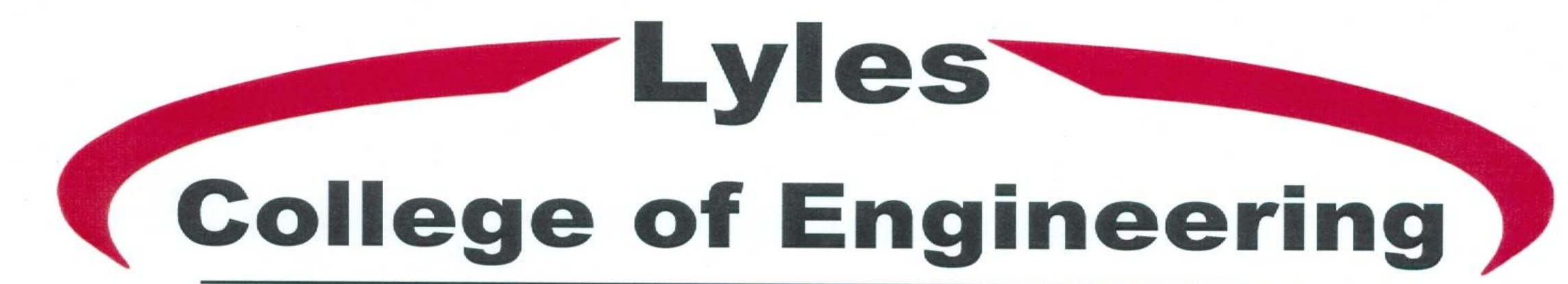




Redesign of the 12th Avenue/SR198 Interchange

Civil Engineering

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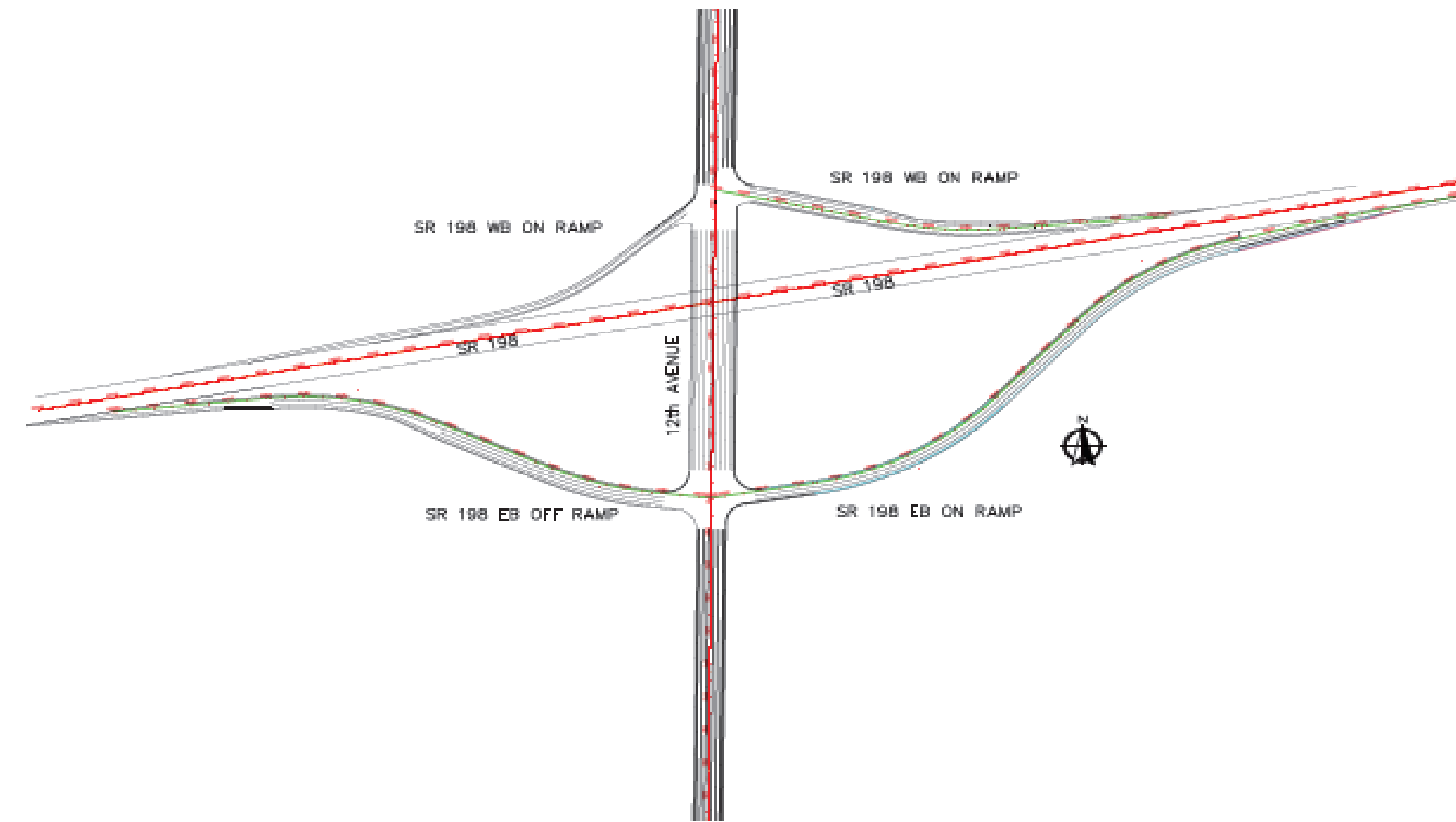
California State University, Fresno

Fall Semester 2012

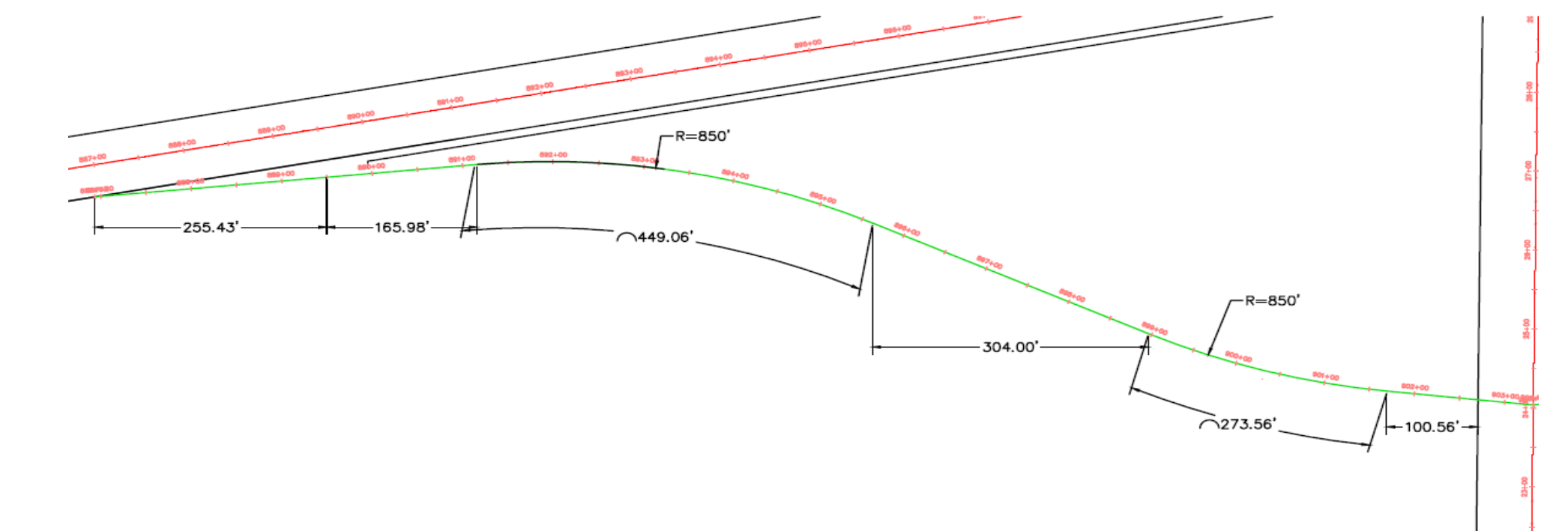
Abstract

The California Department of Transportation, District 6, (Caltrans) has sent a preliminary report to the 12th Avenue Consortium discussing the need to redesign the 12th Avenue/State Route 198 Interchange located in the City of Hanford, Kings County, California, in order to improve the current level of service (LOS) of "D" to a LOS of "B" and to avoid a predicted LOS of "F" by the year 2034. The 12th Avenue Consortium investigated three possible alternative solutions that may potentially improve the LOS: a partial cloverleaf configuration, a single point urban interchange (SPUI) configuration, and a full replacement of the interchange. Furthermore, Caltrans is concerned that the interchange improvements will have adverse effects on the LOS of 12th Avenue which has become a major collector street to recent commercial and retail developments. Therefore, improvements of 12th Avenue such as street widening, signalization, and/or coordination of signalization at the interchange with the City of Hanford signalization of 12th Avenue were also evaluated. However, it was concluded that the best design solution to improve the LOS was an expansion of the existing 12th Avenue overcrossing, from 4 lanes to 7 lanes, for the following specific reasons: 1) the bridge structure has a sufficiency rating of 86.6 therefore Caltrans will not allow the structure to be replaced, 2) the expansion of the bridge will allow regulated traffic flow through the interchange during construction eliminating the need to completely shut down the interchange and provide detours around the interchange, 3) an expansion of the bridge will not disrupt the service of a pressurized sewer line that runs through the bridge structure.

12th Avenue/SR198 Site Plan

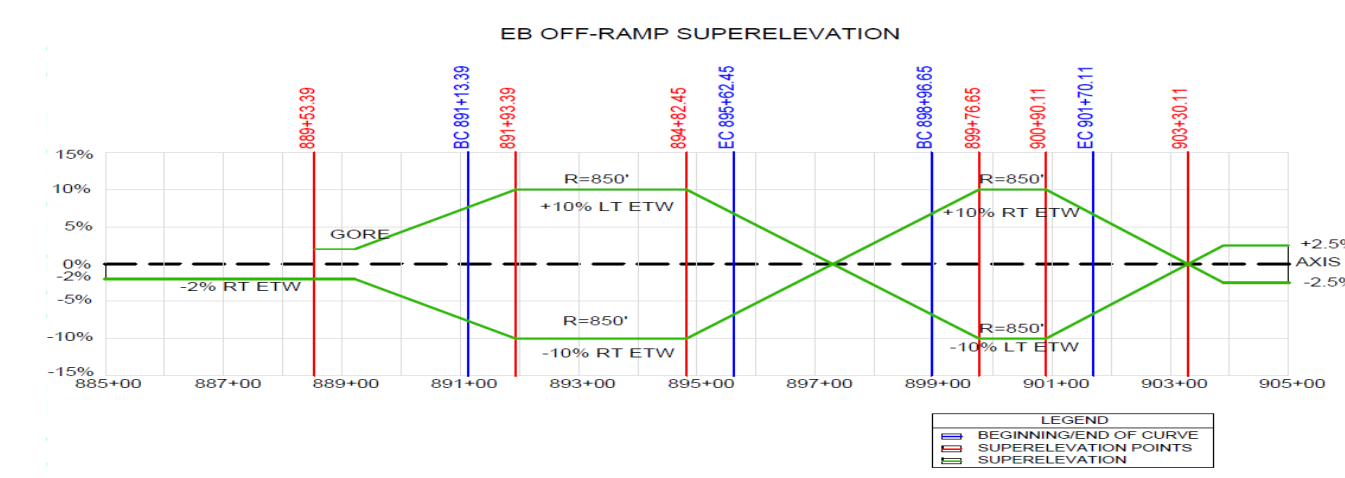


East Bound Off Ramp Control Line

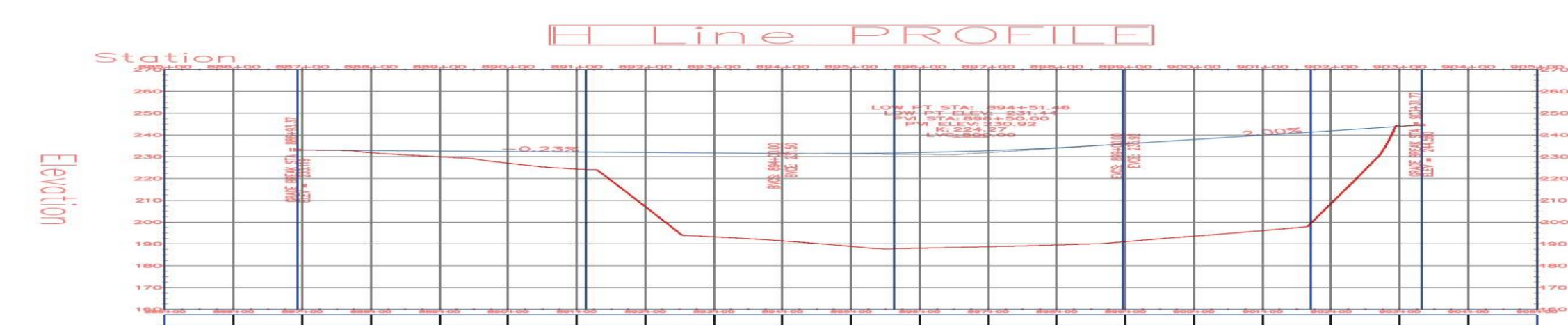


The EB off ramp was constructed using the Caltrans standards designated in chapters 200, 300, and 500 in the Highway Design Manual 6th Edition.

Superelevation and Vertical Profile EB Off Ramp

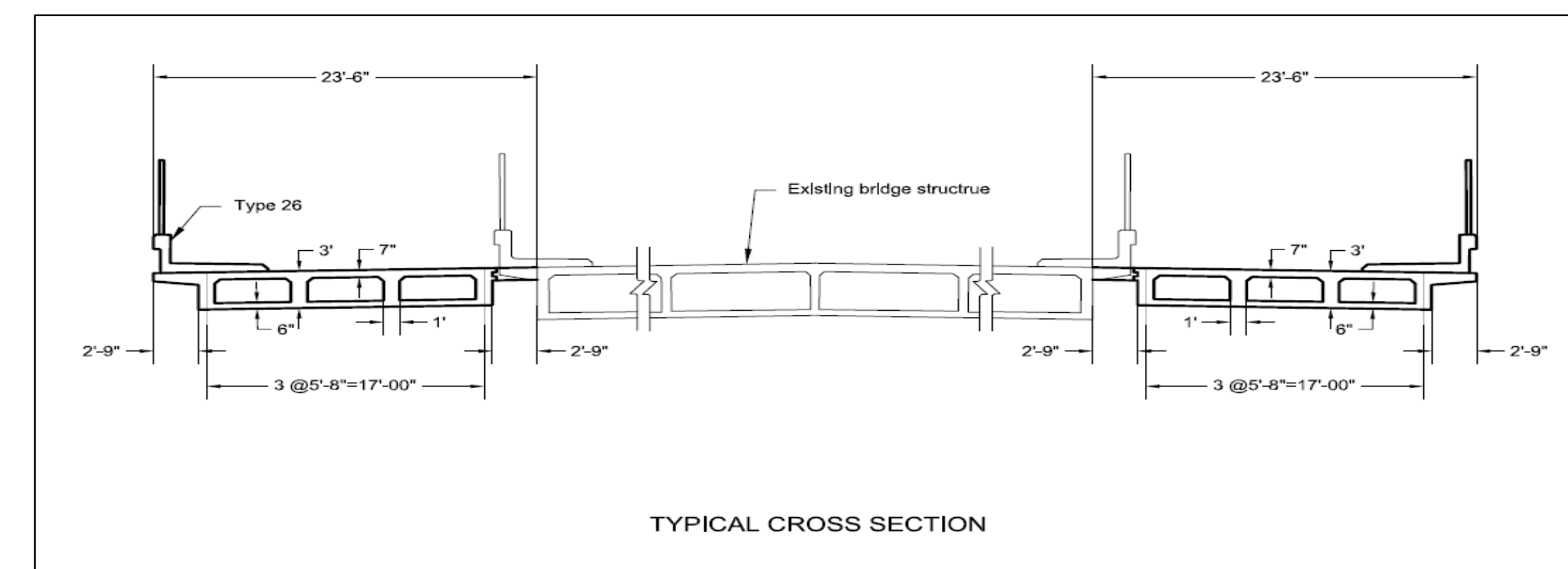


The diagram was constructed by correlating the radius of a specific curve along a particular segment of the ramp to specify a superelevation in which two-thirds of the superelevation is based on the tangent line and one-third on the curve.



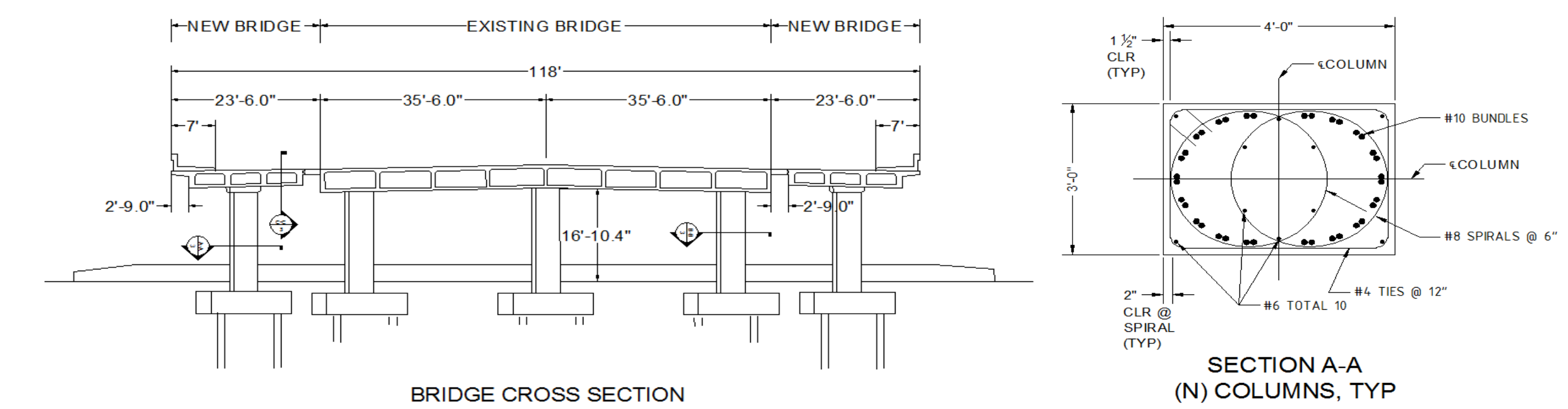
East Bound Off Ramp Vertical Profile

Overcrossing Superstructure



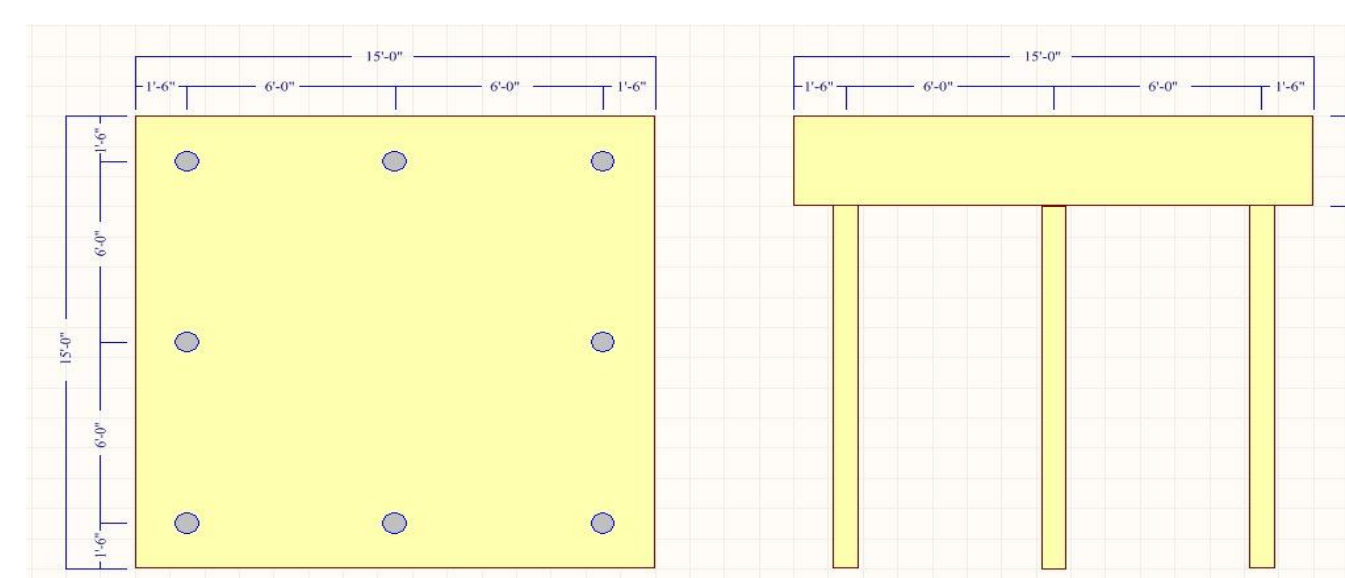
The cross section of the existing bridge with the cross sections of the bridge expansions illustrated above.

Bridge and New Column Cross Sections

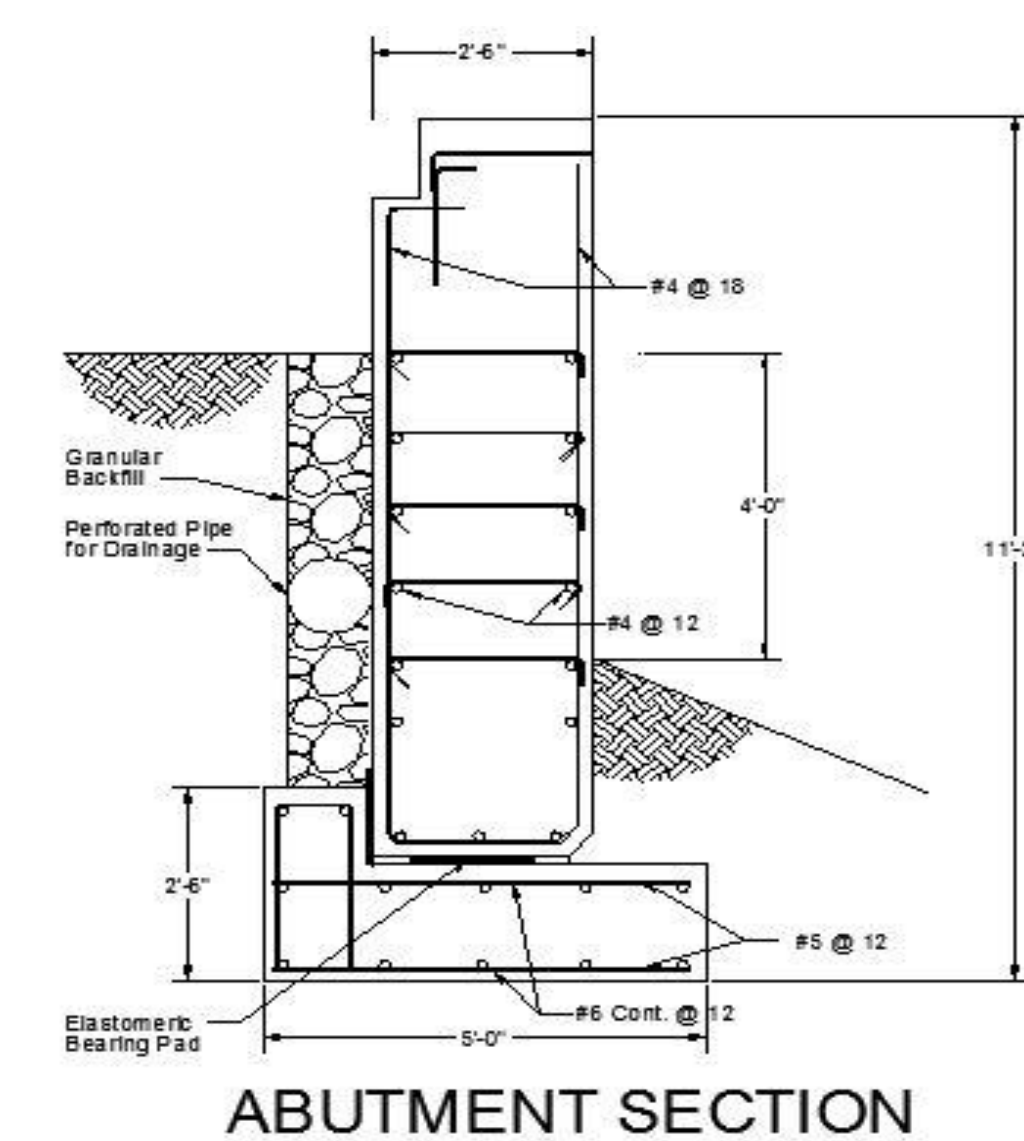


Both existing and new columns were modeled in order to seismically analyze the expansion of the bridge superstructure. Seismic compatibility between the structures was governed by Caltrans' Seismic Design Criteria - V. 1.6.

Geotechnical/Structural

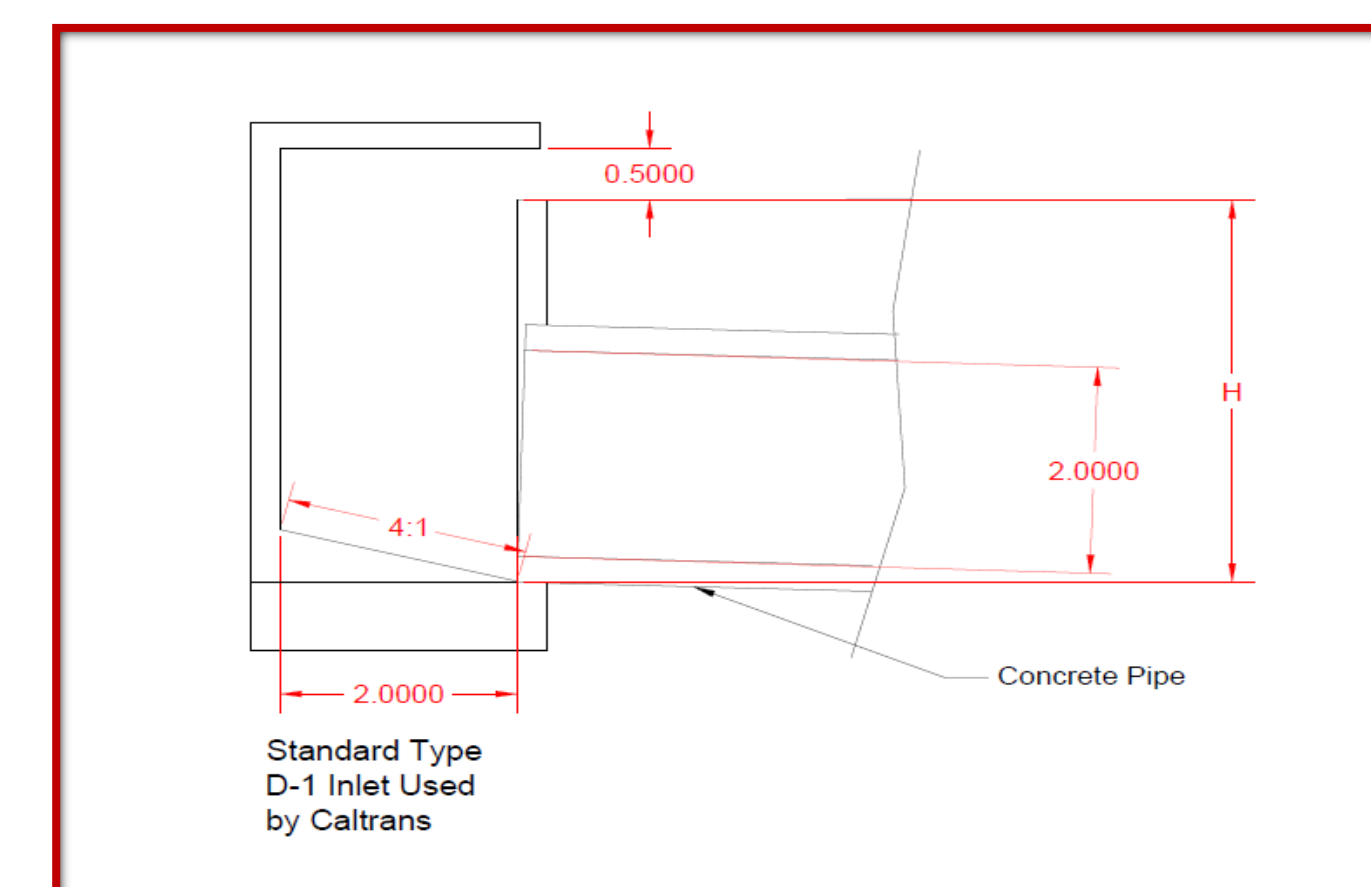


Driven Pile Foundation for Bent Column



ABUTMENT SECTION

Water Resources/Environmental



Standard Caltrans Storm D-1 Inlet

Sponsors



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