

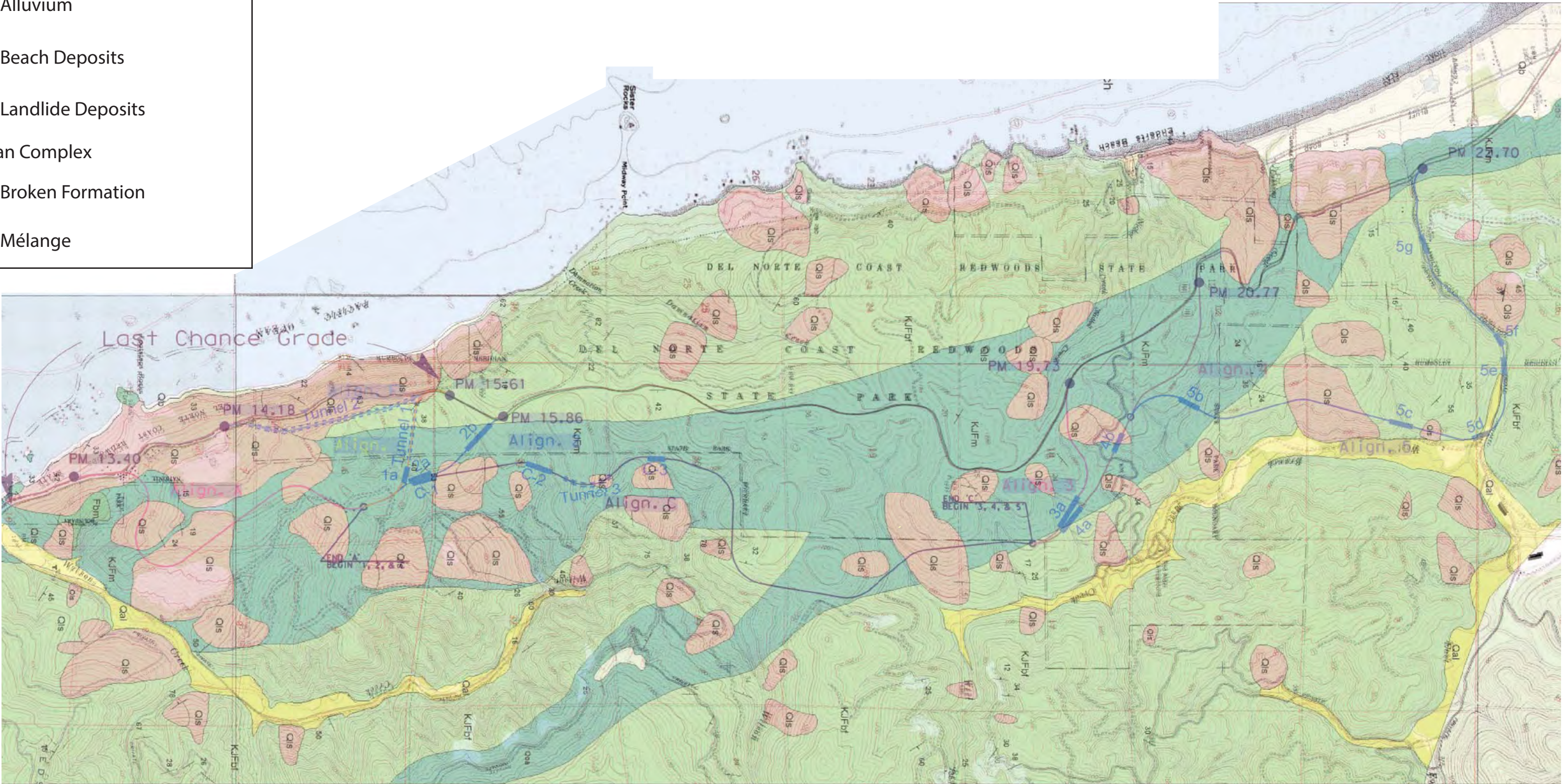
<div data-bbox="1255 1877 1284 1990" data-label="Section-Header"> <p>SCALE</p> </div> <div data-bbox="1300 1772 1325 1982" data-label="Figure"> </div> <div data-bbox="1338 1722 1367 1999" data-label="Text"> <p>0 30 miles</p> </div>	<div data-bbox="1276 1339 1495 1619" data-label="Image"> </div> <div data-bbox="1300 732 1443 1318" data-label="Text"> <p>DIVISION OF ENGINEERING SERVICES GEOTECHNICAL SERVICES GEOTECHNICAL DESIGN - WEST – BRANCH B</p> </div>	<div data-bbox="1260 285 1289 537" data-label="Section-Header"> <p>LOCATION MAP</p> </div> <div data-bbox="1328 144 1357 667" data-label="Text"> <p>01-DN-101 0111000066</p> </div> <div data-bbox="1406 144 1435 667" data-label="Text"> <p>PM 12.5/ 16.3 February 2016</p> </div> <div data-bbox="1476 333 1505 480" data-label="Caption"> <p>FIGURE 1</p> </div>
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KEY

- Qal Alluvium
- Qb Beach Deposits
- Qls Landslide Deposits

Franciscan Complex

- KJFbf Broken Formation
- KJFm Mélange



<div>Reference</div> <div>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)</div>	<div>Scale</div> <div><div></div><div>01 mile</div></div>	<div></div> <div>DIVISION OF ENGINEERING SERVICES GEOTECHNICAL SERVICES GEOTECHNICAL DESIGN - WEST – BRANCH B</div>	Geology	
			01-DN-101	0111000066
			PM 12.5/ 16.3	February 2016
			Figure 2	

DEPARTMENT OF TRANSPORTATION**M e m o r a n d u m**

*Serious drought.
Help Save Water!*

To: Talitha Hodgson
Project Manager

Date: February 25, 2015

File: 01-DN-101-PM 12.5/16.3
EFIS ID: 0114000066
Last Chance Grade EFS

Attn: Jeffrey Pimentel, Project Engineer
Advance Planning

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES
OFFICE OF GEOTECHNICAL DESIGN NORTH

Subject: Preliminary Geotechnical Evaluation of Proposed Realignment

Introduction

This memorandum summarizes the results of a preliminary geotechnical evaluation of the currently proposed realignments of Highway 101 that bypass Last Chance Grade in Den Norte County, California. The proposed realignments are shown on Figures 1 and 2. The information contained in this memorandum is based on a review of existing Caltrans reports, California Geological Survey Special Report 184 (Wills, 2000), the landslide map provided by Green Diamond Resource Company and plan maps, profiles and typical cross sections of the proposed realignments. No field investigation was conducted in preparation of this Memorandum.

This preliminary evaluation focused on identifying existing geologic conditions that could significantly impact the design and performance of the proposed realignments. The intent of this evaluation is to determine if any of the proposed realignments are not feasible based on existing geologic data. A summary of geological conditions identified along the proposed realignments that are considered significant in terms of determining their feasibility is provided in the observations section below.

Geology in the vicinity of the proposed realignments

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 geologic map indicates bedrock beneath the proposed alignments is either Franciscan Complex Broken Formation or Melange. 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 Melange typically consists of highly sheared shale and argillite. Landslides in the Melange are typically earthflows. The existing Highway 101 alignment immediately north of Wilson Creek is located within an active earthflow.

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.

Observations

With the exception of the existing active landslides along the coast, almost all the landslides that the proposed realignments traverse are mapped as probable or questionable, dormant-mature, deep (>50 feet) rockslides (Wills, 2000).

Alternatives A and C between Station 0 and Station 16 are located within an active earthflow and will traverse what is mapped as a probable dormant landslide between approximately Station 26 and Station 42 (Figure 1). The portion of the realignments within the active earthflow will be prone to deformation similar to what is occurring along the existing Highway 101 alignment immediately north of Wilson Creek which requires frequent maintenance. A typical cross section through the probable dormant landslide at approximately Station 37 indicates a 1.5(H):1(V) cutslope would have a vertical height of approximately 200 feet.

Alternative A-1 is a proposed tunnel alignment. The proposed tunnel is approximately 2000 feet in length. Tunnel designs require collecting geotechnical data along the proposed alignment. Horizontal and inclined borings potentially up to 1000 feet in length could be drilled from the ends of the proposed tunnel outside the limits of the continuous old growth Redwood.

Alternative B traverses what is mapped as large probable dormant landslide between approximately Station 56 and Station 87. Portions of Alternatives A, B and C also traverse the

landslide (Figure 1). Review of typical sections at approximately Station 52 and Station 70 along Alternatives A and C indicate a 1.5(H):1(V) cutslope would have a vertical height of approximately 400 feet.

Alternative F is a proposed tunnel alignment. Preliminary cross sections indicate the tunnel would be inboard of the inferred failure surface of the Northern and Southern Last Chance Grade Landslide but the southern portal and a portion of the tunnel would be within the limits of an active earthflow.

Conclusions

The only proposed realignment that does not seem feasible based on a review of available geotechnical data is Alternative F. The southern portal and the portion of the tunnel located within the earthflow would not be feasible unless the potential impacts of the earthflow could be mitigated. In addition, the northern portion of the tunnel and portal would need to be located outside the limits of the northern Last Chance Grade Landslide. It may be possible but an extensive geotechnical investigation would be required to determine if this alternative is feasible.

Cuts on the order of 400 feet in height would be required for some of the currently proposed realignments. The cuts may be feasible from a geotechnical standpoint but may not be practical due to the large excavation volumes. Whether or not landslide mitigation will be required for a given realignment will depend mainly on the stability of the existing slopes, the magnitude of the proposed cuts and fills and the groundwater conditions.

With the exception of Alignment F, there is not sufficient data to determine the feasibility of the proposed realignments based on geotechnical considerations alone. A field investigation that includes subsurface drilling will aid in determining the feasibility of the proposed realignments.

If you have any questions or require additional assistance, please contact me at (707) 445-6036.



CHARLIE NARWOLD
Senior Engineering Geologist
Office of Geotechnical Design North
Branch B



References

Wills, C. J., "California Geological Survey Special Report 184, Landslides in the Highway 101 Corridor between Wilson Creek and Crescent City, Del Norte County, California," 2000.

List of Figures

Figure 1 - Geologic Map of Northern Portion of Proposed Realignment.

Figure 2 - Geologic Map of Southern Portion of Proposed Realignment.

C: Project File

FIGURE 1
GEOLOGIC MAP SHOWING SOUTHERN
PORTION OF PROPOSED REALIGNMENTS

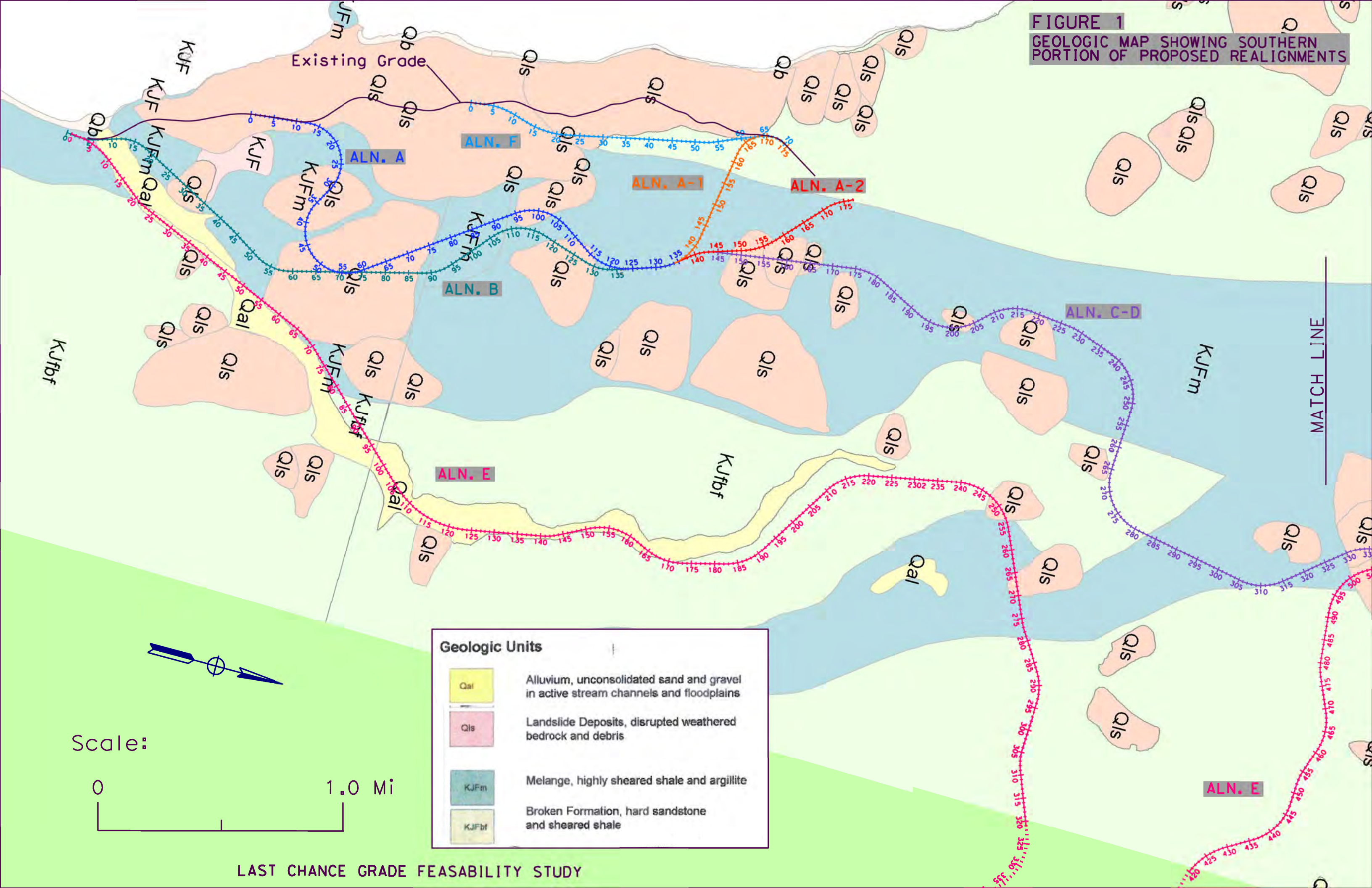


FIGURE 2
GEOLOGIC MAP SHOWING NORTHERN
PORTION OF PROPOSED REALIGNMENTS



ATTACHMENT F
Transportation Management Plan

TRANSPORTATION MANAGEMENT PLAN

To: CARLON SCHRIEVE
Design Engineer
District 1 Advance Planning

Date: January 22, 2016
File: DN-101 PM 13.4/22.8
EA: 01-0F280K
EFIS: 01 1500 0099
Last Chance Grade

From: KEVIN CHURCH, Chief
District 1 Office of Traffic Operations

Project Information

Location: In Del Norte County, near Crescent City, from 0.9 miles north of the Wilson Creek Bridge (#01-0005) to Hamilton Rd.

Type of Work: Construct a bypass.

Anticipated Traffic Control: Reversing traffic control
Intermittent closure
Shoulder closure

Estimated Maximum Delay: 10 minutes during flagging
25 minutes during intermittent closure

Peak Hour Traffic Volumes: 600 vph

Lane Requirement Charts Included: Yes

Closure During Night Hours: Required during tie-ins

Number of Working Days: 2 seasons

PID Date: June 1, 2016

RTL Date: June 19, 2020

District Traffic Manager/ TMP Manager: Kevin Church (707) 445-6377

TMP Coordinator: Paul Hailey (707) 445-5213

Anticipated Traffic Impacts

Significant traffic impacts are not anticipated provided that the following recommendations and requirements are incorporated into the project. In conformance with Deputy Directive-60, District Lane Closure Review Committee approval is not required for projects with anticipated traffic delay less than 30 minutes.

Hours of Work

- See Chart no. 1 “Conventional Highway Lane Requirements” for work hour restrictions.
- The full width of the traveled way must be open for use by public traffic for the following Special Days:

Event	Event Date	Special Days
Sea Cruise	First Weekend in October	Friday through Sunday

The contractor must verify the actual dates for this Special Event. See Chart no. 2 “Lane Closure Restrictions for Designated Holidays and Special Days” for work day restrictions.

Public Notice

- Upon receipt of notice that the total roadway width, including paved shoulder, will be narrowed to less than 16 ft or there is a change in vertical clearance, the Resident Engineer must promptly notify the HQ District 1 Construction Liaison D’Ann Watanabe-Gulling at (916) 322-4822 so annual permit holders can be notified of restrictions.
- The District Public Information Office, (707) 445-6444, must be contacted two weeks in advance of the start of construction.
- Each closure must be entered in the Lane Closure System (LCS; <http://lcs.dot.ca.gov/lcsprod/>).
 - Every Monday by noon, submit a schedule of planned closures for the next week period. The next week period is defined as Friday midnight through the following Friday midnight.
 - Closures must be statused daily with first cone down (1097) and last cone up (1098) or cancelled (1022). Statusing can be accomplished through:

Status With	Day	Time	Contact Number
LCS	Any	Any	-
District 1 Dispatch	Monday-Friday	6am-6pm	(707) 441-5747
District 3 Dispatch	Monday-Friday	6pm-6am	(916) 859-7900
District 3 Dispatch	Saturday and Sunday	Any	(916) 859-7900

- To access the LCS you will need an account. Contact Jeannette Candalot at (707) 445-7807 to get set up with an account.

- Any emergency service agency whose ability to respond to incidents will be affected by any lane closure must be notified prior to that closure.
- Impacts to tribal land during the construction phase must be coordinated with the affected local tribal government and other entities during the design phase. Contact Jaime Hostler, District 1 Native American Liaison, (707) 441-5815.
- Work must be coordinated with the local busing system (including school buses and public systems) to minimize impact on their bus schedules.
- The Resident Engineer must provide information to residents and businesses before and during project work that may represent a negative impact on commerce and travel surrounding the zone of construction. Funding must be included in supplemental funds for public information (Item 066063 Traffic Management Plan – Public Information; consider \$70,000).
- Consider incorporating supplemental funds into the cost estimate for this project for an open house public meeting prior to the construction phase.
- Regarding Traffic Management System (TMS) elements, provide Traffic Electrical and Traffic Census representatives 14 days notice before the pre-construction and post-construction operational status checks. Contact Traffic Electrical at (707) 445-5360 and Traffic Census at (707) 496-0553.

Traffic Control

- One lane closure is permitted within the project limits.
- If stationary mounted construction area signs are used, the W11-1 vehicular traffic sign (bicycle symbol) and the W16-1p supplemental plaque (SHARE THE ROAD) must be placed, in each direction of travel, prior to the construction zone.
- Reversing traffic control must be in conformance with the attached traffic handling plan, “Reversing Control THP.”
 - A minimum of 11 ft of paved roadway must be open for use by public traffic.
 - The maximum length of a reversing traffic control closure is 2,500 ft.
 - Advance flaggers are required during daylight hours. All flaggers must have continuous radio contact with personnel in the work area. Full matrix PCMS boards with the capability of displaying a flagger symbol must be used during hours of darkness when advance flaggers are not present.

- Work that requires a shoulder closure on a conventional highway with approach speeds greater than 50 mph must be in conformance with the Caltrans Revised Standard Plan T-10, “TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS.”
- Work that requires a lane closure on a multilane conventional highway with approach speeds greater than 50 mph must be in conformance with the Caltrans Revised Standard Plan T-10, “TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS.”
 - A minimum of 14 ft of paved roadway in each direction of travel must be open for use by public traffic.
- During the construction of tie-ins between the new bypass and existing Route 101, when reversing traffic control is in effect, the road may be closed and public traffic stopped for periods not to exceed 15 min. After each closure, all accumulated traffic must be allowed to pass through the work before another closure is made.
- A minimum of one PCMS in advance of both ends of the construction site must be required to notify the public of the closures related to this project.
 - Start displaying the message on the PCMS 15 minutes before closing the lane.
- Access to businesses, side roads and residences must be maintained at all times. When work or traffic queues extend through an intersection, additional traffic control will be required at the intersection.
- This section of Highway 101 is part of the Pacific Coast Bike Route. Bicyclists must be accommodated through the work zone. Signage must be used to alert vehicles of the possible presence of bicyclists. During reversing traffic control, bicyclists must be instructed to join the vehicle queue. During lane reduction traffic control, bicyclists must be provided space adjacent to the open traffic lane to traverse through the work zone.
- COZEEP is required for this project during the construction of tie-ins between the new bypass and existing Route 101. The COZEEP requirement is based on risk factors associated with this project and the COZEEP Guidelines (CA DOT Construction Manual Section 2-215C). The associated risk factors include: workers exposed to traffic, night construction activities, speed management, and significant truck volumes.
- The following table lists projects that are anticipated to have closures near this project and must be used to assess cumulative corridor delay.

Contract No.	Co-Rte-PM	Type of Work	Est. Delay (min)
01-0B0904	DN-101-R8.2/8.7	Replace 2 Bridges	10
01-0C6604	DN-101-25.8/27.3	Crescent City Gateway	TBD
01-0F3104	DN-101-39.8	Construct Bridge	10
01-0F6104	DN-101-2.2	Construct bridge	0 (Lane Reduction)
01-436404	DN-101-35.8/36.5	Bridge Replacement	10

Contingency Plan

The contractor must prepare a contingency plan for reopening closures to public traffic. The Contractor must submit the contingency plan for a given operation to the Engineer within one working day of the Engineer's request. Contingencies for unanticipated delays, emergencies, etc. must be coordinated between the RE and the Contractor.

Approval

Approved by:

As Signed By KBC

Approved by:

District Traffic/ TMP Manager

KBC/jnl

CC: 1)KBChurch, 2)JCandalot
SCohen
THodgson
JMcGee
Traffic Safety
PIO

Chart no. 1 Conventional Highway Lane Requirements																																	
County: Del Norte				Route/Direction: 101 NB/SB												PM: 13.4/22.8																	
Closure limits:																																	
From hour to hour				24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
Mondays through Thursdays				I	I	I	I	I	I	I	R	R	R	R	R	R	R	R	R	R	R	R	R	R	I	I	I	I					
Fridays				I	I	I	I	I	I	I	R	R	R	R	R	R	R	R															
Saturdays																																	
Sundays																									I	I	I	I					
<p>Legend:</p> <table border="1"> <tr> <td>R</td> <td>Provide at least one 11 ft through traffic lane for use by both directions of travel (Reversing Control). The maximum closure length is 2,500 ft.</td> </tr> <tr> <td>I</td> <td>Provide at least one 11 ft through traffic lane for use by both directions of travel (Reversing Control). The maximum closure length is 2,500 ft. A 15 minute intermittent closure is allowed during the tie-in of the new bypass to existing Route 101.</td> </tr> <tr> <td></td> <td>No lane and/or shoulder closures allowed.</td> </tr> </table>																												R	Provide at least one 11 ft through traffic lane for use by both directions of travel (Reversing Control). The maximum closure length is 2,500 ft.	I	Provide at least one 11 ft through traffic lane for use by both directions of travel (Reversing Control). The maximum closure length is 2,500 ft. A 15 minute intermittent closure is allowed during the tie-in of the new bypass to existing Route 101.		No lane and/or shoulder closures allowed.
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	No lane and/or shoulder closures allowed.																																
REMARKS: The full width of the traveled way must be open for use by public traffic when construction operations are not actively in progress.																																	

Chart no. 2: Lane Closure Restrictions for Designated Holidays and Special Days

[illegible]

Legend:

	Refer to lane requirement charts
XX	The full width of the traveled way must be open for use by public traffic.
H	Designated Holiday
SD	Special Day

NOTES:

1. CALIFORNIA CODES ARE DESIGNATED BY (CA). OTHERWISE, FEDERAL (MUTCD) CODES ARE SHOWN.
2. ALL SIGNS SHALL HAVE A BLACK LEGEND ON FLUORESCENT ORANGE BACKGROUND AND SHALL BE EQUIPPED WITH AT LEAST TWO 16" x 16" ORANGE FLAGS FOR DAYTIME CLOSURE OR FLASHING BEACONS FOR LANE CLOSURE DURING HOURS OF DARKNESS.
3. ALL CONES USED FOR LANE CLOSURES DURING THE HOURS OF DARKNESS SHALL BE FITTED WITH RETROREFLECTIVE BANDS OR SLEEVES.
4. WHEN A PILOT CAR IS USED, PLACE A C37 (CA) SIGN AT ALL INTERSECTIONS WITHIN TRAFFIC CONTROL AREA. WHERE VEHICULAR TRAFFIC CAN NOT EFFECTIVELY SELF-REGULATE, AT LEAST ONE FLAGGER SHALL BE USED AT EACH INTERSECTION WITHIN THE TRAFFIC CONTROL AREA.
5. FLAGGER SHOULD STAND IN A CONSPICUOUS PLACE, FACING TRAFFIC AT ALL TIMES, BE VISIBLE TO APPROACHING TRAFFIC AS WELL AS APPROACHING VEHICLES AFTER THE FIRST VEHICLE HAS STOPPED.
6. ADDITIONAL ADVANCE FLAGGERS ARE REQUIRED DURING HOURS OF DAYLIGHT.
A FULL MATRIC PCWS IN PLACE OF EACH ADVANCE FLAGGER REQUIRED DURING HOURS OF DARKNESS.
7. WHEN FLAGGER IS NOT VISIBLE FROM THIS LOCATION PLACE A C29 (CA) SIGN BELOW THE C9A (CA) SIGN.

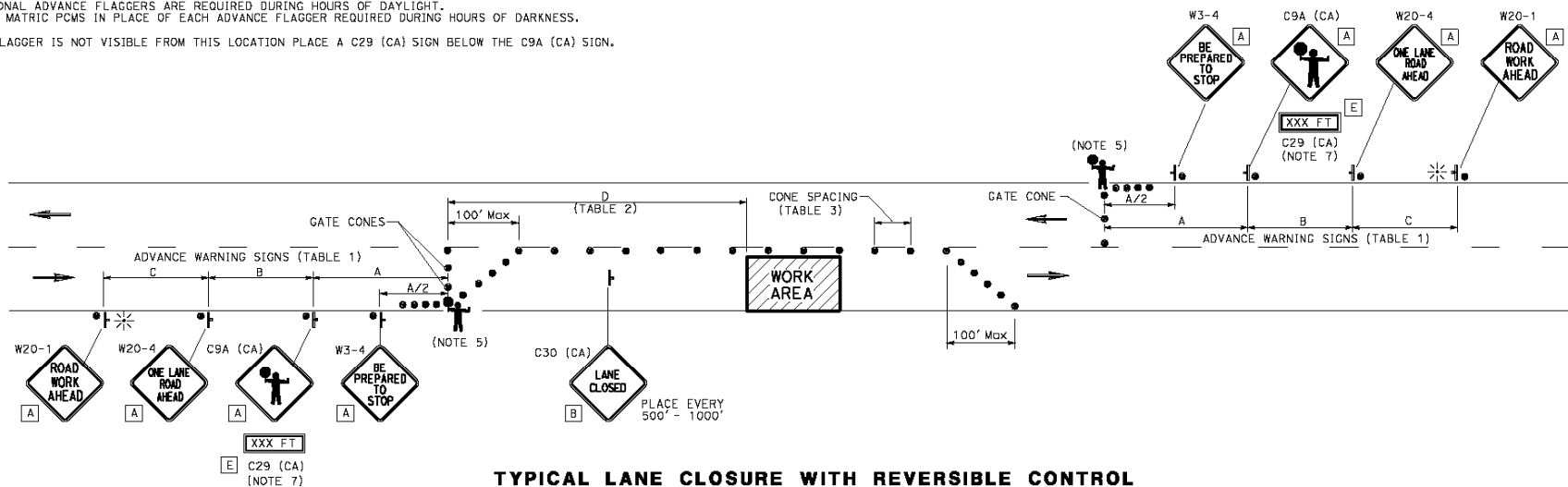
LEGEND

- TRAFFIC CONE
- TEMPORARY SIGN
- DIRECTION OF TRAVEL
- ✱ PORTABLE FLASHING BEACON
- 🚧 FLAGGER

SIGN PANEL SIZE (MINIMUM)

- A 48" x 48" - SPEED OF 45 mph OR MORE
36" x 36" - SPEED LESS THAN 45 mph
- B 30" x 30"
- C UNUSED
- D UNUSED
- E 20" x 7"

Dist	COUNTY	ROUTE	POST MILES	SHEET TOTAL
01	X	X	X	No. SHEETS
SHERI M. RODRIGUEZ			11-13-15	REGISTERED CIVIL ENGINEER
Month Day, Year			DATE	
PLANS APPROVAL DATE				
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SHOWN COPIES OF THIS PLAN SHEET.				



TYPICAL LANE CLOSURE WITH REVERSIBLE CONTROL

TABLE 1

ADVANCE WARNING SIGN SPACING

ROAD TYPE	Min A	Min B	Min C
	ft		
URBAN (25 mph OR LESS)	100	100	100
URBAN (30 mph TO 40 mph)	250	250	250
URBAN (MORE THAN 40 mph)	350	350	350
RURAL	500	500	500
EXPRESSWAY / FREEWAY	1000	1500	2640

TABLE 2

BUFFER SPACE

APPROACH SPEED	Min D	DOWNGRADE Min D		
		-3%*	-6%*	-9%*
mph		ft		
25 & BELOW	155	158	165	173
30	200	205	215	227
35	250	257	271	287
40	305	315	333	354
45	360	378	400	427
50	425	446	474	507
55	495	520	553	593
60	570	598	636	686
65	645	682	728	785

* USE ON SUSTAINED DOWNGRADE STEEPER THAN -3 PERCENT AND LONGER THAN 1 MILE.

TABLE 3

Max CONE SPACING

POSTED SPEED	TAPER	TANGENT	CONFLICT*
mph		ft	
20	20	40	10
25	25	50	12
30	30	60	15
35	35	70	17
40	40	80	20
45	45	90	22
50	50	100	25
55	55	110	27
60	60	120	30
65	65	130	32

* USE WHERE THERE IS A CONFLICT BETWEEN EXISTING PAVEMENT MARKINGS AND CHANNELIZERS.

TRAFFIC HANDLING PLAN

NO SCALE

TH-1

APPROVED FOR TRAFFIC HANDLING WORK ONLY

ATTACHMENT G
Preliminary Geotechnical Report

DEPARTMENT OF TRANSPORTATION

M e m o r a n d u m

*Serious drought.
Help Save Water!*

To: Talitha Hodgson
Project Manager

Date: April 08, 2016

File: 01-DN-101-PM 12.0/15.5
EA: 01-0F280K
EFIS ID: 0115000099
Last Chance Grade Bypass

Attn: Jeffrey Pimentel, Project Engineer
Advance Planning

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES
OFFICE OF GEOTECHNICAL DESIGN WEST

Subject: Preliminary Geotechnical Report for Last Chance Grade Bypass

1. Introduction

This memorandum summarizes the results of a preliminary geotechnical evaluation of six alternative alignments of Highway 101 currently being considered in order to bypass Last Chance Grade in Del Norte County. The bypass alternatives are A-1, A-2, F, C-3, C-4, and C-5. A map showing the location of the proposed alternatives is provided in Attachment A. A layout and profile of the existing alignment is provided in Attachment B. Plan maps and profiles of the six alternatives are provided in Attachments C, D, E, and F1 through F4.

The information contained in this memorandum is based on a review of existing Caltrans reports, California Geological Survey Special Report 184 (Wills, 2000), existing geomorphic maps, a landslide map provided by Green Diamond Resource Company, and plan maps, profiles and typical cross sections of the proposed alignments. No field investigation was conducted in preparation of this Memorandum.

Preliminary foundation recommendations for the bridges along the proposed alignments are provided in the Structures Preliminary Geotechnical Report for Last Chance Grade Bypass dated February 24th, 2016.

2. Site Geology

California Geological Survey Special Report 184, Landslides in the Highway 101 Corridor between Wilson Creek and Crescent City, Del Norte County, California (2000) includes geologic and landslide maps that encompass the proposed alignments. 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 was not collected as part of the investigation.

A geologic map showing the proposed alignments is provided in Figure 1. The geologic map indicates bedrock beneath the proposed alignments is either Franciscan Complex Broken Formation or Melange. 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 alignment are located within the Broken Formation. The Melange typically consists of highly sheared shale and argillite. Landslides in the Melange are typically earthflows. The existing alignment between Wilson Creek (PM 12.7) and approximately PM 14.4 is located within the limits of an active earthflow.

A geologic map showing geomorphic features related to landsliding is provided in Figure 2. The map shows the locations of what are interpreted to be landslides as well as amphitheater slopes, features formed by landslide processes. The map also depicts disrupted ground, irregular ground surfaces formed by complex landsliding.

3. Geotechnical Investigation

A preliminary geotechnical investigation will be required in order to evaluate the feasibility of the proposed alignments based on geotechnical considerations and develop preliminary recommendations. Initially the investigation will be focused in areas of known or probable instability to aid in determining the extent to which landslide mitigation may be required. Geotechnical information collected during the preliminary investigation will aid in determining the preferred alternative or alternatives. Additional field investigation will be required during the design phase of the project in order to develop final geotechnical recommendations for the planned alternative.

The geotechnical investigation will include field mapping, geotechnical drilling, instrumentation and monitoring, seismic refraction surveys, and laboratory testing. Where possible, geotechnical drilling will occur on existing park and logging roads that intersect or are in close proximity to the alternative alignments. Temporary access roads will be constructed to access some locations. Helicopters will be required to transport drilling equipment to areas where access is restricted. We recommend that airborne Lidar be collected along the alignments of the proposed alternatives. High-resolution digital elevation maps generated by airborne Lidar will facilitate

geologic and geomorphic mapping and identifying areas where detailed field investigations are warranted.

A resource estimate for Geotechnical Services for the preliminary geotechnical investigation will be provided in a separate memorandum.

4. Discussion of Alternatives

Existing Alignment

The existing alignment between Wilson Creek (PM 12.7) and approximately PM 14.4 is within the limits of an active earthflow and requires frequent grinding and paving due to ongoing deformation of the roadway. The proposed alternatives do not bypass the earthflow. The existing alignment within the limits of the earthflow will still need to be maintained after the bypass is constructed. Geologic mapping of this area and a subsurface investigation including instrumentation and monitoring should be considered in order to evaluate options for mitigation of the earthflow.

Alternatives A-1, A-2 and C3-C5

All the alternatives with the exception of Alternative F, have the same alignment between Station 0+00 and approximately Station 124+00. Between Station 0+00 and approximately Station 16+00, Alternatives A-1, A-2, and C3-C5 are located within the limits of an active earthflow. The proposed roadway will be prone to deformation similar to what is occurring along the existing alignment between PM 12.7 and 14.4. Investigation of this area will be required in order to evaluate options for mitigation of the earthflow.

Alternatives A-1, A-2, and C3-C5 between approximately Station 26+00 and Station 76+00 are located within the limits of what are mapped as probable dormant mature landslides. Large cuts and fills are proposed throughout this section. In addition to the landslides located between Stations 26+00 and 76+00, alternatives A-1, A-2 and C3-C5 traverse numerous mapped landslides along the proposed alignments.

With the exception of the existing active earthflow located between Stations 0+00 and 16+00, almost all the landslides that the proposed alignments traverse are mapped as probable or questionable, dormant-mature, deep (>50 feet) rockslides.

Whether or not landslide mitigation will be required for a given landslide will depend on the stability of the existing slope, the magnitude of the proposed cuts and fills within the limits of the mapped landslide and the location of the cuts and fills with respect to the head or toe of the landslide. Areas of known or probable instability along the proposed alignments will be investigated in order to determine if landslide mitigation is required.

Based on existing geologic mapping and review of preliminary cross sections, the alignment of the tunnel proposed in Alternative A-1 is outside the limits of the Northern Last Chance Grade

Landslide. A detailed field investigation will be required in order to verify the location of the proposed tunnel with respect to the Northern Last Chance Grade Landslide.

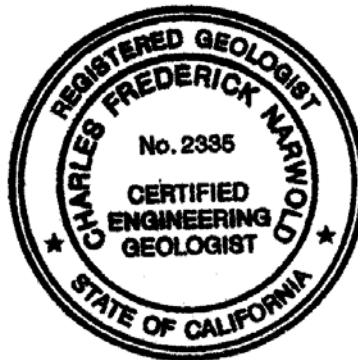
Alternative F

Alternative F is a tunnel alignment that parallels the existing highway. Alternative F departs the existing alignment at approximately PM 14.2. Based on existing geologic mapping and a review of preliminary cross sections, the tunnel is outside the limits of the Wilson Creek Landslide and the Southern and Northern Last Chance Grade Landslides. However, the southern portal and a portion of the tunnel are within the limits of an active earthflow. A detailed field investigation will be required in order to verify the location of the tunnel with respect to the aforementioned landslides and to evaluate options for stabilization the earthflow. This alternative may not be viable unless the potential impacts of the earthflow can be mitigated.

If you have any questions or require additional assistance, please contact me at (707) 445-6036.



CHARLIE NARWOLD
Senior Engineering Geologist
Office of Geotechnical Design West
Branch F



References

Davenport, C.W., 1984, DMG Open-File Report 84-07, Geology and Geomorphic Features Related to Landsliding, Childs Hill 7.5' Quadrangle, Del Norte County, California Scale 1:24,000.

Davenport, C.W., 1984, DMG Open-File Report 84-08, Geology and Geomorphic Features Related to Landsliding, Requa 7.5' Quadrangle, Del Norte County, California Scale 1:24,000.

Wills, C. J., "California Geological Survey Special Report 184, Landslides in the Highway 101 Corridor between Wilson Creek and Crescent City, Del Norte County, California," 2000.

List of Figures

Figure 1 - Geologic Map.

Figure 2 - Geomorphic Map.

Attachments

Attachment A - Location Map

Attachment B - Layout and Profile of Existing Grade

Attachment C - Layout and Profile Alternative A-1

Attachment D - Layout and Profile Alternative A-2

Attachment E - Layout and Profile Alternative F

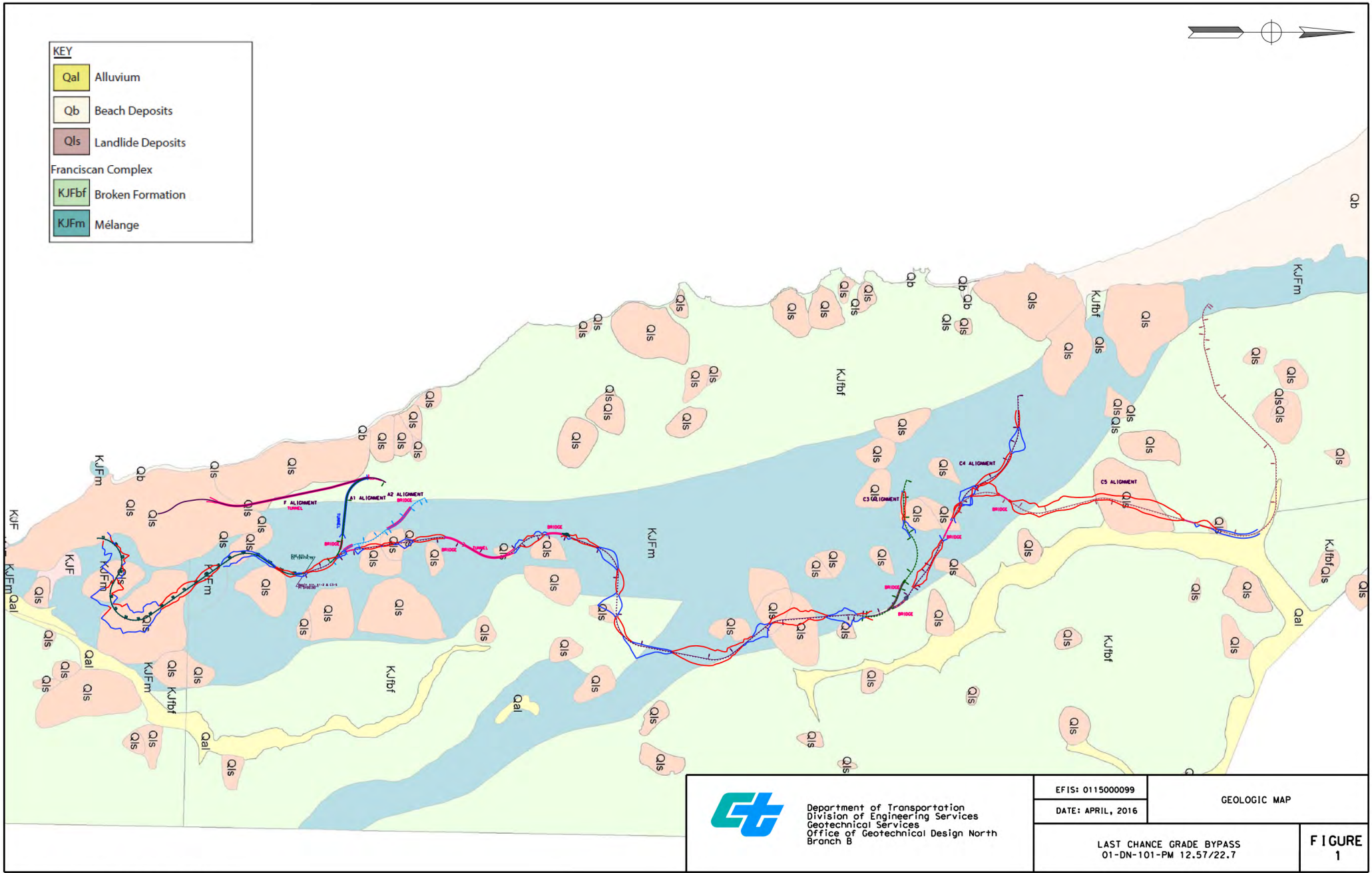
Attachment F1 - Layout and Profile Alternatives C3, C4, and C5 Sheet 1 of 4

Attachment F2 - Layout and Profile Alternative C3, C4, and C5 Sheet 2 of 4

Attachment F3 - Layout and Profile Alternative C3, C4, and C5 Sheet 3 of 4

Attachment F4 - Layout and Profile Alternative C3, C4, and C5 Sheet 4 of 4

C: Project File



Department of Transportation
Division of Engineering Services
Office of Geotechnical Design North
Branch B

EFIS: 0115000099
DATE: APRIL, 2016

GEOLOGIC MAP

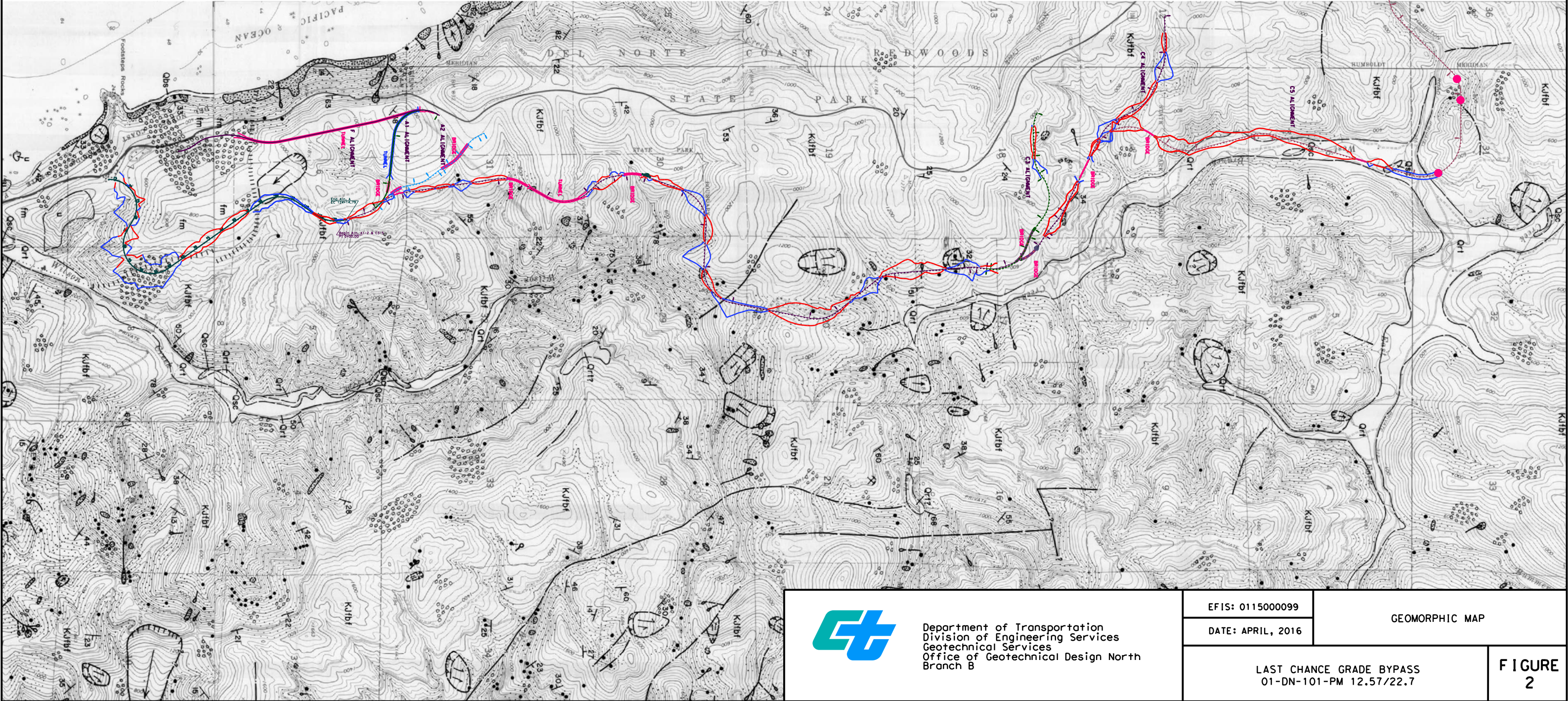
LAST CHANCE GRADE BYPASS
01-DN-101-PM 12.57/22.7

FIGURE
1

Note: alignments are slightly offset with respect to the underlying topographic map.

- Amphitheater Slope
- Disrupted Ground
- Debris Slide (dashed line indicates dormant)

- Translational/Rotational Slide (dashed line indicates dormant)
- Earthflow (dashed line indicates dormant)



Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design North
Branch B

EFIS: 0115000099

DATE: APRIL, 2016

GEOMORPHIC MAP

LAST CHANCE GRADE BYPASS
01-DN-101-PM 12.57/22.7

FIGURE
2

ATTACHMENT H
Community Outreach Summary & Public Engagement Plan

Last Chance Grade

Summary of March 2016 Community Town Halls

Prepared by:



800 Hearst Avenue
Berkeley, CA 94710
April 2016

Last Chance Grade



Table of Contents

I. INTRODUCTION	1
III. METHODOLOGY	2
Outreach Methods	2
Community Town Hall Meetings.....	2
IV. COMMUNITY TOWN HALL PARTICIPATION AND RESULTS.....	5
Community Town Hall Participation.....	5
Community Town Hall Results.....	6

APPENDICES

Appendix A: Outreach Materials

Appendix B: Meeting Materials

Appendix C: Comment Cards

Last Chance Grade

Summary of March 2016 Community Town Halls

I. INTRODUCTION

The “Last Chance Grade” (LCG) is a 3-mile segment of US Highway 101 in Del Norte County, California located between Klamath and Crescent City. Last Chance Grade is an area of highway prone to geological activity. Landslides and road failures have been an ongoing issue for decades and substantial funds have been invested in repairs. The road is currently safe to use, but a long term solution is needed to ensure continued safe and reliable transportation on US 101.

Caltrans, the California Department of Parks and Recreation, the National Park Service, the Yurok Tribe, the Tolowa Dee-ni’ Nation, and the Elk Valley Rancheria entered into a Memorandum of Understanding for the partners to work collaboratively to identify a long-term solution at Last Chance Grade. The partners meet about every 3-4 months to discuss resource issues so they can be addressed early in the planning process as Caltrans prepares the required planning, technical and environmental documents.

During January 2015, the LCG Partners hosted three community workshops presenting possible alternatives for future study, and provided opportunities for stakeholders and the public to submit input regarding the alternatives. In June 2015, Caltrans completed the Last Chance Grade Feasibility Study which identified a full range of alternatives that could provide a long-term solution. Alternatives for this study were developed using design criteria based on constructability, adherence to design standards, and impacts to the environment and sensitive resources. Using the design criteria, a set of fourteen alternatives were studied. These alternatives range from a one-mile long tunnel retreating behind the Last Chance Grade slide, to a 15.5-mile bypass east of the existing US 101 alignment.

Following the Feasibility Study, Caltrans initiated the preparation of the Project Initiation Document (PID), also referred to as the Project Study Report (PSR). The PID is a document that describes the scope, cost, and potential schedule for a transportation project. The PID also narrows down the number of project alternatives to be studied, which allows for a more efficient design and engineering process.

The conditions at Last Chance Grade are complex and there is no alternative that can be achieved without impacts to the significant natural and cultural resources within the project area. As a results, Caltrans is engaged in extensive activities to ensure coordination with the wide variety of federal, state and local agencies and interests who need to be involved. Caltrans has also been meeting with and providing information to area officials regarding the funding needs of the project. Caltrans is limited in its efforts to advance the planning process until funding sources are identified.

II. METHODOLOGY

In March 2016, Caltrans and the Last Chance Grade Partners hosted three community town halls to inform the community on the status of the project and current efforts to ensure the safety of travelers on Last Chance Grade.

Outreach Methods

Participation opportunities were promoted and advertised through a variety of methods including:

- Postcard mailing and e-mail announcements to local residents and updated stakeholder lists and to stakeholder groups including:
 - County, state and city elected officials
 - Local public agencies including transportation, community development and community services agencies
 - Natural resources agencies including State and National Parks, State and National Fish and Wildlife, regional and national coastal and water commissions, and USDA Forest Service
 - Native American Tribes
 - Local and regional public transportation providers
 - Bicycle and pedestrian advocacy groups
 - Safety groups including CHP, CalFire and local fire departments, paramedics and emergency responders
 - Hospitals and clinics
 - Special interest organizations including environmental organizations
 - Chambers of Commerce
 - Local businesses
 - Schools and universities
- Posting on dedicated webpage at www.lastchancegrade.com
- Press releases and media coverage including local and regional online and print newspapers and radio. Local news coverage received included articles in the *Del Norte Triplicate* and *Eureka Times-Standard*.

For more information, see Appendix A, “Outreach Materials.”

Community Town Hall Meetings

Three community town hall meetings were conducted by the Last Chance Grade Partners, with assistance provided by MIG, Inc. on March 22, 23 and 24. MIG is Caltrans’ On-Call contractor whose participation is made available through funding and resources provided through the statewide Public Participation and Engagement Contract.

The workshops were held in the three main communities located along the route: Crescent City, Klamath and Eureka. All workshops were held at ADA-accessible locations. The following workshops were held:

Location	Address	Date and Time
Eureka	Wharfinger Building Great Room Eureka Public Marina, #1 Marina Way Eureka, CA	Tuesday, March 22, 2016 5:30-7:30 p.m.
Crescent City	Del Norte County Fairgrounds Mail Hall Building 421 Highway 101 North Crescent City, CA	Wednesday, March 23, 2016 5:30-7:30 p.m.
Klamath	Yurok Tribal Office Klamath Community Room 190 Klamath Boulevard Klamath, CA	Thursday, March 24, 2016 3:30-5:30 p.m.

Town Hall Format

All three workshops followed the same interactive format, consisting of an open house with multiple stations, staffed by Partner experts to answer attendee's questions, and a presentation by the Caltrans Project Manager on Last Chance Grade.

Each workshop began with a brief open house period. After attendees signed in, they were able to view maps and displays which provided information about the project, the alternatives for a solution currently under consideration, and current efforts to ensure safety on the Grade. The displays were organized into subject matter stations and included the following:

- Introductory LCG information:
 - Location Map showing the location of the project area in relation to Del Norte and Humboldt Counties, local roads, rivers, watersheds and National and State Parks
 - Purpose, need for and description of the Last Chance Grade project
- Project alternatives and current status:
 - Map showing the 6 alternative alignments currently being studied; their position in relation to the existing Last Chance Grade alignment, Highway 101, and State and National Parks; and the topology of the region
 - Matrix comparing details of the alternatives
 - Map with images and information on retaining walls at Last Chance Grade
 - Map of estimated travel delays between Arcata and Crescent City due to project work during Summer 2016
- Geotechnical information:
 - Map of landslides in the project area, with types of landslide specified, shown in relation to Highway 101, existing LCG alignment and alternatives
 - Displays including: typical cross-section of landslide area; horizontal movement at select post miles along slide complex; slide movement and its relation to

recent rainfall at Retaining Wall #3 (most heavily damaged); photograph of “broken formation” common to slide areas

- Environmental and cultural resources:
 - Environmental Resources Map showing the general location of environmental resources including old growth redwoods, coastal zones, state/national parks, watersheds and streams
 - Information regarding tribal cultural resources and federally recognized Tribes participating in the Last Chance Grade partnership
- Information regarding emergency scenarios and funding:
 - Information regarding Caltrans’ Emergency Projects Process, plus requirements and options for Federal emergency relief funding
 - A diagram showing scenarios for emergency repair in the event of small, moderate and large scale slipouts of the road
- Additional general LCG information:
 - Projected Last Chance Grade project timeline
 - List of groups working to support a permanent solution at Last Chance Grade
 - Contact information for the Last Chance Grade project including website address, project team email and phone number

Attendees were also provided with the following handouts:

- Materials packet which included: Agenda, Location Map, Purpose, Need and Description, and Map of Alternatives
- Alternatives Comparison matrix
- Emergency Repair Scenarios diagram
- Comment Card

Information on emergency preparedness for earthquakes and tsunamis was also provided. Last Chance Grade Partner staff experts were available at each station to answer questions.

Presentation

After a fifteen-minute open house period, Caltrans’ Last Chance Grade Project Manager, Sebastian Cohen, made a PowerPoint presentation. The presentation included:

- A summary of the geology of Last Chance Grade including major landslides;
- A history of Last Chance Grade, including details of various emergency events and consequent repair projects undertaken as well as public concern and requests for action, cost history from 1981 to present, completed documents and data on road movement due to seismic activity; and
- An update on the status of the permanent repair project, including alternatives, possible impacts to cultural and environmental resources, likely project timeline,

challenges, emergency project and funding requirements, and stakeholders involved.

Following the presentation, attendees were encouraged to continue visiting the various display stations and get their questions answered one-to-one by the Partner staff experts.

For reproductions of all displays and handouts and the full presentation, please see Appendix B, “Workshop Materials.”

III. COMMUNITY TOWN HALL PARTICIPATION AND RESULTS

Community Town Hall Participation

Approximately 180 people from throughout the region attended the community town halls. They represented a wide variety of organizations and interests, including:

- Area residents, many of whom regularly travel Last Chance Grade
- Local and regional transportation agencies
- Law enforcement agencies
- County and municipal governments
- Fire departments and Community Service Districts
- Regional and local planning staff
- Native American tribal governments
- Emergency and medical services providers
- Environmental organizations
- Bicycle and pedestrian advocacy groups
- National and State Parks and natural resources agencies
- Statewide, regional and local transportation providers
- Tourism organizations
- Local civic and cultural organizations
- Local educators, schools and colleges
- Political organizations
- Local and regional Chambers of Commerce
- Local business interests and labor unions
- Local news media

Community Town Hall Results

At all three town halls, attendees displayed a high degree of interest in the project, engaging in conversation and asking questions of staff at the various display stations. Several attendees at the meeting held in Crescent City had expectations that the meeting format would include a large group comment period. These participants

provided substantial feedback to Caltrans including numerous suggestions regarding their preferred format. A small number of comment cards were submitted; a transcription can be found in Appendix C, “Comment Cards.”

APPENDIX A: OUTREACH MATERIALS

I. Postcard Mailing

LAST CHANCE GRADE COMMUNITY TOWN HALLS

The “Last Chance Grade” is a 4-mile segment of US Highway 101 just south of Crescent City. Landslides and road failures have been ongoing issues for decades. While the road is currently safe to use, a long term solution is needed to ensure continued safe and reliable transportation on US 101.

In March, Caltrans will hold a series of town-hall style meetings to discuss the status of the project and share what’s being done to keep motorists safe as they travel on the Grade right now.

Please join us at a Community Town Hall to get an update on Last Chance Grade.



JOIN US AT A COMMUNITY TOWN HALL!

EUREKA

Tuesday, March 22, 2016

5:30–7:30 p.m.

Wharfinger Building, Great Room
Eureka Public Marina
#1 Marina Way

KLAMATH

Thursday, March 24, 2016

3:30–5:30 p.m.

Yurok Tribal Office
Klamath Community Room
190 Klamath Boulevard

CRESCENT CITY

Wednesday, March 23, 2016

5:30–7:30 p.m.

Del Norte County Fairgrounds
Main Hall Building
421 Highway 101 North

All locations are
ADA-accessible.

Attn: Last Chance Grade
Project Team
Caltrans District 1
P. O. Box 3700
Eureka, CA 95502-3700

CONTACT

For project updates and general information:

www.lastchancegrade.com

Or contact the Last Chance Grade Project Team at:

lastchancegrade@dot.ca.gov

(707) 445-6465, TTY 711



II. Email Blast Sent to Stakeholders

LAST CHANCE GRADE COMMUNITY TOWN HALLS

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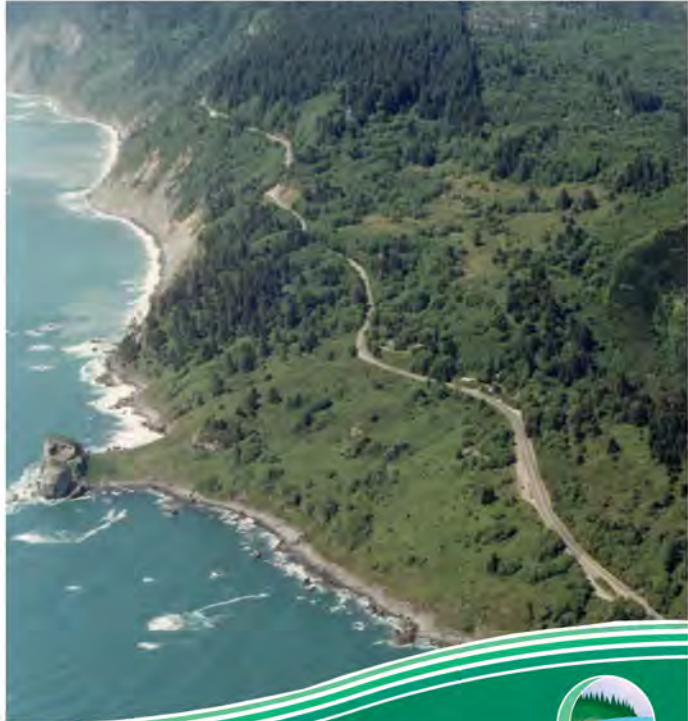
III. Flyer

LAST CHANCE GRADE COMMUNITY TOWN HALLS

The "Last Chance Grade" is a 4-mile segment of US Highway 101 just south of Crescent City. Landslides and road failures have been ongoing issues for decades. While the road is currently safe to use, a long term solution is needed to ensure continued safe and reliable transportation on US 101.

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421 Highway 101 North

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Klamath Community Room

190 Klamath Boulevard

CONTACT

For project updates and general information:

www.lastchancegrade.com

Or contact the Last Chance Grade Project Team at:

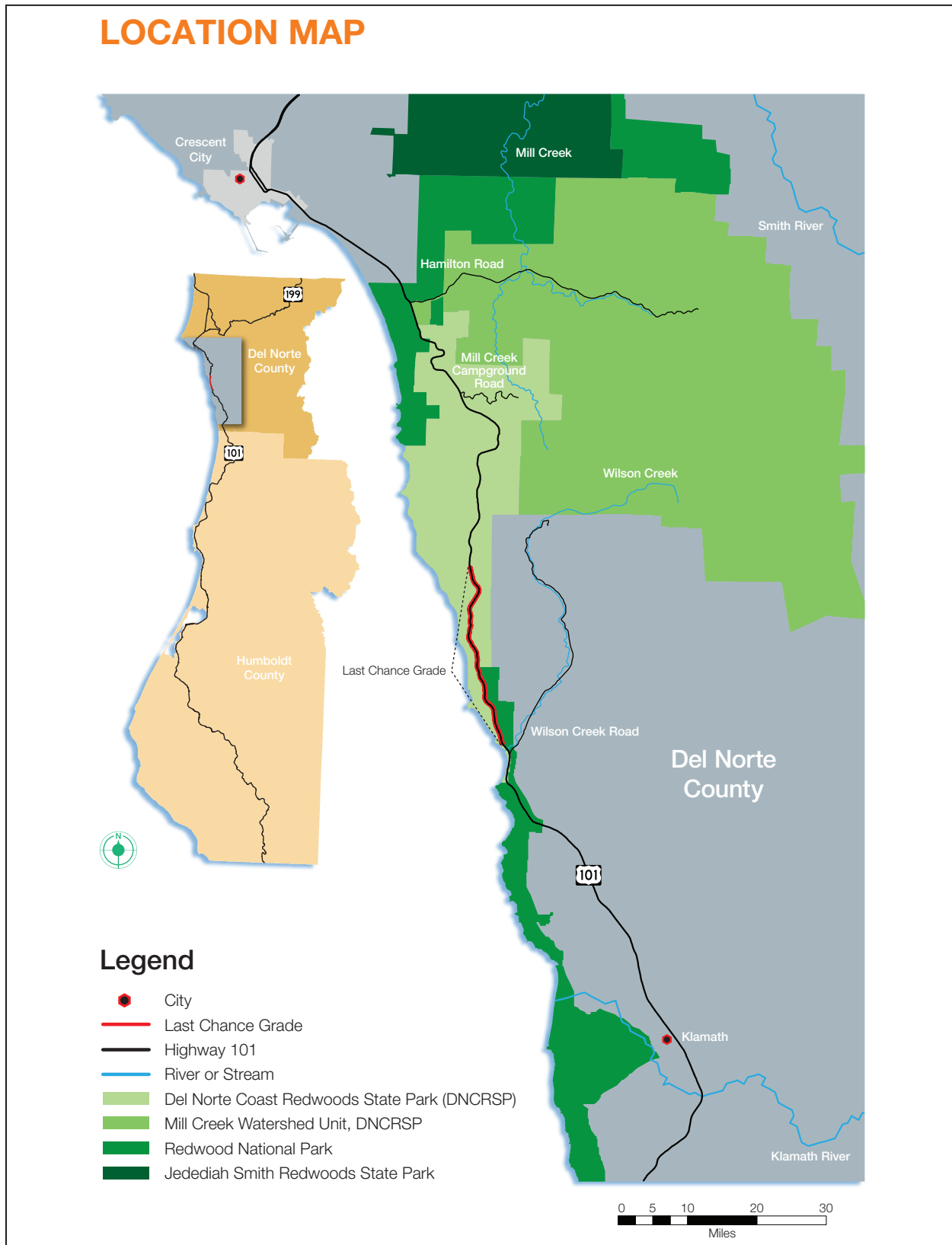
lastchancegrade@dot.ca.gov

(707) 445-6465, TTY 711



APPENDIX B: TOWN HALL MEETING MATERIALS

I. Displays



LAST CHANCE GRADE

Purpose

The purpose of this project is to develop a permanent solution to instability and potential roadway failure at Last Chance Grade. Caltrans is developing the Project Study Report which will consider alternatives that reduce maintenance costs, provide a reliable highway facility, and protect economic, environmental, and cultural resources.

Need

Landslides and road failures at Last Chance Grade have been an ongoing issue 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 expended significant resources on maintenance activities in order to keep the highway open for traffic. Since 1980, landslide mitigation projects – including roadbed overlays, slipout and washout repairs, retaining walls, drainage improvements, and significant maintenance – have cost over \$40 million. There is a need for a long-term solution to this historic instability at Last Chance Grade.

Description

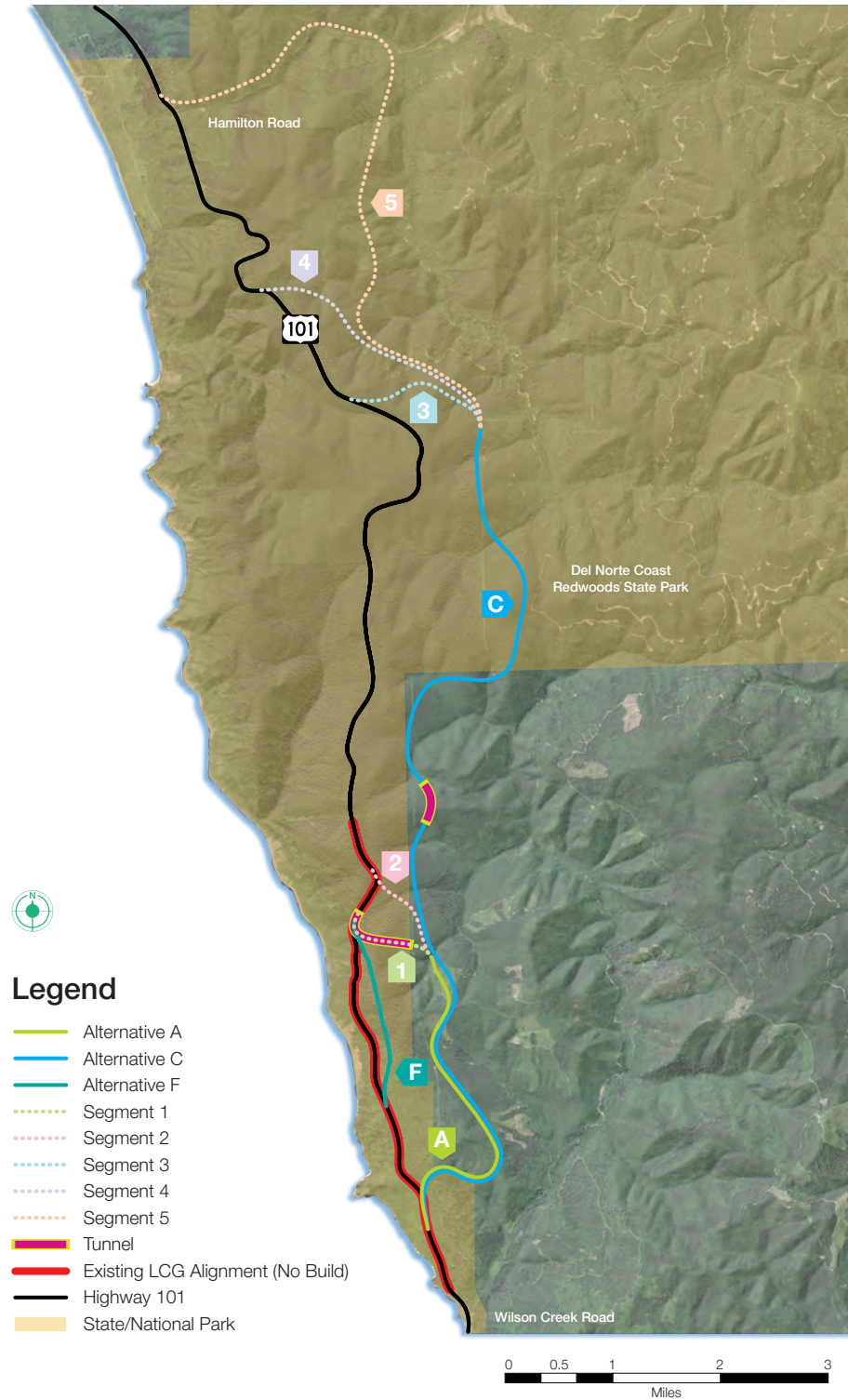
This Project Study Report will propose a range of alternatives to address the segment of US Highway 101 at Last Chance Grade impacted by landslides and increasing instability. A Partnership was formed with the National Park Service, California Department of Parks and Recreation, the Yurok Tribe, Elk Valley Rancheria, and the Tolowa Dee-ni' Nation to study and develop feasible solutions that ensure environmental and cultural resources are considered in the development of a solution.

Last Chance Grade



MAP OF ALTERNATIVES

A1, A2, C3, C4, C5, F



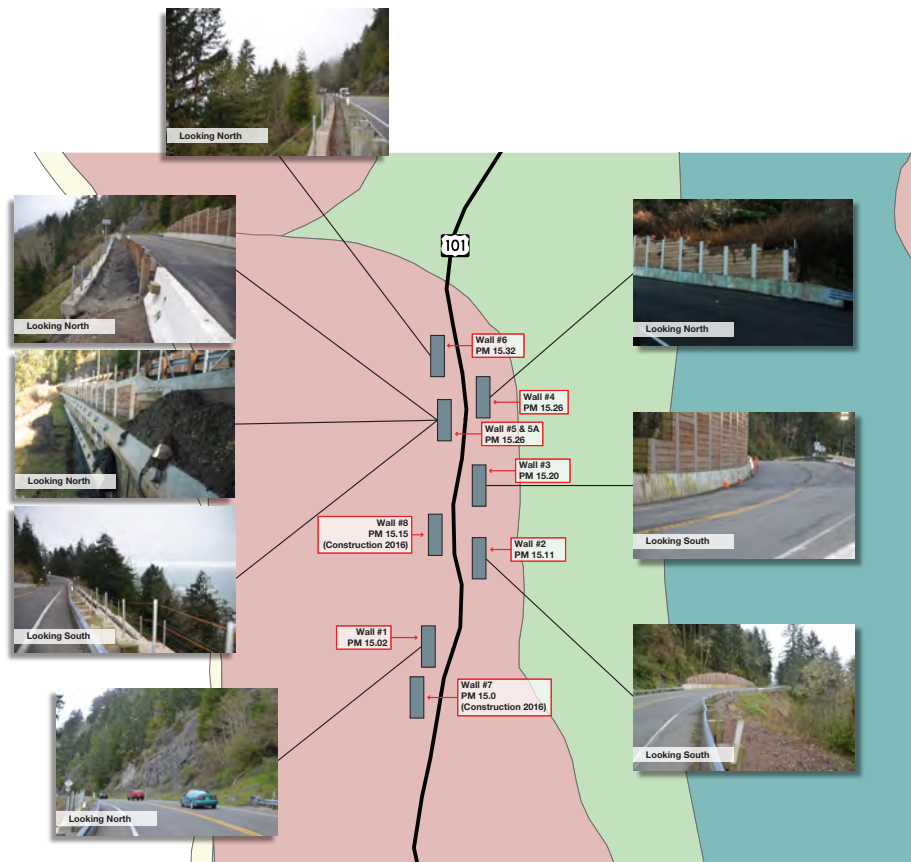
PRELIMINARY ALTERNATIVES COMPARISON*

ALTERNATIVE	NEW CONSTRUCTION										EXISTING HABITAT TYPE	
	STRUCTURES					WATERSHED CROSSINGS					TYPE	ACRES
	TRAVEL TIME ADDED (MINUTES)	CONSTRUCTION LENGTH (MILES)	CULVERTS > 36"	TUNNEL	BRIDGES	LENGTH WITHIN PARKS (MILES)	CONSTRUCTION FOOTPRINT (ACRES)	CONSTRUCTION SCHEDULE (YEARS)	WILSON CREEK	MILL CREEK		
A1 Rudisill Road to LCG Tunnel (Includes 2,425 ft. tunnel)	1.0 min.	3.2 miles	9	Yes	1	0.8 miles	80 acres	3 years	1	0	Coastal scrub/grassland/spruce Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	7 1 13 57 0 1.5
A2 Rudisill Road to Damnation Trailhead	0.8 min.	3.2 miles	10	No	2	0.6 miles	85 acres	2 years	2	0	Coastal scrub/grassland/spruce Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	7 1 13 61 0 3
C3 Rudisill Road to South of Mill Creek Access (Includes 1,650 ft. tunnel)	1.7 min.	7.8 miles	19	Yes	4	3.2 miles	245 acres	3 years	6	3	Coastal scrub/grassland/spruce Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	7 1 13 200 23 0
C4 Rudisill Road to North of Mill Creek Access (Includes 1,650 ft. tunnel)	1.5 min.	8.6 miles	14	Yes	5	4.0 miles	265 acres	4 years	6	4	Coastal scrub/grassland/spruce Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	7 1 13 200 43 0
C5 Rudisill Road to Hamilton Road (Includes 1,650 ft. tunnel)	2.6 min.	11.7 miles	21	Yes	11	7.0 miles	330 acres	4 years	6	10	Coastal scrub/grassland/spruce Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	7 1 13 216 93 0
F Full Tunnel Parallel to Existing Alignment (5,600 ft.)	1.0 min.	1.3 miles	N/A	Yes	N/A	N/A	4.5 acres	6.5 years	N/A	N/A	Coastal scrub/grassland/spruce Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	2 0 0 0 1 1.5
Maintain Existing Alignment	Unknown and unquantifiable											

*All figures are estimates



LAST CHANCE GRADE RETAINING WALLS



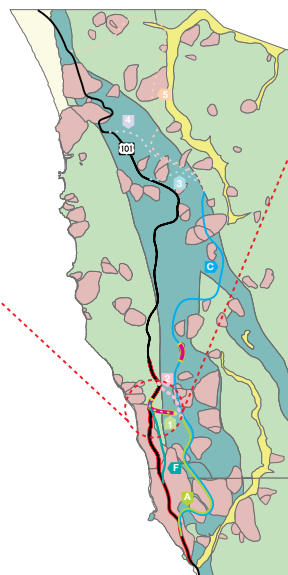
Legend

Routes

- Alternative A
- Alternative C
- Alternative F
- Segment 1
- Segment 2
- Segment 3
- Segment 4
- Segment 5
- Tunnel
- Existing LCG Alignment (No Build)
- Highway 101
- Walls

Geologic Units

- Alluvium (Qal)
 - Beach Deposits (Qb)
 - Landslide Deposits (Qls)
 - Broken Complex (KJFbf)
 - Mélange (KJFm)
- Franciscan Complex

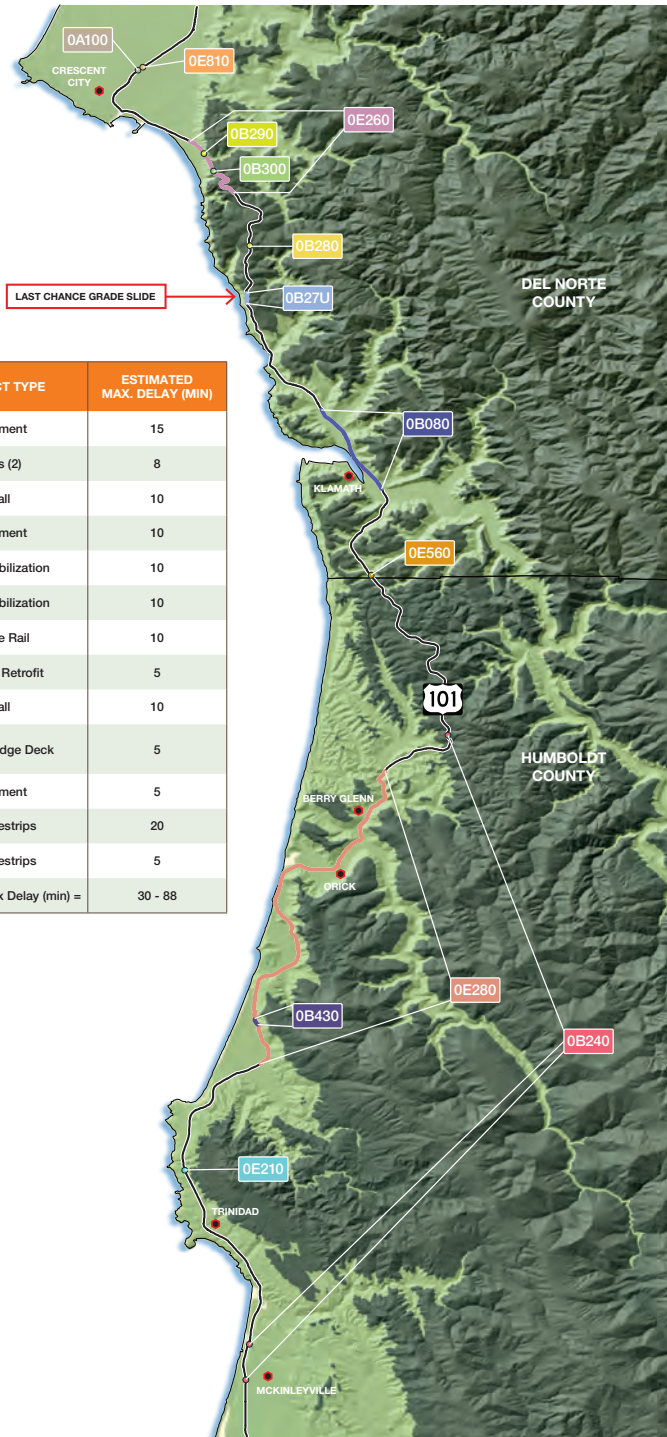


HIGHWAY 101 ESTIMATED TRAVEL DELAYS DUE TO PROJECT WORK (SUMMER 2016)

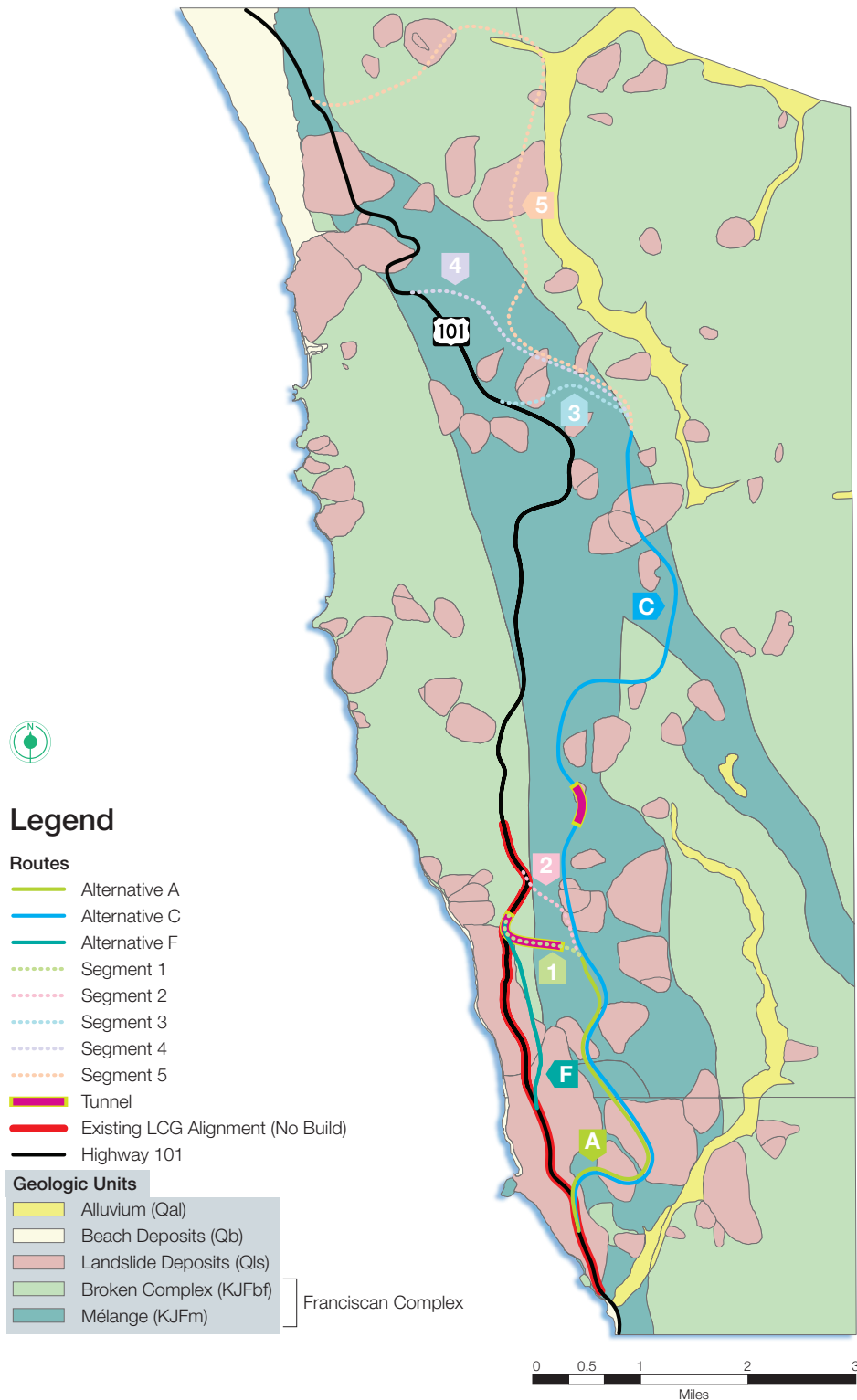


Legend

EA	POSTMILE MARKER	PROJECT TYPE	ESTIMATED MAX. DELAY (MIN)
0B080	4.40 - 9.40	Pavement	15
0B27U	14.90 - 15.30	Walls (2)	8
0B280	17.40	Wall	10
0E260	20.40 - 23.60	Pavement	10
0B300	22.00	Bank Stabilization	10
0B290	22.90	Bank Stabilization	10
0E810	28.32	Bridge Rail	10
0A100	28.32 - 39.63	Seismic Retrofit	5
0B430	111.40 - 111.60	Wall	10
0B240	R93.9, R95.6, R129.0	Rehab Bridge Deck	5
0E210	103.40	Pavement	5
0E280	109.50 - 125.80	Rumblestrips	20
0E560	0.10 - 39.70	Rumblestrips	5
Total Min - Max Delay (min) =			30 - 88

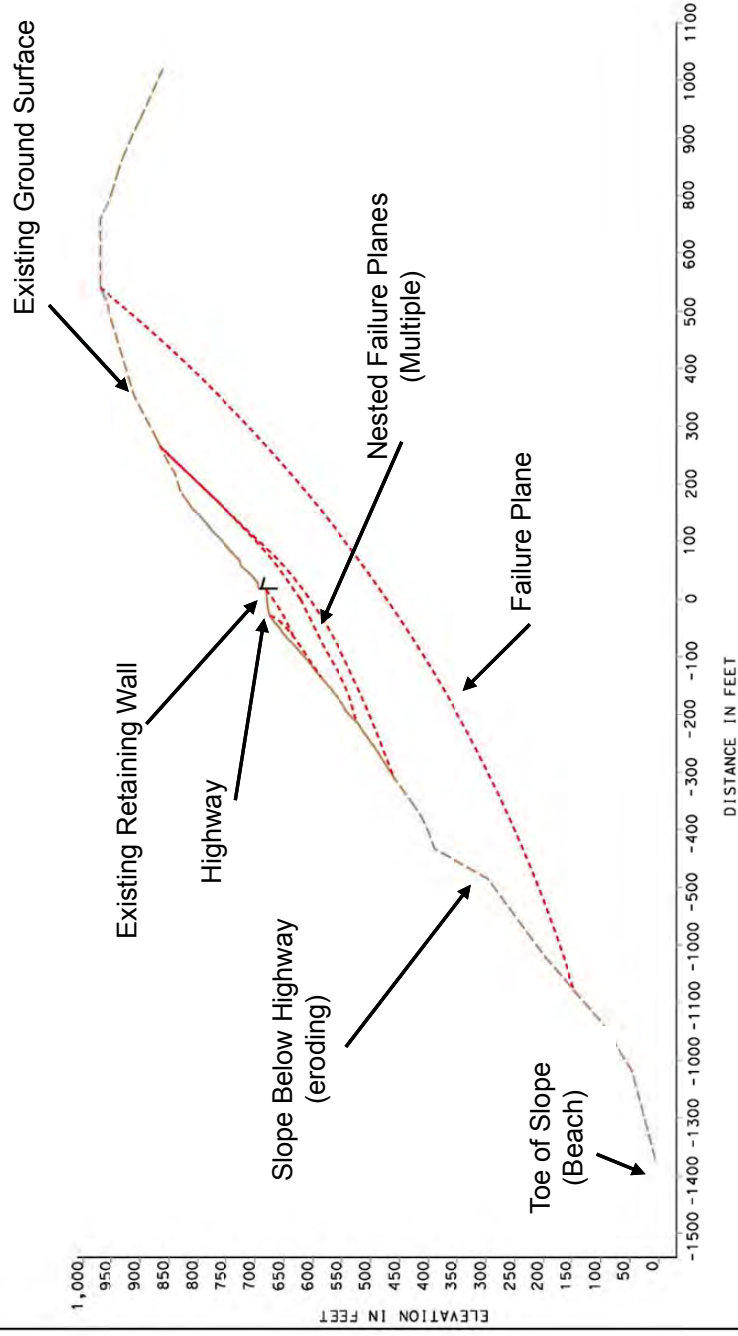


LANDSLIDE MAP



CROSS-SECTION

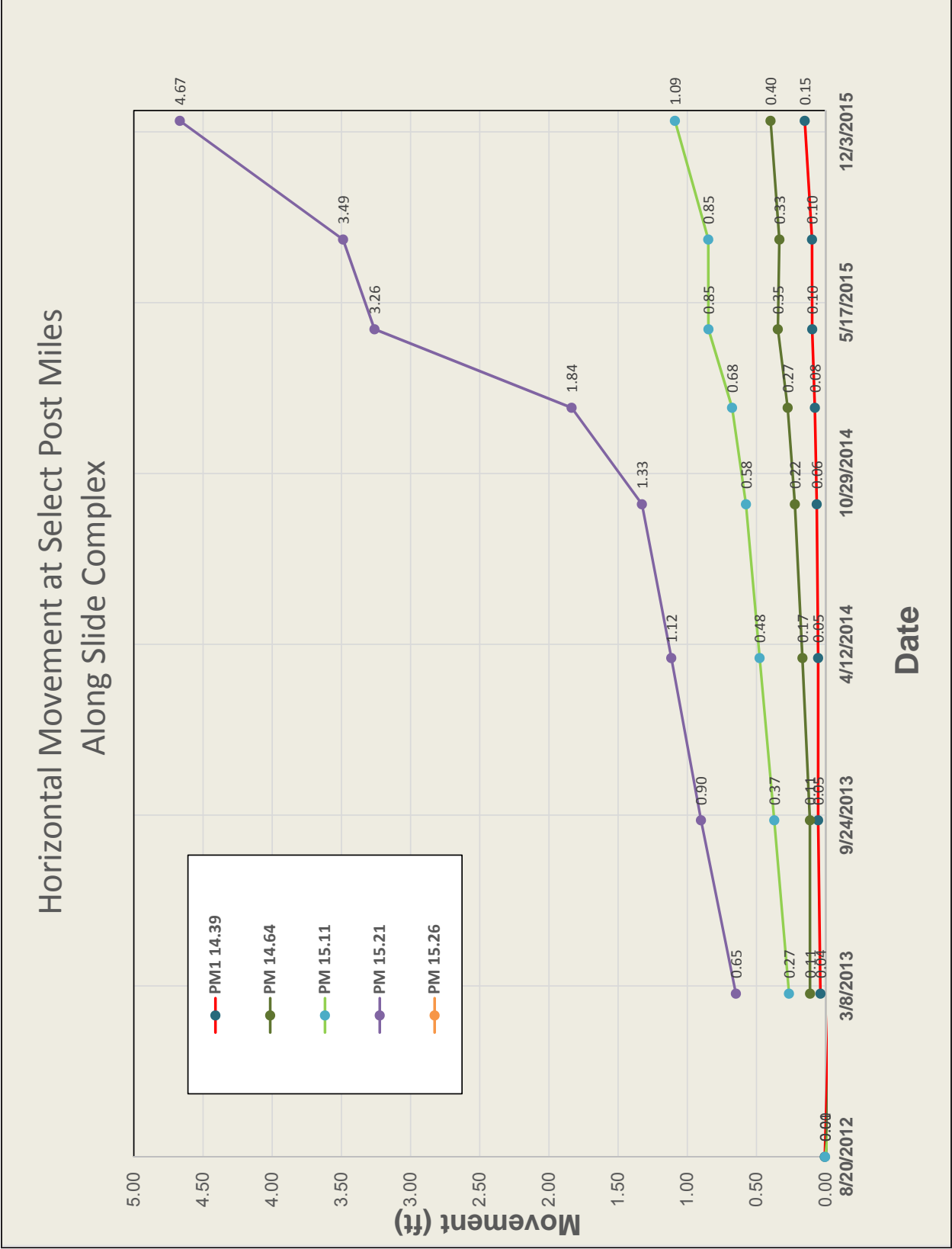
TYPICAL



DESIGN-CROSS-SECT-B: DGN 3/21/2016 12:56:49 PM



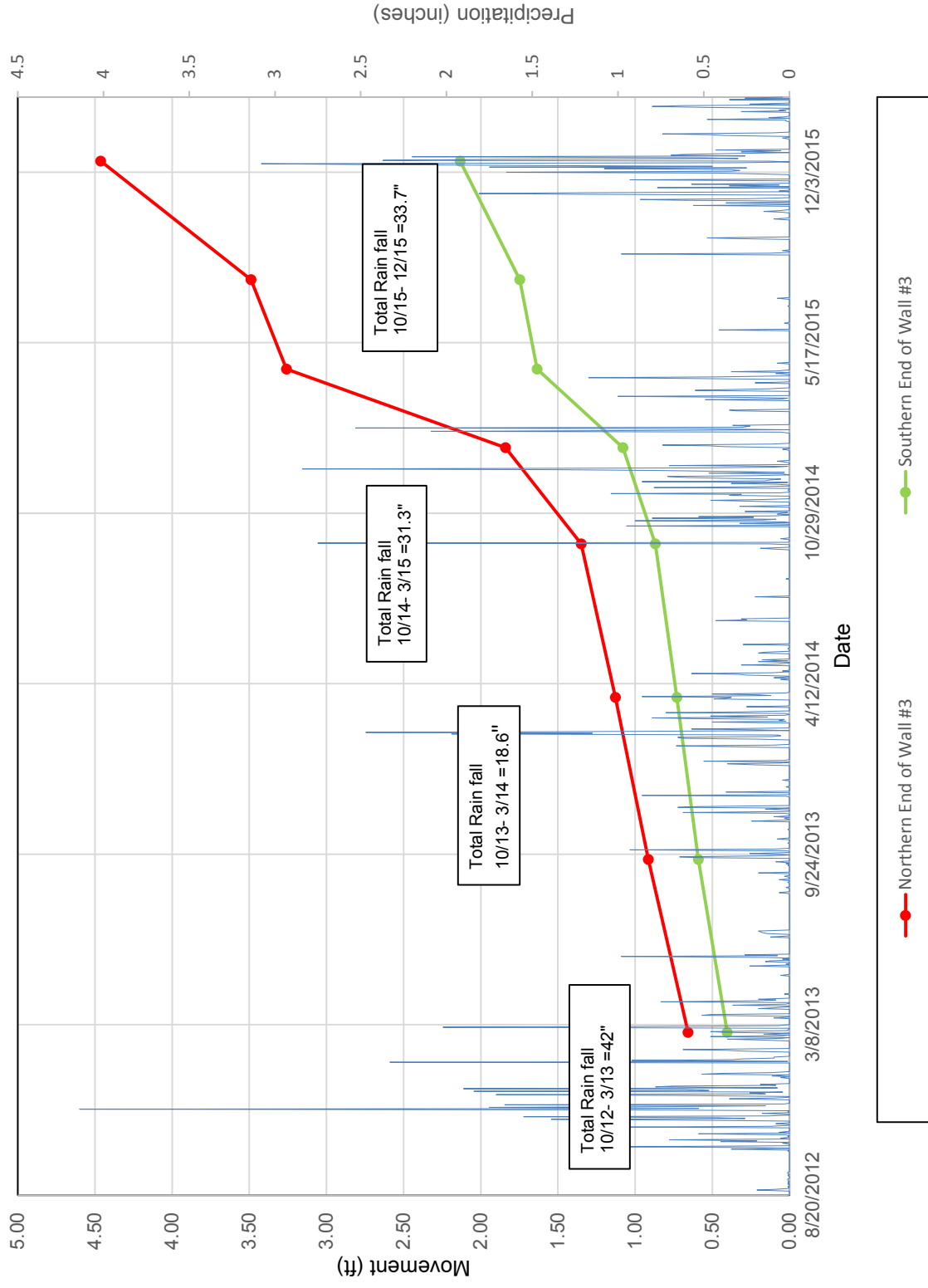
LAST CHANCE GRADE

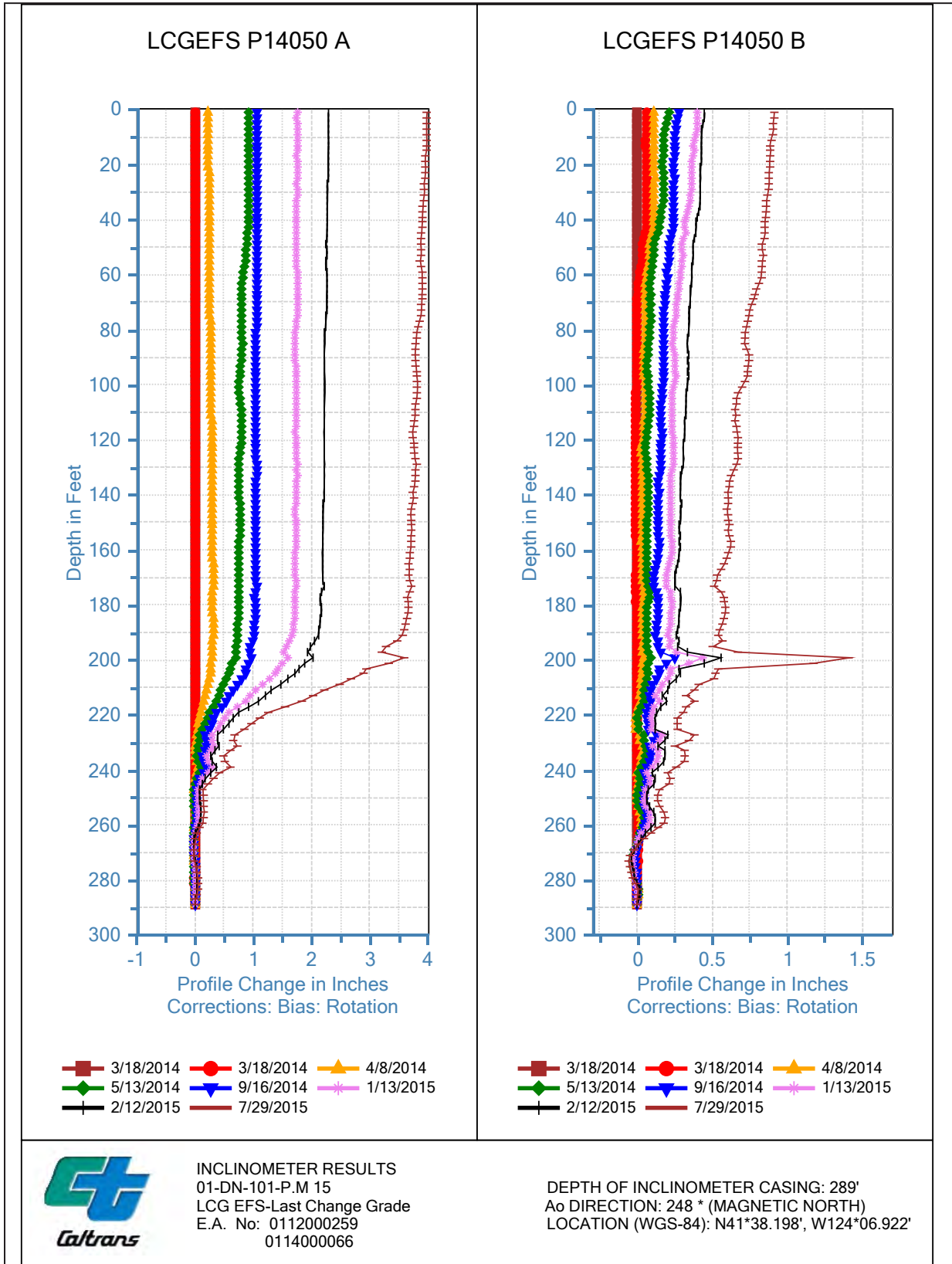


Slide Movement at Wall #3



Wall #3 Horizontal Movement and Rainfall

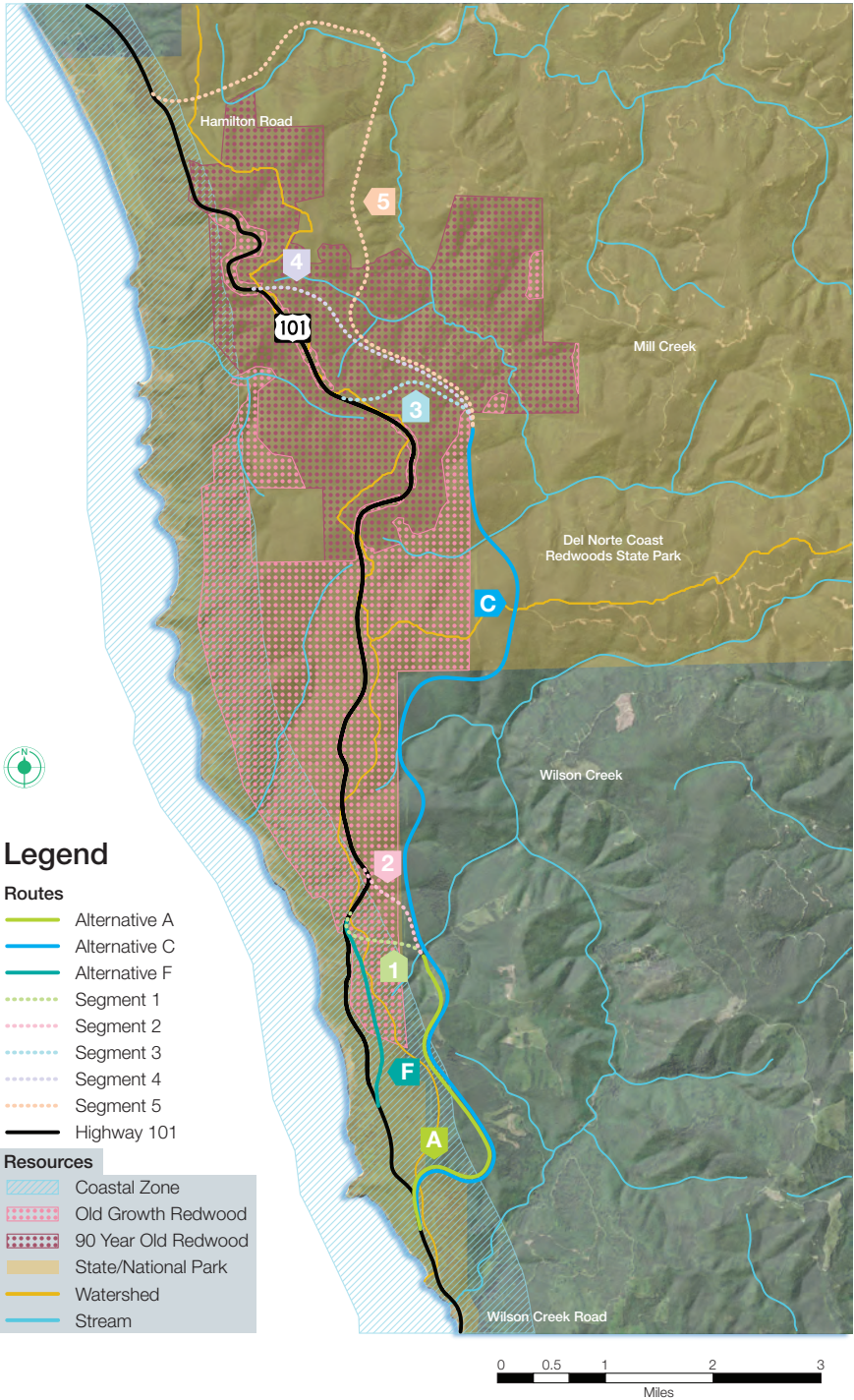




BROKEN FORMATION



ENVIRONMENTAL RESOURCES



Preliminary Alternatives:
A1, A2, C3, C4, C5, F

CULTURAL RESOURCES

There are important tribal cultural resources located in the vicinity of the proposed alternative alignments for Last Chance Grade. The Last Chance Grade Partners are committed to avoiding and minimizing potential impacts on these resources.

The Last Chance Grade Partners include the following federally recognized Tribes:

Elk Valley Rancheria
Tolowa Dee-ni' Nation
Yurok Tribe

Last Chance Grade



FHWA EMERGENCY RELIEF (ER) PROGRAM REQUIREMENTS

- Applicable for identified Federal Aid Routes only
- Governor or Presidential Proclamation required
- Project scope to restore pre-event conditions only (repair of pre-existing conditions not allowed)
- Betterments / Improvements / Traffic capacity increase not allowed
- No work allowed outside State ROW
- Strict project delivery schedule—must reach construction phase by end of second fiscal year following the year of the event.
- Maximum Project Cost—\$100 million max, per event with a Proclamation, per state, per year.
 - Note that ER Program is only funded with \$100 million per year, for all US States and territories. Allocation of funding beyond the maximum requires unique congressional appropriation.
- Variances from ER Program Requirements must be requested and approved.

Last Chance Grade



EMERGENCY REPAIR SCENARIOS

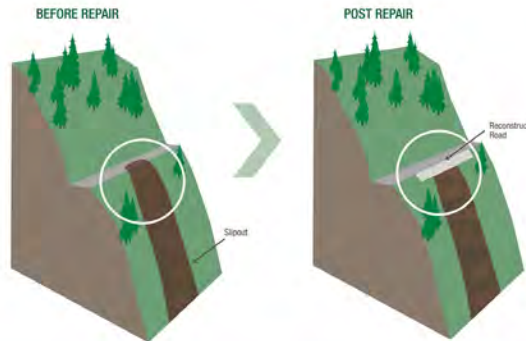
SCENARIO 1

Small Scale Slipout

Caltrans Response
Reconstruct Roadway
in Place

Construction Duration
Days to Weeks

Traffic Access
Yes. Likely One-Way
Reversible



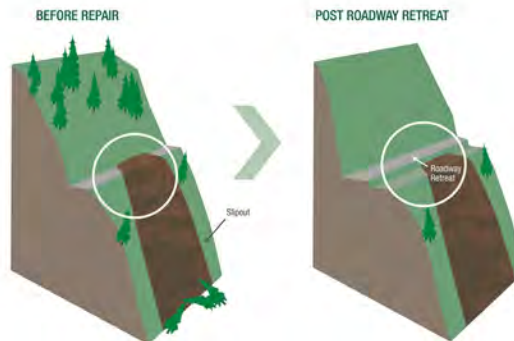
SCENARIO 2

Moderate Scale Slipout

Caltrans Response
Roadway Retreat Away
from Ocean

Construction Duration
Weeks to Years

Traffic Access
Short-Term Full Closure.
Then, One-Way
Reversible Traffic



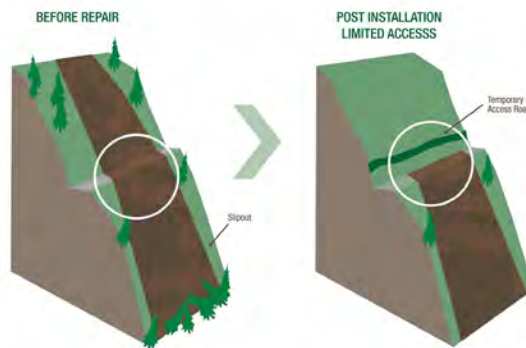
SCENARIO 3

Large Scale Slipout

Caltrans Response
Construct Temporary
Access Road (1 or 2 lanes)
+ Accelerate LCG
Realignment Project

Construction Duration
Years

Traffic Access
Full Closure. Then,
One-Way Reversible
Traffic on Temporary
Road Until Realignment
is Complete



Last Chance Grade



CALTRANS EMERGENCY PROJECTS PROCESS

When Emergency Damage Occurs:



*Note: an Emergency Opening (EO) project only eliminates advertisement and contracting requirements. Caltrans complies with environmental and right of way requirements, and expeditiously obtains required permits, approvals, and any required mitigation. Caltrans expends significant resources ensuring the laws allowing use of emergency contracts is respected, complied with and not abused or over-utilized, as such contracts are an invaluable tool which, along with our Field Maintenance Forces, allow us to keep our roadways open and safe for the traveling public.



FEDERAL EMERGENCY FUNDING

Funding source: Federal Highway Administration (FHWA) Emergency Relief (ER) Program. Note that this is a Congressionally Appropriated program, not a standard Fed-Aid Program.

Requirements:

- Significant damage occurs (coordination with FWHA begins)
- Through coordination with the Office of Emergency Services (OES), a Gubernatorial or Presidential Proclamation declares a State of Emergency and initiates the ER process
- Caltrans & FHWA specialist staff review damage sites and project applications
- FHWA approves, denies or requests adjustments to project applications

If Request For Project Funding Is Approved:

- Emergency Opening (EO) projects, which are minimally scoped to solely restore essential traffic and minimize the extent of further damage until a restoration project that completely restores the roadway to pre-damage conditions can be developed and implemented, are 100% reimbursed for the 1st 180 days after the date of the event stated on the Proclamation.
- Permanent Restoration (PR) projects, which are scoped to bring the roadway facility back to pre-damage conditions, are implemented via the standard federal-aid contract procedures and project delivery process.
- Process includes CEQA/NEPA* compliance, acquisition of approved Permits, and Right of Way (ROW) approvals & acquisitions.

*California Environmental Quality Act of 1970 (CEQA), and National Environmental Policy Act of 1969 (NEPA) are state and federal laws outlining the required environmental analysis.

Last Chance Grade



LAST CHANCE GRADE PROJECT TIMELINE



Last Chance Grade



GROUPS WORKING TO SUPPORT A PERMANENT SOLUTION AT LAST CHANCE GRADE

Congressman Huffman's Stakeholder Group

Convened by Congressman Huffman, representatives from the following groups participate in facilitated full day meetings to explore options for Last Chance Grade.

- Del Norte County
- Humboldt County
- Curry County
- Del Norte Local Transportation Commission
- Yurok Tribe
- Elk Valley Rancheria
- Tolowa Dee-ni' Nation
- Redwood National and State Parks
- California State Parks
- Caltrans
- California Highway Patrol
- Crescent City
- Humboldt County Association of Governments
- Environmental Protection Information Center (EPIC)
- Friends of Del Norte
- Save the Redwoods League
- Green Diamond Resources Co.
- Crescent City-Del Norte Chamber of Commerce
- Last Chance Grade Advisory Committee
- C. Renner Petroleum
- Rumiano Cheese

Biological Resources Working Group

Comprised of Partner and agency specialists and regulators, this group meets to ensure that the proposed strategies are consistent with regulatory requirements.

- Coastal Commission
- California Department of Fish and Wildlife
- Army Corps of Engineers
- California Department of Parks and Recreation
- Yurok Tribe
- National Park Service
- Tolowa Dee-ni' Nation
- Elk Valley Rancheria
- US Fish and Wildlife
- NOAA Fisheries (NMFS)
- North Coast Regional Water Quality Control Board

Last Chance Grade Partners

Comprised of entities with responsibilities in the project area, the Partners meet regularly to discuss issues specific to their entities' missions and responsibilities while working collaboratively to support development of a permanent solution at Last Chance Grade.

- Caltrans District 1
- California Department of Parks and Recreation
- National Park Service
- Elk Valley Rancheria
- Tolowa Dee-ni' Nation
- Yurok Tribe

Caltrans Multi-Disciplinary Project Development Team

Comprised of Caltrans specialists with the goal of determining and advancing the selected alternative.

- Project Manager
- Advanced Planning Project Engineers
- Regional Planner
- Construction Engineer
- Hydraulics Engineer
- Engineering Geologist
- Geologist
- Structures Construction Engineer
- Structures Design Engineer
- Surveyor
- Archaeologist
- Biologist
- Environmental Coordinator
- Traffic Safety Engineer
- Traffic Operations Engineer
- Right of Way Agent and Engineer
- Program Manager and Advisor
- Major Damage Coordinator
- Public Information Officer
- Tribal Liaison

Cultural Resources Sub-Working Group

Comprised of Tribal representatives with the goal of ensuring that impacts to cultural resources and possible mitigation are included in the consideration of alternatives.

- Elk Valley Rancheria
- Tolowa Dee-ni' Nation
- Yurok Tribe
- Caltrans Archeologist

Del Norte County Last Chance Grade Citizens Advisory Committee

Comprised of community members from Del Norte County, with the goal of supporting the effort to find an alternate route at Last Chance Grade and raise public awareness of the issue. To date, they have collected 16 letters of support from government entities and potentially impacted businesses throughout the region.

Other Significant Communications and Ongoing Working Relationships

- Federal Highway Administration (FHWA) Sacramento and FHWA Geotech, Colorado
- Congressman Jared Huffman
- Congressman Peter DeFazio, 4th District Oregon
- Assembly Member Jim Wood, 2nd District
- State Senator Mike McGuire, 2nd District
- California Highway Patrol
- US Coast Guard
- Crescent City Harbor Commission
- Del Norte County
- Humboldt County
- City of Crescent City
- Del Norte Local Transportation Commission (DNLTC)



LAST CHANCE GRADE CONTACT INFORMATION

For project updates and general information:

www.lastchancegrade.com

Or contact the Last Chance Grade Project Team at:

lastchancegrade@dot.ca.gov

(707) 445-6465, TTY 711

Last Chance Grade



II. Agenda Packet

Last Chance Grade COMMUNITY TOWN HALL

EUREKA

March 22, 2016
5:30-7:30 p.m.
Wharfinger Building
Great Room
Eureka Public Marina
#1 Marina Way

CRESCENT CITY

March 23, 2016
5:30-7:30 p.m.
Del Norte County Fairgrounds
Main Exhibit Hall
421 Highway 101 North

KLAMATH

March 24, 2016
3:30-5:30 p.m.
Yurok Tribal Office
Klamath Community Room
190 Klamath Boulevard

AGENDA

15 min.	Sign-in and Open House
20 min.	Presentation
85 min.	Open House/Q&A
	Adjourn

Last Chance Grade Contact Information

For project updates and general information:

www.lastchancegrade.com

Or contact the Last Chance Grade Project Team at:

lastchancegrade@dot.ca.gov

(707) 445-6465, TTY 711

Last Chance Grade



LOCATION MAP



LAST CHANCE GRADE

Purpose

The purpose of this project is to develop a permanent solution to instability and potential roadway failure at Last Chance Grade. Caltrans is developing the Project Study Report which will consider alternatives that reduce maintenance costs, provide a reliable highway facility, and protect economic, environmental, and cultural resources.

Need

Landslides and road failures at Last Chance Grade have been an ongoing issue 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 expended significant resources on maintenance activities in order to keep the highway open for traffic. Since 1980, landslide mitigation projects – including roadbed overlays, slipout and washout repairs, retaining walls, drainage improvements, and significant maintenance – have cost over \$40 million. There is a need for a long-term solution to this historic instability at Last Chance Grade.

Description

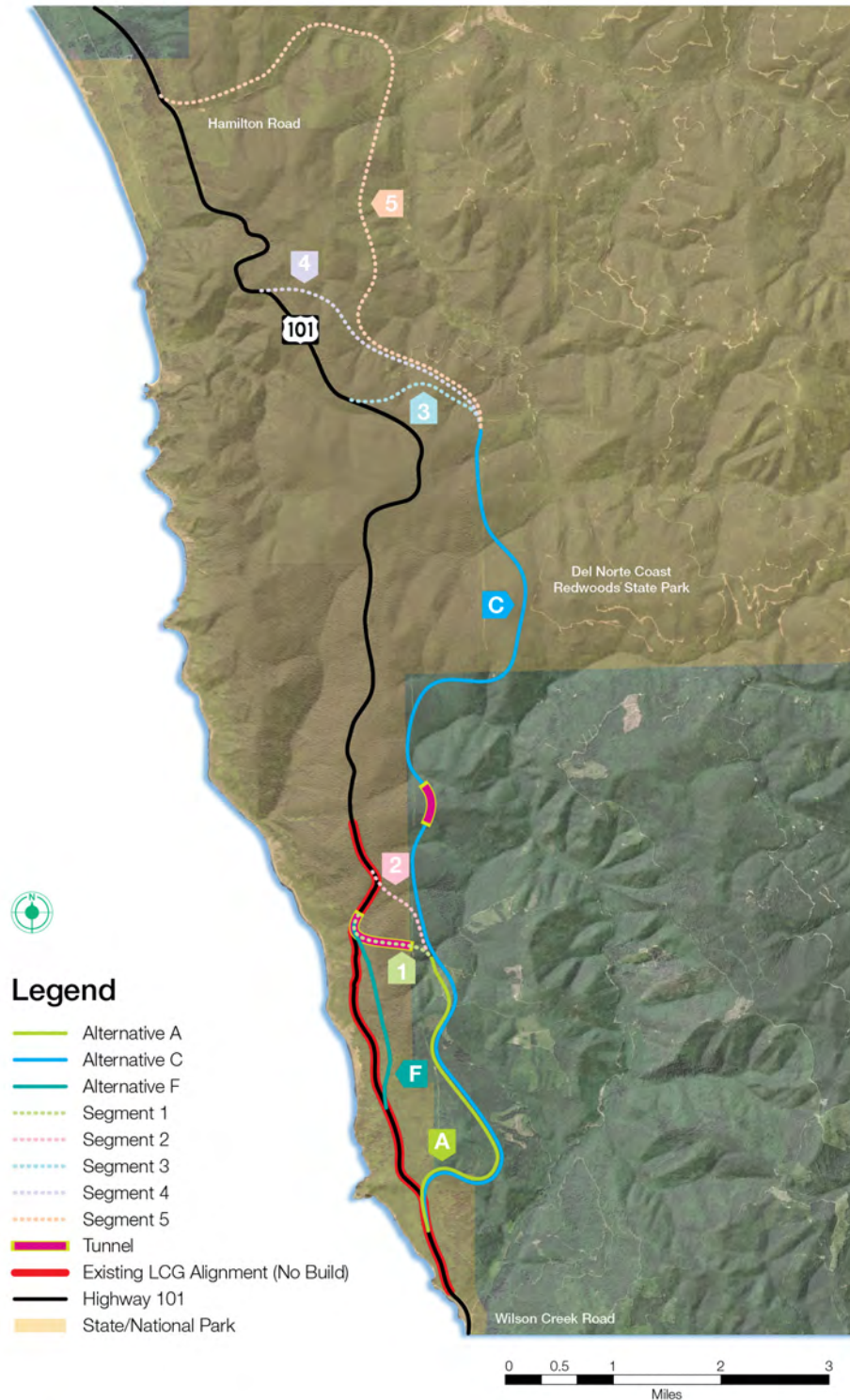
This Project Study Report will propose a range of alternatives to address the segment of US Highway 101 at Last Chance Grade impacted by landslides and increasing instability. A Partnership was formed with the National Park Service, California Department of Parks and Recreation, the Yurok Tribe, Elk Valley Rancheria, and the Tolowa Dee-ni' Nation to study and develop feasible solutions that ensure environmental and cultural resources are considered in the development of a solution.

Last Chance Grade



MAP OF ALTERNATIVES

A1, A2, C3, C4, C5, F



III. Other Handouts

PRELIMINARY ALTERNATIVES COMPARISON*												
ALTERNATIVE	NEW CONSTRUCTION						WATERSHED CROSSINGS			EXISTING HABITAT TYPE		
	STRUCTURES											
	TRAVEL TIME ADDED (MINUTES)	CONSTRUCTION LENGTH (MILES)	CULVERTS > 36"	TUNNEL	BRIDGES	LENGTH WITHIN PARKS (MILES)	CONSTRUCTION FOOTPRINT (ACRES)	CONSTRUCTION SCHEDULE (YEARS)	WILSON CREEK	MILL CREEK	CONSTRUCTION COST IN 2016 \$ (MILLIONS)	ACRES
A1 Rudisill Road to LCG Tunnel (Includes 2,425 ft. tunnel)	1.0 min.	3.2 miles	9	Yes	1	0.8 miles	80 acres	3 years	1	0	\$680	7 Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest
A2 Rudisill Road to Damnation Trailhead	0.8 min.	3.2 miles	10	No	2	0.6 miles	85 acres	2 years	2	0	\$275	7 Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest
C3 Rudisill Road to South of Mill Creek Access (Includes 1,650 ft. tunnel)	1.7 min.	7.8 miles	19	Yes	4	3.2 miles	245 acres	3 years	6	3	\$950	7 Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest
C4 Rudisill Road to North of Mill Creek Access (Includes 1,650 ft. tunnel)	1.5 min.	8.6 miles	14	Yes	5	4.0 miles	265 acres	4 years	6	4	\$1,000	7 Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest
C5 Rudisill Road to Hamilton Road (Includes 1,650 ft. tunnel)	2.6 min.	11.7 miles	21	Yes	11	7.0 miles	330 acres	4 years	6	10	\$1,250	7 Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest
F Full Tunnel Parallel to Existing Alignment (5,600 ft.)	1.0 min.	1.3 miles	N/A	Yes	N/A	N/A	4.5 acres	6.5 years	N/A	N/A	\$1,050	2 Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest
Maintain Existing Alignment												1.5
Unknown and unquantifiable												
*All figures are estimates												

*All figures are estimates



EMERGENCY REPAIR SCENARIOS

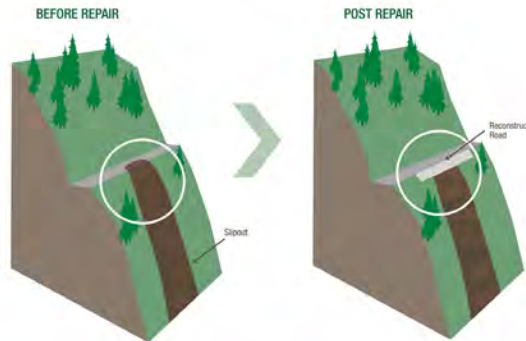
SCENARIO 1

Small Scale Slipout

Caltrans Response
Reconstruct Roadway
in Place

Construction Duration
Days to Weeks

Traffic Access
Yes. Likely One-Way
Reversible



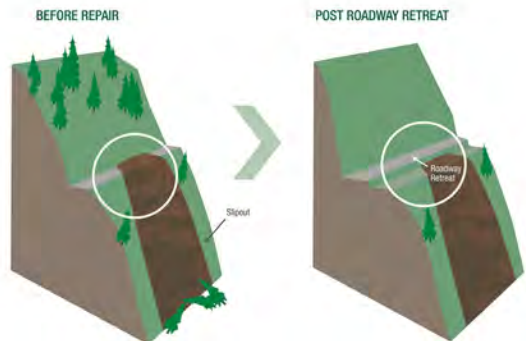
SCENARIO 2

Moderate Scale Slipout

Caltrans Response
Roadway Retreat Away
from Ocean

Construction Duration
Weeks to Years

Traffic Access
Short-Term Full Closure.
Then, One-Way
Reversible Traffic



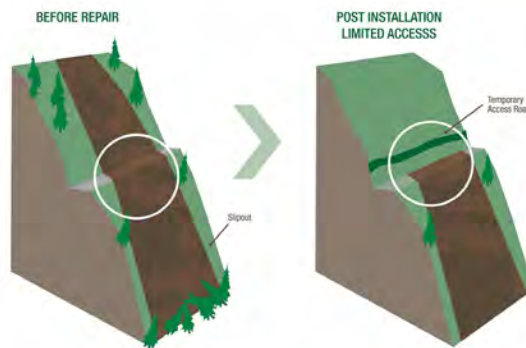
SCENARIO 3

Large Scale Slipout

Caltrans Response
Construct Temporary
Access Road (1 or 2 lanes)
+ Accelerate LCG
Realignment Project

Construction Duration
Years

Traffic Access
Full Closure. Then,
One-Way Reversible
Traffic on Temporary
Road Until Realignment
is Complete



Last Chance Grade



COMMENT CARD

Please share your comments regarding Last Chance Grade.

Optional:

Name: _____ Affiliation: _____

Contact Info: (Mailing address or email):

Thank you for your participation! Please turn this card in at the end of the meeting. You may also return it by mail or email **no later than April 15, 2015**. Please mail to: Caltrans District 1, c/o Sebastian Cohen, 1656 Union Street, Eureka, CA 95501, or email to: lastchancegrade@dot.ca.gov.



VI. Presentation

LAST CHANCE GRADE

COMMUNITY TOWN HALL



Eureka: 03/22/16

Crescent City: 03/23/16

Klamath: 03/24/16

Sebastian Cohen

Caltrans-Project Manager



Presentation Overview

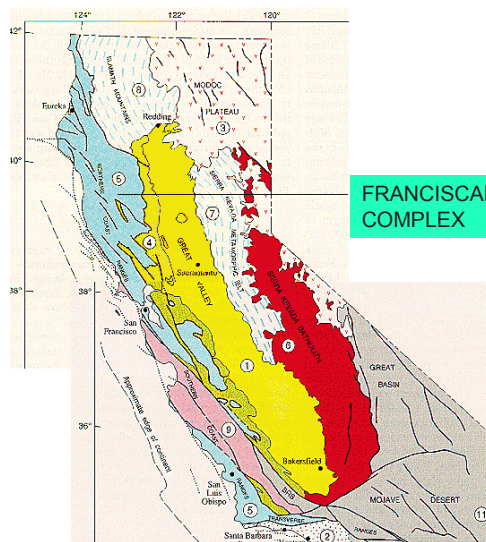
- Geology
- History
- Site Status
 - What's Occurring
- Status of Permanent Repair Project (Realignment)
 - Alternatives, Cultural & Environmental Resources
 - Challenges
 - Emergency Project / Emergency Response / Emergency Funding
 - Stakeholders

LAST CHANCE GRADE





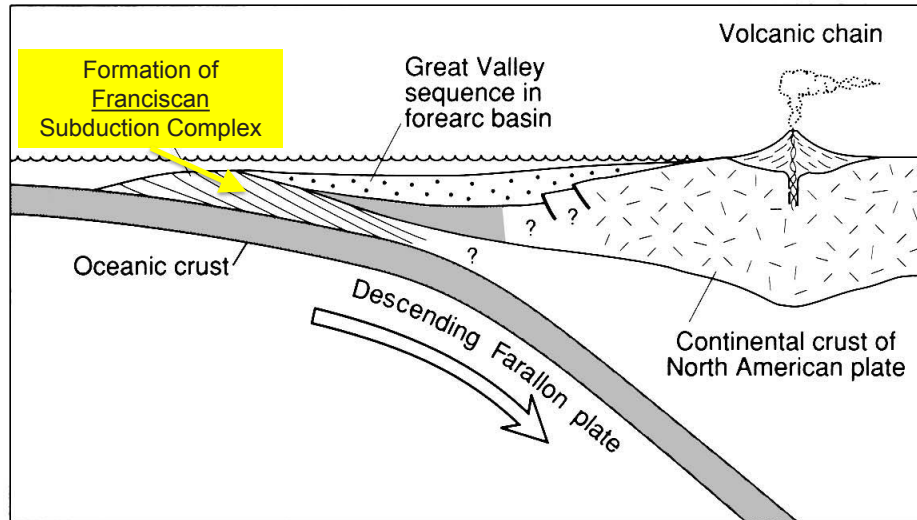
GEOLOGY



LAST CHANCE GRADE



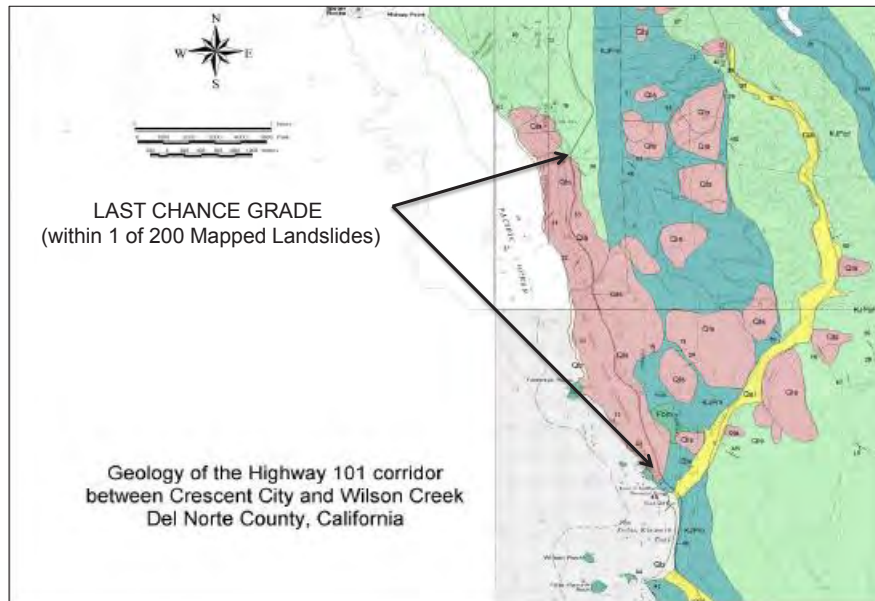
GEOLOGY



LAST CHANCE GRADE

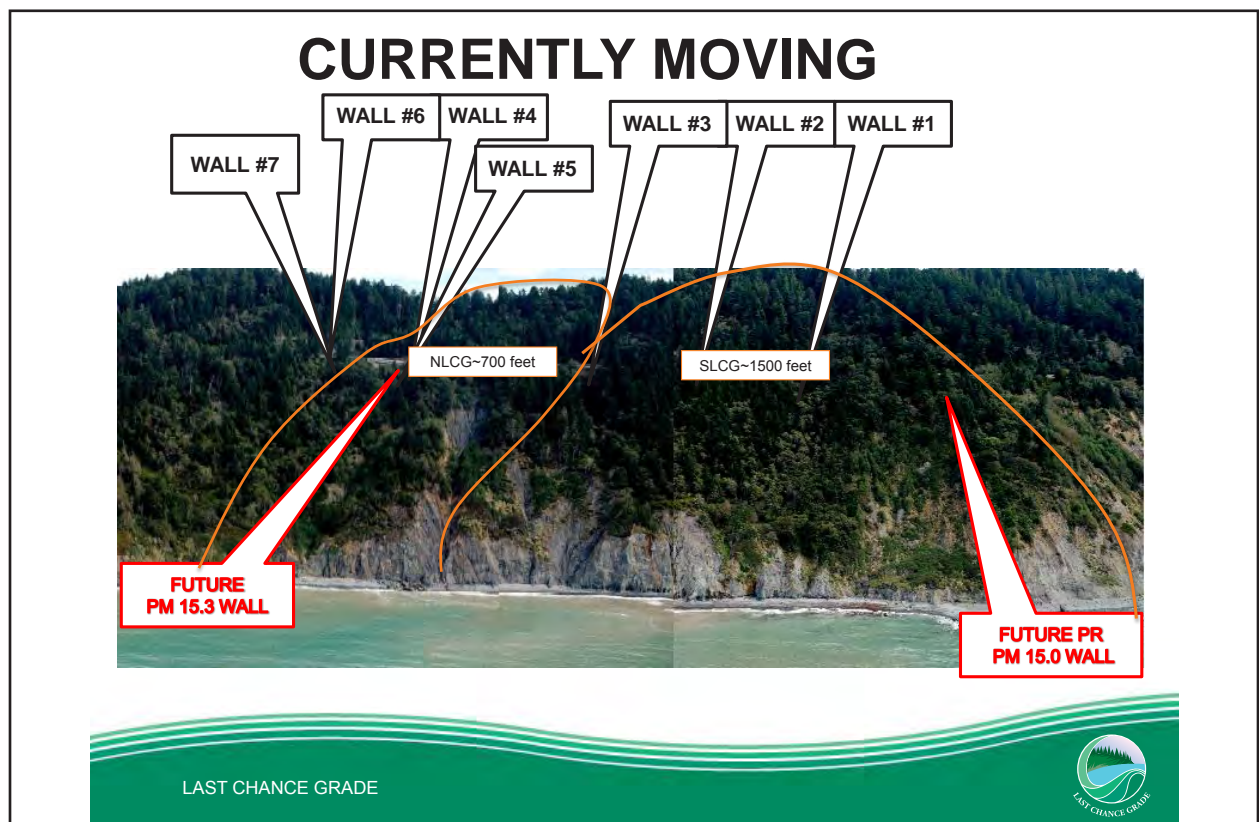
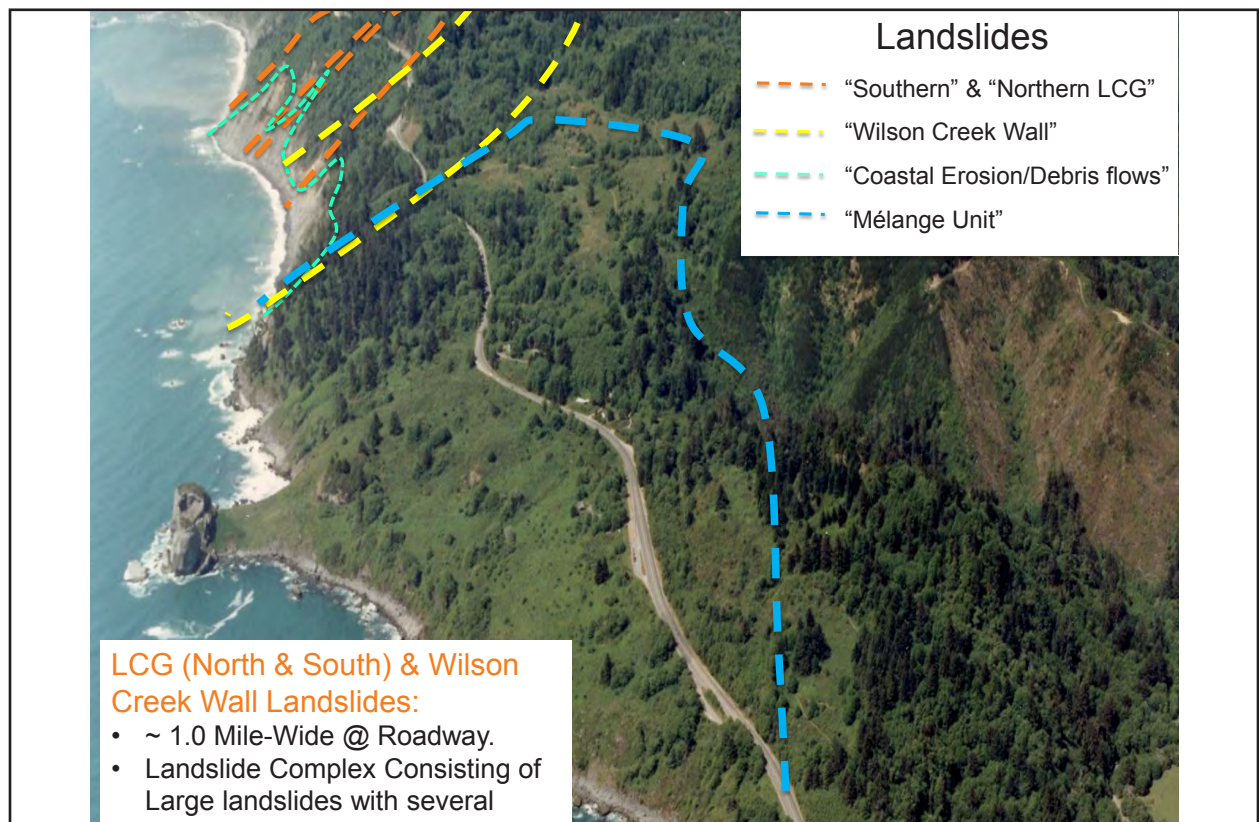


LANDSLIDE OVERVIEW MAP



LAST CHANCE GRADE





Undulating Vertical Alignment



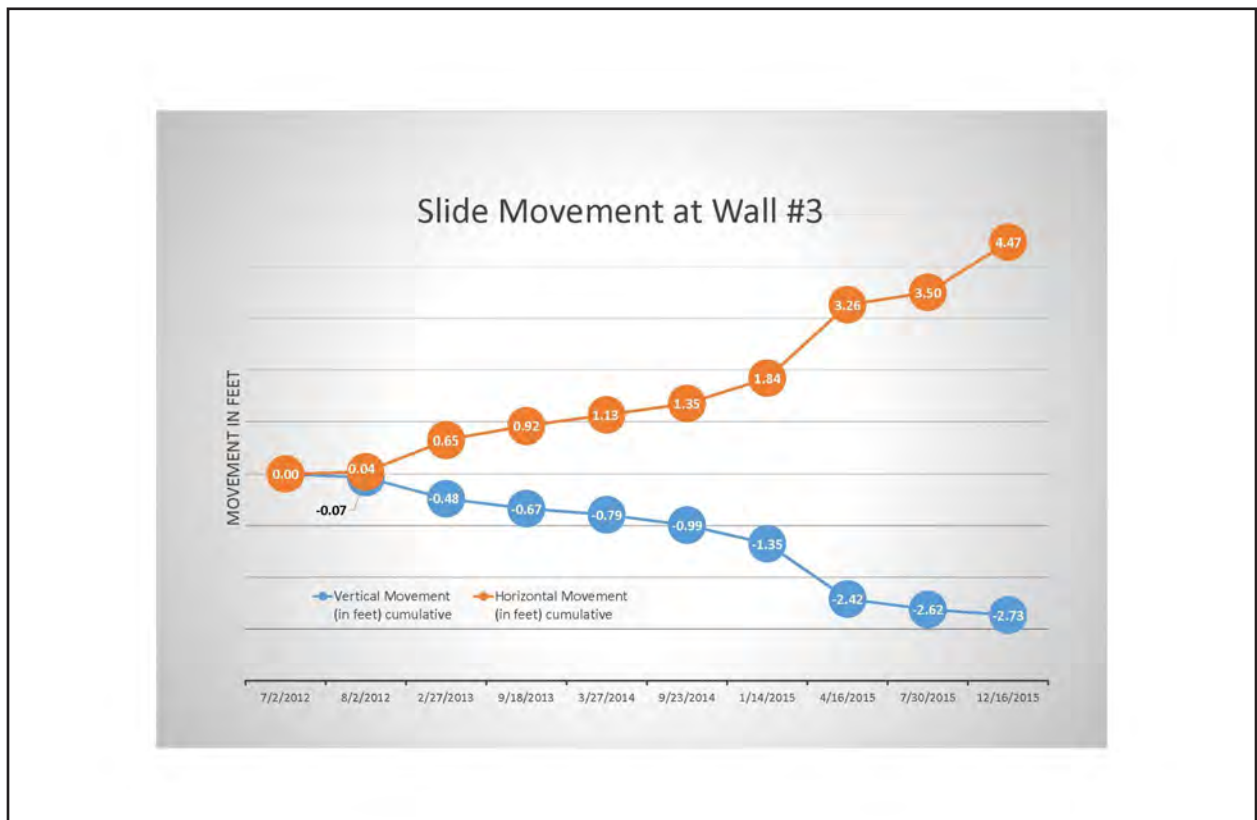
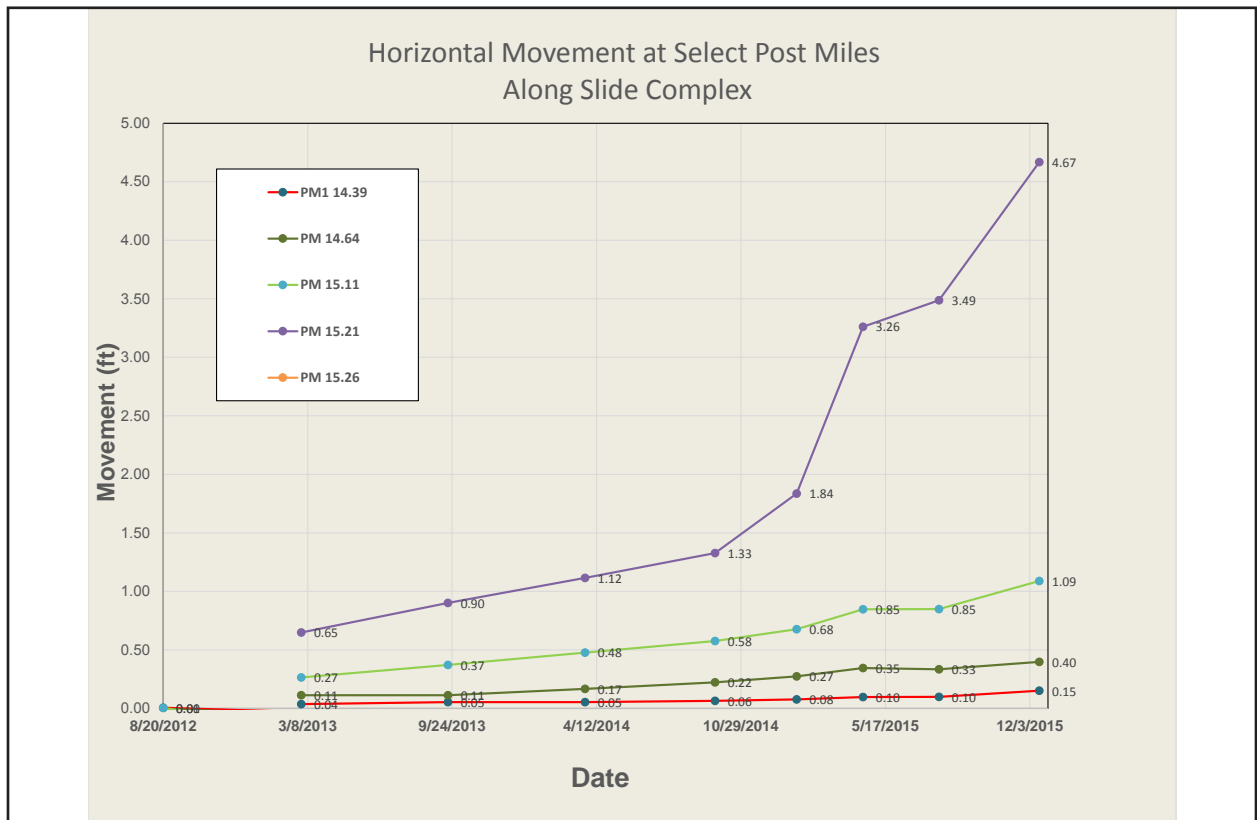
LAST CHANCE GRADE



Work To Be Done This Summer

LAST CHANCE GRADE





ROADWAY LATERAL MOVEMENT



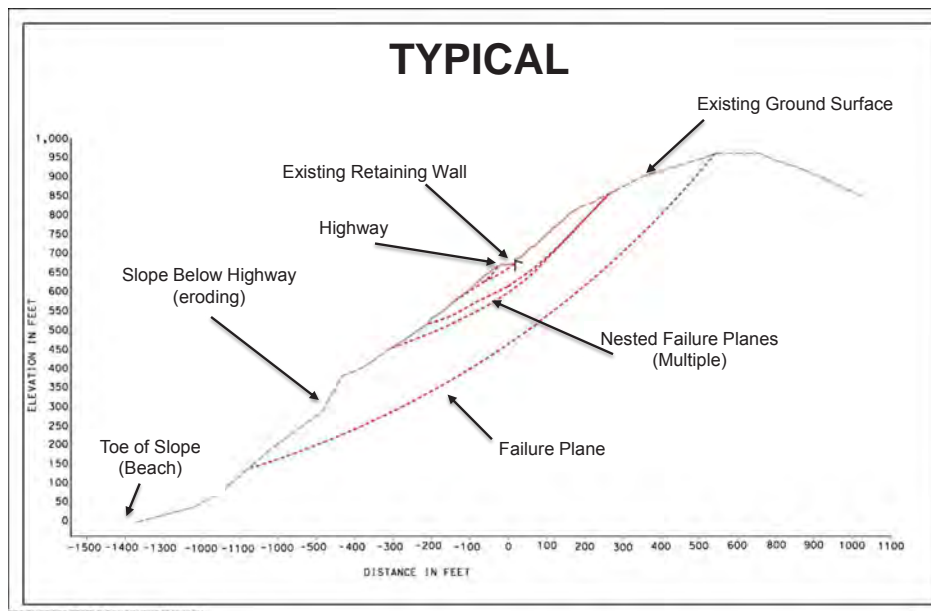
Surface Monitoring Data (Land Surveys) July 2012 – December 2015

- Recent LCG slide movement near RW #3: Vertical ~ **2.5'** Horizontal ~ **3.5'**
- Max horizontal movement near PM 15.21 ~ **4.67'**



CROSS-SECTION

TYPICAL



LAST CHANCE GRADE



HISTORIC TIMELINE

- 1894- Initial “Roadway” built across the site
 - Landslide Noted- “Last Chance Slide”
- 1930’s- Minor realignment performed
 - Landslide Noted-Expensive Maintenance Noted
- 1970’s -\$ and frequency of movement increasing
- 1980’s -Initiated studies for major realignment
 - Realignment Costly & Infeasible
- 1990’s –Reanalyzed major realignment
 - Realignment Costly & Infeasible
 - Maintain Existing Alignment
- 2009 -Safety Project
 - 6 Retaining Walls Constructed

LAST CHANCE GRADE



HISTORIC TIMELINE

- 2010 & 2011 -Federally Declared Storm Event
 - Received Federal Emergency Relief Program Funding
 - Additional Retaining Walls Necessary to Maintain Alignment
- 2012 –Increased Landslide Movement
 - Community Interest Rapidly Increased
 - Congressmen & Assemblymen Involvement
- 2014/15- Feasibility Study & Economic Impact Study
 - Congressman Huffman Working Group
 - Official Partnering with Parks & Tribes
 - Monitoring Systems Installed
 - Project Initiation Document Started
- Currently
 - Emergency Project (RW#3 / Undulating Alignment))
 - Funding Being Sought

LAST CHANCE GRADE



SUMMARY of HISTORY

- **Longstanding History of Road Failures**
- **No Full Closures**
- **Average Repair Cost**
 - \$1.2 mil / yr (1981-2012)
 - \$1.5 mil / yr (2012-2016)
 - Over \$40 mil (1981-present)

LAST CHANCE GRADE



PROJECT DEVELOPMENT (To-Date)

- **Feasibility Study Completed**
 - Included Economic Analysis
- **Project Initiation Document: On track to be completed this summer**
 - Funding identification is next critical step
- **Public Engagement Plan – Proactive Engagement w/ Stakeholders**
 - Initiated early
 - Will continue through out project
- **Several Working Groups**
 - Caltrans Staff/Specialists
 - Congressman Huffman's Working Group
 - Biological Resources Working Group (Agencies)
 - Partnering with Tribes & Parks (not Gov. to Gov)
 - Cultural Resources Working Group

LAST CHANCE GRADE



SIGNIFICANT SUPPORT FOR A PERMANENT SOLUTION

- Congressman Huffman's Stakeholder Group
- Last Chance Grade Partners
- Biological Resources Working Group
- Caltrans Multi-Disciplinary Project Development Team
- Cultural Resources Sub-Working Group
- Del Norte County LCG Citizens Advisory Committee
- Many Others.....(local and regional)

LAST CHANCE GRADE



MAP OF ALTERNATIVES

A1, A2, C3, C4, C5, F



PRELIMINARY ALTERNATIVES FOR STUDY

**Note: All ALTERNATIVES
STILL REQUIRE
GEOTECHNICAL &
ENVIRONMENTAL STUDIES
(CEQA / NEPA)**



PRELIMINARY ALTERNATIVES COMPARISON*

ALTERNATIVE	TRAVEL TIME ADDED (MINUTES)	CONSTRUCTION LENGTH (MI. OR FEET)	NEW CONSTRUCTION			LENGTH WITHIN PARKS (MILES)	CONSTRUCTION FOOTPRINT (ACRES)	CONSTRUCTION SCHEDULE (YEARS)	WATERSHED CROSSINGS		CONSTRUCTION COST IN 2016 \$ (MILLIONS)	EXISTING HABITAT TYPE	
			CULVERTS > 50'	TUNNEL	BRIDGES				WILSON CREEK	MILL CREEK		TYPE	ACRES
A1 Rudell Road to LOG Tunnel (includes 2,425 ft. tunnel)	1.0 min.	3.2 miles	9	Yes	1	0.8 miles	80 acres	3 years	1	0	\$680	Coastal scrub/grassland/riparian Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	7 1 13 57 0 1.5
A2 Rudell Road to Derrington Trailhead	0.8 min.	3.2 miles	10	No	2	0.6 miles	85 acres	2 years	2	0	\$275	Coastal scrub/grassland/riparian Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	7 1 13 81 9 3
C3 Rudell Road to South of Mill Creek Access (includes 1,680 ft. tunnel)	1.7 min.	7.8 miles	19	Yes	4	3.2 miles	245 acres	3 years	6	3	\$950	Coastal scrub/grassland/riparian Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	7 1 13 200 23 5
C4 Rudell Road to North of Mill Creek Access (includes 1,680 ft. tunnel)	1.5 min.	8.6 miles	14	Yes	5	4.0 miles	265 acres	4 years	6	4	\$1,000	Coastal scrub/grassland/riparian Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	7 1 13 200 43 0
C5 Rudell Road to Hamilton Road (includes 1,680 ft. tunnel)	2.6 min.	11.7 miles	21	Yes	11	7.0 miles	330 acres	4 years	6	10	\$1,250	Coastal scrub/grassland/riparian Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	7 1 13 216 93 0
F Full Tunnel Parallel to Existing Alignment (5,500 ft.)	1.0 min.	1.3 miles	N/A	Yes	N/A	N/A	4.5 acres	6.5 years	N/A	N/A	\$1,050	Coastal scrub/grassland/riparian Riparian Clear cut Young Redwood Forest Mature Redwood Forest Old Growth Redwood Forest	2 0 0 0 1 1.5
Maintain Existing Alignment						Unknown and unquantifiable							

*All figures are estimates



ENVIRONMENTAL & CULTURAL RESOURCES

- Extensive Environmental & Cultural resources located in the vicinity of all proposed alternative alignments for Last Chance Grade.
- Stakeholders are working together early & committed to avoiding and minimizing potential impacts to these resources.

Federally Recognized Tribes:

- Elk Valley Rancheria
- Tolowa Dee-ni' Nation
- Yurok Tribe

LAST CHANCE GRADE



ENVIRONMENTAL RESOURCES

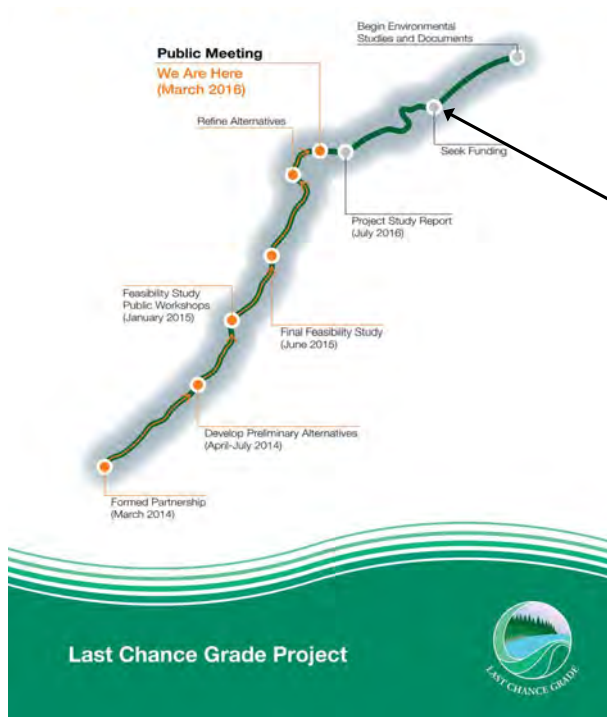


SIGNIFICANT ENVIRONMENTAL RESOURCES

- **Many Studies Will Be Required:**
 - Old Growth Redwoods
 - Marbled Murrelet
 - Cumulative Watershed Impacts
 - Specific Fisheries Impacts
 - Habitat Connectivity Issues
 - Bats, Pollinators, etc...
- **Significant Mitigation Expected**



Project Timeline



Actual Project Delivery Determined by Acquisition of Funding.

Different Funding Programs Have Different Delivery Requirements

Usually Seek Funding After PSR Seeking It Now

Potential Project Delivery Milestone Durations:

- **Enviro Studies: ~5-8 yrs**
- **Design, Permits, ROW: ~3-5 yrs**
- **Construction: ~5-8 yrs**



EMERGENCY PROJECTS

- **CALTRANS' EMERGENCY PROJECT REQ.**
- **FEDERAL EMERGENCY FUNDING**
 - **PROCESS**
 - **FUNDING REQ.**
- **CALTRANS' RESPONSE SCENARIOS**

LAST CHANCE GRADE



CALTRANS' EMERGENCY PROJECT DEVELOPMENT PROCESS

Per PCC 10122 – State can suspend State Contract Act, and initiate an Emergency Contract under specific conditions-

Requirements / Constraints:

- Beyond Caltrans' Maintenance Forces Abilities (Schedule / Equipment / Materials / Technical)
- Project must prevent or mitigate the loss or impairment of life, health, property, or essential services.
- State funds must exist before contract can be initiated

LAST CHANCE GRADE



Damage That Caltrans Responds To



Federal Highway Administration (FHWA) Emergency Relief (ER) Program

Congressionally appropriated program, not a standard Fed-Aid Program. Only applicable under unique conditions. Program has many constraints & specific requirements.

Program Initiation:

- Significant damage occurs & coordination with FHWA begins
- Through Office of Emergency Services (OES), a Gubernatorial or Presidential Proclamation declares a State of Emergency, which initiates the ER Program - allowing project applications.
- FHWA approves, denies or requires adjustments to project applications

LAST CHANCE GRADE



Federal Highway Administration (FHWA) Emergency Relief (ER) Program

Some of the Requirements:

- State ROW Only.
- Betterments (improvements) not allowed.
- CEQA/NEPA*, Permits, Right of Way (ROW) all required.
- Funded \$100 million per year- All US States and Territories.
- \$100 million max project cost, per proclamation, per state, per year.
 - Projects above \$100 million requires unique congressional appropriation.

❖ LCG Realignment Project would require several Variances

LAST CHANCE GRADE



EMERGENCY RESPONSE -1

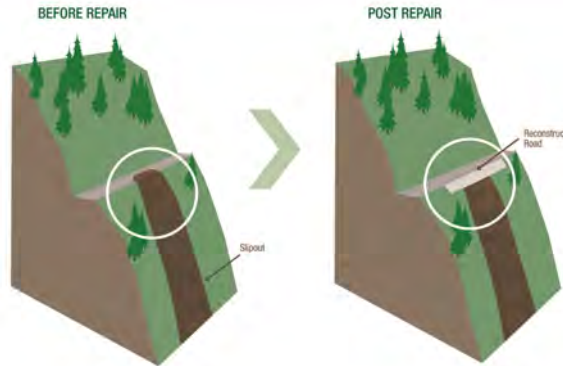
SCENARIO 1

Small Scale Slipout

Caltrans Response
Reconstruct Roadway
in Place

Construction Duration
Days to Weeks

Traffic Access
Yes. Likely One-Way
Reversible



HAS BEEN OCCURRING AT LCG

LAST CHANCE GRADE



EMERGENCY RESPONSE -2

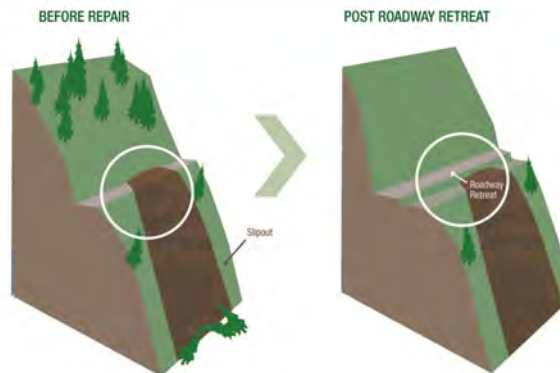
SCENARIO 2

Moderate Scale Slipout

Caltrans Response
Roadway Retreat Away
from Ocean

Construction Duration
Weeks to Years

Traffic Access
Short-Term Full Closure.
Then, One-Way
Reversible Traffic



**NOT OCCURRING AT LCG
(will be next step)**

LAST CHANCE GRADE



EMERGENCY RESPONSE-3

SCENARIO 3

Large Scale Slipout

Caltrans Response

Construct Temporary
Access Road (1 or 2 lanes)
+ Accelerate LCG
Realignment Project

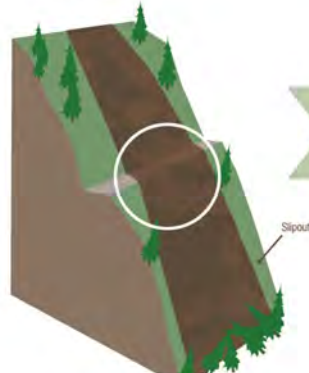
Construction Duration

Years

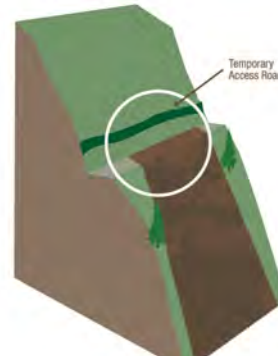
Traffic Access

Full Closure. Then,
One-Way Reversible
Traffic on Temporary
Road Until Realignment
is Complete

BEFORE REPAIR



POST INSTALLATION
LIMITED ACCESS



**NOT OCCURRING AT LCG
(if necessary)**

LAST CHANCE GRADE



EXTENSIVE SITE MONITORING

- Near-Real Time Monitoring System
- Field Topographic Surveys
- Aerial Surveys
Slope & Toe Erosion
- Daily Field Inspections

LAST CHANCE GRADE



WHATS OCCURRING NOW

- Project Initiation Document will be completed June, 2016.
- Federal Funding (ER & Other Potential Sources) Being Sought
- Monitoring & Maintaining Existing Road is Priority
 - Repair Retaining Walls
 - Adjust Vertical Alignment
 - Power Supply; Signs w/ Lights; Changeable Message Signs
 - Additional Monitoring Systems Planned
 - Web Cameras for Public's Use
 - Slope Lighting

LAST CHANCE GRADE



FOR MORE INFORMATION

Website:

[www. Lastchancegrade.com](http://www.Lastchancegrade.com)

Contact:

lastchancegrade@dot.ca.gov

(707) 445-6464, TTY 711

LAST CHANCE GRADE



APPENDIX C: COMMENT CARDS

EUREKA

I would hope that my comment is so obvious as to be unnecessary, but I am told, that is not the case. Since all routes except F start by bypassing the most problematic area, in partly much the same route, that when construction finally begins, you would start work at the south end. That is the part that is mandatory regardless of the route chosen. It would also prepare as quickly as possible for a complete loss of the existing road. If one of the C routes were chosen, you could still cut over route 1 or 2 and replace the part which must be replaced.

Great job! Thank you for the fascinating information. I really want to work on this project ... after I finish Lake 20/53.

- 1) Keep 101 to Oregon/California open! Period
- 2) A2 best
- 3) Tunnel won't work, too much money to maintain.

I have deep concerns based on Caltrans past record of numerous serious screw ups and sloppy work. I do not want to see any so-called improvements such as road adjustment/expansions to facilitate access for Starbucks. I have concerns for the old growth redwoods and wildlife since Caltrans record in that regard is very poor. My other concern is for the salmon at Mill Creek – that is critical salmon habitat!

My preferences for road placement is to (starting south) go on to Green Diamond land (blue and yellow lines), continues to top of blue line and then continue up 5 to Hamilton Road. If the road is moved inland the old 101 would hopefully recover and revert back to nature giving the trees, _____, etc. a chance.

CRESCENT CITY

A1

Horrible meeting.

KLAMATH

- How will Caltrans maximize the economic opportunities for local tribes and communities?
- What is the yearly costs of Last Chance Grade now based off past costs for maintenance?

- What is the actual movement in feet (out and down)?
- Where are the top 3 funding sources for each alternative? How will Caltrans work with tribes to fundraise?
- How will Caltrans “empower” tribes with this project as an example for future projects? How will Caltrans get guidance of “empower” from tribes?

Last Chance Grade Draft Public Engagement Plan

Prepared by:



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Appendix A: Last Chance Grade Project Timeline

Appendix B: Last Chance Grade Stakeholders

Last Chance Grade Draft Public Engagement Plan January 2016

I. Introduction and Project Purpose

The Last Chance Grade (LCG) Project is a collaborative effort to study alternatives for a permanent solution to instability and roadway failure on a 4-mile segment of US Highway 101 in Del Norte County, extending between Wilson Creek to 9 miles south of Crescent City. In March 2014, Caltrans established the LCG Partnership to create an active, working relationship with the agencies and groups that have management responsibilities for lands and resources that would be directly impacted by any realignment of the route. Members of the partnership include: Caltrans District 1, California Department of Parks and Recreation, National Park Service, the Yurok Tribe, Tolowa Dee-ni' Nation and Elk Valley Rancheria. The Partnership initiated a public engagement process and Engineered Feasibility Study (EFS) that included 14 potential alternative routes to ensure the safety and reliability of the highway while protecting the area's critical economic, environmental and cultural resources. The EFS was completed in June 2015.

The next stage in the LCG Project will be to develop the Project Study Report (PSR) to perform a more detailed analysis of the alternative recommended for further study as they relate to the cost, scope and schedule of developing the project. In this phase, alternatives and alignments will be refined with more precise cost estimates along with more detailed technical analysis of proposed structures and right-of-way. Caltrans will conduct public engagement activities to share information and solicit community in the refined alternatives and alignments. The PSR is scheduled to be completed in July of 2016.

Caltrans is required by the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) to study alternatives and determine the potential environmental impacts before deciding on which alternative to select. This process will involve other federal and state agencies, public hearings, a draft Environmental Impact Report and Environmental Impact Statement, public comment, and eventually a decision on the selected alternative. The environmental review process will likely take about eight years, followed by a design and permitting phase, estimated to take five years, and construction, estimated at five to eight years for a total timeline of twenty-one years. A potential project timeline is attached as Appendix A.

Caltrans will continue public engagement throughout the Project Study Report, Project Approval and Environmental Document, and Design and Permitting phases of the project.

This document provides a public engagement strategy to ensure public education and involvement in the development of the PSR. It also describes recommended outreach activities to help keep the public engaged throughout the long-term planning process.

II. Stakeholders

Project stakeholders can be categorized into seven major groups. They include: The Last Chance Grade Partners; the Huffman Stakeholder Group; the Biological Resources Working Group; Partner Cultural Resources Specialists; the Del Norte County Last Chance Grade Citizens Advisory Committee; community stakeholders; and members of the general public. Members of all these varied stakeholder groups have been and will continue to coordinate their efforts and collaborate on finding a long term solution to instability at Last Chance Grade.

A. Last Chance Grade Partners

The LCG Partners consist of the following members: Caltrans District 1; California Department of Parks and Recreation; National Park Service; Yurok Tribe; Tolowa Dee-ni' Nation; and Elk Valley Rancheria.

These entities have entered into a Memorandum of Understanding establishing a framework for cooperation to support development of alternatives to instability of Route 101 at Last Chance Grade and an implementation strategy that all the Partners support. The LCG Partners have met regularly since March 2014. The Partners invest substantial time preparing for, attending these meetings and conducting follow-up activities to identify alternatives that will lead to long-term stability of the roadway. The LCG Partners will continue to work collaboratively throughout the life of the project.

B. Huffman Stakeholder Group Process

Congressman Jared Huffman initiated the Last Chance Grade Stakeholder Group (LCG Stakeholder Group) process on March 30, 2015. Recognizing the wide range of issues and concerns and the need for in-depth understanding to advance these discussions, the Huffman process brought together representatives from agencies, tribes, environmental and business organizations to participate in a series of facilitated discussions to explore options for Last Chance Grade. As of November 2015, the LCG Stakeholder Group has reached consensus on a series of topics. They agreed they will continue to meet, as funding and new information is available, throughout the process of preferred alternative selection. Caltrans provided substantial support and staff participation in these meetings and will continue in the future as requested. It is anticipated the LCG Stakeholder Group will continue to be involved throughout the life of the project.

Members of the LCG Stakeholder Group are listed in Appendix 1, "Last Chance Grade Stakeholders."

C. Biological Resources Working Group

Caltrans has convened a Biological Resources Working Group consisting of Partner and agency specialists, including experts on environmental and other resources from agencies with regulatory responsibilities and other organizations involved in the project. This group plays a critical role in ensuring that the proposed strategies that are being considered by stakeholders

are consistent with the regulatory requirements administered by the agencies. This group will continue to meet on a regular basis to discuss issues including mitigation and resource classification, as needed throughout the life of the project.

D. Cultural Resources Specialists

Caltrans is also meeting with the Partners' cultural resources specialists to ensure that impacts to these resources and possible mitigation are considered and included in the consideration of alternatives. Should the need arise, a regular Cultural Resources Working Group will be convened.

E. Del Norte County Last Chance Grade Citizens Advisory Committee

Community members in Del Norte County formed an LCG Citizens Advisory Committee to support the effort to find an alternate route at Last Chance Grade and raise public awareness of the issue. Since September 2013, they have been meeting with government entities and potentially impacted businesses throughout the region to get letters of support for creating an alternative to the current alignment.

F. Community Stakeholders

Community stakeholders are detailed in Appendix B. These include but are not limited to: residents, elected officials, governmental and resource agencies, Native American tribes, public transportation providers, safety groups, Community Services Districts, health organizations and medical providers, bicycle and pedestrian advocacy groups, Chambers of Commerce and economic development corporations, environmental groups, community-based organizations, schools, and area businesses.

G. Members of the General Public

This group includes members of the general public and residents of the potentially impacted communities. Caltrans will work throughout the life of the project to keep the public informed regarding the planning process and solicit input at key points in the process. Caltrans will also continue its ongoing efforts to keep residents and area travelers informed of road conditions and activities being conducted to ensure and enhance safety.

Caltrans continues to maintain and update the stakeholder list throughout the process.

III. Public Engagement Strategy

The Last Chance Grade Public Engagement Plan (PEP) is designed to engage a diversity of stakeholders and community members throughout the lifetime of the project. Since the planning process will take time and additional information will continue to surface as more technical studies are completed, it is important to keep people engaged and informed over the long-term. The entire community needs to understand that this is not just a Caltrans project, but it is a project the entire community needs to be invested in to ensure the long-term safety and economy of the region. The alternatives and potential impacts are complex and there is no one alternative that will have minimal impacts. Plus, each alternative has its own impacts that must be evaluated individually.

This strategy recommends activities to educate community members on an ongoing basis, about the issues involved in the analysis and evaluation of the alternatives for the permanent solution to roadway failure at Last Chance Grade, the impacts of construction, and the schedule for completion. The process will also provide Caltrans and its Partners with insights into the community's needs and priorities.

A. Goals

The outreach goals of the PEP are to:

- Share information on the technical, land use, geological and environmental issues and challenges to overcome in finding the most reasonable transportation solution.
- Obtain informed, relevant, and useful comments from a wide variety of stakeholders throughout the region.
- Address publicly the potential for roadway failure and help to alleviate concern regarding the interim safety of using the roadway.
- Demonstrate to the public that Caltrans is working diligently, inclusively, and transparently to study viable options for preventing long-term roadway closures in the future and to provide a safe and reliable route.
- Improve and maintain relationships between Caltrans and the public, stakeholders, elected officials, tribes, and the media
- Share information on the status/condition of current and upcoming emergency projects, expected delay, and relative probability of failure.
- Optimize the public education and information sharing opportunities afforded by the Huffman Stakeholder Group process.

B. Public Engagement Activities for the PSR

Three community workshops and associated public outreach activities are planned in support of the Project Study Report process.

1. Project Study Report Community Town Hall Meetings

Three community town hall meetings will be conducted in March 2016. The purpose of these town hall meetings will be to provide updated information to the public and stakeholders regarding the alternatives and potential impacts and to receive input to inform the completion of the Project Study Report. This will include assisting the community in understanding the decision-making process for selecting an alternative and where their input can influence that process, as well as addressing concerns and clarifying the requirements regarding an emergency project. Each of the three town hall meetings will have the same general content, design and format.

Town Hall Locations and Schedule

Town hall meetings will be held in Crescent City, Klamath and Eureka. Town hall meeting locations will be low-cost or no-cost, generally accessible to all parties, ADA-compliant, and accessible by public transit. The Crescent City and Eureka town hall meetings will be held in the evening and as requested by the community, the Klamath town hall meeting will be held during daytime hours. Caltrans anticipates holding the town hall meetings on consecutive days.

Town Hall Meeting Outreach

Outreach activities will begin approximately 3 weeks in advance of the town hall meeting dates using the following recommended methods:

- Notices posted on District and websites and District social media channels
- Press releases and local media relations
- Email communications including email blasts and emails to targeted stakeholders and residents.
- Mailed postcards: Postcards will be mailed 3 weeks in advance to an existing database of interested parties that includes: residents, businesses and organizations
- Community-based communications channels. Interested organizations and community groups will be asked to publicize the town hall meetings through their communications channels including: newsletters, announcements at meetings, social media, email communications and posting and distribution of printed flyers.
- One-on-one communications via phone or email: Targeted stakeholders will be contacted by phone and email to ensure they are aware of the opportunity to participate in the town hall meetings.

Town Hall Meeting Format

The town hall meetings will include an open house with display materials including illustrative display boards and project area maps, a PowerPoint presentation with question and answer period, and handout materials or brochures to provide updated information. All information and instructions will be provided in language that is easy to understand without detailed technical knowledge. The presentation will be kept as concise as possible. Opportunities will be provided to submit input, either verbally during the town hall meetings or through written comment cards. The presentation may also include interactive live electronic polling to enhance engagement.

Online Virtual Town Hall Meeting

Coinciding with the March 2016 community town hall meetings, a “virtual town hall meeting” will be hosted on the project website in order to maximize engagement with those who are unable to attend in person. The virtual town hall meeting will include a taped version of the PowerPoint presentation and a brief survey to collect input. The presentation will be edited to make it as concise as possible (ideally 8-10 minutes in length) and recorded specifically for this purpose.

Town Hall Meeting Summary and Documentation

Once the town hall meetings and comment period is completed, a detailed summary will be provided, focusing on comments received from participants. To ensure transparency, the summary will include transcriptions of comment cards received as well as copies of comments submitted by individuals via correspondence or email. The final summary will be posted on the project and District websites, along with copies of related town hall meeting materials.

2. Other PSR Outreach

Throughout the PSR process, the following outreach tools will be used to keep stakeholders and the public up to date on the status of the project. Outreach activities should be conducted at least once per quarter and at project milestones as they occur.

Project Websites

The project and District websites will be updated on a regular basis. Automatic email notifications will be sent when new information is posted to the project website. Updates will include, but are not limited to: updated project information; all completed project reports and studies; executive summaries of LCG Partner Meetings; summaries of public engagement activities; and public correspondence received regarding the project. The website will also allow users to comment throughout the process through an on-line comment form. A protocol will be established for responding to comments submitted.

E-Blasts or E-Newsletters

Regular e-blasts will be sent at least once per quarter and/or at project milestones. These short, regular communications are intended to keep people engaged with short snippets of information. A template and anticipated schedule of topics will be developed.

Briefings and Presentations

Briefings and presentations will be conducted with elected officials, agency leadership and others as needed by Caltrans or on an as requested basis pending staff availability.

Social Media Engagement

Regular posts on the Caltrans District 1 Facebook and Twitter accounts will be used to keep people engaged. Posts may focus on road conditions, project milestones, findings of technical study and other topics of interest. Posts will be scheduled 1-2 times per month.

Press Releases and Local Media Relations

Caltrans will issue a press release to local media outlets at project milestones including the release of the Project Study Report.

C. Ongoing Communications and Public Engagement

1. Ongoing Communications

Throughout the entire project period, Caltrans should continue to proactively reach out to and engage a full range of stakeholder groups. Project websites should be updated as new information, reports, meeting minutes or other items become available. Website updates should occur regularly, at least monthly or at project milestones, whichever occurs more frequently.

Caltrans is conducting a variety of monitoring activities and maintenance or construction projects on an ongoing basis to keep the current alignment open and safe, including surveying, real-time monitoring, helicopter flyovers, an emergency wall repair project, and safety signage. Caltrans PIO will continue to use established channels to share information about road and safety conditions on a day-to-day or as-necessary basis.

In addition, at least three communications activities should take place each quarter, including project milestones and outreach for workshops or other public engagement opportunities as appropriate. These can include the following methods as previously described:

- E-blasts or E-newsletters
- Social media posts
- Press releases and local media relations
- Briefings and presentations for local officials, community groups, and other stakeholders

2. Public Scoping Workshops and Hearings

Currently, two additional rounds of public workshops are planned to take place during the project scoping period. Other activities may be scheduled to meet future needs, utilizing the methods and tools outlined in this PEP.

Three CEQA/NEPA Scoping Workshops

Three public scoping workshops will be held at the outset of the Environmental Document process, which is projected to be initiated in 2018. The purpose of the scoping workshops will be to educate stakeholders and the public about the current status of the project and impacts, and to gather input regarding the project as part of the CEQA/NEPA-mandated public participation requirements. Locations and timing are to be determined.

The meeting format and outreach will be conducted through all available methods, similar to the approach used for the March 2016 community workshops.

CEQA/NEPA Draft EIR/EIS Public Hearings

Once the draft Environmental Impact Report (EIR) and Environmental Impact Statement (EIS) are completed, a comment period will be established with a specific cutoff date. The draft EIR and EIS will be posted on the project and/or District 1 websites, with provision to submit comments via email or correspondence.

A minimum of three public hearings will be held to enable stakeholders and the public to review the draft. Details of location and timing are to be determined.

D. Performance Measures

The public engagement process will be assessed according to ability to reach a broad range of stakeholder groups and achieve targeted objectives. Caltrans will consider the following metrics to track and evaluate public engagement efforts:

- Number of participants
- Number of responses
- Quality and quantity of input
- Demographics of respondents
- Consistency of results by method
- Level of agreement achieved

Last Chance Grade Project Initiation Document

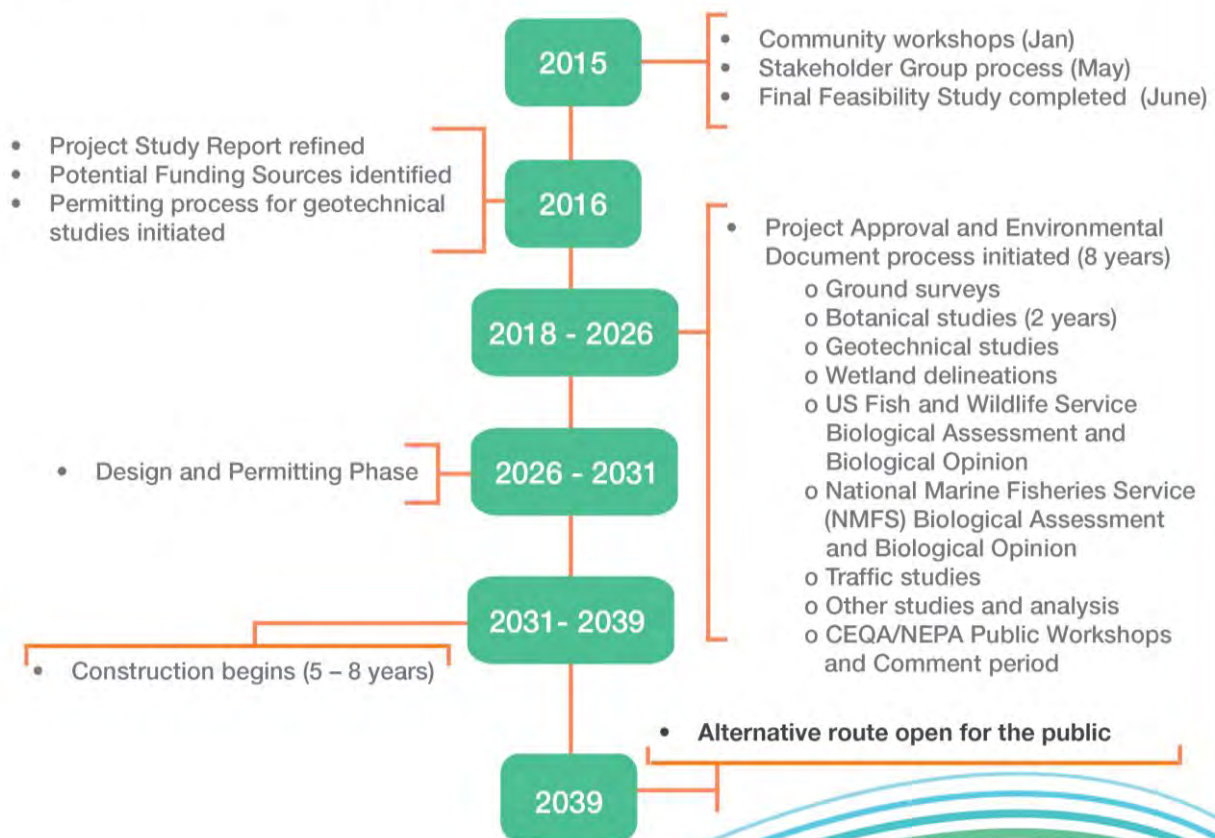
Public Engagement Plan

Appendix A: Last Chance Grade Project Timeline

Project Timeline

Identifying, planning and constructing an alternative route at Last Chance Grade is a complex and lengthy process. Along with securing stakeholder and community agreement along the way, Caltrans will need to conduct a variety of studies and analyses to support decision making throughout the process.

Here's a potential timeline that shows the sequence and timing of key project milestones. In the event of a large scale roadway failure at Last Chance Grade the project will become an **"emergency project"** with an **accelerated schedule**. The project phases including design, environmental documents, and construction will overlap in order to complete the project and have the road open to the public in **2-8 years**.



Last Chance Grade Project Initiation Document

Public Engagement Plan

Appendix B: Last Chance Grade Stakeholders

I. Last Chance Grade Stakeholder Group

The Last Chance Grade Stakeholder Group convened by Congressman Huffman is made up of representatives from each of the following groups, agencies and organizations:

- California Highway Patrol
- California State Parks
- Caltrans
- Crescent City
- Crescent City-Del Norte Chamber of Commerce
- Del Norte County
- Del Norte Local Transportation Commission
- Elk Valley Rancheria
- Environmental Protection Information Center (EPIC)
- Friends of Del Norte
- Green Diamond Resource Company
- Humboldt County
- Humboldt County Association of Governments
- Redwood National and State Parks
- C. Renner Petroleum
- Rumiano Cheese
- Save the Redwoods League
- Tolowa Dee-ni' Nation (formerly Smith River Rancheria)
- Yurok Tribe

II. Additional Stakeholders

All residents of the nearby communities affected by instability at Last Chance Grade are considered to be stakeholders in the process. Specific stakeholders include, but are not limited to, the following groups, agencies, and organizations:

Government

- Federal, State and County elected officials
- Del Norte County Board of Supervisors
- Del Norte Local Transportation Commission (DNLTC)
- Del Norte County Community Development Department
- Humboldt County Association of Governments
- City of Crescent City
- California Department of Parks and Recreation
- California Department of Fish and Wildlife
- California Coastal Commission
- National Park Service
- North Coast Regional Water Quality Control Board (NCRWQCB)
- National Oceanic and Atmospheric Administration (NOAA)
- US Fish and Wildlife
- USDA Forest Service

Native American Tribes

- Elk Valley Rancheria
- Tolowa Dee-ni' Nation (formerly Smith River Rancheria)
- The Yurok Tribe

Community Groups

- Del Norte County Last Chance Grade Citizens Advisory Committee

Public Transportation Providers

- Redwood Coast Transit
- Humboldt Transit Authority
- Arcata and Mad River Transit System
- Other public transportation providers

Safety Groups

- California Highway Patrol
- CalFire
- Paramedics and Emergency responders
- Fire departments and fire protection districts

Community Services Districts

- Big Rock Community Services District
- Humboldt Community Services District

- Del Norte Local Agency Formation Commission (LAFCo)

Health Organizations and Medical Providers

- Sutter Coast Hospital
- Del Norte Healthcare District

Bicycle and Pedestrian Advocacy Groups

- Local bike groups
- Recreational bike users
- Pedestrian and bike advocates
- California Walks
- California Bicycle Coalition
- California Bicycle Advisory Committee
- Rails-to-Trails Conservancy

Organizations

- Crescent City/Del Norte County Chamber of Commerce
- Del Norte Economic Development Corporation
- The Greater Eureka Chamber of Commerce
- Arcata Economic Development Corporation
- Klamath Chamber of Commerce
- Friends of Del Norte
- Save the Redwoods League
- Environmental Protection Information Center (EPIC)
- Redwood Region Audubon Society
- Center for Biological Diversity
- Area 1 Agency on Aging Advisory Council

Schools

- Del Norte County Unified School District
- Humboldt County School District
- Margaret Keating Elementary School, Klamath
- Arcata School District
- Humboldt State University
- Other local community and charter schools

Area Businesses

- Green Diamond Resource Company
- Rumiano Cheese
- Other area businesses or those with interests in the area

ATTACHMENT I
Preliminary Environmental Assessment Report



PRELIMINARY ENVIRONMENTAL ANALYSIS REPORT

1. Project Information

District: 1	County: DN	Route: 101	PM: 12.0 / 15.5	EA: 01-0F280
				Project ID: 0115000099
Project Title: LAST CHANCE GRADE REALIGNMENT				
Project Manager	Sebastian Cohen	Phone # 707-441-3979		
Env. Senior	Rosalind Litzky	Phone # 707-445-5222		
Planner	Jason Meyer	Phone # 707-445-6322		

2. Project Description

2.1 Purpose and Need

Project Purpose:

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

Project 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 planned and emergency 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;
- Risk of delay/detour to traveling public;
- Increasing maintenance costs and;
- Increase in frequency and severity of large storm events caused by climate change.

Description of Work

This project proposes to construct a new roadway around the existing Last Chance Grade on a new alignment. Alternatives include a tunnel and a three to fifteen mile long realignment around the failing area. The concept is for a two lane highway with passing lanes. The alternate alignments pass through coastal forests and varying ages of redwood forest including old-growth and previously harvested forests from 16 to 90 years old. The various project alternatives include multiple creek crossings and bridges. The new alignments pass through private timberland and State and National Park lands.

Construction activities will include, but are not limited to: extensive vegetation removal; large tree removal; excavation and fill; tunneling; culvert placement; construction of bridges and retaining walls; placement of various guardrails and median barriers; and compaction of soil and paving for a driving surface.

ALTERNATIVES

Seven alternatives were considered for the project, including an alternative for maintaining the existing alignment—also 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 4 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).

Viable Alternatives

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

This alternative departs U.S. Highway 101 (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-foot-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.

<i>Alternative A1 Summary</i>				
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. 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, 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 3.2 miles in length and eliminates a 2.5 mile long segment of existing US 101.

<i>Alternative A2 Summary</i>				
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 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.

<i>Alternative F Summary</i>				
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, remaining east of the Del Norte Coast Redwoods State Park, and crosses three ephemeral tributaries of Wilson Creek utilizing two bridges (Bridges 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 1,100-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 of the PSR. 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 mile 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.

<i>Alternative C3 Summary</i>				
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 would 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.

<i>Alternative C4 Summary</i>				
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 a 66-foot-high bridge (Bridge 5c). At mile 9.9 a larger tributary of WB Mill Creek is crossed by a 12-foot-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 (Bridges 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.

<i>Alternative C5 Summary</i>				
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 are \$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 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*.

Rejected Alternatives

The Last Chance Grade Feasibility Study evaluated a total of fifteen alternatives—of which eight were eliminated 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.

3. Anticipated Environmental Approval

- 3.1 CEQA:** EIR
- 3.2 NEPA:** EIS
- 3.3 CEQA Lead Agency:** Caltrans
- 3.4 Estimated length of time (months) to obtain environmental approval:** 5 to 9 years (A revised schedule would need to be prepared if emergency funding was obtained.)
- 3.5 Estimated person hours to complete identified tasks:** 730,000 hours

4. Special Environmental Considerations*Section 4(f):*

This project has the potential to affect park resources, including old-growth redwoods in Del Norte Coast Redwoods State Park and Redwood National Park (parks). All alignments could remove mature trees, and Alignment A2 may remove approximately three acres of old-growth redwoods. The current alignment runs primarily through Del Norte Coast Redwoods State Park, one of the three state parks managed jointly with Redwood National Park as Redwood National and State Parks. Connecting the new alignment to the old will require converting Park lands into highway. The parks are a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site, primarily in recognition of the scientific, ecological

and cultural values of old-growth redwood forest. This will require a Section 4(f) Evaluation as part of the environmental impact analysis document. Project effects on visual quality and aesthetics must be considered.

Right of Entry:

The project will require obtaining Right of Way within the Parks, therefore a Right of Entry will need to be obtained.

Endangered Species:

Marbled murrelets (federally threatened, state endangered) may be impacted by nesting habitat removal (A2) and increased predation through edge effects (C3, C4, C5).

The C alignments may have impacts on coho salmon (federally threatened, state threatened) in Mill Creek, which provides most of the spawning grounds for the coho salmon within the Smith River watershed.

There may be state and federally listed plant and wildlife species not yet identified within the project area that may require consultations and mitigation to reduce impacts.

Wildlife Habitat Connectivity:

Wildlife habitat connectivity, specifically for mesocarnivores, will be impacted by Alternatives A1, A2, C3, C4 and C5 due to the length and width of the highway corridor.

Permit to Conduct Scientific Research and Collections:

The project will require extensive access to both park lands and private timberlands to conduct various surveys. The parks will require a permit to conduct scientific research and collections.

Coastal Zone:

All alternatives will need to address issues related to impacts to visual quality, safety, endangered species, cultural resources, wetlands, Environmentally Sensitive Habitat Areas (ESHA), and public access within the Coastal Zone.

Wetlands and Other Waters:

The alignments will cross numerous small streams with bridges and culverts. There are likely numerous wetland seeps within the project area.

Cultural:

There is the potential for alignments to cross important archeological sites.

5. Anticipated Environmental Commitments

All alignments, and especially Alignment A2, will require mitigation for direct impacts to old-growth redwoods. These cannot be replaced in-kind. While the exact mitigation will be determined later in the

environmental process, mitigation could come in the form of: 1) purchasing stands of old-growth redwood and donating to the Park; and/or 2) funding late seral management and research within the parks. The exact acreage of addition to the Park and/or amount of funding will be carefully considered and determined in future project phases.

Alignments C3, C4 and C5 will require mitigation for impacts to coho salmon in Mill Creek. Coho mitigation could come in the form of: 1) high quality stormwater treatment systems; 2) fish passage projects within the Smith River watershed; 3) in-stream habitat restoration projects; and/or 4) funding road removal/watershed improvement projects within the Mill Creek watershed.

All alignments would break up the forest habitat and impact connectivity because of the linear feature of the highway corridor, therefore mitigation would be required for indirect impacts to wildlife connectivity in general. Alignments C3, C4 and C5 would have higher impacts on wildlife connectivity due to their greater lengths. Most of the wildlife in this area will use drainages rather than ridges to traverse the area. Mitigation could come in the form of: 1) reducing cut and fill widths wherever possible; 2) tunneling under ridges rather than cutting through them; 3) bridging over drainages rather than placing culverts and filling them; and/or 4) fixing the off-site wildlife connectivity problems at the Prairie Creek bypass area by installing a new, porous median barrier.

All alternatives will require some form of mitigation for various resources including wetlands and other waters, coastal wetlands, redwood forest habitat, cultural, archeological, and visual. Mitigation for Caltrans projects has historically cost approximately 10 to 20% of the overall project cost. The diverse types of impacts for the various alignments will be mitigated in different ways. These will be developed and discussed in greater depth in the environmental document after studies have been completed. Our current approach is to estimate mitigation costs based on the historic percentages, and some reasoned projections. Funding of mitigation can be split into three main categories:

- Acquisition: funds on the Right of Way Datasheet for purchasing land for mitigation, or lump sum payments to other agencies or entities to implement mitigation projects (buying credits in a mitigation bank.)
- Construction: funds utilized paying a contractor to implement a mitigation plan, such as building a wetland, implementing a planting.
- Support: funds utilized internally within Caltrans developing a mitigation plan, such as design and environmental clearance.

The estimates include a breakdown of these categories. The tunnel alternatives would require a greater percentage of mitigation funding in the construction category. It is assumed that the limited footprint of Alternatives A1 and F would require less acquisition, and some minor mitigation would be implemented.

In contrast, mitigation for A2, C3, C4, and C5 lean more heavily on acquisition funds. These alignments will likely have either a large portion of land purchased and donated to the Park with some initial management funding, or a large sum of money dedicated to Parks to improve watershed characteristics in Mill Creek. Work

in Mill Creek would include efforts to remove the network of old logging roads, and removing and maintaining culverts along those roads.

A1: Mitigation for this alignment will likely be 10% of the project cost. This alignment assumes some effects to old-growth redwood, coastal resources and timberlands. The lower percentage reflects the reduced footprint of the tunnel combined with the higher construction cost of the tunnel. Mitigation costs would be broken up as follows: 25% Acquisition, 50% Construction, and 25% Support.

A2: Mitigation for this alignment will likely be 50% of the project cost. This alignment assumes effects to old-growth redwood, coastal resources and timberlands. The use of a higher percentage is to account for the difficulty of mitigating loss of old-growth redwoods, and the lower cost of construction of this alignment. Mitigation costs would be broken up as follows: 50% Acquisition, 25% Construction, and 25% Support.

C3, C4, C5: Mitigation for these alignments will likely be 15% of the project cost. These alignments assumes some effects to old-growth redwood and 90-year-old redwood forest, wildlife connectivity, coastal resources, watersheds and timberlands. Mitigation costs would be broken up as follows: 50% Acquisition, 25% Construction, and 25% Support.

F: Mitigation for this alignment will likely be 5% of the project cost. This alignment assumes some impact to old-growth redwood and coastal resources. The high cost of construction and relatively low footprint of the alignment lead to smaller effects to the environment, thus a lower percentage. Mitigation costs would be broken up as follows: 25% Acquisition, 50% Construction, and 25% Support.

6. *Permits and Approvals*

This project will require numerous permits and approvals, which includes the following:

- 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

The project may require a National Environmental Policy Act / 404 and Least Environmentally Damaging Practicable Alternative concurrence from the Army Corps of Engineers to address wetlands and other waters impacts regulated by the Clean Water Act. This depends on the number of stream crossings and hillside seeps affected.

7. Level of Effort: Risks and Assumptions

Assumptions:

1. Timely identification and surveying of the project study area so environmental teams can begin surveys.
2. Timely conducting of subsurface geotechnical investigations within old-growth redwoods on tunnel alignments. Obtaining separate permits, preparing an environmental document, close coordination with Parks, and receiving a Permit to enter from Parks could take up to 12 to 18 months.

This project has several substantial risks.

1. All of the alignments, but especially Alignment A2 that includes removal of three acres of old-growth redwoods has substantial risk because it requires a Section 4(f) agreement with parks for use of important park resources; difficulty in adequately mitigating the loss of old-growth; removal or adverse modification of marbled murrelet habitat could result in a jeopardy opinion from USFWS; potential lawsuits under NEPA and CEQA; and environmental groups organizing to stop construction (tree sitters or other activities).
2. Alignments C3, C4, and C5 will have risk in the quantities of excess material and the difficulty of finding a disposal site within the project area; difficulty in mitigation of impacts to wildlife connectivity; and extensive impacts to streams from excavation and installation of culverts and bridges in Mill Creek could result in a jeopardy opinion on coho salmon from NMFS.
3. During the project new species could be listed by the state and federal Endangered Species Act. Additional investigations and consultations may have to be completed that could delay the schedule.
4. All alignments may have impacts to the ocean Area of Special Biological Significance due to water quality concerns within Wilson Creek.
5. Alignment F will require geotechnical drilling to determine whether it is constructible and feasible. This drilling is likely to occur within old-growth redwoods in the park, likely requiring temporary access roads to locations within old-growth redwoods. Geotechnical drilling will require a separate environmental document, a Section 4(f) Evaluation, and a Permit to Enter from the parks.

6. Project mitigation identified in the environmental document and permit conditions will need to be fully funded, and is likely to be a substantial project in and of itself. If a separate project is initiated, a separate environmental document will be required.
7. Mitigation funds are estimated based on our current knowledge of the project area and impacts, combined with historic mitigation estimates in the range of 10 to 20% of the total project cost.
8. Extensive cooperation and collaboration with the various agencies, each with separate mission statements and sometimes conflicting goals, will be essential throughout the project development and implementation phases of the project to obtain successful outcomes for all stakeholders, road users and sensitive resources.

8. *PEAR Technical Summaries*

These are preliminary assessments of potential impacts to various resources for the purposes of environmental planning and budgeting this proposed project. All resource areas discussed below will need to be considered for study again once the environmental studies phase of the project are initiated by Caltrans. Additional studies could be identified during project scoping conducted pursuant to the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) requirements.

Land Use

The project will directly convert some park and private forest lands to highway uses. There may also be some conversion of private forest to park land. The current highway may be converted to trails or natural areas. There are no other anticipated major changes in land use resulting from this project. The alignments traverse Del Norte Coast Redwoods State Park and Redwood National Park, requiring a full 4(f) analysis and agreement. The alignments also traverse Green Diamond's private timberlands which will require Right of Entry and acquisition of lands. The surrounding lands will continue to be a public park and timberlands.

Growth

There are no anticipated changes in growth from this project. The project will maintain the existing transportation corridor along the north coast.

Farmlands/Timberlands

The project has the potential to permanently convert some timberlands into highway facility, thus removing up to 200 acres from active timber production. This process may involve a Timberland Conversion Permit or Public Utilities Right of Way Exemption under the California Forest Practice Rules regulated by the California Department of Forestry and Fire Protection. Additional investigation into this process is necessary.

Community Impacts

Implementation of this project will not alter existing communities. It will improve the reliability of the transportation corridor, which is critical for adjacent communities. No environmental justice communities have been identified or relocations of housing, commercial, industrial, or non-profit businesses.

Visual/Aesthetics

A Visual Impact Assessment report (VIA) will be required for all alignments considered for this project. The VIA will identify the locations of significant visual resources, identify and quantify potential impacts, and address viewer response to those impacts.

The inventory of visual resources may include:

- Positive and negative views
- Important trees
- Scenic resources
- Opinions generated through public involvement to understand what qualities are important to the local constituents
- Addressing the future use of the existing State Scenic Highway which varies depending on which alternative is selected, thereby reducing the public's experience of this natural resource

The VIA will also identify and evaluate proposed project features which include:

- Location and lengths of potential alignments
- Potential tree removal
- New cut and fill slopes
- Proposed walls, bridge structures and tunnels
- Aesthetic treatment of walls, bridges and guardrails

The VIA will evaluate impacts and the effect on the visual setting and scenic resources. The VIA will propose mitigation measures based on areas of high and low visual impacts and include recommendations to avoid or minimize those impacts.

Cultural Resources

Caltrans will be working closely with our project partners to ensure full compliance with state and federal laws governing cultural resources, specifically CEQA (which includes recent changes through Assembly Bill 52) and Section 106 of the National Historic Preservation Act. No known cultural resources intersect any of the proposed alternatives or end segments. Within the Mill Creek watershed, two archaeological resources have been identified near end segments C4 and C5. These resources have not been evaluated for eligibility for inclusion in the National Register. While these resources are avoided with the proposed end segments for Alternative C, similar resources could be encountered during the archaeological inventory survey.

There are additional aboriginal coastal village sites within the vicinity of the proposed project area. Historic sites recorded in the vicinity include historic refuse scatters; segmented roads, trails, and rail grades; and remnants of historic structures, wells and cisterns.

The following potentially significant resources could be impacted: the DeMartin Ranch, Rellim Lodge, the Hamilton Road historic train trestle, resources associated with logging in the Mill Creek watershed, portions of

the 1894 Crescent City to Trinidad Wagon Road, and the pre- contact/proto-contact trail from Crescent City to Klamath River.

Finally, there are previously recorded ethnographic resources in the upper watershed of Wilson Creek. Waterman (1920) recorded numerous acorn-gathering locations in the Upper Wilson Creek area. These resources were recorded in the early twentieth century and may be part of a larger Traditional Cultural Property, or potentially a Traditional Cultural Landscape. It is not known if these oak groves are still present and utilized, or if they have been removed through logging. It is also possible that potential ethnographic resources are present in the Mill Creek Watershed.

Studies Needed

There have been numerous inventory efforts conducted near the tie-ins of the proposed alignments. Most of the proposed alignments have not been adequately inventoried and it is likely that new, previously unknown resources will be recorded during inventory studies. Such sites could include prehistoric/protohistoric lithic scatters, burial sites, gathering locations, prayer sites, and a range of historic site types such as structural remains, privies and dumps, isolated road segments, trails, and abandoned railroads.

If sites are encountered, it is Caltrans' stated policy that they should be avoided if possible. If cultural resources are found that cannot be avoided, then it will be necessary to conduct Phase II testing, and geo-archaeological investigations will be necessary to assess for National Register of Historic Places (NRHP) eligibility. If these sites are present on the selected alternative, and cannot be avoided, then it will be necessary to develop a Finding of Effect (FOE) Document.

This would likely entail developing a Memorandum of Agreement (MOA) and a treatment plan. These documents will need to be reviewed by the project partners, the regulatory bodies in charge of oversight, the California SHPO, and potentially the Advisory Council.

Each of the alternatives has a moderate to high risk of affecting cultural resources. Archaeological and cultural monitoring will be necessary for construction in areas identified as high sensitivity.

Ethnographic studies will also be necessary to help identify previously unrecorded ethnographic resources in the Wilson Creek and Mill Creek watersheds. Extensive studies will be necessary with the Yurok Tribe, the Elk Valley Rancheria, and the Tolowa Dee-ni' Nation. Members of these Tribes have ancestral and modern links to the project area. Outreach and consultation efforts should also be conducted with the Big Lagoon Rancheria, Trinidad Rancheria and Resighini Rancheria, who also count members with Yurok and Tolowa descent, and State recognized groups such as the Tolowa Nation, the Melochundum Band of Tolowa Indians, and the Howonquet Community Association.

An architectural/historical landscape evaluation will be necessary for the decommissioning of portions of US 101. This old section of highway will likely be relinquished to the Parks, and for PRC 5024 compliance Caltrans must conduct inventory work. Extensive background research and documentation of historic trails, wagon roads, the Olmstead crib walls, the old alignment of US 101, and portions of the current alignment not

previously surveyed in 2010 as part of the Caltrans District 1 Transportation Enhancement Activities Program survey will be necessary as part of the evaluation.

Additional Considerations

For compliance with federal and state cultural resource laws, it will be necessary to consider aspects of this project that have not yet been fully explored such as staging areas, access roads, and other biological mitigation measures. In addition, concurrent federal and state permits (Archeological Resources Protection Act and Department of Parks and Recreation-412A, respectively) will be needed for any cultural resource work within the Parks' property. Due to the nature and complexity of this project, it is strongly recommended that Caltrans and its partners develop an agreement document covering all aspects of cultural resources.

At this time, there are two options for such documents. The first would be to develop a Memorandum of Agreement (MOA) that states the stakeholders accept the current 2014 Caltrans Programmatic Agreement (PA) for this project. A MOA would have the benefit of the California SHPO, FHWA, and the Sacramento and San Francisco Army Corps of Engineers offices having already signed this document. However, given the size and scale of this project, the existing PA may not feasibly address all potential issues to an acceptable level of detail.

The other option is to develop a project specific PA. A project specific PA, with the buy-in and support of project partners, stakeholders and regulatory agencies, would be created specifically for this large and complex undertaking. Further, a project specific PA would establish time frames, peer review and approval procedures of compliance documents, and other important details. This would be a complex negotiation process between the stakeholders, the regulatory bodies responsible for oversight, FHWA, the California SHPO and the Advisory Council. This process would likely take approximately one year to complete, but would serve to streamline the necessary work for this project. At this time, Caltrans has conducted preliminary meetings with project stakeholders and the idea of a project specific PA has been well received. Caltrans should reengage with the project partners to select either approach discussed above as soon as funding for environmental studies becomes available.

Resource Needs

Due to the variety and complexity of required tasks, much of the work required will need to be performed by a consultant as Caltrans District 1 does not have sufficient staffing. A consultant would also provide more effective coordination of task schedules. It is likely that a minimum of 6 to 10 task orders will be necessary for inventory survey, Extended Phase I, geo-archaeological studies, ethnographic studies, archival research, historic archaeological investigations, data recovery/treatment plans. Caltrans would conduct strict oversight of the consultant and conduct all tribal consultation as the federal lead agency. The total calendar time necessary for the completion of the cultural studies will be approximately 48 to 56 months. This time frame will largely depend on the amount of detailed information available from design during the Project Approval & Environmental Document phase.

If details on the alternative alignments, construction easements, access routes, utility relocations, culvert installations, etc., are not provided in a timely fashion by project designers, the completion of the cultural

studies could be delayed. As stated earlier, identification, analysis and determination of mitigation areas will be critical for project development.

Hydrology and Floodplain

There will not be direct impacts to major floodplains for most of the alternatives because the alignments are high on the ridge and bridges will be used for spanning large creeks and waterways. There is the potential for alignment C5 to have impacts within the floodplain of Mill Creek. A Floodplain Evaluation Report will be prepared to address impacts from alignment C5.

Water Quality and Stormwater Runoff

This project will require a Water Quality Assessment Report to comply with NEPA and CEQA. The report will document the evaluation of permanent stormwater treatment structures incorporated into the project to address increases in impervious surface and/or stormwater runoff volumes. This evaluation is also necessary to comply with State Water Resources Control Board (SWRCB) Order No. 2012-0011-DWQ, of the National Pollution Discharge Elimination System (NPDES) No. CAS000003. The feasibility of incorporating appropriate stormwater treatment Best Management Practices (BMPs) will also be required for the project to obtain a Section 401 Water Quality Certification from the North Coast Regional Water Quality Control Board (NCRWQCB). The proximity of the project to tributaries discharging to tributaries of Wilson Creek, Mill Creek, the Smith River, and Areas of Special Biological Significance may require additional actions specific for the project which include the development of stormwater and non-stormwater BMPs to minimize and avoid potential impacts to water quality both during and after construction.

Based on the current project description, the project will have greater than one acre of Disturbed Soil Area during construction. Therefore, the project will be required to obtain coverage under the SWRCB Construction General Permit (CGP) Order No. 2010-0014-DWQ. The CGP requires that receiving water risk level be determined to guide the selection of appropriate sediment and erosion control BMPs implemented as part of the Storm Water Pollution Prevention Plan (SWPPP). Monitoring and reporting for stormwater treatment BMPs may also be required during both construction and post-construction phases of the project.

Potential watershed impacts associated with Alignments F, A1, and A2 would be limited to the Wilson Creek sub-watershed area located within the Point St. George-Frontal Pacific Ocean watershed. The other alternative alignments would have the potential to impact water quality within both the Point St. George-Frontal Pacific Ocean and Smith River-Frontal Ocean watersheds. During the NEPA/CEQA review phase of the project, an initial water quality assessment report (WQAR) will be prepared by Caltrans environmental engineers. This WQAR will discuss the regulatory framework of the project, provide data on surface and groundwater resources within the project area, identify potential impacts/benefits associated with the proposed project, and recommend specific avoidance and/or minimization measures for potentially adverse impacts to water quality.

Several aspects of the proposed alternative alignments will need to be fully evaluated for all potential watershed impacts. Design features that are of specific concern to water quality include, but are not limited to, surface water runoff from impervious surfaces, roadway drainage outfalls and their proximity to sensitive receiving water bodies (e.g., Area of Special Biological Significance). These types of potential impacts are

evaluated under the regulatory framework established by Section 402(p) of the Federal Clean Water Act and California Water Code Section 13376 which establish Waste Discharge Requirements (WDRs) for point source discharges from Caltrans right-of-way (i.e., existing and new facilities and roadways).

Geology, Soils, Seismic and Topography

The project will require extensive amounts of cut and fill through steep mountainous terrain. Some of this terrain may be unstable requiring retaining walls or other engineered facility. A geology study that assesses regional and site-specific geology, soils, seismic hazards, and topography will be required for the environmental phase. Geotechnical site characterization developed for design will require subsurface investigation (geotechnical drilling). Project specific geotechnical drilling will be subject to a separate environmental document and regulatory requirements.

Paleontology

There may be paleontological resources within the study area, and these will need to be investigated during the environmental studies phase. A Paleontological Identification Report (PIR) will first be prepared as an initial screening to determine if the presence of known or reasonably anticipated resources may be impacted. If paleontological resources are determined to be impacted by the project, then a Paleontological Evaluation Report will be prepared to determine the significance of the impacts.

Hazardous Waste/Materials

The project alignments run through relatively natural forest lands, and are unlikely to contain any industrial hazardous waste materials. An Initial Site Assessment will be conducted during the full environmental studies.

Air Quality

The project may slightly increase the length of the highway between Klamath and Crescent City, thus increasing daily traffic emissions. Additionally, the project will have emissions from construction. Both of these will need to be studied during the environmental studies phase of the project. An air quality report that addresses impacts from the project and satisfies state and federal regulatory requirements will be prepared.

Noise and Vibration

There are few sensitive receptors near the project. The Mill Creek Campground is near Alignments C3, C4, and C5, and those alignments would move the highway closer to the campground, potentially increasing highway noise for campers. Currently the highway is approximately 0.8 mile from the campground and the C-alignments are approximately 0.4 mile from the campground. A Noise Study Report will be prepared that addresses impacts from the project that satisfies state and federal regulatory requirements. Impacts to biological resources from noise and vibration are included under the Biological Section.

Energy and Climate Change

The proposed alternative roadway alignments would be up to 2.4 miles longer than the existing alignment. Short term and long term impacts from construction will be studied and determined during the project report

environmental document phase. An Energy Study will be prepared that addresses impacts from the project that satisfies state and federal regulatory requirements.

Biological Environment

Ongoing meetings are being conducted with representatives from Redwood National Park, California State Parks, USFWS, California Department of Fish and Wildlife (CDFW), National Marine Fisheries Service (NMFS), US Army Corps of Engineers (ACOE), North Coast Regional Water Quality Control Board (RWQCB), California Coastal Commission, Elk Valley Rancheria, Tolowa Dee-ni' Nation, and the Yurok Tribe to discuss project impacts, required surveys and potential mitigation.

Surveys

The required surveys will be extensive, and in some cases will require specialized personnel and equipment. Much of this work will need to be contracted out to specialized consultants due to the volume, expertise and schedule required.

Waters and Wetlands

There are likely wetlands and other waters of the U.S. and state jurisdiction within the project limits. There are likely seeps and other wetlands along hillsides within the footprints of the various alternatives. Some of the alternatives will traverse creeks and drainages, which will require bridges or culverts. Wetlands and other waters are under the jurisdiction of the ACOE, the RWQCB, the California Coastal Commission (where resources exist in the Coastal Zone) and the CDFW. These will require mitigation under the Clean Water Act. Wilson Creek flows into the Redwood National Park Area of Special Biological Significance (ASBS) in the Pacific Ocean, which is under regulation by the State Water Resources Control Board.

It is anticipated there will be multiple coastal and ACOE wetlands and other waters of the State and US within the project footprint. These jurisdictional features will need to be identified and delineated. Aerial photography, topographic maps, hydrology layers in ArcGIS map, the National Wetlands Inventory, and other Caltrans projects were reviewed and Caltrans biologists consulted to estimate the number of potential wetlands located within the project area, along with the time it would take to delineate these features.

Potential Biological Resources of Concern

Preliminary queries for rare and sensitive species sightings and records of observations at the project location were conducted using the California Natural Diversity Database (CNDDDB), California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Plants, and United States Fish and Wildlife Services' (USFWS) Information for Planning and Conservation (IPaC). The query was based off the primary 7.5' topographic quad sheets (quad) and the adjacent quads. The quads consisted of: Ah Pah Ridge, Cant Hook Mountain, Childs Hill, Crescent City, Fern Canyon, Gasquet, Hiouchi, Klamath Glen, Requa and Sister Rocks. A thorough Biological Scoping for state and federally listed candidate and Species of Special Concern (SSC) should be conducted at quad and nine quad radiuses (10 mile radius).

The project area consists of suitable habitat for a variety of sensitive natural communities and special status species (Endangered Species Act or other designations). The CNDDDB shows numerous special status species

and natural communities within the vicinity of the project, and many of these could be present within the footprint of the project. Based on Environmental staff experience, species of special status that will need to be evaluated are discussed below. Once mapping of the vegetation communities and floristic surveys are completed additional surveys for special status species could be identified. Environmental staff are currently in the process of reviewing species to determine focused studies with a Biological Working Group that consists of representatives from resource agencies. The list of special status species generated from this effort will be used once the project environmental phase is initiated. An evaluation of direct, indirect, and cumulative impacts to biological resources will need to be addressed in a Natural Environment Study.

Plants and Natural Communities

The alternatives studied encompass mostly forested areas consisting of primarily redwood forest, but also some coastal alder/spruce, and some riparian forest. Within Redwood National and State Parks, the forest contains various age groups including second-growth forests that were harvested 16 to 90 years ago and old-growth forests that have never been logged.

Old-growth redwoods and some younger redwood forest alliances are rare Natural Communities of Special Concern. They provide habitat for some endangered or threatened species such as the marbled murrelet, northern spotted owl, and pacific fisher. The trees are some of the oldest and largest on the planet, reaching over 2,000 years old, with heights greater than 360 feet and diameters larger than 20 feet. Because less than 5 percent of the original old-growth redwood forest remains, it is a very limited resource, which is not renewable due to the time it takes to achieve those characteristics. Redwood National and State Parks are recognized as a World Heritage Site by the United Nations Educational, Scientific, and Cultural Organization.

Most of the area is within the Redwood Forest Alliance and multiple associations are present within the alternatives. Some of these areas will qualify as a High Priority or Natural Community of Special Concern based on guidance by the California Department of Fish and Wildlife. In particular, the stands of old-growth redwoods within the Park are a Natural Community of Special Concern. Other vegetation types that include Natural Communities of Special Concern may be identified when more extensive surveys of the alternatives are conducted.

Western Lily (*Lilium occidentale*) can be found in coastal prairies and scrub habitats within the coastal fog zone. Focused surveys in potential habitat need to be conducted. California Rare Plant Rank (CRPR) plants have the potential to occur within the project footprint. CDFW protocol level surveys will need to be performed within the project footprint and Environmental Study Limits. If any special status plant species are detected appropriate mitigation would need to be developed.

Caltrans botanists were consulted to estimate the time needed to survey redwood forest habitats and coastal habitats. A buffer of 300 feet would be established in coastal areas for botanical surveys, and a 400-foot buffer in redwood forest areas to account for edge effects since redwoods can grow to heights over 375 feet.

A 400-foot buffer was utilized around the cut and fill layer in ArcGIS to calculate the total acreage that would need to be surveyed. The total cut and fill acreage is approximately 410 acres, and with the addition of the 400-foot buffer, the total area in need of botanical surveys would be 2,043 acres.

It is estimated that one to five acres can be surveyed per hour by one person. There will be variability in the level of effort required in different areas and microhabitats. This is the estimate that Green Diamond uses for their intuitive survey method. The project is located in the same habitat, topography, and general area in which Green Diamond operates. The use of this estimate was discussed and generally agreed upon by Caltrans biologists.

There are approximately seven acres of coastal habitat impacted, which would require a 300-foot buffer, and on average would take longer to survey than redwood forest habitat due to the complexity of plant life in coastal habitat. A 400-foot buffer was utilized for the coastal habitat, which approximates the expected increase in survey time.

A professional arborist will also be required to assess any work near large old redwoods for potential root effects.

Birds

Bald Eagle (*Haliaeetus leucocephalus*) are present within the project area, foraging in the river and ocean, and nesting in the tops of large trees. Nesting eagles could be disturbed by the construction activities and nest trees could be removed if within the project footprint. Coordination and consultation with CDFW and USFWS will be required.

Marbled Murrelet (*Brachyramphus marmoratus*) nest in old-growth redwood forests and are present within the Park areas of the alternatives. The USFWS has designated Critical Habitat for the marbled murrelet roughly along the State Park boundaries. Alternative A2 will remove approximately three acres of old-growth redwoods that is marbled murrelet nesting habitat. All of the other alternatives have the potential of removing some old-growth redwood trees, which could be nesting habitat, but at a smaller scale than A2. The project will require formal Section 7 Consultation with USFWS, and may result in an adverse effect to murrelets. The removal of old-growth redwoods along Alternative A2 would result in an adverse modification of designated critical habitat determination under the Endangered Species Act. Segments C3, C4 and the southern portions of C5 are in 80 to 90 year old stands with scattered older trees that may contain suitable nesting trees. In addition to direct removal of nesting habitat, there is also the potential for construction noise to impact nesting murrelets.

Based on initial discussions with USFWS Caltrans liaison, Gregory Schmidt, and Redwood National Park biologist, Keith Benson, as well as the latest scientific research, assessing impacts to marbled murrelet could be conducted by qualified tree climbers able to identify marbled murrelet nests in trees that would be removed. The tree climbers would be able to determine how many nests would be taken by a proposed alignment. Evaluation of project impacts to marbled murrelets should be completed during the environmental studies phase of the project. The approach to evaluating impacts will need to be discussed further with the

resource and partnering agencies prior to conducting any surveys. Stands of old-growth redwood forests are assumed occupied in Alignments A1, A2 and F.

Approximately 75 to 150 large trees have been identified by Caltrans that could be climbed to determine whether they support marbled murrelet nesting. Important areas are at the A1 and F tunnel portal, and the A2 segment. There may also be potential nesting habitat assessments along the C alignments, where they pass through the second growth that may contain larger trees. An assessment of habitat potential will need to be conducted.

Bioacoustic Recording can be used to establish a base line noise level in the project area, and used as a survey method for bird species. Requirements of this type of survey will be similar to those needed for bats (see below).

Northern Spotted Owl (NSO) (*Strix occidentalis*) use older forest types for nesting, foraging and roosting. There are eight historic activity centers near the proposed alternatives that may be affected by the project. Many of these may no longer be active, however there are likely to be a few pairs within the area. The removal of forest habitat within the footprint of the alignments will reduce habitat available for nesting, roosting, foraging, and dispersal of spotted owls. The northern portions of Alternative C3, C4, and C5 would remove large amounts of nesting, roosting and foraging habitat relative to the A and F alternatives. Construction noise could potentially disturb roosting or nesting owls.

Protocol level surveys will be required along the alignments where they intersect with NSO habitat. It is estimated that two years of surveys, with six visits per year during environmental studies, and then again prior to construction, will be necessary.

Western snowy plover (*Charadrius nivosus nivosus*) nest on ocean beaches along the north coast of California and have been detected at Gold Bluffs Beach to south of the project area. There is a small amount of nesting habitat along Wilson Creek beach, but most of this beach is susceptible to inundation during high tide, therefore would not be nesting habitat. Work around Wilson Creek Bridge could disturb plovers from this area. Given the small amount of marginal habitat and disturbance from people using the beach access, impact to plovers here would be negligible. No surveys would be necessary.

Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*) nest in mature riparian forest. The tie-in Segment 5 at Hamilton Road could support nesting or migrating Western Yellow-billed Cuckoo.

Willow flycatcher (*Empidonax trailii*) use riparian forest. The tie-in Segment 5 at Hamilton Road could support nesting or migrating willow flycatcher. Removal of this habitat would affect willow flycatchers.

Habitat assessment and surveys for Western Yellow-billed Cuckoo and Willow flycatcher can be done concurrently. Protocol level surveys will require at least two separate surveys at each site: up to six surveys per year. There may be approximately 15 sites at Mill Creek at the end of the C5 alignment. Follow up surveys may be required depending on initial survey results.

The Migratory Bird Treaty Act offers protection to active bird nests. We anticipate breeding birds throughout the project are present from February through August. Vegetation removal should occur outside of the breeding season. This will require vegetation removal to occur in a narrow range between September to October 15—between the end of the nesting season and beginning of the rain season. Given the large area of the project and this small window of time, this will be a difficult task. Caltrans, partners and regulatory agencies will need to work through appropriate ways to address this issue.

Mammals

Bats

Bats are classified as non-game mammals by the CDFW. Bats are afforded protection under various California Fish and Game Code sections, including Sections 86, 2000, 2014, 3007, and 4150. Several sections under Title 14 of the California Code of Regulations also apply, including but not limited to Section 251.1, Article 20; Section 15380; Section 15382; and several sections under the California Public Resources Code, Division 13. There is habitat present for one listed bat species and non-listed bat species.

Townsend's big-eared bat (*Corynorhinus townsendii*) is a State Candidate Threatened species as well as a California Species of Special Concern. According to CNDDB, the nearest occurrence is from 1945 approximately eight miles south of the project area. They are a cavity dwelling species utilizing basal hollows in large redwood trees and other cavities created by fire and lightning strikes.

Daytime visual surveys will be necessary to determine the presence and location of day, night, and maternity roosts. Bioacoustics monitoring and recording, combined with SonoBat analysis, will determine which species are present.

Mesocarnivores

Pacific fisher (*Pekania pennanti*) use mature forest habitats and are assumed present within the project area. Removal of mature and old forest stands would decrease the amount of habitat available to fisher within the project area.

Humboldt Marten (*Martes americana humboldtensis*) is a California Species of Special Concern (SSC) that use mature coastal redwood forest habitat with a dense shrub layer and are assumed present in the project area.

All alternatives could be a migration barrier to fisher, Humboldt marten and other terrestrial animals causing reduced gene flow and isolating populations. These species primarily travel along drainages. To maintain their connectivity it will be important to utilize bridges and large culverts whenever possible.

Habitat analysis will be required for these species and bait station surveys should be included as part of the analysis to determine presence, and to assess potential impacts. There are 159 acres of 80 to 90 year old redwood forest and 3 acres of old-growth that may need to be assessed.

Fish

Caltrans has a responsibility under Section 7(a) 2 of the Endangered Species Act (ESA) to consult with NMFS if a proposed project may affect listed species or their designated critical habitats. In addition, Caltrans must determine if there are potential effects to essential fish habitat (EFH) designated under the Magnuson Stevens Fisheries Conservation and Management Act (MSA). Furthermore, pursuant to section 2080 of the California Fish and Game Code, Caltrans is required to consult with the California Department of Fish and Wildlife if a proposed action may affect state listed species. If take of a state listed species occurs Caltrans must fully mitigate any impacts.

Alternatives proposed for the project include new alignments thorough the Mill Creek (tributary to Smith River) watershed. Federal and state threatened species and critical habitat in the Mill Creek watershed include the Southern Oregon/Northern California Coast (SONCC) coho Evolutionarily Significant Unit (ESU) (*Oncorhynchus kisutch*). The Mill Creek watershed is noted as having high intrinsic potential for the SONCC coho population. The Mill Creek and Wilson Creek watersheds may also have coastal cut-throat trout (*Oncorhynchus clarkii clarkii*) and Klamath mountains province steelhead (*Oncorhynchus mykiss irideus*), which are state species of concern.

EFH for the SONCC coho and Chinook salmon are present within Mill Creek.

Mill Creek is almost entirely public land since the acquisition of 25,000 acres in 2002. It is noted as having high productivity and favorable rearing and spawning conditions for coho, but is far below its carrying capacity. The fisheries and habitat within Mill Creek play an important role in the productivity of coho in the Smith River. Construction and 24-hour operation of a new highway facility within these watersheds may have impacts on salmonid and EFH.

A fisheries habitat analysis will be necessary where the A and C alignments cross waterways. There are 18 mapped crossings that will require fish and habitat surveys. A Biological Assessment will need to be prepared to comply with the requirements of the ESA and EFH Assessment.

Reptiles and Amphibians

Amphibians can be particularly sensitive to erosion, pollution, and habitat loss. There are five amphibians and one reptile listed as SSCs with the potential to occur in the project area including Del Norte salamander (*Plethodon elongates*), foothill yellow-legged frog (*Rana boylei*), northern red-legged frog (*Rana aurora*), Pacific tailed frog (*Ascaphus truei*), southern torrent salamander (*Rhyacotriton variegatus*) and western pond turtle (*Emys marmorata*).

The Pacific tailed frog has a more restricted habitat preference than either the northern red-legged frog or foothill yellow-legged frog as it is usually found in a more riparian setting and is restricted to perennial montane streams. The other two frog species can be found in more varied habitat such as woodlands, grasslands, and rocky substrates.

Both the Del Norte salamander and the southern torrent salamander prefer old-growth forests. The Del Norte salamander is often found in talus and rock rubble of closed, multi-storied canopy forests while the southern torrent salamander prefers well-shaded permanent streams and seepages.

Habitat Assessments will need to be performed to determine where the pre-construction surveys will be necessary. Using the Waters and Wetlands estimate as an approximation for sites with suitable habitat, there are potentially up to 83 sites that would need habitat assessments. Additional survey locations maybe determined once the wetland delineation is completed.

Invertebrates

Populations of western pearshell mussel (*Margaritifera falcata*) exist in Mill Creek. This species has a Global Rank of G4/G5 (Apparently Secure/Secure) and state rank of S1/S2 (Critically Imperiled/Imperiled). The C5 alignment runs along known occurrences. Surveys would need to be conducted in streams that may support the mussel to determine population locations and abundance.

The federally threatened Oregon silverspot butterfly (*Speyeria zerene hippolyta*) inhabits coastal meadows in Del Norte County. Surveys will need to be conducted for their food plant, western dog violet (*Viola adunca*) in coastal habitat where the A and C alignments diverge from US 101 at the project's southern edge.

Wildlife Habitat and Connectivity

Many species of forest wildlife regularly travel through the project areas. Wildlife populations are often patchy and require movement of individuals between patches for genetic diversity and for robustness against demographic stochasticity. Linear transportation corridors can isolate populations, causing genetic bottlenecks and loss of populations. Many of the stream crossings will be bridges, which do provide for wildlife passage underneath through the riparian corridor. Both fish and terrestrial wildlife can pass through natural habitat under a bridge without being exposed to increased predation or vehicle mortality. The movement of mesocarnivores is a primary concern within the project area. Many of these species move along drainages. The use of bridges and large open arch culverts should be implemented whenever possible. The maximum use of tunnels, bridges and drainages will reduce these impacts.

The A and C alternatives will reduce connectivity within the canopy. This would impact species such as red tree vole (*Arborimus longicaudus*) and salamander species that live in the canopy. Any potential mitigation to reduce impacts will need to be considered.

Cumulative Impacts

The project may have cumulative impacts to various resources. These should be included in the various specialist reports. Due to the size and complexity of the project, it may benefit from a separate report investigating cumulative impacts.

Context Sensitive Solutions

There may be an opportunity to have tribal designs on bridges or railings.

Section 4(f)

The project will require a Section 4(f) Evaluation for converting Park lands into a highway facility. Additionally, the project has the potential to effect Park resources.

9. Summary Statement for PSR or PSR-PDS

This project will require the preparation of an EIR/EIS. All the project alignments have the potential for significant impacts to the environment from loss of native habitat and increased impervious surface. All the alignments would require Cultural Resources surveys and consultations, Coastal Development Permit, Endangered Species Consultations, Clean Water Act Section 404 Permit, Clean Water Act Section 401 Water Quality Certification and Stream and Lakebed Alteration Agreement, and a Section 4(f) Evaluation with Parks.

The project will take extensive surveying for cultural and biological resources on park and private lands (Green Diamond Resources Company timberlands). This will require coordination with parks to obtain permits for investigations. Park staff have expressed an interest in assisting in conducting technical surveys. Most alignments would require extensive acquisition of private timberlands, as well as public park lands.

The project has substantial risk of a lawsuit under NEPA and CEQA, public controversy, conflicts with stakeholder groups and partners.

This process, from project initiation through Project Approval and Environmental Document (PAED), will take approximately 8 years. Design and permitting is estimated to take approximately 5 years.

Significant consultation and coordination with partners and regulatory agencies throughout the project is necessary. This may add various risks as the goals and opinions of these organizations may not always be the same. There is already a push from these organizations to be more involved in the current design process in order to “avoid, minimize, and mitigate through design”. This is positive in that it could lower the impacts, but could prolong the design process.

10. Disclaimer

This Preliminary Environmental Analysis (PEAR) provides information to support programming of the proposed project. It is not an environmental determination or document. Preliminary analysis, determinations, and estimates of mitigation costs are based on the project description provided in the Project Study Report (PSR). The estimates and conclusions in the PEAR are approximate and are based on cursory analyses of probable effects. A reevaluation of the PEAR will be needed for changes in project scope or alternatives, or in environmental laws, regulations, or guidelines.

11. Preparers

		Date Scoping Completed
Planner	Jason Meyer	3/4/2016
Air Specialist		
Archaeologists	Dennis Wardlaw and Tim Keefe	3/1/2016
Architectural Historian		
Biologist	Jennifer Barbour	6/3/2016
CIA Specialist		
Floodplain Specialist		
Hazardous Waste Specialist	Steve Werner	2/18/2016
Noise Specialist		
Paleo Specialist		
Visual Specialist	Laura Lazarotto	2/18/2016
Water Specialist	Samantha Hadden	2/19/2016

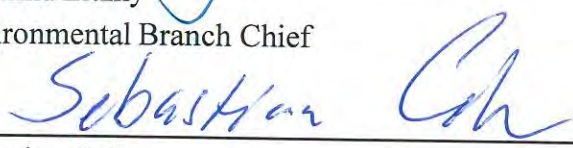
12. Review and Approval

I confirm that environmental cost, scope, and schedule have been satisfactorily completed and that the PEAR meets all Caltrans requirements. Also, if the project is scoped as a routine EA, complex EA, or EIS, I verify that the HQ DEA Coordinator has concurred in the Class of Action.


 Rosalind Litzky
 Environmental Branch Chief

6/29/16

Date


 Sebastian Cohen
 Project Manager

6/29/16

Date

REQUIRED ATTACHMENTS:

- Attachment A: PEAR Environmental Studies Checklist
- Attachment B: Estimated Resources by WBS Code (Submitted under separate cover.)
- Attachment C: Schedule (Gantt Chart) (Not included. Schedule is discussed in Section 3.4)
- Attachment D: PEAR Environmental Commitments Cost Estimate (Standard PSR) (Submitted under separate cover.)

Attachment A: PEAR Environmental Studies Checklist

District: 1	County: DN	Route: 101	PM: 12.5/16.3	EA: 01-0F280
				Proj ID: 0115000099
Project Title: LAST CHANCE GRADE				

	Not Anticipated	Memo to File	Report Required	Risk L M H	Comments
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Human Environment					
Land Use	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	L	
Coastal Zone	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	M	
Wild & Scenic River Consistency	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L	
Growth	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L	
Farmlands/Timberlands	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Community Impacts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L	
Community Character and Cohesion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L	
Relocations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	L	
Environmental Justice	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L	
Utilities/Emergency Services	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L	
Visual/Aesthetics	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	
Cultural Resources					
Screening Memo	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Archaeological Survey Report	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Historic Resources Evaluation Report	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Historic Property Survey Report	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Historic Resource Compliance Report	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Section 106 / PRC 5024 & 5024.5	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Native American Coordination	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Finding of Effect	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Data Recovery Plan	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Memorandum of Agreement	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Tribal Lands	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	L	
Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	L	
ARPA Permit	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	M	
Physical Environment					
Hydrology and Floodplain	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Water Quality	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Stormwater Runoff	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Geology, Soils, Seismic and Topography	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Air Quality	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Noise and Vibration	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Energy and Climate Change	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Hazardous Waste/Materials					
Hazardous Waste/Materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L	
ISA (Additional)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L	
PSI	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L	

	Not Anticipated	Memo to File	Report Required	Risk L M H	Comments
Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	L	
Paleontology					
Paleontology	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	L	
PER	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	L	
PMP	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	L	
Biological Environment					
Natural Environment Study	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	
Natural Environment Study (MI)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Section 7 Formal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	
Section 7 Informal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Section 7 No effect	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Section 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
USFWS Consultation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	Marbled Murrelets
NMFS Consultation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	Coho Salmon
Species of Concern	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Wetlands & Other Waters/Delineation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
404(b)(1) Alternatives Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Invasive Species	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L	
Coastal Management Plan	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	M	
DFG Consistency Determination	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	
HMMP	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	M	
Other	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Other					
Cumulative Impacts	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Context Sensitive Solutions	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	M	
Section 4(f)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	Needs full 4(f)

Not Anticipated	Memo to File	Report Required	Risk L M H	Comments
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Permits

	Not Anticipated	Required	Risk L M H	Comments
1600 Agreement Coordination	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	
2081	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	
401 Certification Coordination	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	
Tribal 401	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
404 Permit Coordination	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	
Local Coastal Development Permit Coord.	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
State Coastal Development Permit Coord.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	
NPDES Coordination	<input type="checkbox"/>	<input checked="" type="checkbox"/>	H	
US Coast Guard (Section10)	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
TRPA	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
BCDC	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
State Lands Commission Lease Agreement	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Bureau of Reclamation Encroachment Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

ATTACHMENT J
Cost Estimates

Last Chance Grade

Alternative A1

01-DN-101 PM 12.0/15.5

ALTERNATIVE DESCRIPTION: Alternative A1 (Rudisill Road to LCG Tunnel)

SUMMARY OF ESTIMATED COST

TOTAL ROADWAY ITEMS (2016)	\$189,214,000
TOTAL STRUCTURE ITEMS (2016)	\$464,472,000
SUBTOTAL CONSTRUCTION COSTS	\$653,686,000
TOTAL RIGHT OF WAY ITEMS (2016)	\$17,919,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$671,605,000

I. ROADWAY ITEMS

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost
Clearing & Grubbing	79	Ac	\$18,000	\$1,422,000
Roadway Excavation	2,371,000	CY	\$20	\$47,420,000
Subtotal Earthwork				\$48,842,000

Section 2 Pavement Structural Section	Quantity	Unit	Unit Price**	Item Cost
HMA-A	10,606	TON	\$120	\$1,272,720
RHMA-G	5,933	TON	\$120	\$711,960
BWC-O	4,092	TON	\$120	\$491,040
AB (CI-2)	23,440	CY	\$50	\$1,172,000
SEG	60,622	SY	\$2	\$121,244
HMA Dike	144	TON	\$120	\$17,280
Place HMA Dike	11,240	LF	\$4	\$44,960
Subtotal Pavement Structural Section				\$3,831,204

Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost
Drainage (Geotechnical)	1	LS	\$5,493,700	\$5,493,700
Drainage (Hydraulics)	1	LS	\$5,247,500	\$5,247,500
Subtotal Drainage				\$10,741,200

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost
Shoulder Rumble strip	273	STA	\$100	\$27,300
Erosion Control	1	LS	\$2,711,770	\$2,711,770
Highway Planting and Revegetation	1	LS	\$1,791,280	\$1,469,000
Mitigation (Construction)	1	LS	\$45,000,000	\$45,000,000
Temporary Construction BMPs	1	LS	\$7,092,850	\$7,092,850
Subtotal Specialty Items				\$56,300,920

Section 5 Traffic Items	Quantity	Unit	Unit Price	Item Cost
Thermoplastic Striping (4")	657	STA	\$50	\$32,850
Pavement Marker (reflective-recessed)	1,370	EA	\$5	\$6,850
Construct Metal Beam Guardrail (TOTAL)	7,840	LF	\$35	\$274,400

Tie-in Work and Construction Access:				
Portable Changeable Message Sign (PCMS)	2	EA	\$8,000	\$16,000
Temp Flashing Beacon	2	EA	\$7,000	\$14,000
Construction Area Signs	1	LS	\$5,000	\$5,000
Subtotal Traffic Items				\$349,100

Total Sections 1 : 5	\$120,064,424
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Traffic Additions (Tie-in Work & Access)				
Traffic Control System	1	LS	\$2,000,000	\$2,000,000
Maintain Traffic	1	LS	\$2,000,000	\$2,000,000
			Subtotal Traffic Additions	\$4,000,000
			TOTAL 1:5 + TRAFFIC ADD.	\$124,064,424
			Time Related Overhead (5%)	\$6,203,221
			Subtotal	\$130,267,645

Section 6 Minor Items				
			\$120,064,424 x (5%) =	\$6,003,221
			Subtotal Minor Items	\$6,003,221
			Subtotal Sections 1 : 6	\$136,270,866

Section 7 Roadway Mobilization				
			\$120,064,424 x (10%) =	\$12,006,442
			Subtotal Mobilization	\$12,006,442
			Subtotal Sections 1 : 7	\$148,277,309

Section 8 Roadway Additions			Item Cost
Supplemental Work			
			\$136,270,866 x (5%) =
			\$6,813,543
Contingencies			
			\$136,270,866 x (25%) =
			\$34,067,717
Construction Office (3-yr.)			\$35,000
			Subtotal Roadway Additions
			\$40,916,260
	\$ Per Hour	Hours Per Day	Work Days
COZEEP setups (Tie-in Work)	\$100	10	20
			\$20,000

TOTAL ROADWAY ITEMS	\$189,213,569
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II. STRUCTURES ITEMS

	Tunnel 1	\$458,444,000
	Bridge 1A	\$6,028,000
	TOTAL STRUCTURES ITEMS	\$464,472,000

III. RIGHT OF WAY ITEMS

A. Total Acquisition Cost	\$954,250
B. Appraisal Fees Estimate	\$5,000
C. Mitigation acquisition & credits	\$15,750,000
D. Project Development Permit Fees	\$453,000
E. Utility Relocation (State share)	\$755,000
F. Relocation Assistance (RAP)	\$0
G. Clearance/Demolition	\$0
H. Title and Escrow Fees	\$1,000
	TOTAL RIGHT OF WAY ITEMS
	\$17,918,250

Anticipated Date of Right of Way Certification
(Date to which Values are Escalated)

Estimate Prepared By: Carlon Schrieve
Estimate Checked By: Jeff Pimintel

Last Chance Grade

Alternative A2

01-DN-101 PM 12.0/15.5

ALTERNATIVE DESCRIPTION: Alternative A2 (Rudisill Road to Damnation Trailhead)

SUMMARY OF ESTIMATED COST

TOTAL ROADWAY ITEMS (2016)	\$170,744,000
TOTAL STRUCTURE ITEMS	\$26,677,000
SUBTOTAL CONSTRUCTION COSTS (2016)	\$197,421,000
TOTAL RIGHT OF WAY ITEMS (2016)	\$42,392,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$239,813,000

I. ROADWAY ITEMS

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost
Clearing & Grubbing (Includes Large Timber)	87	Ac	\$20,000	\$1,740,000
Roadway Excavation	3,533,000	CY	\$20	\$70,660,000
			Subtotal Earthwork	\$72,400,000

Section 2 Pavement Structural Section	Quantity	Unit	Unit Price**	Item Cost
HMA-A	11,844	TON	\$120	\$1,421,280
RHMA-G	6,626	TON	\$120	\$795,120
BWC-G	4,570	TON	\$120	\$548,400
AB (CI-2)	26,180	CY	\$50	\$1,309,000
SEG	67,700	SY	\$2	\$135,400
HMA Dike	139	TON	\$120	\$16,680
Place HMA Dike	10,870	LF	\$4	\$43,480
			Subtotal Pavement Structural Section	\$4,269,360

Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost
Drainage (Geotechnical)	1	LS	\$6,673,300	\$6,673,300
Drainage (Hydraulics)	1	LS	\$4,923,000	\$4,923,000
			Subtotal Drainage	\$11,596,300

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost
Shoulder Rumble strip	305	STA	\$100	\$30,500
Erosion Control	1	LS	\$2,973,230	\$2,973,230
Highway Planting and Revegetation	1	LS	\$1,969,370	\$1,582,000
Mitigation (Construction)	1	LS	\$37,500,000	\$37,500,000
Temporary Construction BMPs	1	LS	\$1,781,963	\$1,782,000
			Subtotal Specialty Items	\$43,867,730

Section 5 Traffic Items	Quantity	Unit	Unit Price	Item Cost
Thermoplastic Striping (4")	657	STA	\$50	\$32,850
Pavement Marker (reflective-recessed)	1,370	EA	\$5	\$6,850
Construct Metal Beam Guardrail (TOTAL)	8,380	LF	\$35	\$293,300

Tie-in Work and Construction Access:				
Portable Changeable Message Sign (PCMS)	2	EA	\$8,000	\$16,000
Temp Flashing Beacon	2	EA	\$7,000	\$14,000
Construction Area Signs	1	LS	\$5,000	\$5,000
			Subtotal Traffic Items	\$368,000

Total Sections 1 : 5	\$132,501,390
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Traffic Additions (Tie-in & Access)				
Traffic Control System	1	LS	\$2,000,000	\$2,000,000
Maintain Traffic	1	LS	\$2,000,000	\$2,000,000
			Subtotal Traffic Additions	\$4,000,000
			TOTAL 1:5 + TRAFFIC ADD.	\$136,501,390
			Time Related Overhead (5%)	\$6,825,070
			Subtotal	\$143,326,460

Section 6 Minor Items				
			$\$132,501,390 \times (5\%) =$	\$6,625,070
			Subtotal Minor Items	\$6,625,070
			Subtotal Sections 1 : 6	\$149,951,529

Section 7 Roadway Mobilization				
			$\$132,501,390 \times (10\%) =$	\$13,250,139
			Subtotal Mobilization	\$13,250,139
			Subtotal Sections 1 : 7	\$163,201,668

Section 8 Roadway Additions	Quantity	Unit	Unit Price	Item Cost
Supplemental Work				
			$\$149,951,529 \times (5\%) =$	\$7,497,576
Contingencies				
			$\$149,951,529 \times (25\%) =$	\$37,487,882
			Construction Office (2-yr.)	\$25,000
			Subtotal Roadway Additions	\$7,522,576
		\$ Per Hour	Hours Per Day	Work Days
COZEEL setups @ \$100/hr.	\$100	10	20	\$20,000

TOTAL ROADWAY ITEMS	\$170,744,244
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II. STRUCTURES ITEMS

	Bridge 2A	\$5,978,000
	Bridge 2B	\$20,699,000
TOTAL STRUCTURES ITEMS		\$26,677,000

III. RIGHT OF WAY ITEMS

A. Total Acquisition Cost		\$1,046,750
B. Appraisal Fees Estimate		\$10,000
C. Mitigation acquisition & credits		\$39,375,000
D. Project Development Permit Fees		\$453,000
E. Utility Relocation (State share)		\$1,505,000
F. Relocation Assistance (RAP)		\$0
G. Clearance/Demolition		\$0
H. Title and Escrow Fees		\$2,000

Anticipated Date of Right of Way Certification
(Date to which Values are Escalated)

Estimate Prepared By: Carlon Schrieve
Estimate Checked By: Jeff Pimentel

Last Chance Grade

Alternative F

01-DN-101 PM 12.0/15.5

ALTERNATIVE DESCRIPTION: Alternative F (Full Tunnel)

SUMMARY OF ESTIMATED COST

TOTAL ROADWAY ITEMS (2016)	\$69,972,000
TOTAL STRUCTURE ITEMS	\$978,070,000
SUBTOTAL CONSTRUCTION COSTS (2016)	\$1,048,042,000
TOTAL RIGHT OF WAY ITEMS (2016)	\$13,585,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$1,061,627,000

I. ROADWAY ITEMS

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost
Clearing & Grubbing	6.4	Ac	\$20,000	\$128,000
Roadway Excavation (To Portal)	48,900	CY	\$20	\$978,000
Off Site Disposal (Tunnel Excavation)	200,000	CY	\$25	\$5,000,000
Subtotal Earthwork				\$6,106,000

Section 2 Pavement Structural Section	Quantity	Unit	Unit Price**	Item Cost
HMA-A	1,710	TON	\$120	\$205,200
RHMA-G	960	TON	\$120	\$115,200
BWC-O	535	TON	\$120	\$64,200
AB (CI-2)	4,560	CY	\$50	\$228,000
SEG	9,780	SY	\$2	\$19,560
HMA Dike	21	TON	\$120	\$2,520
Place HMA Dike	1,630	LF	\$4	\$6,520
Subtotal Pavement Structural Section				\$641,200

Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost
Drainage (Geotechnical)	1	LS	\$500,000	\$500,000
Drainage (Hydraulics)	1	LS	\$370,000	\$370,000
Subtotal Drainage				\$870,000

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost
Shoulder Rumble strip	156	STA	\$100	\$15,600
Erosion Control	1	LS	\$30,712	\$30,712
Highway Planting and Revegetation	1	LS	\$22,700	\$22,700
Mitigation (Construction)	1	LS	\$37,500,000	\$37,500,000
Temporary Construction BMPs	1	LS	\$6,000,000	\$6,000,000
Subtotal Specialty Items				\$43,569,012

Section 5 Traffic Items	Quantity	Unit	Unit Price	Item Cost
Thermoplastic Striping (4")	312	STA	\$50	\$15,600
Pavement Marker (reflective-recessed)	650	EA	\$5	\$3,250
Construct Metal Beam Guardrail (TOTAL)	1,550	LF	\$35	\$54,250
Tie-in Work and Construction Access:				
Portable Changeable Message Sign (PCMS)	2	EA	\$8,000	\$16,000
Temp Flashing Beacon	2	EA	\$7,000	\$14,000
Construction Area Signs	1	LS	\$5,000	\$5,000
Subtotal Traffic Items				\$108,100

Total Sections 1 : 5**\$51,294,312****Traffic Additions (Tie-in Work & Access)**

Traffic Control System	1	LS	\$2,500,000	\$2,500,000
Maintain Traffic	1	LS	\$2,500,000	\$2,500,000
Subtotal Traffic Additions				\$5,000,000
TOTAL 1:5 + TRAFFIC ADD.				\$56,294,312
Time Related Overhead (5%)				\$2,814,716
Subtotal				\$59,109,028

Section 6 Minor Items

$$\$51,294,312 \times (5\%) =$$

\$2,564,716

Subtotal Minor Items**\$2,564,716****Subtotal Sections 1 : 6****\$61,673,743****Section 7 Roadway Mobilization**

$$\$51,294,312 \times (10\%) =$$

\$5,129,431

Subtotal Mobilization**\$5,129,431****Subtotal Sections 1 : 7****\$66,803,174**

Section 8 Roadway Additions	Quantity	Unit	Unit Price	Item Cost
	Supplemental Work			
		\$61,673,743 x (5%) =		\$3,083,687
	Contingencies			
		\$61,673,743 x (25%) =		\$15,418,436
	Construction Office (6.5-yr.)			\$65,000
		Subtotal Roadway Additions		\$3,148,687
	\$ Per Hour	Hours Per Day	Work Days	
COZEOP setups	\$100	10	20	\$20,000

TOTAL ROADWAY ITEMS \$69,971,862

II. STRUCTURES ITEMS

	Tunnel 2	\$978,070,000
		TOTAL STRUCTURES ITEMS \$978,070,000

III. RIGHT OF WAY ITEMS

A. Total Acquisition, including Cost	\$1,125
B. Appraisal Fees Estimate	\$0
C. Mitigation acquisition & credits	\$13,125,000
D. Project Development Permit Fees	\$453,000
E. Utility Relocation (State share)	\$5,000
F. Relocation Assistance (RAP)	\$0
G. Clearance/Demolition	\$0
H. Title and Escrow Fees	\$0
TOTAL RIGHT OF WAY ITEMS \$13,584,125	

Anticipated Date of Right of Way Certification
(Date to which Values are Escalated)

Estimate Prepared By: Carlon Schrieve
Estimate Checked By: Jeff Pimentel

Last Chance Grade

Alternative C3

01-DN-101 PM 12.0/15.5

ALTERNATIVE DESCRIPTION:

Alternative C3 (Rudisill Road to South of Mill Creek Access)

SUMMARY OF ESTIMATED COST

TOTAL ROADWAY ITEMS (2016)	\$358,009,000
TOTAL STRUCTURE ITEMS	\$401,461,000
SUBTOTAL CONSTRUCTION COSTS (2016)	\$759,470,000
TOTAL RIGHT OF WAY ITEMS (2016)	\$38,087,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$797,557,000

I. ROADWAY ITEMS

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost
Clearing & Grubbing (Includes Large Timber)	235	Ac	\$20,000	\$4,700,000
Roadway Excavation	8,023,300	CY	\$20	\$160,466,000
Subtotal Earthwork				\$165,166,000

Section 2 Pavement Structural Section	Quantity	Unit	Unit Price**	Item Cost
HMA-A	37,240	TON	\$120	\$4,468,800
RHMA-G	15,960	TON	\$120	\$1,915,200
BWC-O	11,084	TON	\$120	\$1,330,080
AB (CI-2)	76,630	CY	\$50	\$3,831,500
SEG	164,200	SY	\$2	\$328,400
HMA Dike	364	TON	\$120	\$43,680
Place HMA Dike	28,408	LF	\$4	\$113,632
Subtotal Pavement Structural Section				\$12,031,292

Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost
Drainage (Geotechnical)	1	LS	\$15,603,000	\$15,603,000
Drainage (Hydraulics)	1	LS	\$11,510,000	\$11,510,000
Subtotal Drainage				\$27,113,000

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost
Shoulder Rumble strip	739	STA	\$100	\$73,900
Erosion Control	1	LS	\$8,093,620	\$8,093,620
Highway Planting and Revegetation	1	LS	\$5,306,030	\$5,306,030
Mitigation (Construction)	1	LS	\$54,000,000	\$54,000,000
Temporary Construction BMPs	1	LS	\$8,820,200	\$8,820,200
Subtotal Specialty Items				\$76,293,750

Section 5 Traffic Items	Quantity	Unit	Unit Price	Item Cost
Thermoplastic Striping (4")	1,653	STA	\$50	\$82,650
Pavement Marker (reflective-recessed)	3,444	EA	\$5	\$17,220
Construct Metal Beam Guardrail (TOTAL)	27,700	LF	\$35	\$969,500
Tie-in Work and Construction Access:				
Portable Changeable Message Sign (PCMS)	2	EA	\$8,000	\$16,000
Temp Flashing Beacon	2	EA	\$7,000	\$14,000
Construction Area Signs	1	LS	\$5,000	\$5,000
Subtotal Traffic Items				\$1,104,370

Total Sections 1 : 5	\$281,708,412
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Traffic Additions (Tie-in Work & Access)				
Traffic Control System	1	LS	\$2,000,000	\$2,000,000
Maintain Traffic	1	LS	\$2,000,000	\$2,000,000
			Subtotal Traffic Additions	\$4,000,000
			TOTAL 1:5 + TRAFFIC ADD.	\$285,708,412
			Time Related Overhead (5%)	\$14,285,421
			Subtotal	\$299,993,833

Section 6 Minor Items				
			\$281,708,412 x (5%) =	\$14,085,421
			Subtotal Minor Items	\$14,085,421
			Subtotal Sections 1 : 6	\$314,079,253

Section 7 Roadway Mobilization				
			\$281,708,412 x (10%) =	\$28,170,841
			Subtotal Mobilization	\$28,170,841
			Subtotal Sections 1 : 7	\$342,250,094

Section 8 Roadway Additions	Quantity	Unit	Unit Price	Item Cost
Supplemental Work				
			\$314,079,253 x (5%) =	\$15,703,963
Contingencies				
			\$314,079,253 x (25%) =	\$78,519,813
Construction Office (3-yrs.)				\$35,000
			Subtotal Roadway Additions	\$15,738,963
	\$ Per Hour	Hours Per Day	Work Days	
COZEOP setups	\$100	10	20	\$20,000

TOTAL ROADWAY ITEMS	\$358,009,057
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II. STRUCTURES ITEMS

	Bridge C1	\$10,708,000
	Bridge C2	\$11,199,000
	Tunnel 3	\$335,962,000
	Bridge C3	\$10,262,000
	Bridge C4	\$11,030,000
	Bridge 3A	\$22,300,000
TOTAL STRUCTURES ITEMS		\$401,461,000

III. RIGHT OF WAY ITEMS

A. Acquisition, including excess lands,	\$2,504,625
B. Appraisal Fees Estimate	\$20,000
C. Mitigation acquisition & credits	\$28,350,000
D. Project Development Permit Fees	\$453,000
E. Utility Relocation (State share)	\$6,755,000
F. Relocation Assistance (RAP)	\$0
G. Clearance/Demolition	\$0
H. Title and Escrow Fees	\$4,000
TOTAL RIGHT OF WAY ITEMS	\$38,086,625

Anticipated Date of Right of Way Certification
(Date to which Values are Escalated)

Estimate Prepared By: Carlon Schrieve
Estimate Checked By: Jeff Pimintel

Last Chance Grade

Alternative C4

01-DN-101 PM 12.0/15.5

ALTERNATIVE DESCRIPTION:

Alternative C4 (Rudisill Road to North of Mill Creek Access)

SUMMARY OF ESTIMATED COST

TOTAL ROADWAY ITEMS (2016)	\$413,047,000
TOTAL STRUCTURE ITEMS	\$395,591,000
SUBTOTAL CONSTRUCTION COSTS (2016)	\$808,638,000
TOTAL RIGHT OF WAY ITEMS (2016)	\$38,678,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$847,316,000

I. ROADWAY ITEMS

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost
Clearing & Grubbing (Includes Large Timber)	254	Ac	\$20,000	\$5,080,000
Roadway Excavation	9,817,000	CY	\$20	\$196,340,000
Subtotal Earthwork				\$201,420,000

Section 2 Pavement Structural Section	Quantity	Unit	Unit Price**	Item Cost
HMA-A	32,134	TON	\$120	\$3,856,080
RHMA-G	17,980	TON	\$120	\$2,157,600
BWC-O	12,400	TON	\$120	\$1,488,000
AB (CI-2)	85,700	CY	\$50	\$4,285,000
SEG	183,667	SY	\$2	\$367,334
HMA Dike	366	TON	\$120	\$43,920
Place HMA Dike	28,500	LF	\$4	\$114,000
Subtotal Pavement Structural Section				\$12,311,934

Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost
Drainage (Geotechnical)	1	LS	\$17,087,000	\$17,087,000
Drainage (Hydraulics)	1	LS	\$16,321,000	\$16,321,000
Subtotal Drainage				\$33,408,000

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost
Shoulder Rumble Strip	827	STA	\$100	\$82,700
Erosion Control	1	LS	\$8,694,660	\$8,694,660
Highway Planting and Revegetation	1	LS	\$4,520,000	\$4,520,000
Mitigation (Construction)	1	LS	\$55,125,000	\$55,125,000
Temporary Construction BMPs	1	LS	\$8,868,662	\$8,868,700
Subtotal Specialty Items				\$77,291,060

Section 5 Traffic Items	Quantity	Unit	Unit Price	Item Cost
Thermoplastic Striping (4")	1,829	STA	\$50	\$91,450
Pavement Marker (reflective-recessed)	3,810	EA	\$5	\$19,050
Construct Metal Beam Guardrail (TOTAL)	27,960	LF	\$35	\$978,600
Tie-in Work and Construction Access:				
Portable Changeable Message Sign (PCMS)	2	EA	\$8,000	\$16,000
Temp Flashing Beacon	2	EA	\$7,000	\$14,000
Construction Area Signs	1	LS	\$5,000	\$5,000
Subtotal Traffic Items				\$1,124,100

Total Sections 1 : 5	\$325,555,094
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Traffic Additions (Tie-in Work & Access)	Work			
Traffic Control System	1	LS	\$2,000,000	\$2,000,000
Maintain Traffic	1	LS	\$2,000,000	\$2,000,000
Subtotal Traffic Additions				\$4,000,000
TOTAL 1:5 + TRAFFIC ADD.				\$329,555,094
Time Related Overhead (5%)				\$16,477,755
Subtotal				\$346,032,849

Section 6 Minor Items		\$325,555,094 x (5%) =	\$16,277,755
		Subtotal Minor Items	\$16,277,755
		Subtotal Sections 1 : 6	\$362,310,603

Section 7 Roadway Mobilization			
		$\$325,555,094 \times (10\%) =$	\$32,555,509
		Subtotal Mobilization	\$32,555,509
		Subtotal Sections 1 : 7	\$394,866,113

Section 8 Roadway Additions	Quantity	Unit	Unit Price	Item Cost
	Supplemental Work			
		\$362,310,603 x (5%) =		\$18,115,530
	Contingencies			
		\$362,310,603 x (25%) =		\$90,577,651
	Construction Office (4-yr.)			\$45,000
			Subtotal Roadway Additions	\$18,160,530
COZEEP setups	\$ Per Hour	Hours Per Day	Work Days	
	\$100	10	20	\$20,000

TOTAL ROADWAY ITEMS	\$413,046,643
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II. STRUCTURES ITEMS

	Bridge C1	\$10,708,000
	Bridge C2	\$11,199,000
	Tunnel 3	\$335,962,000
	Bridge C3	\$10,262,000
	Bridge C4	\$11,030,000
	Bridge 4A	\$9,985,000
	Bridge 4B	\$6,445,000
TOTAL STRUCTURES ITEMS		\$395,591,000

III. RIGHT OF WAY ITEMS

A. Total Acquisition Cost	\$2,504,625
B. Appraisal Fees Estimate	\$20,000
C. Mitigation acquisition & credits	\$28,940,625
D. Project Development Permit Fees	\$453,000
E. Utility Relocation (State share)	\$6,755,000
F. Relocation Assistance (RAP)	\$0
G. Clearance/Demolition	\$0
H. Title and Escrow Fees	\$4,000
TOTAL RIGHT OF WAY ITEMS	
	\$38,677,250

Anticipated Date of Right of Way Certification
(Date to which Values are Escalated)

Estimate Prepared By: Carlon Schrieve
Estimate Checked By: Jeff Pimentel

Last Chance Grade

Alternative C5

01-DN-101 PM 12.0/15.5

ALTERNATIVE DESCRIPTION:

Alternative C5 (Rudisill Road to Hamilton Road)

SUMMARY OF ESTIMATED COST

TOTAL ROADWAY ITEMS (2016)	\$533,147,000
TOTAL STRUCTURE ITEMS	\$424,106,000
SUBTOTAL CONSTRUCTION COSTS (2016)	\$957,253,000
TOTAL RIGHT OF WAY ITEMS (2016)	\$44,897,000
TOTAL PROJECT CAPITAL OUTLAY COSTS	\$1,002,150,000

I. ROADWAY ITEMS

Section 1 Earthwork	Quantity	Unit	Unit Price	Item Cost
Clearing & Grubbing (Includes Large Timber)	321	Ac	\$20,000	\$6,420,000
Roadway Excavation	14,422,000	CY	\$20	\$288,440,000
Subtotal Earthwork				\$294,860,000

Section 2 Pavement Structural Section	Quantity	Unit	Unit Price**	Item Cost
HMA-A	43,245	TON	\$120	\$5,189,400
RHMA-G	24,190	TON	\$120	\$2,902,800
BWC-O	16,684	TON	\$120	\$2,002,080
AB (CI-2)	115,140	CY	\$50	\$5,757,000
SEG	247,170	SY	\$2	\$494,340
HMA Dike	479	TON	\$120	\$57,480
Place HMA Dike	37,320	LF	\$4	\$149,280
Subtotal Pavement Structural Section				\$16,552,380

Section 3 Drainage	Quantity	Unit	Unit Price	Item Cost
Drainage (Geotechnical)	1	LS	\$23,229,000	\$23,229,000
Drainage (Hydraulics)	1	LS	\$17,746,000	\$17,746,000
Subtotal Drainage				\$17,746,000

Section 4 Specialty Items	Quantity	Unit	Unit Price	Item Cost
Shoulder Rumble strip	1,112	STA	\$100	\$111,200
Erosion Control	1	LS	\$10,519,740	\$10,519,740
Highway Planting and Revegetation	1	LS	\$5,311,000	\$5,311,000
Mitigation (Construction)	1	LS	\$64,500,000	\$64,500,000
Temporary Construction BMPs	1	LS	\$10,308,350	\$10,308,400
Subtotal Specialty Items				\$90,750,340

Section 5 Traffic Items	Quantity	Unit	Unit Price	Item Cost
Thermoplastic Striping (4")	2,465	STA	\$50	\$123,250
Pavement Marker (reflective-recessed)	5,136	EA	\$5	\$25,680
Construct Metal Beam Guardrail (TOTAL)	33,130	LF	\$35	\$1,159,550
Tie-in Work and Construction Access:				
Portable Changeable Message Sign (PCMS)	2	EA	\$8,000	\$16,000
Temp Flashing Beacon	2	EA	\$7,000	\$14,000
Construction Area Signs	1	LS	\$5,000	\$5,000
Subtotal Traffic Items				\$1,343,480

Total Sections 1 : 5 \$421,252,200

Traffic Additions (Tie-in Work & Access)				
Traffic Control System	1	LS	\$2,000,000	\$2,000,000
Maintain Traffic	1	LS	\$2,000,000	\$2,000,000
Subtotal Traffic Additions				\$4,000,000
TOTAL 1:5 + TRAFFIC ADD.				\$425,252,200
Time Related Overhead (5%)				\$21,262,610
Subtotal				\$446,514,810

Section 6 Minor Items		
	\$421,252,200 x (5%) =	\$21,062,610
	Subtotal Minor Items	\$21,062,610
	Subtotal Sections 1 : 6	\$467,577,420

Section 7 Roadway Mobilization		
	\$421,252,200 x (10%) =	\$42,125,220
	Subtotal Mobilization	\$42,125,220
	Subtotal Sections 1 : 7	\$509,702,640

Section 8 Roadway Additions	Quantity	Unit	Unit Price	Item Cost
Supplemental Work				
\$467,577,420 x (5%) =				\$23,378,871
Contingencies				
\$467,577,420 x (25%) =				\$116,894,355
Construction Office (4 yr.)				\$45,000
Subtotal Roadway Additions				\$23,423,871
COZEOP setups	\$ Per Hour	Hours Per Day	Work Days	
	\$100	10	20	\$20,000

TOTAL ROADWAY ITEMS \$533,146,511

II. STRUCTURES ITEMS

	Bridge C1	\$10,708,000
	Bridge C2	\$11,199,000
	Tunnel 3	\$335,962,000
	Bridge C3	\$10,262,000
	Bridge C4	\$11,030,000
	Bridge 4a	\$9,985,000
	Bridge 4b	\$6,445,000
	Bridge 5B	\$10,128,000
	Bridge 5C	\$9,933,000
	Bridge 5D	\$3,288,000
	Bridge 5E	\$1,722,000
	Bridge 5F	\$1,722,000
	Bridge 5G	\$1,722,000
TOTAL STRUCTURES ITEMS		\$424,106,000

III. RIGHT OF WAY ITEMS

A. Total Acquisition Cost	\$2,852,125
B. Appraisal Fees Estimate	\$20,000
C. Mitigation acquisition & credits	\$33,862,500
D. Project Development Permit Fees	\$453,000
E. Utility Relocation (State share)	\$7,705,000
F. Relocation Assistance (RAP)	\$0
G. Clearance/Demolition	\$0
H. Title and Escrow Fees	\$4,000
TOTAL RIGHT OF WAY ITEMS	
	\$44,896,625

Anticipated Date of Right of Way Certification
(Date to which Values are Escalated)

Estimate Prepared By: Carlon Schrieve
Estimate Checked By: Jeff Pimintel

ATTACHMENT K
Programming Sheet

PROGRAMMING SHEET

06/27/2016

EFIS ID: 0115000099 EA:01-0F280 County: DN Route: 101 PostMile: 12.50/16.30

Project Manager: COHEN, SEBASTIAN H	PM Assistant: FALK-CARLSEN, KARL	Project Nickname: LAST CHANCE GRADE
Project Description - Long: IN DEL NORTE COUNTY FROM WILSON CREEK BRIDGE TO 3.8 MILES NORTH OF WILSON CREEK BRIDGE		
Work Description - Long: REPAIR SLIDES; CONSTRUCT BYPASS		
PPNO: 1112	Program: Planning	RTP: No Funding Candidate: No
Open for Time: Yes	Subprogram: Major Damage (Permanent Restoration)	CT Status: APL RMP: PROGRAM YR: Working Days:
10 Yr SHOPP: No	AADD: Yes	Dist Category: STORM DAMAGE
FED Aid Eligible:		

MS	MS Description	MS Date
M000	ID NEED	05/05/2015 (A)
M010	APPROVE PID	06/30/2016 (T)
M015	PROG PROJ	01/16/2017 (T)
M020	BEGIN ENVIRO	09/14/2017 (T)
M040	BEGIN PROJ	07/01/2017 (T)
M120	CIRC DPR & DED EXT	08/19/2024 (T)
M200	PA & ED	02/16/2026 (T)
M221	BRIDGE SITE DATA RECEIVE	04/16/2026 (T)
M224	R/W REQTS	08/19/2024 (T)
M225	REGULAR R/W	04/14/2025 (T)
M275	GENERAL PLANS	04/16/2026 (T)
M377	PS&E TO DOE	03/15/2029 (T)
M378	DRAFT STRUC PS&E	02/15/2030 (T)
M380	PROJ PS&E	04/15/2030 (T)
M410	R/W CERT	07/01/2030 (T)
M460	RTL	09/02/2030 (T)
M480	HQ ADVERT	12/02/2030 (T)
M495	AWARD	04/14/2031 (T)
M500	APPROVE CONTRACT	06/16/2031 (T)
M600	CONTRACT ACCEPT	10/14/2039 (T)
M700	FINAL REPORT	09/30/2041 (T)
M800	END PROJ	09/29/2042 (T)

Capital Cost Estimates		
	Amount \$k	EST Date
Roadway	533,147	06/01/16
Structures	424,106	06/01/16
Const Total	957,253	
ROW	44,897	05/11/16
Total	1,002,150	

Env Doc: EIR, EIS

Funding Info (\$k)						
Fund Source	PA&ED	PS&E	ROW	CON	ROW Cap	CON CAP
4050201.131	0	0	0	0	0	0
Grand Total:	0	0	0	0	0	0

Capital Cost Estimates	
2031	
CC Escalation %:	3.50%
CC Escalated \$:	1,603,733
ROW CAPITAL:	89,516
TOTAL:	1,693,249

PROJECT SUPPORT COSTS									
Phase	PRIOR	2016	2017	2018	2019	2020	Future	Total	Sup/Cap
Escalation Rate	ACT \$	FTC	(1 50%)	(1 50%)	(1 50%)	(1 50%)	(1 50%)		
0	0	0	669	5,008	5,571	5,670	35,660	52,578	3.11%
1	0	0	0	0	0	0	31,067	31,067	1.83%
2	0	0	0	0	0	0	1,586	1,586	0.09%
3	0	0	0	0	0	0	86,313	86,313	5.10%
TOTAL SUPPORT COSTS:								171,545	10.13%
TOTAL PROJECT COSTS:								1,864,794	

PROJECT SUPPORT PYs									
Division	PRIOR	2016	2017	2018	2019	2020	Future	Total	
	ACT PYs	FTC PYs	FTC PYs	FTC PYs	FTC PYs	FTC PYs	FTC PYs	PYs	
01 ADMN	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	
01 MTCE	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	
01 PPM	0.00	0.00	0.01	0.03	0.03	0.03	2.63	2.74	
01 TPLN	0.00	0.00	0.00	1.37	1.72	1.73	37.83	42.65	
01 TROP	0.00	0.00	0.00	0.02	0.02	0.02	0.61	0.67	
01 TOTALS:	0.00	0.00	0.02	1.42	1.77	1.78	41.13	46.12	
03 CONS	0.00	0.00	0.00	0.00	0.00	0.00	84.03	84.04	
03 ENVM	0.00	0.00	4.39	18.57	20.55	20.61	326.66	390.78	
03 ESRV	0.00	0.00	0.01	0.47	0.49	0.49	7.42	8.88	
03 PRJD	0.00	0.00	0.02	4.16	4.42	4.44	71.54	84.58	
03 RWLS	0.00	0.00	0.00	0.03	0.03	0.03	1.92	2.00	
03 SURV	0.00	0.00	0.00	0.97	0.98	0.98	8.81	11.74	
03 TOTALS:	0.00	0.00	4.43	24.20	26.47	26.54	500.39	582.03	
59 GS	0.00	0.00	0.01	0.43	0.49	0.49	14.62	16.03	
59 METS	0.00	0.00	0.00	0.05	0.05	0.05	15.71	15.85	
59 OE	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.17	
59 PPM	0.00	0.00	0.03	0.07	0.07	0.07	0.87	1.11	
59 SCON	0.00	0.00	0.00	0.01	0.01	0.01	26.11	26.13	
59 SDSN	0.00	0.00	0.00	0.64	0.64	0.65	30.03	31.96	
59 SP&I	0.00	0.00	0.00	0.11	0.11	0.11	1.88	2.22	
59 TOTALS:	0.00	0.00	0.04	1.30	1.37	1.37	89.39	93.48	
PROJECT TOTALS:	0.00	0.00	4.48	26.93	29.62	29.70	630.90	721.62	

Comments:

ATTACHMENT L
Risk Register

Level 2 Register is Provided; Level 3 Register is Recommended for High Cost Projects (Quantitative Probabilistic Analysis) -To Be Produced Upon Acquisition of Funding & Programming; Level 3 is Beyond Scope of This Document For Various Reasons: Lack of:-Staff (Risk Management Team), Sufficiently Accurate Data, Impacts, Costs, In-District Expertise, Required Software,etc...)					<div>- Last Chance Grade Re-Alignment Project- Del Norte-101-PM 12.0/15.5; EA 01-0F280K / EFIS Project ID 01 1500 0099 Program Code 20.XX.201.131 SHOPP Permanent Reservation --Project Initiation Document--</div>					PROJECT EA: 0F28001		Project Manager: Sebastian Cohen			REGISTER OF KNOWN RISKS SIGNIFICANT ISSUES WITH RISK OF REQUIRING FUTURE PCRs				
										PROJECT ID#: 01 11500099									
Risk & Issue Identification										Risk / Issue Assessment						Risk Response			
Status	ID #	Type	Category	Title	Risk / Issue	Current Status / Assumptions / Comments	Prob.	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Risk Owner	Updated			
A c t i v e	1	Threat	PM / PDT	Geology / Groundwater	Given the complexity and magnitude of the geologic instability, If unforeseen geologic issues are either discovered late in the project development process or otherwise are significant enough to alter project alternatives and the subsequent analysis and decisions made for each alternative, the new info could change CEQA/NEPA timeline; it could alter feasibility of alternatives (both for and against various alternatives, and could overall delay project delivery and increase project costs. Groundwater site characteristics specifically are not well known and could impact project alternatives and project funding, as FHWA has indicated that they would like to see more data before fully ruling out the ability to maintain the existing alignment. Given this, an on-alignment project alternative may become looked upon as a feasible option by FHWA, and this could impact the type of project as well as the amount of funding we receive via the ER Program. Additionally, obtaining additional data requires access roads and permits and can take a long time, as well as be costly.	The project site and challenge to find a stable route around or through LCG is a complex and massive project that will require extensive studies, analysis and reporting on many issues, but especially the subsurface geologic issues. Current assumptions about the geologic characterizations of the site are mainly based on many years of Caltrans' Maintenance Forces and Engineers experience in responding to continual slope movement and subsequent roadway failures, requiring extensive efforts and unique emergency project sto simply keep the roadway open. Via the various projects that have been required, Caltrans has been able to drill and analyze LCG sufficiently enough to determine the main failure planes and geotechnical features that are separate from one another. However, as FHWA Geotech Engineers have indicated, there are additional site characterizations and data they would like to have acquired, compiled and analyzed, in order for them to feel that they fully understand all geotech features and can comment on the feasibility for an on-alignment repair project (need for a new alignment). Caltrans was already going to obtain a majority of the data they want, but our ability to obtain the data ASAP will be a challenge.	3- Moderate	4 - Moderate	12	4 - Moderate	12	Risks are moderate based upon the fact that additional data will likely illustrate that the existing site is less conducive to an on-alignment project, then has been stated, due to the fact that additional and possibly deeper failure planes may be discovered and mapped. Given the size of the entire 1 mile long section of active landslide (at roadway elevation), there are additional areas that can be drilled, as well as monitoring the entire grade for other parameters, such as groundwater. If an on-alignment alternative is determined by FHWA to be feasible and results in their desire to pursue such a project, additional risks will need to be analyzed and included, and will likely result in much higher probability for risks to occur and cause failures or project issues.	Mitigate	PDT has begun acquiring as much site characterization data ASAP, via various funding sources, including ongoing emergency projects, as well as planned projects. Additionally, we are planning so that once the project is funded and in the PAED phase, all geotechnical characterization work will be initiated ASAP. Support funds for this work will be allocated much earlier in the project than is normally performed.	PM/ PDT/GEOTECH	June, 2016			
A c t i v e	2	Threat	PM / PDT	ER Funding	Given the complexity and magnitude of the site and the geotechnical instabilities, all project alternatives are substantial and require funding in the range of a billion dollars, and given the current general limitations of available transportation funding from any source, acquiring adequate funds for any of the initial alternatives considered is a significant challenge. As a result of the 2016 Governor's Proclamation for a State of Emergency (SOE) covering Del Norte County, funding for a project via the Federal ER Program is currently being sought. Meetings and discussions with FHWA are ongoing, however several challenges and issues must be resolved before FHWA will likely approve the type and magnitude of project scoped in this PID. The main risks are that the ER Program is specifically meant to replace the existing highway facility in-kind, essentially only rebuilding what existed prior to the SOE event that triggered the Proclamation. The ER Program does not allow for new ROW (no new alignments); no betterments (improvements, such as wider shoulders, passing lanes, etc...; and the program has a \$100 million project max, per state, per event, per year. Additionally, if any programming of any kind, for any phase of any project that includes the scope of work that we are requesting funding for, is already programmed, ER funding can't be obtained for that project scope. Given the significance of the above listed requirements, and the importance that we acquire exceptions from FHWA to maintain our ability to acquire ER funding, if any obstacles arise in any of the exception request processes; substantial delays, decrease in approved project scope and funding, and even denial for a re-alignment project could occur. Additionally, if ER Funds are not obtained, a unique TBD source, such as a bond or specific congressional allocation would be required. If ER funding is obtained, depending upon the size of the allocation (greater than \$100 million) unique congressional action will be required before project funding approval. This all means that the site could remain as it exists for a significant amount of time and would require continual maintenance and emergency funds to keep the area traversable.	ER funding is currently being sought, as STIP and SHOPP are not realistic. Increased maintenance and emergency projects are expected to be required for the next several years, depending upon if funding is obtained and what delivery requirements come with said funding. ER Funding is currently the only feasible source for a project of this magnitude, although given that transportation funding is a highly political issue with various forms of bills being considered, it is possible that other non-ER Program funds may be viable in the future if the ER Program does not approve funding for a project.	3- Moderate	4 - Moderate	12	4 - Moderate	12	Funding any transportation project that requires over a billion dollars is a challenge in most climates, but given the current funding climate and the rural project location, this project is especially challenging. Extensive communication with FHWA began prior to the ER Program being opened via the Proclamation, resulting in knowledge of risks, issues, constraints and requirements associated with using ER Program funds.	Mitigate	District/PDT will continue to work with any and every possible funding avenue/opportunity/agency and seek out any and every opportunity to find sufficient funding for a project, including continually working with: FHWA, Congress, Local & State Representatives, and any other potential funding organization.	PM / PROG	June, 2016			
A c t i v e	3	Threat	PM / PDT / Tribal	Tribal Communication / Agreements& Plans / Culturally Significant & Sensitive Sites	Given the fact that there are four federally-recognized tribes within or nearby of the potential project limits, with some of the project alternatives lying within tribal boundaries and ancestral territories, recognizing them as major project stakeholders and fostering and maintaining a professional line of communication with them, not only for the project delivery phases, but also for the construction phases is a critical and essential task for Caltrans. If a proper and respectful relationship is not created and maintained, the risk of mis-trust; delays to required agreements and plans, etc... could heavily impact or alter project alternative route locations; could delay the project delivery timeline; and could increase overall project support and capital costs.	Given that early consultation with the local tribes has been ongoing, a significant amount of the known sites have already been mapped and project alternatives have been adjusted such that impacts to known sites have been eliminated or minimized. Once on the ground studies have been initiated, and new/actual culturally significant sites are verified, if new information is obtained that shows that some of the initially assumed sites are not culturally significant, it may be possible to re-adjust some of the alternatives such that some of the project alternative routes bypass more of the unstable LCG area. This would be beneficial in terms of stabilizing a larger portion of LCG, however such an action would take substantial consultation and verification by the Tribes of acceptable study and updated analysis results, which could be highly expensive and take a long time.	3-Moderate	4 -Moderate	12	4 -Moderate	12	Not all initially identified culturally sensitive & significant sites are positively known to contain artifacts or rise to the level of cultural significance & sensitivity. Due to various opinions by various tribal members having different opinions about what locations should be off limits and are culturally sensitive (protected from any development) it was simply assumed that the location under discussion was sensitive and to be protected. Regardless of any disagreements, it must be a unanimous decision and proven that no culturally sensitive sites are present before any plans for adjusting any alternative alignments will be entertained.	Mitigate	Continual consultation with all Tribes will continue to occur throughout the entire project development process. The tribes will be made aware of plans, studies, and all results of all types of analysis. Caltrans plans to keep the tribes involved and have them assist in as much project development process as possible. Additionally, we want to have all reports and studies posted and made available on our web site, creating as much transparency as possible. Plans and the associated pre-approved actions will be implemented if new sites are discovered during project development.	PM / PDT / ENVIRO	June, 2016			

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Risk & Issue Identification												Risk / Issue Assessment						Risk Response				
Status	ID #	Type	Category	Title	Risk / Issue	Current Status / Assumptions / Comments	Prob.	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Risk Owner	Updated						
A c t i v e	4	Threat	PM / PDT	Previously Unknown Environmental ly Significant Sites - Jeopardy Designation Risk	Given that the existing highway alignment and project alternatives are within; adjacent to; as well as go through highly unique and sensitive environments that contain a large variety of special, rare, endangered and/or protected resources; and given that alternative alignments are either adjacent to or run through parts of the State & National Park, which contains one of the last and largest virgin old growth redwood (OGR) forests, which are highly protected and are a major part of why the park was designated a World Heritage Site by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1980; all result in a high probability of challenges and obstacles in acquiring environmental approval for any alternatives where impacts on OGR trees could be avoided. Any impacts to OGR trees could be opposed by several organizations, groups and agencies, including: Parks, due to their own internal policies; the Sierra Club; UNESCO; local, state and international environmental protection organizations, as well as factions from local community members. Additionally, OGR trees are habitat for endangered species, such as the marbled Murrelet, so depending upon the results of impacts by various alternatives, a "jeopardy call" could be determined, which would eliminate the subject alternative that initiated that specific analysis. In addition to OGR trees, the park is also part of the California Coastal Ranges Biosphere Reserve, as well as being home to many unique types of flora and fauna, as well as 75 different mamals,including Roosevelt Elk. In addition, the project is bordered by a rugged and protected section of Pacific Ocean Coastline, which does fall within the jurisdiction of the State Coastal Commission. Given all of the above stated interest in project alternative impacts, it is imperative that the studies, analysis and impacts for each potential alternative be performed professionally and per the current proper format and procedural processes, as well as be accurate in the conclusions, because if any performed studies are not able to stand up to highly critical review and fact checking, any improper, incorrect, or even inconsequential and accidental mistakes could result in delay of project development process and require additional studies, which are likely to be expensive. The number of unique and special resources that are currently known to be listed as threatened or endangered, and therefore need to be analyzed, is already quite extensive; and, given the magnitude of the project and the lengthy estimated duration for PAED, it is possible that new laws or regulations protecting new resources or species, which currently aren't identified as needing studying or analysis for potential impacts, would then require analysis and potentially timely consultation . These all represent additional risks towards achieving PAED as well as potentially altering acceptable route alternatives, project delivery costs and overall capital costs.	The current assumptions are that it will take somewhere between 5 to 9 years to perform all necessary studies, analysis and determination of any impacts on various resources from various project alternatives', as required by NEPA and CEQA laws. This duration estimate is based on the currently known resources needing to be analyzed, the current list of assumed potential alignments, and assumed types of studies that will be required by the various permitting agencies. The duration range stated is generally an expansion of the durations normally encountered for similar types of studies for the identified types of resources. The actual duration it takes to achieve approval of an environmental document for this project could be adjusted faster or slower, depending upon the quantity and experience of available staff, which will be a direct function of available funding sources and the requirements that said funding program may require; and it will highly depend on the types of studies performed to be required and their subsequent approval by the various permitting/environmental resource agencies, as well as buy-in and approval from parks, tribes and adjacent land owners.	4-High	4-Moderate	16	4-Moderate	16	Given the substantial list of resources, the size of the project, and the complexity of all parts of the project and the extensive timeline initially estimated, it is highly possible that new resources / studies / impacts will be encountered, as well as potential disagreement between resource / permitting agencies about acceptable type and level of analysis performed; the conclusions and the recommended mitigation strategies considered acceptable for impacts from various project alternatives; especially so for some of more sensitive, high value resources. When these types of issues occur, it often results in higher support costs, delay in project delivery, and potentially higher capital costs required for additional mitigation and/or longer monitoring periods.	Mitigate	The PDT and all of the various ongoing working groups (especially the Biological Resources Working Group and the Tribal and Parks Partnering Working Group) will continue to regularly meet; discuss project alternative options; discuss site concerns, issues and share knowledge; proactively and progressively work together with all resource agencies to be clear and comprehensive on all alternatives and potential issues/impacts/options. These various meetings will remain in effect in some format, even once the PID is approved and prior to identification of a funding source such that staff are able to charge time to meet, as these meetings and lines of communication that we have established between many groups, agencies and organizations has been critical to-date, and are sure to be even more important and helpful for all later in the project development phases.	PM / PDT / ENVIRO	June, 2016						
A c t i v e	5	Threat	PM / PDT	PIO / Public Outreach (Management of: Website; Public Inquiries; Press)	Given the significance of the project and the high level of concern and involvement from the public, as well as some organized community groups who are becoming more involved and even funding their own radio adds, an ever growing amount of press involvement is highly likely, especially once funding is obtained. Some of the press, especially the opinion pieces and letters to the editor that we get from some sources, as well as the fact that the project gets press via local politicians providing input and opinion, along with local activist groups who have an agenda, the risk of incorrect information being spread and subsequent negative sentiment about the status of progress on the project development process has been occurring for several months and is likely to increase, without proactive actions and response activities by the PDT, the PM, and PIO. Without a substantial PIO effort to quickly respond and correct all inaccurate statements made, negative and incorrect information is likely to quickly propagate and become the most common understanding of what's occurring. Continued use of the LCG website is an important item that we must ensure is continued, even once our Planning Consultant (MIG) is not available to assist us in uploading all available documents, making Caltrans progress as transparent as possible. Future plans to maximize the positive attributes of the website are being planned, including: future picture stills/video on a continual update loop; a general project development status update section, and other TBD uses.	Given the experience over the last 2+ yrs., it is clear that continual actions will be required by Caltrans to work with the press and give regular briefings as well as correct inaccurate statements by those with agendas. Luckily, almost all groups want a project to be built, but they have inaccurate and infeasible assumptions or faulty data.	3-Moderate	4-Moderate	12	2-Low	6	Use of a consultant to perform only PIO for a unique single project will be costly, but once correct information and proper presentations are provided to the public, it shouldn't have any impact to project progress.	Mitigate	A unique and solely project allocated PIO is being planned for and will be requested to perform the duties stated under this risk item, however, several other duties will be included in their job description, such as keeping the website updated and running. Note that a non-Caltrans website will be requested, as restraints on CT Websites have constraints that limit their effectiveness and ability to properly maintain.	PM / PIO	June, 2016						
A c t i v e	6	Threat	PM / PDT	Early Access; Permits, Surveys & Geotech Analysis (drilling & monitoring)	Given the magnitude of the site and the need for additional geotechnical data ASAP, to assist in acquiring FHWA Geotechnical concurrence on the status of the subsurface characterizations/feasibility for an on-alignment project (as well as important data for feasibility of all alignment alternatives), and to minimize potential delays in acquiring ER funding and delays in achieving PAED, its important to acquire permits to enter for access roads and permits/approval to get subsurface drilling underway ASAP. Since this requires permits and approval from various organizations, including theWaterboard, CDFW, CCC and Parks, it is likely to require a substantial effort in itself, and if its delayed, it will likely subsequently delay future milestones and decions about feasibility of alternatives; decisions about necessary scope; decisions about constructability issues; delay determination of project cost estimates and potential mitigation options, as well as delay the overall project development process timeline.	Early communication with all agencies and organizations is already underway about issues surrounding getting permits and access to perform early surveys and geotech studies, however it is clear that it will take significant staff time on everyone's part to properly provide permits for the stated access. additionally, the support costs for the necessary geotech drilling and analysis is significant, and must occur as early as possible, and not in the 1 phase or late in the 0 phase.	4-High	4-Moderate	16	4-Moderate	16	As discussed, early discussions have been underway with all required stakeholders, and it is clear that permitting agencies and approval will require some critical planning, description of details about how the geotech drilling will occur and what BMPs will be used to eliminate or minimize impacts to several different resources, including OGR trees.	Mitigate	This is priority #1 once project funding is obtained and staff are assigned or a consultant services are made viable for use. Additionally, PDT is continuing to discuss this issue at the various working groups, so all agencies are not surprised when we ask for permits and approvals for access to the various locations for drilling and monitoring of subsurface data ASAP. Additionally, the PDT is actively finding other outside-the-box methods to perform as much additional drilling and data acquisition as possible on the existing alignment, where environmental approval is much easier to obtain.	Geotech/Enviro/PM	June, 2016						

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										PROJECT ID#: 01 11500099									
Risk & Issue Identification										Risk / Issue Assessment						Risk Response			
Status	ID #	Type	Category	Title	Risk / Issue	Current Status / Assumptions / Comments	Prob.	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Risk Owner	Updated			
A c t i v e	7	T h r e a t	PM / PDT	Tunnel Construction Techniques / Feasibility of Tunnels (seismic faults, unknown slides/instabilities, etc...)	Given that all but one of the current re-alignment project alternatives includes some form of tunnel construction, and that the underlying geology still requires additional analysis to determine if a tunnel is definitively feasible and cost effective, as well as what type of tunnel construction would be appropriate for the various locations within the various alternatives, there is a risk that additional studies may result in eliminating or drastically altering the acceptable tunnels location, type and costs. Where tunnels are initially proposed, unforeseen and yet to be discovered geologic instabilities orcare constraints, including further analysis and modeling of tunnel constraints and required design characteristics, which include the need for a unique maintenance support building that will house specific support units, for responses to any accidents or maintenance needs within a tunnel. could result in a change in the feasibility of some of the proposed tunnels. Results like this would alter scope of some project alternatives; could delay various delivery milestones as well as delay the overall project delivery date; drive up project costs, as the project alternative(s) may now require additional amounts of cut / fill and subsequent disposal of excess material.	Tunnel feasibility has only been tentatively analyzed to-date. Once additional geotech drilling and analysis is completed, tunnel feasibility will be better understood. In some cases, on some alignments, without use of a tunnel, the subsequent costs associated with cut / fill, in terms of potential impacts from more fill and the increased costs for more disposal could result in an infeasible alternative.	3-Moderate	8 -High	24	8 -High	24	if a project is not a "balanced project" (all excavation can be used as fill within the project limits), and when cut-&-fill techniques are not feasible, due to either impacts to resources or excessive costs because of large amounts of excess excavation, and the subsequent costs associated with haul and disposal of this excess material, tunnels are often considered. However, several other site characteristics must be acceptable, including geologic stability, groundwater elevations, seismic/fault concerns, and other site constraints.	Mitigate	PDT will continue to communicate with all of the existing Working Groups; the many agencies and organizations actively working with us; and try to acquire the necessary approvals to be able to determine various required geotechnical and site characteristics so that we can determine tunnel feasibility ASAP. Additionally, the PDT is planning to work with known tunnel specialists within FHWA and other consultants who can help assist with an appropriate approach for additional analysis that we can perform in-house. Hiring a tunnel specialist consultant will also be entertained, pending available funds.	PM / PDT / Geotech	June, 2016			
A c t i v e	8	T h r e a t	PM / PDT	Mitigation Costs / Old Growth Trees / Opposition	Given the magnitude and the location of the project, the subsequent list of potential resources that will be impacted and potentially require mitigation, project cost-benefit could be extensive and so significant. This, along with the fact that the Old Growth Redwood Trees in the Park, which are part of a UNESCO-identified World Heritage Site, are considered to be a resource where any perceived or agreed to impacts can't be mitigated, all point to estimation for any mitigation costs for this project being problematic. Any estimate that is assumed, regardless of inaccurate and could result in costs that in excess of what is considered acceptable based on the cost-benefit ration for the project.	Discussion of all resources, but especially the potential impacts and options for acceptable forms of mitigation for old growth redwood trees have been and will remain to be an important item for all of our ongoing working groups, which includes Parks. Impacts to old growth will likely be an international issue, given the WHS designation by UNESCO.	3-Moderate	8 -High	24	4 -Moderate	12	Old growth redwood tree impacts are considered to have no acceptable mitigation, so by definition, it will be a challenge to get approval on any project alternative that impacts old growth.	Mitigate	Once project funding is acquired, high level presentations and outreach with UNESCO, Dept. of Interior, Congress and other organizations will be determined via a special scoped PDT working group and then quickly implemented. The approach will be to proactively take-on this issue, instead of wait for activism groups / agencies and resource agencies to discover and inquire potential impacts.	PM / PDT	June, 2016			
A c t i v e	9	T h r e a t	PM / PDT	National Parks Policy / Support	Even though both State & National Park's have been heavily involved in our Partnering Working Group, along with Congressman Huffman's Working Group, and our Biological Resources Working Group, and have been very helpful, proactive and supportive in almost everyway possible, given the significance of the WHS designation by UNESCO, along with Parks' internal policies, and their upper management's potential concern over OGR tree impacts, as well as political and international pressures, any alternative that impacts virgin OGR trees may be challenging for them to support, as it may be an impact their respective organizations are not able to support, or at least not from their local positions. Even if an alternative appears to be acceptable from a variety/majority of CEQA and NEPA analysis/processes, it may require substantial effort to lobby the Department of the Interior, and/or Congressman who can apply pressure and influence. This could delay project development and/or otherwise reject an acceptable alternative.	Based on input from National and State Parks Superintendents, via our current ongoing Partnerships, they have made it clear that it will take special elevation to their management and legal functional groups to acquire approval of an alternative that has OGR tree impacts	4-High	4 -Moderate	16	4 -Moderate	16	State & National Parks' Superintendents provided input.	Mitigate	Once project funding is obtained, along with initiating geotechnical drilling and determining various subsurface characteristics, discussions and presentations to high level management within parks and with the correct contacts, as described above for the Response Actions listed under Risk #8 (above).	PM / PDT	June, 2016			
A c t i v e	10	T h r e a t	PM / PDT	Cut-N-Fill Quantities	If tunnels are determined not feasible for any alternative, and/or cut & fill quantities increase for other reasons, project delays and project costs could increase.	Given that tunnels have already been discussed as having minimal geotech analysis and being tentative, and since they are often called for to minimize cut & fill quantities for minimizing impacts to resources and minimizing disposal / haul costs, it is highly possible that this risk could be elevated as more info is obtained.	3-Moderate	4 -Moderate	12	4 -Moderate	12	Caltrans contains minimal detailed info for all necessary subsurface characteristics around tunnel locations away from the existing alignment.	Mitigate	Geotech and the PDT are pursuing interim analysis measures in an attempt to refine the initial assumptions about tunnel locations and to see if additional info can be obtained that will assist in early analysis of tunnel viability at the various planned locations, such as newer technologies that can be utilized form the air, as well as working with data from the adjacent timber companies	Design, Enviro , R/W and PM	June, 2016			
A c t i v	11	T h r e a	PM / PDT	Consultants (Full Project Delivery; & Tunnel Expertise)	If FHWA approves ER funding, depending upon the scope and costs of the type of project they approve, and their required project delivery timeline, which based upon previous experience where they required and extremely fast overall delivery schedule, which previously was unfeasible, a unique approach for staffing of the entire PDT will be required, otherwise their likely accelerated schedule may not be feasible. Given the average/normal PAED timeline experienced for delivery of fairly simple and straightforward District 1 Projects, where minimal sensitive resources require analysis and proven mitigation strategies are utilized, PAED and subsequent delivery still requires several years. Considering the extensive list of sensitive environmental resources on this project, if ER Funds are approved, proposal of a unique consultation approach should be presented and requested. Use of a single Consultant Firm, who has the capabilities (appropriate staff, experienced with Caltrans delivery process, and infrastructure) should be utilized to perform and deliver all functional unit's various deliverables. A unique Caltrans Oversight PDT would be required to continually work with the consultant, perform continual monitoring and reporting, and keep Caltrans' interests are being maximized and work is being done as efficient as possible. Additionally, if a rapid delivery schedule is required, another approach worth considering, to maximize efficiency of studies and analysis of resources in the park, as well as significantly increase trust between Caltrans and Parks and possibly some of the tribes, is to involve local professionals (including Parks' biologists) to assist, or at least be involved and have ownership of various studies. This may be a challenge considering they are another Government agency, but such an operation/action would drastically improve the likelihood of rapid NEPA	Prior ER funded projects have required rapid timelines, regardless of the magnitude and type of project. Additional analysis and meetings with various functional groups within HQ will be required to perform use of a "turn-key" consultant, as well as use of a specialized CPM scheduler. However, given that Caltrans has limited tunnel expertise, this is a quality justification for such exceptions.	3-Moderate	4 -Moderate	12	4 -Moderate	12	Hiring a "Turn-key" consultant is not a method Caltrans is able to use, as a standard practice. We generally use specific consultants hired per each functional unit. However, the magnitude of this project warrants, and needs unique and out of the box approaches to be able to efficiently deliver such a challenging project.	Mitigate	A unique and solely project allocated oversight staff will be required, if a turn-key consultant is allowed. District 1 Management (D1 PPM Deputy/ SFP) has already considered and discussed such an approach with HQ and other members of Executive Management. use of several different consultants, per each individual functional unit will not be efficient and will result in delays and extra support costs.	Design, Enviro , R/W and PM	June, 2016			

<div>Level 2 Register is Provided; Level 3 Register is Recommended for High Cost Projects (Quantitative Probabilistic Analysis) -To Be Produced Upon Acquisition of Funding & Programming; Level 3 is Beyond Scope of This Document For Various Reasons: Lack of-:Staff (Risk Management Team), Sufficiently Accurate Data, Impacts, Costs, In-District Expertise, Required Software,etc...)</div> <div>- Last Chance Grade Re-Alignment Project- Del Norte-101-PM 12.0/15.5; EA 01-0F280K / EFIS Project ID 01 1500 0099 Program Code 20.XX.201.131 SHOPP Permanent Reservation --Project Initiation Document--</div>							PROJECT EA: 01-0F280		Project Manager: Sebastian Cohen			REGISTER OF KNOWN RISKS SIGNIFICANT ISSUES WITH RISK OF REQUIRING FUTURE PCRs				
							PROJECT ID#: 01 1150 0099									
Risk & Issue Identification							Risk / Issue Assessment					Risk Response				
Status	ID #	Type	Category	Title	Risk / Issue	Current Status / Assumptions / Comments	Prob.	Cost Impact	Cost Score	Time Impact	Time Score	Rationale	Strategy	Response Actions	Risk Owner	Updated
e		t			and CEQA timelines. Additionally, initial CPM scheduling for a project of this magnitude, via the use of a specialized consultant should be considered a requirement, otherwise, changes, CCOs, claims and overhead charges by a consultant run the risk of costing the state large sums of money. Specifics will depend upon the type of contract utilized between the state and the consultant, but the simple day-long process of developing the main points of a properly developed CPM schedule is not only a protective measure for frivolous claims, but the development process helps all involved fully understand and buy into their part and the required timeline.											

**APPENDIX A5 *Addendum to the 2016 Project Study Report, Last
Chance Grade, Permanent Restoration Project
(Caltrans District 1, 2019a)***

01-DN-101- 12.0/15.5
EA 01-0F280K – 01 1500 0099 – (PPNO)
Program Code 20.XX.201.131
July/2019

Addendum to the 2016 Project Study Report

Last Chance Grade Permanent Restoration Project

In Del Norte County from Wilson Creek Bridge to 3.8 miles north of
Wilson Creek Bridge

APPROVAL RECOMMENDED:



Tom Fitzgerald
DISTRICT PROGRAM MANAGER

APPROVAL RECOMMENDED:



Jaime Matteoli,
PROJECT MANAGER

APPROVED:



Matthew K. Brady,
DISTRICT DIRECTOR

July 16, 2019

Date

01-DN- 101- 12.0/15.5

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



REGISTERED CIVIL ENGINEER

7/8/19

DATE



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1. INTRODUCTION

Report Purpose:

The purpose of this report is to document any significant changes since the Project Study Report (PSR) document signed in June, 2016. A number of scope related items have been changed, removed, and added since the original PSR and this report will discuss the project's current scope, alignments, and design concepts as it proceeds with the PA&ED phase. This is not a scoping document and no funding changes are recommended by this document.

Project Description:

The project is located on a segment of US Highway 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). Refer to Location Map (Attachment A) for location information.

The project proposes to realign the highway in response to landslide and roadway failures at LCG which have cause damage for decades. Six of the seven build alternatives would include realignment of Route 101 with the goal of avoiding the unstable portions of LCG. One of the alternatives, Alternative X, proposes to make slight geometric improvements to the existing alignment. The realignment alternatives (A1, A2, G1, G2, F, and L) vary between 1.1 miles and 3.5 miles in length. Some of the project alternatives have been modified since the 2016 PSR and further discussion of dropped alternatives can be found in the Background section.

Project Limits	01-DN-101 PM 12.0/15.5
Number of Alternatives	7 Build, 1 No Build
Current Cost Estimate (millions):	\$295-\$2,000
Funding Year	2031
Type of Facility	Conventional 2-lane rural highway
Number of Structures	Varies
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

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 because of 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.

Expert Based Risk Assessment:

An Expert Based Risk Assessment was conducted in 2018. The assessment used geological and landslide studies, published reports, and Caltrans' experience with the area to analyze the potential risks associated with long-term ownership of each project alternative: maintenance needs and costs, significant repairs and delays, and long-term closures. The general conclusion was that all alternatives are expected to have high maintenance cost and the risks of delay and closure vary. However, the "C" alternatives have the highest associated risk of long-term closure. This information was used in the 2018 Value Analysis to determine the viability of the different alignments. Refer to the Expert Based Risk Assessment in the project files for more detailed information.

Alternative Alignment Changes:

The information from the Expert Based Risk assessment and results from the Value Analysis (See section below), resulted in the PDT and stakeholders eliminating the "C" alignments from further consideration. See the Rejected Alternatives section below for additional information.

In addition, Alternative L, Alternative X, and Alternative G1 and G2 have been added. These alternatives have been added into the PA&ED phase for further design and are included in the environmental study limits.

The alignments for Alternatives A1, A2, and F remain the same as proposed in the 2016 PSR. However, the larger cut and fills slopes associated with A1 and A2 have

been replaced with proposed structures. Detailed information regarding the locations, size, and costs of the structures was not available at the time this document was produced, but the updated structures information can be found in the Structure Advance Planning Study (APS) document located in the project files.

3. PURPOSE AND NEED

Purpose:

The purpose of this project is to develop a long-term 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 1997, landslide mitigation projects, including retaining walls, drainage improvements, and roadway repairs have cost over \$85 million. 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 if 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 40 feet horizontally from the original roadway centerline constructed in 1937.

Existing roadway geometrics, existing structures, and geologic instability is discussed in further detail in the 2016 PSR.

5. VALUE ANALYSIS

A Value Analysis (VA) study was conducted in August 2018 and a Final Value Analysis Study Report was prepared on October 2018. This report is available in the

project files. The VA study was tasked with analyzing the potential Alignment Alternatives that optimize project scope to meet the project need and purpose while addressing the long list of constraints and challenges. The following paragraphs are summarized statements taken from the Value Analysis Report:

A major component of this analysis was Value Metrics, which seeks to assess the elements of cost, performance, time, and risk as they related to the overall project value. A team of stakeholders and Caltrans representatives evaluated the identified performance attributes, which were Permanent impacts (*or Environmental Impacts*), Maintainability, Mainline operations, and Temporary impacts (*or Construction Impacts*). These results were combined with project cost and schedule components to provide a more holistic approach to determine overall project value.

The key project issues, or constraints considered were: Environmental Considerations, Geotechnical Risks, and overall Project Feasibility. These are further described in the Value Analysis Report.

The analysis combined with overall input from the project stakeholders, the VA team recommended that Alignment Alternatives C3, C4, and C5 be removed from further consideration. These alignments are the longest of all alternatives and were initially proposed to bypass the LCG landslide complex and avoid impact to the old growth redwood resource. Despite some of the benefits that they provide to roadway stability and low temporary impacts, the stakeholders determined that these three alignments would have the greatest project footprints of those under consideration, which is directly related to forest land and wildlife impacted within and outside of the State and National Parks, substantial additional right of way and roadway construction required, and the amount of excess material (cut) that will need disposal. Additionally, the geotechnical expert-based risk assessment found that the risk to long-term performance of these alignment alternatives is very high, which is associated with high/uncertain future maintenance costs. In summary, the C alignments do not provide any additional benefits not provided by other alternatives and they contain a high level of long-term failure risk at a greater capital cost.

6. ALTERNATIVES

The PSR consisted of seven alternatives one of which included maintaining the existing alignment (referred to as the no-build). The project now consists of eight alternatives, including the no-build, one of which proposes geometric improvements along the existing alignment (known as Alternative X). All build alternatives, with the exception of Alternative X, propose a two-lane highway with an intermittent truck-climbing/passing lane. Proposed lanes are 12 feet wide with 8-foot shoulders (10 foot shoulders inside tunnels).

There are three proposed roadway widths among the five alternatives (excluding Alternative X): 40 feet (12-foot lanes, 8-foot shoulders), 54 feet (12-foot lanes, 5-foot inside shoulders with median divider, 10-foot shoulders in tunnels), and 52 feet (12-

foot lanes, 8-foot shoulders, and a 12-foot truck-climbing/passing lane). Additional cross-sectional width may be required in areas of significant through cuts to accommodate rock fall protection.

Most 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), and superelevation rates that meet current design standards. The proposed design speed and associated horizontal curve radii should be discussed and reconfirmed with the District Geometric Design Reviewer.

At this phase, the project cut slopes of 1.5:1 (H:V) were assumed, with fill slopes that vary between 1.5:1 to 2:1. Benching along the cut slopes has not yet been considered. No special facilities such as a vista points or tunnel maintenance building areas have been identified. However, the existing overlook at PM 13.2 will remain functional. Determination of which portions of the existing alignment, if any, will be used or restored will need to be evaluated in an additional planning effort with State and National Parks and the community. Current cost estimates do not account for restoration of the bypassed existing alignment.

All alignments, grades, truck climbing lane locations, and cut/fill slopes are preliminary designs and future adjustments to design elements are anticipated.

6A. Viable Alternatives

Introduced Alternative Alignments

Four new additional alignments have been developed since the completion of the PSR in 2016. These are alignments X, L, G1, and G2. See the alternative Layouts (Attachment B) and the Alternative Description Table (Attachment C) for detailed information.

Alternative X (PM 14.55 to PM 15.56): Maintain Existing Alignment with Geometric Improvements

This alternative maintains the existing alignment with segments of slight realignment to improve horizontal and vertical geometry and to retreat from failing areas. The area of improvement begins at PM 14.55 and conforms to the existing highway at PM 15.56. The alignment cuts into the hillside at spot locations. Approximately 12 existing walls will be reconstructed to match the new alignment and profile. Additional upslope retaining walls are proposed at areas of significant cut. This alternative will also investigate the potential of including a dewatering component to improve the global stability of the slide.

This alternative does not meet full geometric standards. There are no bridges or tunnels associated with this alternative and the alignment will be entirely within Parks and the Coastal Zone. The alignment does not cross major waterways and does not impact old growth redwoods on the ridges.

Alternative X Summary				
Length (miles)	Roadway Cost (2018)	Structure Cost (2018)	Right of Way Cost (2018)	Total Capital Cost (2018)
1.3	\$ 144,000,000	\$ 140,000,000	\$ 11,000,000	\$ 295,000,000

Alternative L (PM 13.45 to PM 15.92): Rudisill Road to South of Damnation Trialhead

This alternative departs Route 101 near Rudisill Road and retreats into the hillside east of the existing alignment. The alignment climbs at a constant 7% grade for the first 1.7 miles and consists of mostly large through cut sections with a truck climbing lane. It remains to the west of the hill ridgeline and conforms to the existing highway at PM 15.56. See the Alternative Description Table (Attachment C) for detailed information.

To reduce the depth of through cut, the profile grade begins to climb along a portion of the existing highway. This involves placing fill on the southern portion of the existing alignment.

The entire alignment remains within Del Norte Coast State Parks and Redwood National Park. It has been designed to avoid impacts to old growth redwoods but does travel close to the trees at the northern portion.

A 700-foot retaining wall is proposed at the northern end of the realignment. Additional upslope walls may also be required at areas of the larger (100'+) cut slopes. There are no bridges or tunnels associated with this alternative. This alternative will also investigate the potential for including a dewatering component to improve the global stability of the slide.

Alternative L Summary				
Length (miles)	Roadway Cost (2018)	Structure Cost (2018)	Right of Way Cost (2018)	Total Capital Cost (2018)
1.3	\$ 250,000,000	\$ 16,800,000	\$ 30,000,000	\$ 296,800,000

Alternative G1 (PM 13.45 to PM 15.92): Retreat from Rudisill Road to LCG Tunnel

The G alternatives were developed to avoid the longer, "S-curve" portions of the A alignments. The G alignment shares the same beginning portion as Alignment L but travels eastward climbing directly into the hillside at a constant 7% grade for the first

1.6 miles before merging with the proposed A alignments. It consists mostly of a large through cut and includes a truck climbing lane. The depth of the through cut was reduced by beginning the profile grade climb for approximately 2500 feet along the existing alignment.

Alternative G1 merges with the A1 alignment which includes the proposed bridges and tunnel in the A1 alternative.

Alternative G1 Summary				
Length (miles)	Roadway Cost (2018)	Structure Cost (2018)	Right of Way Cost (2018)	Total Capital Cost (2018)
3.0	\$195,100,000	\$ 464,472,000	TBD	\$ 671,612,000*

* Based on total cost from similar Alternative A1

Alternative G2 (PM 13.45 to PM 15.92): Retreat from Rudisill Road to Damnation Trailhead

Alternative G2 consists of the same beginning characteristics as G1 but merges with the A2 alignment which includes the two proposed bridges in the A2 alternative.

Alternative G2 Summary				
Length (miles)	Roadway Cost (2018)	Structure Cost (2018)	Right of Way Cost (2018)	Total Capital Cost (2018)
3.1	\$200,100,000	\$26,680,000	TBD	\$ 295,000,000*

* Based on total cost from similar Alternative A2

Previous Alternative Alignments (from 2016 PSR)

The following are alternatives that are included in the original PSR with updated costs estimates, construction footprints, and impacts. See the alternative description table (Attachment C) for detailed information.

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

This alternative remains as described in the PSR, with the addition of potential viaducts along segments of substantial embankment fill heights. Structures Design is currently producing an Advance Planning Study for preliminary consideration of these structures.

Alternative A1 Summary				
Length (miles)	Roadway Cost (2016)	Structure Cost (2016)	Right of Way Cost (2016)	Total Capital Cost (2016)
3.4	\$ 189,220,000	\$ 464,472,000*	\$ 17,920,000	\$ 671,612,000

* Cost does not include recently proposed Structures in the updated APS

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

This alternative shares the same beginning portion as Alternative A1 and also remains as described in the PSR, with the addition of potential viaducts along segments of substantial embankment fill heights.

Alternative A2 Summary				
Length (miles)	Roadway Cost (2016)	Structure Cost (2016)	Right of Way Cost (2016)	Total Capital Cost (2016)
3.5	\$230,920,000	\$26,680,000*	\$42,400,000	\$ 300,000,000

* Cost does not include recently proposed Structures in the updated APS

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

This alternative proposes a complete tunnel along the new alignment and remains as described in the PSR. Further consideration should be given to the possibility of a double bore tunnel design. Below are some general guidelines regarding tunnels:

- Generally, a double bore is used to meet the fire, life, safety requirements when tunnel length exceeds approx. 1,000 feet. At this length, emergency escape routes (an enclosed passageway) and refuge rooms must be considered.
- Twin bores are smaller diameter tunnels which make them more practical for design and construction. A 60-foot diameter tunnel is considered one of the largest single bore diameters. For this project, a single bore would need to consist of two 12-foot lanes, two 5-foot inside shoulders, two 10-foot outside shoulders, center divider wall, and tunnel thickness widths.
- Emergency escape routes can still be provided in a single bore by providing a complete full height concrete wall and providing doors or even an escape route between the two sides.

The estimate summary from the 2016 PSR assumes a single bore tunnel:

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

Nonstandard Mandatory and Advisory Design Exception Features

Currently, each alternative except Alternative X is designed to horizontal and vertical geometric standards. This includes meeting minimum horizontal curve radii, maximum grade rates, superelevation transitions and rates, and shoulder width

requirements. However, at this stage of development, not all design features have been evaluated. Each alternative may require exceptions to features such as embankment/cut slopes, horizontal clearances, passing site distance, etc. These features should be identified and discussed with the District Geometric Design Reviewer as design is further developed.

6B. Rejected Alternatives

Alternative C3, C4, C5: Rudisill Road to Mill Creek Access/Hamilton Road

Alternatives C3, C4, C5 have been considered but rejected. These alternatives are the longest of all alternatives, which results in the largest construction footprint and right of way acquisition. The C alternatives ranged from 7.8 to 11.7 miles of new highway, with cuts and fills up to 600 feet across, for an overall footprint area of 225 to 332 acres, which is a substantial area to convert from forest lands to paved highway with engineered slopes.

The results of the Value Analysis determined that the C alignments do not provide any additional benefits not provided by other alternatives and they contain a high level of long-term failure risk at a greater capital cost and high environmental impacts. This decision has been documented by the Project Development Team in the project files.

No Build Alternative

This alternative will have no planned construction and would maintain the existing alignment. Regular maintenance and operations will continue, with emergency restoration projects as needed to address changing conditions.

7. GEOTECHNICAL STUDIES

Due to the uniquely challenging geology in the project area, preliminary geotechnical studies are needed to validate and refine the project alternatives. The preliminary geotechnical studies have been divided into three phases. Since the completion of the 2016 PSR, the first phase has been completed. A Preliminary Geotechnical Design Report was prepared which contains information regarding the drilling locations, mapping of slopes features, slide monitoring, seismic refraction surveys, and discussion of study results. This report can be found in the project files. Additional locations along the L alignment are to be drilled during phase 2 and 3 in the 2019/2020 year.

8. COMMUNITY INVOLVEMENT

Refer to the PSR for community involvement information. Since completion of the PSR, multiple stakeholder meetings and a Value Analysis has been conducted. Outreach documents are available on the project website: lastchancegrade.com.

9. ENVIRONMENTAL COMPLIANCE

Refer to the PSR for information regarding environmental compliance.

State Parks has requested to conduct surveys for the project which will result in a determination of what type of mitigation or permitting might be required. If feasible, Caltrans will work towards implementing an agreement with State Parks which includes providing State Parks compensation for the work.

10. FUNDING, PROGRAMMING AND ESTIMATE

The project is programmed as a Long Lead SHOPP project in the 131 Permanent Restoration Program. This project will be programmed in phases. Partial funding of \$5 million was allocated in both 2017 and 2018. The CTC allocated the remaining \$45 million estimated to complete the Project Approval and Environmental Document phase in Spring 2019.

Refer to the PSR for additional information regarding project funding and estimates.

11. DELIVERY SCHEDULE

Project Milestones		Milestone Date (Month/Day/Year)
PROGRAM PROJECT	M015	6/1/2018
BEGIN ENVIRONMENTAL	M020	6/1/2019
CIRCULATE DPR & DED EXTERNALLY	M120	1/1/2023
PA & ED	M200	2/16/2026
PS&E TO DOE	M377	3/15/2019
DRAFT STRUCTURES PS&E	M378	2/15/2030
PROJECT PS&E	M380	4/15/2030
RIGHT OF WAY CERTIFICATION	M410	7/1/30
READY TO LIST	M460	9/2/2030
HEADQUARTERS ADVERTISE	M480	12/2/2030
AWARD	M495	4/14/2031

12. RISKS

A Risk Register has been developed (Attachment D). The most notable risks for this project included:

- Geotechnical discoveries could potentially cause alter project scope: alternatives could be eliminated, increased in scope, or new alternatives developed.
- Unique environmental issues: the project is in a sensitive location and the potential impacts are uniquely severe. Complex inter-agency coordination, permit approval, and public engagement could potentially create significant project delays and support cost increases.
- Mitigation uncertainty; The mitigation estimates are highly uncertain, and the potential environmental impacts are significant. Mitigation requirements could greatly increase cost and lengthen project schedule.

13. PROJECT PERSONNEL

Name	Title	Phone Number
Jaime Matteoli	Project Manager	(707) 445-5877
Matt Smith	Project Engineer	(707) 445-6526
Charlie Narwold	District 1 Geotechnical Engineering	(707) 445-6036
Eric Wilson	District 1 Geotechnical Engineering	(707) 441-5607
Jason Meyer	Environmental Sr. (Prior)	(707) 445-5222
Steve Croteau	Environmental Sr.	(707) 441-5615
Jerimiah Joyner	Senior Right of Way Agent	(707) 445-6424

14. ATTACHMENTS (Number of Pages)

- A. Location Map (1)
- B. Typical Sections, Layouts, and Profiles (32)
- C. Alternative Description Table (1)
- D. Risk Register (3)