



Texas Council of Engineering Companies  
2007 Engineering Excellence Awards  
Silver Medal Winner – Category C: Structural Systems, Bridges

Telfair

## Bridges of *Telfair*

Located on former State of Texas prison farmland in the City of Sugar Land, the Telfair development was virtually a blank canvas on which to paint an authentic southern setting. Newland Communities, a master-planned community developer, purchased the last, large open tract in the City of Sugar Land and transformed it into Telfair, a beautifully landscaped master-planned community with a 70-acre lake and park system, which provides habitat for flora and fauna, and lushly planted areas at entries and on greenbelts.

The focus of this masterpiece is two sets of twin bridges, reminiscent of the ornate bridges with graceful steel arches and patterned brickwork built around Savannah, Georgia, in the nineteenth century. One twin set of bridges heralds the main entrance to Telfair while the other is positioned in the interior of the development. Both sets of bridges carry traffic across man-made waterways, part of the meandering lake and park system.

Brown & Gay Engineers designed the bridges, retaining walls, and electrical utilities and coordinated efforts with TBG Partners, the landscape architectural firm that originated the bridge design concept.

The client developed initial budget figures based on a standard steel bridge design. As they fleshed out the concept of a Savannah-style ambience for the development, the bridges became more important in setting the tone, and the client increased the budget several times. Allocations for patterned brick and larger cables were added

to increase the aesthetic appeal. Brown & Gay Engineers facilitated joint sessions for design and value engineering discussions. The client praised the final result as an economical bridge structure that achieved the design vision.



*Side view of inverted-Tee bent cap, which enabled box beams to be supported by just two columns.*

Designing an actual arched bridge would have been much more grandiose, and hence costly, than needed for the 100-foot spans required for the Telfair development. The engineers took the innovative approach of combining an often used, economical bridge superstructure and added a decorative arch to enhance visibility and aesthetic appeal. This approach allowed the owner to have the look and feel of an arched bridge while taking advantage of a more economical, standard superstructure.

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The bridge design began as a typical box beam bridge that, for its 51-foot width, would normally utilize four interior columns and square bent caps. To achieve the more delicate look sought by Newland Communities, the engineers had to resolve two opposing engineering objectives—eliminating columns while minimizing the bent cap depth.

Eliminating columns would normally require a deeper bent cap, but the engineers selected an inverted-Tee bent cap that allows the tops of the beams to be flush with the tops of the cap, providing a thinner, more elegant look. Careful design and detailing enabled the inverted-Tee bent cap, which supports ten 5-foot-wide beams, to be supported by only two columns. The engineers drew on their experience designing complex bridge structures for the Texas Department of Transportation to make the bent cap even shallower and less obtrusive. These engineering

efforts achieved an elegant column-free look while assuring the structural soundness of the bridges and allowing them to carry full highway loads.

Although the bridges' arches are decorative, non-load bearing architectural elements, the large scale of the arches required legitimate structural design for them to be self supporting—each arch weighs 5 tons and towers 22 feet above the roadway surface. Red brick covering the columns and superstructure, antique-style lamps, arches painted black to mimic cast iron, and custom railings complete the authentic historic feel.

The Telfair Bridges opened in the Spring of 2006, in time to meet Newland Communities' goal of initiating pre-sales by May 2006. Pre-sales of lots to builders surpassed the client's goals, and 328 homes were sold in the development's first four months, a remarkable success for a new community.

