

243rd Street (E-45) Over Buttermilk Creek

Leavenworth County, Kansas



DRG was selected by Leavenworth County Public Works to design a replacement structure for the E-45 Bridge. The existing structure, carrying 243rd Street across Buttermilk Creek, is located northwest of the town of Easton, Kansas. Following a large storm event that occurred in the area, **DRG** was called upon to perform emergency flood damage assessments of many of the structures throughout LVCO. Acting upon the recommendations of this flood inspection, in conjunction with findings of previous bridge inspections, Leavenworth County decided to replace the bridge due to its structurally and hydraulically inadequate condition. In addition, the existing bridge was functionally obsolete due to its narrow traffic lanes, lack of shoulders, and out-dated bridge barriers and guard rail.

The current structure was clearly constricting the water flow resulting in significant scour around the piers and abutments, as well as a moderate amount of debris buildup under the structure. As a result, **DRG** was required to design a bridge that was capable of carrying the current design loads, would improve the hydraulic performance at the bridge site, and provided a safer roadway for the motorists.

DRG's new bridge design calls for a reinforced concrete slab haunch superstructure that supports a 32-foot-wide roadway and concrete corral rail barriers along the entire length. The three-span 160-foot-long bridge provides a significant upgrade in hydraulic performance. It was decided upon jointly by **DRG** and Leavenworth County, to lengthen the bridge more than hydraulically required to allow the piers to be built perpendicular to the bridge centerline. Concrete hammerhead piers were incorporated into the design to both reduce construction costs and minimize pier intrusion into the natural stream channel. It was determined that by not skewing,



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