

‘Raise 80’ Boosts Safety, Commerce

Higher Clearances for Placer Overcrossings Benefit Communities, Shippers



No longer will truckers that transport oversized loads over the Sierra Nevada on Interstate 80 have to worry about striking a low overcrossing, or being forced onto side roads or long detours.

Nine I-80 overcrossings in south Placer County have been elevated to accommodate larger trucks under the Caltrans Vertical Clearance project, dubbed “Raise 80.” The federally funded, \$36 million project increased the vertical clearance of those nine older overcrossings (including one railroad trestle) to the new overcrossing height requirement of 16 feet, 6 inches. Seven of the overcrossings were raised between 16 and 21.5 inches, while the roadways underneath two overcrossings — one a Union Pacific railroad trestle — were excavated an average of 18 inches each to achieve the required clearance.

The overcrossings were built in the late 1950s when trucks transporting goods were much smaller.

As America’s economy has grown, so have the trucks — getting longer and taller. As more big rigs are unable to fit under these older overcrossings, the potential for “high load hits” has increased, although the exact number of incidents is unknown.

On the Placer County portion of I-80, large trucks were avoiding the low bridges by using local roads ill-equipped to handle their tall loads. The other option for truckers was to use a 300-mile detour.

Not anymore.

Contractor RGW Construction of Livermore was awarded the project contract in April 2014. Together with engineers from the Caltrans Office of Structure Construction, and North Region Construction, the project’s schedule was established and the intricate process to lift a bridge structure was developed.

The overcrossings provide essential routes to and from home, school and work for thousands of local residents. As each of the seven bridges closed for lifting, detours had to be established and publicized. Closure of I-80 during the nights when the actual lifts were done meant truckers, commuters, tourists, residents, local businesses and community groups needed to be informed. With more than 170,000 vehicles traveling I-80 every day, (carrying an estimated \$4.7 million of goods every hour), effectively coordinating with local, regional and intrastate entities, as well as media, to get the word out was essential.

While the “Raise80.com” campaign generated

much interest in project schedules and closures, others were fascinated by the engineering feat of raising bridge structures weighing millions of pounds.

Before lifting an overcrossing, workers placed concrete barricades around the bridge columns on the freeway to provide space for construction. The overcrossing was closed to traffic, and steel-frame temporary supports were constructed under the bridge structure to hold it in place. Underneath these supports were hydraulic jacks capable of lifting, inch-by-inch, the immense weight of each concrete bridge structure. (The overcrossings themselves weigh from 1.88 million to 3.88 million pounds.) These temporary supports bore the bridge's weight while approximately 2.5 vertical feet of concrete on each column was chiseled away to expose the rebar. Once the rebar was cut, the bridge was supported by the temporary supports and the bearing pads upon which each end of the bridge rested.

Up on top, the pavement connecting the roadway to the bridge was cut to free the structure for lifting. Under each bridge end (abutment), lumber was brought in for temporary support while additional hydraulic jacks were spaced across each end as the last component of the "lifting" equipment. The overcrossing was then ready to be raised.

After closing the freeway, the jacks were pressurized, and as RGW's project superintendent counted down, each jack began edging upward. With workers at each column (some overcrossings had nine columns) calling out the quarter-of-an-inch increases (done to ensure all columns were being raised at the same speed to prevent structure cracking), the structure was lifted several inches and halted. Then the jacks under the abutments were pressurized, and the crews called out the precise vertical increases until each was level with the new column height. Back and forth the lifts continued until the 16-foot, 6-inch height was achieved.

Raising an Overcrossing



Once supports are in place, the concrete of the bridge columns is chiseled away to expose the steel rebar.



Hydraulic jacks, capable of lifting four to six inches, raise the steel frame that supports the bridge deck. Wood/steel plates support each new height level.



Bridge column reinforcement bars (rebar) are now separated by 16 to 21.5 inches. Steel couplers are used to reconnect the rebar inside each bridge column.



Concrete is poured into wood forms to create a new, taller bridge column.

Raise 80 Projects Completed

Overcrossing	Date Completed	Lift Height
Magra	September 2014	1 foot, 4 inches
Penryn Road	November 2014	1 foot, 6 inches
Brace Road	January 2015	1 foot, 9 inches
Gilardi Road	March 2015	1 foot, 6 inches
Horseshoe Bar Road	April 2015	1 foot, 6 inches
King Road	June 2015	1 foot, 6 inches
Newcastle Road	March 2016	1 foot, 6.5 inches
Underpass	Date Completed	Excavation Depth
Weimar Cross Road	May 2015	average 18 inches*
Newcastle Union Pacific Railroad	May 2016	average 18 inches*

*Excavation across three lanes of curved freeway varied in depth

It was an exciting process to watch. The energy and focus of the contractor’s crew and Caltrans engineers and inspectors was palpable, and a sudden shout to stop (usually because a single jack had stopped lifting) brought an additional dimension of drama. Viewers marveled at the precise engineering and intricate choreography of the operation.

The next step involved reattaching the bridge to the existing foundation. Steel couplers were used to splice the rebar together, and concrete was poured into forms around each column to solidify the bridge’s foundation. The roadway on both ends of the bridge was reconstructed to match the new bridge height. Finish work on the bridge included new railings, facing and sidewalks; pedestrian and bicycle barrier fencing; and new drainage, erosion

control measures, and drought-resistant landscaping. Finally, the overcrossings received new pavement and striping.

The two remaining overcrossings presented different challenges. Because Weimar Cross Road met height requirements over westbound I-80, but not on the eastbound side, engineers decided to excavate and lower the eastbound lanes about 18 inches. The excavation operation ended up saving time and money.

The remaining overcrossing, the Newcastle Union Pacific Railroad trestle, also couldn’t be lifted. To achieve the desired height, excavation was required on both sides of the freeway. The result was a barely noticeable, gradual slope that lowered the roadway as much as 18 inches to allow trucks unobstructed passage.



In the town of Loomis, along I-80, Loomis Chamber of Commerce members, town officials, Caltrans staff and neighbors held a ribbon cutting for the town’s new Western-themed artwork on the Horseshoe Bar Road crossing.

Other overcrossings in Caltrans' District 3 also have been elevated. In the summer of 2016, three overcrossings on Interstate 5 near Orland were also raised to conform to the new height requirement. These projects, and the Raise 80 endeavor, provided valuable knowledge and experience for other transportation engineers seeking to bring their overcrossings into compliance with state and federal highway standards for interstate freeways.

At the ribbon cutting ceremony in July 2016, Caltrans Director Malcolm Dougherty said the Raise 80 vertical clearance project is a "clear demonstration of the commitment of the State of California and Caltrans to support our state's, and our nation's, economy by efficiently moving goods and people."

And by eliminating the need for truckers to use local roadways as detours, Placer County's Economic Development Board Chair Dave Butler said that the project was a "positive contribution to the region's quality of life."

The project offered many opportunities for partnership with local agencies and organizations. Town of Loomis Mayor Brian Baker was especially thankful for Caltrans' partnership and assistance to install artwork celebrating their town onto the project's Horseshoe Bar Road overcrossing. **MM**

Source: Liza Whitmore, District 3 Public Information Officer

High Loads Pose Big Danger



The Walters Road overpass on Interstate 5 south of Yreka sustained massive damage in 2012 after being struck by a high load. At right, the overpass is being removed prior to replacement.

Low bridges pose a transit challenge in the state. Of the 13,100-plus bridges that Caltrans maintains, more than 1,000 are classified as poor for vertical clearance — meaning the structure does not provide 14 feet of clearance for non-principal arterial local roadways under state facilities, 15 feet for state conventional highways, and 15 feet, 6 inches for state or local principal arterials.

There are almost 800 bridges classified as fair for vertical clearance, providing at least 15 feet of space for non-principal arterial local roadways under state facilities and conventional highways, and at least 16 feet for state and local principal arterials.

The remaining bridges in California, more than 11,300, are listed as good for vertical clearance, maintaining at least 15 feet of space for non-principal arterial

local roadways under state facilities and state highways, and 16 feet for state or local principal arterials.

According to Caltrans' Highway Design Manual, the minimum vertical clearance on all new construction, lane additions, reconstruction or modifications performed on freeways and expressways is 16 feet, 6 inches. A height notice must be posted on any state highway overpass with a vertical clearance below 15 feet, 6 inches.

Companies that ship loads taller than 14 feet on state roads must obtain permits from Caltrans prior to their trips. Of the almost 113,000 single-trip permits issued by Caltrans in fiscal year 2015-16 for oversized vehicle trips, about 79,000 permits, or 70 percent, were for vehicles that exceeded the 14-foot height limit specified in the California Vehicle Code.