

Silicon Valley Rapid Transit Project

Type Selection and Seismic Performance Evaluation

Location: San Jose, CA

Owner: Santa Clara Valley Transportation Authority

Santa Clara Valley Transportation Authority (VTA) intends to construct the Silicon Valley Rapid Transit (SVRT) Extension through San Jose, California. This will be a 16.3 mile long extension of the Bay Area Rapid Transit (BART) heavy rail rapid transit system from its planned terminus at the end of the Warm Springs Extension in Fremont, to San Jose. The alignment includes seven stations (three above and four below grade), a proposed future station and vehicle storage and maintenance facilities.



The alignment is composed of two major segments: a Line Segment which will be approximately 11 miles of at-grade, elevated and cut-and-cover track from Warm Springs to San Jose, and a 5.1 mile long Tunnel Segment predominantly consisting of twin bored tunnels and cut-and-cover structures through downtown San Jose. The remaining 4.3 miles of the alignment will be twin circular tunnels constructed by a closed face tunnel boring machine (TBM) to interconnect the stations and portals. Total length of the bored tunnels to be lined (at time of writing) is 22,730 feet in the S1 tunnel and 22,835 feet in the S2 tunnel.

The TBMs will be used to install a single pass lining system consisting of pre-cast concrete segmental rings in lightly over-consolidated alluvial soils with the water table generally lying 5 to 15 feet below the ground surface.

SC Solutions' responsibilities have included 3D seismic soil-structure interaction (SSI) analyses of the proposed tunnel segmental liner and soil alternatives. Analytical investigations were performed to consider variations in soil properties and to examine the two segment geometries. Structural models for the project included 3D characterization of the segments and contact with friction interfaces. A Mohr-Coulomb material model was used to characterize surrounding soil. Construction sequence, followed by the ovaling analysis was carried out and stability of each geometric configuration was evaluated for seismic performance.

