
# RAISING THE RAILS:

## ELEVATING TRAIN TRAFFIC OVER THE CITY OF OLATHE

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EXPERIENCE | Transportation

# INTRODUCTION

Since the late 1800s, with three railroads serving the town, Olathe has been an important transportation hub. With the development of a major interstate nearby, the population began to boom. Today, Olathe has become home to over 122,500 residents with continued growth leading to increased traffic volumes – meaning drivers who often had to wait for trains to pass at 23 at-grade crossings around the area.

Train traffic, at-grade crossing safety, vehicular congestion and train noise were issues that city leaders struggled with over the past 30 years. Addressing traffic congestion was identified as a number one priority by citizens. Following this advice, the City Council directed their engineering staff to investigate ways to ease congestion, especially as it relates to train traffic. The at-grade crossing at Santa Fe Street with the BNSF Fort Scott Subdivision double track quickly became the focus of attention. With the crossing of 40 trains and over 30,000 vehicles per day, this location ranked as the second busiest at-grade crossing in the entire state.

The City's Engineering Department then initiated a study to eliminate this busy crossing. The findings suggested that lowering Santa Fe Street under the railroad tracks would comprise a solution. A complex phasing plan was developed to temporarily relocate the BNSF mainline double track immediately to the west of its existing location.

In 2002, the city issued a request for proposals for the design and preparation of construction documents to lower Santa Fe Street under the railroad tracks.

TranSystems' innovative idea suggested that instead of temporarily relocating the BNSF mainline double track to the west, a permanent relocation should be designed that might also elevate the mainline double track at the same time. This design included the construction of a dual-track elevated railroad section on a structured embankment and grade separation bridge structures proposed at Ridgeview Road, Santa Fe, Park and Loula streets.

A substantial advantage to this proposed solution was that the city could address not just one grade separation at Santa Fe Street, but also three additional congested at-grade crossings, eliminating them all. The city of Olathe entered into an agreement with TranSystems to begin design of this option.

After reviewing the request for proposals and evaluating other options, TranSystems submitted a solution that revolved around viewing this project as a railroad project as opposed to a roadway project.

As the prime consultant, TranSystems provided construction management and construction inspection, including:

- Preparation of design specifications and drawings consistent with applicable BNSF requirements as needed for construction of four grade separations by elevating 1.4 miles of the BNSF Railroad tracks and providing two sets of track with provisions for access;
- Development of draft comprehensive construction management plan prior to contracting for construction services; and
- Administration of a Phase I Environmental Site Assessment, which identified a "recognized environmental condition" and recommended a Phase II Limited Site Investigation to be performed to identify the extent of contamination.

TranSystems prepared design specifications and drawings for construction of the grade separations, which elevated 1.4 miles of the BNSF Railroad tracks, providing two sets of railroad tracks with provisions for access. The Santa Fe and Ridgeview crossings had "exposure" ratings that ranked as two of the city's top three priorities. Loula and Park streets were classified as collector roadways with current average daily volumes of 4,600 and 3,500 respectively. Due to the proximity of the side streets, elevating the existing BNSF double track and grade separating these crossings was an economical solution to eliminating vehicular and pedestrian at-grade crossings.

To satisfy vertical grade requirements of the railroad and to provide appropriate vertical clearances at the cross streets, the elevated section of the railroad began approximately 1,500 feet north of Ridgeview Road. Likewise, at the south end of the project, the elevated section extended nearly 2,500 feet south of Loula Street before matching the existing railroad elevations. It is noteworthy that only minor profile corrections of the cross streets were proposed and were primarily associated with the elimination of the at-grade rail crossings.

With the exception of the minor interruptions to rail traffic as the north and south ties were made to the existing track alignment, continuous rail operations were maintained throughout the construction phase. In addition, this method of sequencing was cost effective because only one new set of tracks was purchased and the existing tracks were reused.

To minimize the need for permanent right-of-way, precast concrete retaining walls were constructed to support the embankment for the duration of the project. Located in the heart of the city and in an urban area, the purchase of additional property along this portion of the railroad right-of-way would have been costly and would have required

the relocation of numerous residential and commercial properties.

All four structures utilized the vertical abutments and integrated the retaining wall design for a consistent look to the project. Due to span lengths and aesthetic purposes, the Ridgeview and Santa Fe structures were designed as two-span welded steel girder structures with concrete slab decks. Park and Loula streets were designed as single spans utilizing steel through plate girder design.

## BEAUTIFICATION, TOO

Aesthetic treatments played an important role in the development of these improvements and a decorative railing was developed to depict the Conestoga wagon train and westward movement. This railing treatment resulted in a bridge that fits very well into the surrounding historic area.

TranSystems was the only firm that presented the City with a unique, innovative solution that could reduce traffic congestion and noise pollution while maintaining the integrity of the community.

Cities from as far away as the state of Mississippi have contacted the City to ask how they might emulate this remarkable project. TranSystems' successful partnership with the City and BNSF Railway Company on a project of this magnitude is notable. These projects are typically complicated, expensive, and take longer to accomplish than predicted; however TranSystems professionally coordinated the design and construction activities with BNSF staff to ensure a timely completion.

The use of inventive design using precast modular wall systems allowed the project to be constructed in limited right-of-way and on an accelerated schedule.

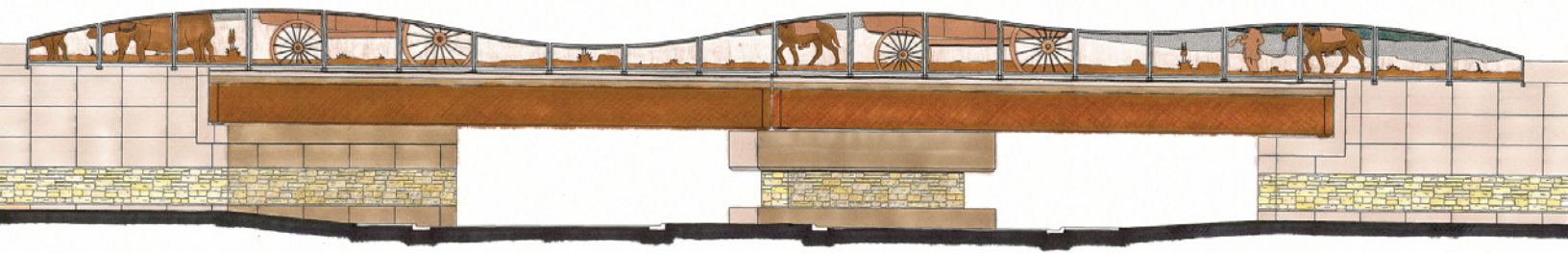
## SOCIAL, ECONOMIC AND SUSTAINABLE DESIGN

The at-grade railroad crossings presented a safety hazard and required trains from the BNSF Railway Company to blow their whistles as they passed through the city. There were as many as six incidents a year involving cars or equipment occurring at the crossings.

By raising the rail, TranSystems eliminated the wait for 7,000 vehicles blocked by trains each day. This equates to approximately 580 hours of time each day that motorists spent waiting for trains at these intersections last year – the equivalent of 24 cars idling 24/7 for a year. Not only did the project help air quality by reducing congestion and traffic delays, it has had an impact on noise pollution in the area by eliminating an hour of train-horn blowing a day.

In designing and constructing the grade separation, many complex issues were resolved:

- Limiting impacts to adjacent properties along the project and at the same time not disrupt train traffic



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*- Phil Estes, PE, Senior Project Manager*

on the BNSF mainline double track, TranSystems constructed a retaining wall system located just 10 feet from the centerline of one of the mainline tracks, limiting the footprint of construction. This required unique coordination with the BNSF Railroad and their Road Master responsible for controlling train traffic throughout the Midwest. Furthermore, to satisfy BNSF construction specifications, the retaining walls used to support the rail infrastructure required reinforced concrete construction cast by an off-site fabricator and trucked to the construction where thousands of segments were individually set into place.

- Constructing a solution that maintained the integrity of the existing residential and commercial area surrounding the project site, while also reducing costs to the project.
- Working closely with the railroad and the city to limit the effects of construction on pedestrian and rail traffic in the area.

## EXCEEDING CLIENT/ OWNER NEEDS

The city's solution to solve their congestion problem was considered too expensive for the limited benefit it would provide. The rail elevation solution, suggested by TranSystems, made the project eligible for state funding, federal appropriations and federal funding from CMAQ.

In addition, environmental issues that were discovered during construction were identified and managed with the appropriate government agencies.

Finally, due to a difficult bidding environment the project was successfully repackaged and rebid to reduce the cost to within the city's budget.


Phil Estes, PE, Senior Project Manager said, "These services are above and beyond the typical scope of most consulting firms and were greatly appreciated by the City of Olathe staff, city council and the citizens of our community. We owe them our congratulations on a very successful project."

This landmark project was completed without taking one business or home and reduced car-train conflicts by half in Olathe and by 8 percent in the entire state of Kansas. TranSystems' project provided significantly greater value than the original concept prepared by the City of Olathe, which only addressed one at-grade crossing. This project eliminated a total of four for the cost of one.

The project required significant coordination, communication and overall collaboration with the BNSF Railway and the synergy developed through this project from

design through construction will be a benchmark for others to emulate.

Concrete evidence of the project's successes are seen all day every day since the rail has been raised. The positive impact on the travelling public and community in general as well as the positive impact on the environment is noticeable in the eliminated wait for vehicles blocked by trains, thereby reducing noise and air pollution in the surrounding area.

## SUMMARY

By raising the rail, TranSystems eliminated the wait for 7,000 vehicles blocked by trains each day. This equates to approximately 580 hours each day that motorists spent waiting for trains at these intersections in a year – the equivalent of 24 cars idling 24/7 for a year. Not only did the project vastly reduce this wasted time, it improved the air quality, and it has had a significant impact on noise pollution by eliminating an hour of train-horn blowing a day.