



## Beck Street Bridge over I-15 Salt Lake City, Utah



DBA Client: Kiewit-Clyde (Joint Venture)

Owner: UDOT

Design/Build Team:

Kiewit (JV partner)

W.W. Clyde & Co. (JV partner)

Parsons Transportation Group—Designer

DBA Services:

- Develop, execute and manage geotechnical exploration for the bridge structure.
- Drilled shaft design for interior bents; driven pile design for abutments.
- Base grouting design for drilled shafts.
- Consulting during foundation construction.

Project Highlights:

The Beck Street Bridge is a 10-lane structure that replaced an existing 6-lane structure over I-15 as part of the I-15 Express Link project. DBA worked only on this structure; Shannon & Wilson, Inc. performed geotechnical engineering services for the rest of the project as part of the D/B team.

This bridge spans 2 Union Pacific Railroad mainline tracks, two spur tracks, and the Utah Transit Authority commuter rail line. Drilled shafts were selected as the best foundation for the interior bents due to the site restrictions imposed by the adjacent railroads and the performance of shafts under seismic loading.

The soil conditions are upper 40 to 50 feet of the site consisting of recent alluvial sands, silts, and clays. Below the alluvial deposits are a weak cohesive soil strata and a gravel strata derived from glacial deposits, underlain by sandy silts and silty sands associated with the nearby Great Salt Lake.

Each abutment is supported on a group of 12.75 inch closed-end driven pipe piles. The abutment is isolated from the approach embankment to reduce loading effects from lateral spread of the embankment in an earthquake. A driving resistance of 525 to 550 kips was required for the 100 to 120 foot long piles.

The three interior bents are supported on drilled shafts with a single 9 ft 2 in shaft beneath each column. The shafts derive most of their resistance in the firm sandy silt/silty sand soils. The shaft design included base grouting to enhance end bearing resistance in the silty sands, resulting in shorter shaft lengths to carry the 2700 to 3900 kip design loads. Grout pressures of 400 to 650 psi were designed and applied in the field. The shafts were constructed using an oscillator and segmental casing.

*Photo Credits: UDOT(Aerial); DBA.*