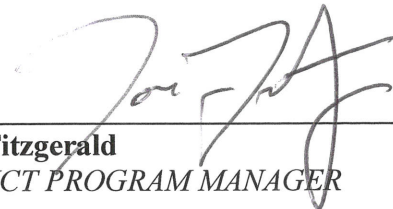


## Addendum to the 2016 Project Study Report

### Last Chance Grade Permanent Restoration Project

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

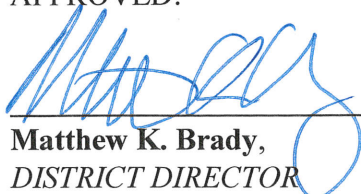
APPROVAL RECOMMENDED:

  
\_\_\_\_\_  
**Tom Fitzgerald**  
*DISTRICT PROGRAM MANAGER*

APPROVAL RECOMMENDED:

  
\_\_\_\_\_  
**Jaime Matteoli,**  
*PROJECT MANAGER*

APPROVED:

  
\_\_\_\_\_  
**Matthew K. Brady,**  
*DISTRICT DIRECTOR*

July 16, 2019

*Date*



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.

*Matthew Alan Smith*

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.

<b>Project Limits</b>	01-DN-101 PM 12.0/15.5
<b>Number of Alternatives</b>	7 Build, 1 No Build
<b>Current Cost Estimate (millions):</b>	\$295-\$2,000
<b>Funding Year</b>	2031
<b>Type of Facility</b>	Conventional 2-lane rural highway
<b>Number of Structures</b>	Varies
<b>SHOPP Project Output</b>	1 Location
<b>Anticipated Environmental Determination or Document</b>	EIR/EIS (CEQA/NEPA)
<b>Legal Description</b>	On Route 101 in Del Norte County, 10 miles south of Crescent City from PM 12.0-15.5
<b>Project Development Category</b>	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.

<b>Alternative X Summary</b>				
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.

<b>Alternative L Summary</b>				
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.

<b>Alternative G1 Summary</b>				
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.

<b>Alternative G2 Summary</b>				
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.

<b>Alternative A1 Summary</b>				
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.

<b>Alternative A2 Summary</b>				
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:

<b>Alternative F Summary</b>				
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](http://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

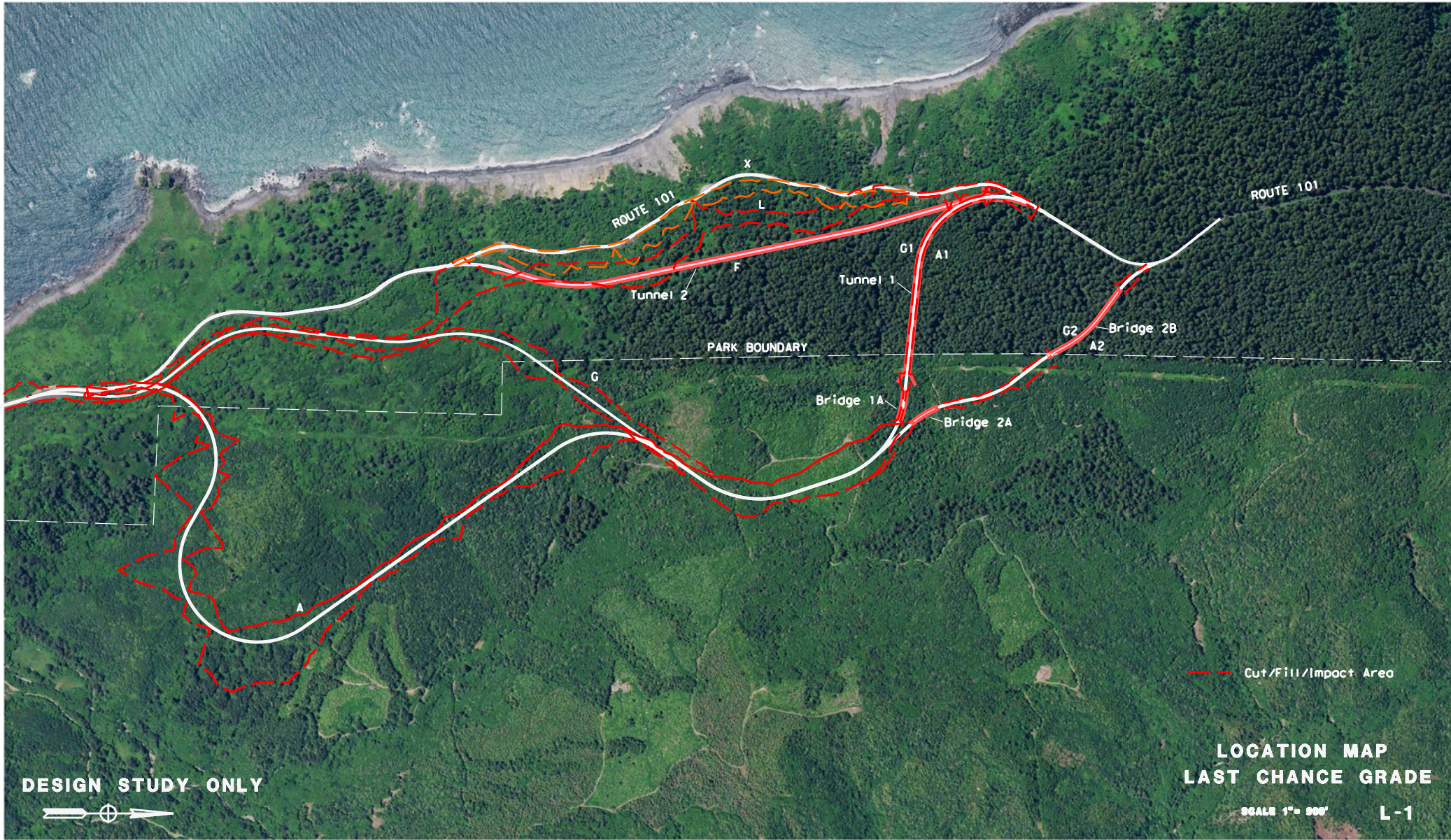
<b>Name</b>	<b>Title</b>	<b>Phone Number</b>
Jaime Matteoli	Project Manager	(707) 445-5877
Matt Smith	Project Engineer	(707) 445-6526
Charlie Narwold	District 1 Geotechnical Engineering	(707) 445-6036
Eric Wilson	District 1 Geotechnical Engineering	(707) 441-5607
Jason Meyer	Environmental Sr. (Prior)	(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)

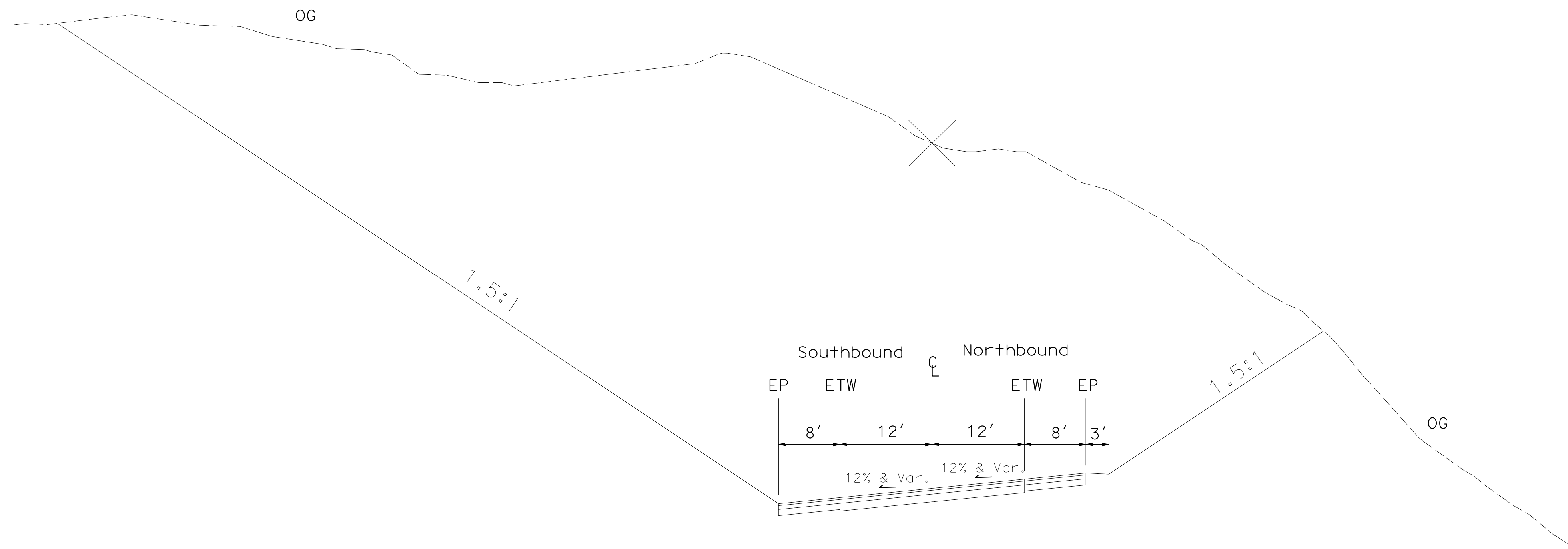
ATTACHMENT A  
PROJECT LOCATION  
MAP



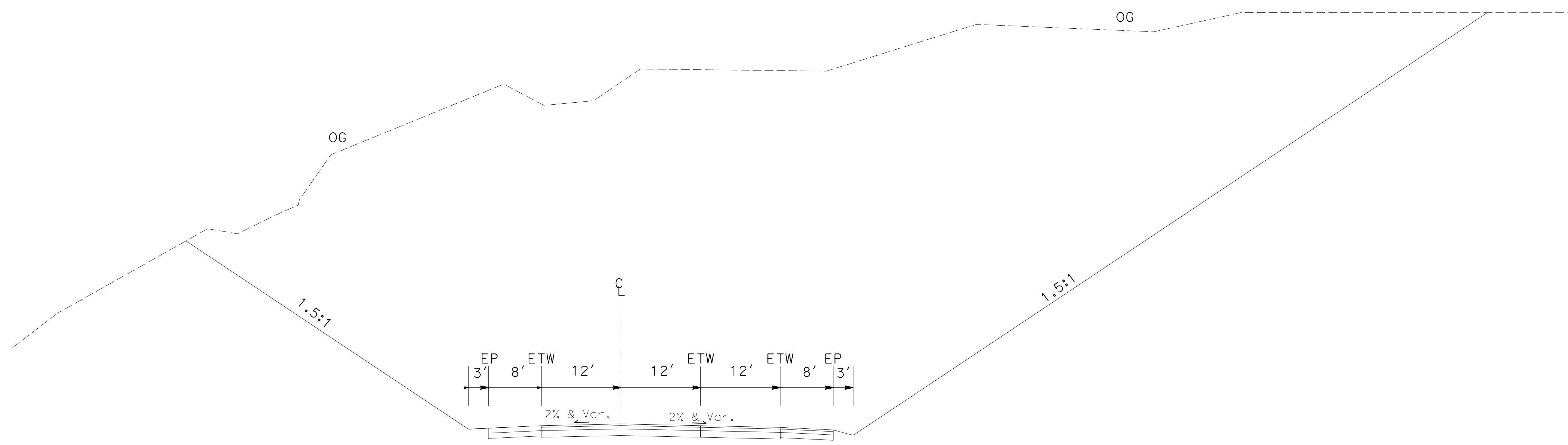


ATTACHMENT B  
TYPICAL SECTIONS,  
LAYOUTS, AND  
PROFILES

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO. TOTAL SHEETS
REGISTERED CIVIL ENGINEER DATE				
PLANS APPROVAL DATE				
PRELIMINARY DESIGN FOR REVIEW ONLY				
THE ENGINEER OR ARCHITECT SHALL BE RESPONSIBLE FOR THE ACCURACY AND COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.				



**TYPICAL THROUGH CUT ON CURVE**  
 Alignment "A1"  
 Alignment "A2"



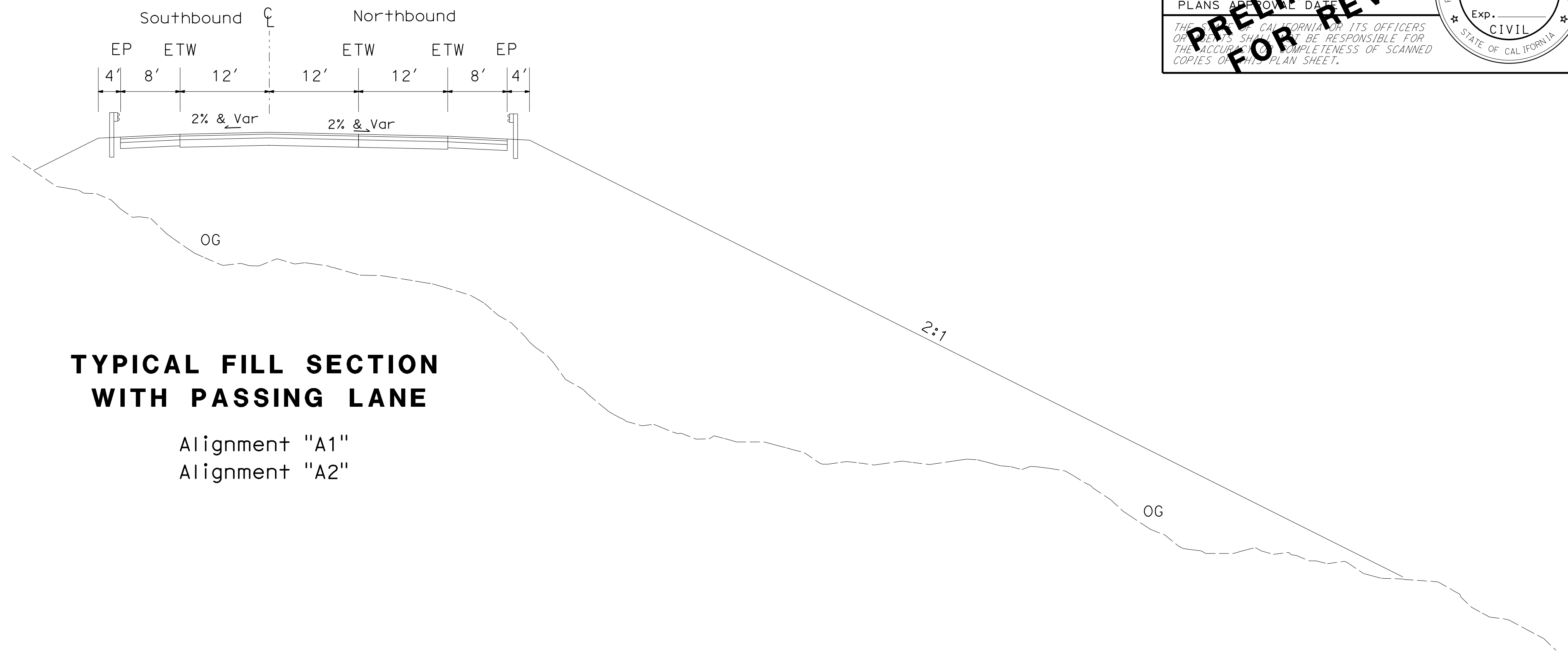
**TYPICAL THROUGH CUT SECTION WITH PASSING LANE**  
 Alignment "L"  
 Alignment "G"

**TYPICAL CROSS SECTIONS**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Et Caltrans
FUNCTIONAL SUPERVISOR
CALCULATED/DESIGNED BY
CHECKED BY
REVISOR
DATE
REVISION
DATE
REVISION
DATE
REVISION
DATE

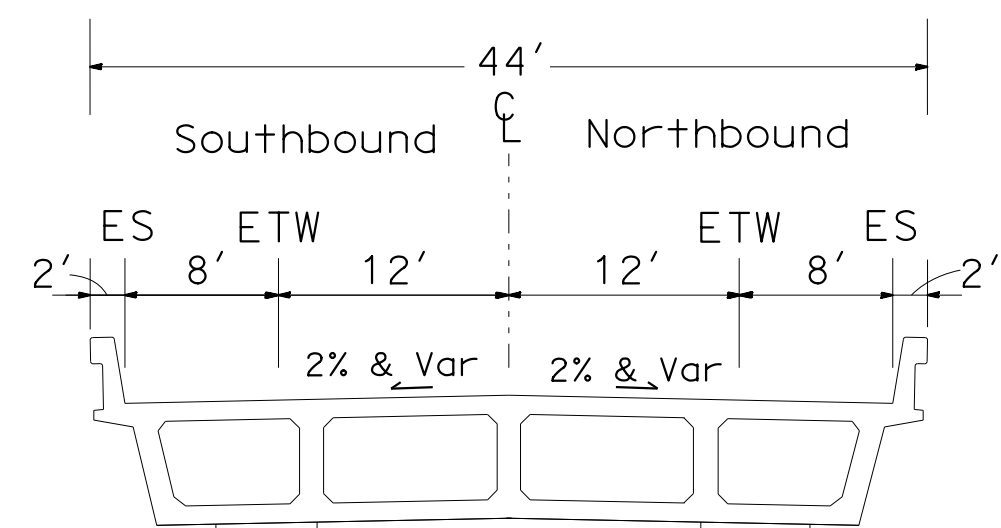
LAST REVISION | DATE PLOTTED => 06-MAY-2019  
 00-00-00 | TIME PLOTTED => 15:02

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL NO. SHEETS
REGISTERED CIVIL ENGINEER DATE				
PLANS APPROVAL DATE				
PRELIMINARY DESIGN FOR REVIEW ONLY No. _____ Exp. _____ CIVIL STATE OF CALIFORNIA				



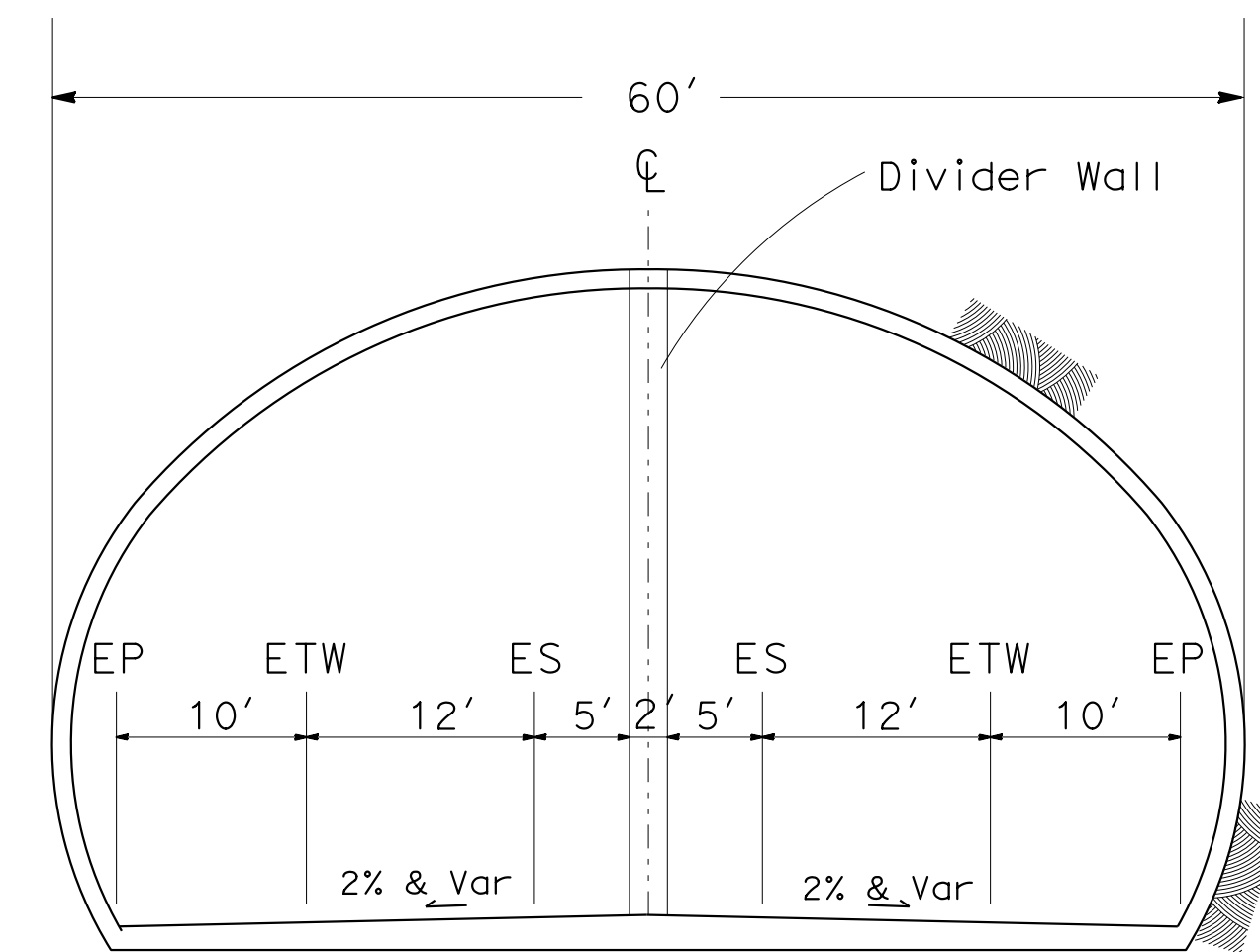
**TYPICAL FILL SECTION  
WITH PASSING LANE**

Alignment "A1"  
Alignment "A2"



**TYPICAL BRIDGE**

Alignment "A1"  
Alignment "A2"  
Alignment "G1"  
Alignment "G2"



**TYPICAL TUNNEL  
Single Bore**

Alignment "A1"  
Alignment "F"

**TYPICAL CROSS SECTIONS**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	REVISOR	DATE
<b>Caltrans</b>	REVISOR	DATE
FUNCTIONAL SUPERVISOR	CHECKED BY	DATE
CALCULATED/DESIGNED BY	CHECKED BY	DATE
REVISOR	CHECKED BY	DATE





DESIGN STUDY ONLY



LAST CHANCE GRADE  
ALIGNMENT "X"

SCALE 1" = 200'

L-1

"X" 450+25.00 BEG  
 "X" 454+71.16 BC  
 "X" 458+08.21 EC  
 "X" 459+12.00 BC  
 "X" 462+30.43 EC  
 "X" 467+80.35 BC  
 "X" 474+35.83 EC  
 "X" 476+63.71 BC  
 "X" 480+16.83 EC  
 "X" 482+16.93 BC  
 "X" 484+91.88 EC  
 "X" 487+03.53 BC  
 "X" 490+48.01 EC  
 "X" 492+97.64 BC  
 "X" 494+99.46 EC  
 "X" 496+60.08 BC  
 "X" 497+96.52 EC  
 "X" 504+35.59 BC  
 "X" 506+84.78 END

CUT/FILL



US 101

"L" 438+04.16 EC

"L" 448+16.59 BC

"L" 428+82.05 BC

"L" 424+64.41 EC

"L" 412+00.55 EC

"L" 416+21.17 BC

"L" 408+19.58 BC

"L" 403+00.00 EC

"L" 398+87.13

"L" 395+92.62 EC

"L" 392+12.46 BC

"L" 387+81.88 EC

"L" 385+41.42 BC

"L" 382+34.48 BEG

WILSON CREEK BRIDGE

CUT/FILL

DESIGN STUDY ONLY



LAST CHANCE GRADE ALIGNMENT "L"

SCALE 1" = 200'

L-1



DESIGN STUDY ONLY



LAST CHANCE GRADE  
ALIGNMENT "L"

SCALE 1" = 200'

L-2

US 101

"L" 456+85.96 EC

"L" 461+71.78 BC

"L" 466+02.78 EC

"L" 471+49.12 BC

"L" 475+42.43 EC

"L" 480+41.28 BC

"L" 486+90.01 EC

"L" 491+16.21 BC

"L" 498+18.11 EC

"L" 502+34.91 BC

"L" 506+33.81 EC

"L" 510+41.61 BC

"L" 513+58.16 EC

"L" 517+91.14 BC

"L" 519+66.19 EC

"L" 523+62.42 BC

CUT/FILL



DESIGN STUDY ONLY



LAST CHANCE GRADE  
ALIGNMENT "G1"

SCALE 1" = 200'

L-1

"G" 10+00.00 BEC  
"G" 11+06.94 BC

"G" 15+47.40 EC

"G" 20+37.97 BC

"G" 23+38.14 EC

"G" 26+52.65

"G" 30+65.66 EC

"G" 35+48.34 BC

"G" 39+65.25 I.P.

"G" 43+92.95 IC

"G" 52+18.70 EC

"G" 56+73.27 BC

"G" 65+41.31 EC

"G" 78+44.61 BC

CUT/FILL





Route 101

Route 101

END TUNNEL

"G1"164+50.65 BC

Beg. TUNNEL

END BRIDGE

"G1"149+36.33 EC

Beg. BRIDGE

CUT/FILL

"G1" 82+69.32 EC  
"G1" 83+99.60 BC

"G1" 95+80.55 EC

"G1" 110+12.11 EC

"G1" 120+36.48 BC

"G1" 130+91.96 EC

"G1" 138+12.43 BC

DESIGN STUDY ONLY

LAST CHANCE GRADE ALIGNMENT "G1"



SCALE 1" = 200'

L-2



DESIGN STUDY ONLY

PARK BOUNDARY

--- CUT/FILL

LAST CHANCE GRADE ALIGNMENT "G2"

SCALE 1" = 200'

L-1

"G" 10+00.00 BEG  
"G" 11+06.94 BC

"G" 15+41.40 EC  
"G" 20+31.97 BC

"G" 23+58.14 EC  
"G" 26+52.65 BC

"G" 30+55.66 EC  
"G" 35+48.34 BC

"G" 39+65.25 EC  
"G" 43+92.95 BC

"G" 52+18.70 EC  
"G" 56+79.27 BC

"G" 65+41.31 EC



Route 101

Route 101

PARK BOUNDARY

Beg. BRIDGE

CUT/FILL

DESIGN STUDY ONLY

LAST CHANCE GRADE ALIGNMENT "G2"

SCALE 1" = 200'

L-2



"G1" 78+44.61 BC

"G1" 82+69.32 EC

"G1" 83+99.60 BC

"G1" 93+80.55 EC

"G1" 110+12.11 EC

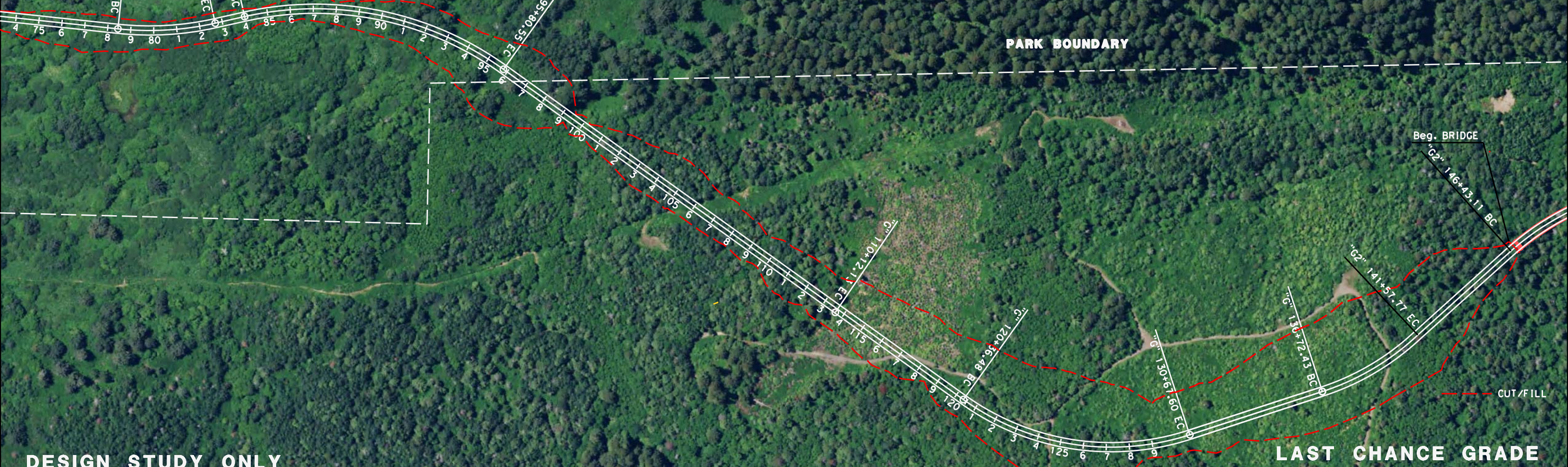
"G1" 120+36.48 BC

"G1" 130+19.00 EC

"G1" 133+12.45 BC

"G2" 141+57.77 EC

"G2" 146+45.11 BC





Route 101

"G2" 181+27.64 END

"G2" 175+74.88 BC  
END BRIDGE

"G2" 171+83.75 EC

"G2" 167+05.14 BC

"G2" 164+79.94 EC

"G2" 163+05.82 BC

"G2" 159+74.59 EC

"G2" 154+51.72 BC

"G2" 152+48.00 EC

PARK BOUNDARY

Beg. BRIDGE

END BRIDGE

DESIGN STUDY ONLY

LAST CHANCE GRADE  
ALIGNMENT "G2"



SCALE 1" = 200'

L-3



"A1" 10+00.00 BEG

"A1" 15+44.99 BC

"A1" 34+07.35 EC

"A1" 37+99.63 BC

"A1" 62+29.43 EC

"A1" 97+96.37 BC

CUT/FILL

DESIGN STUDY ONLY



LAST CHANCE GRADE  
ALIGNMENT "A1"

SCALE 1" = 200'

L-1



DESIGN STUDY ONLY



LAST CHANCE GRADE  
ALIGNMENT "A1"

SCALE 1" = 200'

L-2

END TUNNEL  
"A1" 172+80

"A1" 160+98.22 BC

Beg. TUNNEL  
"A1" 148+55

END BRIDGE  
"A1" 146+54

Beg. BRIDGE  
"A1" 143+08

"A1" 145+83.91 EC

CUT/FILL

"A2"

"A1" 179+14.8 END P.S.

"A1" 97+98.37 BC

"A1" 110+12.13 EC

"A1" 117+09.81 BC

"A1" 127+4.79 EC

"A1" 133+20.00 BC

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Route 101

Route 101

"A1"

END Bridge  
"A2" 172+91

Beg. Bridge  
"A2" 161+92

END Bridge  
"A2" 148+00

Beg. Bridge  
"A2" 143+85

CUT/FILL

DESIGN STUDY ONLY

LAST CHANCE GRADE  
ALIGNMENT "A2"

SCALE 1" = 200'

L-1





Route 101

"F" 10+65.35 BC  
"F" 10+00.00 BEG

"F" 17+14.15 EC

"F" 31+51.96 BC

"F" 37+19.19 EC

Beg. Tunnel  
"F" 23+00

--- CUT/FILL

DESIGN STUDY ONLY



LAST CHANCE GRADE  
ALIGNMENT "F"

SCALE 1" = 200'

L-1





"F" 65+43.37 BC

"F" 69+51.12 EC

"F" 79+71.96 BC

"F" 88+01.57 EC

"F" 91+00.00 END

END Tunnel  
"F" 82+68

--- CUT/FILL

DESIGN STUDY ONLY



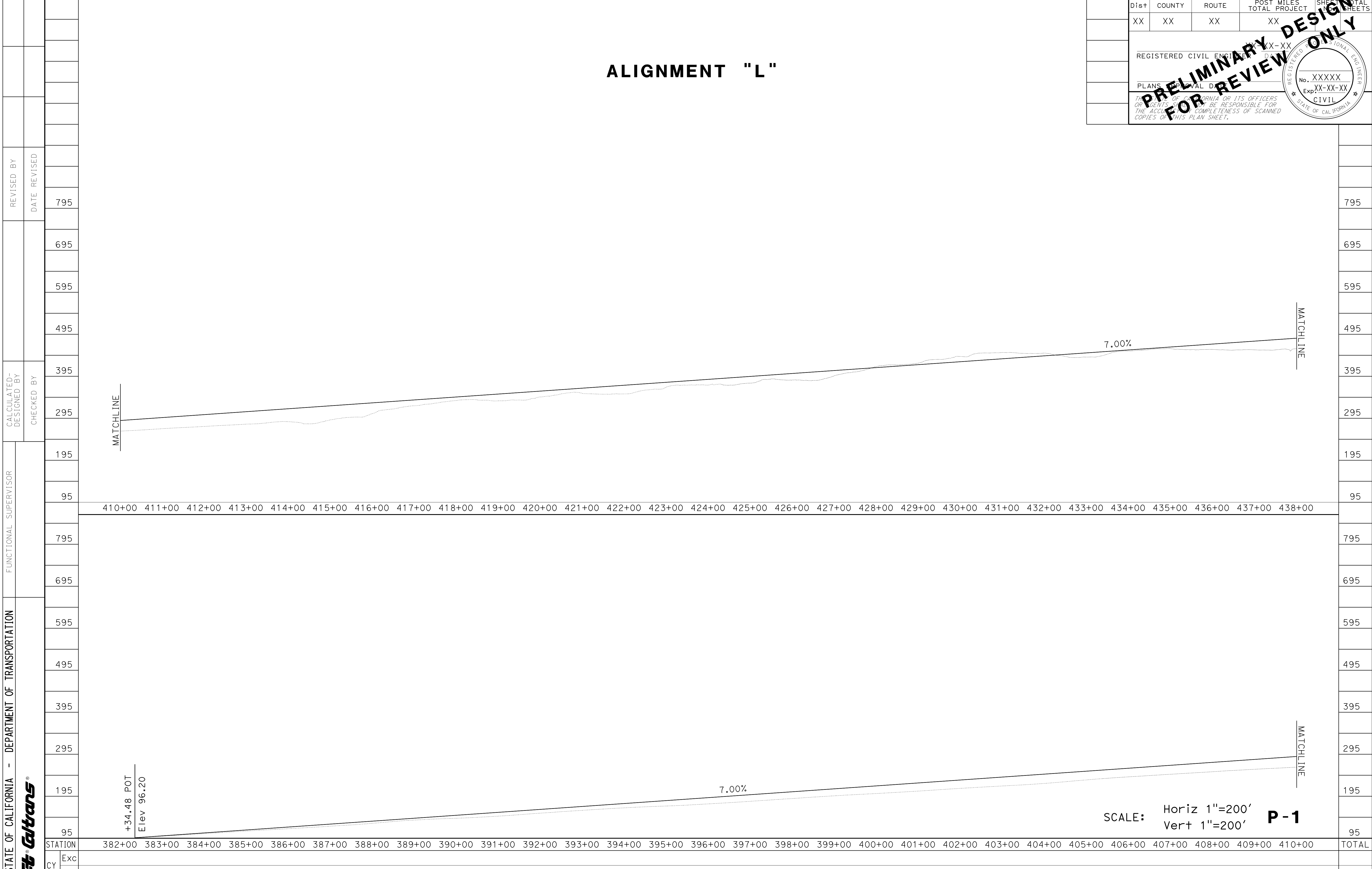
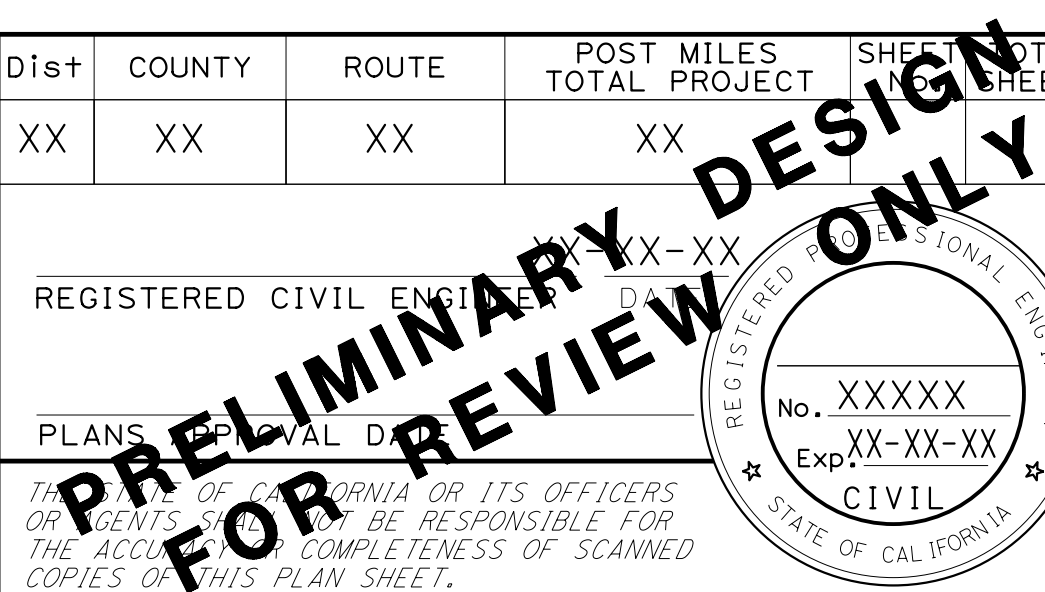
LAST CHANCE GRADE  
ALIGNMENT "F"

SCALE 1" = 200'

L-2

# ALIGNMENT "L"

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
XX	XX	XX	XX	XX
REGISTERED CIVIL ENGINEER NO. XXXXX Exp. XX-XX-XX CIVIL STATE OF CALIFORNIA				

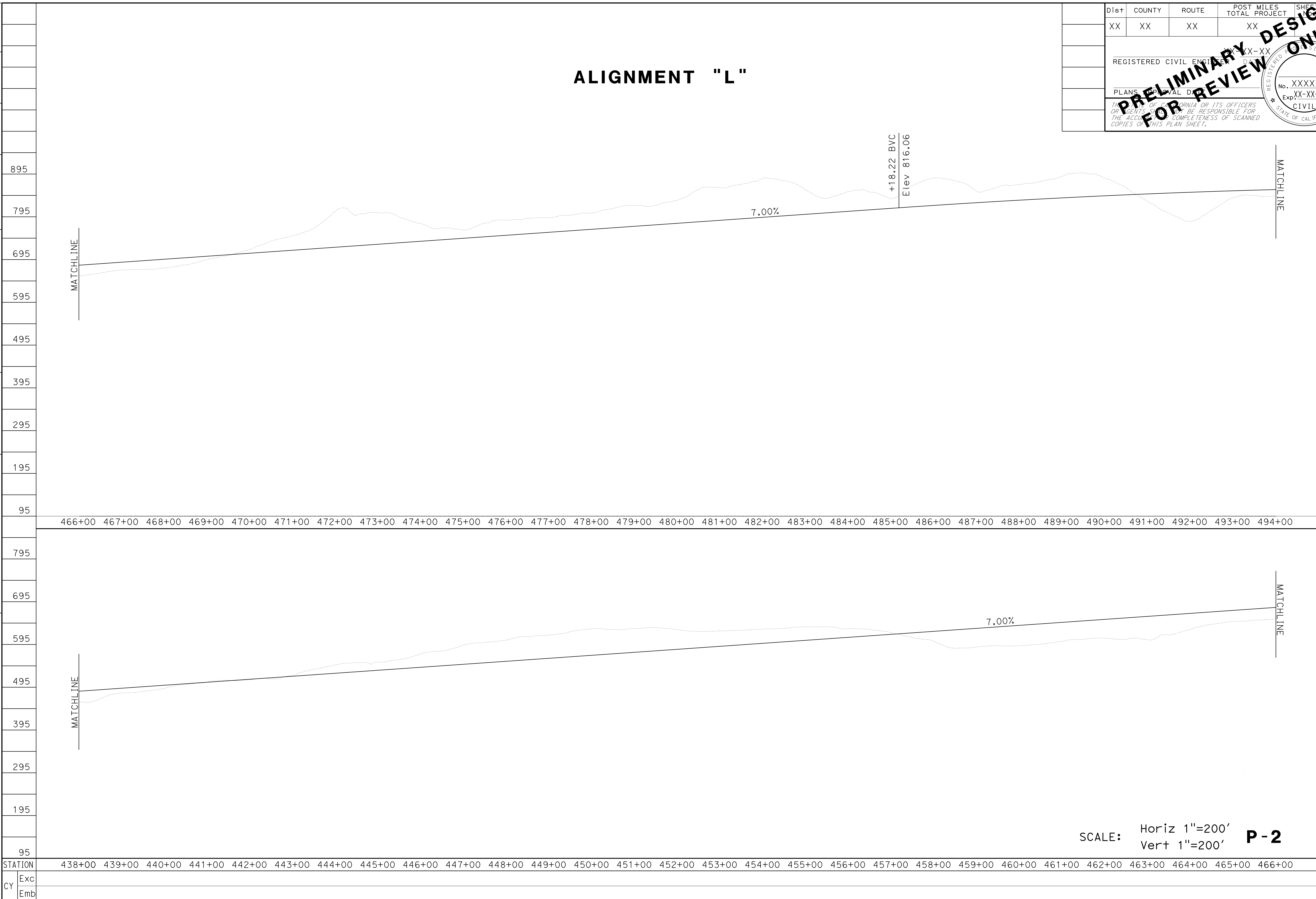


STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED/DESIGNED BY	REVISOR	DATE
<b>Caltrans</b>		CHECKED BY	DATE	REVISION

STATION	382+00	383+00	384+00	385+00	386+00	387+00	388+00	389+00	390+00	391+00	392+00	393+00	394+00	395+00	396+00	397+00	398+00	399+00	400+00	401+00	402+00	403+00	404+00	405+00	406+00	407+00	408+00	409+00	410+00	TOTAL
Exc																														
Emb																														

LAST REVISION: DATE PLOTTED => 03-MAY-2019 00-00-00 TIME PLOTTED => 09:54

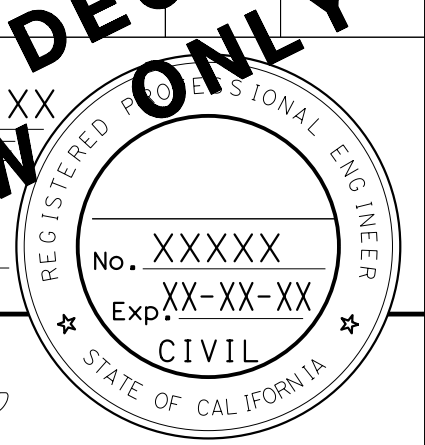
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
**Caltrans**  
 FUNCTIONAL SUPERVISOR  
 CALCULATED/DESIGNED BY  
 CHECKED BY  
 REVISED BY  
 DATE REVISED



SCALE: Horiz 1"=200'  
 Vert 1"=200'

**P - 2**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
XX	XX	XX	XX	XX
REGISTERED CIVIL ENGINEER No. XXXXX Exp. XX-XX-XX				
PLANS APPROVAL DATE				
THE ENGINEER OR ARCHITECT SHALL BE RESPONSIBLE FOR THE ACCURACY AND COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.				

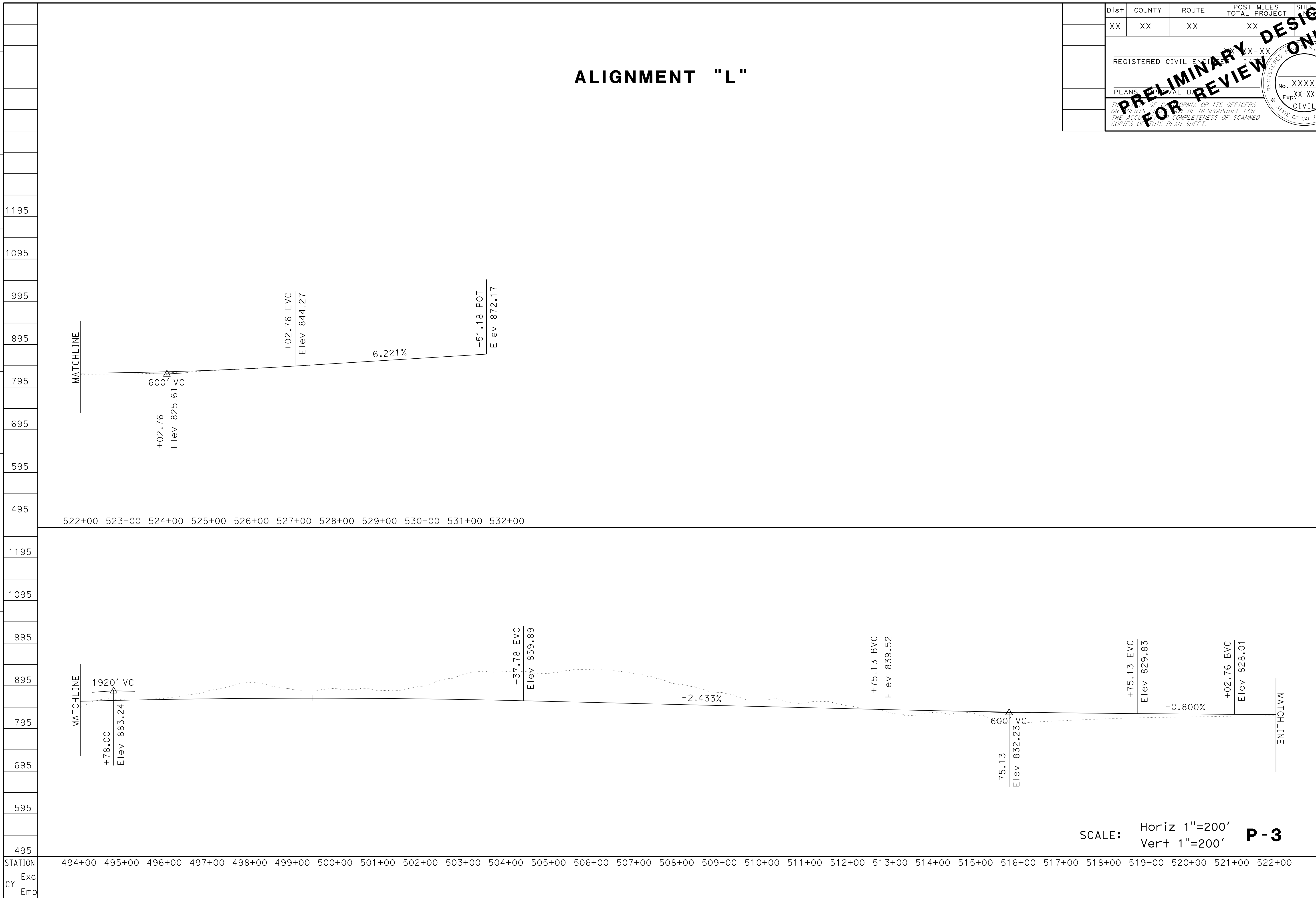


LAST REVISION | DATE PLOTTED => 03-MAY-2019  
 00-00-00 TIME PLOTTED => 09:54

x  
x  
x  
x  
x  
x

# ALIGNMENT "L"

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION		FUNCTIONAL SUPERVISOR	CALCULATED/DESIGNED BY	CHECKED BY	REVISOR BY	DATE REVISED
<b>Caltrans</b>						



SCALE: Horiz 1"=200'  
Vert 1"=200' **P-3**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
XX	XX	XX	XX	XX
REGISTERED CIVIL ENGINEER No. XXXXX Exp. XX-XX-XX				REGISTERED PROFESSIONAL ENGINEER No. XXXXX Exp. XX-XX-XX CIVIL
PLANS PERMIT NO. ...				
THE ENGINEER OR ARCHITECT SHALL BE RESPONSIBLE FOR THE ACCURACY AND COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.				

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
01	DN	101	12/15.5		

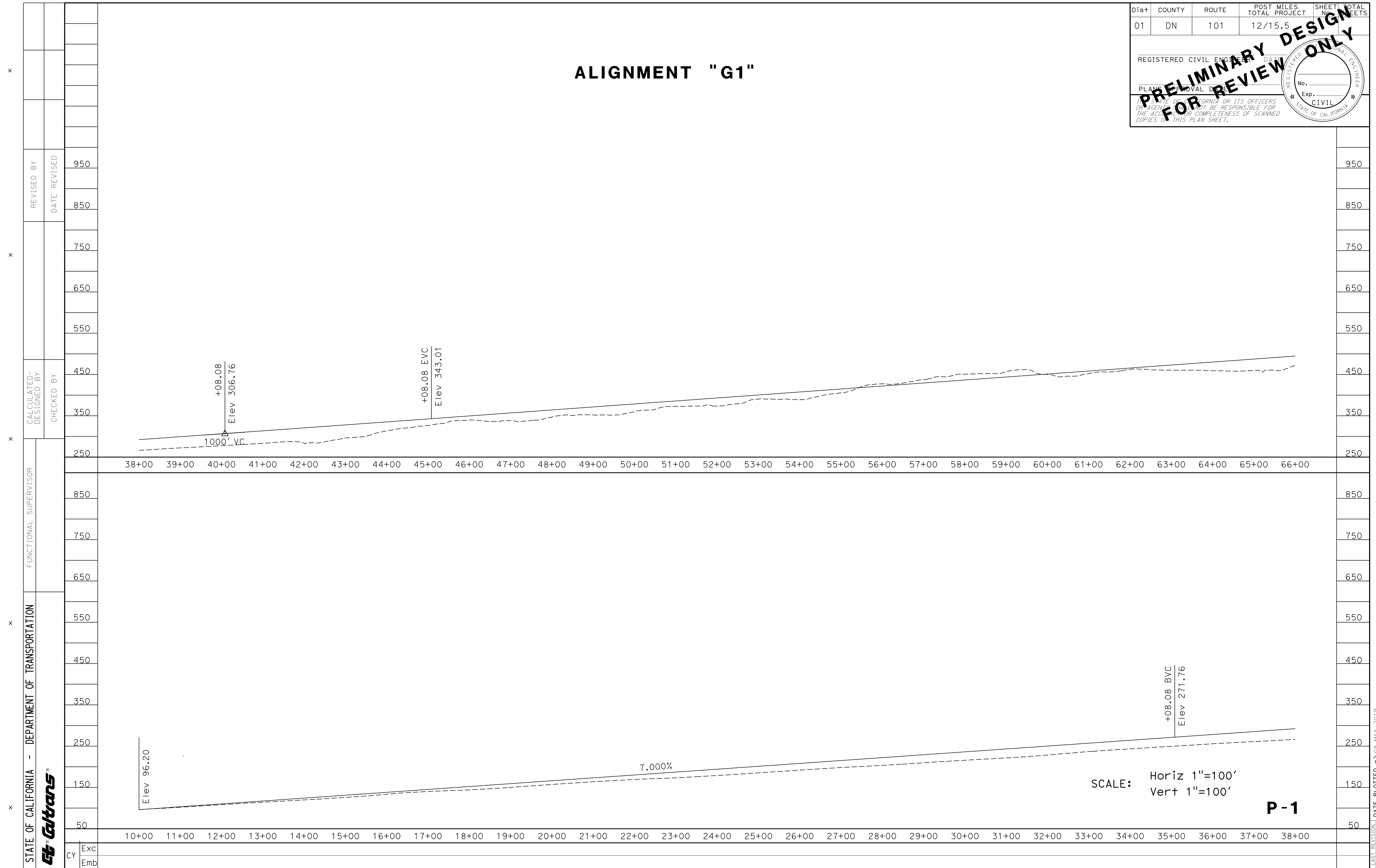
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

STATE OF CALIFORNIA OR ITS OFFICERS OR AGENCIES SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

REGISTERED CIVIL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

# ALIGNMENT "G1"



SCALE: Horiz 1"=100'  
Vert 1"=100'

**P-1**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED/DESIGNED BY	CHECKED BY	REVISOR	DATE
				REVISOR	DATE
Exc	Emb	CY			
		CY			

LAST REVISION DATE PLOTTED => 08-MAY-2019 05/06/19 TIME PLOTTED => 14:22

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
01	DN	101	12/15.5	

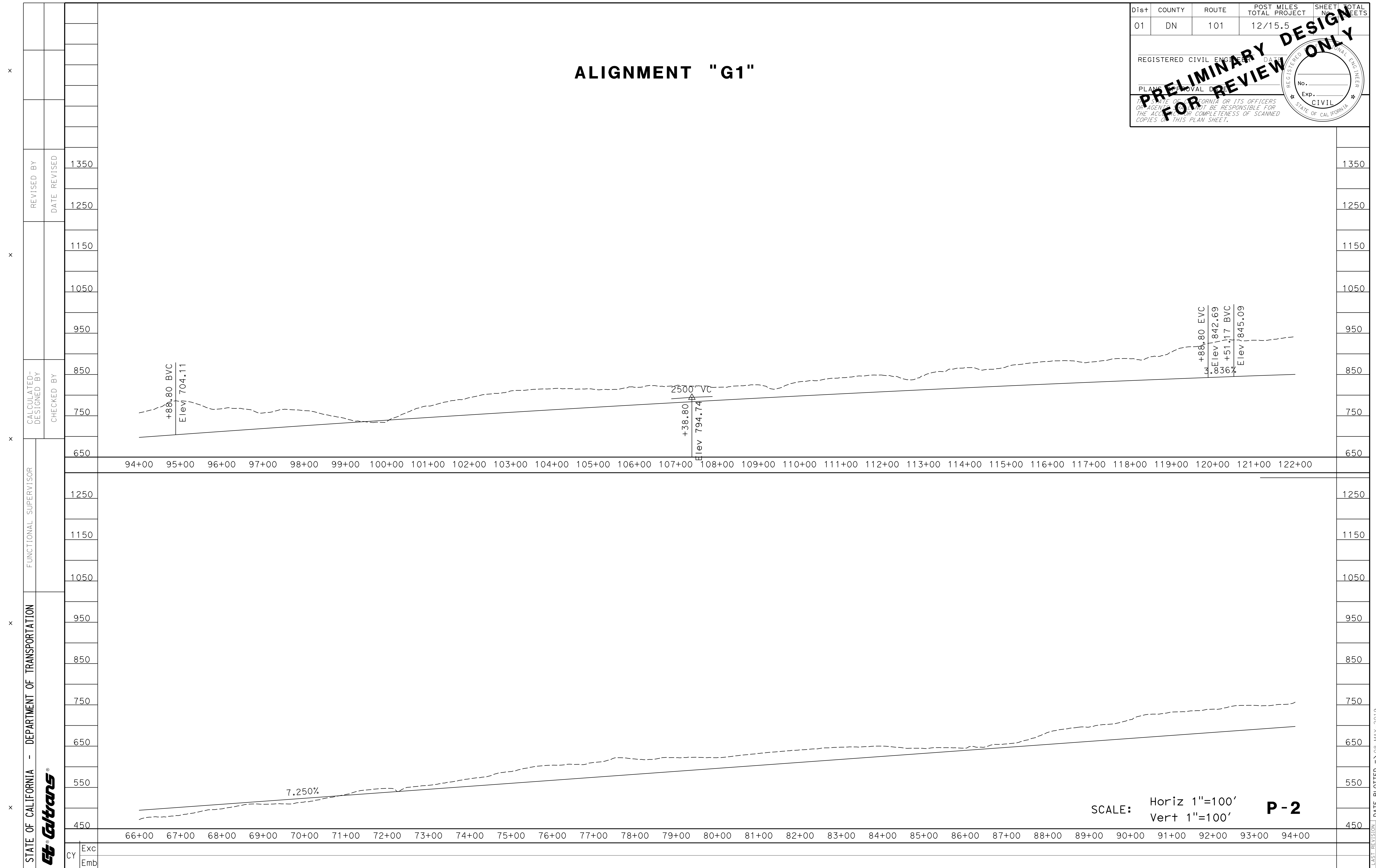
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

REGISTERED CIVIL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

# ALIGNMENT "G1"



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED/DESIGNED BY	CHECKED BY	REVISOR	DATE
Exc	Emb				

SCALE: Horiz 1"=100'  
Vert 1"=100'

**P-2**

LAST REVISION DATE PLOTTED => 08-MAY-2019 05/06/19 TIME PLOTTED => 14:22

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
01	DN	101	12/15.5		

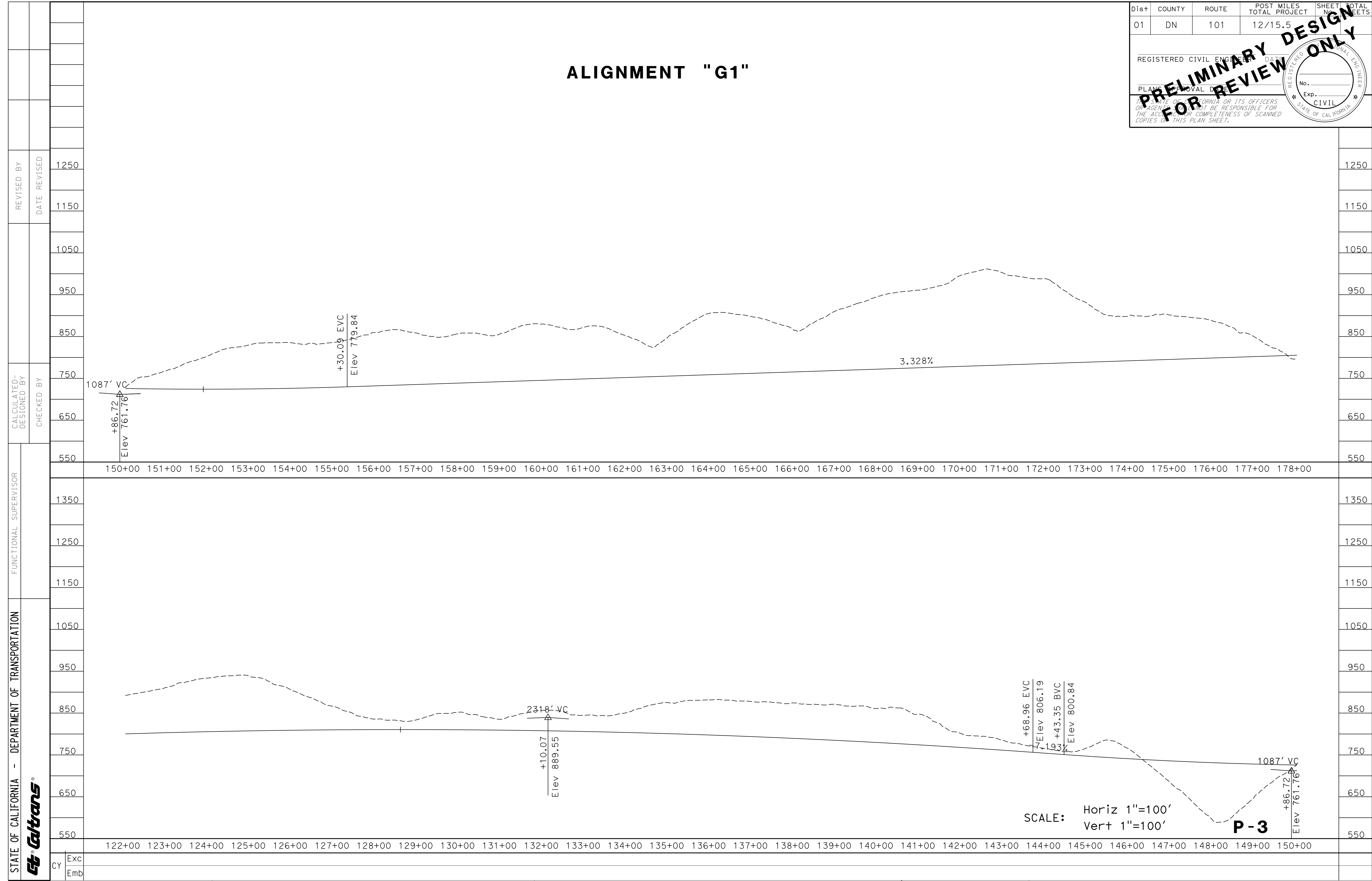
**PRELIMINARY DESIGN FOR REVIEW ONLY**

REGISTERED CIVIL ENGINEER DATE: \_\_\_\_\_  
 No. \_\_\_\_\_  
 Exp. \_\_\_\_\_  
 CIVIL

PLANS APPROVAL DATE: \_\_\_\_\_  
 REGISTERED CIVIL ENGINEER  
 No. \_\_\_\_\_  
 Exp. \_\_\_\_\_  
 CIVIL

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# ALIGNMENT "G1"



SCALE: Horiz 1"=100'  
 Vert 1"=100'

**P-3**

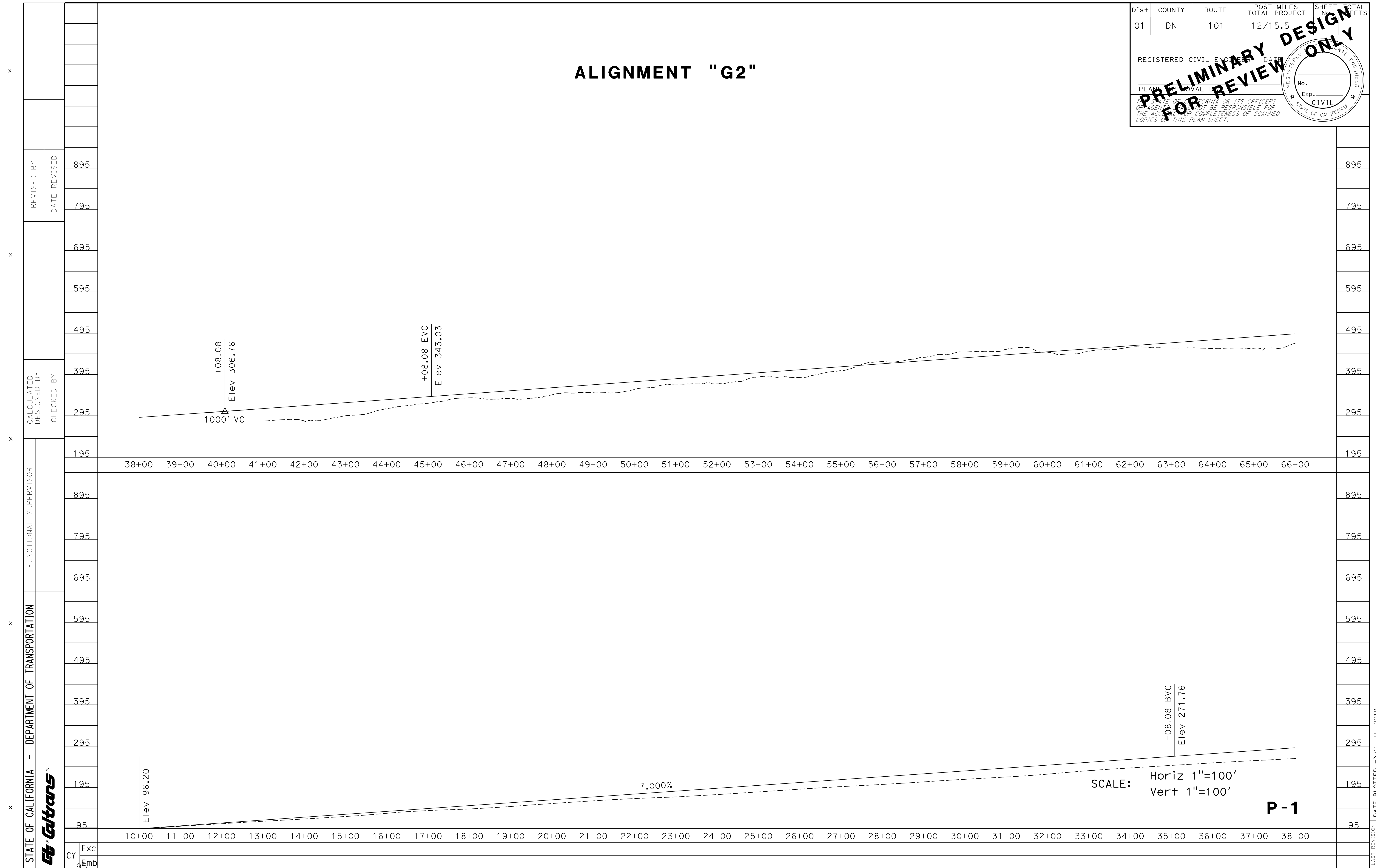
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
01	DN	101	12/15.5		

REGISTERED CIVIL ENGINEER DATE \_\_\_\_\_  
 No. \_\_\_\_\_  
 Exp. \_\_\_\_\_  
 CIVIL  
 STATE OF CALIFORNIA

PLANS APPROVAL DATE \_\_\_\_\_  
 REGISTERED CIVIL ENGINEER DATE \_\_\_\_\_  
 No. \_\_\_\_\_  
 Exp. \_\_\_\_\_  
 CIVIL  
 STATE OF CALIFORNIA

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# ALIGNMENT "G2"



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED/DESIGNED BY	CHECKED BY	REVISOR	DATE
<b>Caltrans</b>					

Exc	Emb	895	895
		795	795
		695	695
		595	595
		495	495
		395	395
		295	295
		195	195
		95	95

LAST REVISION DATE PLOTTED => 01-JUL-2019  
 05/06/19 TIME PLOTTED => 14:31



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
01	DN	101	12/15.5	

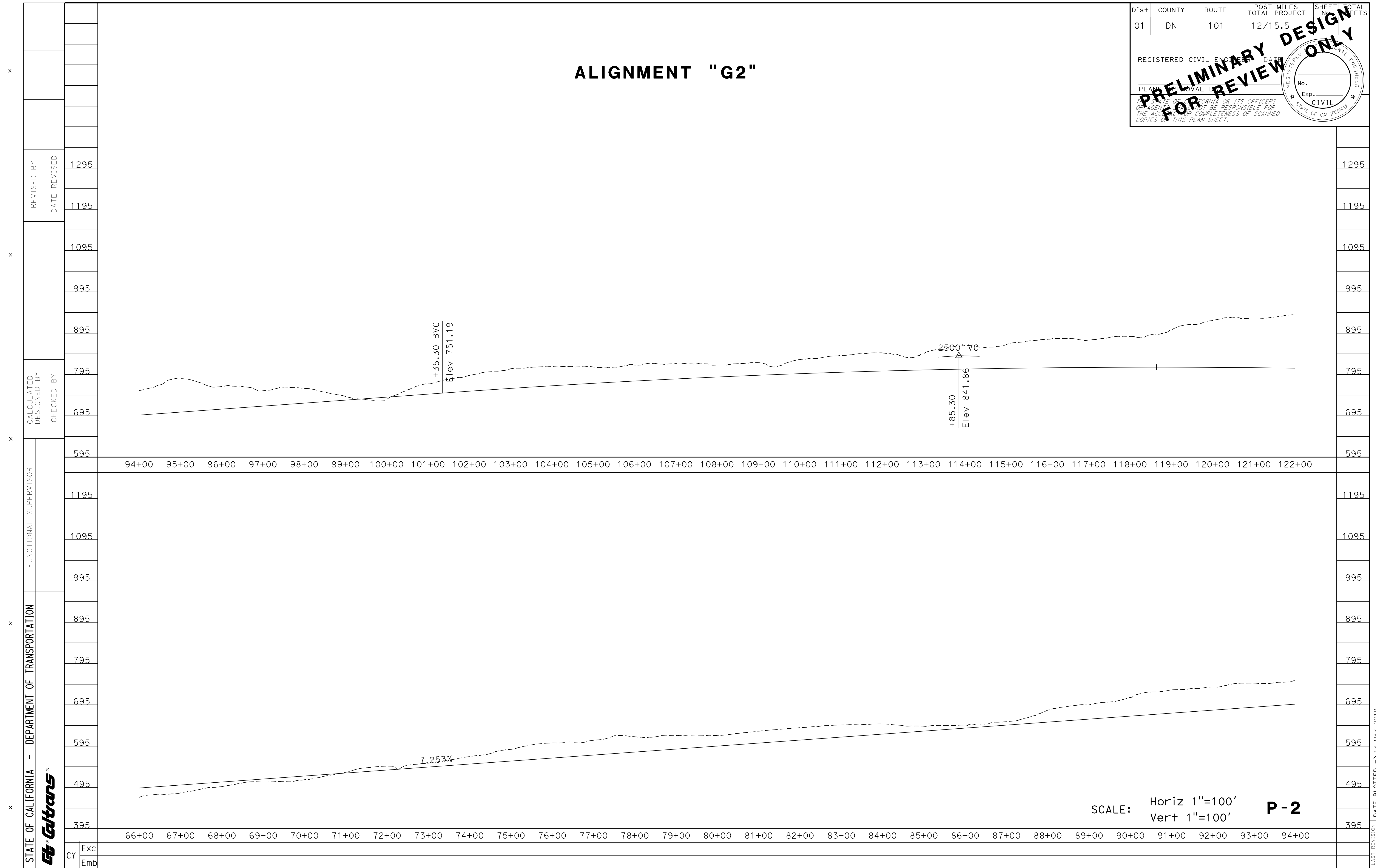
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

STATE OF CALIFORNIA OR ITS OFFICERS OR AGENCIES SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

REGISTERED CIVIL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

# ALIGNMENT "G2"



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED/DESIGNED BY	CHECKED BY	REVISOR	DATE	
				REVISOR	DATE	
Exc	Emb	REVISIONS				

SCALE: Horiz 1"=100'  
Vert 1"=100'

**P-2**

LAST REVISION DATE PLOTTED => 13-MAY-2019 05/06/19 TIME PLOTTED => 15:59

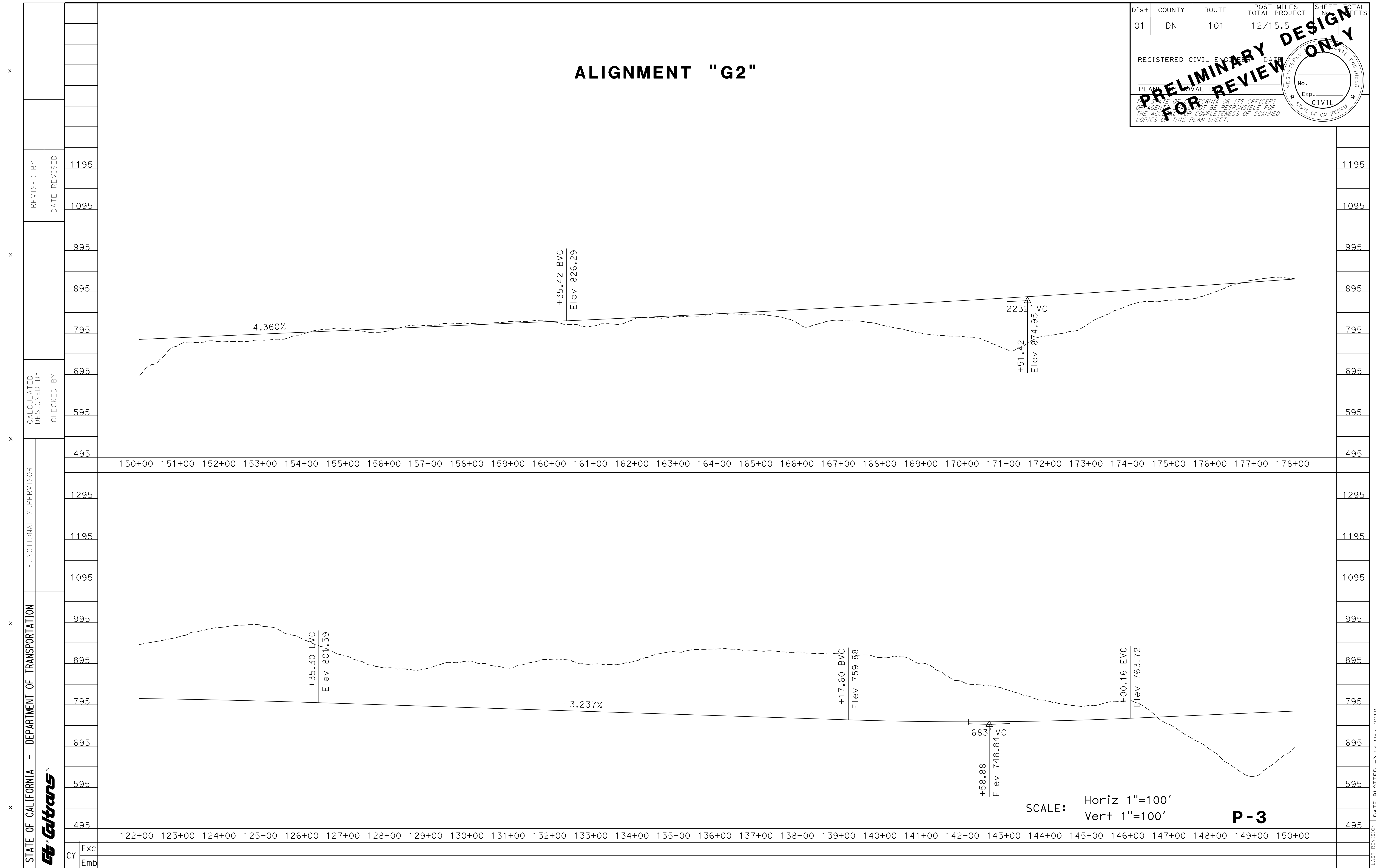
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
01	DN	101	12/15.5		

REGISTERED CIVIL ENGINEER DATA  
 No. \_\_\_\_\_  
 Exp. \_\_\_\_\_  
 CIVIL  
 STATE OF CALIFORNIA

PLANS APPROVAL DATE \_\_\_\_\_  
 REGISTERED CIVIL ENGINEER DATA  
 No. \_\_\_\_\_  
 Exp. \_\_\_\_\_  
 CIVIL  
 STATE OF CALIFORNIA

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 THE ACCURACY OR COMPLETENESS OF SCANNED  
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# ALIGNMENT "G2"

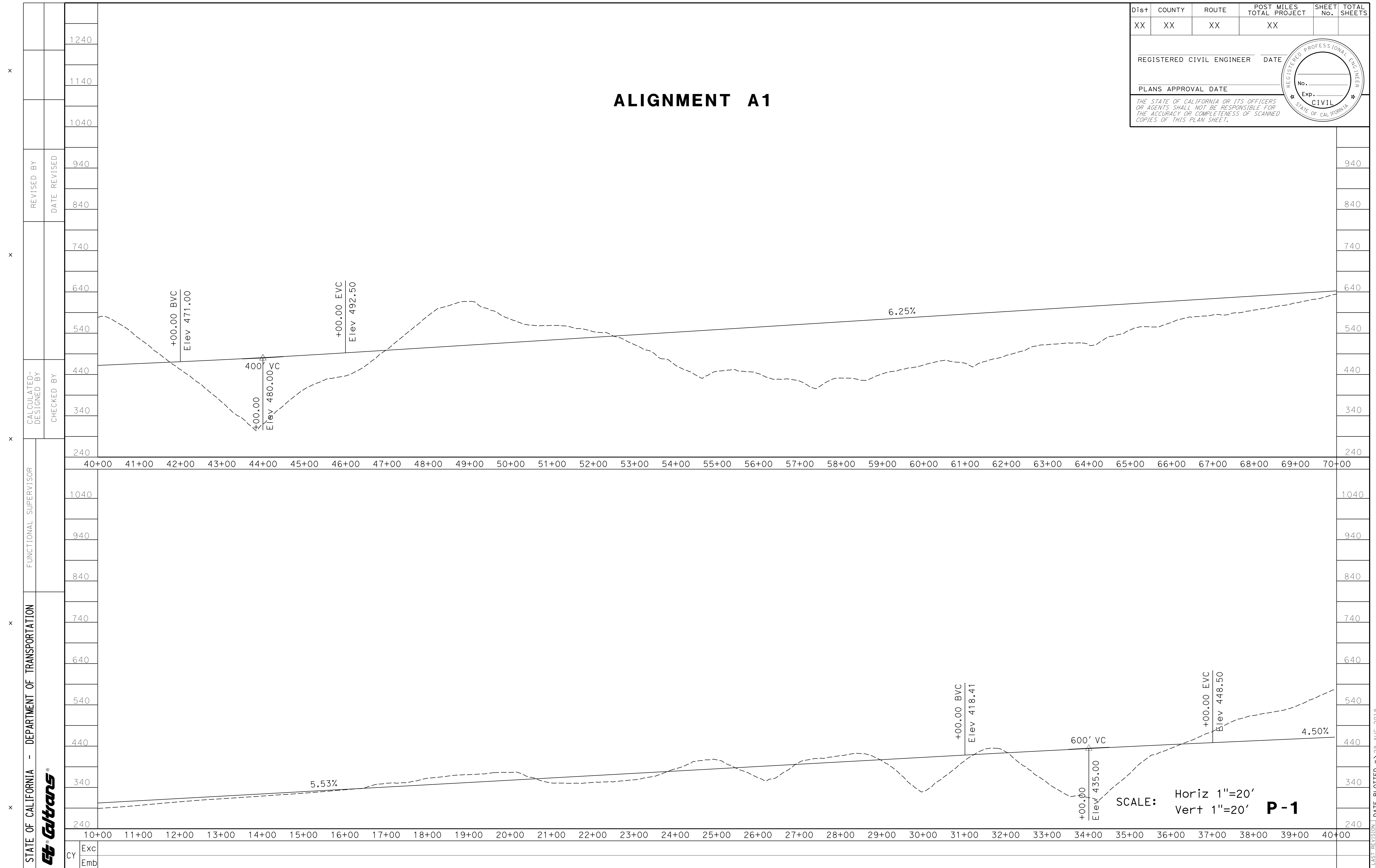


STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION <b>Caltrans</b>	FUNCTIONAL SUPERVISOR	CHECKED BY	DESIGNED BY	REVISOR	DATE
CY	Exc				
	Emb				

LAST REVISION | DATE PLOTTED => 13-MAY-2019 05/06/19 | TIME PLOTTED => 15:59

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
XX	XX	XX	XX		
REGISTERED CIVIL ENGINEER				DATE	
PLANS APPROVAL DATE					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

# ALIGNMENT A1



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	FUNCTIONAL SUPERVISOR	CALCULATED/DESIGNED BY	CHECKED BY	REVISOR	DATE
				REVISOR	DATE
CY	Exc				
	Emb				

BORDER LAST REVISED 7/2/2010

USERNAME => s147289  
DGN FILE => Profile A1 .dgn

RELATIVE BORDER SCALE IS IN INCHES

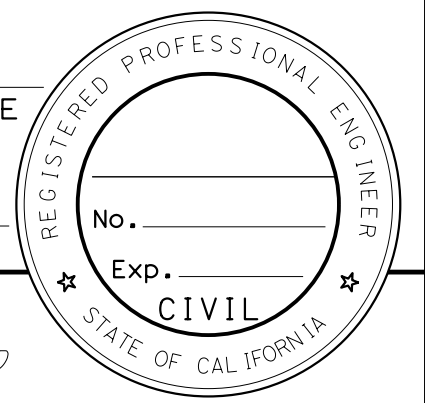
UNIT 0312

PROJECT NUMBER & PHASE

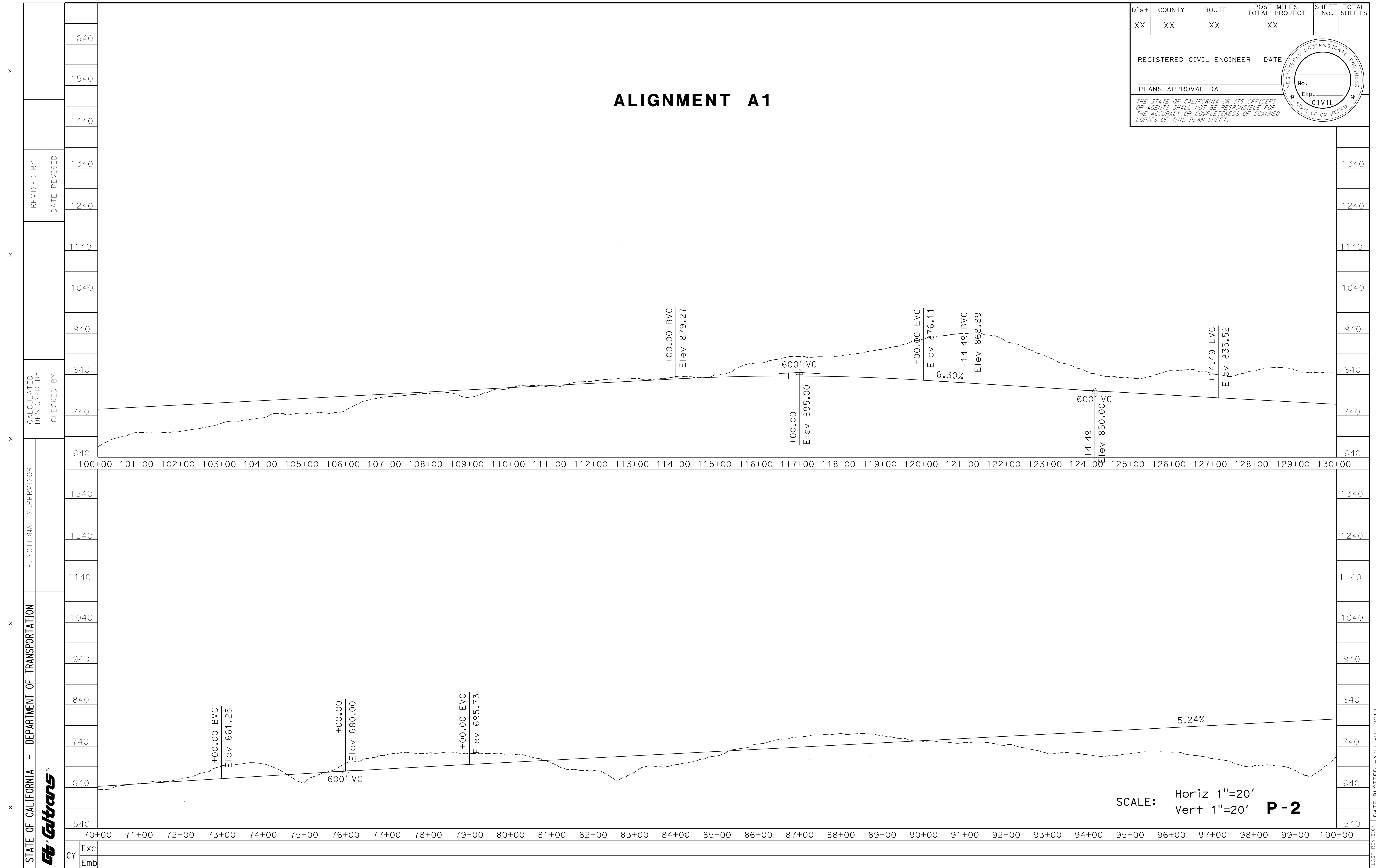
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LAST REVISION DATE PLOTTED => 28-AUG-2018  
00-00-00 TIME PLOTTED => 09:52

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
XX	XX	XX	XX		
REGISTERED CIVIL ENGINEER					DATE
PLANS APPROVAL DATE					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					




# ALIGNMENT A1

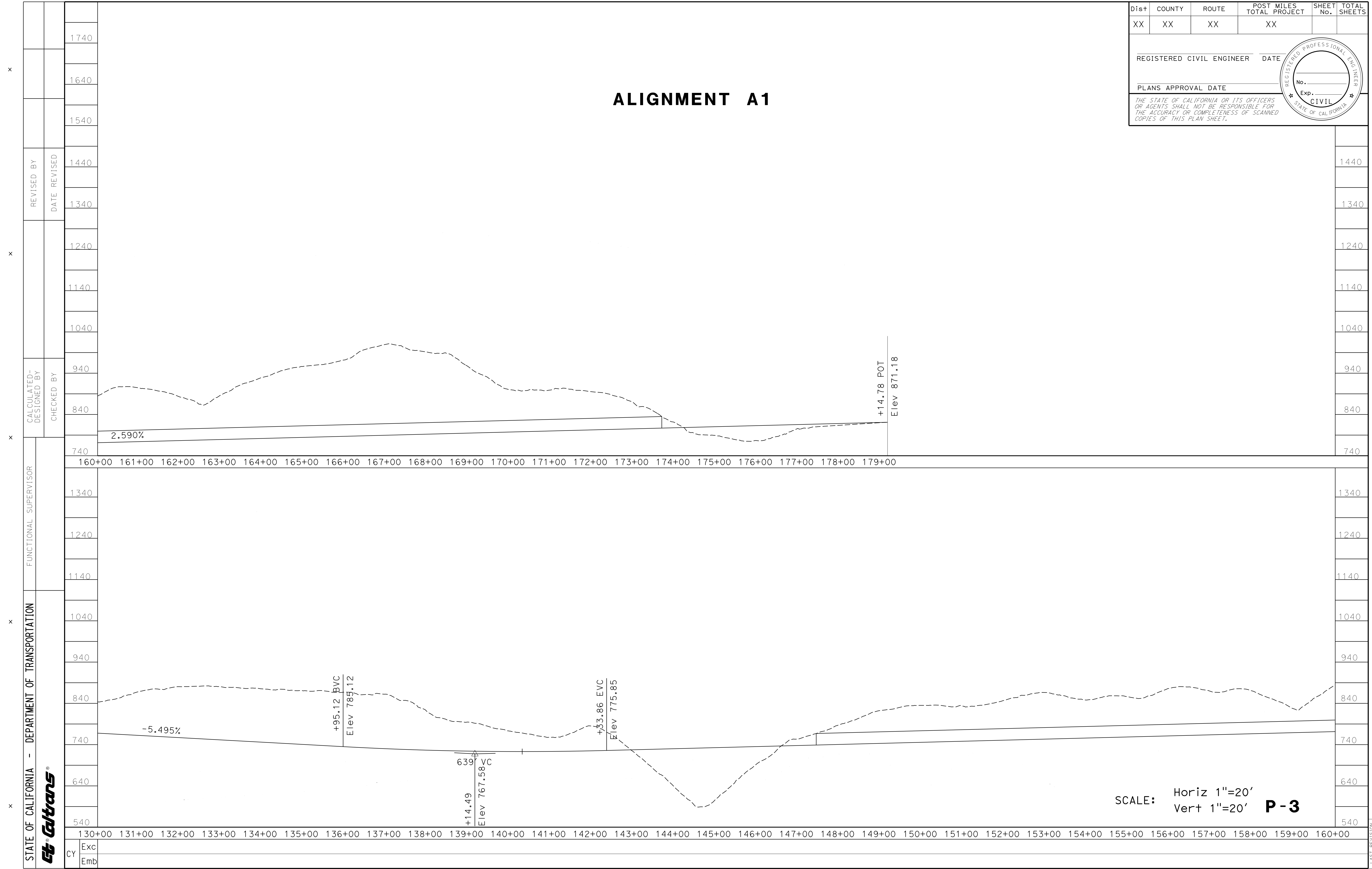


STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
**Caltrans**  
 FUNCTIONAL SUPERVISOR  
 CALCULATED/DESIGNED BY  
 CHECKED BY  
 REVISED BY  
 DATE REVISED

SCALE: Horiz 1"=20'  
 Vert 1"=20' **P-2**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
XX	XX	XX	XX		
REGISTERED CIVIL ENGINEER					DATE
PLANS APPROVAL DATE					
					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

# ALIGNMENT A1



SCALE: Horiz 1"=20'  
Vert 1"=20' **P-3**

# ALIGNMENT A2

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

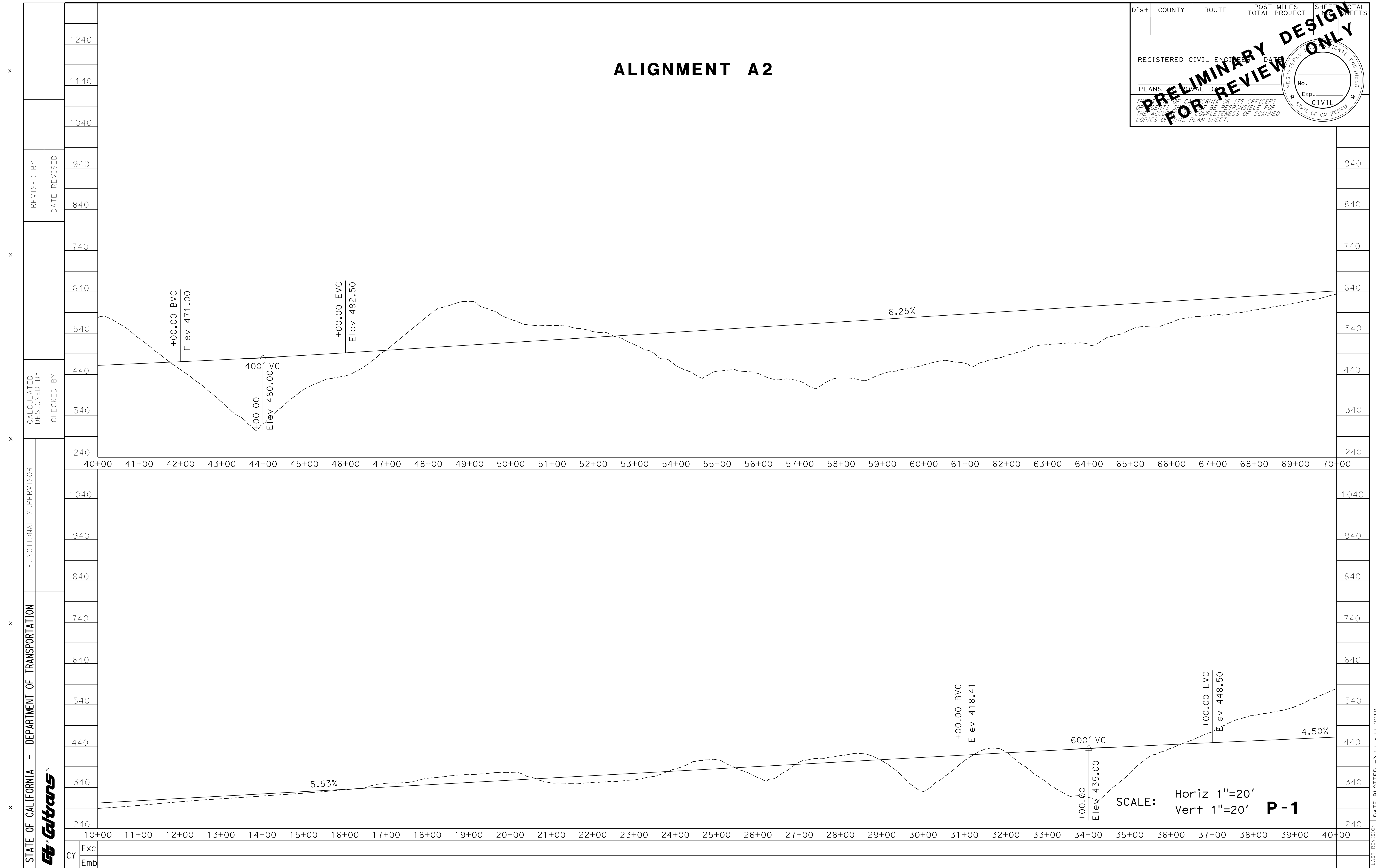
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

THE ENGINEER OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL BE RESPONSIBLE FOR THE ACCURACY AND COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

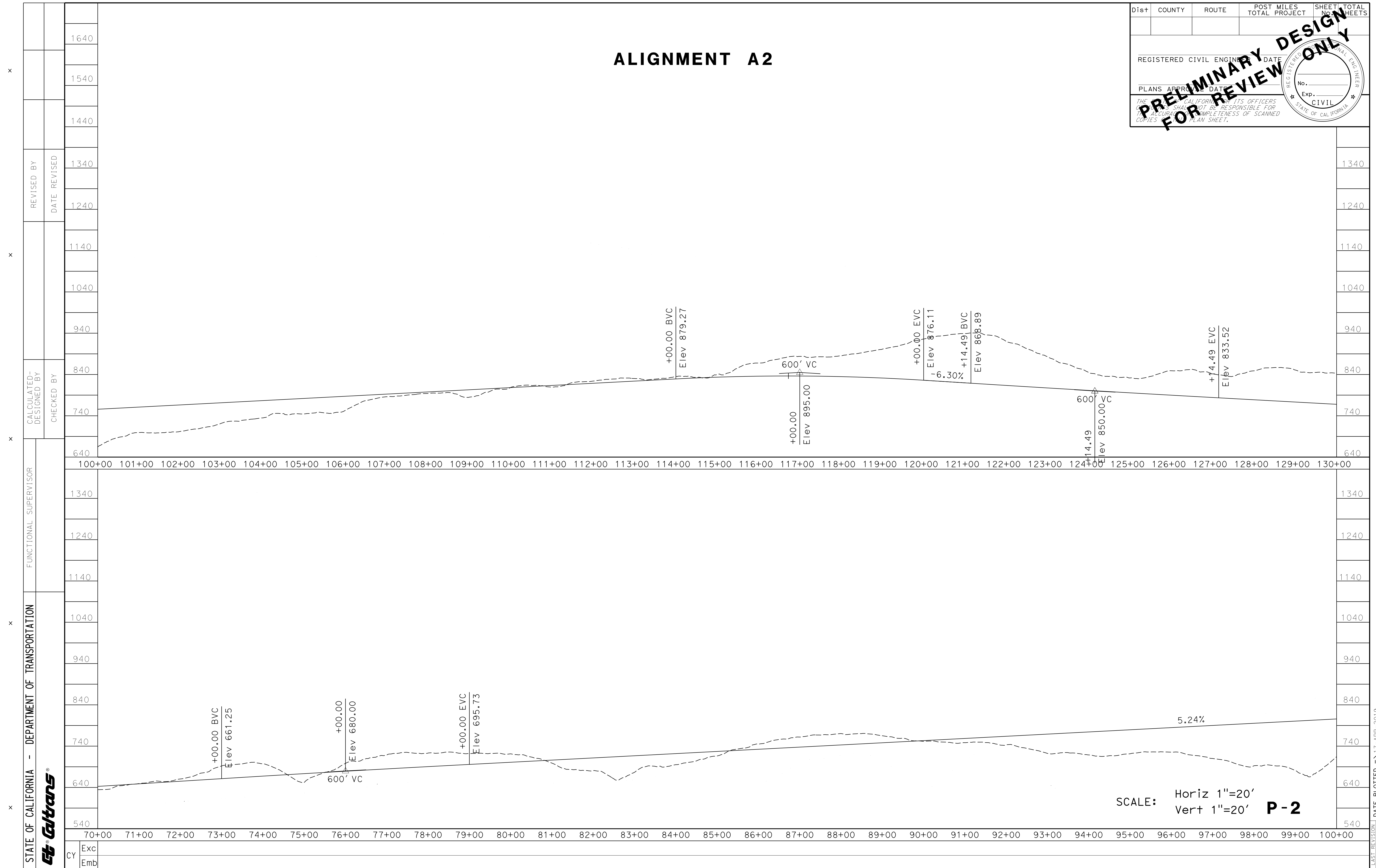
**PRELIMINARY DESIGN FOR REVIEW ONLY**

REGISTERED CIVIL ENGINEER  
No. \_\_\_\_\_  
Exp. \_\_\_\_\_  
STATE OF CALIFORNIA



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<b>PRELIMINARY DESIGN FOR REVIEW ONLY</b>					
REGISTERED CIVIL ENGINEER			DATE		
PLANS APPROVED DATE					
<small>THE ENGINEER OR SURVEYOR SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

# ALIGNMENT A2



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER DATE

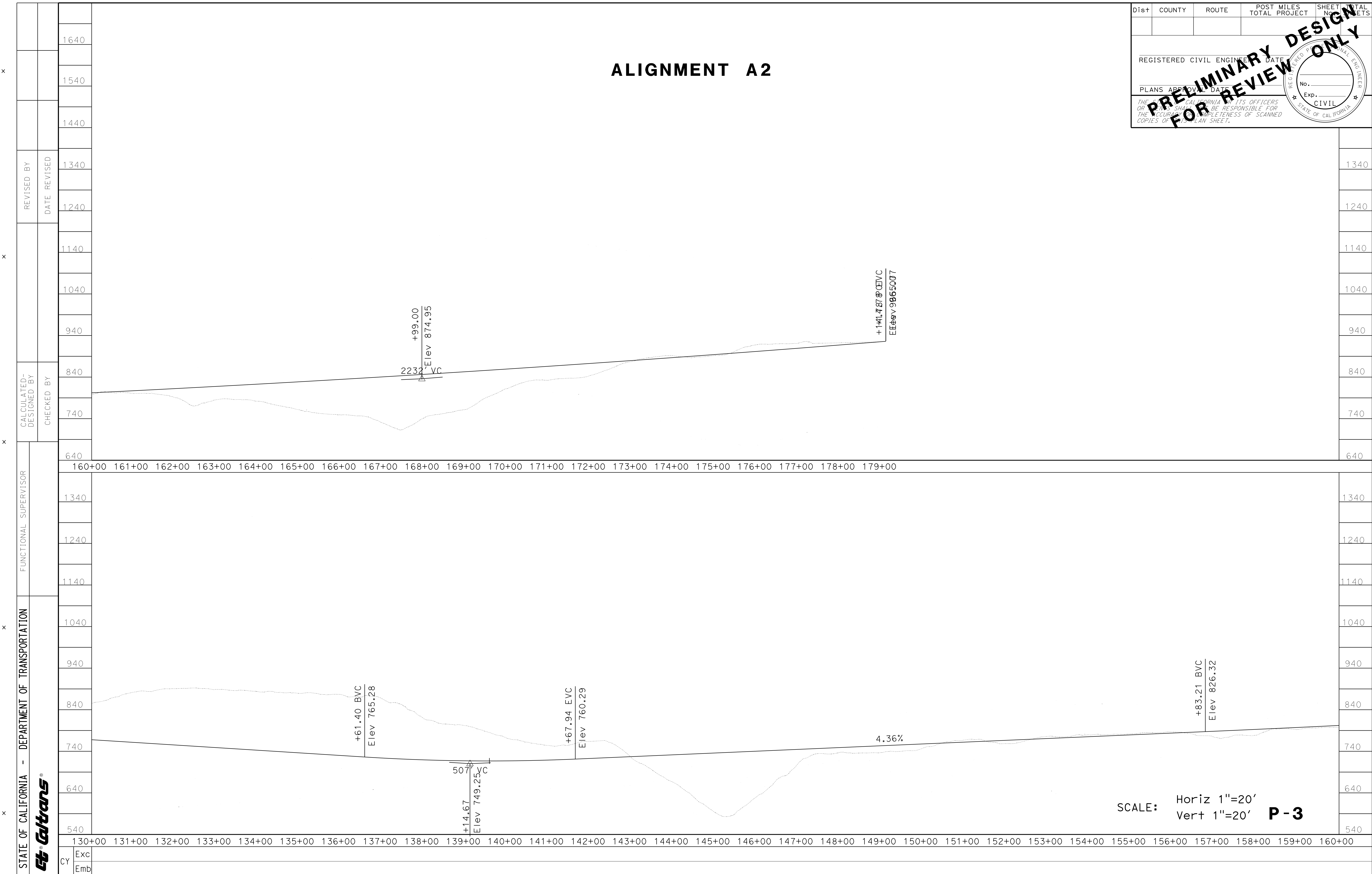
PLANS APPROVAL DATE

THE ENGINEER OR ARCHITECT SHALL BE RESPONSIBLE FOR THE ACCURACY AND COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**PRELIMINARY DESIGN FOR REVIEW ONLY**

REGISTERED PROFESSIONAL ENGINEER  
No. \_\_\_\_\_  
Exp. \_\_\_\_\_  
CIVIL  
STATE OF CALIFORNIA

# ALIGNMENT A2



STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION <b>Caltrans</b>	FUNCTIONAL SUPERVISOR	CALCULATED/DESIGNED BY	CHECKED BY	REVISOR	DATE

SCALE: Horiz 1"=20'  
Vert 1"=20' **P-3**

LAST REVISION DATE PLOTTED => 17-APR-2019 10:00:00 TIME PLOTTED => 10:53



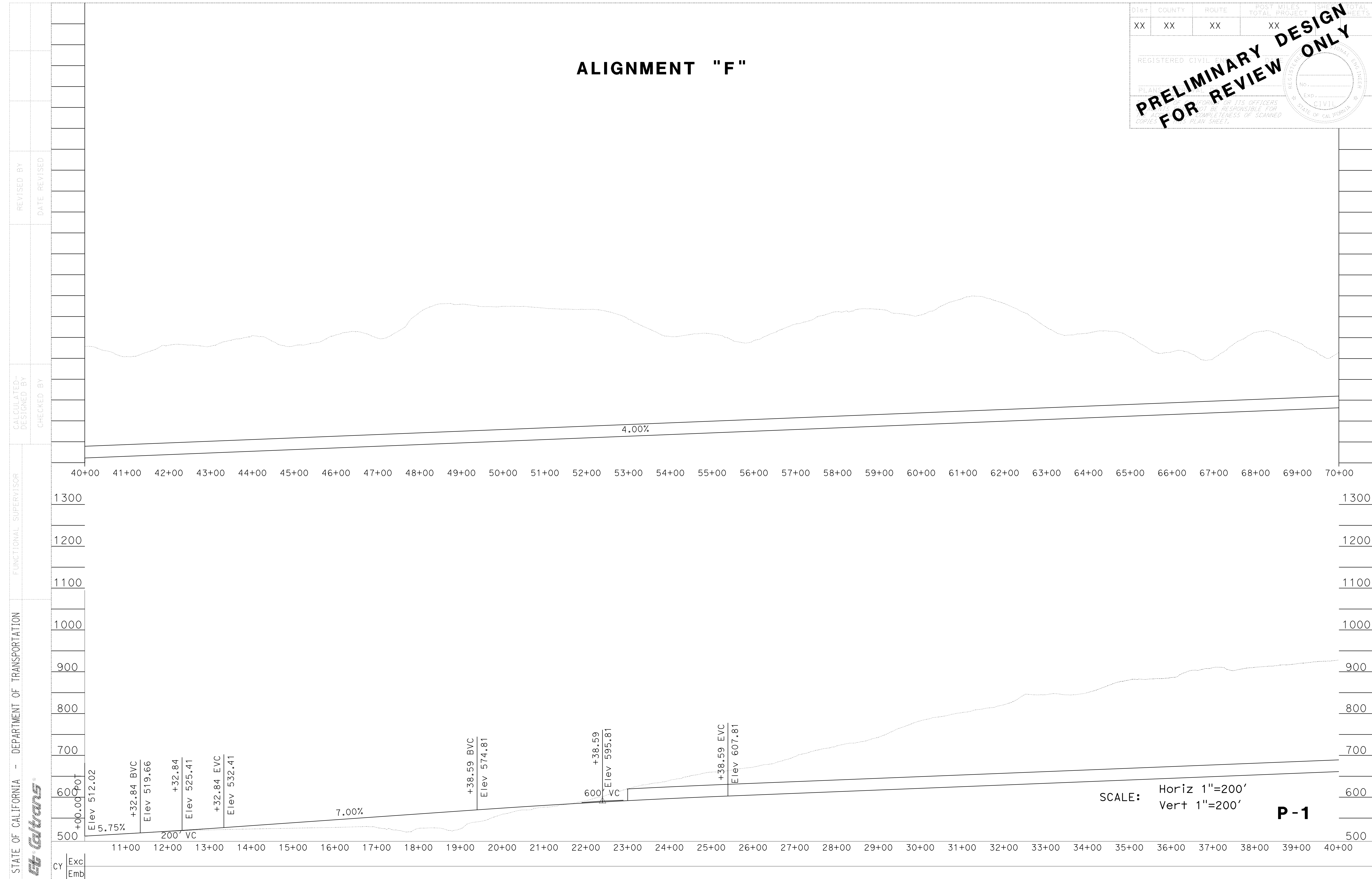
# ALIGNMENT "F"

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
XX	XX	XX	XX		

REGISTERED CIVIL ENGINEER  
 STATE OF CALIFORNIA  
 No. \_\_\_\_\_  
 Exp. \_\_\_\_\_  
 CIVIL ENGINEER

**PRELIMINARY DESIGN FOR REVIEW ONLY**

FOR THE INFORMATION OF ITS OFFICERS AND EMPLOYEES, THE ENGINEER DOES NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO	TOTAL SHEETS
XX	XX	XX	XX		

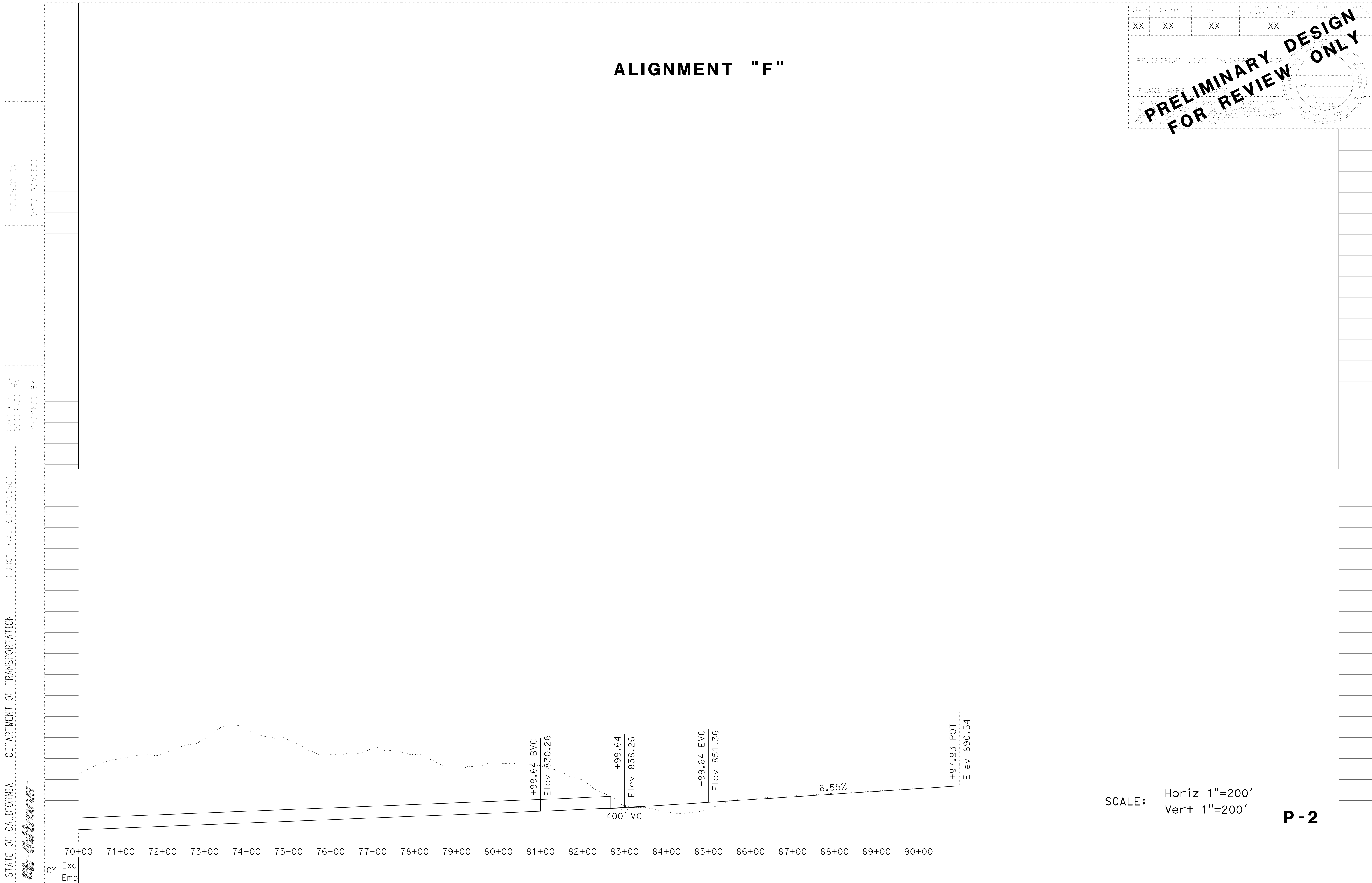
REGISTERED CIVIL ENGINEER STATE OF CALIFORNIA

PLANS APPROVED

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# ALIGNMENT "F"



SCALE: Horiz 1"=200'  
Vert 1"=200'

**P-2**

ATTACHMENT C  
ALTERNATIVE  
DESCRIPTION TABLE

Alternative Comparison Table														
Alternative	New Construction										Capital Cost (millions)	Existing Habitat Type		Notes/ Assumptions
	Construct. Length (miles)	Structures			Length in Parks (miles)	Construct. Footprint (acres)	Construct. Schedule (years)	Cut (cubic yards)	Fill (cubic yards)	Excess Material (cubic yards)		Type	Acres	
		Walls	Tunnel	Bridges										
A1	3.4	Unk	1	1	1.0	77	4	3,359,780	3,731,250	-371,500	\$672	Coastal scrub/grassland/spruce	7	Slopes: Cut 1:1, Fill 2:1 Cut/Fill quantities contingent on use of potential structures instead of embankment fill in some areas
												Riparian	1	
												Clear Cut	13	
												Young Redwood Forest	54	
												Mature Redwood Forest	0	
												Old-growth Redwood Forest	1	
A2	3.5	Unk	0	2	0.9	80	3	4,990,000	3,800,000	1,190,000	\$300	Coastal scrub/grassland/spruce	7	Slopes: Cut 1:1, Fill 2:1 Cut/Fill quantities contingent on use of potential structures instead of embankment fill in some areas
												Riparian	1	
												Clear Cut	13	
												Young Redwood Forest	56	
												Mature Redwood Forest	0	
												Old-growth Redwood Forest	3	
G1	3.0	Unk	1	1	1.7	53	4	1,900,000	360,000	1,540,000	\$672	Coastal scrub/grassland/spruce	21	Slopes: Cut 1.5:1 and 1:1, Fill 2:1 7% sustained grade w/ additional climbing lane for 1.5 miles. Same as A1 alignment for 2nd half
												Riparian	1	
												Clear Cut	2	
												Young Redwood Forest	27	
												Mature Redwood Forest	3	
												Old-growth Redwood Forest	1	
G2	3.1	Unk	0	2	0.9	56	3	1,500,000	300,000	1,200,000	\$295	Coastal scrub/grassland/spruce	22	Slopes: Cut 1.5:1 and 1:1, Fill 2:1 7% sustained grade w/ additional climbing lane for 1.5 miles. Same as A2 alignment for 2nd half
												Riparian	1	
												Clear Cut	3	
												Young Redwood Forest	28	
												Mature Forest	3	
												Old-growth Redwood Forest	3	
L	2.2	1	0	0	2.2	47	3.5	2,084,100	129,100	1,955,000	\$300	Coastal scrub/grassland/spruce	28	Slopes: Cut 1.5:1 and 1:1, Fill 2:1 7% sustained grade Additional climbing lane for 1.6 miles High potential for additional retaining walls.
												Riparian	0	
												Clear Cut	0	
												Young Redwood Forest	0	
												Mature Forest	18	
												Old-growth Redwood Forest	1	
F	1.5	2	1	0	-	5	7	2,500,000	Negligible	2,250,000	\$1100-\$2000	Coastal scrub/grassland/spruce	2	Continued Operation costs not included Double bore possibly required (See tunnel considerations sheet) Double bore would greatly increase footprint at northern portal
												Riparian	0	
												Clear Cut	0	
												Young Redwood Forest	0	
												Mature Redwood Forest	1	
												Old-growth Redwood Forest	1	
X	1.1	15	0	0	1.1	20	3.5	575,000	Negligible	570,000	\$295	Coastal scrub/grassland/spruce	10	Slopes: Cut 1:1, Fill 2:1 Road Geometrics not to full standard Assumes 12 existing walls will be reconstructed. Potentially 3+ additional uphill walls
												Riparian	0	
												Clear Cut	0	
												Young Redwood Forest	0	
												Mature Forest	10	
												Old-growth Redwood Forest	0	

**ATTACHMENT D**  
**RISK REGISTER**

## Risk Register for 01-0F280, Last Chance Grade

<b>Risk Checkpoint:</b> Post PSR, Before Full Funding <b>Date:</b> 9/21/2018
<b>Project Nickname:</b> Last Chance Grade <b>EA:</b> 01-0F280 <b>Co-Rt, Post Miles:</b> DN-101, 12.5/15.5 <b>Project Manager:</b> Jaime Matteoli
<b>FY &amp; Program (SHOPP or STIP):</b> 2018 (SHOPP) <b>Total Costs (Capital &amp; Support):</b> \$500,000k <b>RTL Target:</b> 9/2/2030

Phase	Cost Contingency F	
	Optimistic	PERT
0-PA&ED	\$3,420	\$7,112
1-PS&E	\$600	\$2,558
2-RW Sup	\$0	\$0
3-Con Sup	\$0	\$0
Support Contingency	\$4,020	\$9,671
9-RW Cap	\$0	\$0
4-Con Cap	\$600	\$28,100
Capital Contingency	\$600	\$28,100
Total Contingency	\$4,620	\$37,771

Risk Identification								Risk Assessment			Risk Response			
Status	ID #	Type	Category	Title	Risk Statement	Current status / assumptions	Risk Trigger	Probability (P)	Cost Impact Schedule Impact (I)	Cost Score Schedule Score (Pxl)	Strategy	Response Actions	Risk Owner	Updated
Active	10	Threat	Geotechnical	<b>Geotechnical Discoveries Alter Scope</b>	Because of the complexity and magnitude of the geologic instability, both at the current highway location and surrounding the new proposed alternatives, the geotechnical investigations could lead to discoveries that fundamentally alter project scope: project alternatives could be eliminated, increased in scope, or new possible alternatives could come to light. These project changes would result in major cost increases and major delays to perform rework or to extend studies and preliminary engineering.	Geotechnical Investigations are being performed in stages and will be performed throughout the first few years of the environmental phase. All of the project alternatives are located in areas of active or historic landslides. The Geotechnical team will not be certain that project alternatives meet the purpose and need of the project until these investigations have been completed.	Geotechnical Reports	4-High (51-70%)	16 - Very High (>\$1600k)	64	Mitigate	Caltrans is working closely with our partners to facilitate the environmental process for the geotechnical drilling and to reduce risk of delays to this process. The public engagement and partnership efforts will mitigate this risk.	Jaime Matteoli, PM	9/21/2018
								60%	16 - Very High (>6 months)	64				
Active	10	Threat						4-High (51-70%)	16 - Very High (>\$1600k)	64				
								60%	16 - Very High (>6 months)	64				
Active	20	Threat	Funding	<b>Funding Uncertainties</b>	This project costs are well above what is typical for the SHOPP Permantant Restoration Program. Achieving full funding for each phase will be a challenge and may require special action on the part of the State or Federal governments. If funding is delayed and project funds are depleted, project development would be delayed. Stops and starts would require rework and other inefficiencies.	The project will be funded by phase. Currently there is partial funding of \$10M programmed for 0 phase. It is anticipated that there is an above 50% chance that 0 phase would be fully funded in 2019 if the current funding environment does not change.	Change in Federal or State Funding Environement	3-Moderate (31-50%)	8 - High (\$800k - \$1600k)	24	Mitigate	Caltrans will work closely with funding partners and elected officials to manage funding needs and communicate needs and risks to the CTC and public at large.	Jaime Matteoli, PM	9/21/2018
								40%	16 - Very High (>6 months)	48				
Active	30	Threat	Environmental	<b>Tribal Coordination</b>	Because of the unique project location within State and National Park Boundaries and within tribal boundaries or ancestral territories of four federally-recognized tribes, if a proper, respectfull, and open relationship is not maintained with tribal governments, the project would be delayed and support costs would increase.	Caltrans cultural team is facilitating a cultural resouce working group with tribal governments and State and National Parks that is proactively working toward a Programmatic Agreement on this project.	Continuous	1-Very Low (1-10%)	2 - Low (<\$400k)	2	Mitigate	Caltrans will continue positive engagement with tribal governments before and after any Programatic Agreement is signed.	Tim Keefe, Archeologist	9/21/2018
									16 - Very High (>6 months)	16				

Risk Identification								Risk Assessment			Risk Response			
Status	ID #	Type	Category	Title	Risk Statement	Current status / assumptions	Risk Trigger	Probability (P)	Cost Impact Schedule Impact (I)	Cost Score Schedule Score (PxI)	Strategy	Response Actions	Risk Owner	Updated
								5%	months)					
Active	40	Threat	Environmental	<b>Unique Environmental Issues</b>	The project is in a uniquely sensitive location and the potential impacts are uniquely severe. An estimated 13 agencies will have influence on the project environmental document or permits and a number of interest groups, some with opposing objectives, will be engaged in groundtruthing all documents and public records. If inadequacies are discovered in project documents, agency coordination, or public engagement, major project delays and cost increases could result.	Currently, the history or agency coordination and public engagement has been positive. However, there is a high likelihood that some difficulties emerge during the environmental process that affect project cost and schedule.	Environmental Milestones	4-High (51-70%)	16 - Very High (>\$1600k)	64	Mitigate	Caltrans will continue to provide open, transparent, and accountable public engagement and agency coordination in support of this project. Caltrans will pursue all resources available to increase awareness and skill in these critical activities by (1) utilizing the statewide public engagement contract and (2) procuring engagement services via on-call or project specific contracts. Caltrans will continue to maintain a project website to a high standard to provide timely updates and receive public feedback and questions.	Jaime Matteoli, PM	9/21/2018
								60%	16 - Very High (>6 months)	64				
Active	50	Threat	Environmental	<b>Litigation</b>	Caltrans projects with much smaller environmental impacts are currently delayed because of lawsuits by local NGOs. If NGOs file lawsuits on this project, major delays and cost increases would occur.	Some NGOs may file a lawsuit if any cutting of old growth redwoods or significant damage to old growth redwoods is proposed in the preferred alternatives.	Environmental Milestones	2-Low (11-30%)	16 - Very High (>\$1600k)	32	Mitigate	The PDT will continue to engage the stakeholders and partners with a high level of openness, transparency, and accountability. Maintaining stakeholder/partner support and understanding their needs is paramount to minimizing this risk of litigation.	Jaime Matteoli, PM	9/25/2018
								20%	16 - Very High (>6 months)	32				
Active	60	Threat	Geotechnical	<b>Geotechnical Investigation Delays</b>	Understanding the underlying geologic conditions is critical to validating and refining the project alternatives. If environmental clearance of this work is delayed, any geologic discoveries would occur later in the process and the delays to schedule would be compounded.	Caltrans plans to perform geotechnical investigations in phases. Drilling will occur in 2018, 2019, and 2020.	Geotechnical Permit Applications	3-Moderate (31-50%)	4 - Moderate (\$400k - \$799.2k)	12	Mitigate	Caltrans is working closely with our partners to facilitate the environmental process for the geotechnical drilling and to reduce risk of delays to this process. The public engagement and partnership efforts will mitigate this risk.	Jaime Matteoli, PM	9/28/2018
								40%	8 - High (3-6 months)	24				
Active	80	Threat	Environmental	<b>Mitigation Uncertainty</b>	Because the mitigation estimates are highly uncertain and the potential environmental impacts are significant, there could be new discoveries about mitigation requirements that greatly increase cost and schedule.	The current mitigation cost estimates are preliminary and based on historic percentages. More information and coordination is needed to develop accurate mitigation cost estimates.	Cost Estimate Updates	3-Moderate (31-50%)	16 - Very High (>\$1600k)	48	Mitigate	The PDT will continue to engage the stakeholders and partners to seek out off-system partner opportunities and on-system improvements.	Jaime Matteoli, PM	9/28/2018
								40%	16 - Very High (>6 months)	48				

Risk Identification								Risk Assessment			Risk Response			
Status	ID #	Type	Category	Title	Risk Statement	Current status / assumptions	Risk Trigger	Probability (P)	Cost Impact Schedule Impact (I)	Cost Score Schedule Score (PxI)	Strategy	Response Actions	Risk Owner	Updated
Active	90	Threat	Environmental	Remove C Alternatives	As a result of removing the C Alternatives from further environmental study, we run the risk that we may need to add them back into consideration at a futher date. This would lead to considerable delay in PAED and additional costs to the project.	The current information suggests that the C Alternatives do not add benefits over other alternatives that are currently under consideration.	Geologic Reviews of other alternatives	1-Very Low (1-10%)  5%	8 - High (\$800k - \$1600k)  16 - Very High (>6 months)	8  16	Accept	The PDT will continue to review the other alternatives, and if necessary add the C Alternatives back into consideration. The sooner this happens (if necessary) the lower the impact to schedule.	Jason Meyer, Environmental	11/30/2018