	$6,877,000	$7,111,000	$7,324,000	$7,500,000

Category 2 Bridges

Structure	Years Beyond Midpoint				
	1	2	3	4	5
C-1	$11,072,000	$11,426,000	$11,814,000	$12,168,000	$12,460,000
C-2	$11,580,000	$11,951,000	$12,357,000	$12,728,000	$13,033,000
C-3	$10,611,000	$10,951,000	$11,323,000	$11,663,000	$11,943,000
5b	$10,472,000	$10,807,000	$11,174,000	$11,509,000	$11,785,000
5c	$10,271,000	$10,600,000	$10,960,000	$11,289,000	$11,560,000

Category 3 Bridges

Structure	Years Beyond Midpoint				
	1	2	3	4	5
5d	$3,400,000	$3,509,000	$3,628,000	$3,737,000	$3,827,000
5e, 5f, 5g	$1,781,000	$1,838,000	$1,900,000	$1,957,000	$2,004,000

Bridges 2b and 3a

Structure	Years Beyond Midpoint				
	1	2	3	4	5
2b	$ 21,403,000	$ 22,088,000	$ 22,839,000	$ 23,524,000	$ 24,089,000
3a	$ 23,058,000	$ 23,796,000	$ 24,605,000	$ 25,343,000	$ 25,951,000

Tunnels

Structure	Years Beyond Midpoint				
	1	2	3	4	5
Tunnel 1	$ 474,031,000	$ 489,200,000	$ 505,833,000	$ 521,008,000	$ 533,512,000
Tunnel 2	$ 1,011,324,000	$ 1,043,686,000	$ 1,079,171,000	$1,111,546,000	$ 1,138,223,000
Tunnel 3	$ 347,385,000	$ 358,501,000	$ 370,690,000	$ 381,811,000	$ 390,974,000

This Advance Planning Study and the associated cost estimate are based on the following assumptions:

1. Tunnel Cost Estimates are subject to uncertainty due to a lack of detailed subsurface geotechnical information. The appropriateness of a mined tunnel is based on the recent successful completion of the tunnels at Devil's Slide and Caldecott in District 4.
2. Tunnel Cost Estimates do not include paving costs inside the tunnels. Also excluded are any highway utilities or drainage systems not directly related to the tunnel.
3. The scope of operation buildings and tunnel systems (e.g. ventilation) has not been thoroughly determined. It is assumed they will be needed and the cost for these facilities has been included in the estimate based on similar facilities used at the recently completed Caldecott Tunnel in District 4.
4. Tunnel construction will face several difficulties, including muck disposal and limited work areas at the portal locations. For example, the construction of Tunnel 2 will produce over 250,000 CY of excavated material.
5. The tunnels, by necessity, have several undesirable features. They handle two-way traffic, are on curved alignments, and have profile grades at the upper limit of acceptability according to FHWA guidelines. They are also quite long, which introduces safety evacuation concerns.
6. With the exception of the four bridges that cross Mill Creek at the North end of Alignment 5, CIDH foundations have been assumed for all foundation locations at all bridges. The four bridges crossing Mill Creek assume 36" diameter CISS Piles at the Bents and driven piles at the abutments. Further Geotechnical investigation will be required to finalize foundation types.
7. Bridge locations and span lengths are sensitive to the steep and variable topography. The bridge span layouts and abutment locations will require refinement when final alignments, and topographical and geotechnical information become available.
8. This estimate includes only retaining walls that appear necessary at bridge abutment locations. All walls were assumed to be Type 1 with no further information available

at this time. Feasibility of other wall types, and the potential need for retaining walls at other non-bridge (roadway) locations may be considered at the appropriate stage of project development.

9. The estimate reflects the expected construction constraints due to remote location, steep terrain and difficult access.

If you have any questions or if you need additional information regarding this study, please contact **Rod Simmons** at (916) 227-8168 or **Gary Joe** at (916) 227-8516.

Attachments

c: ESKINDER TADDESE, Project Liaison Engineer
GUDMUND SETBERG, Bridge Design Office Chief
JOHN FUJIMOTO, Technical Liaison Engineer
EROL KASLAN, Office Chief, Structure Maintenance & Investigations
JOHN BABCOCK, Structure Construction Assistant Deputy Division Chief
TOM POKRYWKA, Geotechnical Services

Schrieve, Carlon T@DOT

From: Fujimoto, John H@DOT
Sent: Thursday, June 02, 2016 4:26 PM
To: Pimentel, Jeffrey L@DOT; Schrieve, Carlon T@DOT
Cc: Simmons, Rodney R@DOT; Joe, Gary S@DOT; Taddese, Eskinder@DOT; Li, Louise@DOT
Subject: RE: 0F280K resource estimate

I indicated in red, the changes to the cost totals, below.

John Fujimoto
Technical Liaison Engineer, North Region
Division of Engineering Services, Structure Design
(916) 227-8757

From: Fujimoto, John H@DOT
Sent: Thursday, June 02, 2016 4:24 PM
To: Pimentel, Jeffrey L@DOT; Schrieve, Carlon T@DOT
Cc: Simmons, Rodney R@DOT; Joe, Gary S@DOT; Taddese, Eskinder@DOT; Li, Louise@DOT
Subject: RE: 0F280K resource estimate

Jeff, Carlon,

Based on the estimated cost of Bridge C4 at $11,030,000 (see my previous email), and correcting the subtotal for Alignment Segment C and Segment 5 (apparent math errors on the APS transmittal), I come up with a total structure cost of **$424,106,000** for Alternative C-5.

If you concur, then this should be the total structure cost used in the PSR and for estimating resource needs associated with Alternative C-5.

Thanks.

John Fujimoto
Technical Liaison Engineer, North Region
Division of Engineering Services, Structure Design
(916) 227-8757

PROBABILISTIC STRUCTURE COST ESTIMATE

INPUT

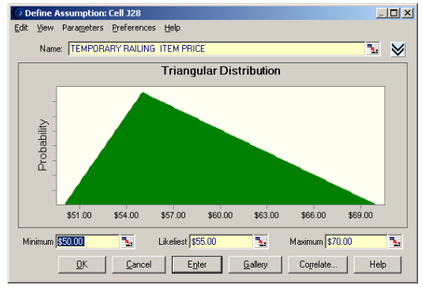
[ ] GENERAL PLAN ESTIMATE [X] ADVANCE PLANNING ESTIMATE

Revised - September 4, 2015

IN EST:	1/13/2016
OUT EST:	2/19/2016

BRIDGE NAME:	BRIDGE 2A (CATEGORY 1)
BRIDGE NUMBER:	
TYPE:	CIP/PS Box Girder
CU:	
EA:	01-0F280K
PROJECT ID:	0115000099
DESIGN SECTION:	Branch 17
# OF STRUCTURES IN PROJECT :	15
PRICES BY :	C. Siegenthaler
PRICES CHECKED BY :	
QUANTITIES BY:	R. Simmons

DISTRICT:	01
CO:	DN
RTE:	101
PM:	
DEPTH	7.5
LENGTH	344
WIDTH	43
AREA	14,792
EST. NO.	1
COST INDEX:	452
DATE:	2/11/2016
DATE:	1/16/2016



The Assumption Curves, unless noted otherwise, are modeled with a triangular distribution with the "Minimum, Likeliest and Maximum values."

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	ITEM PRICE RANGE MINIMUM	LIKELIEST	MAXIMUM	AMOUNT
1	STRUCTURE EXCAVATION (BRIDGE)		CY	875	$70.00	$110.00	$150.00	$96,250
2	STRUCTURE BACKFILL (BRIDGE)		CY	460	$65.00	$95.00	$125.00	$43,700
3	CIDH CONCRETE PILING	16" DIA	LF	1,600	$50.00	$125.00	$200.00	$200,000
4	CIDH CONCRETE PILING	48" DIA	LF	320	$600.00	$900.00	$1,200.00	$288,000
5	STRUCTURAL CONCRETE, BRIDGE		CY	1,700	$850.00	$1,300.00	$1,750.00	$2,210,000
6	STRUCTURAL CONCRETE, BRIDGE FOOTING		CY	192	$450.00	$600.00	$750.00	$115,200
7	PRESTRESSING STEEL		LB	66,000	$1.40	$1.80	$2.20	$118,800
8	BAR REINFORCING STEEL (BRIDGE)		LB	420,000	$0.95	$1.10	$1.25	$462,000
9	JOINT SEAL (MR 2")		LF	86	$60.00	$75.00	$90.00	$6,450
10	CONCRETE BARRIER	TYPE 736	LF	768	$90.00	$110.00	$130.00	$84,480
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
						SUBTOTAL		$3,624,880

Comments

TIME RELATED OVERHEAD	10%		$362,488
MOBILIZATION	10%		$443,041
SUBTOTAL BRIDGE ITEMS			$4,430,409
CONTINGENCIES	25%		$1,107,602
		SUBTOTAL	$5,538,011

	TYPE	UNIT	QUANTITY	MINIMUM	LIKELIEST	MAXIMUM
BRIDGE REMOVAL						

BRIDGE REMOVAL LUMP SUM PRICE INCLUDES TRO, MOBILIZATION AND CONTINGENCY

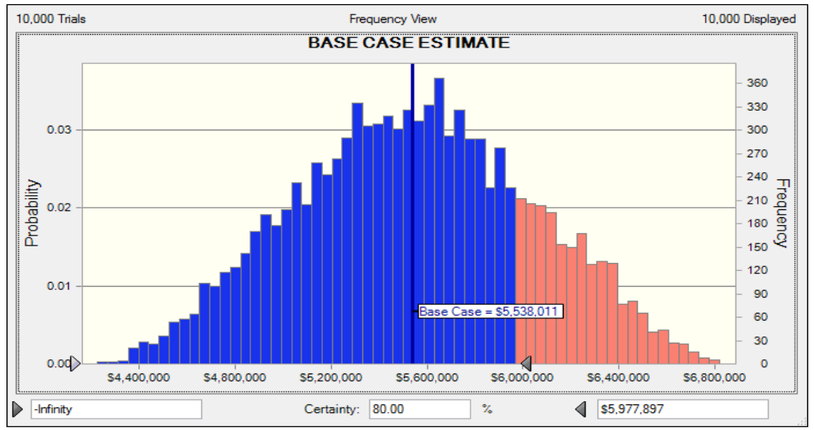
Notes

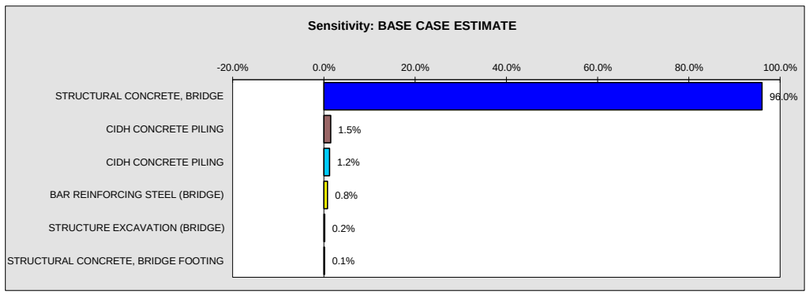
Highlighted cells represent the quantities and prices that are included in the model.
Base Case Estimate is the sum of the Quantity multiplied by "Likeliest" Item Price

BASELINE ESTIMATE TO ASSUMED MIDPOINT OF CONSTRUCTION	
BASE CASE ESTIMATE	$5,538,011

OUTPUT

The estimate ranges generated below were prepared using Crystal Ball software. Crystal Ball software automatically calculates and records the results of thousands of different "what if" cases. Analysis of these scenarios reveals to you the range of possible outcomes, their probability of occurring, the inputs that most impact your model, and where you should focus your efforts.





Percentiles:	Forecast values
0%	$4,226,912
10%	$4,892,970
20%	$5,107,322
30%	$5,273,936
40%	$5,406,269
50%	$5,542,647
60%	$5,668,854
70%	$5,808,492
80%	$5,977,897
90%	$6,206,124
100%	$6,816,739

Recommended Range

BASED ON THE ASSUMPTIONS USED TO CREATE THE MODEL, THE DES-STRUCTURE OFFICE ENGINEER RECOMMENDS THAT THE PROGRAMMING LEVEL BUDGET FOR THIS PROJECT BE DESIGNATED AT THE 80% FORECAST VALUE.

80% FORECAST VALUE = $5,978,000.00

***80% Forecast Value Escalated Budget Estimate to Assumed Midpoint of Construction**

Years Beyond Midpoint	Escalation Rate	Escalated Budget Est.
1	3.40%	$6,181,000
2	3.20%	$6,379,000
3	3.40%	$6,596,000
4	3.00%	$6,794,000
5	2.40%	$6,957,000

* Escalated structure cost is provided for information only, actual construction costs may vary. Escalated structure costs provided do not replace Departmental policy to update cost estimates annually. Escalation rates used are based on Global Insight data posted at http://www.dot.ca.gov/hq/oppd/costest/data.htm. Web page updated May 2014.

80 % Forecast

BRIDGE COST PER SQUARE FOOT	=	$404
BRIDGE REMOVAL	=	

Bridge Cost per Square Foot and/or Bridge Removal costs modeled independently. Their 80% Forecast Values Provided for informational purposes only.

PROBABILISTIC STRUCTURE COST ESTIMATE

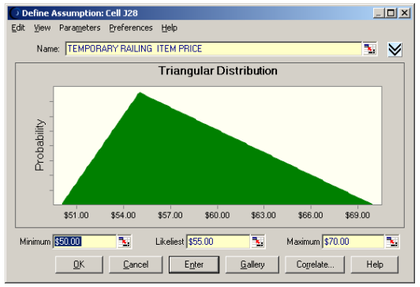
	GENERAL PLAN ESTIMATE	X	ADVANCE PLANNING ESTIMATE

Revised - September 4, 2015

BRIDGE NAME:	BRIDGE C-1 (CATEGORY 2)
BRIDGE NUMBER:	
TYPE:	CIP/PS Box Girder
CU:	
EA:	01-0F280K
PROJECT ID:	
DESIGN SECTION:	Branch 17
# OF STRUCTURES IN PROJECT :	15
PRICES BY :	C. Siegenthaler
PRICES CHECKED BY :	
QUANTITIES BY:	R. Simmons

IN EST:	1/13/2016
OUT EST:	2/19/2016
DISTRICT:	01
CO:	DN
RTE:	101
PM:	
DEPTH	varies
LENGTH	544
WIDTH	43
AREA	23,392
EST. NO.	1
COST INDEX:	452
DATE:	2/11/2016
DATE:	1/6/2016

INPUT



The Assumption Curves, unless noted otherwise, are modeled with a triangular distribution with the "Minimum, Likeliest and Maximum values."

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	ITEM PRICE RANGE MINIMUM	LIKELIEST	MAXIMUM	AMOUNT
1	STRUCTURE EXCAVATION (BRIDGE)		CY	1,650	$70.00	$110.00	$150.00	$181,500
2	STRUCTURE BACKFILL (BRIDGE)		CY	1,000	$65.00	$95.00	$125.00	$95,000
3	CIDH CONCRETE PILING	16" DIA	LF	1,920	$50.00	$125.00	$200.00	$240,000
4	CIDH CONCRETE PILING	60" DIA	LF	800	$700.00	$980.00	$1,260.00	$784,000
5	STRUCTURAL CONCRETE, BRIDGE		CY	2,670	$850.00	$1,300.00	$1,750.00	$3,471,000
6	STRUCTURAL CONCRETE, BRIDGE FOOTING		CY	393	$450.00	$600.00	$750.00	$235,800
7	PRESTRESSING STEEL		LB	90,000	$1.40	$1.80	$2.20	$162,000
8	BAR REINFORCING STEEL (BRIDGE)		LB	835,000	$0.95	$1.10	$1.25	$918,500
9	JOINT SEAL (MR 2")		LF	86	$60.00	$75.00	$90.00	$6,450
10	CONCRETE BARRIER	TYPE 736	LF	1,318	$90.00	$110.00	$130.00	$144,980
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		SUBTOTAL	$6,239,230
TIME RELATED OVERHEAD	10%		$623,923
MOBILIZATION	10%		$762,573
SUBTOTAL BRIDGE ITEMS			$7,625,726
CONTINGENCIES	25%		$1,906,431
		SUBTOTAL	$9,532,157

Comments

	TYPE	UNIT	QUANTITY	MINIMUM	LIKELIEST	MAXIMUM
BRIDGE REMOVAL						

BRIDGE REMOVAL LUMP SUM PRICE INCLUDES TRO, MOBILIZATION AND CONTINGENCY

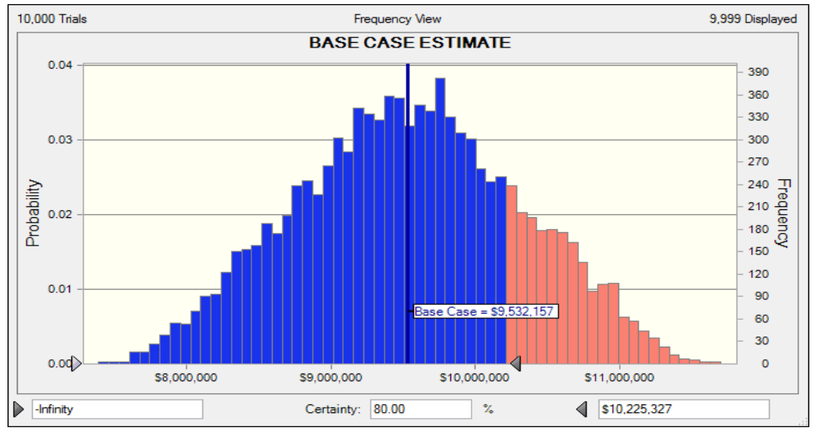
Notes

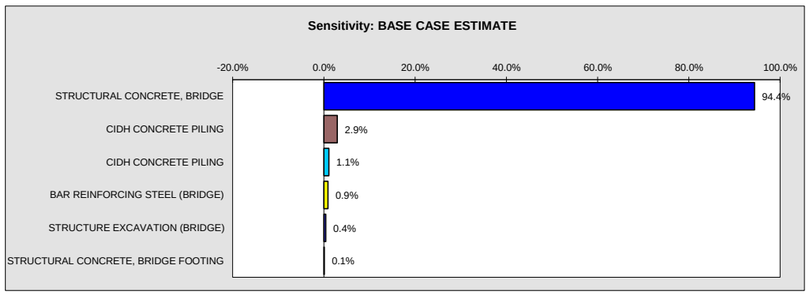
Highlighted cells represent the quantities and prices that are included in the model.
Base Case Estimate is the sum of the Quantity multiplied by "Likeliest" Item Price

BASELINE ESTIMATE TO ASSUMED MIDPOINT OF CONSTRUCTION	
BASE CASE ESTIMATE	$9,532,157

OUTPUT

The estimate ranges generated below were prepared using Crystal Ball software. Crystal Ball software automatically calculates and records the results of thousands of different "what if" cases. Analysis of these scenarios reveals to you the range of possible outcomes, their probability of occurring, the inputs that most impact your model, and where you should focus your efforts.





Percentiles:	Forecast values
0%	$7,392,653
10%	$8,500,585
20%	$8,851,626
30%	$9,114,995
40%	$9,331,353
50%	$9,531,298
60%	$9,741,847
70%	$9,954,263
80%	$10,225,327
90%	$10,585,716
100%	$11,769,693

Recommended Range

BASED ON THE ASSUMPTIONS USED TO CREATE THE MODEL, THE DES-STRUCTURE OFFICE ENGINEER RECOMMENDS THAT THE PROGRAMMING LEVEL BUDGET FOR THIS PROJECT BE DESIGNATED AT THE 80% FORECAST VALUE.

80% FORECAST VALUE = $10,225,000.00

***80% Forecast Value Escalated Budget Estimate to Assumed Midpoint of Construction**

Years Beyond Midpoint	Escalation Rate	Escalated Budget Est.
1	3.40%	$10,573,000
2	3.20%	$10,911,000
3	3.40%	$11,282,000
4	3.00%	$11,620,000
5	2.40%	$11,899,000

* Escalated structure cost is provided for information only, actual construction costs may vary. Escalated structure costs provided do not replace Departmental policy to update cost estimates annually. Escalation rates used are based on Global Insight data posted at http://www.dot.ca.gov/hq/oppd/costest/data.htm. Web page updated May 2014.

80 % Forecast		
BRIDGE COST PER SQUARE FOOT	=	$437
BRIDGE REMOVAL	=	

Bridge Cost per Square Foot and/or Bridge Removal costs modeled independently. Their 80% Forecast Values Provided for informational purposes only.

PROBABILISTIC STRUCTURE COST ESTIMATE

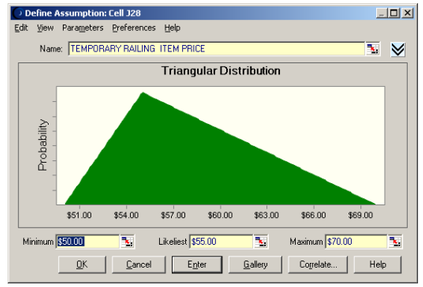
[ ] GENERAL PLAN ESTIMATE [X] ADVANCE PLANNING ESTIMATE

Revised - September 4, 2015

BRIDGE NAME:	BRIDGE 5d (CATEGORY 3)
BRIDGE NUMBER:	
TYPE:	RC Box
CU:	
EA:	01-0F280K
PROJECT ID:	
DESIGN SECTION:	Branch 17
# OF STRUCTURES IN PROJECT :	15
PRICES BY :	C. Siegenthaler
PRICES CHECKED BY :	
QUANTITIES BY:	P. Vu

IN EST:	1/13/2016
OUT EST:	2/19/2016
DISTRICT:	01
CO:	DN
RTE:	101
PM:	
DEPTH	4.5
LENGTH	286
WIDTH	43
AREA	12,298
EST. NO.	1
COST INDEX:	452
DATE:	2/11/2016
DATE:	1/16/2016

INPUT



The Assumption Curves, unless noted otherwise, are modeled with a triangular distribution with the "Minimum, Likeliest and Maximum values."

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	MINIMUM	LIKELIEST	MAXIMUM	AMOUNT
1	STRUCTURE EXCAVATION (BRIDGE)		CY	200	$70.00	$110.00	$150.00	$22,000
2	STRUCTURE BACKFILL (BRIDGE)		CY	134	$65.00	$95.00	$125.00	$12,730
3	FURNISH CONCRETE PILING	CLASS 90	LF	1,440	$30.00	$40.00	$50.00	$57,600
4	DRIVE CONCRETE PILES	CLASS 90	EA	36	$1,600.00	$2,400.00	$3,200.00	$86,400
5	FURNISH CISS PILING	36" DIA	LF	420	$210.00	$245.00	$280.00	$102,900
6	DRIVE CISS PILES	36" DIA	EA	6	$12,000.00	$18,000.00	$24,000.00	$108,000
7	STRUCTURAL CONCRETE, BRIDGE		CY	900	$850.00	$1,300.00	$1,750.00	$1,170,000
8	STRUCTURAL CONCRETE, BRIDGE FOOTING		CY	65	$450.00	$600.00	$750.00	$39,000
9	BAR REINFORCING STEEL (BRIDGE)		LB	300,000	$0.95	$1.10	$1.25	$330,000
10	JOINT SEAL (MR 1.5")		LF	86	$65.00	$75.00	$85.00	$6,450
11	CONCRETE BARRIER	TYPE 736	LF	628	$90.00	$110.00	$130.00	$69,080
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						SUBTOTAL		$2,004,160

Comments

TIME RELATED OVERHEAD	10%	$200,416
MOBILIZATION	10%	$244,953
SUBTOTAL BRIDGE ITEMS		$2,449,529
CONTINGENCIES	25%	$612,382
SUBTOTAL		$3,061,911

	TYPE	UNIT	QUANTITY	MINIMUM	LIKELIEST	MAXIMUM
BRIDGE REMOVAL						

BRIDGE REMOVAL LUMP SUM PRICE INCLUDES TRO, MOBILIZATION AND CONTINGENCY

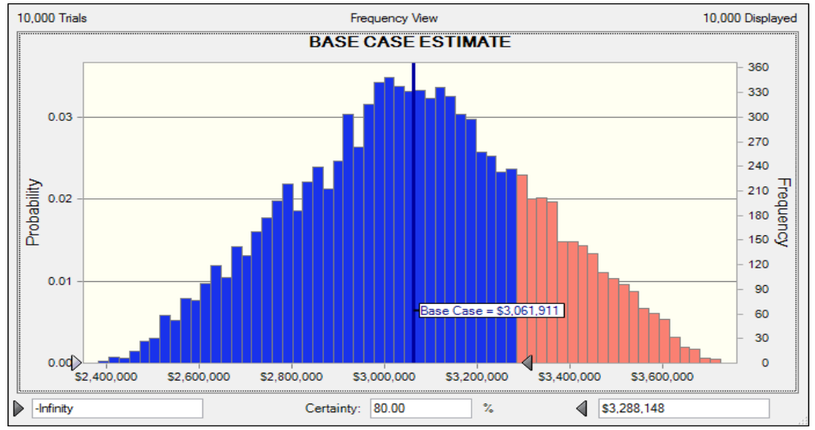
Notes

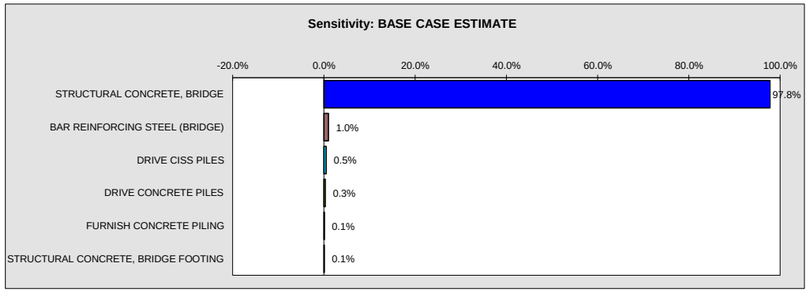
Highlighted cells represent the quantities and prices that are included in the model.
Base Case Estimate is the sum of the Quantity multiplied by "Likeliest" Item Price

BASELINE ESTIMATE TO ASSUMED MIDPOINT OF CONSTRUCTION	
BASE CASE ESTIMATE	$3,061,911

OUTPUT

The estimate ranges generated below were prepared using Crystal Ball software. Crystal Ball software automatically calculates and records the results of thousands of different "what if" cases. Analysis of these scenarios reveals to you the range of possible outcomes, their probability of occurring, the inputs that most impact your model, and where you should focus your efforts.





Percentiles:	Forecast values
0%	$2,382,492
10%	$2,721,151
20%	$2,833,777
30%	$2,923,870
40%	$2,995,946
50%	$3,060,543
60%	$3,127,023
70%	$3,199,151
80%	$3,288,148
90%	$3,405,531
100%	$3,722,906

Recommended Range

BASED ON THE ASSUMPTIONS USED TO CREATE THE MODEL, THE DES-STRUCTURE OFFICE ENGINEER RECOMMENDS THAT THE PROGRAMMING LEVEL BUDGET FOR THIS PROJECT BE DESIGNATED AT THE 80% FORECAST VALUE.

80% FORECAST VALUE = $3,288,000.00

***80% Forecast Value Escalated Budget Estimate to Assumed Midpoint of Construction**

Years Beyond Midpoint	Escalation Rate	Escalated Budget Est.
1	3.40%	$3,400,000
2	3.20%	$3,509,000
3	3.40%	$3,628,000
4	3.00%	$3,737,000
5	2.40%	$3,827,000

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80 % Forecast

BRIDGE COST PER SQUARE FOOT	=	$267
BRIDGE REMOVAL	=	

Bridge Cost per Square Foot and/or Bridge Removal costs modeled independently. Their 80% Forecast Values Provided for informational purposes only.

PROBABILISTIC STRUCTURE COST ESTIMATE

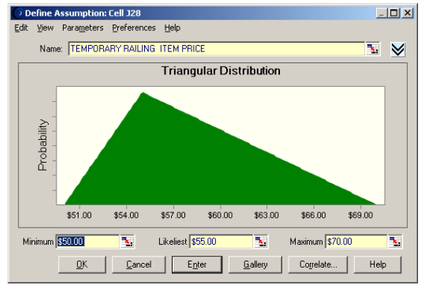
INPUT

[ ] GENERAL PLAN ESTIMATE [X] ADVANCE PLANNING ESTIMATE

Revised - September 4, 2015

BRIDGE NAME:	BRIDGE 2b
BRIDGE NUMBER:	
TYPE:	7-span CIP / PS Box Girder
CU:	
EA:	01-0F280K
PROJECT ID:	0115000099
DESIGN SECTION:	Branch 17
# OF STRUCTURES IN PROJECT :	15
PRICES BY :	Christa Siegenthaler
PRICES CHECKED BY :	
QUANTITIES BY:	R. Simmons

IN EST:	1/13/2016
OUT EST:	2/19/2016
DISTRICT:	01
CO:	DN
RTE:	101
PM:	
DEPTH	varies
LENGTH	1,106
WIDTH	43
AREA	47,558
EST. NO.	1
COST INDEX:	452
DATE:	2/11/2016
DATE:	1/8/2016



The Assumption Curves, unless noted otherwise, are modeled with a triangular distribution with the "Minimum, Likeliest and Maximum values."

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	ITEM PRICE RANGE MINIMUM	LIKELIEST	MAXIMUM	AMOUNT
1	STRUCTURE EXCAVATION (BRIDGE)		CY	1,200	$70.00	$110.00	$150.00	$132,000
2	STRUCTURE BACKFILL (BRIDGE)		CY	770	$65.00	$95.00	$125.00	$73,150
3	CIDH CONCRETE PILING (abutments)	16" DIA	LF	1,760	$50.00	$125.00	$200.00	$220,000
4	CIDH CONCRETE PILING	60" DIA	LF	800	$700.00	$950.00	$1,200.00	$760,000
5	CIDH CONCRETE PILING	72" DIA	LF	480	$730.00	$1,000.00	$1,270.00	$480,000
6	CIDH CONCRETE PILING	120" DIA	LF	480	$1,450.00	$2,200.00	$2,950.00	$1,056,000
7								
8	STRUCTURAL CONCRETE, BRIDGE		CY	5,000	$800.00	$1,250.00	$1,700.00	$6,250,000
9	STRUCTURAL CONCRETE, BRIDGE FOOTING		CY	400	$450.00	$600.00	$750.00	$240,000
10	PRESTRESSING STEEL		LB	180,000	$1.40	$1.80	$2.20	$324,000
11	BAR REINFORCING STEEL (BRIDGE)		LB	1,800,000	$0.95	$1.10	$1.25	$1,980,000
12	JOINT SEAL ASSEMBLY (MR 5")		LF	86	$650.00	$850.00	$1,050.00	$73,100
13	JOINT SEAL (MR 2")		LF	86	$60.00	$75.00	$90.00	$6,450
14	CONCRETE BARRIER	TYPE 736	LF	2,570	$90.00	$110.00	$130.00	$282,700
15								
16	TYPE 1 RETAINING WALL		SQFT	4,026	$150.00	$200.00	$250.00	$805,200
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30								
						SUBTOTAL		$12,682,600

Comments

TIME RELATED OVERHEAD	10%		$1,268,260
MOBILIZATION	10%		$1,550,096
SUBTOTAL BRIDGE ITEMS			$15,500,956
CONTINGENCIES	25%		$3,875,239
		SUBTOTAL	$19,376,194

	TYPE	UNIT	QUANTITY	MINIMUM	LIKELIEST	MAXIMUM
BRIDGE REMOVAL						

BRIDGE REMOVAL LUMP SUM PRICE INCLUDES TRO, MOBILIZATION AND CONTINGENCY

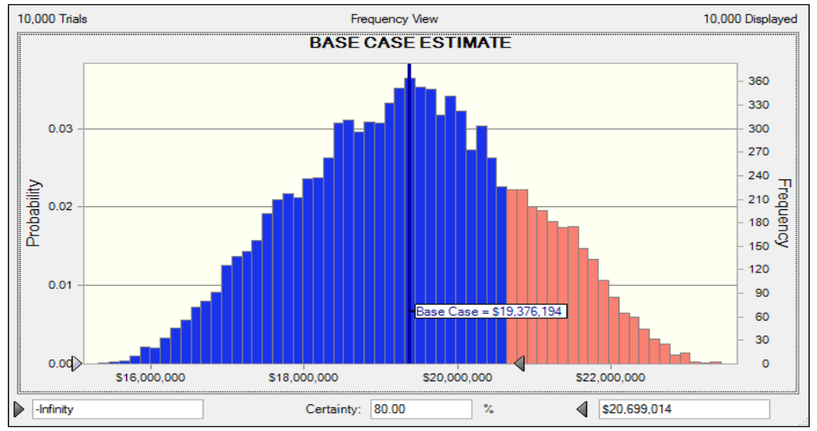
Notes

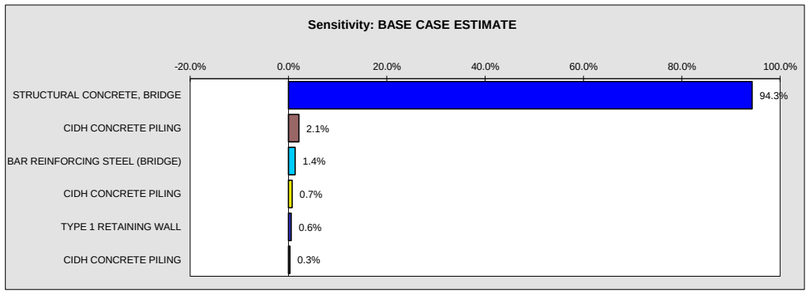
Highlighted cells represent the quantities and prices that are included in the model.
Base Case Estimate is the sum of the Quantity multiplied by "Likeliest" Item Price

BASELINE ESTIMATE TO ASSUMED MIDPOINT OF CONSTRUCTION	
BASE CASE ESTIMATE	$19,376,194

OUTPUT

The estimate ranges generated below were prepared using Crystal Ball software. Crystal Ball software automatically calculates and records the results of thousands of different "what if" cases. Analysis of these scenarios reveals to you the range of possible outcomes, their probability of occurring, the inputs that most impact your model, and where you should focus your efforts.





Percentiles:	Forecast values	
0%	$15,329,554	
10%	$17,451,252	
20%	$18,074,922	
30%	$18,572,127	
40%	$19,001,868	
50%	$19,393,816	
60%	$19,769,375	
70%	$20,189,590	Recommended Range
80%	$20,699,014	
90%	$21,358,145	
100%	$23,428,302	

BASED ON THE ASSUMPTIONS USED TO CREATE THE MODEL, THE DES-STRUCTURE OFFICE ENGINEER RECOMMENDS THAT THE PROGRAMMING LEVEL BUDGET FOR THIS PROJECT BE DESIGNATED AT THE 80% FORECAST VALUE.

80% FORECAST VALUE = $20,699,000.00

***80% Forecast Value Escalated Budget Estimate to Assumed Midpoint of Construction**

Years Beyond Midpoint	Escalation Rate	Escalated Budget Est.
1	3.40%	$21,403,000
2	3.20%	$22,088,000
3	3.40%	$22,839,000
4	3.00%	$23,524,000
5	2.40%	$24,089,000

* Escalated structure cost is provided for information only, actual construction costs may vary. Escalated structure costs provided do not replace Departmental policy to update cost estimates annually. Escalation rates used are based on Global Insight data posted at http://www.dot.ca.gov/hq/oppd/costest/data.htm. Web page updated May 2014.

80 % Forecast		
BRIDGE COST PER SQUARE FOOT	=	$435
BRIDGE REMOVAL	=	

Bridge Cost per Square Foot and/or Bridge Removal costs modeled independently. Their 80% Forecast Values Provided for informational purposes only.

PROBABILISTIC STRUCTURE COST ESTIMATE

INPUT

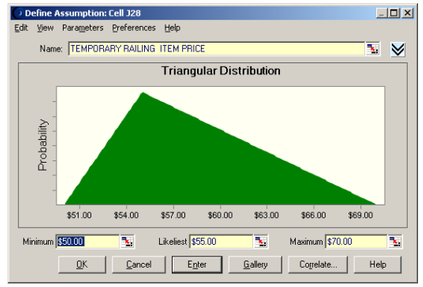
[ ] GENERAL PLAN ESTIMATE [X] ADVANCE PLANNING ESTIMATE

Revised - September 4, 2015

IN EST:	1/13/2016
OUT EST:	2/19/2016

BRIDGE NAME:	BRIDGE 3a
BRIDGE NUMBER:	
TYPE:	5-span CIP/PS Box Girder
CU:	
EA:	01-0F280K
PROJECT ID:	0115000099
DESIGN SECTION:	Branch 17
# OF STRUCTURES IN PROJECT :	15
PRICES BY :	Christa Siegenthaler
PRICES CHECKED BY :	
QUANTITIES BY:	R. Simmons

DISTRICT:	01
CO:	DN
RTE:	101
PM:	
DEPTH	varies
LENGTH	1,098
WIDTH	43
AREA	47,214
EST. NO.	1
COST INDEX:	452
DATE:	2/11/2016
DATE:	1/11/2016



The Assumption Curves, unless noted otherwise, are modeled with a triangular distribution with the "Minimum, Likeliest and Maximum values."

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	ITEM PRICE RANGE MINIMUM	LIKELIEST	MAXIMUM	AMOUNT
1	STRUCTURE EXCAVATION (BRIDGE)		CY	3,000	$70.00	$110.00	$150.00	$330,000
2	STRUCTURE BACKFILL (BRIDGE)		CY	2,150	$65.00	$95.00	$125.00	$204,250
3	CIDH CONCRETE PILING (abutments)	24" DIA	LF	2,400	$200.00	$280.00	$360.00	$672,000
4	CIDH CONCRETE PILING (bents)	60" DIA	LF	1,600	$700.00	$950.00	$1,200.00	$1,520,000
5	STRUCTURAL CONCRETE, BRIDGE		CY	5,800	$800.00	$1,250.00	$1,700.00	$7,250,000
6	STRUCTURAL CONCRETE, BRIDGE FOOTING		CY	761	$450.00	$600.00	$750.00	$456,600
7	PRESTRESSING STEEL		LB	196,000	$1.40	$1.80	$2.20	$352,800
8	BAR REINFORCING STEEL (BRIDGE)		LB	1,800,000	$0.95	$1.10	$1.25	$1,980,000
9	JOINT SEAL ASSEMBLY (MR 2")		LF	129	$60.00	$75.00	$90.00	$9,675
10	CONCRETE BARRIER	TYPE 736	LF	2,544	$90.00	$110.00	$130.00	$279,840
11								
12	TYPE 1 RETAINING WALL		SQFT	2,800	$150.00	$200.00	$250.00	$560,000
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29								
30							SUBTOTAL	$13,615,165

Comments

TIME RELATED OVERHEAD	10%		$1,361,517
MOBILIZATION	10%		$1,664,076
SUBTOTAL BRIDGE ITEMS			$16,640,757
CONTINGENCIES	25%		$4,160,189
		SUBTOTAL	$20,800,947

	TYPE	UNIT	QUANTITY	MINIMUM	LIKELIEST	MAXIMUM
BRIDGE REMOVAL						

BRIDGE REMOVAL LUMP SUM PRICE INCLUDES TRO, MOBILIZATION AND CONTINGENCY

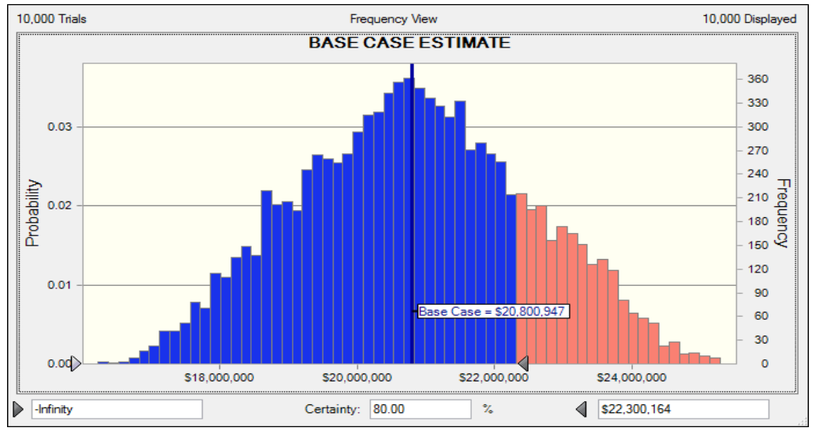
Notes

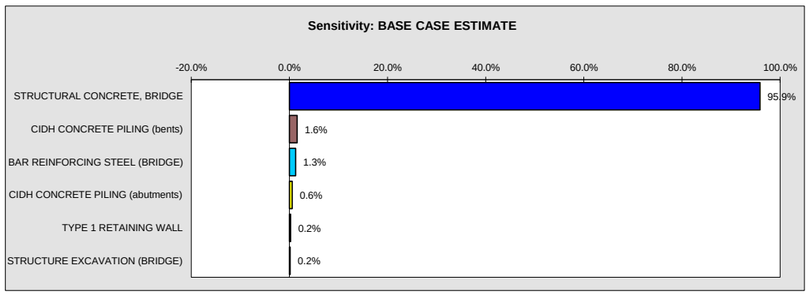
Highlighted cells represent the quantities and prices that are included in the model.
Base Case Estimate is the sum of the Quantity multiplied by "Likeliest" Item Price

BASELINE ESTIMATE TO ASSUMED MIDPOINT OF CONSTRUCTION	
BASE CASE ESTIMATE	$20,800,947

OUTPUT

The estimate ranges generated below were prepared using Crystal Ball software. Crystal Ball software automatically calculates and records the results of thousands of different "what if" cases. Analysis of these scenarios reveals to you the range of possible outcomes, their probability of occurring, the inputs that most impact your model, and where you should focus your efforts.





Percentiles:	Forecast values
0%	$16,227,727
10%	$18,622,767
20%	$19,316,419
30%	$19,885,745
40%	$20,377,481
50%	$20,800,268
60%	$21,231,973
70%	$21,720,144
80%	$22,300,164
90%	$23,100,786
100%	$25,283,042

Recommended Range

BASED ON THE ASSUMPTIONS USED TO CREATE THE MODEL, THE DES-STRUCTURE OFFICE ENGINEER RECOMMENDS THAT THE PROGRAMMING LEVEL BUDGET FOR THIS PROJECT BE DESIGNATED AT THE 80% FORECAST VALUE.

80% FORECAST VALUE = $22,300,000.00

***80% Forecast Value Escalated Budget Estimate to Assumed Midpoint of Construction**

Years Beyond Midpoint	Escalation Rate	Escalated Budget Est.
1	3.40%	$23,058,000
2	3.20%	$23,796,000
3	3.40%	$24,605,000
4	3.00%	$25,343,000
5	2.40%	$25,951,000

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80 % Forecast		
BRIDGE COST PER SQUARE FOOT	=	$472
BRIDGE REMOVAL	=	

Bridge Cost per Square Foot and/or Bridge Removal costs modeled independently. Their 80% Forecast Values Provided for informational purposes only.

PROBABILISTIC STRUCTURE COST ESTIMATE

INPUT

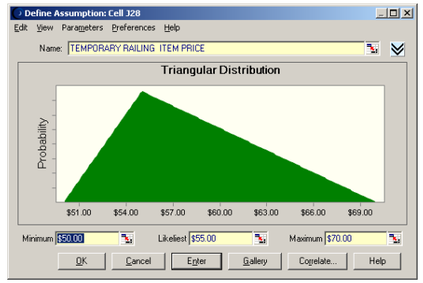
[ ] GENERAL PLAN ESTIMATE [X] ADVANCE PLANNING ESTIMATE

Revised - September 4, 2015

IN EST:	1/13/2016
OUT EST:	2/19/2016

BRIDGE NAME:	TUNNEL 1
BRIDGE NUMBER:	
TYPE:	MINED TUNNEL
CU:	
EA:	01-0F280K
PROJECT ID:	0115000099
DESIGN SECTION:	Branch 17
# OF STRUCTURES IN PROJECT :	15
PRICES BY :	D. Seifert
PRICES CHECKED BY :	
QUANTITIES BY:	R. Simmons

DISTRICT:	01
CO:	DN
RTE:	101
PM:	
DEPTH	
LENGTH	2,425
WIDTH	44
AREA	106,700
EST. NO.	1
COST INDEX:	452
DATE:	2/11/2016
DATE:	1/16/2016



The Assumption Curves, unless noted otherwise, are modeled with a triangular distribution with the "Minimum, Likeliest and Maximum values."

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	ITEM PRICE RANGE MINIMUM	LIKELIEST	MAXIMUM	AMOUNT
1	MINED TUNNEL		LF	2,425	$61,714.33	$78,914.53	$136,703.99	$191,367,732
2	PORTAL STRUCTURE (INCLUDING RETAINING WALLS)		EA	2	$7,886,135.25	$8,814,496.25	$9,191,588.00	$17,628,993
3	OMC BUILDING		EA	1	$3,325,000.00	$6,591,666.67	$6,650,000.00	$6,591,667
4	TUNNEL SYSTEMS		LF	2,425	$5,841.96	$6,710.93	$9,169.66	$16,274,003
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Note: While the pricing includes the mechanical and electrical systems specific to the tunnel, the pricing excludes Roadway pavement,drainage, and utilities through the tunnel section

	SUBTOTAL	$231,862,395
TIME RELATED OVERHEAD	10%	$23,186,239
MOBILIZATION	10%	$28,338,737
SUBTOTAL BRIDGE ITEMS		$283,387,371
CONTINGENCIES	25%	$70,846,843
	SUBTOTAL	$354,234,214

Comments

	TYPE	UNIT	QUANTITY	MINIMUM	LIKELIEST	MAXIMUM
BRIDGE REMOVAL						

BRIDGE REMOVAL LUMP SUM PRICE INCLUDES TRO, MOBILIZATION AND CONTINGENCY

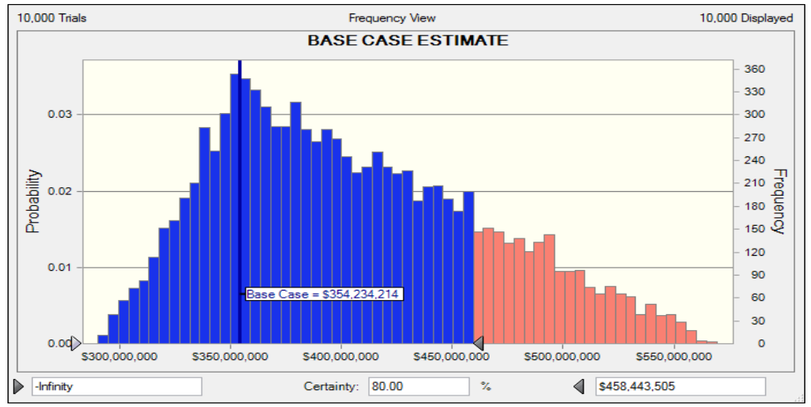
Notes

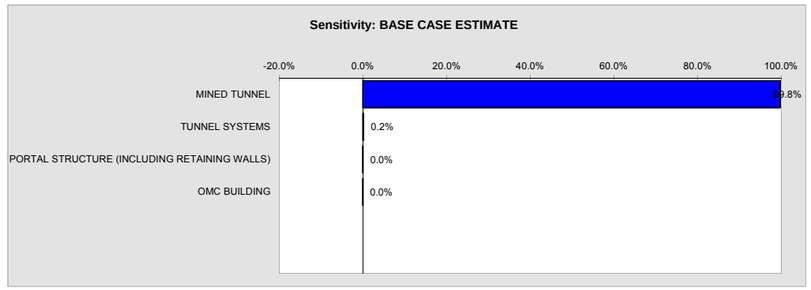
Highlighted cells represent the quantities and prices that are included in the model.
Base Case Estimate is the sum of the Quantity multiplied by "Likeliest" Item Price

BASELINE ESTIMATE TO ASSUMED MIDPOINT OF CONSTRUCTION	
BASE CASE ESTIMATE	$354,234,214

OUTPUT

The estimate ranges generated below were prepared using Crystal Ball software. Crystal Ball software automatically calculates and records the results of thousands of different "what if" cases. Analysis of these scenarios reveals to you the range of possible outcomes, their probability of occurring, the inputs that most impact your model, and where you should focus your efforts.





Percentiles:	Forecast values
0%	$290,578,441
10%	$334,190,518
20%	$351,079,323
30%	$364,178,157
40%	$379,568,532
50%	$395,927,896
60%	$414,856,397
70%	$435,101,860
80%	$458,443,505
90%	$490,791,927
100%	$569,237,082

Recommended Range

BASED ON THE ASSUMPTIONS USED TO CREATE THE MODEL, THE DES-STRUCTURE OFFICE ENGINEER RECOMMENDS THAT THE PROGRAMMING LEVEL BUDGET FOR THIS PROJECT BE DESIGNATED AT THE 80% FORECAST VALUE.

80% FORECAST VALUE = $458,444,000.00

***80% Forecast Value Escalated Budget Estimate to Assumed Midpoint of Construction**

Years Beyond Midpoint	Escalation Rate	Escalated Budget Est.
1	3.40%	$474,031,000
2	3.20%	$489,200,000
3	3.40%	$505,833,000
4	3.00%	$521,008,000
5	2.40%	$533,512,000

* Escalated structure cost is provided for information only, actual construction costs may vary. Escalated structure costs provided do not replace Departmental policy to update cost estimates annually. Escalation rates used are based on Global Insight data posted at http://www.dot.ca.gov/hq/oppd/costest/data.htm. Web page updated May 2014.

80 % Forecast

BRIDGE COST PER SQUARE FOOT = $4,297

BRIDGE REMOVAL =

Bridge Cost per Square Foot and/or Bridge Removal costs modeled independently. Their 80% Forecast Values Provided for informational purposes only.

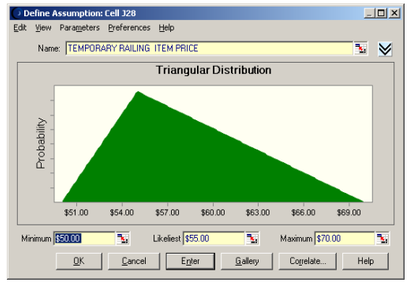
PROBABILISTIC STRUCTURE COST ESTIMATE

INPUT

[ ] GENERAL PLAN ESTIMATE [X] ADVANCE PLANNING ESTIMATE

Revised - September 4, 2015

		IN EST:	1/13/2016
		OUT EST:	2/19/2016
BRIDGE NAME:	TUNNEL 2		
BRIDGE NUMBER:		**DISTRICT:**	01
TYPE:	MINED TUNNEL	**CO:**	DN
CU:		**RTE:**	101
EA:	01-0F280K	**PM:**	
PROJECT ID:	0115000099	**DEPTH**	
		LENGTH	5,600
DESIGN SECTION:	Branch 17	**WIDTH**	44
# OF STRUCTURES IN PROJECT :	15	**AREA**	246,400
		EST. NO.	1
PRICES BY :	D. Seifert	**COST INDEX:**	452
PRICES CHECKED BY :		**DATE:**	2/11/2016
QUANTITIES BY:	R. Simmons	**DATE:**	1/16/2016



The Assumption Curves, unless noted otherwise, are modeled with a triangular distribution with the "Minimum, Likeliest and Maximum values."

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	ITEM PRICE RANGE MINIMUM	LIKELIEST	MAXIMUM	AMOUNT
1	MINED TUNNEL		LF	5,600	$61,714.33	$78,914.53	$136,703.99	$441,921,361
2	PORTAL STRUCTURE (INCLUDING RETAINING WALLS)		EA	2	$7,886,135.25	$8,814,496.25	$9,191,588.00	$17,628,993
3	OMC BUILDING		EA	1	$3,325,000.00	$6,591,666.67	$6,650,000.00	$6,591,667
4	TUNNEL SYSTEMS		LF	2,425	$5,841.96	$6,710.93	$9,169.66	$16,274,003
5								
6								
7								
8								
9	Note: While the pricing includes the mechanical and							
10	electrical systems specific to the tunnel, the pricing							
11	excludes Roadway pavement,drainage, and utilities							
12	through the tunnel section							
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						SUBTOTAL		$482,416,023

Comments

TIME RELATED OVERHEAD	10%		$48,241,602
MOBILIZATION	10%		$58,961,958
SUBTOTAL BRIDGE ITEMS			$589,619,584
CONTINGENCIES	25%		$147,404,896
		SUBTOTAL	$737,024,480

	TYPE	UNIT	QUANTITY	MINIMUM	LIKELIEST	MAXIMUM
BRIDGE REMOVAL						

BRIDGE REMOVAL LUMP SUM PRICE INCLUDES TRO, MOBILIZATION AND CONTINGENCY

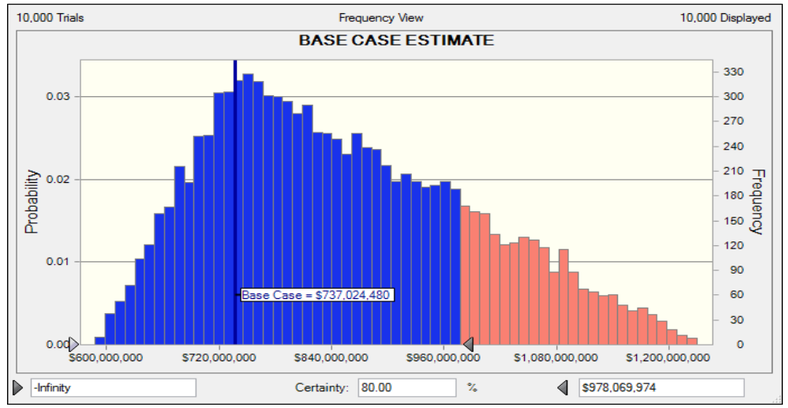
Notes

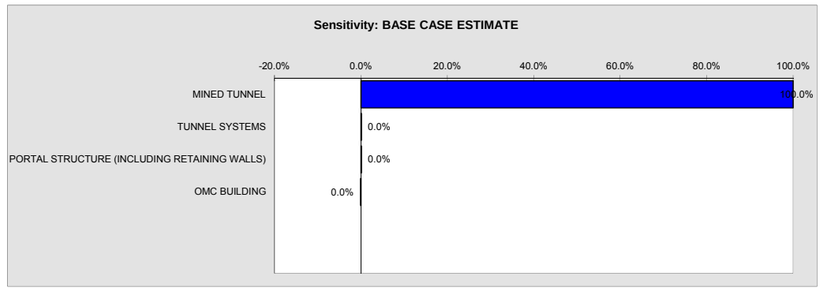
Highlighted cells represent the quantities and prices that are included in the model.
Base Case Estimate is the sum of the Quantity multiplied by "Likeliest" Item Price

BASELINE ESTIMATE TO ASSUMED MIDPOINT OF CONSTRUCTION	
BASE CASE ESTIMATE	$737,024,480

OUTPUT

The estimate ranges generated below were prepared using Crystal Ball software. Crystal Ball software automatically calculates and records the results of thousands of different "what if" cases. Analysis of these scenarios reveals to you the range of possible outcomes, their probability of occurring, the inputs that most impact your model, and where you should focus your efforts.





Percentiles:	Forecast values	
0%	$588,020,126	
10%	$686,536,567	
20%	$726,784,183	
30%	$759,365,784	
40%	$793,888,985	
50%	$832,457,674	
60%	$875,025,599	
70%	$923,629,713	Recommended Range
80%	$978,069,974	
90%	$1,052,409,219	
100%	$1,229,559,946	

BASED ON THE ASSUMPTIONS USED TO CREATE THE MODEL, THE DES-STRUCTURE OFFICE ENGINEER RECOMMENDS THAT THE PROGRAMMING LEVEL BUDGET FOR THIS PROJECT BE DESIGNATED AT THE 80% FORECAST VALUE.

80% FORECAST VALUE = $978,070,000.00

***80% Forecast Value Escalated Budget Estimate to Assumed Midpoint of Construction**

Years Beyond Midpoint	Escalation Rate	Escalated Budget Est.
1	3.40%	$1,011,324,000
2	3.20%	$1,043,686,000
3	3.40%	$1,079,171,000
4	3.00%	$1,111,546,000
5	2.40%	$1,138,223,000

* Escalated structure cost is provided for information only, actual construction costs may vary. Escalated structure costs provided do not replace Departmental policy to update cost estimates annually. Escalation rates used are based on Global Insight data posted at http://www.dot.ca.gov/hq/oppd/costest/data.htm. Web page updated May 2014.

80 % Forecast
BRIDGE COST PER SQUARE FOOT = $3,969
BRIDGE REMOVAL =

Bridge Cost per Square Foot and/or Bridge Removal costs modeled independently. Their 80% Forecast Values Provided for informational purposes only.

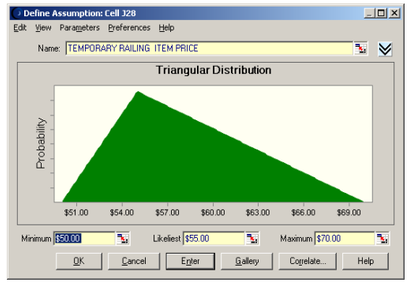
PROBABILISTIC STRUCTURE COST ESTIMATE

INPUT

[ ] GENERAL PLAN ESTIMATE [X] ADVANCE PLANNING ESTIMATE

Revised - September 4, 2015

		IN EST:	1/13/2016
		OUT EST:	2/19/2016
BRIDGE NAME:	TUNNEL 3		
BRIDGE NUMBER:		**DISTRICT:**	01
TYPE:	MINED TUNNEL	**CO:**	DN
CU:		**RTE:**	101
EA:	01-0F280K	**PM:**	
PROJECT ID:	0115000099	**DEPTH**	
		LENGTH	1,666
DESIGN SECTION:	Branch 17	**WIDTH**	44
# OF STRUCTURES IN PROJECT :	15	**AREA**	73,304
		EST. NO.	1
PRICES BY :	D. Seifert	**COST INDEX:**	452
PRICES CHECKED BY :		**DATE:**	2/11/2016
QUANTITIES BY:	R. Simmons	**DATE:**	1/16/2016



The Assumption Curves, unless noted otherwise, are modeled with a triangular distribution with the "Minimum, Likeliest and Maximum values."

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	ITEM PRICE RANGE MINIMUM	LIKELIEST	MAXIMUM	AMOUNT
1	MINED TUNNEL		LF	1,666	$61,714.33	$78,914.53	$136,703.99	$131,471,605
2	PORTAL STRUCTURE (INCLUDING RETAINING WALLS)		EA	2	$7,886,135.25	$8,814,496.25	$9,191,588.00	$17,628,993
3	OMC BUILDING		EA	1	$3,325,000.00	$6,591,666.67	$6,650,000.00	$6,591,667
4	TUNNEL SYSTEMS		LF	2,425	$5,841.96	$6,710.93	$9,169.66	$16,274,003
5								
6								
7								
8	Note: While the pricing includes the mechanical and							
9	electrical systems specific to the tunnel, the pricing							
10	excludes Roadway pavement,drainage, and utilities							
11	through the tunnel section							
12								
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29								
30							SUBTOTAL	$171,966,267

Comments

TIME RELATED OVERHEAD	10%	$17,196,627
MOBILIZATION	10%	$21,018,099
SUBTOTAL BRIDGE ITEMS		$210,180,993
CONTINGENCIES	25%	$52,545,248
SUBTOTAL		$262,726,242

	TYPE	UNIT	QUANTITY	MINIMUM	LIKELIEST	MAXIMUM	
BRIDGE REMOVAL							

BRIDGE REMOVAL LUMP SUM PRICE INCLUDES TRO, MOBILIZATION AND CONTINGENCY

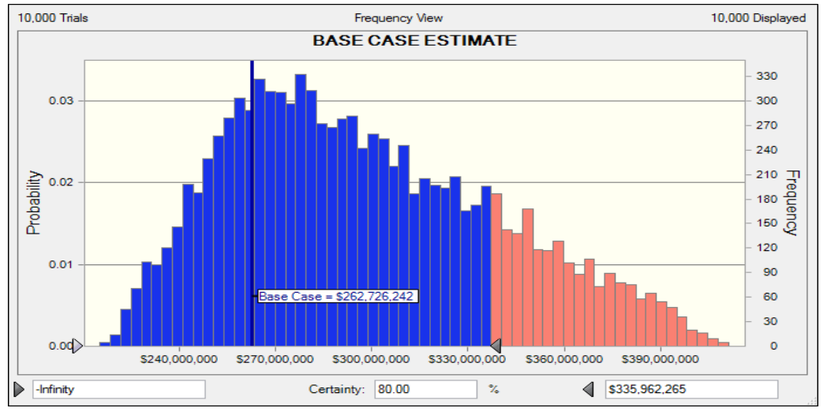
Notes

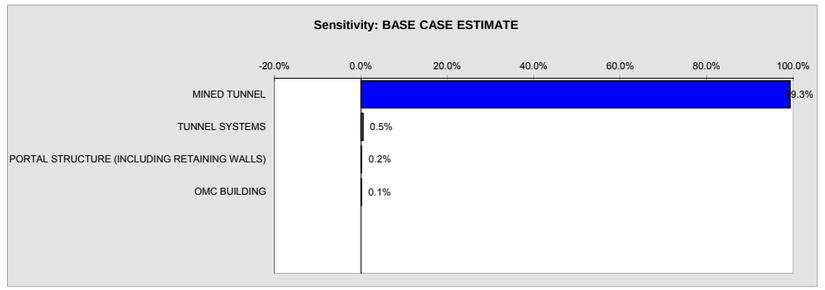
Highlighted cells represent the quantities and prices that are included in the model.
Base Case Estimate is the sum of the Quantity multiplied by "Likeliest" Item Price

BASELINE ESTIMATE TO ASSUMED MIDPOINT OF CONSTRUCTION	
BASE CASE ESTIMATE	$262,726,242

OUTPUT

The estimate ranges generated below were prepared using Crystal Ball software. Crystal Ball software automatically calculates and records the results of thousands of different "what if" cases. Analysis of these scenarios reveals to you the range of possible outcomes, their probability of occurring, the inputs that most impact your model, and where you should focus your efforts.





Percentiles:	Forecast values	
0%	$215,425,388	
10%	$247,677,110	
20%	$259,712,127	
30%	$270,183,029	
40%	$280,408,874	
50%	$291,796,721	
60%	$304,310,170	
70%	$318,910,858	Recommended Range
80%	$335,962,265	
90%	$357,903,272	
100%	$411,062,606	

BASED ON THE ASSUMPTIONS USED TO CREATE THE MODEL, THE DES-STRUCTURE OFFICE ENGINEER RECOMMENDS THAT THE PROGRAMMING LEVEL BUDGET FOR THIS PROJECT BE DESIGNATED AT THE 80% FORECAST VALUE.

80% FORECAST VALUE = $335,962,000.00

***80% Forecast Value Escalated Budget Estimate to Assumed Midpoint of Construction**

Years Beyond Midpoint	Escalation Rate	Escalated Budget Est.
1	3.40%	$347,385,000
2	3.20%	$358,501,000
3	3.40%	$370,690,000
4	3.00%	$381,811,000
5	2.40%	$390,974,000

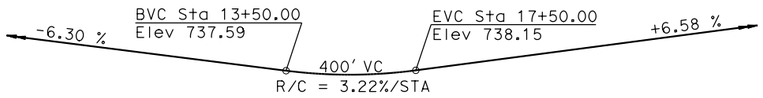
* Escalated structure cost is provided for information only, actual construction costs may vary. Escalated structure costs provided do not replace Departmental policy to update cost estimates annually. Escalation rates used are based on Global Insight data posted at http://www.dot.ca.gov/hq/oppd/costest/data.htm. Web page updated May 2014.

80 % Forecast
BRIDGE COST PER SQUARE FOOT = $4,583
BRIDGE REMOVAL =

Bridge Cost per Square Foot and/or Bridge Removal costs modeled independently. Their 80% Forecast Values Provided for informational purposes only.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST	COUNTY	ROUTE	POST MILE
01	DN	101	X



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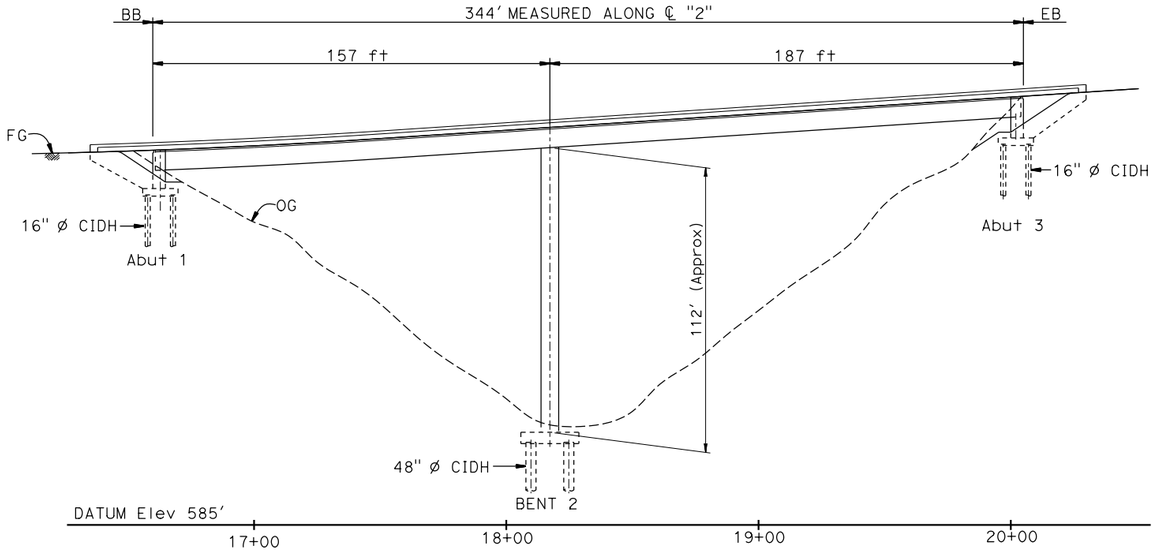
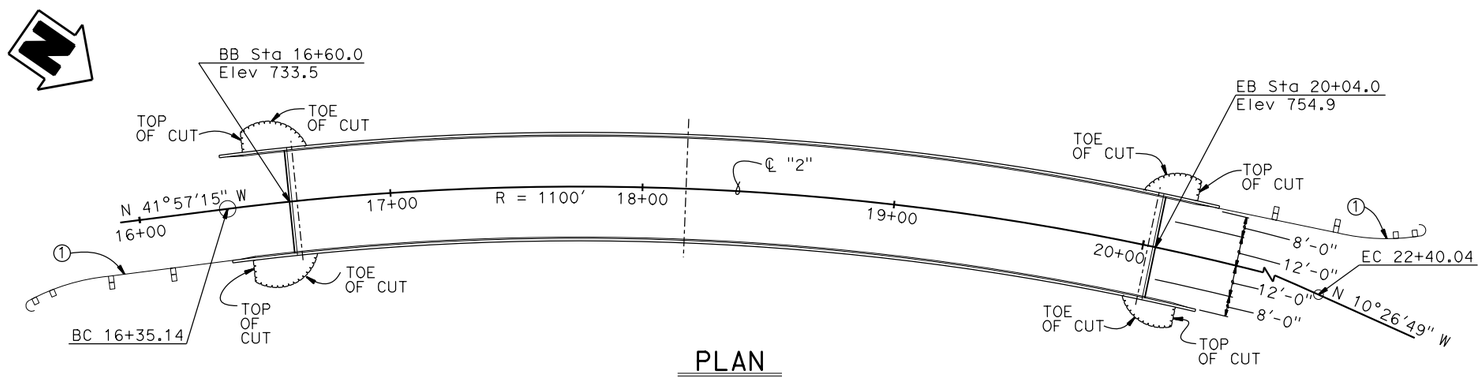
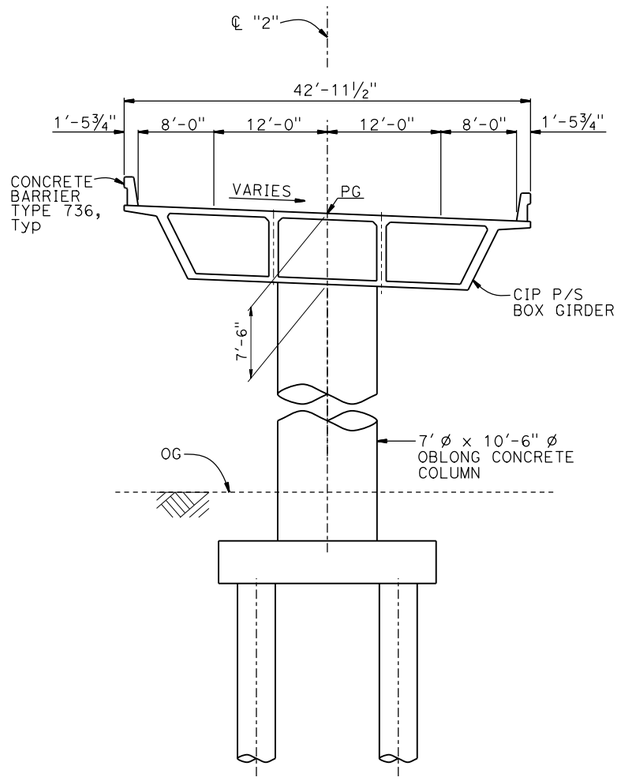


DEVELOPED ELEVATION
1" = 30'-0"



PLAN
1" = 30'-0"



TYPICAL SECTION
⅛" = 1'-0"

NOTES:

① MBGR, see "ROADWAY PLANS"

1. Access is limited due to steep, remote terrain. See sheet 2 for cost data.
2. See sheet 2 of 2 for BRIDGE CATEGORY 1 COST DATA.
3. Alignment and profile shown are preliminary and approximate.

BRIDGE CATEGORY 1

SHEET 1 OF 2

DESIGNED BY R. Simmons	DATE 11-15	STRUCTURE DESIGN BRANCH 17
DRAWN BY L. Wang	DATE 11-15	
CHECKED BY A. Tern	DATE 11-15	
APPROVED X	DATE X	

ORIGINAL SCALE IN INCHES 0 1 2 3

PLANNING STUDY

LAST CHANCE GRADE

UNIT: 3586	BRIDGE No. **2a**
SCALE: As Noted	PROJECT No. & PHASE: 0115000099

CONTRACT No.: 01-0f280k

STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 08-09-10)

FILE => aps-01-0f280k_cat1-2a-01.dgn

USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:44

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST	COUNTY	ROUTE	POST MILE
01	DN	101	X

BRIDGE CATEGORY 1

Description:
Multi-Span CIP/PS prismatic box girder (moderate spans up to approx 190').
Tall Single Column bents with CIDH pile foundations at all supports.

NOTE: Bridge 2a as shown on sheet 1 is representative of "Category 1" bridges. Other bridges of this category are shown in the following table and are assigned the same square foot cost for this preliminary study.

BRIDGE NUMBER	NO. SPANS	SPAN LENGTHS	MAXIMUM COLUMN HEIGHT	RETAINING WALL AREA	DATE OF ESTIMATE	STRUCTURE DEPTH	LENGTH	WIDTH	AREA	(1) COST PER SQ FT	(2) WALL COST	TOTAL COST $ x 1000
1a	2	181-166	129	N/A	2/9/16	7'-6"	347	43	14921	$ 404	N/A	$ 6,028
2a	2	157-187	113	N/A	2/9/16	7'-6"	344	43	14792	$ 404	N/A	$ 5,978
4a	4	115-155-165-125	94	1025 s.f.	2/9/16	6'-6"	560	43	24080	$ 404	$ 256,250	$ 9,985
4b	3	110-151-110	82	N/A	2/9/16	6'-0"	371	43	15953	$ 404	N/A	$ 6,445

(1) Cost includes 10% mobilization and 25% contingency.

(2) Wall cost assumed to be $ 250/sf, including 10% mobilization and 25% contingency.

ORIGINAL SCALE IN INCHES 0 1 2 3

DESIGNED BY	R. Simmons	DATE	12-15
DRAWN BY	L. Wang	DATE	12-15
CHECKED BY	I. Cherniogio	DATE	12-15
APPROVED	X	DATE	X

STRUCTURE DESIGN BRANCH 17

BRIDGE CATEGORY 1

SHEET 2 OF 2

PLANNING STUDY

LAST CHANCE GRADE

UNIT: 3586	BRIDGE No. VARIOUS
SCALE: As Noted	PROJECT No. & PHASE: 0115000099

CONTRACT No.: 01-0f280k

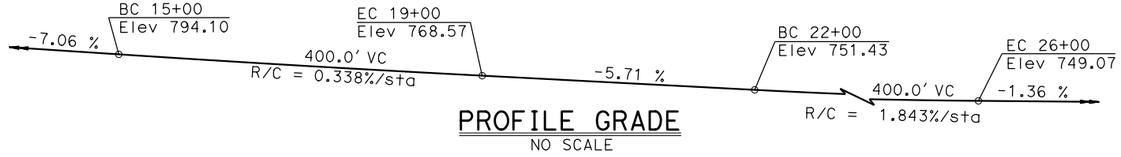
FILE => aps-01-0f280k_cat1-2a-02.dgn

USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:44

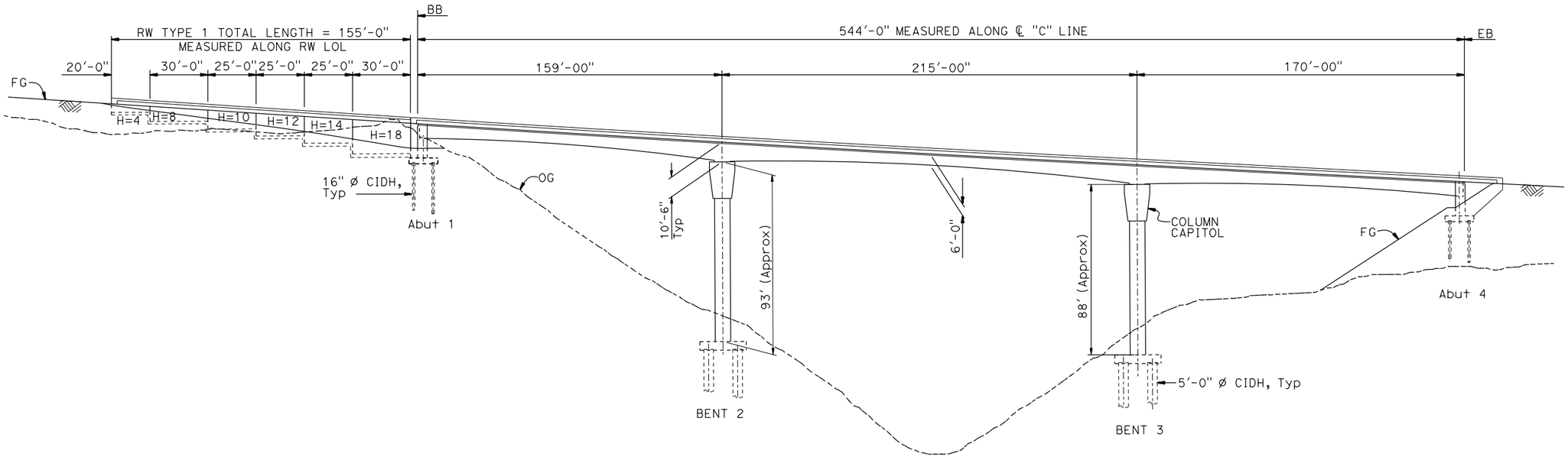
STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 08-09-10)

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

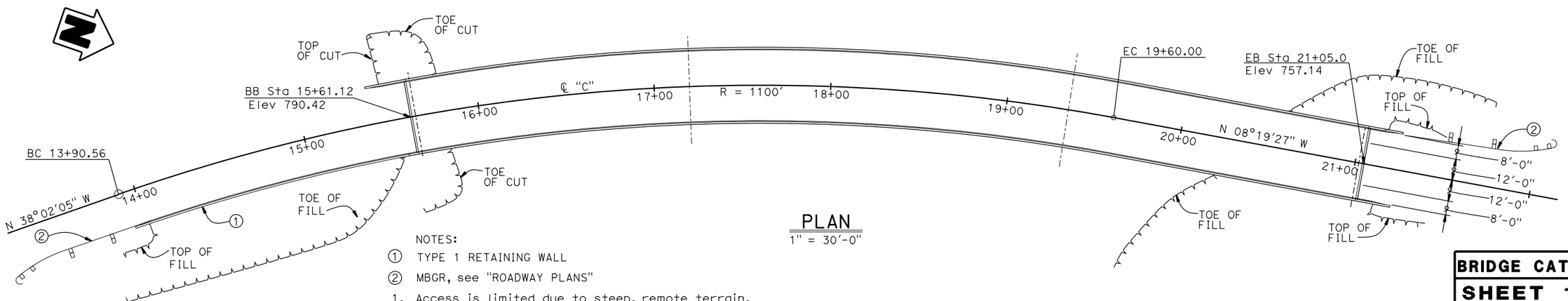
DIST	COUNTY	ROUTE	POST MILE
01	DN	101	X



PROFILE GRADE
NO SCALE



DEVELOPED ELEVATION
1" = 30'-0"



PLAN
1" = 30'-0"

NOTES:
① TYPE 1 RETAINING WALL
② MBGR, see "ROADWAY PLANS"
1. Access is limited due to steep, remote terrain.
2. See sheet 2 of 2 for Typical Section.
3. See sheet 2 of 2 for BRIDGE CATEGORY 2 COST DATA.
4. Alignment and profile shown are preliminary and approximate.

ORIGINAL SCALE IN INCHES 0 1 2 3

DESIGNED BY R. Simmons	DATE 12-15	STRUCTURE DESIGN BRANCH 17
DRAWN BY L. Wang	DATE 12-15	
CHECKED BY I. Cherniglo	DATE 12-15	
APPROVED X	DATE X	

BRIDGE CATEGORY 2

SHEET 1 OF 2

PLANNING STUDY
LAST CHANCE GRADE

UNIT: 3586 | BRIDGE No. C-1
SCALE: As Noted | PROJECT No. & PHASE: 0115000099

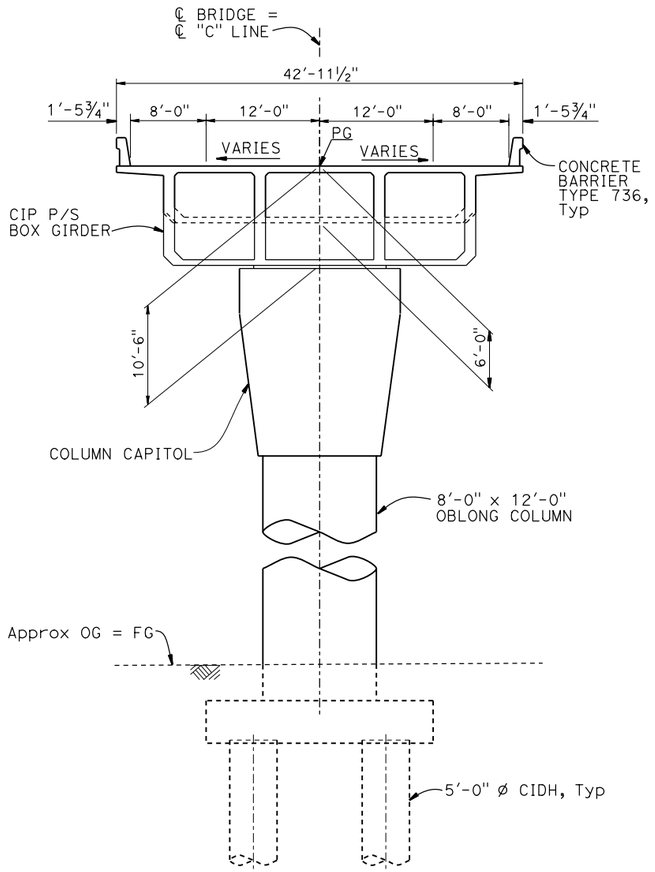
CONTRACT No.: 01-0f280k

FILE => aps-01-0f280k_cat2-c-1-01.dgn

USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:44

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST	COUNTY	ROUTE	POST MILE
01	DN	101	X



TYPICAL SECTION

1/8" = 1'-0"

BRIDGE CATEGORY 2

Description:
Multi-Span, long span (>200 ft) CIP/PS variable depth (parabolic soffit) box girder.
Single Column (8x12 oblong) Bents CIDH Foundations.

NOTE: Bridge C-1 as shown is representative of "Category 2" bridges.
The other bridges of this category are shown in the table and
are assigned the same square foot cost for this preliminary study.

BRIDGE NUMBER	NO. SPANS	SPAN LENGTHS	MAXIMUM COLUMN HEIGHT	RETAINING WALL AREA	DATE OF ESTIMATE	STRUCTURE DEPTH	LENGTH	WIDTH	AREA	(1) COST PER SQ FT	(2) WALL COST	TOTAL COST $ x 1000
C-1	3	159-215-170	93	1933	2/11/16	10'-6" max/6'-6" min	544	43	23392	$ 437	$ 483,250	$ 10,708
C-2	3	172-234-190	102	N/A	2/11/16	11'-6" max/7'-0" min	596	43	25628	$ 437	N/A	$ 11,199
C-3	2	233-233	112	6020	2/11/16	11'-6" max/7'-0" min	466	43	20038	$ 437	$ 1,505,000	$ 10,262
5b	3	163-213-163	94	N/A	2/11/16	10'-0" max/6'-0" min	539	43	23177	$ 437	N/A	$ 10,128
5c	3	152-206-152	66	1400	2/11/16	10'-0" min/6'-0" max	510	43	21930	$ 437	$ 350,000	$ 9,933

(1) Cost includes 10% mobilization and 25% contingency.

(2) Wall cost assumed to be $ 250/sf, including 10% mobilization and 25% contingency.

ORIGINAL SCALE IN INCHES 0 1 2 3

DESIGNED BY	R. Simmons	DATE	12-15
DRAWN BY	L. Wang	DATE	12-15
CHECKED BY	I. Cherniogio	DATE	12-15
APPROVED	X	DATE	X

STRUCTURE DESIGN BRANCH 17

BRIDGE CATEGORY 2

SHEET 2 OF 2

PLANNING STUDY

LAST CHANCE GRADE

UNIT: 3586	BRIDGE No. VARIOUS
SCALE: As Noted	PROJECT No. & PHASE: 0115000099

CONTRACT No.: 01-0f280k

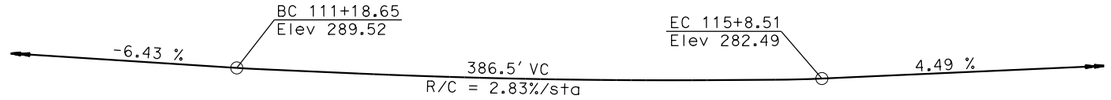
FILE => aps-01-0f280k_cat2-c-1-02.dgn

USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:45

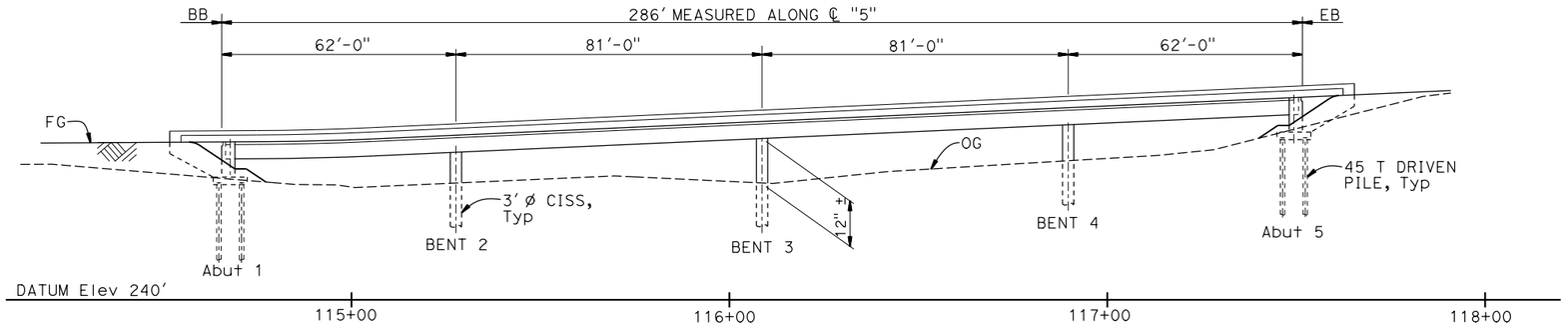
STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 08-09-10)

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

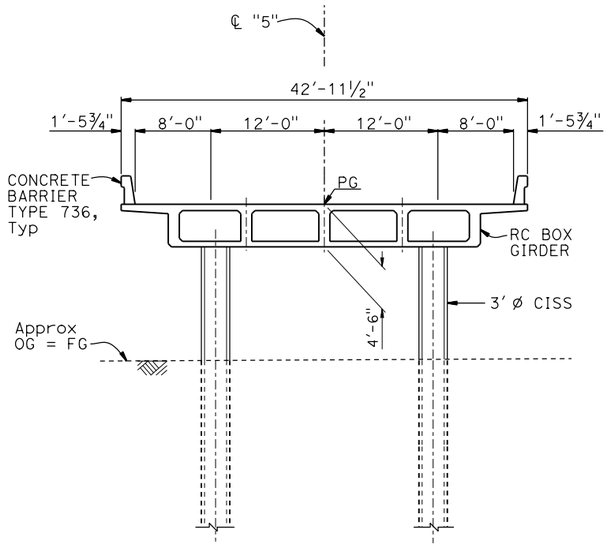
DIST	COUNTY	ROUTE	POST MILE
01	DN	101	X



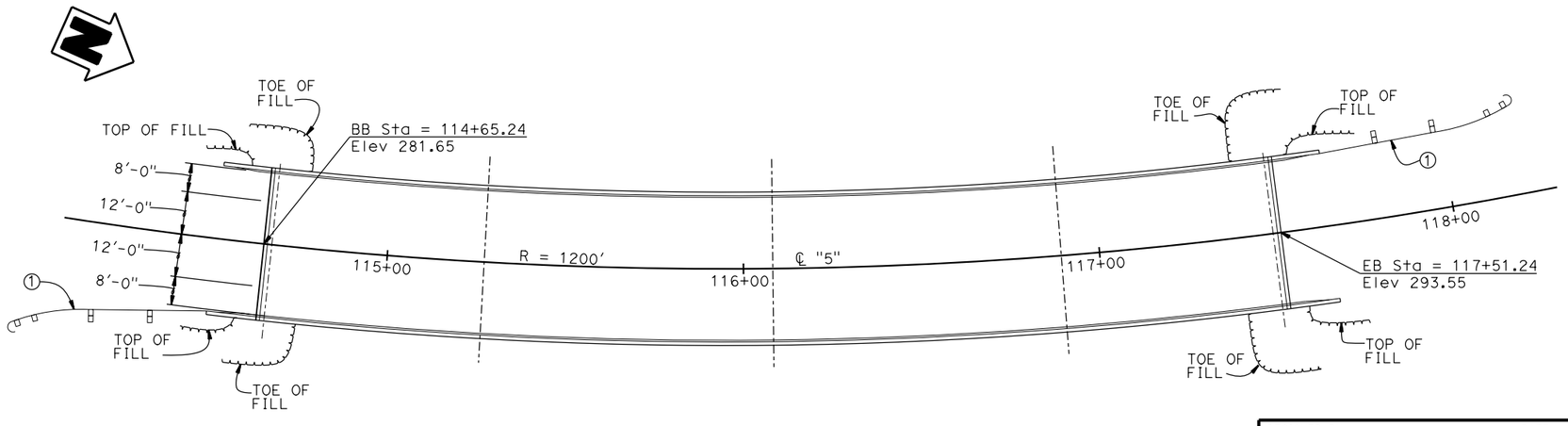
PROFILE GRADE
NO SCALE



DEVELOPED ELEVATION
1" = 20'-0"



TYPICAL SECTION
⅛" = 1'-0"



PLAN
1" = 20'-0"

NOTES:

① MBGR, see "ROADWAY PLANS"

1. Access is limited due to steep, remote terrain.
2. See sheet 2 of 2 for BRIDGE CATEGORY 3 COST DATA.
3. Alignment and profile shown are preliminary and approximate.

ORIGINAL SCALE IN INCHES 0 1 2 3

DESIGNED BY	R. Simmons	DATE	11-15
DRAWN BY	L. Wang	DATE	11-15
CHECKED BY	I. Cherniogl o	DATE	11-15
APPROVED	X	DATE	X

STRUCTURE DESIGN BRANCH 17

BRIDGE CATEGORY 3

SHEET 1 OF 2

PLANNING STUDY

LAST CHANCE GRADE

UNIT: 3586	BRIDGE No. 5d
SCALE: As Noted	PROJECT No. & PHASE: 0115000099

CONTRACT No.: 01-0f280k

USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:45

FILE => aps-01-0f280k_cat3-5d-01.dgn

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST	COUNTY	ROUTE	POST MILE
01	DN	101	X

BRIDGE CATEGORY 3

Description:
Multi-Span RC prismatic box girder (short to medium spans).
Short two-column bents. 45T pile foundations at abutments, CISS piles @ bents.

NOTE: Bridge 5d as shown is representative of "Category 3" bridges.
The other bridges of this category are shown in the table and
are assigned the same square foot cost for this preliminary study.

BRIDGE NUMBER	NO. SPANS	SPAN LENGTHS	MAXIMUM COLUMN HEIGHT	DATE OF ESTIMATE	STRUCTURE DEPTH	LENGTH	WIDTH	AREA	(1) COST PER SQ FT	TOTAL COST $ x 1000
5d	4	62-81-81-62	12	2/11/16	4'-6"	286	43	12298	$ 267	$ 3,288
5e*	2	75-75	20	2/11/16	4'-3"	150	43	6450	$ 267	$ 1,722
5f*	2	75-75	20	2/11/16	4'-3"	150	43	6450	$ 267	$ 1,722
5g*	2	75-75	20	2/11/16	4'-3"	150	43	6450	$ 267	$ 1,722

(1) Cost includes 10% mobilization and 25% contingency.

* 5e, 5f and 5g are assumed to be 150 ft total length.
No supporting information is available for this preliminary study.
These bridges all cross Mill Creek.

ORIGINAL SCALE IN INCHES 0 1 2 3

DESIGNED BY R. Simmons	DATE 12-15	STRUCTURE DESIGN BRANCH 17
DRAWN BY L. Wang	DATE 12-15	
CHECKED BY I. Cherniogl	DATE 12-15	
APPROVED X	DATE X	

BRIDGE CATEGORY 3
SHEET 2 OF 2
PLANNING STUDY
LAST CHANCE GRADE
UNIT: 3586 | BRIDGE No. VARIOUS
SCALE: As Noted | PROJECT No. & PHASE: 0115000099
CONTRACT No.: 01-0f280k

USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:45

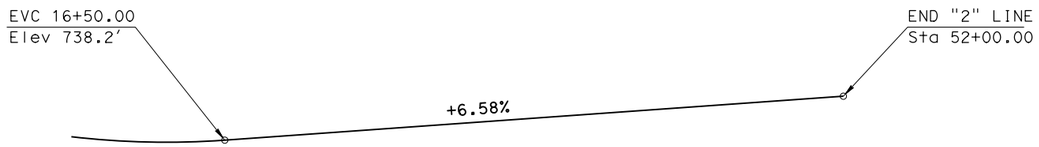
STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 08-09-10)

FILE => aps-01-0f280k_cat3-5d-02.dgn

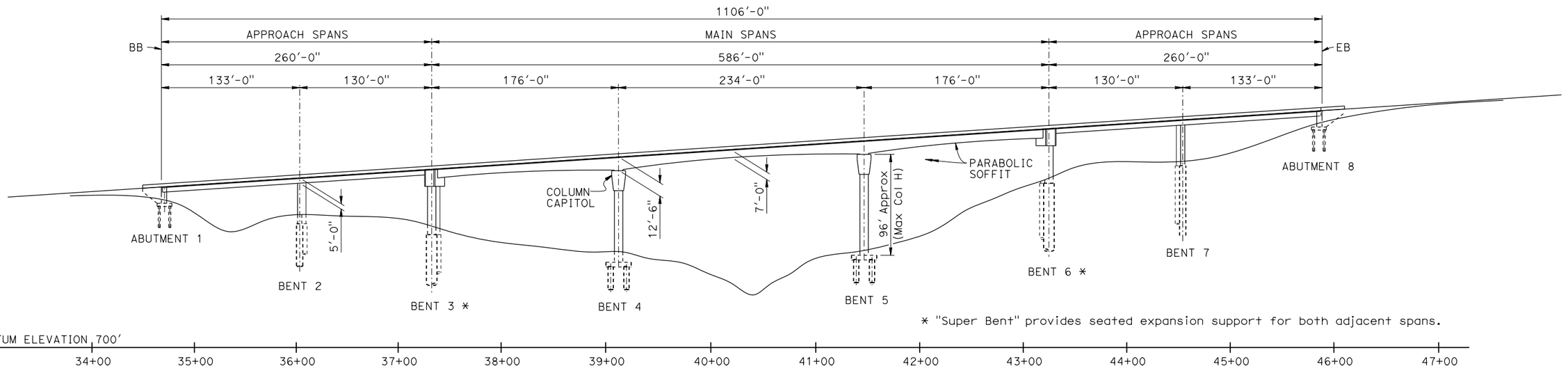
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST	COUNTY	ROUTE	POST MILE
01	DN	101	XXXX

DATE OF ESTIMATE	2-19-16
STRUCTURE DEPTH	= Varies 12′-6" Max
LENGTH	= 1106
WIDTH	= 43
AREA	= 47558
COST/ □ft INCLUDING 10% MOBILIZATION & 25% CONTINGENCY	= 435
TOTAL COST	= $ 20,699,000



PROFILE
NO SCALE

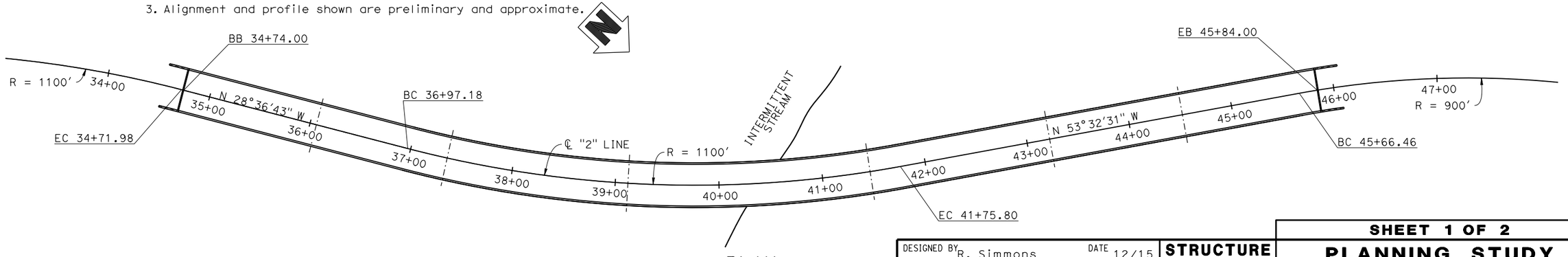


* "Super Bent" provides seated expansion support for both adjacent spans.

ELEVATION
1" = 50′

Notes:

1. New alignment, no traffic control required.
2. Access is limited by steep, remote terrain.
3. Alignment and profile shown are preliminary and approximate.



PLAN
1" = 50′

ORIGINAL SCALE IN INCHES 0 1 2 3

DESIGNED BY	R. Simmons	DATE	12/15
DRAWN BY	G. Souza	DATE	12/15
CHECKED BY	I. Cherniogla	DATE	12/15
APPROVED	X	DATE	X

STRUCTURE DESIGN BRANCH 17

SHEET 1 OF 2

PLANNING STUDY

LAST CHANCE GRADE

UNIT: 3586	BRIDGE No. 2b
SCALE: AS SHOWN	PROJECT No. & PHASE: 0115000099K

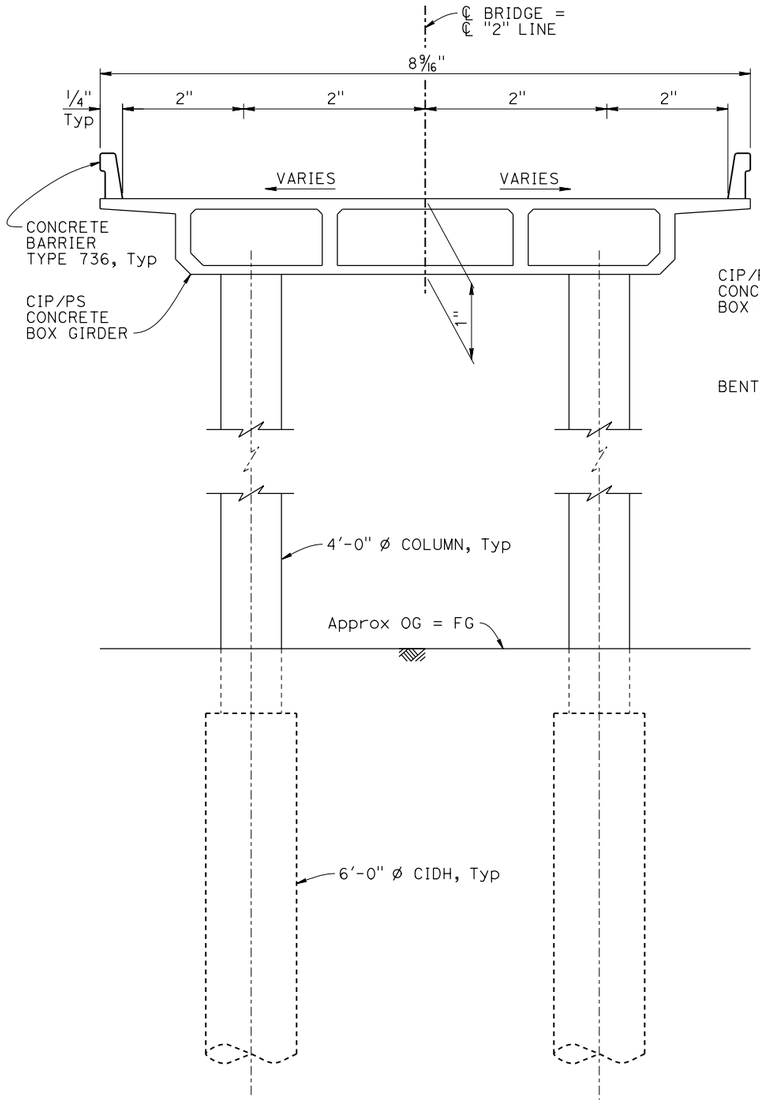
CONTRACT No.: 01-0F280K

USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:44

FILE => aps-01-0f280k_Align-2 Bridge 2b-01.dgn

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

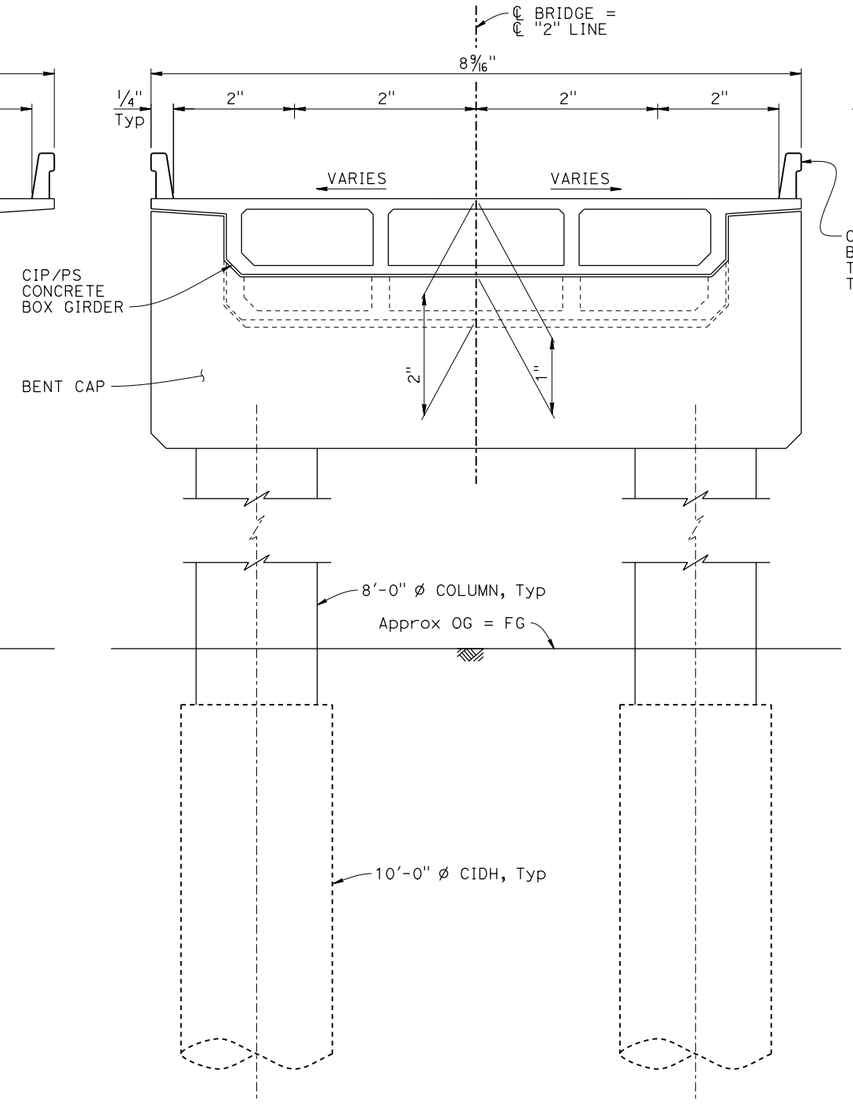
DIST	COUNTY	ROUTE	POST MILE
01	DN	101	XXXX



BENTS 2 AND 7 (APPROACH SPANS)

TYPICAL SECTION

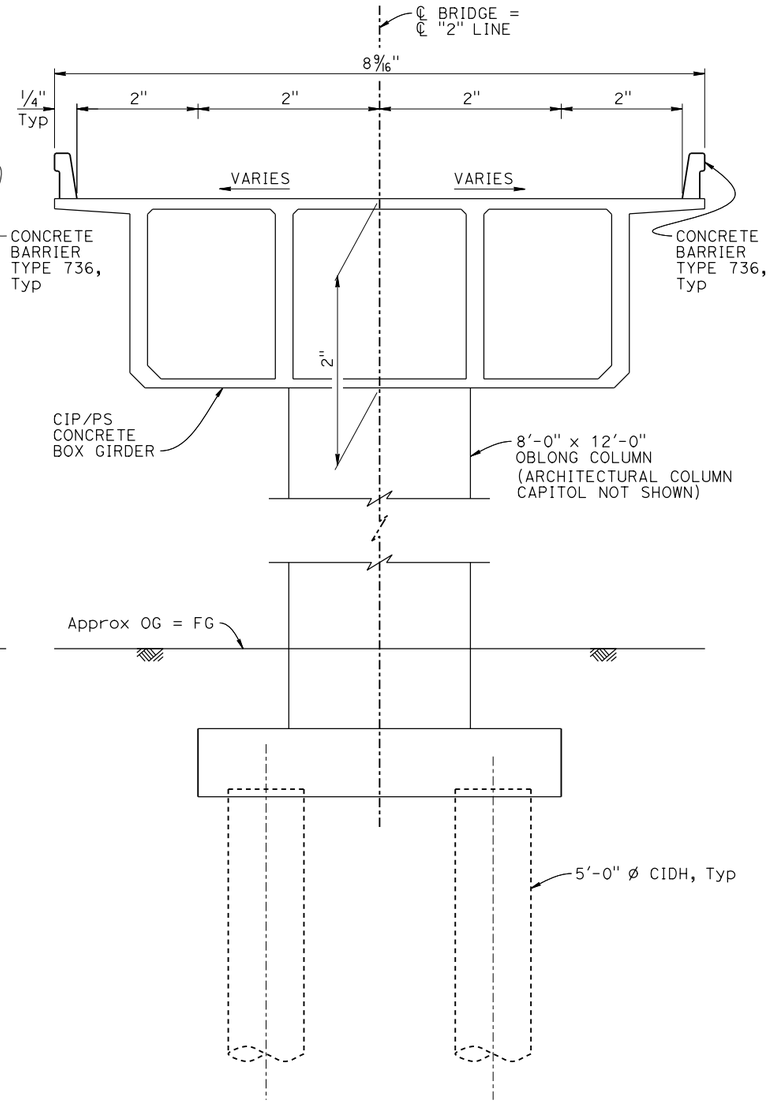
1" = 5'



BENTS 3 AND 6 ("SUPER BENT")

TYPICAL SECTION

1" = 5'



BENTS 4 AND 5 (MAIN SPANS)

TYPICAL SECTION

1" = 5'

ORIGINAL SCALE IN INCHES 0 1 2 3

DESIGNED BY	R. Simmons	DATE	12/15
DRAWN BY	G. Souza	DATE	12/15
CHECKED BY	I. Cherniogl o	DATE	12/15
APPROVED	X	DATE	X

STRUCTURE DESIGN BRANCH 17

SHEET 2 OF 2

PLANNING STUDY

LAST CHANCE GRADE

UNIT: 3586	BRIDGE No. 2b
SCALE: AS SHOWN	PROJECT No. & PHASE: 0115000099K

CONTRACT No.: 01-0F280K

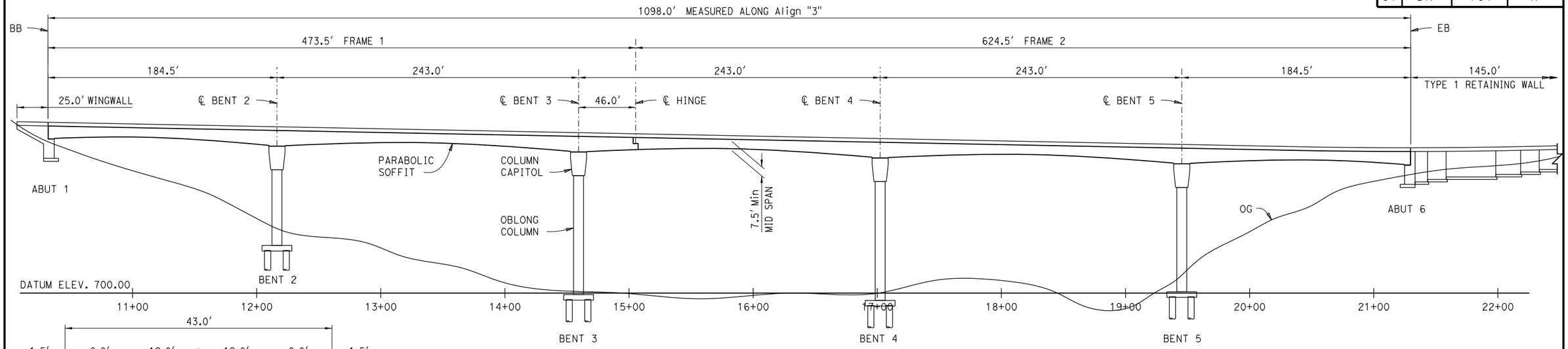
USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:44

FILE => aps-01-0f280k_Align-2 Bridge 2b-02.dgn

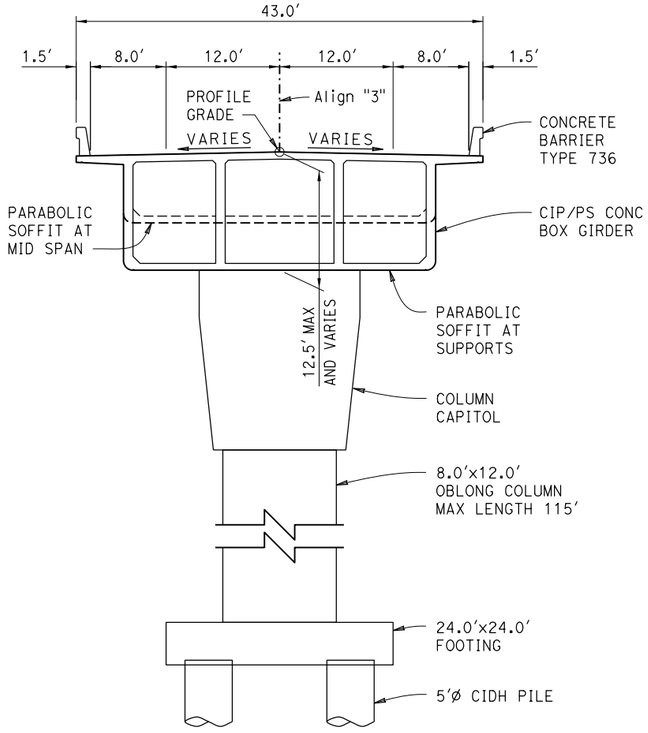
STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 08-09-10)

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

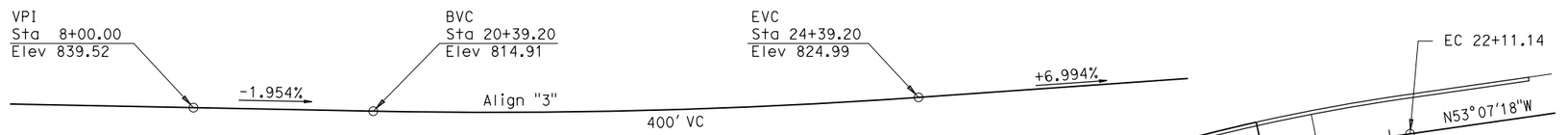
DIST	COUNTY	ROUTE	POST MILE
01	DN	101	X



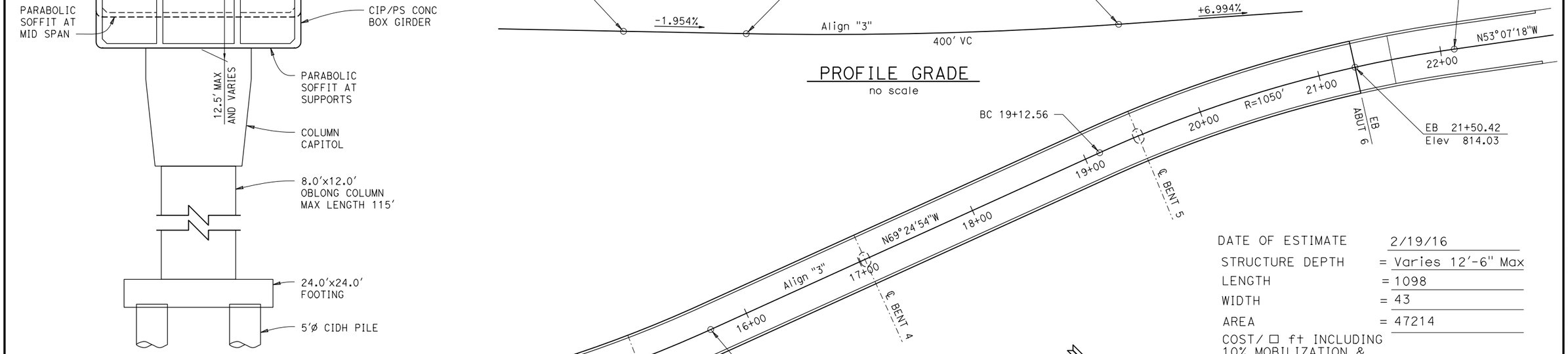
DEVELOPED ELEVATION
1" = 40′



TYPICAL SECTION
1/8" = 1′-0"



PROFILE GRADE
no scale



PLAN
1" = 40′

DATE OF ESTIMATE	2/19/16
STRUCTURE DEPTH	= Varies 12′-6" Max
LENGTH	= 1098
WIDTH	= 43
AREA	= 47214
COST/ □ ft INCLUDING 10% MOBILIZATION & 25% CONTINGENCY	= $ 472
TOTAL COST	= $ 22,300,000

DESIGNED BY	R. Simmons	DATE 12/2015
DRAWN BY	T. Mason	DATE 12/2015
CHECKED BY	I. Cherniogio	DATE 12/2015
APPROVED		DATE

ORIGINAL SCALE IN INCHES 0 1 2 3

STRUCTURE DESIGN BRANCH 17

LAST CHANCE GRADE
PLANNING STUDY
BRIDGE 3a - Align."3"

UNIT: 3586	BRIDGE No. N/A
SCALE: as noted	PROJECT No. & PHASE: 01 1500 0099 K

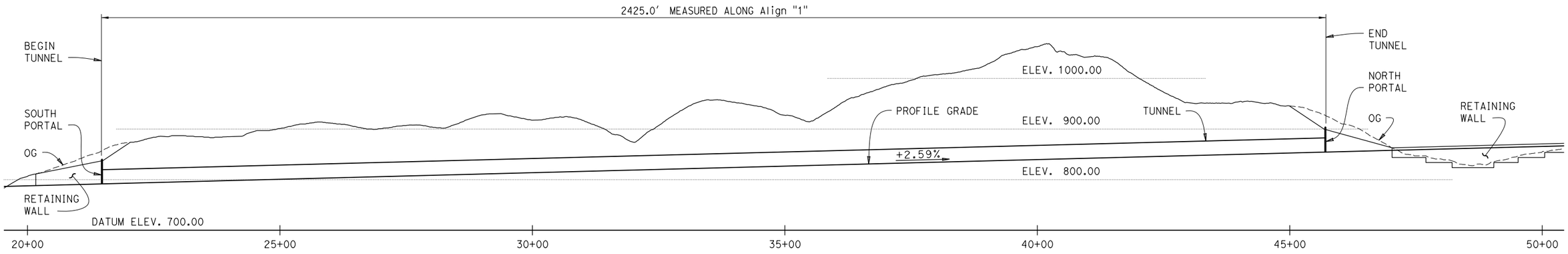
CONTRACT No.: 01-0F280K

USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:44

FILE => aps-01-0f280k_Align-3 Bridge 3a.dgn

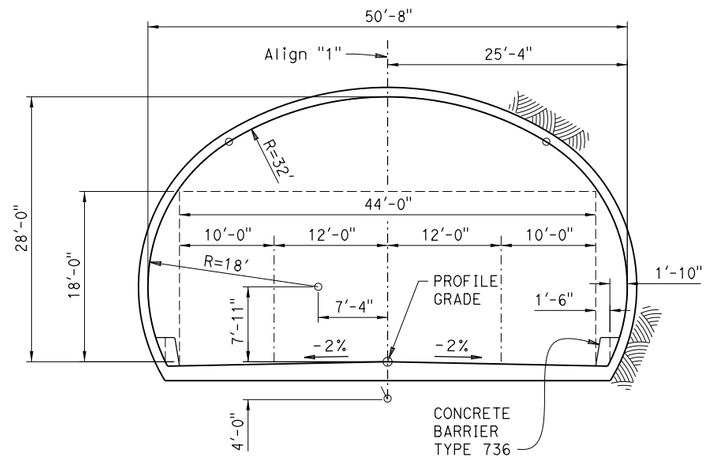
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST	COUNTY	ROUTE	POST MILE
01	DN	101	X



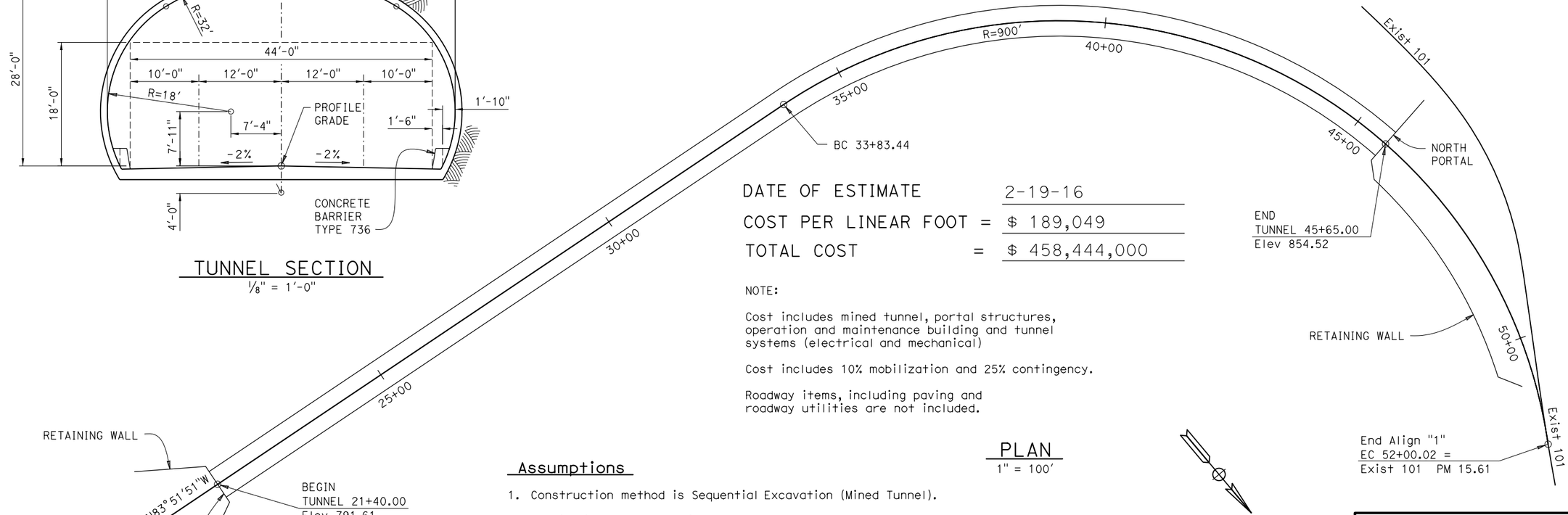
DEVELOPED LONGITUDINAL SECTION

1" = 100'



TUNNEL SECTION

1/8" = 1'-0"



PLAN

1" = 100'

DATE OF ESTIMATE		2-19-16
COST PER LINEAR FOOT	=	$ 189,049
TOTAL COST	=	$ 458,444,000

NOTE:

Cost includes mined tunnel, portal structures, operation and maintenance building and tunnel systems (electrical and mechanical)

Cost includes 10% mobilization and 25% contingency.

Roadway items, including paving and roadway utilities are not included.

Assumptions

1. Construction method is Sequential Excavation (Mined Tunnel).
2. Ventilation by Forced Air System.
3. Details of Fire Safety/Suppression System, Electrical and Mechanical Systems and Drainage Systems are unknown.
4. Need and scope of an Operating Facility is unknown.

DESIGNED BY	R. Simmons	DATE 12/2015
DRAWN BY	T. Mason	DATE 12/2015
CHECKED BY	I. Cherniaglo	DATE 12/2015
APPROVED		DATE

ORIGINAL SCALE IN INCHES 0 1 2 3

STRUCTURE DESIGN BRANCH 17

LAST CHANCE GRADE
PLANNING STUDY
TUNNEL No.1 - Align."1"

UNIT: 3586	BRIDGE No. N/A
SCALE: as noted	PROJECT No. & PHASE: 01 1500 0099 K

CONTRACT No.: 01-0F280K

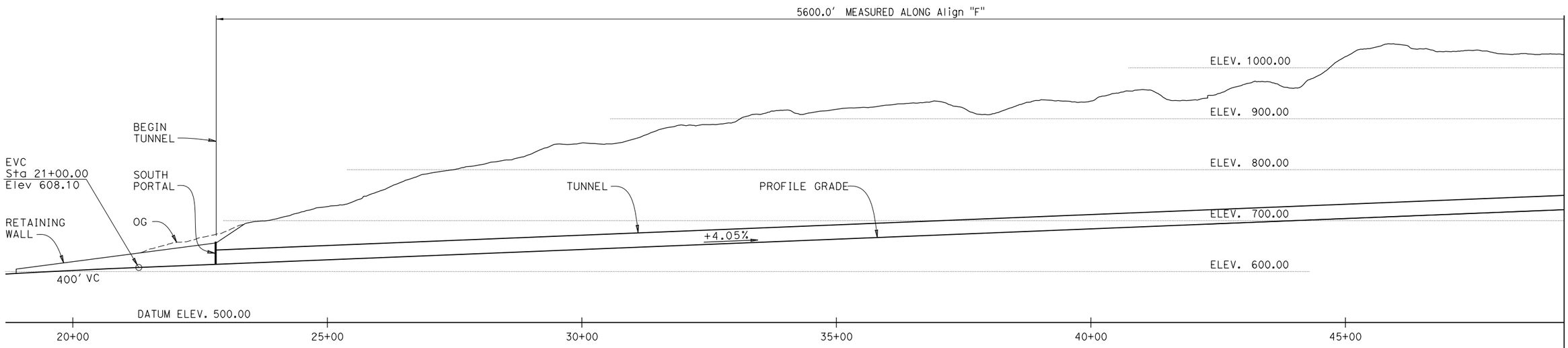
USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:45

FILE => aps-01-0f280k_Tunnel 1 Align-1.dgn

STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 08-09-10)

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST	COUNTY	ROUTE	POST MILE
01	DN	101	X



DEVELOPED LONGITUDINAL SECTION
1" = 100'

DATE OF ESTIMATE 2-19-16

COST PER LINEAR FOOT = $ 174,655

TOTAL COST = $ 978,070,000

NOTE:

Cost includes mined tunnel, portal structures, operation and maintenance building and tunnel systems (electrical and mechanical)

Cost includes 10% mobilization and 25% contingency.

Roadway items, including paving and roadway utilities are not included.

Match Line A

PLAN
1" = 100'

ORIGINAL SCALE IN INCHES 0 1 2 3

DESIGNED BY R. Simmons	DATE 12/2015	STRUCTURE DESIGN BRANCH 17
DRAWN BY T. Mason	DATE 12/2015	
CHECKED BY I. Cherniogio	DATE 12/2015	
APPROVED	DATE	

LAST CHANCE GRADE
PLANNING STUDY
TUNNEL No.2 - Align."F" 1 of 2

UNIT: 3586	BRIDGE No. N/A
SCALE: as noted	PROJECT No. & PHASE: 01 1500 0099 K

CONTRACT No.: 01-0F280K

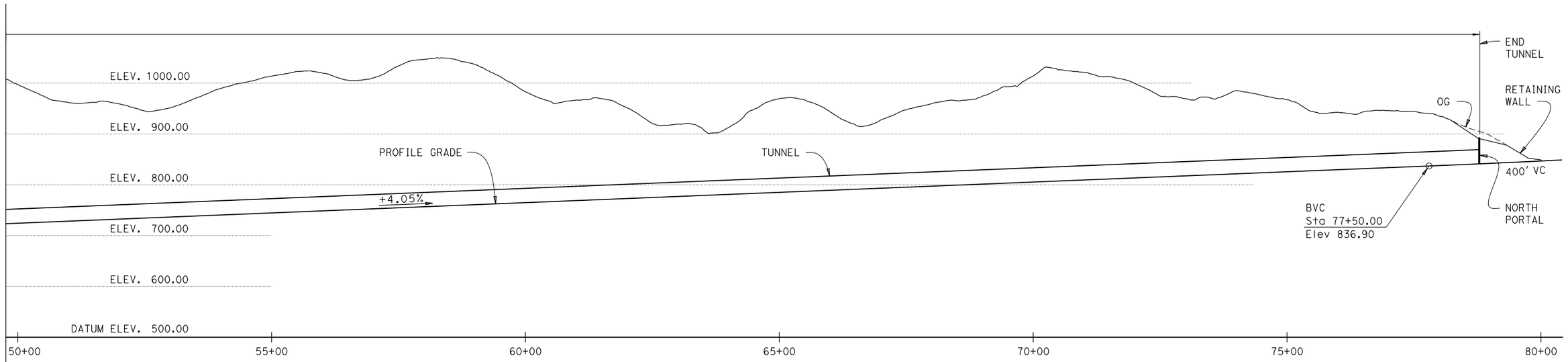
USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:45

STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 08-09-10)

FILE => aps-01-0f280k_Tunnel 2 Align-F-1-01.dgn

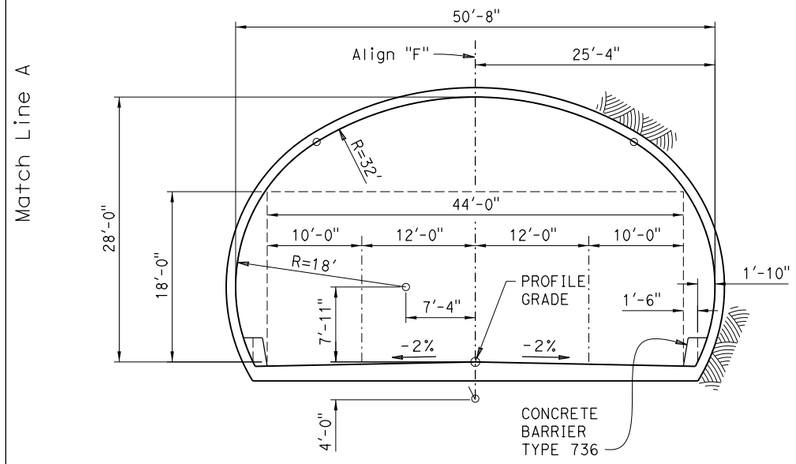
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST	COUNTY	ROUTE	POST MILE
01	DN	101	X



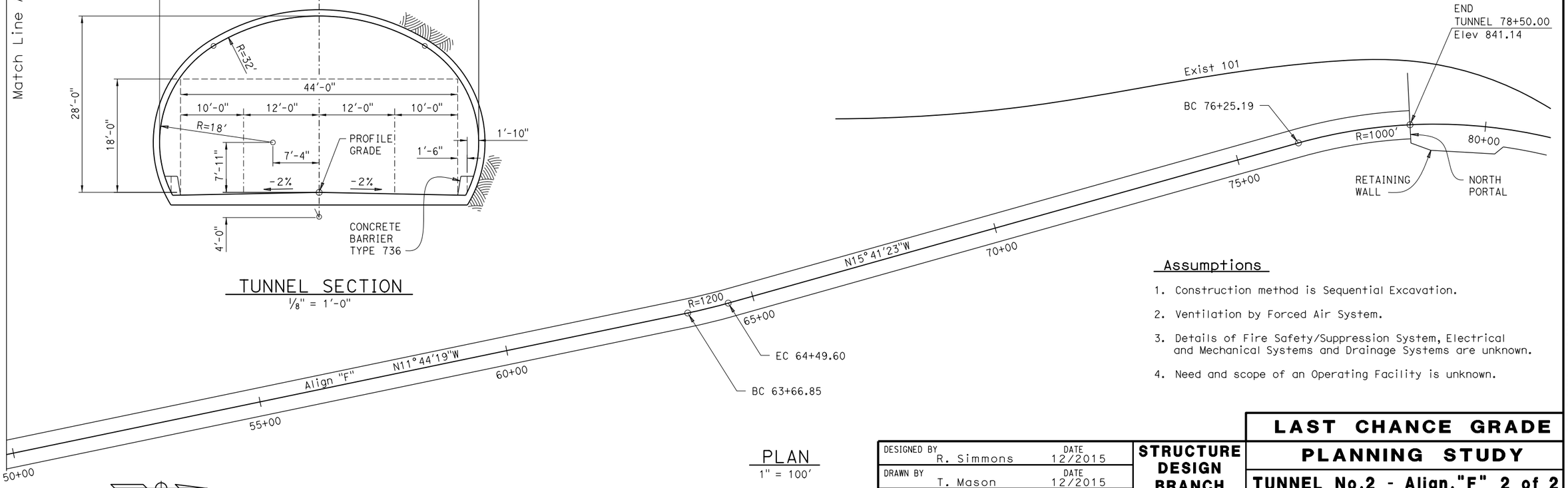
DEVELOPED LONGITUDINAL SECTION

1" = 100'



TUNNEL SECTION

1/8" = 1'-0"



PLAN

1" = 100'

Assumptions

1. Construction method is Sequential Excavation.
2. Ventilation by Forced Air System.
3. Details of Fire Safety/Suppression System, Electrical and Mechanical Systems and Drainage Systems are unknown.
4. Need and scope of an Operating Facility is unknown.

ORIGINAL SCALE IN INCHES 0 1 2 3

DESIGNED BY R. Simmons	DATE 12/2015	STRUCTURE DESIGN BRANCH 17
DRAWN BY T. Mason	DATE 12/2015	
CHECKED BY I. Cherniogio	DATE 12/2015	
APPROVED	DATE	

LAST CHANCE GRADE
PLANNING STUDY
TUNNEL No.2 - Align."F" 2 of 2

UNIT: 3586	BRIDGE No. N/A
SCALE: as noted	PROJECT No. & PHASE: 01 1500 0099 K

CONTRACT No.: 01-0F280K

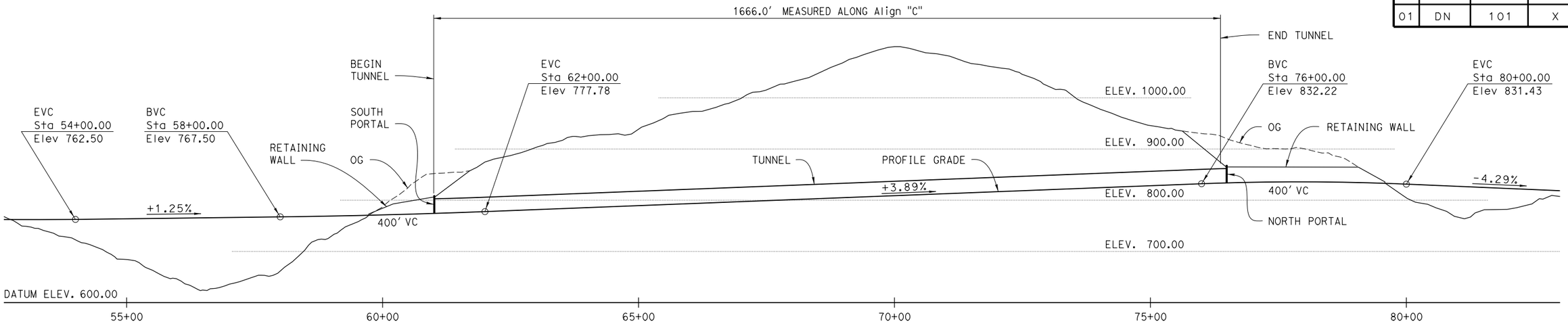
USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:45

FILE => aps-01-0f280k_Tunnel 2 Align-F-1-02.dgn

STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 08-09-10)

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST	COUNTY	ROUTE	POST MILE
01	DN	101	X



DATE OF ESTIMATE 2-19-16

COST PER LINEAR FOOT = $ 201,658

TOTAL COST = $ 335,962,000

NOTE:

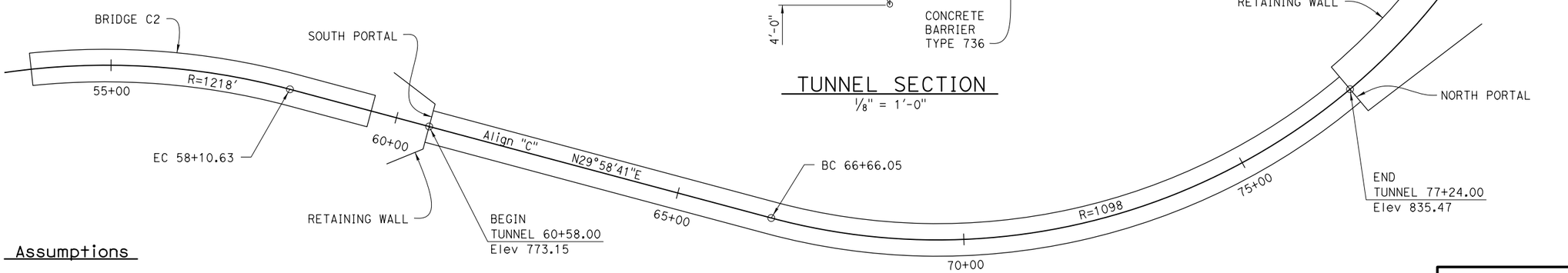
Cost includes mined tunnel, portal structures, operation and maintenance building and tunnel systems (electrical and mechanical)

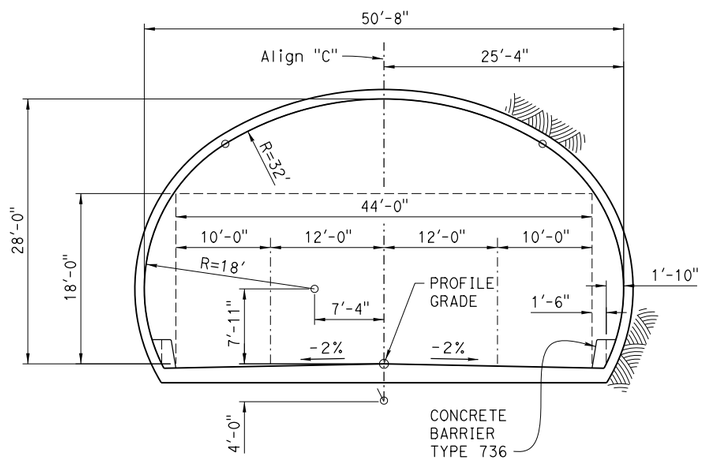
Cost includes 10% mobilization and 25% contingency.

Roadway items, including paving and roadway utilities are not included.

DEVELOPED LONGITUDINAL SECTION

1" = 100'





TUNNEL SECTION

1/8" = 1'-0"

Assumptions

1. Construction method is Sequential Excavation.
2. Ventilation by Forced Air System.
3. Details of Fire Safety/Suppression System, Electrical and Mechanical Systems and Drainage Systems are unknown.
4. Need and scope of an Operating Facility is unknown.

PLAN

1" = 100'

ORIGINAL SCALE IN INCHES 0 1 2 3

DESIGNED BY R. Simmons	DATE 12/2015	STRUCTURE DESIGN BRANCH 17
DRAWN BY T. Mason	DATE 12/2015	
CHECKED BY I. Cherniglo	DATE 12/2015	
APPROVED	DATE	

LAST CHANCE GRADE
PLANNING STUDY
TUNNEL No.3 - Align."C"

UNIT: 3586	BRIDGE No. N/A
SCALE: as noted	PROJECT No. & PHASE: 01 1500 0099 K

CONTRACT No.: 01-0F280K

FILE => aps-01-0f280k_Tunnel 3 Align-C .dgn

USERNAME => s117840 DATE PLOTTED => 29-FEB-2016 TIME PLOTTED => 14:45

STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (ENGLISH) (REV. 08-09-10)

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Serious drought
Help Save Water!

To: MR. GUDMUND SETBERG
Office Chief
Office of Bridge Design North

Date: February 25, 2016

Attention: Gary Joe
Rodney Simmons

File: 04-DN-101 (PM 12.57/22.7)
EA 01-0F280K
E-FIS 0115000099
Last Chance Grade Bypass

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Subject: **STRUCTURE PRELIMINARY GEOTECHNICAL REPORT FOR LAST CHANCE GRADE BYPASS - TUNNELS**

This memo is in response to your request for preliminary foundation recommendations for the structures in the proposed Last Chance Grade Bypass project. The project is on Route 101, between Eureka and Crescent City along the North Coast of California (Figure 1). This report only covers the proposed tunnel structures. The proposed bridges are covered in a separate report.

1. SCOPE OF WORK

Currently, six alternative realignments are under consideration for the new bypass. Mr. Charlie Narwold from Branch F of Geotechnical Design West (previously Branch B of Geotechnical Design North) prepared a Preliminary Geotechnical Report on February 25, 2015 (attached). That report discussed the geology and observations in the vicinity of the proposed realignments. In this report, we provide more details on site geology and tunnel structures. Additional discussions about the proposed bridges will be provided in a separate report.

2. PROJECT DESCRIPTION

US Route 101 along Last Chance Grade is a two lane roadway traversing steep coastline. The highway is bordered to the east by Del Norte Coast Redwood State Park. In recognition of the

rare ecosystem found in the park, the United Nations designated it a World Heritage Site (WHS) on September 5, 1980 and an International Biosphere Reserve on June 30, 1983.

The highway has for years been plagued by numerous landslides and has been the site of various repairs to maintain the route, especially between PM 14.3 and 15.6. This project proposes to bypass the slide-prone segment of the existing alignment with a new alignment. Six alternatives are labeled A-1, A-2, F, C-3, C-4, and C-5 respectively. Each of these alignments consists of new roadway and new structures. Alignment F traverses the Del Norte Coast Redwoods State Park. The other alignments are partially within the State Park and partially within private properties owned by logging companies. Segments within the Park property will have severe access issues, while those outside the park may be accessed by limited logging roads.

Construction of the tunnels will use the Sequential Excavation Method (also known as the New Austrian Tunnel Method), with cut-and-cover sections of tunnel at each portal. Proposed tunnel geometries include two 12-feet lanes and 10-feet shoulders on either side. Further description of the three tunnels involved in the alternatives are summarized below.

Table 1. Tunnel Structures Involved in Alternative Realignments

Tunnel	Alignment	Length (ft)	South Portal Elev. (ft)	North Portal Elev. (ft)	Gradient
1	A-1	2425	791.61	854.52	2.59%
2	F	5600	614.17	841.14	4.05%
3	C-3, C-4, C-5	1666	773.15	835.47	3.89%

We studied the following materials for preparation of this SPGR:

- California Geological Survey (CGS) Special Report 184: Landslides in The Highway 101 Corridor Between Wilson Creek and Crescent City, Del Norte County, California (Wills, 2000)

- Documents relating to the Last Chance Grade project history and realignment available through District 1 (http://www.dot.ca.gov/dist1/d1projects/last_chance_grade/).

3. EXCEPTION TO POLICY

There is no known exception to Department policy relating to investigation or design of the realignments.

4. FIELD INVESTIGATION AND TESTING PROGRAM

No geotechnical investigation has been conducted along any of the alternative realignments. See Section 12 below for more information.

5. LABORATORY TESTING PROGRAM

No laboratory testing has been conducted for the current project. See Section 12 below for more information.

6. SITE GEOLOGY AND SUBSURFACE CONDITIONS

California Geological Survey Special Report 184, Landslides in the Highway 101 Corridor between Wilson Creek and Crescent City, Del Norte County, California (2000) includes a geologic map and a landslide map that encompasses the proposed realignments. The maps are based on a compilation of previous mapping, interpretation of aerial photographs and field mapping. The landslides identified in the landslide map are classified and mapped based on their geomorphology. Detailed geotechnical data required to evaluate the probability of movement of the landslides were not collected as part of the investigation. Figure 2 presents geology.

The geologic map indicates bedrock beneath the proposed alignments is either Franciscan Complex Broken Formation or Franciscan Complex Mélange. The Broken Formation typically consists of hard sandstone blocks separated by weak beds of shale and shear zones. Landslides within the Broken Formation tend to be deep seated. The Northern and Southern Last Chance Grade Landslides along the existing Highway 101 alignment are located within the Broken Formation. The Mélange typically consists of highly sheared shale and argillite. Landslides in the Mélange are typically earthflows. The existing Highway 101 alignment immediately north of Wilson Creek is located within an active earthflow. The remaining mapped portion are alluvium deposits within the active stream channels, which consist of unconsolidated sand and gravels.

The geology associated with each tunnel is listed below:

Tunnel 1: Traverses roughly southeast to northwest and straddles the Franciscan Mélange (eastern section) and the Broken Formation (western section). The proposed north portal will be located within the active earthflows of Last Chance Grade.

Tunnel 2: Traverses south to north through the Broken Formation. Both the proposed south and north portals will be located in active earth flows of Last Chance Grade.

Tunnel 3: Traverses roughly south to north through Franciscan Mélange. The proposed north portal will be located within a mapped landslide of unknown age or activity.

7. SCOUR EVALUATION

Scour does not apply to tunnels.

8. CORROSION EVALUATION

No corrosion data is available at this time.

9. PRELIMINARY SEISMIC STUDY

Seismicity information was not requested at this time.

10. AS-BUILT FOUNDATION DATA

No as-built structure information is available along any of the alternative alignments.

11. PRELIMINARY FOUNDATION RECOMMENDATIONS

As described in Section 6 above, the north portal of Tunnel 1 and both portals of Tunnel 2 are located in active earth flow zones. The north portal of Tunnel 3 is located in a potentially active landslide zone. However, the available geology information is not sufficient to determine whether any of these three alternatives is feasible or not. A more comprehensive feasibility study is needed to determine the viability of each alternative. Note that a tunnel alignment is generally easier to adjust to avoid geologically hazardous areas.

12. ADDITIONAL FIELD WORK AND LABORATORY TESTING

Several additional reports are necessary for the design and construction of the proposed tunnel(s). These include Geotechnical Design Report for the tunnel(s) as well as separate Foundation Reports for the portals, and a Geotechnical Baseline Report. It is assumed that these reports will be completed by a consultant with expertise in tunneling. The following is a general discussion of field and laboratory work necessary for these reports.

Field Mapping

Geologic mapping of the surface geology will be completed for each tunnel, portal, and surrounding area. This mapping will determine extent of geologic formations present at the surface, determine geologic structures that may impact the tunnel at depth, identify discontinuity features in the rock formations that impacts behavior of the rock at depth (joint orientations, etc.).

Drilling and In Situ Testing

Drilling and sampling of the subsurface is necessary to characterize the strength parameters of geologic formations along the tunnel alignments and provide data for the design of initial and final tunnel lining. At least one hole at each portal is necessary for the portal design, and perhaps more depending on the complexity of the design and nature of the subsurface. Sampling at portals could include Standard Penetration Testing (SPT), rock core, as well as bulk samples. Testing could include any standard test for the design and construction of retaining walls: unconfined compression testing, Rock Quality Designation (RQD), corrosion, consolidation, etc.

For tunnel design, drilling will be done from along the alignment at the surface. Drilling may be vertical or inclined, depending on the structure of the geologic material. Drilled holes can be up to 1000 feet in length, however, it may be more economical to include more, shorter holes as core recovery and in situ testing can be time consuming in very long drill holes. At each portal, horizontal holes may be drilled along the proposed alignment. Rock cores will be logged and described focusing on weathering, discontinuities, rock hardness, RQD, and rock strength. Sampling will focus on rock cores for further strength testing. In situ analyses may include modulus determination to evaluate ground behavior and packer testing to evaluate rock permeability.

Reporting

Reports will include a Geotechnical Data Report and Geotechnical Design Reports, Hydraulics Reports, Seismic Design, a Geotechnical Baseline Report and others. The reports provide the analyses for estimating rock behavior during excavation of the tunnel opening, design of the initial lining, and design of the final lining. Geologic formations will be assigned Rock Mass Types (RMT's) based on their engineering properties. Ground Support Categories (GSC's) can then be determined based on anticipated behaviors of similar RMT's. A Geotechnical Baseline Report (GBR) will be used for bidding purposes as well as a basis for unanticipated conditions found in the tunnel during construction. The GBR is common to the tunneling industry. It defines minima and maxima for various rock properties to be used in disputes.

Involvement of Geotechnical Services

Because consultants will provide the bulk of the investigation and tunnel design, the Office of Geotechnical Design will have limited involvement other than oversight. There may be opportunities to partner with the consultants on the investigation. Recently completed tunnel projects in the state have required extensive geotechnical involvement in the early phases, leading to higher than normal oversight hours.

The Preliminary Geotechnical Recommendations included in this report are based on specific project information regarding structure type and structure location that has been provided by the Office of Structure Design Branch 17. If you have any questions or require further information, please contact Matthew Gaffney at (510) 622-1777, Sunny Yang at (510) 286-4808, Chris Risden at (510) 622-8757 or Hooshmand Nikoui at (510) 286-4811.

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State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Serious drought
Help Save Water!

To: MR. GUDMUND SETBERG
Office Chief
Office of Bridge Design North

Date: February 24, 2016

Attention: Gary Joe
Rodney Simmons

File: 04-DN-101 (PM 12.57/22.7)
EA 01-0F280K
E-FIS 0115000099
Last Chance Grade Bypass

From: SUNNY YANG
Transportation Engineer
Office of Geotechnical Design – West
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Division of Engineering Services

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Subject: **STRUCTURE PRELIMINARY GEOTECHNICAL REPORT FOR LAST CHANCE GRADE BYPASS**

This memo is in response to your request for preliminary foundation recommendations for the structures in the proposed Last Chance Grade Bypass project. The project is on Route 101, between Eureka and Crescent City along the North Coast of California (Figure 1). This report only covers the proposed bridge structures. The proposed tunnels are covered in a separate report.

1. SCOPE OF WORK

Currently, six alternative realignments are under consideration for the new bypass. Mr. Charlie Narwold from Branch F of Geotechnical Design West (previously Branch B of Geotechnical Design North) prepared a Preliminary Geotechnical Report on February 25, 2015 (attached). That report discussed the geology and observations in the vicinity of the proposed realignments. In this report, we provided more comments on site geology and bridge foundations, as well as resource estimate for Geotechnical Services. Additional discussions about the proposed tunnels will be provided in a separate report.

2. PROJECT DESCRIPTION

US Route 101 along Last Chance Grade is a two lane roadway traversing steep coastline. The highway is bordered to the east by Del Norte Coast Redwood State Park. In recognition of the

rare ecosystem found in the park, the United Nations designated it a World Heritage Site (WHS) on September 5, 1980 and an International Biosphere Reserve on June 30, 1983.

The highway has for years been plagued by numerous landslides and has been the site of various repairs to maintain the route, especially between PM 14.3 and 15.6. This project proposes to bypass the slide-prone segment of the existing alignment with a new alignment. Each of these alignments consists of new roadway and new structures. The number of structures involved in each of the alternatives are summarized below.

Table 1. Structures Involved in Alternative Realignments

Alternative	Bridges	Tunnels
A-1	One bridge, length 347’	One tunnel, length 2425’
A-2	Two bridges, lengths 344’and 1106’	None
F	None	One tunnel, length 5600’
C-3	Four bridges, lengths 466’ to 1098’	One tunnel, length 1666’
C-4	Five bridges, lengths 466’ to 596’	One tunnel, length 1666’
C-5	Eleven bridges, lengths 150’ to 596’	One tunnel, length 1666’

Alignment F traverses the Del Norte Coast Redwoods State Park. The other alignments are partially within the State Park and partially within private properties owned by logging companies. Segments within the Park property will have severe access issues, while those outside the park may be accessed by limited logging roads.

We studied the following materials for preparation of this SPGR:

- California Geological Survey (CGS) Special Report 184: Landslides in The Highway 101 Corridor Between Wilson Creek and Crescent City, Del Norte County, California (Wills, 2000)
- Documents relating to the Last Chance Grade project history and realignment available through District 1 (http://www.dot.ca.gov/dist1/d1projects/last_chance_grade/).
- As-built LOTBs and geotechnical investigation and design reports from previous projects constructed on the existing alignment within the project limits, available at Caltrans Digital Archive of Geotechnical Data (GeoDOG) and Document Retrieval System.

3. EXCEPTION TO POLICY

There is no known exception to Department policy relating to investigation or design of the realignments.

4. FIELD INVESTIGATION AND TESTING PROGRAM

No geotechnical investigation has been conducted along any of the alternative realignments. Once the new alignment is selected, we will develop a field investigation and testing program to collect field information. See Section 12 below for more information.

5. LABORATORY TESTING PROGRAM

A laboratory testing program will be conducted for the current project. See Section 12 below for more information.

6. SITE GEOLOGY AND SUBSURFACE CONDITIONS

California Geological Survey Special Report 184, Landslides in the Highway 101 Corridor between Wilson Creek and Crescent City, Del Norte County, California (2000) includes a geologic map and a landslide map that encompasses the proposed realignments. The maps are based on a compilation of previous mapping, interpretation of aerial photographs and field mapping. The landslides identified in the landslide map are classified and mapped based on their geomorphology. Detailed geotechnical data required to evaluate the probability of movement of the landslides were not collected as part of the investigation. Figure 2 presents geology.

The geologic map indicates bedrock beneath the proposed alignments is either Franciscan Complex Broken Formation or Franciscan Complex Mélange. The Broken Formation typically consists of hard sandstone blocks separated by weak beds of shale and shear zones. Landslides within the Broken Formation tend to be deep seated. The Northern and Southern Last Chance Grade Landslides along the existing Highway 101 alignment are located within the Broken Formation. The Mélange typically consists of highly sheared shale and argillite. Landslides in the Mélange are typically earthflows. The existing Highway 101 alignment immediately north of Wilson Creek is located within an active earthflow. The remaining mapped portion are alluvium deposits within the active stream channels, which consist of unconsolidated sand and gravels.

The geology associated with each bridge structure is listed in Table 2.

Table 2: Geology at Bridge Locations

Bridge Number	Geology
1a	Mélange
2a	Mélange; north abutment within a shallow slide
2b	Mélange; north abutment within the Broken Formation
C1	Mélange; north abutment within a shallow slide

C2	Mélange
C3	Mélange
3a	Mélange; south abutment within Broken Formation
4a	Mélange; south abutment within Broken Formation
4b	South half within Mélange; north half within a shallow slide
5b	Mélange
5c	Broken Formation
5d	Broken Formation and alluvium deposits
5e	Broken Formation
5f	Broken Formation
5g	Broken Formation

Subsurface Conditions

No subsurface soil data is available at this time. Based on the as-built LOTBs collected from previous projects along the existing alignment, the subsurface materials typically consist of colluvium soils (sand, gravel, clay, silt) with thickness varying from zero to more than 50 feet, underlain by bedrocks of three major types: sandstone, greywacke, and shale. Note that the colluvium soils at the existing alignment are likely landslide debris. On the realignment routes, the bedrock is expected to be near ground surface typically.

Groundwater

No groundwater data is available at this time. Groundwater data will be collected as part of the field investigation program to be developed (see Section 12).

7. SCOUR EVALUATION

No scour information is available at this time. Final scour recommendations should be furnished in the Structure Hydraulics Report for each structure.

8. CORROSION EVALUATION

No corrosion data is available at this time. Corrosion samples will be collected and tested as part of the field and laboratory investigation program to be developed (see Section 12).

9. PRELIMINARY SEISMIC STUDY

Seismicity information was not requested at this time.

10. AS-BUILT FOUNDATION DATA

No as-built structure information is available along any of the alternative alignments. As mentioned above, many retaining wall structures have been built along the existing alignment. Most of these structures used CIDH piles (with or without tiebacks) as foundations.

11. PRELIMINARY FOUNDATION RECOMMENDATIONS

Structure Design has provided us with preliminary plans of the bridge structures and preliminary loads. Refer to Table 2. For all bridges, CIDH pile extension or pile group are a viable foundation choice. CIDH pile construction may encounter the challenge of high groundwater level and the potential of caving in. For cost estimate purposes, the CIDH piles may be assumed 4 to 6 feet in diameter with a length-to-diameter ratio of 20. For smaller bridges, spread footing may also be considered. Driven pile is generally not viable. However, it may be considered if field exploration indicates thick layers of soil materials (alluvium, colluvium) at certain locations.

Some of the bridges also have wing walls / retaining walls near the abutments. For the time being, Standard Caltrans retaining walls with spread footing can be assumed for these walls.

12. ADDITIONAL FIELD WORK AND LABORATORY TESTING

For the Final Foundation Report, a field investigation program will be developed to characterize the site and obtain information concerning subsurface conditions, ground water conditions, corrosion potential, site-specific seismic data and other pertinent geologic information. One mud rotary boring up to 100 feet depth may be required at each foundation support (bents and abutments) of the proposed bridges. The locations of some of the borings will require significant clearing and grading of working pads. Other locations will require the drill rig and support vehicles to be flown in with a helicopter.

Borings should be drilled at or near the proposed support locations to a maximum depth of 100 feet. The subsurface investigation should provide adequate information to describe the soil and rock conditions, and obtain geology and groundwater information for seismic analyses.

Laboratory testing of soil/rock samples may include, but not limited to:

- Corrosion tests
- Strength tests (pocket penetrometer, unconfined compression)
- Index tests (unit weight, water content, gradation, Atterberg limits)
- Consolidation tests

A request for a Foundation Report should include a General Plan (GP), Foundation Plan (FP), and any additional plans available for the proposed structures. The District Project Manager should be aware that several permits will be required to commence the drilling and should plan to schedule sufficient time (a minimum of three months) for obtaining the permits. Encroachment, right of entry and sensitive environmental permits may be required for the drilling in the District/County. In addition to the permits, sufficient time needs to be scheduled for utility clearances, site access and site hazardous assessment reports. If a site hazardous assessment report for soil and groundwater contamination is available, it should be communicated to our Office prior to starting the subsurface investigation.

Estimate of Geotechnical Services Resources Required

The following are resource estimates for the Foundation Reports. The estimated time and duration are based upon the following assumptions:

1) Structure Design will provide all information required by Geotechnical Services.
2) The Department will provide the appropriate resources (funding, staff, and equipment) for the project.
3) The District will provide the necessary support services as stated above.

The tables below present the Geotechnical Services (GS) resource estimate necessary to complete the various alignments. Note that this does not include the tunnel portion of the alignments which will be covered in a separate report. The resource estimate includes cost centers 3650 (Geotechnical Support/Drafting), 3656 (Drilling Services), and 3660 (Geotechnical Design West). The resource estimate does not include cost of C-57 consultation and, if necessary, cost of equipment mobilization and lane closure work. The resource estimate is based on our understanding of the current scope of the project. If scope changes occur, revisions to the estimated hours will be necessary.

Table 3. Alignment A-1: One bridge, 3 borings

Unit		Task												
		100	150	160	185	230	240	250	255	270	275	285	290	Total
GS Support and Drafting	3650	0	0	0	0	0	300	0	0	0	0	0	0	300
Drilling	3656	0	0	0	0	0	480	0	0	0	0	0		480
GDW	3660	40	0	80	80	0	400	40	40	0	200	50	40	970
Total Hours		40	0	80	80	0	1180	40	40	0	200	50	40	1750

Notes: (1) Includes one 100-foot mud rotary borings necessary for each bent and abutment.
(2) Additional cost will be required for clearing and grubbing for drilling service to obtain access to the site
(3) The request for the FR should be forwarded to Geotechnical Services a minimum of twelve (12) weeks before the requested due date.
(4) This estimate is preliminary and is subject to revision.

Table 4. Alignment A-2: Two bridges, 11 borings

Unit		Task												
		100	150	160	185	230	240	250	255	270	275	285	290	Total
GS Support and Drafting	3650	0	0	0	0	0	500	0	0	0	0	0	0	500
Drilling	3656	0	0	0	0	0	1760	0	0	0	0	0		1760
GDW	3660	40	0	80	80	0	1200	40	40	0	200	50	40	1770
Total Hours		40	0	80	80	0	3460	40	40	0	200	50	40	4030

Table 5. Alignment C-3: Four bridges, 17 borings

Unit		Task												
		100	150	160	185	230	240	250	255	270	275	285	290	Total
GS Support and Drafting	3650	0	0	0	0	0	600	0	0	0	0	0	0	600
Drilling	3656	0	0	0	0	0	2720	0	0	0	0	0		2720
GDW	3660	40	0	80	80	0	1600	40	40	0	200	50	40	2170
Total Hours		40	0	80	80	0	5320	40	40	0	200	50	40	5490

Table 6. Alignment C-4: Five bridges, 20 borings

Unit		Task												
		100	150	160	185	230	240	250	255	270	275	285	290	Total
GS Support and Drafting	3650	0	0	0	0	0	700	0	0	0	0	0	0	700
Drilling	3656	0	0	0	0	0	3200	0	0	0	0	0		3200
GDW	3660	40	0	80	80	0	2000	40	40	0	200	50	40	2570
Total Hours		40	0	80	80	0	5900	40	40	0	200	50	40	6470

Table 7. Alignment C-5: Eleven bridges, 42 borings

Unit		Task												
		100	150	160	185	230	240	250	255	270	275	285	290	Total
GS Support and Drafting	3650	0	0	0	0	0	1000	0	0	0	0	0	0	1000
Drilling	3656	0	0	0	0	0	6720	0	0	0	0	0		6720
GDW	3660	40	0	80	80	0	5000	40	40	0	200	50	40	5570
Total Hours		40	0	80	80	0	11720	40	40	0	200	50	40	13290

The Preliminary Geotechnical Recommendations included in this report are based on specific project information regarding structure type and structure location that has been provided by the Office of Structure Design Branch 17. If you have any questions or require further information, please contact Matthew Gaffney at (510) 622-1777, Sunny Yang at (510) 286-4808, Chris Risden at (510) 622-8757 or Hooshmand Nikoui at (510) 286-4811.

c: TJPokrywka, CRisden, MGaffney, HNikoui, CNarwold, Daily File

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