



## Water Conveyance

### Client

South Nevada Water District

### Location

Las Vegas, NV, USA

## Tunnel Pump Station

### Project Highlights



- CH2M HILL played a significant role in a tunnel, pump station, and aqueduct project that was successfully completed to the owner's satisfaction, including leading all phases of planning, design, and construction management
- CH2M HILL experts handled tunneling in a mixture of soft and hard ground conditions along the tunnel layout
- CH2M HILL successfully installed an intake that is 200 feet below the surface of Lake Mead

### Project Description

The Joint Venture (JV) Team of CH2M HILL and MWH is serving as the lead design engineer for SNWA's phased long-term treatment and transmission program. CH2M HILL leads the JV's design and construction support for SNWA's Lake Mead Intake No. 2. The overall project included three major components, as follows: Lake Mead Intake No. 2, the Bay Aqueduct, and the East Tunnel. The planning and design of these components included consultation with a Technical Advisory Committee made up of nationally recognized experts in underground and underwater construction. In addition to leading the design, CH2M HILL also provided one member of that team.

CH2M HILL leads the planning and design, as well as engineering support during construction, for SNWA's second raw water intake system. After an extensive siting analysis, this new intake was ultimately located on Saddle Island on the west shore of Lake Mead. The new intake includes a 70-foot deep shaft collared more than 200 feet below the surface of Lake Mead, a 1,700-linear foot, 14-foot diameter intake tunnel, a 30- by 30- by 200-foot subterranean forebay chamber, 22, 6 foot bore/42-inch diameter steel pipe lined deep well shafts, a 30-foot diameter access shaft, and extensive surface excavations for a new pumping station. The intake tunnel construction was performed under more than 300 feet of groundwater head. Umbrella grouting ahead of the heading was required for most of the drive.

CH2M HILL also lead all phases of planning and design, as well as engineering support during construction, for about 3,600 linear feet of the 144-inch diameter Bay Aqueduct. The Bay Aqueduct runs from Saddle Island to the mainland under Lake Mead's Boulder Harbor and is one of the largest pressure pipes designed for underwater service in the world. The Bay Aqueduct was designed to carry a nominal design flow of 600 mgd with a peak flow capacity of about 800 mgd. Normal working pressure will be about 150 psi, depending on depth. The aqueduct is also capable of withstanding extreme pressures of about 300 psi under unusual conditions. Design features include structural pipe design based on modifications to AWWA C300 pipe design; installation in over 80 feet of water with both soil and rock trenching; large concrete ballast blocks to counteract buoyancy; and a complex double rubber gasket/ welded butt-strap pipe joint arrangement that allows underwater installation and dewatering of the pipe.



CH2M HILL's efforts also included similar planning, design, and construction support for SNWA's East Tunnel. The East Tunnel is an intermediate leg of SNWA's raw water aqueducts and includes about 2,700 linear feet of 108-inch diameter steel pipe lined tunnel. The tunnel was constructed by drill and blast methods through a ridge of the River Mountains. Extensive rock excavation and earthwork were required at each tunnel portal to facilitate connections into the main raw water system aqueducts under a separate contract.