



ROADWAY STABILIZATION

Old Santa Cruz Highway Project
Santa Clara County, California

PROJECT DESCRIPTION

Old Santa Cruz Highway was formerly the major access route from the Santa Clara Valley, through the Santa Cruz Mountains and to the City of Santa Cruz. Since the construction of Highway 17, Old Santa Cruz Highway is presently considered by Caltrans and commuters as the primary emergency alternative to Highway 17.

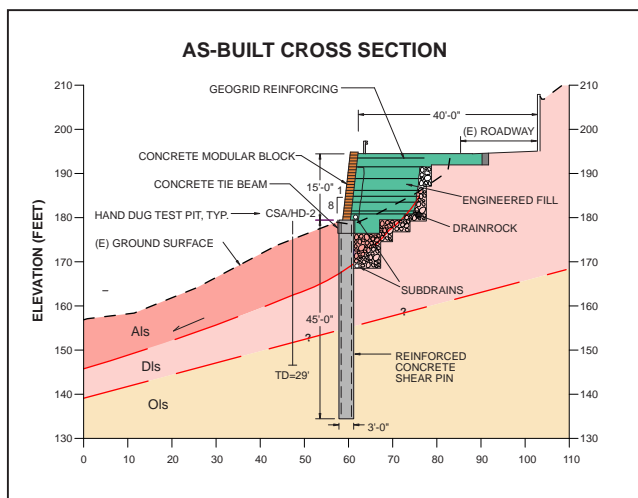
During the winter of 1995/1996 a landslide mobilized and severely damaged the outboard (northbound) side of Old Santa Cruz Highway. By the winter of 1996/1997 the landslide had further destabilized the northbound lane to such an extent that Santa Clara County Department of Roads and Airports was forced to close the road to two-way traffic, and traffic lights were installed at each end of the damaged roadway.



Between 1995 and 1997 our firm, Cotton, Shires and Associates, Inc. (CSA), was retained by the Santa Clara County Department of Roads and Airports to investigate and monitor the landslide, and to design an emergency upslope retaining wall to widen and increase the safety of the roadway. Site subsurface investigation included down-hole logging of large-diameter exploratory shafts. The exploration indicated that there was an active landslide to a depth of 12 feet beneath the roadway. The active landslide was underlain by a dormant landslide to a depth of 25 feet and the dormant landslide was, in turn, underlain by an old landslide to a depth of over 50 feet.

ENGINEERING SOLUTION

CSA designed an engineering solution to reestablish the failed roadway, remove the active landslide under the new roadway, and pin the dormant landslide in place under the roadway. The retaining structure we designed utilized a hybrid modular block wall and cast-in-place concrete piers that minimized costs yet supported the tall, vehicle-loaded roadway. Our innovative design consisted of 42, 3-foot diameter by 35- and 45-foot deep reinforced concrete shear pins connected at the top with a concrete tie beam.



In addition to pinning the dormant landslide debris and installing subdrains, the shear pin and tie beam structure supports a 17-foot high, geogrid-reinforced engineered fill with a Keystone TM modular block wall facing. The shear pins and improved subsurface drainage are intended to mitigate the destabilizing effect of the weight of reinforced, engineered fill on the underlying dormant landslide. The project was constructed between August of 2001 and February of 2002 for a bid price of \$916,000. CSA provided the total design service package, including investigation, design, AutoCAD drawing preparation, assistance with technical specifications, construction observation and testing, and surveying. The project was overseen by the Santa Clara County Department of Roads and Airports, Sure Engineering provided the structural engineering, and the General Contractor was Hillside Drilling, Inc.