MISSOURI RIVERFRONT TRAIL

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INTRODUCTION

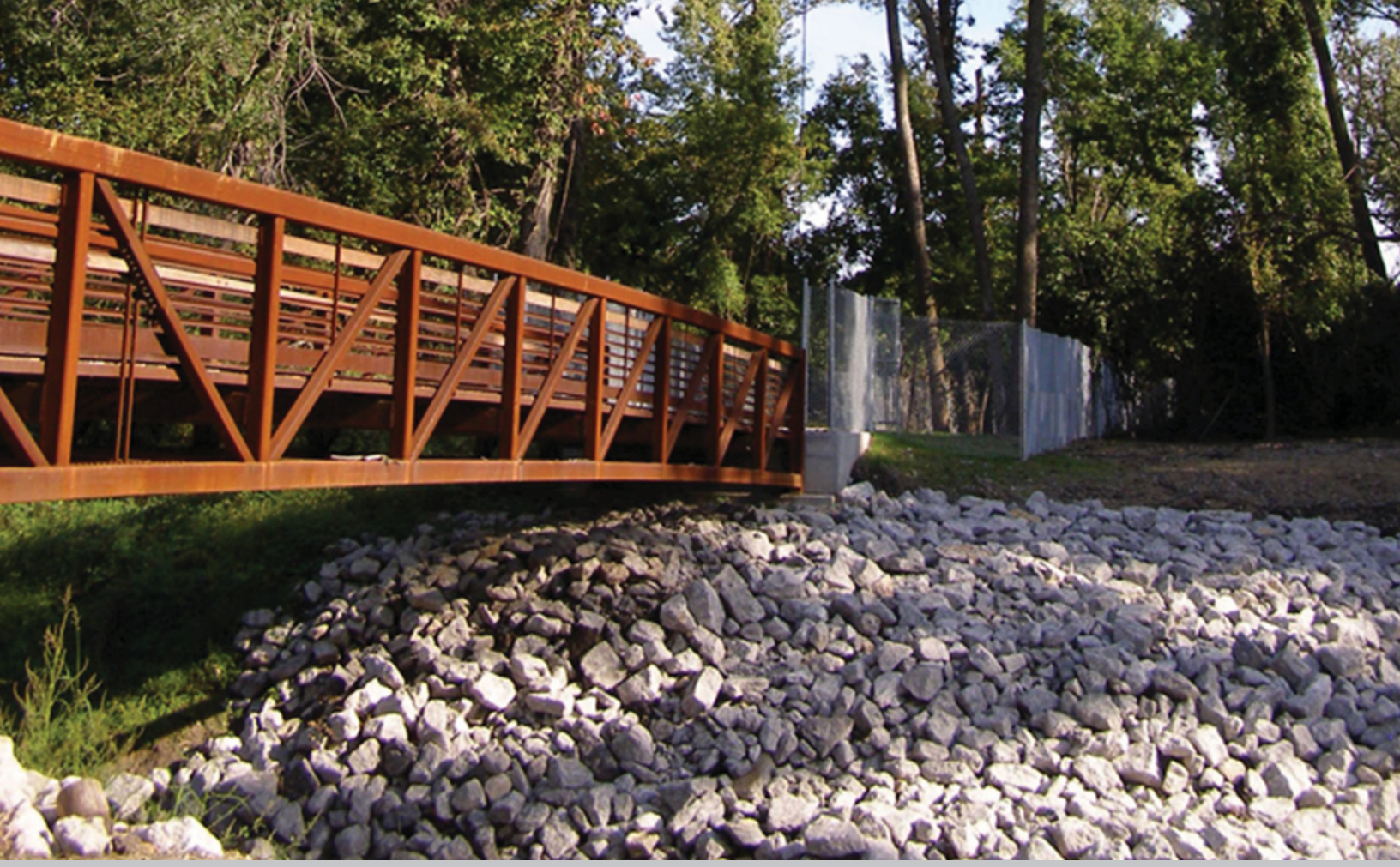
A high priority for residents living in Platte County, MO, one of the fastest growing in the Kansas City metropolitan area, was an increase in parkland and recreation opportunities. In 2000 they voted for a sales tax for trails, parks, and stormwater improvements. This appropriation, along with a Recreation Trail Program Grant from the Missouri Department of Natural Resources, allowed the Missouri Riverfront Trail (MRT) to come to fruition.

The MRT was envisioned to not only satisfy the needs of Platte County's residents but also form a segment within two regional trail routes, the Metro Green Trail System and the Northland Trails Vision Plan. The trail follows the north bank of the Missouri River in Riverside and Parkville for approximately 3.5 miles including a two-mile section on top of the Riverside-Quindaro Bend L-385 Levee. The MRT connects with the regional trail routes through links provided at an integral section of the trail: the underpasses at I-635 and US 69 and a 134-ft-long pedestrian bridge over Burlington Creek.

The MRT's two-mile section along the levee raised concerns as a number of stakeholders felt the trail would deviate from the levee's primary role of controlling the Missouri River and Burlington Creek's water.

Turning an obstacle into an opportunity, the County selected TranSystems to coordinate with the US Army Corps of Engineers (USACE) and the Riverside-Quindaro Bend Levee District, which challenged the team to meet all the USACE and other stakeholders' guidelines and led to the development of several innovative designs. Due to the strong camaraderie developed among all the stakeholders, TranSystems was able to design the first walking and biking facility atop a levee in the Kansas City area.

As a consultant, TranSystems was responsible for trail and structural design services. Our focus was to develop engineering solutions that met the USACE, Missouri Department of Transportation (MoDOT), and other stakeholders' requirements. The firm designed a stabilized subgrade through the use of base rock and geo-grid that provided a headache-free paving operation during construction. A fence with breakaway footing was also designed by TranSystems to meet the USACE and industrial contractor's security fencing criteria. Finally, TranSystems



addressed the technical details of the underpass and drainage system modification to make certain erosion doesn't occur on MoDOT's property or on the levee's surface.

One key reason Platte County selected TranSystems to provide trail and structural design services for the Missouri Riverfront Trail was the firm's extensive experience in trail design and in particular its cooperative relationship with the County and the Cities of Riverside and Parkville, built over many years of working together. Through these relationships, it was possible for TranSystems to predominately focus its efforts in meeting the USACE's stringent technical requirements which kept the project progressing through the different phases of design.

CREATIVITY GIVEN FREE REIN

The County encouraged TranSystems' engineers to be as creative as possible in order to meet the criteria set forth by the USACE. Melding traditional ideas with modern applications, TranSystems was able to design a trail surface that was particularly suitable for use on the existing levee surface as well as security fence that did not disrupt the levee's primary objective of controlling flood waters.

The trail pavement ultimately accepted by the USACE consists of a subgrade with a geo-grid base. Understanding the limitations of the subgrade in the river silt while knowing the trail pavement had to be very thin because of the bicycle and pedestrian uses was influential in making the decision to add base rock to give the contractor a platform on which to work. Observing firsthand the levee's condition after repeated rains, TranSystems also added a geo-grid below the base rock to further stabilize the subgrade. This solution created a solid base for the asphalt surface paving.

The MRT's route passes through an industrial area that lies in the critical area of the levee, adding another stakeholder's criteria to the mix. To meet the security requirements of the industrial neighbors, TranSystems incorporated an eight-ft tall, chain link fence into the design. However, the USACE was adamant that the integrity of the levee was not to be altered in any fashion.

To solve this predicament, the design team used their ingenuity to specify a base similar to the breakaway sign posts on highways for the trail's fence. In addition, minimum gage fence fabric, ties, and tension wires were used to only allow top rails near the gate posts. TranSystems' analysis confirmed the pull-out strength of the footing, the breakaway strength of the post, and the scour potential of the posts to satisfy the USACE that this 3,000 ft-long fence would not impact the levee's integrity.

ANOTHER PUBLIC USE FOR A LEVEE

The Missouri Riverfront Trail project demonstrates the potential for blending an engineered trail with the natural environment which takes the trail beyond mere functionality and embraces the client's vision. This approach represents an opportunity for engineers to help the residents of Platte County to enhance their livability through providing a scenic trail with no compromise in the Riverside-Quindaro Bend L-385 levee's functionality.

The collaboration with the USACE and other public and private entities during the trail's design phase reveals that levees can provide a commodity such as active transportation to communities' future developments.

SOCIAL, ECONOMIC, AND SUSTAINABLE DESIGN

The direct social benefit to the residents of Platte County comes foremost from the promotion of pedestrian activity that the trail itself provides. Beyond providing residents with physical health benefits, the scenic location of the Missouri Riverfront Trail improves their entire quality of life through the extended opportunity for interaction with the river's environment.

MISSOURI RIVERFRONT TRAIL FIGURES

Total Projected Budgeted Cost:
$1,000,000

Total Actual Cost
$900,000

TranSystems Portion of the Budgeted Cost: $950,000

TranSystems Portion of the Actual Cost: $850,000

Scheduled Date of Completion:
June 18, 2008

Actual Date of Completion:
September 1, 2008

The trail transformed the perception of the levee as an unsafe environment into a public amenity serving over a hundred people on a daily basis. In the past, homeless often set up camps on the levee. With the introduction of the Missouri Riverfront Trail, the homeless are now discouraged from using the levee as a shelter as there is a constant presence of trail users.

In addition, the trail is bringing significant economic benefits as local developers start to leverage the 1,200 acres within the levee ring as prime real estate. The easy access and connection to the trail is being marketed as an amenity to attract the desired types of developments and tenants for Platte County.

Further, the Missouri Riverfront Trail greatly improves the awareness of sustainability issues as the trail attracts people to enjoy the Missouri River and its surrounding area. With the trail running directly along the Missouri River, the residents of Platte County can see firsthand the fragile the nature of this area and appreciate growing concerns about preserving on their river system's environment.

CONTENDING WITH HIGH WATER

Given the trail's construction on the levee, close coordination with both the Riverside-Quindaro Bend Levee District and the USACE took precedence as issues relating to the poor subgrade, levee constraints, USACE requirements, security issues, highway impacts, and private property easements had to be resolved. The aforementioned issues were complex in themselves, but TranSystems had to also consider flooding during and after construction.

The levee provides flood control for both the Missouri River and Burlington Creek and as a result the trail was designed to survive most flood events. The effects of the flooding were felt firsthand as the project team had to plan their work around numerous rain storms and four high water events.

CONCLUSION

Platte County sought an innovative solution to its creation of the Missouri Riverfront Trail. The County and Cities of Riverside and Parkville's leaders wanted a cost-effective trail route that offered residents a safe environment for active transportation. TranSystems delivered a striking trail design that seamlessly integrated the County and Cities' vision while meeting the region's need for an extensive trail route throughout the metropolitan area. Furthermore, the plans were delivered on schedule, with no increase in design costs. This trail has been the recipient of numerous awards for it's planning and innovative designs.

The Missouri Riverfront Trail was completed and opened to residents in September 2008, providing a major new trail route connecting Platte County residents to their local environment. It's location and facilities also make its benefits available to pedestrians and bicyclists across the region.

ACKNOWLEDGEMENTS

Cooperation between Platte County, Cities of Riverside and Parkville, USACE, Riverside-Quindaro Bend Levee District, MoDOT, and the various firms contributing to the project, led by Patti Banks Associates, a landscape architecture firm, ensured that the project progressed through all phases without digressing from the County's vision of creating an active transportation trail for its residents while providing connectivity to the regional trail routes.

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"The Riverfront Trail is a natural for Platte County," commented First District Commissioner Kathy Dusenbery.

"It combines two elements of our park plan that citizens tell us is most important to them, providing more walking paths and protecting open space along our streams and rivers. This is just a great thing for us to have."