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Comparison of Groundwater Inflow Estimates and Tunneling Conditions for a Large Diameter Water Pipeline Crossing of Las Vegas Wash Using Vertical and Horizontal Coreholes

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Abstract: The Southern Nevada Water Authority has completed a 1,400 foot long, 150-foot deep, inverted siphon tunnel under Las Vegas Wash, Clark County, Nevada. The tunnel was constructed with a Tunnel Boring Machine (TBM) and was designed for a 78-inch water pipeline. This talk compares the results of the field investigations that were completed in order to evaluate the groundwater and tunneling conditions at the site compared with those actually encountered during construction. The subsurface conditions at the wash crossing consisted of fractured and faulted sandstone, siltstone, and claystone bedding with numerous andesitic dikes and sills. Groundwater elevations at the site were at or near the water levels in the overlying flowing wash. Throughout the geotechnical investigations and construction phase of the project there was a concern regarding groundwater inflow into the tunnel including possible fracture and fault connections with the proposed tunnel and the wash overhead. Subsurface exploration during the geotechnical study included traditional vertical coreholes along the proposed tunnel alignment with the collection of Rock Quality Designation (RQD) data and packer testing. During the construction phase, horizontal coreholes were advanced from the bottom of both construction shafts by the contractor that also included RQD estimations and packer testing. During construction, the tunneling conditions were closely documented including measurement of water inflows along the reaches. Refinements and improvements are suggested for geotechnical investigations to more accurately predict groundwater flows during construction.