



SOLEDAD MOUNTAIN ROAD LANDSLIDE REMEDIATION LA JOLLA, CALIFORNIA



OCTOBER 3, 2007 LANDSLIDE



RECONSTRUCTION OF SOLEDAD MOUNTAIN ROAD

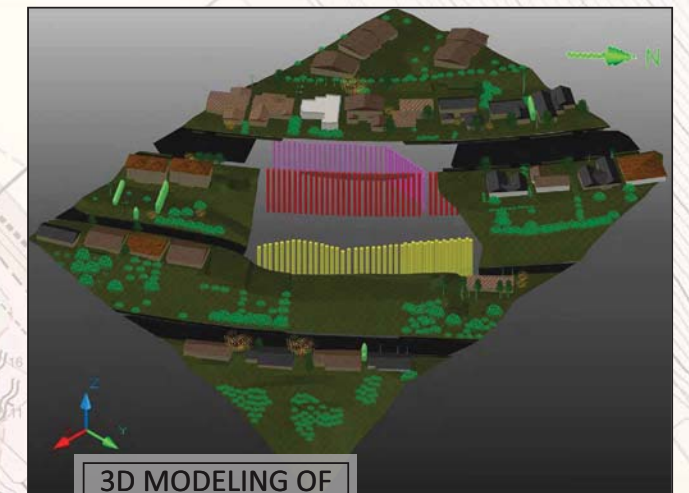


COMPLETED LANDSLIDE REPAIR - JUNE 2009

On the morning of October 3, 2007, a portion of the east facing slope between Soledad Mountain Road and Upper Desert View Drive failed catastrophically rendering both roads impassable. In addition, four homes were destroyed and three sustained varying degrees of structural damage.

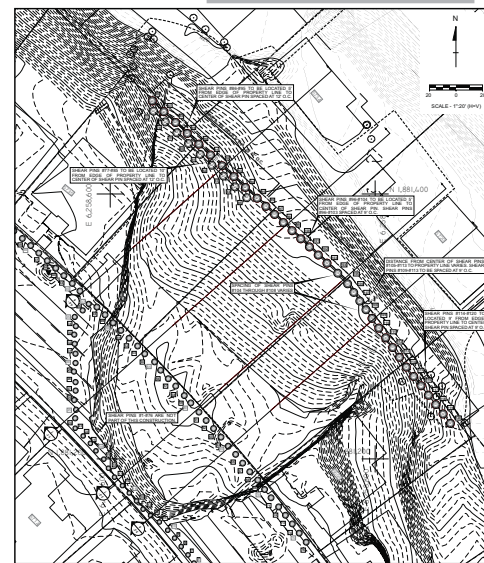
Following an extensive geotechnical investigation, which included 30 small and large diameter borings and installation of slope monitoring instrumentation, subsurface information was evaluated and used as the basis for several remediation design options that were presented to the City of San Diego. Cast-In-Drilled-Hole (CIDH) shear pins were selected as the preferred stabilization option in order to minimize construction of permanent structures outside the two affected right-of-ways, and to reduce potential future conflicts with subsurface utility installation.

A total of 119, Grade 60 steel reinforced CIDH shear pins, varying in diameter from 42 to 72 inches, and in length from 60 to 81 feet, were installed in three phases. Phase One shear pins were designed to prevent westward expansion of the landslide mass and to provide temporary excavation stability. Phase Two shear pins were designed to provide long-term stability along the east edge of the Soledad Mountain Road. Engineered roadway backfill was supported with one foot thick, steel reinforced concrete panel walls constructed between adjacent pins. Phase Three shear pins provided stability across the toe of the landslide, facilitating the reconstruction of Upper Desert View Drive and slope restoration between the two right-of-ways. Type II/V concrete with design strengths of 5000-6000 psi, in conjunction with admixtures to achieve high-early strengths, was used throughout. Other design elements included engineered fills and surface and subsurface drainage improvements.

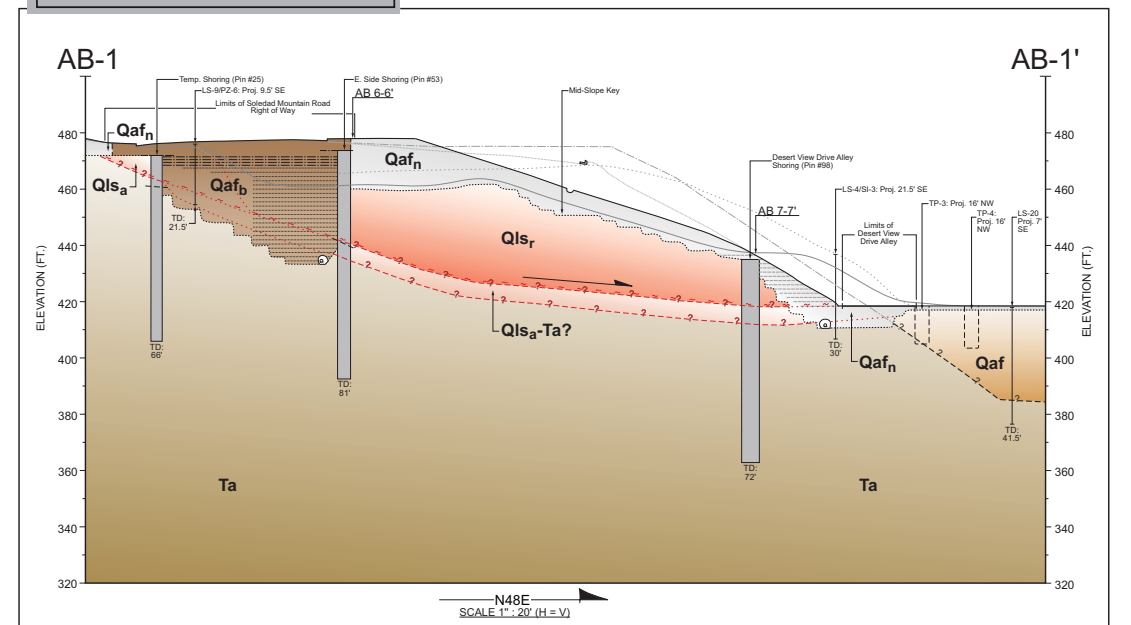


3D MODELING OF SHEAR PIN DESIGN

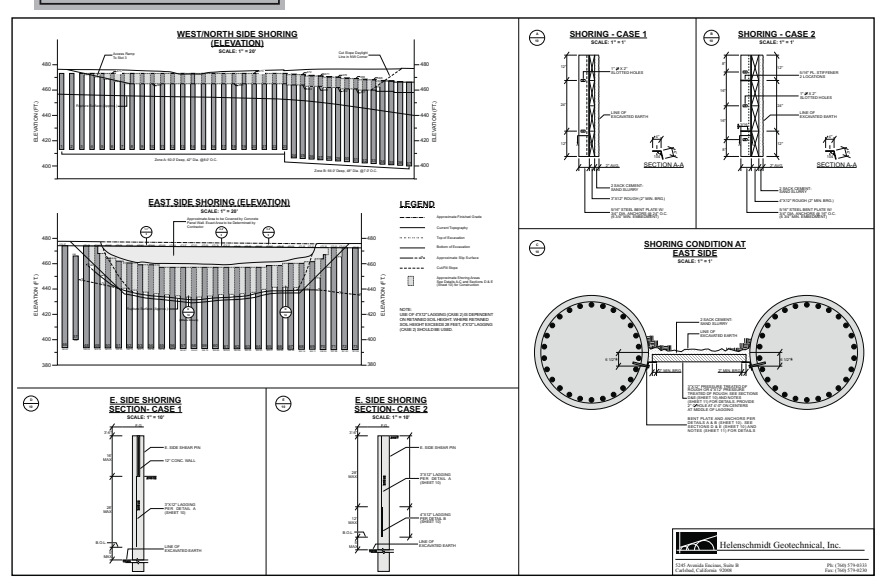
SHEAR PIN LAYOUT



CROSS SECTION SHOWING STABILIZATION MEASURES



SHORING DESIGN



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