



Sam White Bridge Structure and Move Plan

A two-span steel-plate girder option was chosen for the Sam White Bridge due to its light weight and its ability to follow the profile grade line. The bridge is constructed approximately 300 feet from the final location and moved into place using Self Propelled Modular Transporters (SPMTs).

Sam White Lane crosses I-15 at a very high skew and on a sharp vertical curve with the crown essentially at the center of the center bent. The approach slabs each have a grade of approximately 7.3 percent.

Structure

- Total length along the control line: 354 feet
- Bridge width: 76 feet 10 inches
- The bridge crosses I-15 at a 48-degree skew
- All supports are skewed at 48 degrees
- The length of bridge from acute corner to acute corner is approximately 440 feet
- The substructure is on piles, and the abutments are integral

Girders and Columns

- The superstructure uses six girders at 13 feet 6 inches spacing with a 4 foot 8 inch overhang.
- The structure depth is approximately 7 feet 1 inches including a 10-foot deck.
- The girders use 70 ksi steel in the flanges over the bent and 50 ksi steel everywhere else.
- The framing plan uses staggered perpendicular cross frames up to near the bent. Near the bent the cross frames go to a continuous line across the bent with each line intersecting the girder at the column. The bent does not have a cap; each girder sits directly on a 4-foot square column.
- The high skew and large girder spacing make the girder spacing along the bent approximately 20 feet. The elimination of the bent cap more than makes up for the additional column(s). The bent is located between northbound and southbound traffic. UDOT has a design exception in place to allow the inside shoulders to be reduced to 9 feet around the columns.
- The girder/column connection uses an innovative interlocking sole plate and masonry plate detail, which allows seismic loads to be transferred into the column while allowing girder rotation and transverse movements due to temperature effects.

- An oversized sole plate allows for setting tolerance during the bridge move. Each sole plate sits on a steel-reinforced elastomeric bearing pad.

Foundation

- The foundations consist of 12-foot concrete-filled pipe piles driven approximately 100 feet through soft clays and tipped in a medium-dense silty sand.
- The abutments are made integral after the move.
- The superstructure was built on temporary foundations on the east side of I-15.
- The temporary substructure consists of H-pile supports framed together with relative bearing seat elevations matching the final bearing seat elevations.

SMPTs and the Move

- The bridge will be moved as a two-span unit.
- Due to the steep vertical curve on Sam White Lane combined with the high support skew, the abutment bearing seat elevations vary by almost 5 feet (far more than the 1-foot-6-inch useable stroke on the SPMT units). The actual SPMT stroke is slightly over 2 feet, but some of the stroke is used up in the lifting process and some is held back as a factor of safety. To get the bridge past the high corner, the bridge is moved in over the low corner on abutment one and in front of the high corner on abutment three. The bridge is then moved directly along the control line to slot the bridge into place.
- The length and width of the bridge combined with a normal 2-percent cross slope also require some minor grade modifications during the move. During the move the bridge has to pull out into I-15 and rotate over the center median. Some minor temporary grading is required so the SPMT stroke is not exceeded during the rotation.
- The SPMT system uses a gravity connection to the bridge. Four lines of SPMT supports are used (two lines per span). Stability during the move is provided by large pipe braces. The pipe braces consist of two K braces per span between the SPMT lines with a single diagonal brace between the K braces. The K braces are made of 36-foot and 24-foot tubes, and the distance between SPMT lines is approximately 123 feet. Additional stability is also provided by the configuration of the SPMT hydraulic systems.