Developers of a new upscale housing community near Utah’s Wasatch Mountains wanted to create an access bridge that provided a strong welcoming presence. But the difficult terrain created challenges in blending function and aesthetics. To achieve these goals, designers produced two reinforced concrete bridges, including a five-span, 450-foot-long structure with a switchback curve along an 80-foot radius of the centerline, which also featured a 12 percent grade.

Typical solutions for curved highway bridges include straight girders that form tangents between supports or curved steel girders. In this case, the curve was too severe for tangent girders without reducing the span lengths to less than 30’, and curving steel girders proved too costly. In addition, post tensioning wouldn’t have been effective on such a tight radius. The cast-in-place (cip) reinforced concrete girders met the needs creatively and effectively.

The entire structure, from its footings to parapet, features conventionally reinforced, cast-in-place concrete. Spread footings of 25 square feet support 7-foot-diameter single column-bent supports. Full-depth integral bent caps, each 5’ wide, support the concrete box superstructure, which consists of a three-cell concrete box girder.

The lower, five-span bridge features three curved middle spans, connecting to the two straight end spans. The entire structure used more than 2,500 yards of concrete and 415,000 pounds of Grade 60 reinforcement steel (rebar). The bridge’s curvature was so severe that longitudinal #8 deck bars were bent at the fabricator’s shop to achieve the proper shape. Smaller #5 bars were bent in the field and spaced along the deck’s outside edge at a wider spacing than along the curve’s inside edge. The top deck and parapets feature epoxy-coated reinforcing bars, with the other sections using uncoated reinforcing bars.

The parapet included recesses for LED lighting tubes along the top of the barrier and conduit, with blockouts for ornamental floor lights. The completed bridge was stained to better fit with the natural environment of Big Cottonwood Canyon while still making a strong structural and architectural statement.

A total of 415,000 pounds of Grade 60 reinforcement steel (rebar) was used in this structure.