

# Chapter 1. Proposed Project

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## 1.1. Introduction

The California Department of Transportation (Caltrans) is the lead agency under the California Environmental Quality Act (CEQA).

Caltrans proposes to widen shoulders, construct a 12' wide truck climbing lane on eastbound Interstate 80 (I-80) in Placer County between Long Ravine Underpass (PM 35.1) and Alpine Overcrossing-Secret Town Road (PM 38.3), and replace and widen the Cape Horn Road Undercrossing. This section of the interstate is a divided freeway with narrow shoulders and a 5% grade uphill. Figures 2 and 3 show project location, vicinity, and project features. Figure 4 shows project typical cross-sections.

This project is included in the Sacramento Area Council of Governments (SACOG) 2035 Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) and the 2011-2014 Metropolitan Transportation Improvement Program (MTIP).

### 1.1.1. Purpose and Need

The purpose of this truck climbing lane is to improve the capacity of the I-80 corridor, and improve Level of Service (LOS) and safety by providing separation between large trucks forced to slow to a speed far below the free flowing speed of other users on this stretch of I-80, known as the Colfax Narrows.

The need for the project is the result of the increase in I-80 regional and interregional traffic that has occurred since the original alignment was constructed in the late 1950's. High trucking volumes combined with long and steep grades, narrow shoulders, accident frequency, and difficult winter driving conditions can severely limit the operation of the facility.

Highway Design Manual (HDM) Section 204.5 specifies that, in general, a climbing lane should be considered where the running speed of trucks falls 10 mph or more below the running speed of remaining traffic. Since California sets a legal speed limit of 55 mph for trucks and 65 mph for other vehicles on multilane highways, this is rather ambiguous with regards to the Colfax Narrows grade. However, HDM Section 204.5 (2) states:

*"Freeway Climbing Lanes.* If design year traffic volumes are expected to be near capacity, right of way acquisition and grading for a future lane should be considered at locations where the upgrade exceeds two percent and the total rise exceeds 50 feet.

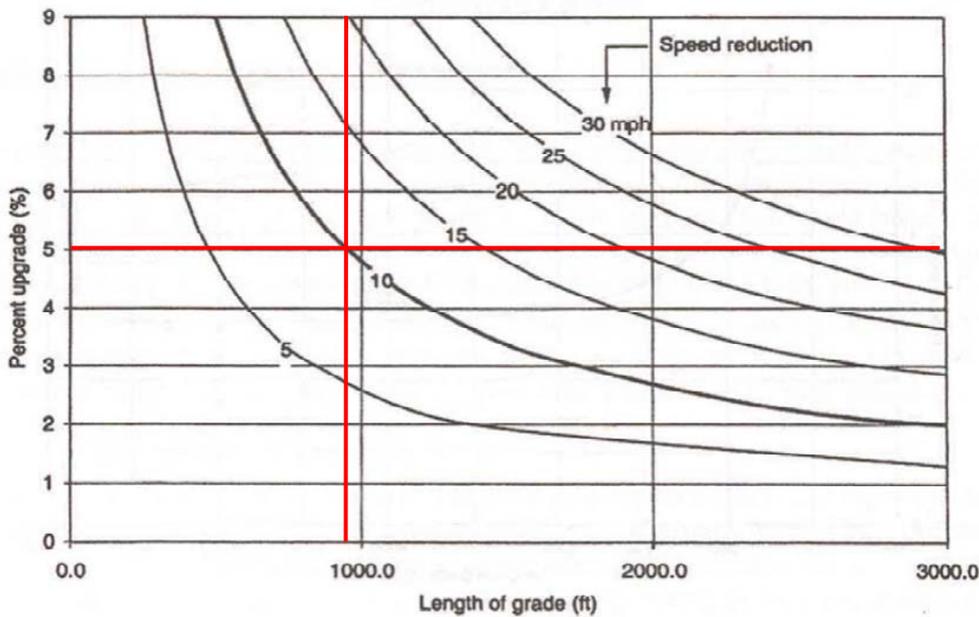
Regardless of traffic volumes, the need for a climbing lane should be investigated on sustained upgrades greater than two percent if the total rise is greater than 250 feet. Refer to the Highway Capacity Manual for passenger car equivalent factors and sample calculations.

Decision sight distance should be provided as climbing lane drops on freeways."

The Colfax Narrows grade of 5% and length of over 12,000 feet easily meets both standards. Additionally, the American Association of State Highway and Transportation Officials (AASHTO) Policy on Geometric Design of Highways and Streets (the “Green Book”) includes discussion on determining the critical length of grade; meaning, the maximum length of a designated upgrade on which a loaded truck can operate without an unreasonable reduction in speed. “If the desired freedom of operation is to be maintained on grades longer than critical,” it says, “design adjustments such as changes in location to reduce the grades or addition of extra lanes should be considered.”

Figure 1, below, shows the Critical Length of a 5% grade at less than 1,000 feet. This places a truck at the Long Ravine Bridge by the time they have slowed 10 mph below the speed at which they have entered the grade.

**Figure 1. Critical Length of Grade for Design – 200 LB / HP vehicle**



Again from AASHTO’s “Green Book” discussion on Climbing Lanes on Freeways and Multilane Highways:

"To justify the cost of providing a climbing lane, the existence of a low level of service on the grade should be the criterion, as in the case of justifying climbing lanes for two-lane roads, because highway users will accept a higher degree of congestion (i.e., a lower LOS<sup>1</sup>) on individual grades than over long sections of highway. As a matter of practice, the service volume of an individual grade should not exceed that for the next poorer level of service from that used for the basic design. The one exception is that the service volume for LOS D should not be exceeded.

Generally, climbing lanes should not be considered unless the directional traffic volume for the upgrade is equal to or greater than the service volume for LOS D. In most cases when the service volume, including trucks, is greater than 1,700 vehicles per hour per lane and the length of grade and the percentage of trucks are sufficient to

<sup>1</sup> LOS = Level of Service. LOS is used to analyze highways by categorizing traffic flow with corresponding safe driving conditions using A to F categories, where A represents free flow and F represents significant delays.

consider climbing lanes, the volume in terms of equivalent passenger cars is likely to approach or even exceed the capacity. In this situation, an increase in the number of lanes throughout the highway section would represent a better investment than the provision of climbing lanes."

In this case, the current service volume is LOS E, about 4,000 peak hour traffic, and 5% grade.

Traffic and Truck Volumes

The traffic volumes below were taken from the 2011 All Traffic Volumes on California State Highway System provided by Caltrans' Traffic and Vehicle Data Systems Unit. "Back" and "Ahead" refer to traffic data before and after the Magra Road interchange.

**Table 1. Traffic Volumes – Peak Hour and Annual Average Daily Traffic (AADT)**

Location	Back Peak Hour	Back Peak Month	Back AADT	Ahead Peak Hour	Ahead Peak Month	Ahead AADT
03-PLA-80 PM 37.728, Magra Road	4,050	30,000	26,500	4,450	30,500	26,500

The truck volumes for I-80 (below) were taken from the 2011 Average Annual Daily Truck Traffic on the California State Highway System.

**Table 2. Truck Volumes – Truck AADT and % of AADT**

Location	Total AADT	Truck AADT	Percent Truck	Truck AADT by axle			
				2	3	4	5+
03-PLA-80 PM 33.131 Colfax Jct. 174	26,500	5,022	18.95	1,393	189	72	3,369

Accident History

Accidents within the study area were obtained from the Traffic Accident Surveillance and Analysis System (TASAS) Table B for a five-year period. In the five years from April 1, 2006 to March 31, 2011, there were 78 accidents eastbound on this grade. None in the eastbound direction were fatal.

**Table 3. 5-Year Accident Data; April 1, 2006-March 31, 2011**

Location	Number of Accidents				Accident Rate					
	Total*	Fatal	Injury	F+I	Actual per million vehicle			Average per million vehicle		
					Fatal	F+I	Total*	Fatal	F+I	Total*
03-PLA-80 PM 35.1-PM 38.0 Eastbound	78	0	18	18	.000	.25	1.08	.009	.17	.46

\*Total accidents include fatalities and injuries, plus property damage only accidents.

Thirty-eight of the 78 eastbound collisions involved trucks. Of those 38, 22 were sideswipe collisions and three were rear end collisions.

## **1.2. Project Description**

Caltrans proposes to widen shoulders and construct a 12' wide truck climbing lane on eastbound Interstate 80 (I-80) in Placer County between Long Ravine Underpass (PM 35.1) and Alpine Overcrossing-Secret Town Road (PM 38.3). I-80 is a four lane (2-lane-per-direction) freeway with full access control throughout the project limits. In the project area, this stretch of roadway traverses a mountainous and curvilinear path while climbing at a sustained 5% upgrade eastbound for approximately three miles.

I-80 was constructed between 1947 and 1957 and became the first California freeway opened under the Federal Highway Act of 1956. I-80 is the second longest route in the Dwight D. Eisenhower System of Interstate and Defense Highways (Interstate System) and runs from its western limits in the San Francisco Bay Area eastward toward the northeastern United States, terminating in Teaneck, New Jersey. I-80 is a "High Emphasis" route and has been designated a "Gateway" by Caltrans in the Interregional Transportation Strategic Plan. In reference to highways, "Gateways" are key passageways into and out of the state or into critical geographic areas of the state. I-80 is the predominant commercial and recreational route serving Northern California, the Sacramento Valley, and Southern Oregon. It is a major truck route in California because it is the only all-weather route over the Sierra-Nevada mountain range north of State Route 58 in Kern County, and as such is a critical link for goods movement not only for the region but for the entire west coast. In Placer County, I-80 is a six-lane facility from the Placer/Sacramento County line to the Applegate/Weimar area, where it decreases to four lanes to the Nevada County line.

### **1.2.1. Alternatives**

#### Proposed Build Alternative (Alternative 1)

Alternative 1 includes the following features:

- Construct a 12-foot wide truck climbing lane on eastbound I-80 in Placer County between Long Ravine Underpass (PM 35.1) and Alpine-Secret Town Road Overcrossing (PM 38.3);
- Extend and replace existing drainage facilities and construct new drainage facilities such as inlets, cross culverts, underdrains, side ditches, and overside drains;
- Replace and relocate metal beam guardrail and roadside signs;
- Replace and widen Cape Horn Road Undercrossing (UC) (Bridge Number 19-0091);
- Construct mountable concrete barrier approaching and through Magra Road Overcrossing (OC) to shield bents on the right shoulder;
- Construct a retaining wall along Interstate 80 between Magra Road OC and Alpine-Secret Town Road OC.

#### No-Build (No Action) Alternative (Alternative 2)

The No-Build Alternative (Alternative 2) would not add any improvements to the existing facility. Alternative 2 would not meet the purpose and need of the project.

### 1.2.2. Alternatives Considered but Eliminated from Further Discussion

Three other alternatives were analyzed, but were eliminated for various reasons (discussed below):

#### Alternative 3 (PM 34.90 to 38.27)

Alternative 3 extends the project limits by 1,300' to the west. This alternative would widen the Long Ravine UC by 25 feet, widen Long Ravine Bridge by 25 feet, and replace North and South Long Ravine Underpasses. Each of the four structures is currently in satisfactory condition. The benefit of beginning the truck climbing lane sooner when large trucks were travelling 55 mph versus 45 mph was not enough to justify the additional \$15 million cost.

#### Alternative 4 (PM 34.15 to 38.27)

Alternative 4 has the same features as Alternative 1, but also requires the replacement of Magra OC in order to provide standard shoulders for the entirety of the project limits. This alternative was eliminated because the Magra Road OC is in satisfactory condition.

#### Alternative 5 (PM 34.90 to 37.76)

Alternative 5 limits are less than the other alternatives. Caltrans eliminated Alternative 5 due to restrictive sight conditions from the cut slope on the inside of a curve and an analysis showing that trucks would be forced to begin merging into mixed flow lanes while still only travelling at 30 mph. The speed differential between running traffic and merging large trucks would be at least 30 mph at the approach to Magra Road OC, three times more than the speed differential which triggers consideration of a truck climbing lane on sustained grades.

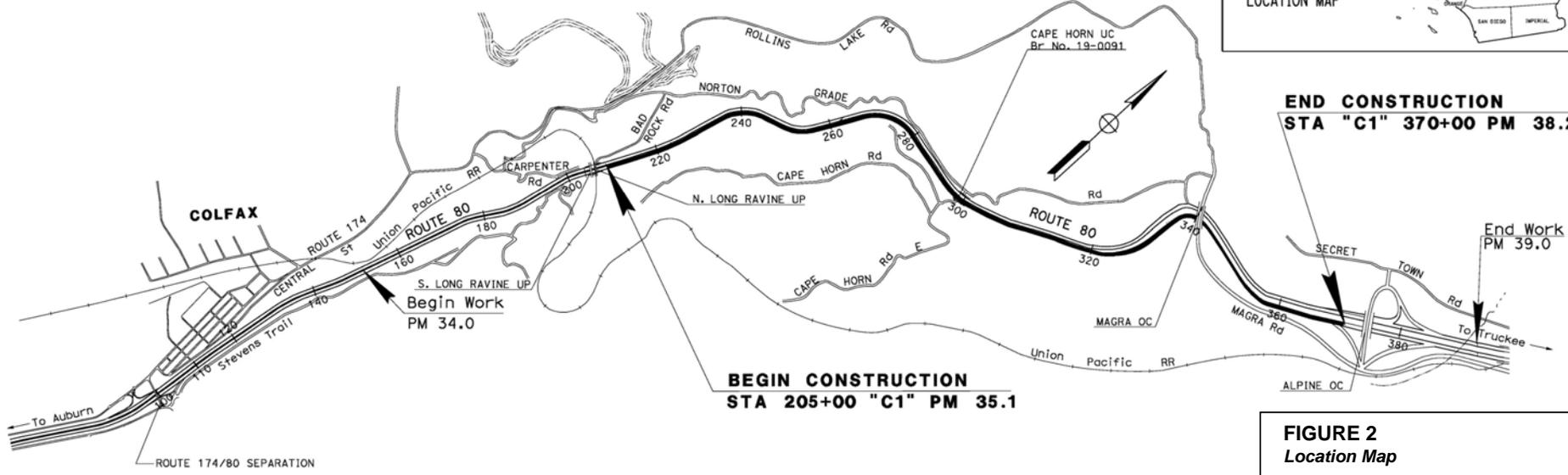
### 1.3. Permits and Approvals Needed

The following permits, reviews, and approvals would be required for project construction:

Agency	Permit/Approval	Status
United States Army Corps of Engineers (USACE)	Section 404 Permit for filling or dredging waters of the United States	Apply for the Section 404 permit after final environmental document is completed.
Central Valley Regional Water Quality Control Board (CVRWQCB)	Section 401 Certification	Apply for the Section 401 permit after final environmental document is completed.
California Department of Fish and Wildlife (CDFW)	1602 Agreement for Streambed Alteration	Apply for the 1602 Agreement after final environmental document is completed.



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
03	Pla	80	35.1/38.2	1	XXX



**END CONSTRUCTION**  
**STA "C1" 370+00 PM 38.2**

**BEGIN CONSTRUCTION**  
**STA 205+00 "C1" PM 35.1**

End Work  
 PM 39.0

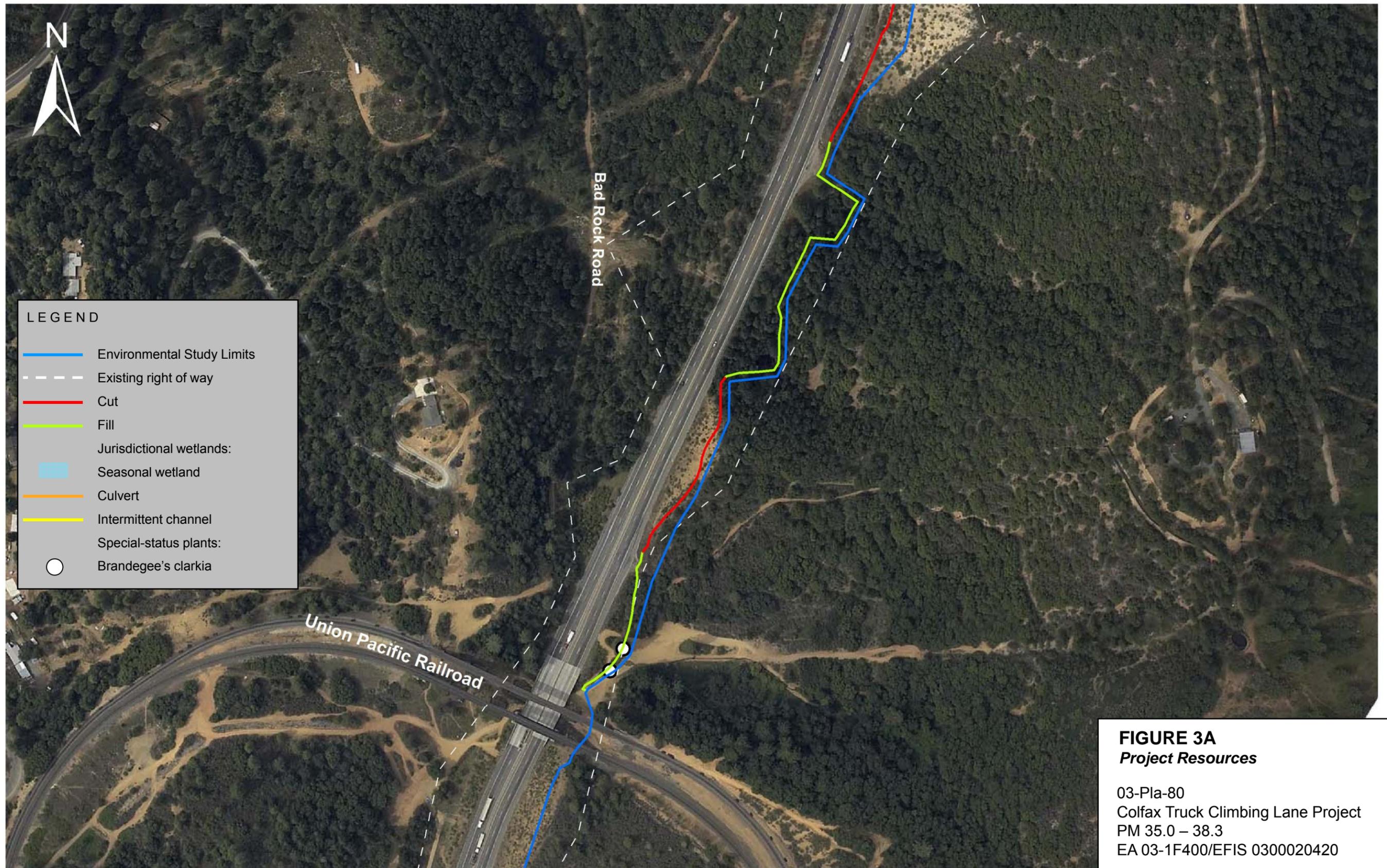
**FIGURE 2**  
**Location Map**

03-Pla-80  
 Colfax Truck Climbing Lane Project  
 PM 35.0 – 38.3  
 EA 03-1F400, EFIS 03000020420

State of California  
 Department of Transportation



Not to scale



**LEGEND**

- Environmental Study Limits
- - - Existing right of way
- Cut
- Fill
- Jurisdictional wetlands:
- Seasonal wetland
- Culvert
- Intermittent channel
- Special-status plants:
- Brandegee's clarkia

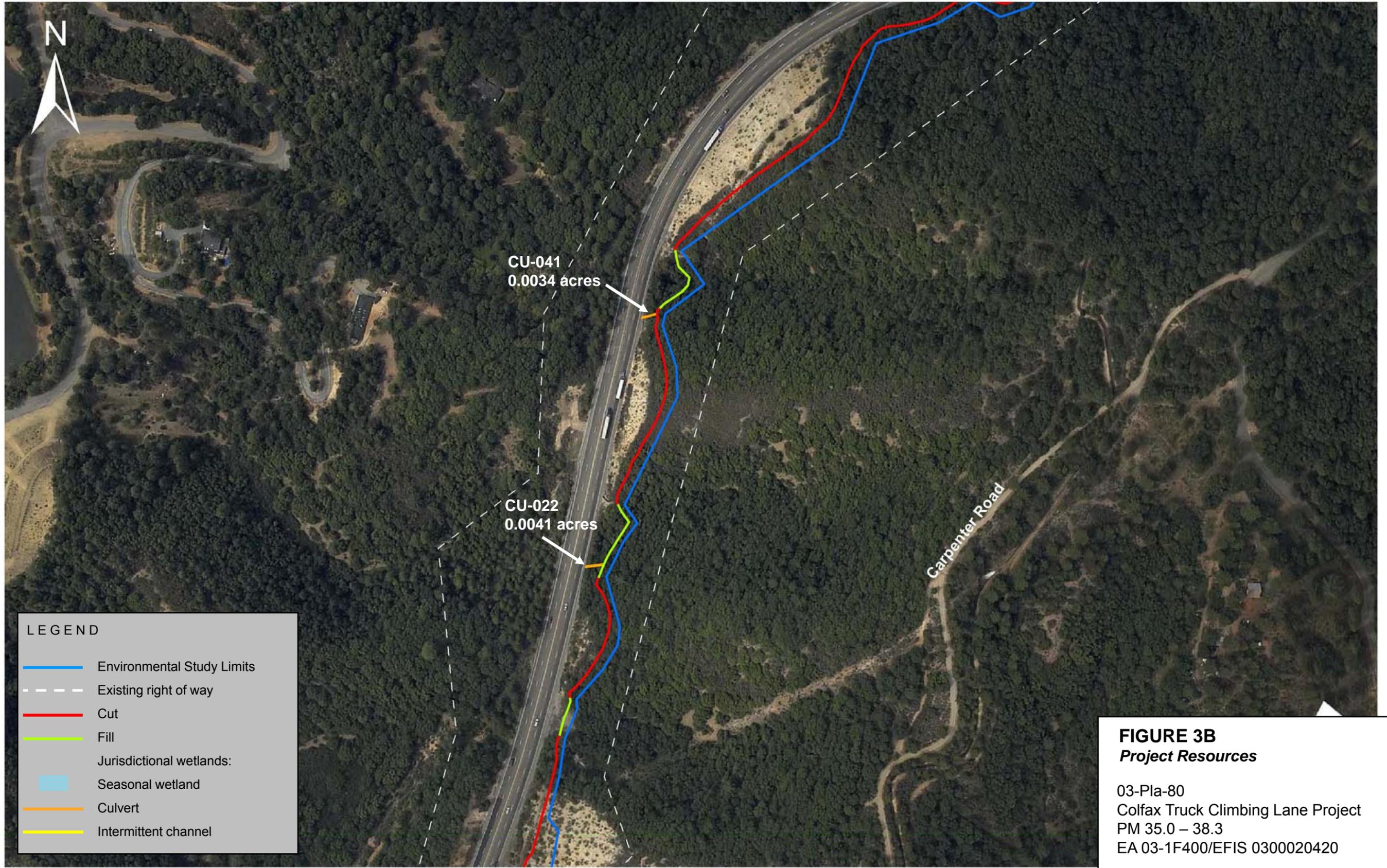
**FIGURE 3A**  
**Project Resources**

03-Pla-80  
 Colfax Truck Climbing Lane Project  
 PM 35.0 – 38.3  
 EA 03-1F400/EFIS 0300020420

State of California  
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0 500 1,000 Feet



**LEGEND**

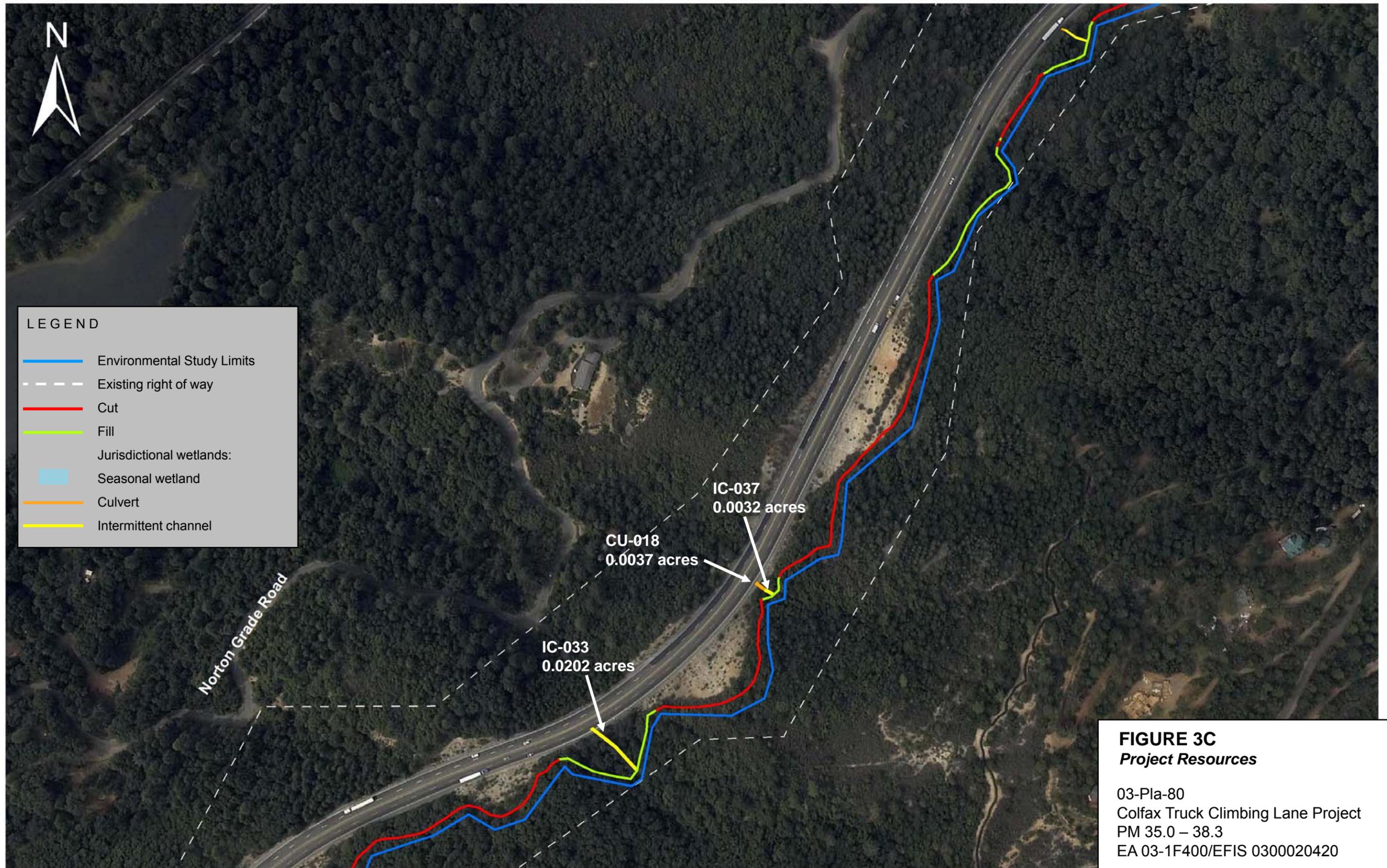
- Environmental Study Limits
- - - Existing right of way
- Cut
- Fill
- Jurisdictional wetlands:
- Seasonal wetland
- Culvert
- Intermittent channel

**FIGURE 3B**  
**Project Resources**

03-Pla-80  
 Colfax Truck Climbing Lane Project  
 PM 35.0 – 38.3  
 EA 03-1F400/EFIS 0300020420

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**LEGEND**

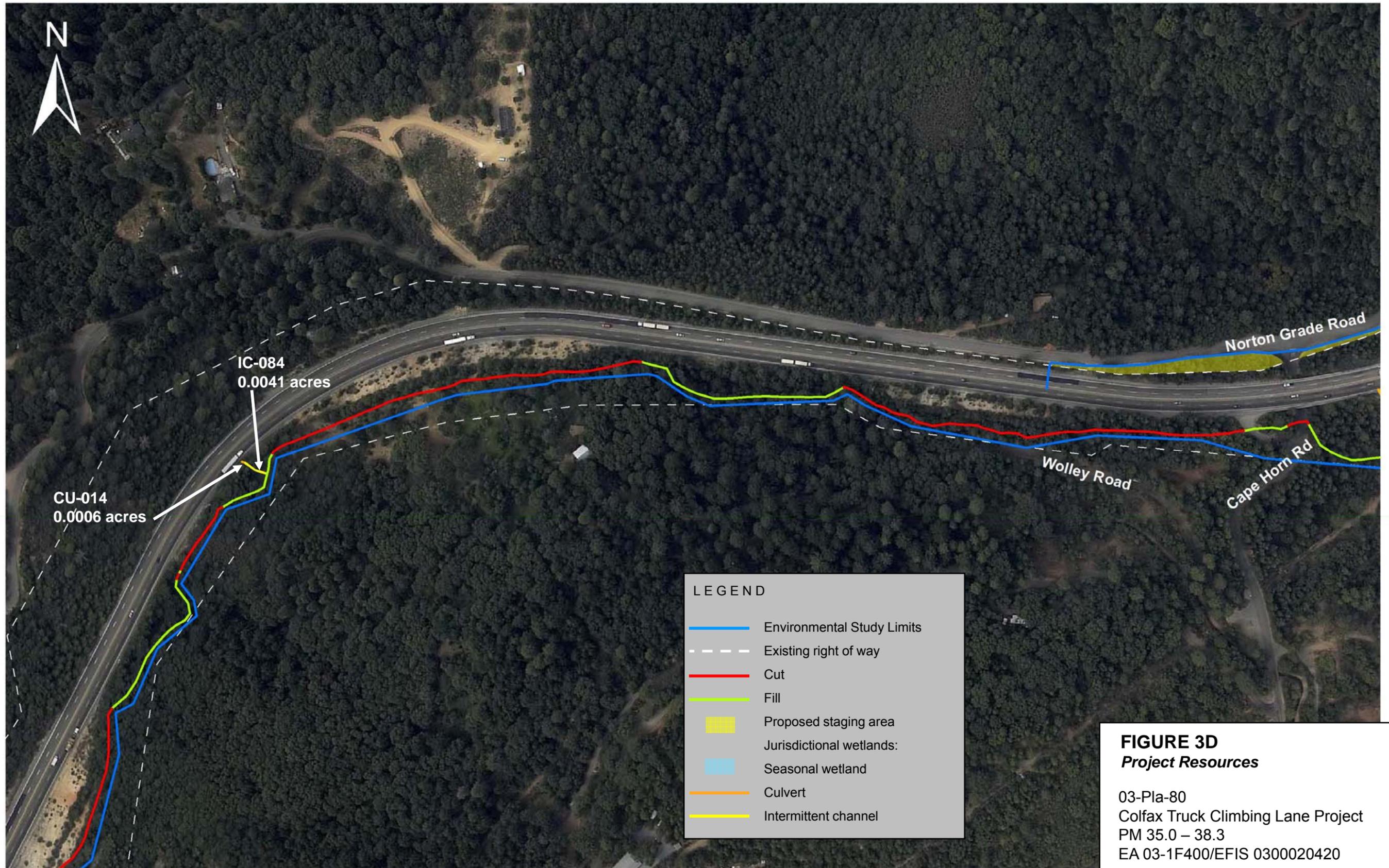
- Environmental Study Limits
- - - Existing right of way
- Cut
- Fill
- Jurisdictional wetlands:
  - Seasonal wetland
  - Culvert
  - Intermittent channel

**FIGURE 3C**  
**Project Resources**

03-Pla-80  
 Colfax Truck Climbing Lane Project  
 PM 35.0 – 38.3  
 EA 03-1F400/EFIS 0300020420

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**LEGEND**

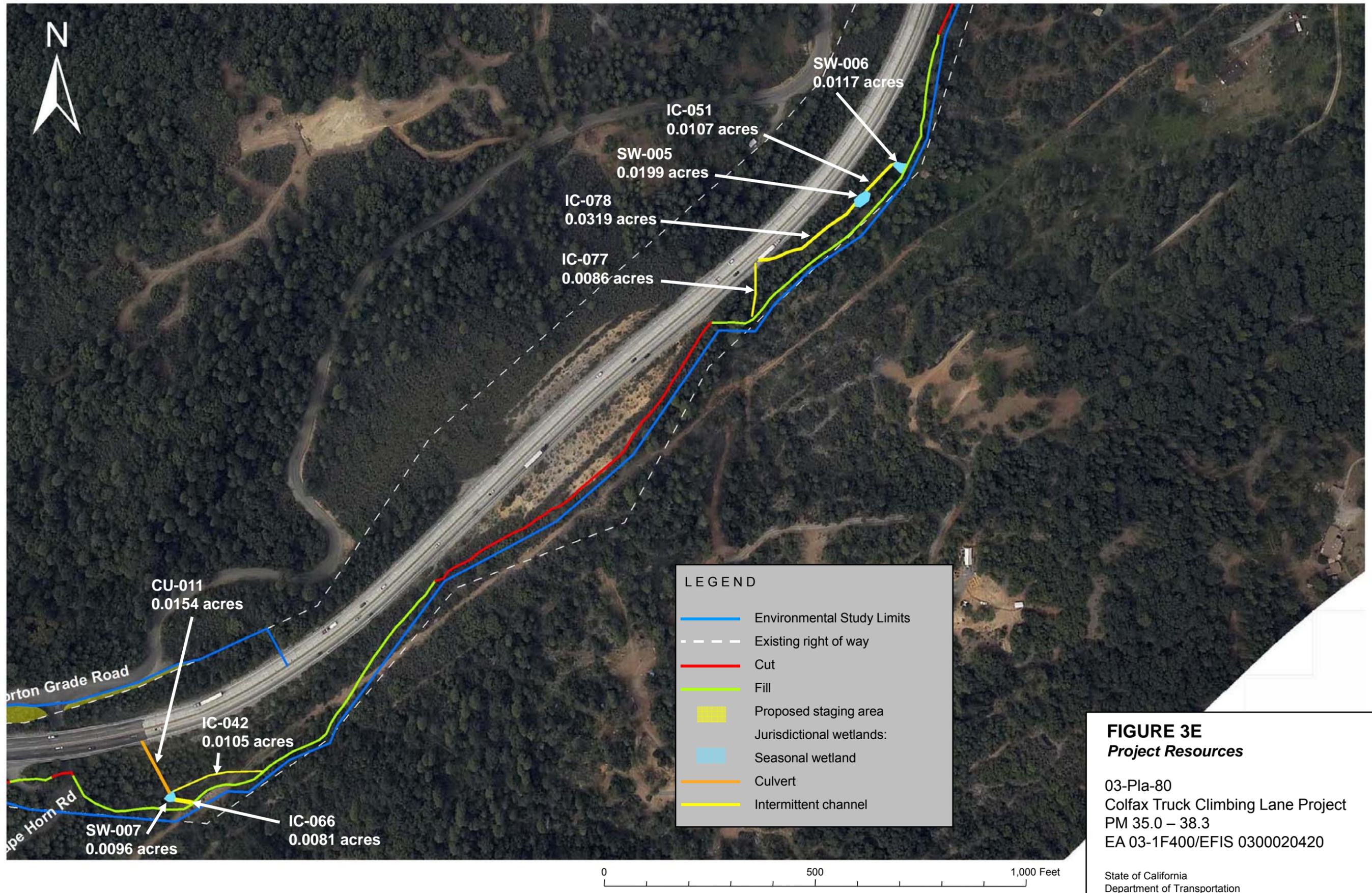
- Environmental Study Limits
- Existing right of way
- Cut
- Fill
- Proposed staging area
- Jurisdictional wetlands:
- Seasonal wetland
- Culvert
- Intermittent channel

**FIGURE 3D**  
**Project Resources**

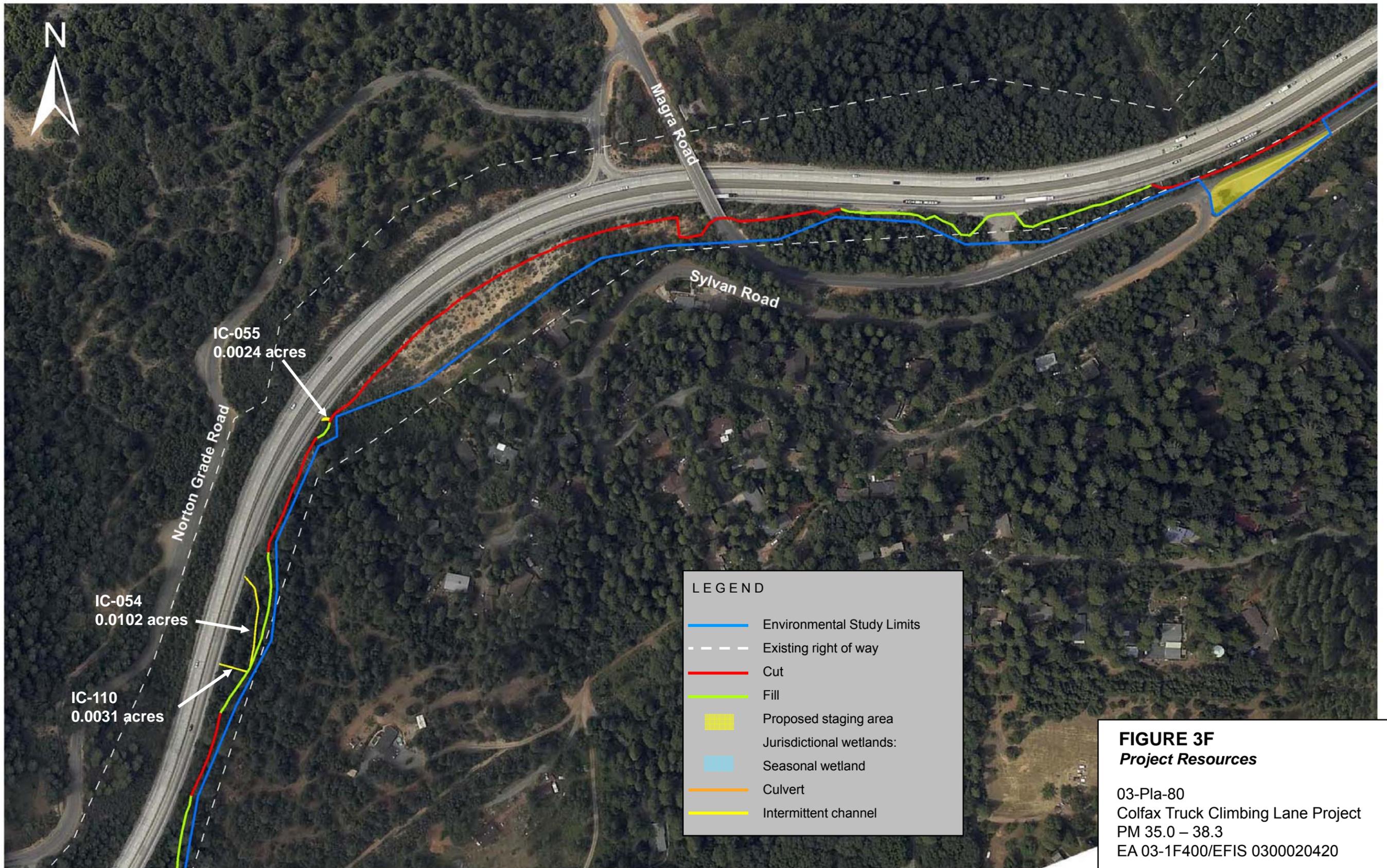
03-Pla-80  
 Colfax Truck Climbing Lane Project  
 PM 35.0 – 38.3  
 EA 03-1F400/EFIS 0300020420

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**FIGURE 3E**  
**Project Resources**  
 03-Pla-80  
 Colfax Truck Climbing Lane Project  
 PM 35.0 – 38.3  
 EA 03-1F400/EFIS 0300020420



**LEGEND**

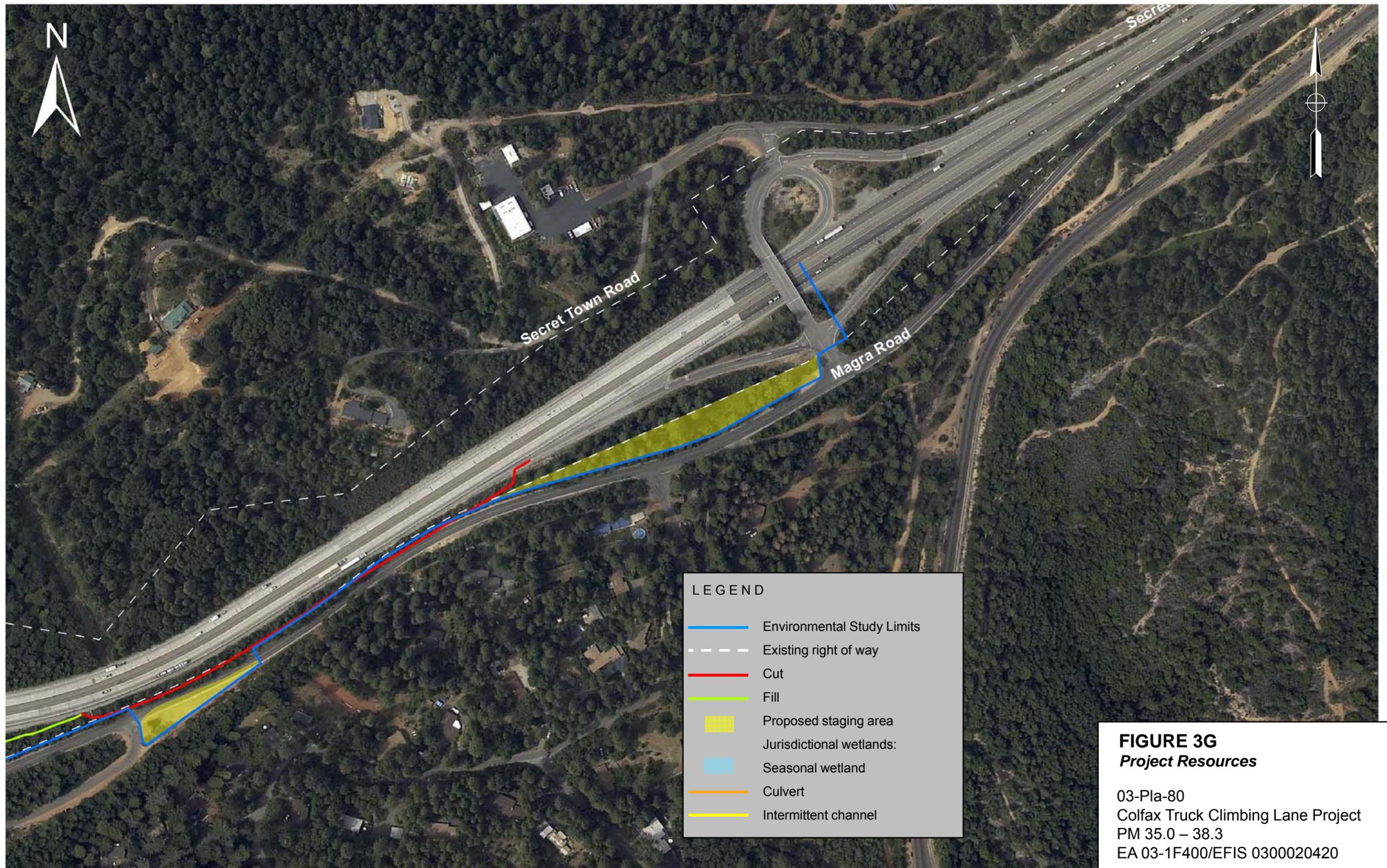
	Environmental Study Limits
	Existing right of way
	Cut
	Fill
	Proposed staging area
Jurisdictional wetlands:	
	Seasonal wetland
	Culvert
	Intermittent channel

**FIGURE 3F**  
**Project Resources**

03-Pla-80  
 Colfax Truck Climbing Lane Project  
 PM 35.0 – 38.3  
 EA 03-1F400/EFIS 0300020420

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**LEGEND**

- Environmental Study Limits
- Existing right of way
- Cut
- Fill
- Proposed staging area
- Jurisdictional wetlands:
- Seasonal wetland
- Culvert
- Intermittent channel

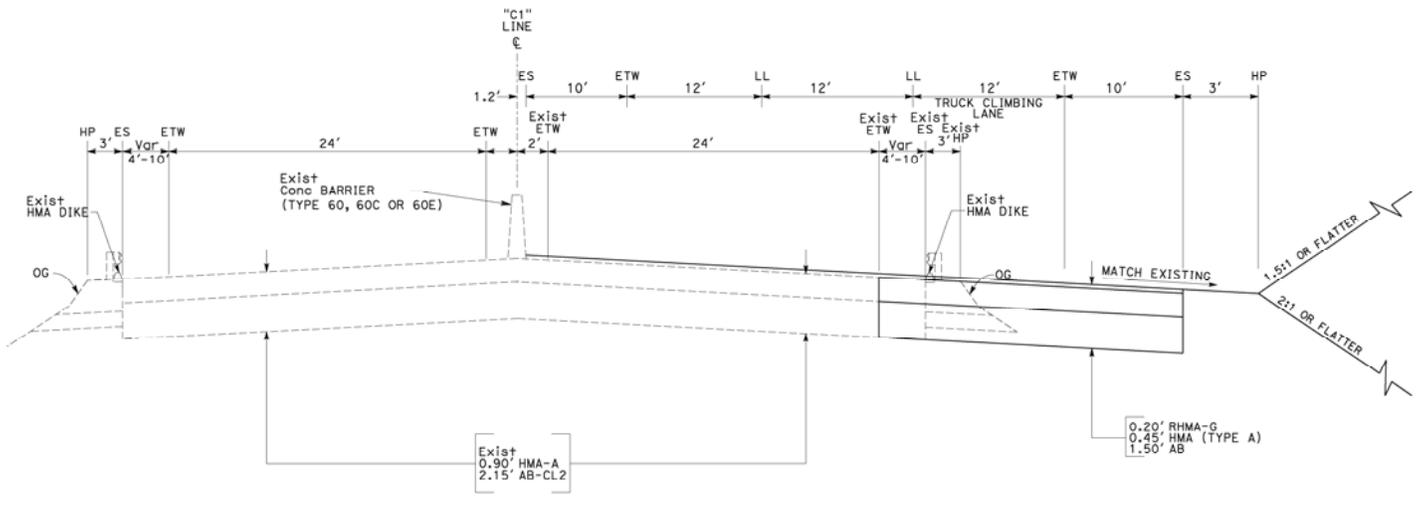
**FIGURE 3G**  
**Project Resources**

03-Pla-80  
 Colfax Truck Climbing Lane Project  
 PM 35.0 – 38.3  
 EA 03-1F400/EFIS 0300020420

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0 500 1,000 Feet

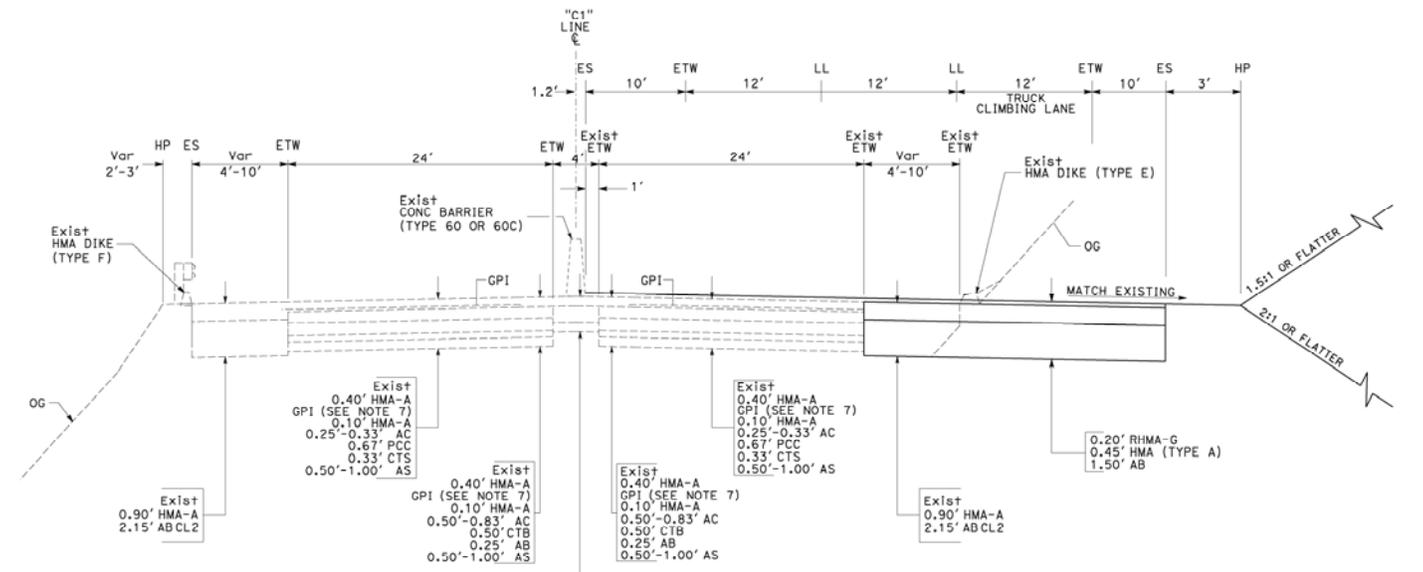


**ROUTE 80**

WESTBOUND

EASTBOUND

"C1" 204+97.4 TO 208+29.4  
 "C1" 291+59.8 TO 294+91.8  
 "C1" 296+40.7 TO 298+40.7  
 "C1" 340+85.0 TO 346+75.0



**ROUTE 80**

WESTBOUND

EASTBOUND

"C1" 208+29.40 TO 291+59.80

**LEGEND**

- GPI - GEOSYNTHETIC PAVEMENT INTERLAYER
- HMA-A - HOT MIX ASPHALT (TYPE A)
- CTS - CONCRETE TREATED SUBBASE

**NOTES:**

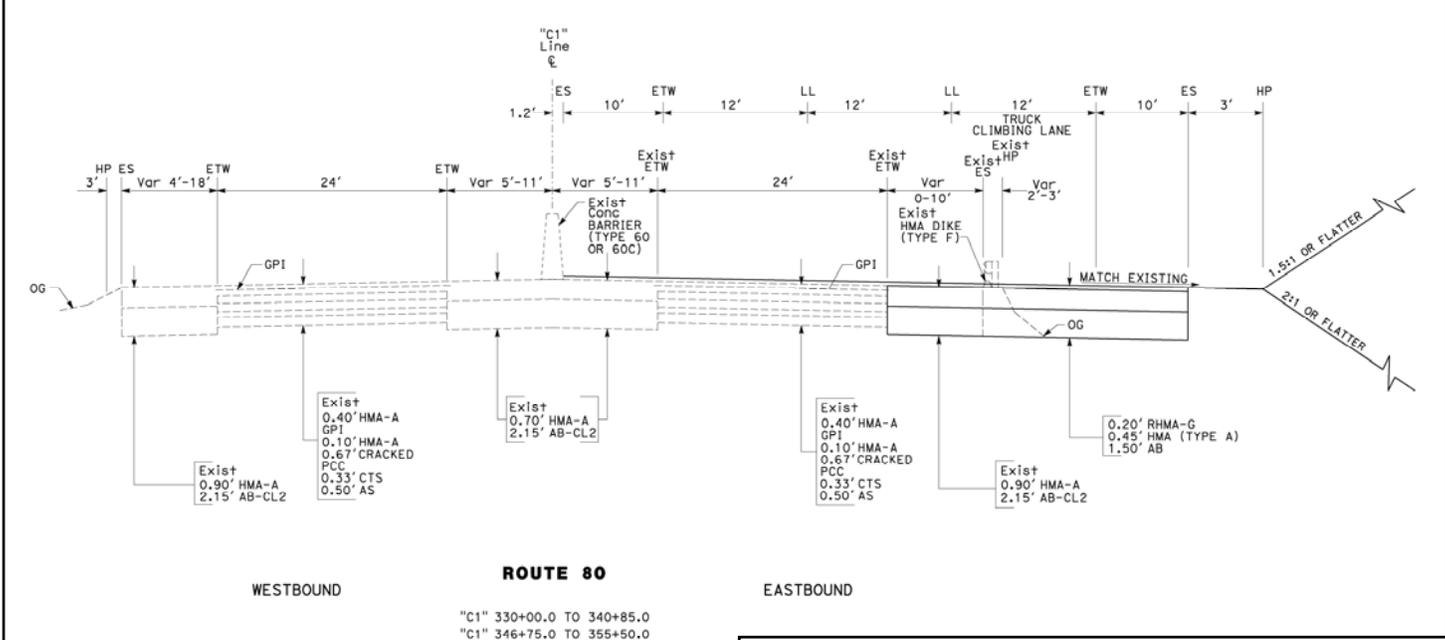
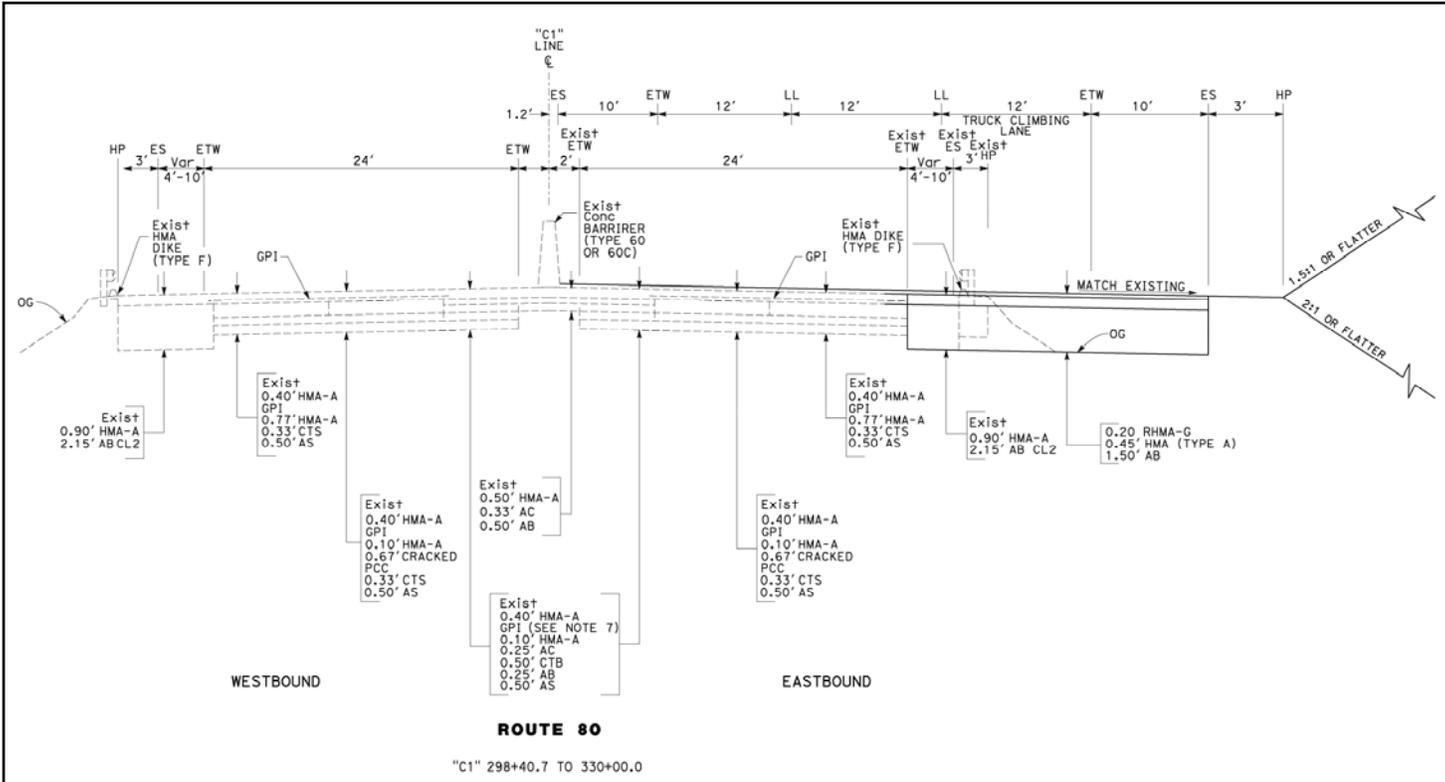
1. FOR REMOVAL, NEW TYPE AND LOCATION OF HMA DIKE, HMA GUTTER, MBGR AND CONCRETE BARRIER, SEE SUMMARY OF QUANTITIES & LAYOUT SHEETS.
2. DIMENSIONS OF THE PAVEMENT STRUCTURES (STRUCTURAL SECTIONS) ARE SUBJECT TO TOLERANCES SPECIFIED IN THE STANDARD SPECIFICATIONS.
3. SUPERELEVATION AS SHOWN OR AS DIRECTED BY THE ENGINEER.
4. SHOULDER BACKING TO BE PLACED AT ALL FILL SLOPES.
5. EXISTING AC DIKE TO BE REMOVED (TYP).
6. REMOVE CONCRETE PAVEMENT LOCATIONS SEE LAYOUT & QUANTITY SHEETS.
7. GPI IS FROM ETW TO ETW FOR BOTH WESTBOUND AND EASTBOUND DIRECTIONS. GPI OVERLAPS 1' ONTO ADJACENT SHOULDER.

**FIGURE 4**  
*Typical Cross Sections*

03-Pla-80  
 Colfax Truck Climbing Lane Project  
 PM 35.0 – 38.3  
 EA 03-1F400/EFIS 03000020420

State of California  
 Department of Transportation





**FIGURE 4**  
*Typical Cross Sections (cont.)*

03-Pla-80  
Colfax Truck Climbing Lane Project  
PM 35.0 – 38.3  
EA 03-1F400/EFIS 03000020420

State of California  
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