Chapter 1 Proposed Project

1.1 Introduction

The California Department of Transportation (Caltrans) proposes to replace the Spanish Creek Bridge (Bridge No. 09-0015) on State Route (SR) 70 in Plumas County, post mile 35.3, near the community of Keddie (Exhibits 1 & 2).

The project is included in the State Highway Operation and Protection Program and is funded in the Bridge Rehabilitation Program. Construction is scheduled for the 2009/2010 fiscal year.

SR 70 is a two-lane conventional highway that connects SR 99 near Sacramento in Sutter County and U.S. Route 395 in southeastern Lassen County. The annual average daily traffic volume on SR 70 in the project vicinity is 1,500 vehicles westbound and 3,050 vehicles eastbound.[1] The route is a designated National Scenic Byway from 10 miles north of Oroville to its terminus at U.S. Route 395 in Lassen County. The California Division of Highways constructed what was then known as the Feather River Highway between 1927 and 1932. The Feather River Highway Historic District, a 48-mile section of SR 70 from Jarbo Gap to Keddie, was determined eligible for listing in the National Register in April 1987. The Spanish Creek Bridge was designed by the California Division of Highways and was constructed in 1932. The bridge is a contributing element of the highway historic district and is eligible for inclusion in the National Register of Historic Places on its own merit.

In 1993, the Spanish Creek Bridge was combined with three other bridges in the Feather River Canyon, Rock Creek, Storrie, and Tobin, for a seismic retrofit and structural rehabilitation project. However, the project was postponed so that the funding could be used for emergency projects on Interstate 5 and SR 97 in Siskiyou County. Subsequently, two separate projects were developed to address the need for seismic upgrades and bridge rehabilitation in the Feather River Canyon. One project included Rock Creek, Storrie, Tobin, Pulga, and Howell’s bridges. The other project was for the Spanish Creek Bridge. The multiple bridges project was completed in 2006.

[1] Annual average daily traffic is the total volume for the year divided by 365 days. Counts are adjusted to an estimate of annual average daily traffic by compensating for seasonal influence, weekly variation and other variables which may be present.

1.2 Purpose and Need

The purpose of the project is to provide a road crossing that meets modern highway design standards and accommodates interregional transportation needs. The existing Spanish Creek Bridge was constructed in 1932 and is near the end of its service life. The bridge exhibits signs of structural fatigue, does not meet modern seismic standards, lacks standard shoulder width, and cannot accommodate some large permit loads due to lane width and structural limitations for weight loading.

Due to traffic load restrictions on the existing bridge and the condition of the structural steel, permit loads on this section of SR 70 are often denied. The bridge has an 80,000 lbs. maximum load restriction. Fires, landslides, and train derailments have occurred in the Feather River Canyon requiring the deployment of heavy equipment. PG&E, Union Pacific Railroad, and the California Department of Forestry and Fire Protection have been denied access through the area in the past due to the weight restriction. In addition, SR 70 is occasionally used as a secondary route for truck traffic crossing the Sierra mountain range when Interstate 80 is closed due to weather or other circumstances. Bridges located downstream of the Spanish Creek Bridge had the same seismic deficiencies and load restrictions. Projects to correct these deficiencies were completed in 2006, which leaves the Spanish Creek Bridge as the one remaining structure on SR 70 that limits permit loads. The Spanish Creek Bridge also does not have shoulders, which makes maintenance more difficult due to the need for traffic control and potential lane closures.

1.3 Project Description

This section describes the proposed project and the design alternatives that were developed by a multi-disciplinary team to address the project purpose and need while minimizing impacts to the environment. The alternatives considered include:

- Alternative A - construction of a new bridge and seismically retrofit the existing bridge.
- Alternative B - construction of a new bridge and removal of the existing bridge.
- Alternative D - “no build” alternative, which assumes the existing bridge will be maintained and substantial improvements will not be made.

Two different highway alignments and four bridge types were considered for Alternatives A and B, which include replacement structures. The alignments, 2 and 4 (Exhibit 3), are west of and parallel to the existing highway. Alignment 2 would place the new bridge approximately 40 feet west of the existing bridge, centerline to centerline, while Alignment 4 would place the new bridge roughly 285 feet west of the existing bridge. A decision was made to eliminate Alignment 4 and proceed with Alignment 2 based on the following:

- Preliminary engineering studies indicate that Alignment 4 would require a substantial earth retaining structure on the south side of the proposed bridge to avoid the massive amount of excavation that would otherwise be required to obtain a 1:2 (vertical/horizontal) cut slope. Even with an earth retaining structure, this alignment would produce a substantial amount of excess dirt and rock. Although Alignment 4 reduces the curvature of the highway immediately north and south of the bridge, there is no documented accident history indicating a need to reduce the curvature of the roadway at this location.

- Alignment 4 would cross over the Union Pacific Railroad tunnel. A preliminary geological report indicates that the material is comprised of hard rock that would require blasting. The cost to excavate and dispose of this material is estimated to be three times that of the earthwork costs associated with Alignment 2. Alignment 2 eliminates the need to traverse the Union Pacific Railroad tunnel on the south side of the creek because it is close to the existing highway and conforms with the adjoining highway prior to reaching the railroad tunnel. This would alleviate some concerns related to the structural integrity of the tunnel. Blasting will likely be necessary in the construction of the southern bridge approach and adjoining highway section of Alignment 2.

- Alignment 2 would require less excavation because it is closer to the existing roadbed and conforms to the existing highway sooner than the other alignment. Although earthwork quantities have not been calculated, based on engineering judgment, Alignment 2 would require significantly less excavation. This would minimize construction costs, unsightly cuts and fills, vegetation removal, and disturbed areas subject to erosion.

- Alignment 2 would require less right-of-way because it is the shorter alignment and it is closer to the existing highway.

- Alignment 2 would significantly reduce encroachment within the Spanish Creek Campground.

The four bridge types considered for Alternatives A and B include: 1) steel plate girder, 2) concrete box girder, 3) open-spandrel arch box girder, and 4) open-spandrel arch slab. Photo simulations of each of these bridges at the project location are shown in Exhibit 4. The criteria used for bridge type selection include foundation requirements, cost, and aesthetics. The open-spandrel arch box girder bridge is the preferred bridge type because of its relatively low cost, low maintenance, and its aesthetic compatibility with the surrounding area. This type of bridge is characteristic of early bridges that were found in the lower reaches of the Feather River Canyon prior to the creation of Lake Oroville. The bridge will have two traffic lanes 12 feet in width, eight foot wide shoulders, and a galvanized steel horizontal rail system. Although a preferred bridge type was identified early in the project development process, it is recognized that any of the four bridges would work equally well with negligible differences in effects upon the environment. Final bridge type selection will be made at the project approval stage.

The method of construction will be left to the discretion of the contractor. Project plans and specifications will identify the desired outcome for each aspect of the project. For example, pilings shall be installed to a specified depth. The specifications do not always direct the contractor how to perform the work necessary to achieve the desired outcome. The contractor therefore could use various methods or types of equipment to achieve the required pile depth.

All of the build alternatives would require construction staging areas, from which cranes could operate, at each corner of the bridge at highway elevation and beneath the bridge at stream elevation. The main construction staging area would be situated beneath the bridge. Given the depth and required span of the highway crossing, construction from the highway elevation only, without a staging area below the bridge, is not an option. Cranes typically used in bridge construction would not have the reach and lifting capability needed to construct the bridge from above. A crane large enough to perform this work is not standard for the industry and would limit the number of qualified contractors. The cost and timeframe for construction would increase due to the expense of mobilizing and setting up such a large piece of equipment. In addition, since the crane is only capable of performing one task at a time, it would be inefficient as a primary method of transferring equipment and materials to the area beneath the bridge.

Significant amounts of materials will be delivered to the construction staging area, including concrete, lumber, and reinforcing steel. In addition, equipment such as cranes, excavators, and concrete trucks will need to gain access to and operate from the main staging area beneath the bridge. Methods of accessing the area beneath the bridge are limited. Construction of a temporary access road from the highway elevation is not feasible due to the steep terrain in the vicinity of the bridge. Based on an assessment of potential access points at each corner of the bridge, it was determined that it would not be feasible to construct an access road with grades and turning radii necessary to accommodate various types of construction vehicles. Natural barriers include the steep terrain, railroad, highway, and creek. Even if there were sufficient area, the creation of a temporary access road would result in increased environmental impacts due to factors such as increased vegetation removal, erosion potential, habitat destruction, aesthetic impacts, and a prolonged construction timeframe. Therefore, it is proposed to utilize the existing Spanish Creek Campground access road. The primary access and staging areas proposed for construction are shown in Exhibit 5. The campground road is wide and paved and leads to an open area at stream elevation where a temporary trestle would be constructed to access the opposite (south) side of the creek. For safety reasons, the campground would be closed for the estimated three-year period required for major bridge construction activities. From the trestle location on the south side of the creek, a temporary road would be constructed to provide access to a staging area beneath the bridge. It would be possible to align the road such that it avoids some of the larger trees that exist in this area. The area for the proposed access road is above the base floodplain and is flat enough that erosion would not be a significant concern. Placement of gravel and/or asphalt on the temporary roadway could be necessary due to the anticipated weight and volume of truck traffic. It is likely that the deck of the temporary trestle would be removed each year during the rainy season so the structure would not interfere with high flows.

A level work pad would be required beneath the bridge to facilitate construction and demolition operations. Since the creek is relatively shallow at this location, it is likely that a culvert(s) would be placed in the creek channel for the length of the existing and proposed bridges. Clean cobbles, construction fabric, and a layer of gravel could then be placed over the culvert(s) to create a level work pad. The culverts and rock could be removed each winter prior to the onset of winter rains.

If Alternative A or B were implemented, traffic would continue to utilize the existing bridge during construction. Once the new bridge and adjoining sections of highway were completed, traffic would be shifted to the new alignment. The temporary staging areas, access road, and trestle would be removed upon completion of the project.

Other items of work proposed for the project include:

- Reconstruction of the highway storm water system and campground entrance.
- Repair and/or restoration of Plumas National Forest (PNF) land, including but not limited to, grading, vegetation, campsites, and campground road.
- Re-striping and signing on the highway.
- Construction of a paved pullout on SR 70 opposite the campground entrance for Caltrans' Bridge Maintenance crew.

Following public circulation of the draft environmental document, it was determined that additional area beyond the original environmental study limits would be required for the relocation of overhead electrical utilities, minor grading for drainage, and traffic staging during construction. The expanded environmental study limits are depicted in Exhibit 5. The additional area was evaluated to determine if its inclusion in the project would affect new environmental factors or result in a significant adverse effect upon the environment. Based on a review of resource databases, consultation with resource agency personnel, and field surveys, it was determined that inclusion of the additional area would not affect new environmental factors or result in a significant adverse effect upon the environment.

1.4 Alternatives

Project alternatives were developed based upon preliminary environmental and engineering studies, public input, and a value analysis study. Value analysis is defined by Caltrans as "the process used to improve the quality and reduce the cost of transportation projects and other Caltrans programs." Four project alternatives were generated by a Value Analysis team. Three of the alternatives were carried forward and one alternative, Alternative C, was eliminated from further consideration because it did not fully address the project purpose and need. However, since the eliminated alternative offered the potential to avoid and/or minimize use of the Spanish Creek Bridge and the Feather River Highway Historic District, it was included in the Section 4(f) Evaluation in Appendix B of this document.

Based on an evaluation of environmental impacts, consideration of public input, and approval of the Final EIR/EA, Caltrans has identified Alternative B (Build New Bridge and Remove Existing Bridge) as the preferred alternative. Alternative B provides a modern, low maintenance bridge with standard shoulder width. The bridge would accommodate interregional transportation needs, including large permit loads. Traffic could remain on the existing bridge during construction of the replacement bridge, thereby reducing the level of traffic control and conflicts with construction activities. Removal of the existing bridge following construction of the new bridge would eliminate costs associated with the maintenance and monitoring of the deteriorating structure, including lead paint issues.

Following is a summary of the project alternatives that were considered:

1.4.1 Alternative B (Build New Bridge and Remove Existing Bridge)Preferred Alternative

Alternative B proposes construction of a new bridge and removal of the existing bridge. The proposed bridge would be an open-spandrel arch concrete box girder bridge situated immediately west of and parallel with the existing bridge. Alternative B satisfies the purpose and need criteria and provides a new bridge that is compatible with the historic and scenic attributes of the Feather River highway corridor.

Construction of a replacement bridge on a new alignment would simplify construction because traffic would be able to remain on the existing bridge until construction of the new bridge was completed. Removal of the existing bridge would eliminate costs associated with rehabilitation and maintenance, reduce the safety hazards associated with routine maintenance, eliminate potential hazardous waste issues involved with maintenance of the paint system that protects the metal structure, and most importantly, it would address the planned disposition of the existing bridge, which is becoming progressively less stable.

1.4.2 Alternative A (Build New Bridge and Seismic Retrofit Existing Bridge)

Alternative A entails construction of a new bridge and seismic retrofit of the existing bridge. The new bridge would be situated west of and parallel to the existing bridge. Seismically retrofitting the existing bridge would not address the fatigue critical condition of the structural steel, therefore, only bicyclists and pedestrians would be allowed on the existing bridge. This alternative satisfies the purpose and need criteria because it includes construction of a new bridge. Alternative A would be the environmentally superior build alternative because the existing bridge and highway alignment could be preserved to some extent. Everything else being equal, alternative B proposes removal of the old bridge and obliteration of the adjoining sections of highway.

1.4.3 Alternative D (No Build)

The "no build" alternative assumes that the existing bridge would be maintained and substantial improvements would not be made. The structural integrity of the bridge would continue to deteriorate and permit loads would continue to be limited due to the width and weight capacity of the bridge. Bridge maintenance costs would increase and the structural integrity of the bridge would continue to decline, leading to a future bridge rehabilitation or replacement project.

1.5 Alternatives Considered but Eliminated from Further Discussion Prior to Draft Environmental Document

1.5.1 Alternative C (Rehabilitate Existing Bridge)

Alternative C would entail rehabilitation of the existing structure to increase the load bearing capacity and meet current seismic standards. The work would include foundation strengthening, steel member strengthening, bearing replacement, deck replacement, rail replacement, and painting. It was estimated that this work would extend the service life of the structure up to 25 years, after which time another major rehabilitation project would be necessary.

This alternative was eliminated from further consideration because the seismic retrofit and strengthening would not address the fatigued steel and the bridge would remain fracture critical. In addition, the bridge would still lack standard shoulder width. Rehabilitation of the bridge would be difficult due to the nonstandard shoulder widths. Traffic and construction delays would occur due to the limited width, which in turn would result in higher construction and user delay costs. Rehabilitation of the structure also requires maintenance of the paint system, which contains lead paint.

An option to rehabilitate the bridge and widen the deck to obtain standard eight-foot wide shoulders and accommodate wide permit loads was also evaluated by Caltrans' Office of Structure Design. However, this option was not considered feasible due to various factors. Widening would require replacement of the floor beams and other parts of the deck system, which would require complete closure of the bridge during construction. Replacing the floor beams would also raise the profile of the bridge. The existing trusses have deficiencies with the current loads and therefore would not be adequate for the additional loading of a wider deck. It is likely that additional trusses and support towers would be required to carry the additional load. This work would affect the visual appearance of the bridge to the extent that the historical integrity would be adversely affected. Given the problems associated with widening, it was determined that widening is not a feasible alternative.

1.6 Permits and Approvals

- California Department of Fish and Game, Region 2 - Streambed Alteration Agreement pursuant to Section 1602 of the Fish and Game code

- United States Army Corps of Engineers, Sacramento District – Department of the Army permit pursuant to Section 404 of the Clean Water Act

- Regional Water Quality Control Board, Central Valley Region - Water Quality Certification pursuant to Section 401 of the Clean Water Act

- State Office of Historic Preservation - Consultation regarding National Register eligibility, Finding of Effects, and mitigation of adverse effects

- U.S. Department of Agriculture, Plumas National Forest - Consultation regarding NEPA compliance and temporary and permanent easements on forest land.