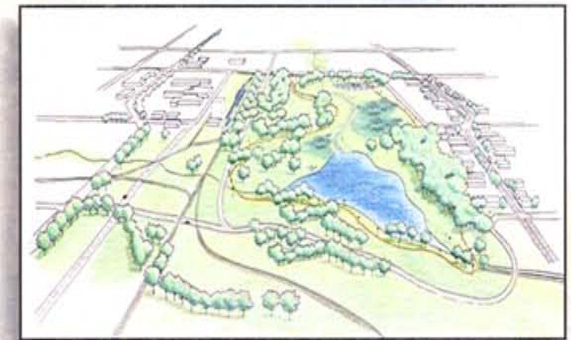
Railroad Reconfiguration and Grade Separation Study Springfield, Missouri



West Meadows

CITY of SPRINGFIELD

November 30, 2006

East Chestnut Expressway

Prepared for:
City of Springfield
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Division Street

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Section 1

1 EXECUTIVE SUMMARY

PURPOSE AND GOALS

The Springfield Railroad Reconfiguration and Grade Separation Study has two goals. The first goal is to determine a track arrangement that would satisfy the needs of the railroads and provide for the continued expansion of the Jordan Valley Park (JVP) initiative named West Meadows (WM). The second goal is to review the Springfield area rail system to first determine if there is another alternative for delivering coal to the James River Power Plant, and, if not, determine a preferred arrangement for grade separating the at-grade railroad crossings at Division Street and East Chestnut Expressway.

JORDAN VALLEY PARK - WEST MEADOWS

The results of the West Meadows portion of the study has concluded that there is an arrangement that will reduce and relocate the trackage enabling the railroads (Missouri and Northern Arkansas Railroad/Union Pacific and BNSF) the ability to continue service to customers that are unaffected by the continued development of JVP. The arrangement does require certain off-site railroad improvements to be constructed that will serve to provide replacement storage and operating capacity. Below is an artist's rendering of the WM area with the proposed track arrangements.

Figure 1 - West Meadows General Arrangement

Off-site improvements include:

- West Wye Track Connection
- Third Main Track and Storage Track Additions at Commercial Street
- East Wye Connection at Commercial Street
- Chestnut Expressway Storage Track

- Bennett Street Storage Track
- Customer Relocations

The estimated conceptual construction costs for the West Meadows project, inclusive of the track removal and reconstruction and offsite improvements ranges from $29,750,000[1] to $38,669,000[1]. The risks associated to this cost estimate include when the project is undertaken, cost of sensitively priced materials including steel and concrete and other modifications as a result of final negotiations between the railroads and the City.

JAMES RIVER FREEWAY AT-GRADE CROSSING

The railroad system that serves the Springfield region is comprised of two railroad carriers; BNSF and M&NA who operates on track owned by the Union Pacific. Today, coal is delivered to the James River Power Plant by rail on the BNSF Kissick Subdivision which passes diagonally through the heart of Springfield and crosses the James River Freeway just north of the Power Plant. A number of alternatives were identified to deliver coal to the Power Plant including trucking, rail line re-routing, and combinations of rail and truck and coal pipeline slurry. It was determined that each of the alternatives would have a variety of adverse impacts on the environment, traffic and ultimately, the community. Therefore, it was concluded that the grade separation of the track at James River Freeway would be the best, cost-effective solution to maintaining coal delivery. Further, it was envisioned that this corridor could become a commuter corridor pending the need of the frequency of rail service to other customers along the line and the demand of the traveling public to have alternative means of traveling between Ozark/Nixa and Downtown Springfield.

DIVISION STREET AND EAST CHESTNUT EXPRESSWAY CONCEPT PLAN DEVELOPMENT

Figure 2 - Artist Rendering of Division Street Grade Separation

The study reviewed various alternatives for the grade separations at Division Street and East Chestnut Expressway. These alternatives ranged from new corridors established east of Highway 65, railroad over/roadway under and roadway over/railroad under and each combination at both locations. Further, alternatives examined the impacts of maintaining railroad customers throughout the corridor versus customer relocations. The study concludes that the arrangement of raising the existing tracks in conjunction with lowering the roadways will yield a scenario that maintains access to businesses along each of the roads and keeps all railroad customers in-service. Further, the adverse impact to railroad operations is minimized in this scenario. However, Cherry Street, a local 2-lane at-grade crossing located south of East Chestnut Expressway, contributes to adverse operational impacts and does not

[1] Cost ranges are reflective of project estimates with and without contingencies.

reduce the vehicular/pedestrian/train exposure. The study was able to derive an arrangement that would enable Cherry Street to become grade separated as a part of the Division/East Chestnut Expressway project or be added at some time in the future. The costs associated to the grade separation of Cherry Street, if it is added in the future, will be a premium.

Figure 3 - Artist Rendering of the East Chestnut Expressway Grade Separation

The conceptual construction costs estimated for the East Chestnut Expressway and Division Street is between $41,040,000[1] and $54,100,000[1]. The risks associated to this cost estimate include considerations of when the project is undertaken, cost of sensitively priced materials including steel and concrete and other modifications as a result of final negotiations between the railroads and the City. The project construction costs if Cherry Street were included range between $53,680,000[1] and $70,000,000[1]. If Cherry Street were to be added later, then the costs for the Cherry Street grade separation may range between $15,200,000[1] and $19,200,000[1].

In the closing stages of the study, a request was made to consider the application of a 6-lane template as the future East Chestnut Expressway improvements. Because there is insufficient time to adjust the base report, an addendum was issued and bound in the report. It has been concluded that the conceptual construction costs estimates that are inclusive of a 6-lane future East Chestnut Expressway and the Division Street grade separation would result in a project construction cost estimated between $42,000,000 and $55,400,000. If Cherry Street were included in the initial construction, then the estimated construction costs may be between $54,640,000 and $71,300,00. Adding Cherry Street grade separation later may result in a construction cost between $15,200,000 and $19,200,000.

In conclusion, it should be noted that the Springfield railroad reconfiguration and grade separation effort is a highly challenging and aggressive approach undertaken by City government. It has resulted in a series of sophisticated recommendations for engineering alternatives to achieve critically important goals for the City of Springfield. These implementation objectives may be capable of being met using a very narrow range of funding options in a creative combination which is now available through new Federal Transportation Reauthorization allowing public-private funding effort. The process will require adequate dialogue and Congressional representation. The forthcoming Memorandum of Understanding between the City of Springfield and the railroads should reflect all of the above.

The tables illustrated on page iv represent three approaches worthy of project funding consideration.

ALTERNATIVE FUNDING PORTFOLIO USING PRIVATE ACTIVITY BONDS

JORDAN VALLEY - WEST MEADOWS

($'s in Milliions)

YEAR	RAIL LINE RELOCATION CAPITAL GRANT	PRIVATE ACTIVITY BONDS	PROJECT EXPENDITURE	REMAINING AVAILABLE FUNDING	CONSTRUCTION SEASONS
1	$ 3.0	$ 4.0	$ 1.5	$ 5.5	Design/R/W Acq./Permitting West Wye
2	$ 3.0	$ 4.0	$ 8.7	$ 3.8	Design/Permitting/Const - East 3rd Main & West Wye
3	$ 5.0	$ 4.0	$ 11.6	$ 1.2	Construct West 3rd Main/North Yard/Chestnut/Bennet/Sunshine Storage
4	$ 3.0	$ 4.0	$ 0.7	$ 7.5	Design/Permitting/East Connection
5*	$ 3.0	$ 4.0	$ 9.4	$ 5.1	East Connection Track
6	$ 2.0		$ 2.5	$ 4.6	North Yard Storage
7	$ 1.0		$ 4.0	$ 1.6	West Meadows Alterations

TOTAL AVAILABLE = $ 40.0

* - Corresponds to Year 1 of the Grade Separations Project

ALTERNATIVE FUNDING USING ONLY RAIL LINE RELOCATION CAPITAL GRANTS

JORDAN VALLEY - WEST MEADOWS

($'s in Milliions)

YEAR	RAIL LINE RELOCATION CAPITAL GRANT	LOCAL MATCH	PROJECT EXPENDITURE	REMAINING AVAILABLE FUNDING	CONSTRUCTION SEASONS
1	$ 6.0	$ 0.6	$ 1.5	$ 5.1	Design/R/W Acq./Permitting West Wye
2	$ 6.0	$ 0.6	$ 8.7	$ 3.0	Design/Permitting/Const - East 3rd Main & West Wye
3	$ 9.0	$ 0.6	$ 11.6	$ 1.1	Construct West 3rd Main/North Yard/Chestnut/Bennet/Sunshine Storage
4	$ 5.0	$ 0.6	$ 0.7	$ 6.0	Design/Permitting/East Connection
5*	$ 5.0	$ 0.6	$ 9.4	$ 2.2	East Connection Track
6	$ 4.0	$ 0.6	$ 2.5	$ 4.3	North Yard Storage
7	$ 1.0	$ 0.4	$ 4.0	$ 1.6	West Meadows Alterations

TOTAL AVAILABLE = $ 40.0

* - Corresponds to Year 1 of the Grade Separations Project

ALTERNATIVE FUNDING PORTFOLIO USING APPROPRIATIONS & CAPITAL GRANTS

GRADE SEPARATIONS

($'s in Milliions)

YEAR	LINE ITEM APPROPRIATIONS	RAIL RELOCATION CAPITAL GRANTS	LOCAL MATCH	PROJECT EXPENDITURE	REMAINING AVAILABLE FUNDING	CONSTRUCTION SEASONS
1*	$ 6.0		$ 4.5	$ 4.5	$ 6.0	Design/Permitting
2	$ 6.0	$ 15.0		$ 20.5	$ 6.5	R/W/Utility Relocations/Pythian/Shoofly
3	$ 6.0	$ 15.0		$ 21.2	$ 6.3	Division Street
4	$ 6.0	$ 5.0		$ 15.8	$ 1.6	Chestnut Expressway
5	$ 6.0	$ 5.0		$ 10.1	$ 2.5	Cherry Street

TOTAL AVAILABLE = $ 74.5

* - Corresponds to Year 5 of the West Meadows Project

Section 2

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Note:
Selected Figures are provided in an 11"x17" format in the "Concept Exhibits" section

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4 List of Tables & Photographs

Section 5

5 PURPOSE, GOALS AND APPROCH

PURPOSE AND GOALS

The purpose of the project is to study three distinct areas within Springfield:

1. Jordan Valley Park – West Meadows Expansion
2. Springfield Railroad System Overview – Coal Delivery to James River Power Plant
3. Division Street and East Chestnut Expressway Grade Separation Concept Plan Development.

The goals of the project are to:

1. Remove all railroad tracks within the West Meadows Area and Jordan Valley Park necessary to enable the continued development of the park.
2. Ensure that rail served customers maintain service or are relocated to a mutually agreed upon location to continue rail service.
3. Reduce the train versus vehicle and pedestrian exposure at E. Chestnut Expressway and Division Street to zero.

Jordan Valley Park - West Meadows

As a part of the Vision 20/20 plan, the City of Springfield has undertaken the development of Jordan Valley Park (JVP) within the core of the City. The JVP development has progressed well with the creation of the Hammons Baseball Field Stadium, Ice Skating Park and various green spaces. To continue the momentum of JVP, the City has created a vision for a park as the western boundary. That park is called "West Meadow." (see figure below)

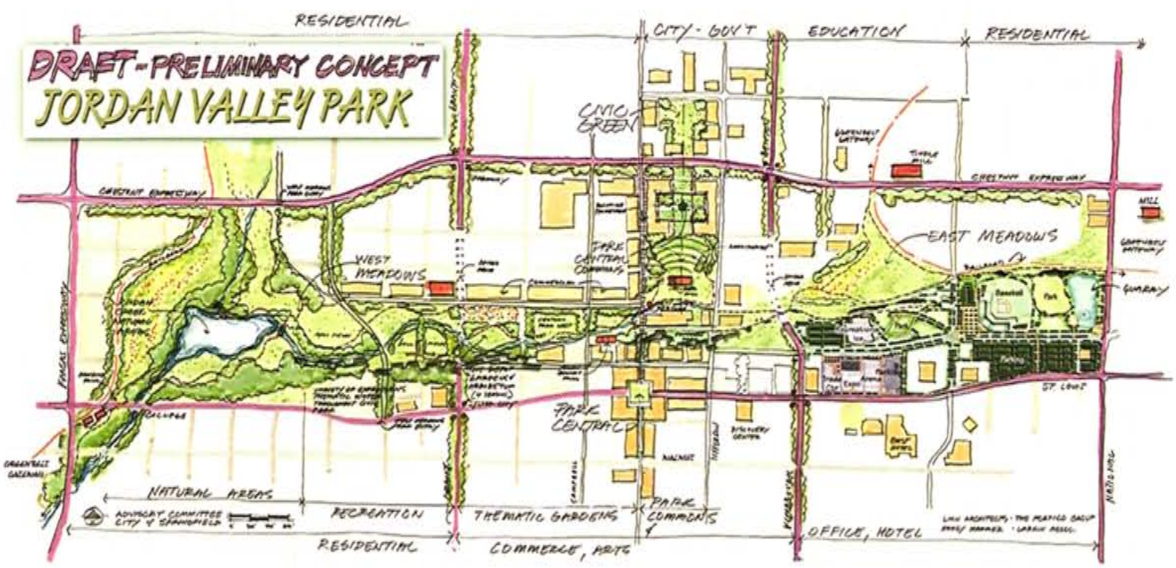


Figure 4 - Jordan Valley Park Master Plan

To achieve the goal of creating the West Meadows Park, this study will review the existing conditions within the proposed park boundaries and develop conceptual plans to rearrange railroad tracks to accommodate the proposed expansion. Various elements of the existing conditions will be reviewed including railroad operations, customers served by the railroads, general environmental conditions and costs associated with the project for on-site and off-site improvements. The results of the study will provide conceptual level track rearrangement plans and necessary conceptual level off-site railroad improvements necessary to provide the replacement serviceability and storage needs.

James River Freeway At-Grade Crossing

One of Springfield's busiest at-grade railroad crossing is located on the James River Freeway (U.S. 60/Business 65) just east of the U.S. 60/65 interchange. This track provides trains service, coal delivery, to the James River Power Plant (JRPP). As a part of the scope this study will evaluate alternative methods of delivering coal to the JRPP and determine if there may be a more economical alternative than creating a grade separation on the present corridor. (See figure to right) The result of the analysis will be to offer a listing of considered choices and recommendation of a preferred alternative to serve coal to the power plant.

Figure 5 - At-grade Railroad Crossing at US 60/Bus. 65

Division Street and East Chestnut Expressway Concept Plan Development

Arguably the two busiest vehicular corridors into and out of the city center from the east are along Division Street and East Chestnut Expressway. (See figure to right) The BNSF mainline track, termed the "Thayer Subdivision," runs parallel and west of U.S. 65 and crosses each of these roads at-grade. The purpose of this study will be to evaluate alternatives for each of these at-grade crossings ultimately providing a recommendation for eliminating the train/vehicular/pedestrian exposure.

A variety of alternatives will be examined including new rail corridor locations, raising or lowering the roadways, raising or lowering the railroad and combinations of raising and lowering both the road and railroad. Further, the impacts of maintaining railroad customer service during and post construction will be evaluated and modifications required for businesses that front Division Street and East Chestnut Expressway.

The results of the study will be presented via a recommended conceptual level plan to achieve the goal of eliminating train/vehicular/pedestrian exposure.

Figure 6 - Thayer Subdivision Corridor

STUDY APPROACH

The study began with the creation of a Steering Committee with representatives from the City, MoDOT, BNSF, M&NA, UPRR and the Ozark Transportation Organization (the MPO in the region). The Steering Committee met on a regular basis to review the progress of the project and offer direction to the study team. This vehicle of information exchanged and guidance proved extremely beneficial to the development of the project and success of reaching the recommendations contained herein.

This 18-month study was divided into six primary phases:

- Public Engagement
- Discovery
- Planning and Analysis
- Stakeholder Discussions
- Concept Design – Grade Separations
- Report Development

Public Engagement

Early in the study planning phase the importance of information exchange between the public and the study team was realized. Consequently, three public meetings were held offering the public a forum to express their thoughts and concerns about the project features and benefits. The first public meeting offered an introduction of the project and the process that was to be followed. The second meeting offered a plethora of alternatives that were being considered for general comment and the last public meeting brought forward the preferred alternatives for final comment. The meetings were very well attended.

In addition to the public meetings the study approach also provided for other information exchange mechanisms. A study website was created that shared all information disclosed at the public meeting about the development of the study and also included an online survey so that people could offer their thoughts directly about various alternatives being considered. An email link was also provided to on the website for correspondence.

Finally, the public engagement effort also included a phone number that the general public could use to speak directly with the City's project manager.

The public engagement phase began on day one and lasted throughout the lifespan of the project.

Discovery Phase

The Discovery Phase of the project was the initial data gathering task. Available information about the project sites was gathered. A detailed log of information including the type, source and date of the data is included at the end of this report. It is important to note that the study team has signed a non-disclosure agreement with the railroads that prohibits the public sharing of sensitive information about customers, specific train movements and other data that is considered competitive or security related information. The use of this information is reflected in some of the conclusions drawn by the study and presented in this report.

Planning and Analysis

This Planning and Analysis (PA) phase of the project looked at both West Meadows and the Grade Separations. During this phase, detailed considerations of all alternatives identified were examined. The examination included engineering, costs, sequencing, operations (vehicular and train) and business impacts among other considerations. The results of the PA phase were ultimately carried forward into the public meetings and became an iterative analysis.

Stakeholder Discussions

Concurrent and following the PA phase, stakeholder discussions were held. These discussion brought concepts to light to the Steering Committee participants as well as to various businesses within the community that might be affected by any particular alternative. The discussions proved fruitful in crafting modifications to alternatives that grew into general acceptance by all parties.

Concept Design – Grade Separations

Following the PA phase, the study team delved into further details on the proposed grade separation arrangements at Division and Chestnut. Additional planning and engineering details were examined in an effort to expose any fatal flaws. Type, size and location (TS&L) drawings were produced for each to the grade separations and conceptual roadway and railroad plan/profiles were developed. Construction sequencing and estimates were developed to finalize the study development.

Report Development

The final phase of the study included the development of the report and creation of a tri-fold brochure outlining the features and benefits of the study elements. A city council presentation was made offering insights to the results of the project and anticipated next steps.

Section 6

6 Jordan Valley Park – West Meadows

JORDAN VALLEY PARK[2]

Described as a "grand civic gesture", Jordan Valley Park is designed to mix open space and buildings, water and meadows, playgrounds and plazas. The park contrasts public space and solitude, recreation and revitalization via:

Sub-districts: Resembling an hourglass, the two ends of the park are marked by large meadows held together by a narrow band of activity-filled spaces, leading to a "central green." Each area is a distinct composition of landscape, buildings and open spaces.

Edges: Edges define the park and its many spaces - not to divide or disconnect, but to provide a transition from downtown's urban environment to the natural, expressive environment of the Park.

Connections: Jordan Valley Park is about connections - the past with the future, north Springfield with south, industry with agriculture, people with nature.

Unifying Elements: Physical and symbolic references to Jordan Creek and historic Springfield will knit the elements of the park together. Artwork, gateways, streetscapes and focal points will lend powerful symbols to the varied landscape.

WEST MEADOWS - EXISTING CONDITIONS OVERVIEW

The West Meadows area is primarily an industrial area consisting of various commercial businesses and railroad infrastructure. The site is roughly bounded by Main Street overpass on the east, Wall Street to the North, Fort Street to the west and College Avenue to the south. The rough area of this site is about 60 acres. It should be noted that track removal will also occur as far east as Sherman Parkway.

[2] Text obtained from the current Jordan Valley Park Website

Zoning

Below is a color coded map representing the current zoning (8/1/2006) within the West

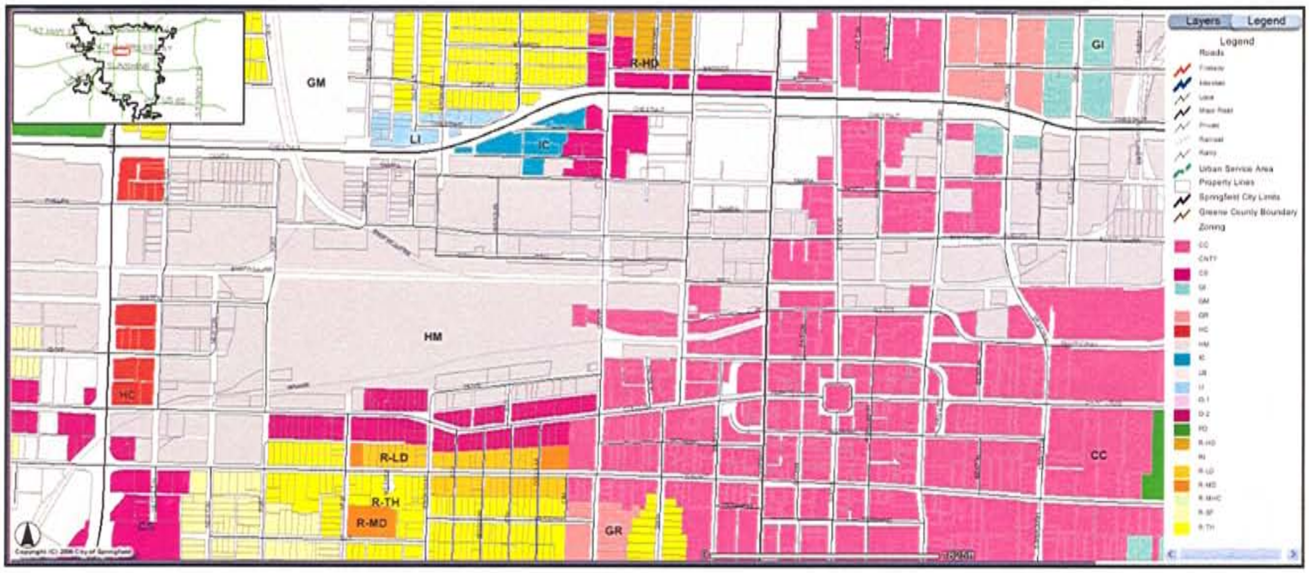


Figure 7 - Zoning in the West Meadows Area

Meadows Area.

The 2006 zoning is classified as follows:

HC - Highway Commercial District.
A zone designed to accommodate business and commercial uses that depend upon high-visibility and convenient sites on arterial streets in order to attract customers.

CS - Commercial Service District.
A zone designed to accommodate non-retail commercial and services uses.

CC - Center City District.
A zone designed to accommodate the existing mix of uses in the Springfield Central Business District and Commercial Street area.

GM - General Manufacturing District.
A zone designed to accommodate industrial development that should be effectively buffered from all but other industrial and heavy commercial uses because of the potential such uses may have for affecting the use and enjoyment of nearby property.

HM - Heavy Manufacturing District.
A zone designed to accommodate railroad terminal and yard facilities and intensive manufacturing uses that may have adverse impacts on nearby property unless properly located and buffered.

IC - Industrial Commercial District.
A zone designed to allow a combination of industrial and commercial uses in those areas where the combination of such uses is consistent with adopted policies and plans.

It is anticipated that rezoning portions of the project area to reflect the park space being planned will be required.

Roadway Infrastructure

The WM area roadway infrastructure is comprised primarily of paved, 2-lane city streets connected to adjacent state or county roads. The limits of WM are generally bounded by North Fort Avenue to the west, Phelps, Wall and Mill Streets to the north, College and West Olive Street to the south and extend to the east to North Sherman Parkway.

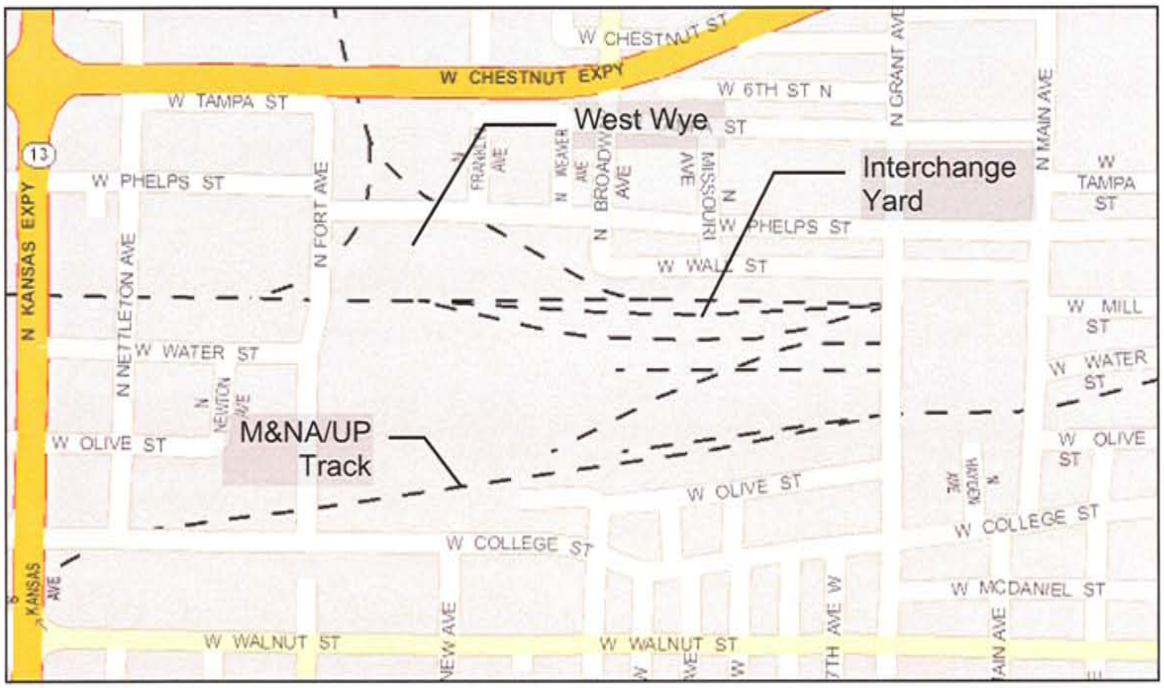


Figure 8 - Western-Half of West Meadows

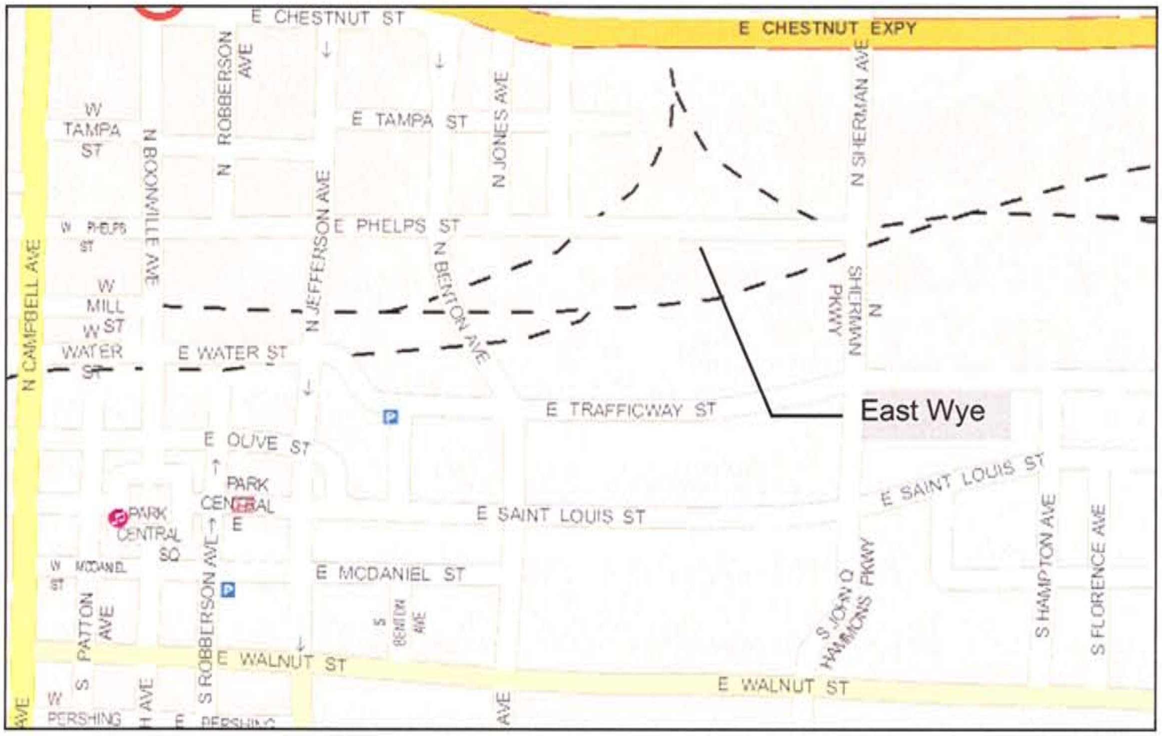


Figure 9 - Eastern-Half of West Meadows

Railroads

This project focuses on the railroad infrastructure of WM. There are two railroads owning property within WM. BNSF Railway Company (BNSF) owns and operates most of the railroad property within West Meadows and the Springfield region. Union Pacific Railroad Corporation (UPRR) owns the trackage and property within the southwestern portion of WM and to the southwest for approximately 7 miles. The railroad that operates on the UPRR trackage is the Missouri & Northern Arkansas Railroad which is a subsidiary of RailAmerica, Inc. (See figure on next page)

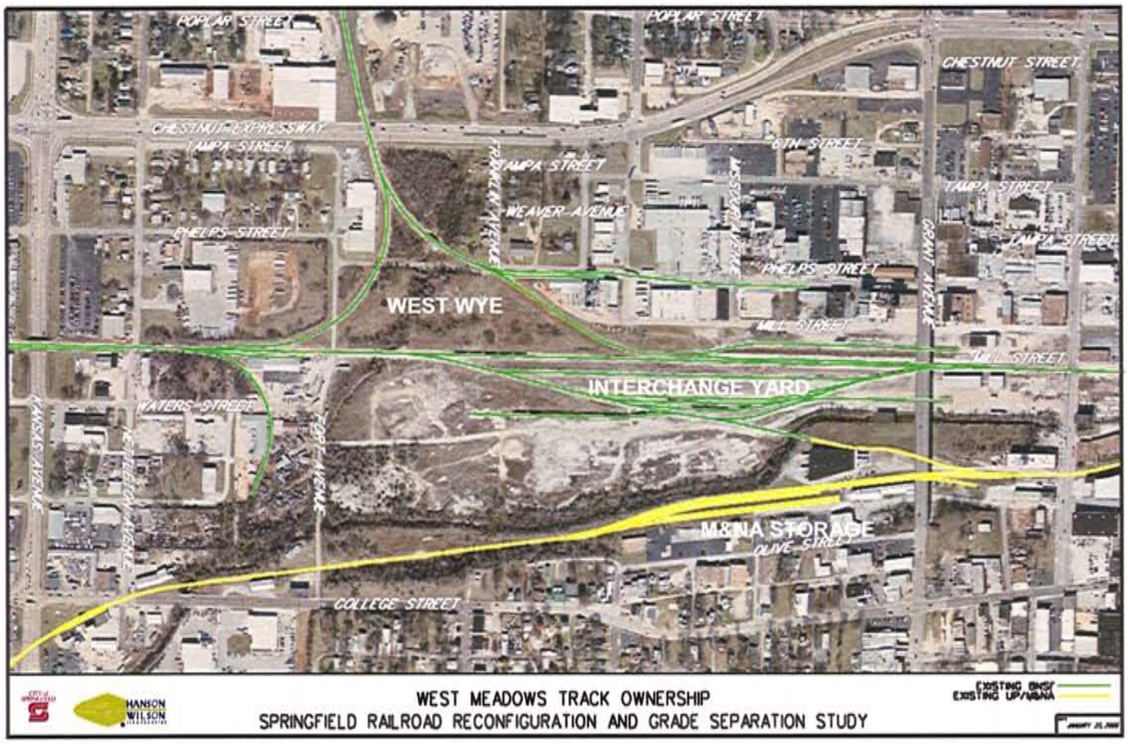


Figure 10 - Track Ownership in West Meadows
Green is BNSF
Yellow is UPRR

BNSF Operations and Facilities

It is important to be able to see the overall BNSF track arrangements within Springfield to understand the basic BNSF train operations to and from West Meadows. The following figure provides a regional view of the BNSF rail system at Springfield. There are four primary mainlines converging at Springfield. The line from the northwest is called the Ft. Scott Subdivision and travels between Ft. Scott and Springfield. The line to the northeast is called the Cuba Subdivision and travels between Springfield and St. Louis. The line to the southeast is called the Thayer Subdivision and travels between Springfield and Memphis and the line to the southwest is called the Cherokee Subdivision and travels between Springfield and Tulsa.

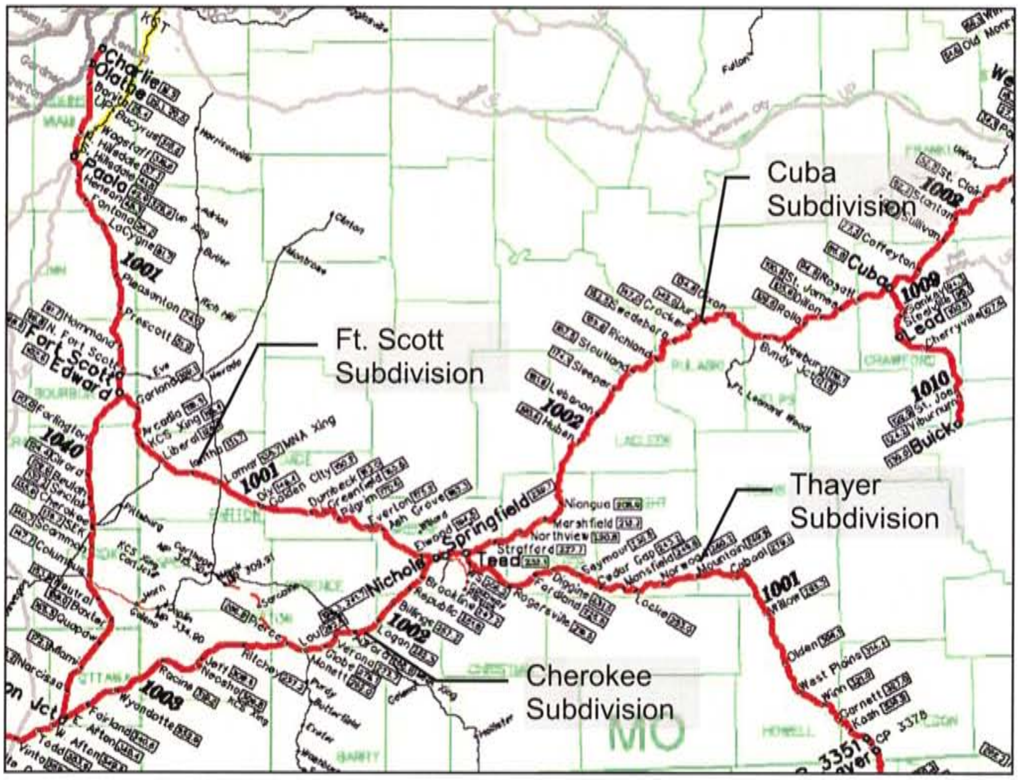


Figure 11 - BNSF Rail System - Springfield Division

There BNSF main yard located in the northwestern portion of the Springfield Railroad infrastructure and facilitates switching operations for the region. Typically local switching operations originate at that yard and convey freight and empty cars to and from the Main and North Yards to and from the West Meadows area and other locations on the Kissick Subdivision.

Delivery and pick-up of local freight for the M&NA is also a part of the local BNSF switching operations. Freight is delivered utilizing the east wye track to the Interchange Yard and pick-up from the interchange yard can be follow either the west wye or the east wye back to the North or Main yards. There is a daily operation for local switching.

Coal service is provided to the James River Power Plant via the Kissick Subdivision. Unit trains are divided to accommodate available siding space at the Power Plant, so a single coal unit train is delivered by multiple moves between the main yard and the power plant.

Intermodal traffic is a primary component of train service between Springfield and Memphis traveling on the Thayer Subdivision. The Thayer Subdivision departs the Cuba Subdivision just west of Highway 65.

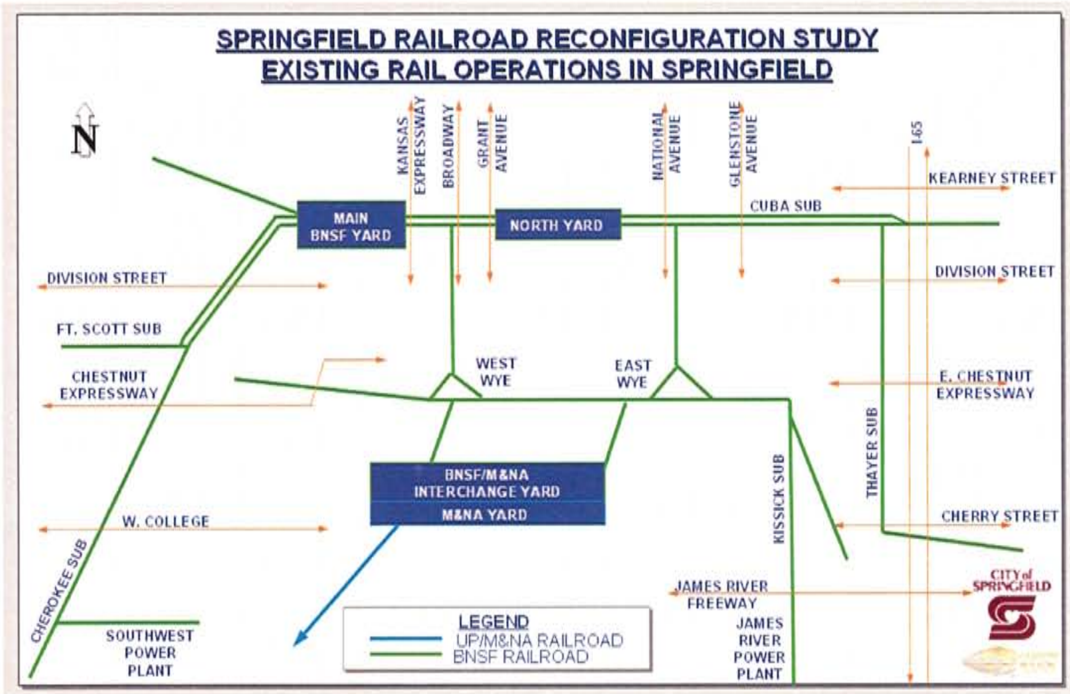


Figure 12 - Springfield Railroad System Schematic

Rail line service levels are depicted in the following figure. The greatest number of daily train movements occurs on the Cuba Subdivision between the Main and North Yards. This is driven by a combination of thru train service and local switching operations. The Cuba Subdivision between the North Yard and the start of the Thayer Subdivision has the second greatest number of daily train movements and the Thayer Subdivision traveling towards Memphis has the third greatest number of daily train movements. In summary the volumes are:

Track Segment	TM/D
Cuba Sub – Main Yard to North Yard	>80
Cuba Sub – North Yard to Thayer Sub	50-80
Thayer Sub – Springfield to Memphis	30-40
Ft. Scott Sub –Ft. Scott to Springfield	30-40
Cherokee Sub – Tulsa to Springfield	20-30

Table 1 - BNSF Daily Train Movements - Springfield

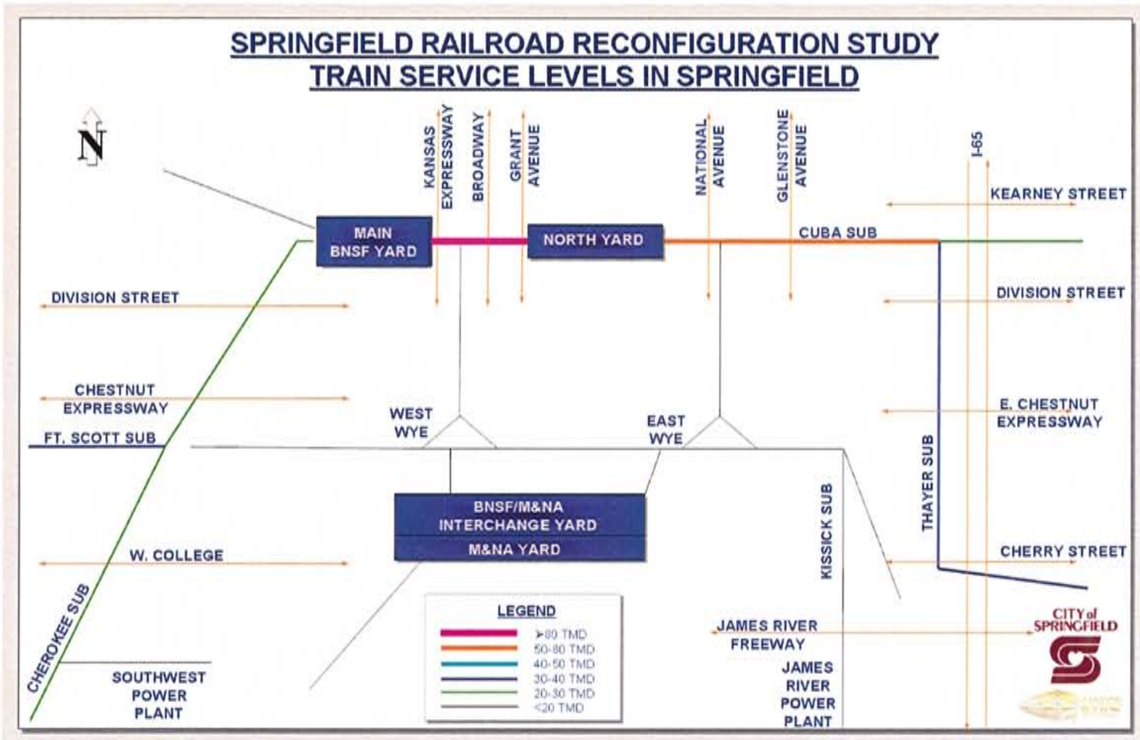


Figure 13 – 2006 BNSF Daily Train Movement Volumes in Springfield

Missouri & Northern Arkansas Operations and Facilities

The M&NA operates on a track owned by the Union Pacific Railroad that travels to the southwest from the West Meadows Interchange area, to customers generally to the south. Their switching locomotives are tied-up overnight at the south end of their trackage. Daily switching operations are available.

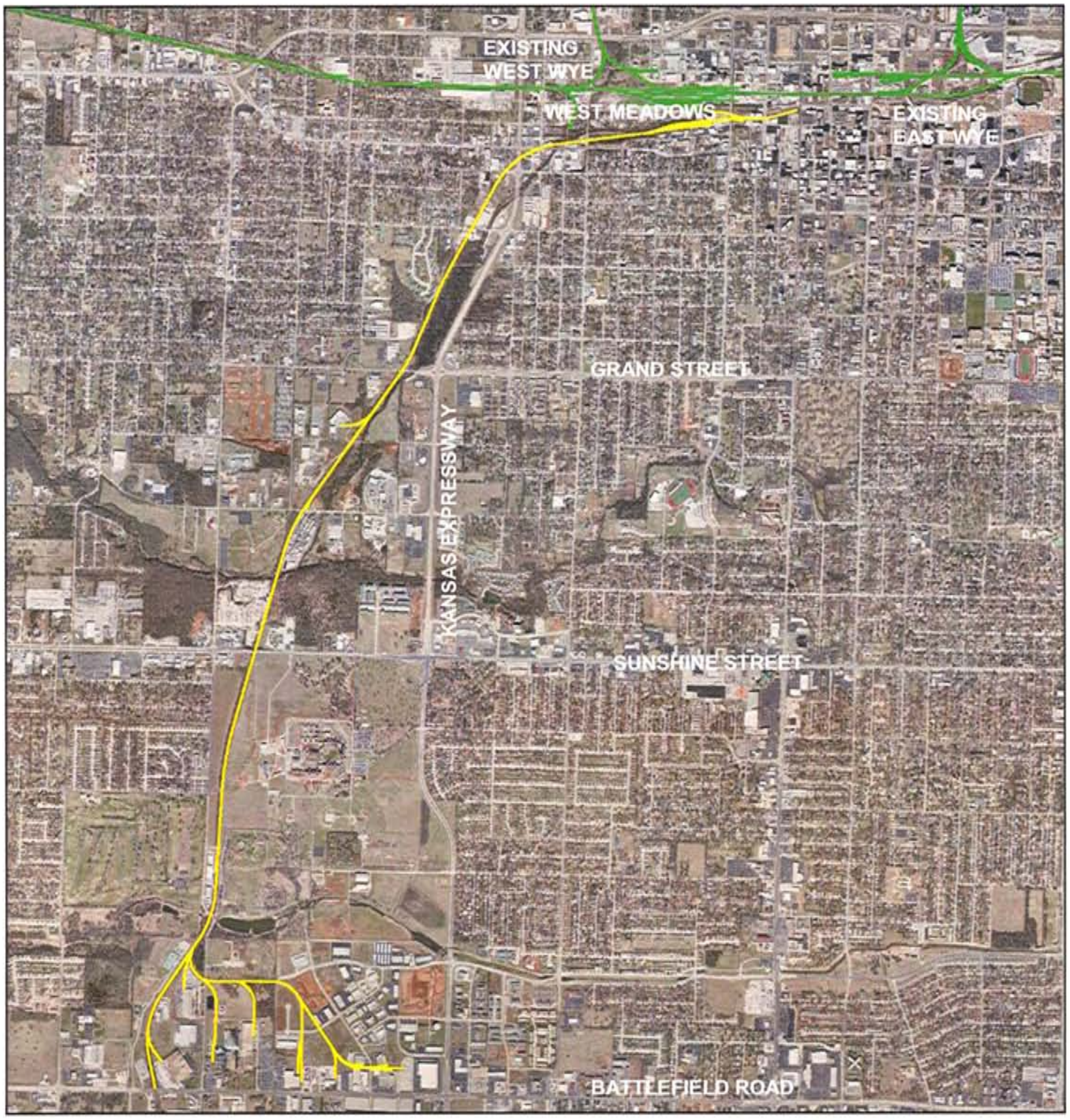


Figure 14 - UPRR/M&NA Track (Yellow)

City Services & Utilities within West Meadows

Since the majority of the West Meadows site is presently comprised of railroad tracks and city streets, there are few utilities that will require attention.

Natural Gas

A portion of an existing natural gas line may require relocation and rerouting of existing services and addition of new service may be required.

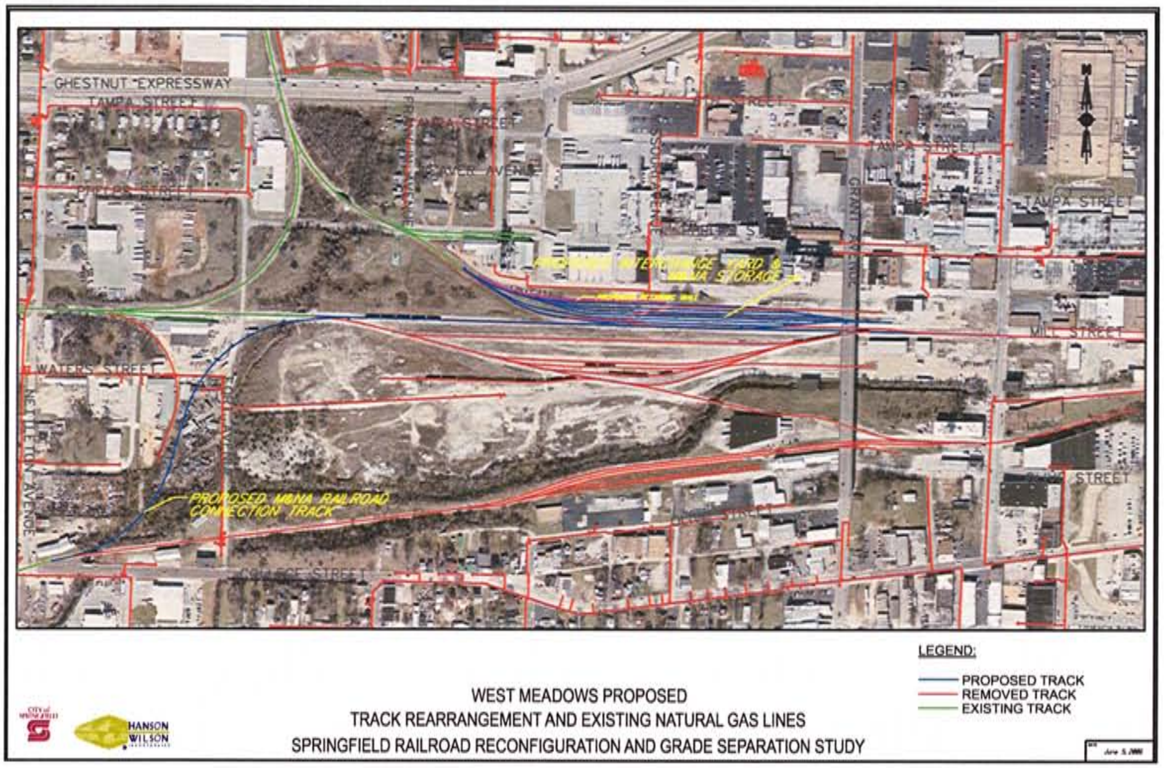


Figure 15 – Existing Natural Gas Service within West Meadows

Electric

City Utilities has an electric transmission line that traverses the West Meadows site that may require relocation to achieve potential track connections. Please refer to the following page.

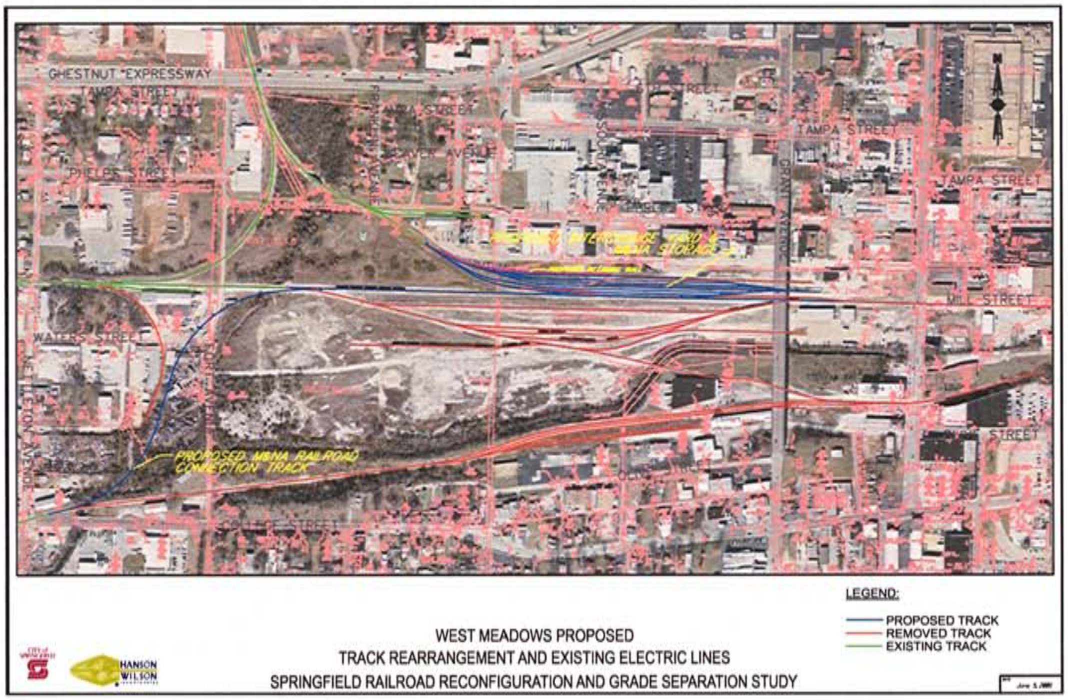


Figure 16 - Existing Electric Service with West Meadows

Sanitary Sewer

The city has sanitary sewer lines that traverse the site that will require encasement as it passes under railroad tracks.

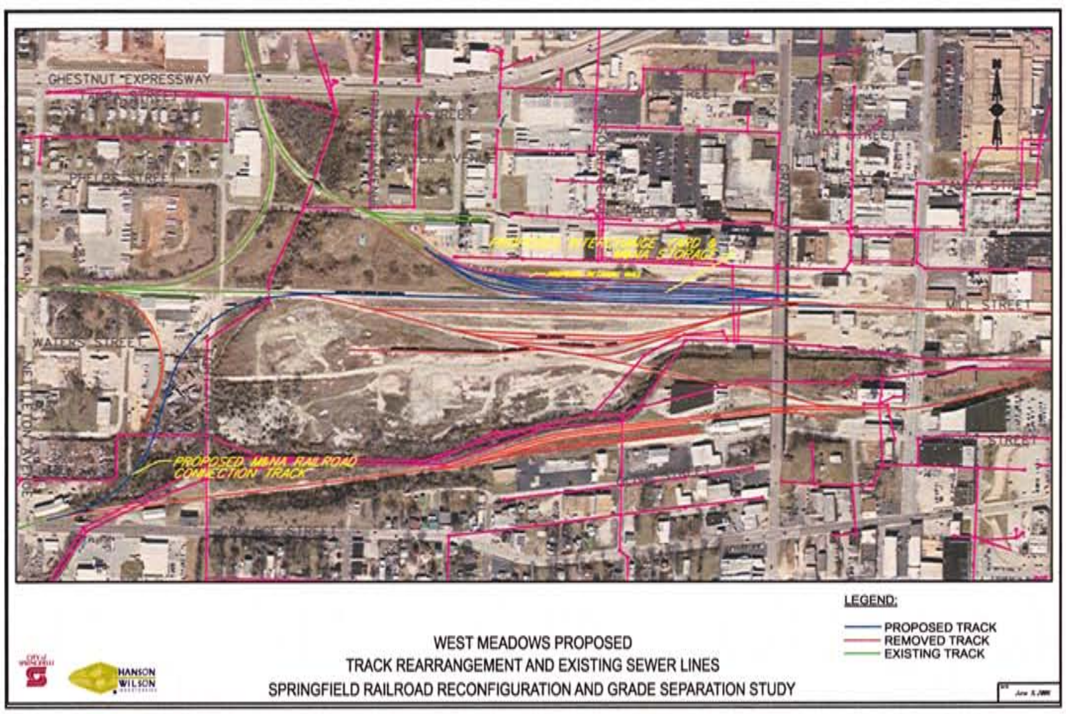


Figure 17 - Existing Sewer Service within West Meadows

Potable Water

The city has potable water lines that traverse the site that will require encasement as it passes under railroad tracks. There appears to be no work associated with the track reconfiguration regarding potable water.

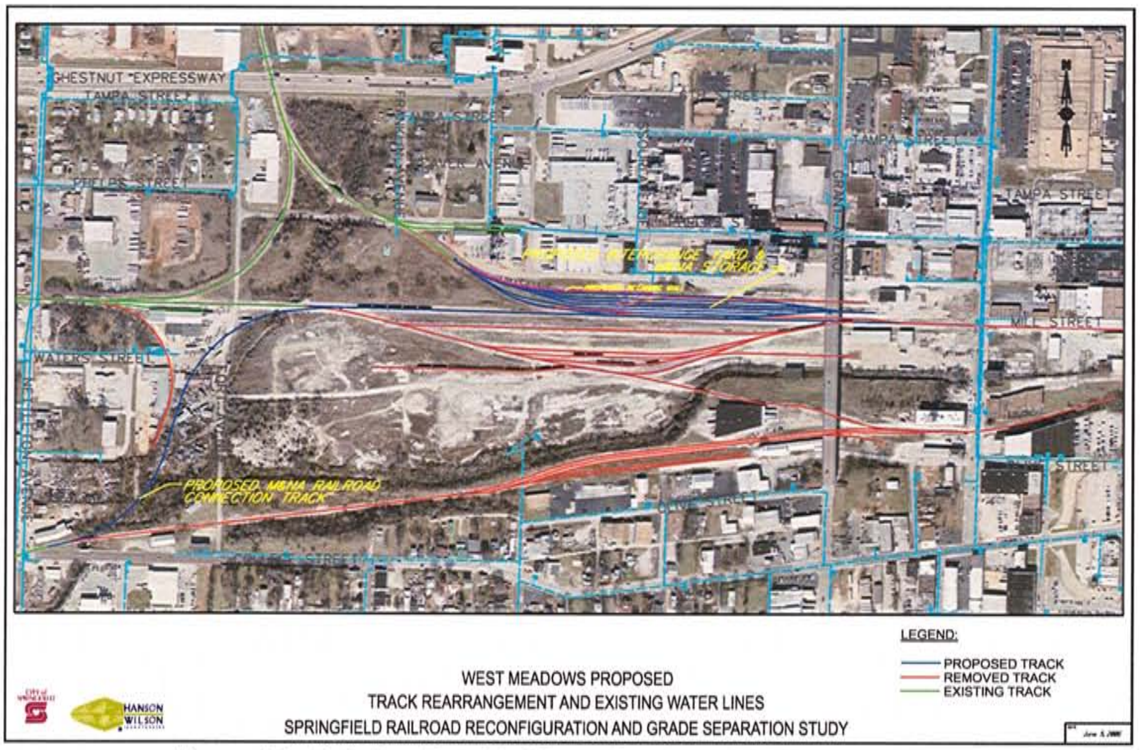


Figure 18 - Existing Potable Water Service with West Meadows

Railroad Analysis and Preferred Alternative

There are several factors that must be considered when evaluating alternative track arrangements within WM. Therefore, a discussion on the evaluation criteria is warranted.

Evaluation Criteria

There are several evaluation criteria that played a key role in determining the viability of various alternatives within WM. Those considerations include:

Functionality – is train operations functionality maintained, i.e. has ability to turn trains, run-around trains, maintain tie-up locations, maintain haulage distances, etc.

Storage – has the ability to store loaded or empty cars been adversely impacted?

Adverse Customer Impacts – are customers able to maintain uninterrupted rail service?

Railroad Operations Agreements – would the arrangement require change in track ownership, trackage rights or other train dispatch operations?

Park Master Plan – does the configuration achieve the goals of the park master plan?

Associated Costs – are the costs to achieve the changes commensurate with the benefit?

West Meadows Alternative 1

Please refer to the following figure. The significant features of this alternative include:

- A simple rail connection serving BNSF line to the existing M&NA line near College Street. The horizontal geometry may require some improvement to provide added tangent length between curves. The vertical alignment (profile) would require that roadway adjustments on Chestnut Expressway occur to help reduce the required grade to meet the M&NA tracks at College Street.
- Would require either an additional at-grade crossing of Chestnut Expressway or removal of the existing track and elimination of local service to the east leg of the Wye track. Additional grade crossing warning protection may be required at Chestnut Expressway.
- This scenario requires property acquisition near Phelps Street and east of Nettleton Avenue.
- A single siding or storage track could be constructed parallel to the proposed connection between the track that travels west across Kansas Expressway to near College Street. Otherwise, this scenario offers little storage replacement or functionality improvements.
- There are active rail customers in this area which would require relocation to continue rail service.
- Trackage ownership and usage would require agreement modifications.
- Additional storage and functionality replacement would be required off-site.
- This arrangement reduces the amount of track within the West Meadows area substantially. In this scenario an interchange yard is assumed to be at another location to the north. This assumption would then require that M&NA trains travel to the interchange yard location to pick-up or drop-off rail cars, or that BNSF performs that operation.
- Rearrangement of some city streets would be required to support this scenario.
- Property acquisitions would be necessary near Phelps Street, Waters Street and Nettleton Avenue. Existing rail served customers would require relocation. However, this arrangement does leave in-service customers near Broadway and Phelps Street.
- Wye track functionality would be reduced as whole trains would not be "turnable." However, locomotive sets would be able to be turned.
- It would appear that of the 4 scenarios considered, the probable construction costs the on-site modifications depicted by this scenario may be in the middle of the cost range.

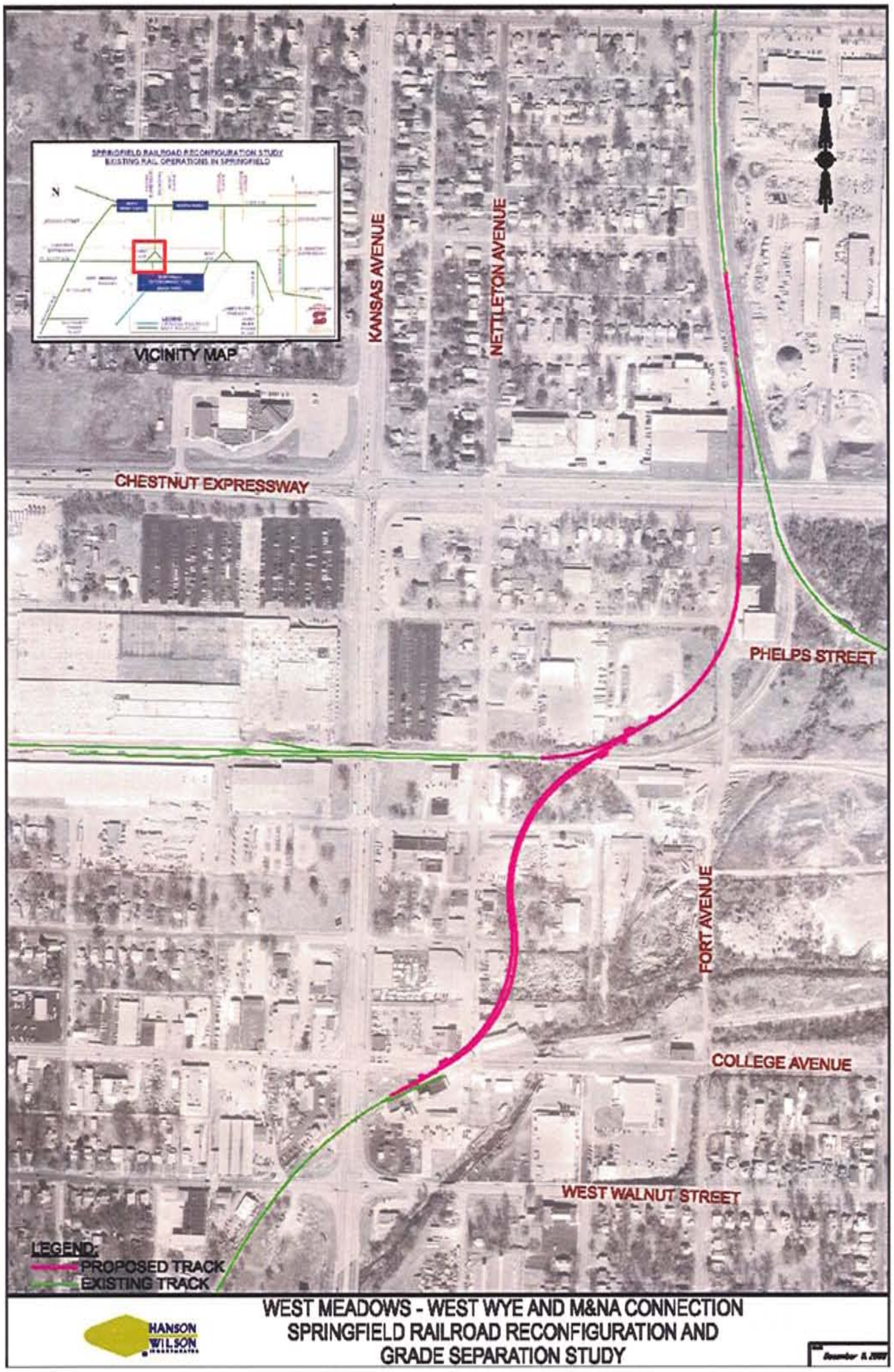


Figure 19 - West Meadows Alternate 1

West Meadows Alternative 2

Please refer to the following figure. The significant features of this alternative include:

- A simple rail connection serving BNSF line to the existing M&NA line near College Street. Profile grades in this scenario are above 1.5% and is considered incompatible with yard storage. However, if the yard tracks are considered an option to this alternative and only the connection track is considered, then it may become a viable alternative. Profile grades remain a concern particularly with the at-grade crossing at College Street and Kansas Expressway.
- This scenario requires minor property acquisition near Phelps Street and Nettleton Avenue.
- This scenario reduces the amount of track within the West Meadows are substantially and therefore, supports the goals of the West Meadows development.
- There would be no proposed modifications to Chestnut Expressway in this scenario.
- Additional storage and functionality replacement would be required off-site.
- Trackage ownership and operations agreements would require modifications.
- There are active rail customers within this area that would require relocation to maintain rail service.
- Rearrangement of some city streets would be required to support this scenario.
- It would appear that of the 4 scenarios considered, the probable construction costs the on-site modifications depicted by this scenario may be in the lower cost range.

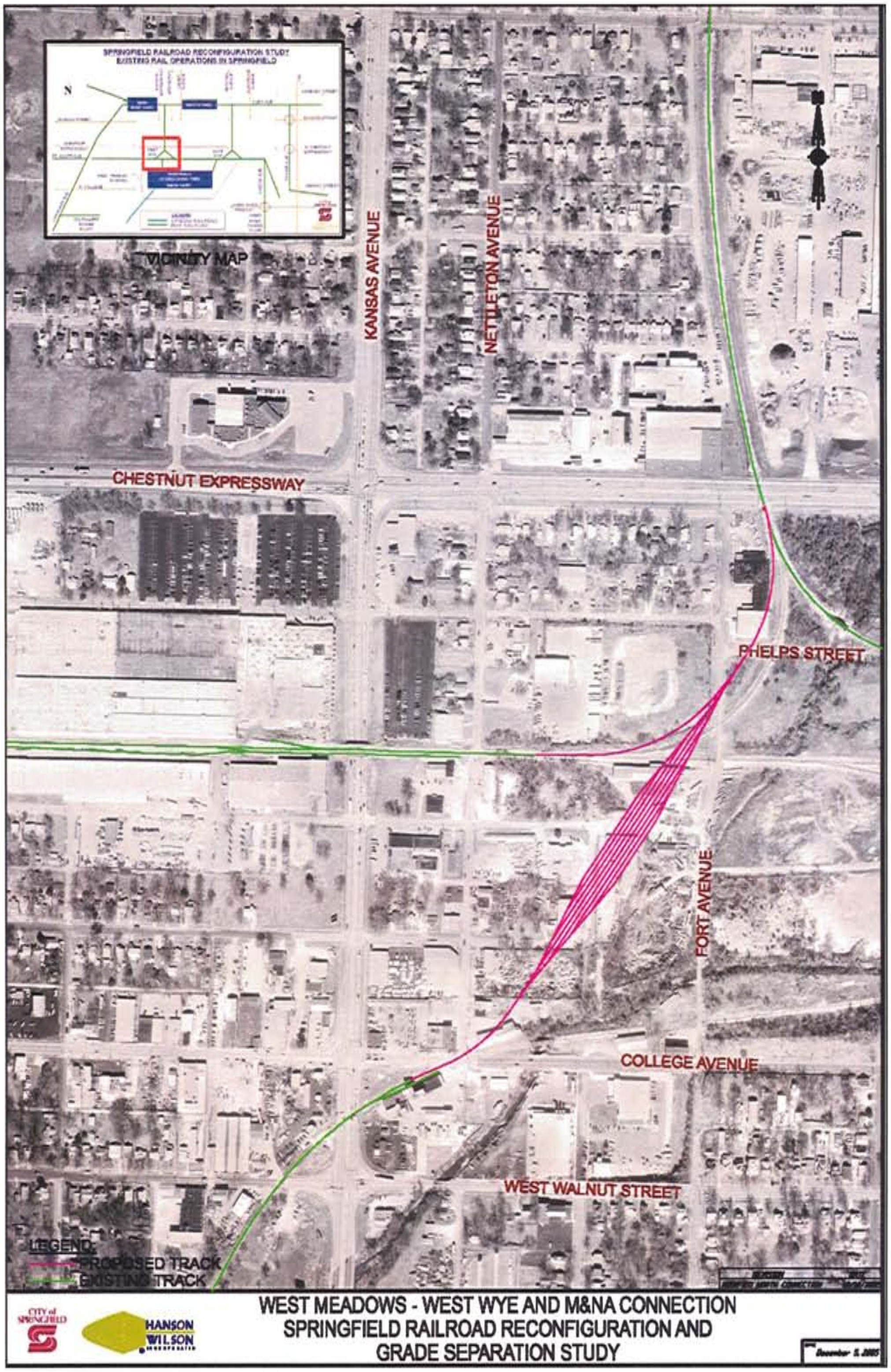


Figure 20 - West Meadows Alternate 2

West Meadows Alternative 3

Please refer to the following figure. The significant features of this alternative include:

- This scenario offers a track connection that maintains service between BNSF and M&NA. The connection uses a maximum 1% profile grade from the grade separation at Nichols Street to the connection at College Street.
- Because of the lowering of the track at Chestnut Expressway, this option offers the ability to create a grade separation at Chestnut Expressway. Chestnut Expressway's profile grade is in a "sag" curve at this location and lends to the creation of a grade separation. The grade separation may affect the City Owned property in the northwest quadrant with driveway entrance modifications and may require retaining walls at the northwest and southwest quadrants.
- The interchange tracks could be replaced by adding tracks on either side of the existing BNSF serving track located north of Chestnut Expressway. These track additions would require the construction of two adjacent bridge structures and associated retaining walls at Nichols Street. Webster Street would be proposed to be closed since the additional tracks would be used as storage and have railcars occupying the tracks for long periods of time.
- Additional storage and functionality replacement would be required off-site.
- Replacement storage and functionality for the M&NA is also offered by this option by the creation of a "shuffle" yard adjacent to and along the west wye leg. This yard would enable M&NA to sort the railcars for delivery to their customers.
- Property acquisition would be required near Phelps Street, Nettleton Avenue and Waters Street. Existing rail served customers would require relocation.
- Trackage ownership and operations agreements would require modification or creation.
- Rearrangement of some city streets would be required in this scenario.
- This scenario supports the goals of the West Meadows Park very well by reducing or eliminating track within the proposed park area.
- It would appear that of the 4 scenarios considered, the probable construction costs the on-site modifications depicted by this scenario may be the highest of the four.

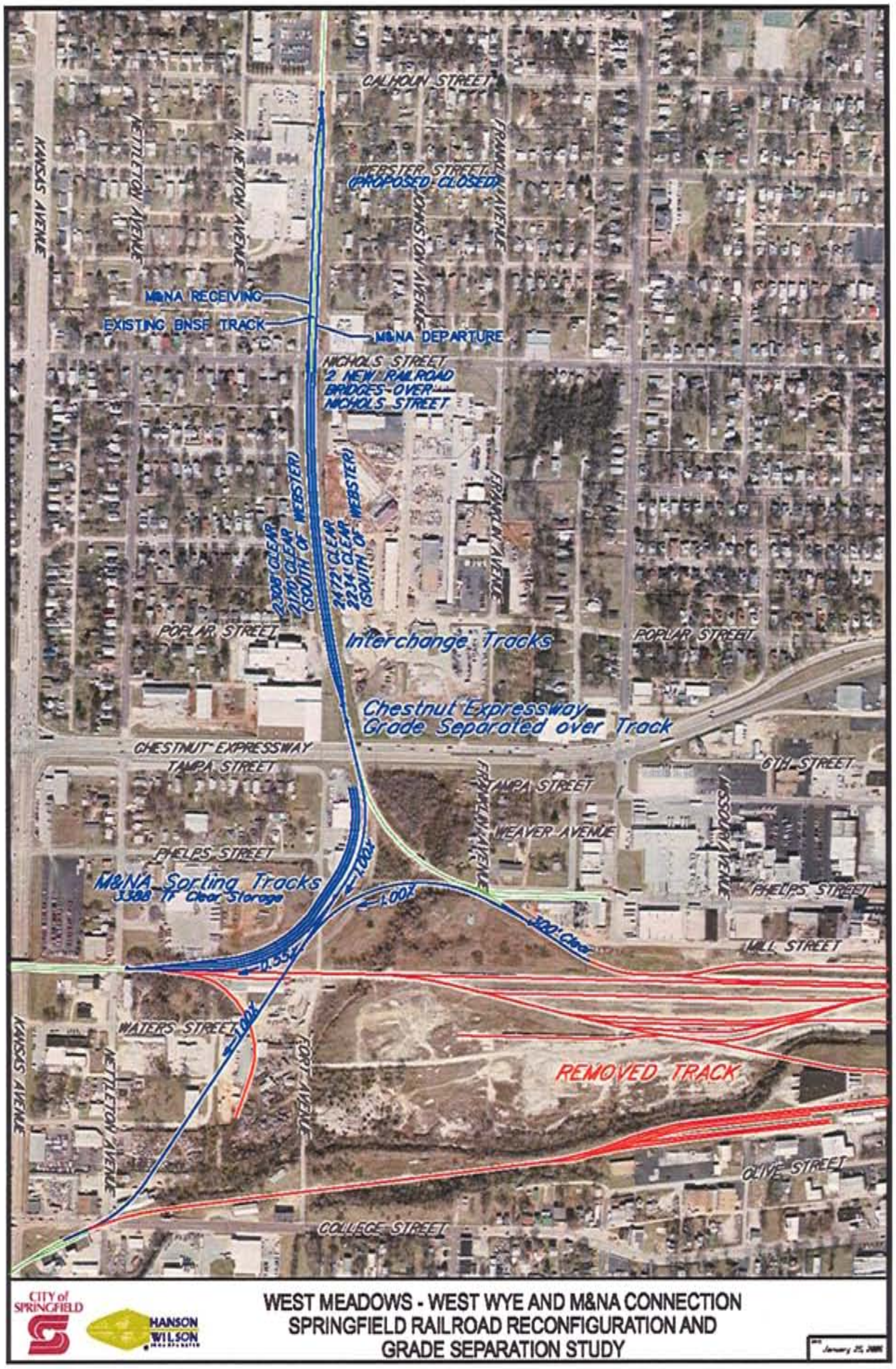


Figure 21 - West Meadows Alternate 3

West Meadows Alternative 4 – Preferred Alternative

Please refer to the following figure. The significant features of this alternative include:

- This scenario offers a track connection that maintains service between BNSF and M&NA and offers replacement functionality of the interchange yard in a location near the existing interchange yard. Profile grade for the connection track between the interchange yard and the M&NA connection appear to not exceed 1%.
- Property acquisition would be required near Nettleton Avenue and Fort Street and existing rail served customers would require relocation.
- Track ownership and operations agreements would require modification or creation for this scenario.
- Provides for Rail-to-Truck/Truck-to-Rail transfer via a truck dock.
- Additional storage and functionality replacement would be required off-site.
- Minor relocation of city streets would be required by this scenario.
- This arrangement does not achieve the goal of removing all tracks from the West Meadows area, but it does enable a significant portion of the park construction and provides a "hard" boundary to the north and west.
- It appears that the probable construction costs may be the lowest of the scenarios considered.

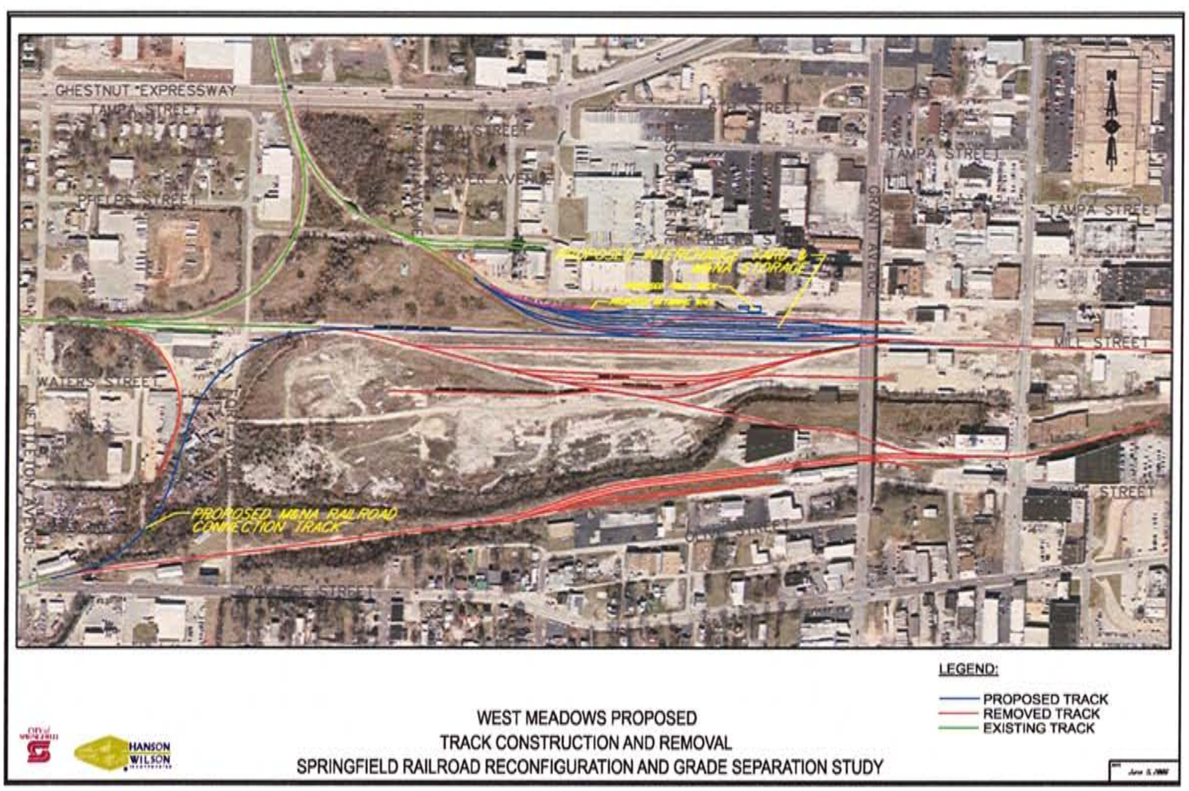


Figure 22 - West Meadows Reconfiguration - Recommended Track Reconfiguration

An artists rendering of the proposed West Meadows Railroad Reconfiguration is in the following figure:

Figure 23 - Artists Rendering of the West Meadows Reconfiguration

Recommended Arrangement -Track Ownership and Operations

A proposed track ownership arrangement within the West Meadows area, subject to final track design and railroad negotiations, is offered below. The concept suggest that the connection track at the M&NA near College Street to the connection of the existing track just west of the proposed Interchange Yard be owned by UPRR. The ownership of that track to the east and the next two tracks within the Interchange yard is proposed to be owned by UPRR. All other track would be owned by the BNSF. Again, this proposal is subject to final design and railroad negotiations. The existing track depicted in the figure below represents BNSF track in-service today and that track ownership would remain BNSF's.

Train operations within the interchange yard may be very similar to those that occur today. Trackage rights agreements and dispatching procedures may require some modifications, but would remain substantially similar to today's procedures. Maintenance would likely be similar to today's maintenance operations with minor modifications to maintenance limits required.

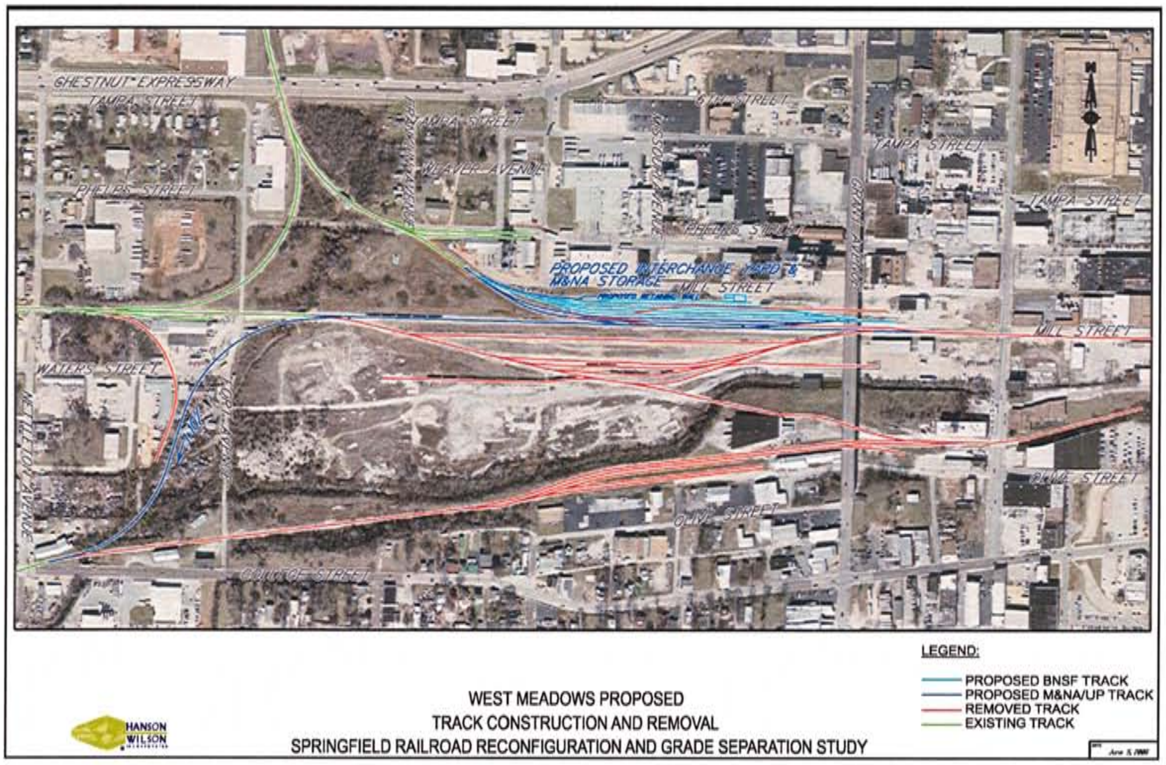


Figure 25 - Example Track Ownership - Preferred West Meadows Arrangement

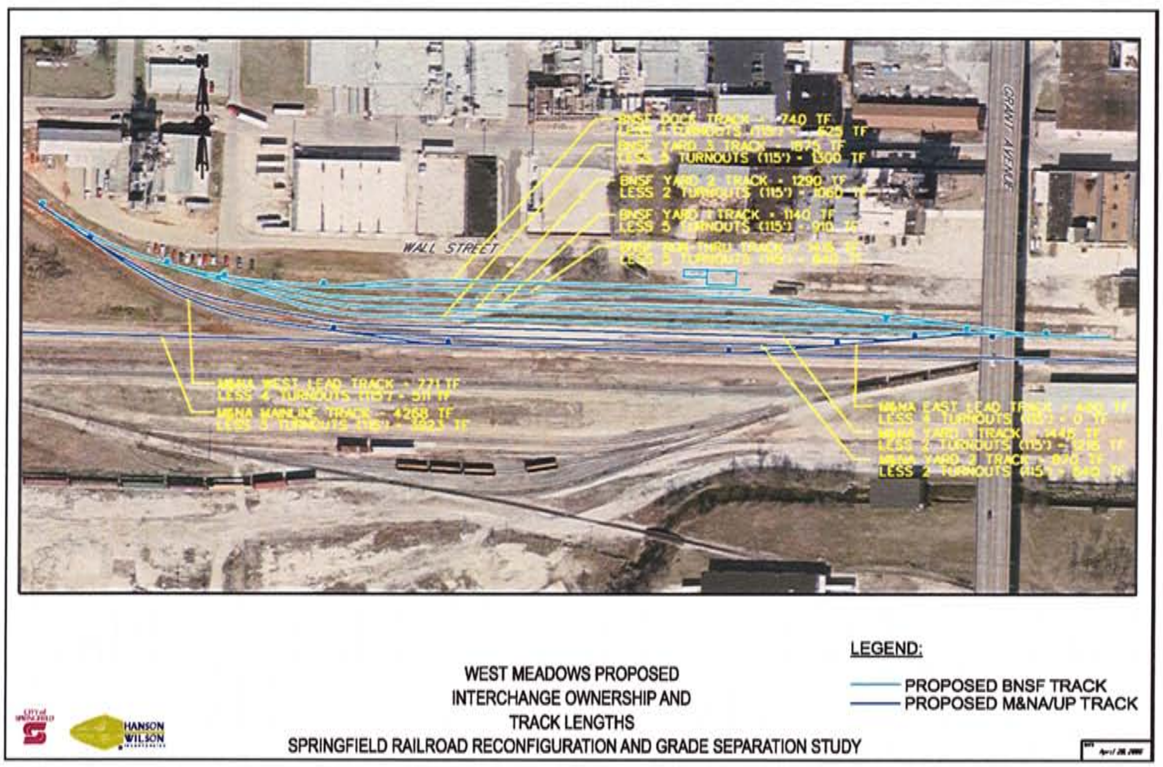


Figure 24 – Example track ownership at interchange yard

Replacement Functionality and Storage Requirements

The quantification of operations functionality and track storage within West Meadows is necessary to determine the required off-site improvement work.

Existing Functionality, Local Storage and replacement considerations within West Meadows

Train service functionality loss can be determined by reviewing the proposed track removal plan and understanding today's current train operations. There are several existing train service functions that will be impacted by the removal of track:

- Customer relocation impacts – there are several customers that are served within the limits of the West Meadows Park area. The plan indicates that those customers would lose service and therefore, require either a change in service modes (i.e. commodity delivery by truck or some alternative means) or a change in plant location. In most cases, the latter change will be required. Prior to any service interruptions, an acceptable site location for the customer and the railroad must be identified. Negotiations between the Railroad, City and the customer should be conducted to resolve a variety of issues including relocation costs (property acquisition, relocation costs, etc.), train service costs (operational impacts, storage track and operations serviceability replacement) among others. It is recommended that these issues be resolved with each customer prior to modifying/removing tracks from West Meadows which could result in a service delivery interruption.
- Removal of the west leg of the east wye track – the existing west wye serves several functions today. It enables trains the ability to serve customers that are located off the east leg and the western track and provides a direct access to the tracks used for interchange between the BNSF and M&NA. There is also the functionality of being able to turn a train at the west wye track.
- Removal of connecting track between the two wye tracks – between the two wye tracks is a connecting track. This connecting track can serve two purposes. It offers switching flexibility by enabling a train to depart the north yard, head south through the west leg of the east wye and continue into the interchange yard area. It can drop-off railcars or pick-up railcars and, via a switchback move, head north through the east leg of the west wye up towards the main and north yards. This results in the locomotives being able to "pull" the train through grade crossings rather than "push" the railcars. The second function that this track may serve is short-term storage of cars during preparation of delivery or pick-up or as a relief track when the interchange yard may become occupied.
- Reduction of available track for rail car storage – throughout the West Meadows area there are a variety of tracks that are used for general car storage, including tracks near the interchange yard and other, possibly former customer tracks. These tracks represent local storage capacity and will be replaced elsewhere.
- Interchange yard relocation – the interchange yard is presently located in the heart of the West Meadows Park. It will require relocation. Considerations of it's relocation include distance from its present location, "switch-ability", and storage capacity.

The following figure depicts a quantity summation of track lengths and number of turnouts within the West Meadows area. It should be noted that these are approximate track lengths as the distances have been measured from the recently (December, 2005) aerial photography. Detailed final survey and track inventory will be required finalize the quantities.

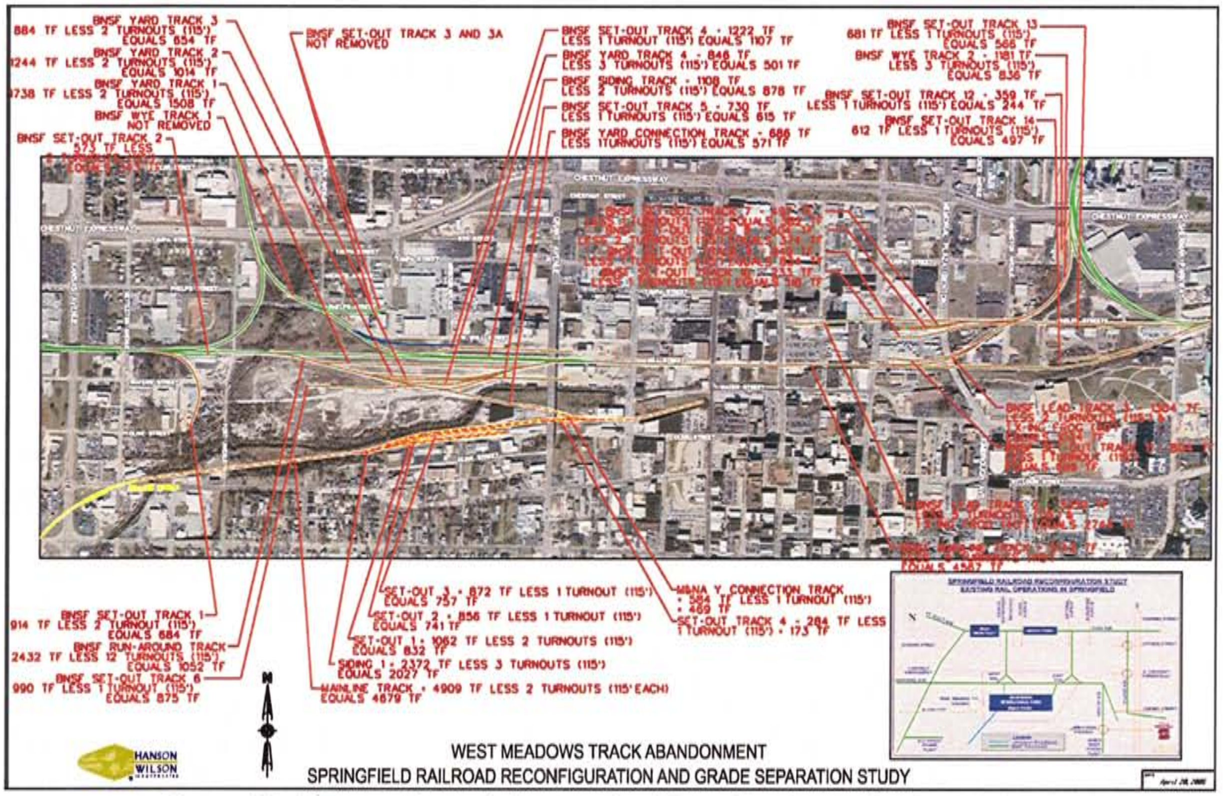


Figure 26 - Proposed Track Removals - West Meadows, Jordan Valley Park

Using the information gathered from the aerial mapping, the following table was developed that identifies track and turnouts within the West Meadows area and compares that to proposed track construction located outside and within the West Meadows area. The improvements identified on the right side of the table are discussed in the following pages.

It can be seen that the proposed improvements actually provides for slightly more replacement track length with fewer turnouts. However, 3 of the turnouts are considered mainline turnouts which may be CTC controlled turnouts. Ultimately, the cost of the differences may be determined and could be reimbursed to either party via a cash contribution.

Please also note that the length and number of tracks for customers that are served are not included in this quantification. The approach taken was that the relocations of the customers will be very site dependent and may include not only local storage capacity replacement, but also operational functionality replacement (i.e. the ability to run-around a cut of cars) to enable proper service. Therefore, the ultimate costs associated with the West Meadows project will be higher due to customer relocation.

BNSF Track Quantities Comparison
May 1, 2006

BNSF TRACK REMOVAL QUANTITIES				BNSF TRACK REPLACEMENT QUANTITIES			
BNSF TRACK	TRACK LENGTH (FT)	INCLUDED (Y/N)	TOTAL INCLUDED CLEAR	BNSF TRACK	TRACK LENGTH (FT)	INCLUDED (Y/N)	TOTAL INCLUDED CLEAR
MAINLINE TRACK	6681	Y	6681	WEST WYE TRACK	1627	Y	1627
SET-OUT 1 (ACTIVE CUSTOMER)[1]	684	N		NORTH STORAGE YARD	4803	Y	4803
SET-OUT 2	343	N		NSY RUN-AROUND TRACK[3]	1473	N	
SET-OUT 3 & 3a	1375	N		EAST CONNECTION TRACK	2370	Y	2370
SET-OUT 4	1107	Y	1107	WEST CONNECTION TRACK	2336	Y	2336
SET-OUT 5	615	Y	615	EAST WYE TRACK	4345	Y	4345
SET-OUT 6	875	Y	875	INTERCHANGE YARD			
SET-OUT 7 (ACTIVE CUSTOMER)[1]	382	N		BNSF 1	910	Y	910
SET-OUT 8 (ACTIVE CUSTOMER)[1]	374	N		BNSF 2	1060	Y	1060
SET-OUT 9 (ACTIVE CUSTOMER)[1]	834	N		BNSF 3	1300	Y	1300
SET-OUT 10	118	Y	118	RUN-THRU	840	Y	840
SET-OUT 11	689	Y	689	DOCK TRACK	625	Y	625
SET-OUT 12 (ACTIVE CUSTOMER)[1]	244	N		Chestnut Storage Track	2202	Y	2202
SET-OUT 13	566	Y	566	Bennett Street Storage Track	1511	Y	1511
SET-OUT 14	497	Y	497				
WYE TRACK 1	1544	N					
WYE TRACK 2	836	Y	836				
SIDING TRACK	1807	Y	1807				
RUN-AROUND TRACK	1052	Y	1052				
LEAD TRACK 2	2744	Y	2744				
LEAD TRACK 3	1034	Y	1034				
YARD TRACK 1	1508	Y	1508				
YARD TRACK 2	1014	Y	1014				
YARD TRACK 3	654	Y	654				
YARD TRACK 4	501	Y	501				
YARD CONNECTION TRACK	571	Y	571	25Yard Turnouts added			
30 Yard Turnouts and 1 Diamond Crossing removed				3 Mainline Turnouts added			
TOTALS	28649		22869		25402		23929
						DIFFERENCE	1060

Notes:
1. Assumes that active customers tracks will be replaced by the city at the new location within the city.
2. All track lengths exclude turnouts
3. The North Storage Yard Run-around Track is not added to replacement quantities as it is itself a "localized" replacement

Table 2 - BNSF Track Quantity Comparison, Removed vs. Replaced

Similar to the table above, the following table was generated to quantify existing tracks and turnout for the M&NA/UPRR. Using a similar approach the difference in replacement quantity indicates a deficit, or need to create additional track storage somewhere on the M&NA system. Adding roughly 900' of track as a storage track is very inefficient and likely not operationally functional. The "Sunshine Storage Track" is a location just south of Sunshine Street on the M&NA system that may offer a location for a siding construction. There is substantially more room available at that location than 900 track feet. Other locations for the track replacement may be at West Meadows or returned to the M&NA via an equity payment. It should be noted that there are 3 additional yard turnouts added to the system to ensure functionality. The value of the three turnouts equates to substantially more than an equivalent of 900 track feet. This would be worked out during the final negotiations.

MNA/UP Track Quantities Comparison
May 1, 2006

M&NA/UP TRACK REMOVAL QUANTITIES				M&NA/UP TRACK REPLACEMENT QUANTITIES			
M&NA/UP TRACK	OVERALL LENGTH (FT)	INCLUDED (Y/N)	TOTAL INCLUDED CLEAR	M&NA/UP TRACK	OVERALL LENGTH (FT)	INCLUDED (Y/N)	TOTAL INCLUDED CLEAR
MAINLINE TRACK	4679	Y	4679	INTERCHANGE YARD			
SETOUT TRACK 1	832	Y	832	MNA EAST LEAD	0	Y	0
SETOUT TRACK 2	741	Y	741	MNA WEST LEAD	511	Y	511
SETOUT TRACK 3	757	Y	757	MNA YARD 1	1216	Y	1216
SETOUT TRACK 4	173	Y	173	MNA YARD 2	640	Y	640
				MNA/BNSF CONNECTION TRACK	3923	Y	3923
				SUNSHINE STREET STORAGE	3215	N	0
7 Turnouts Removed				10 Yard Turnouts Added			
TOTALS	7182		7182		9505		6290
						DIFFERENCE	-892

Notes:
1.

Table 3 - M&NA/UP Track Quantity Comparison, Removed vs. Replaced

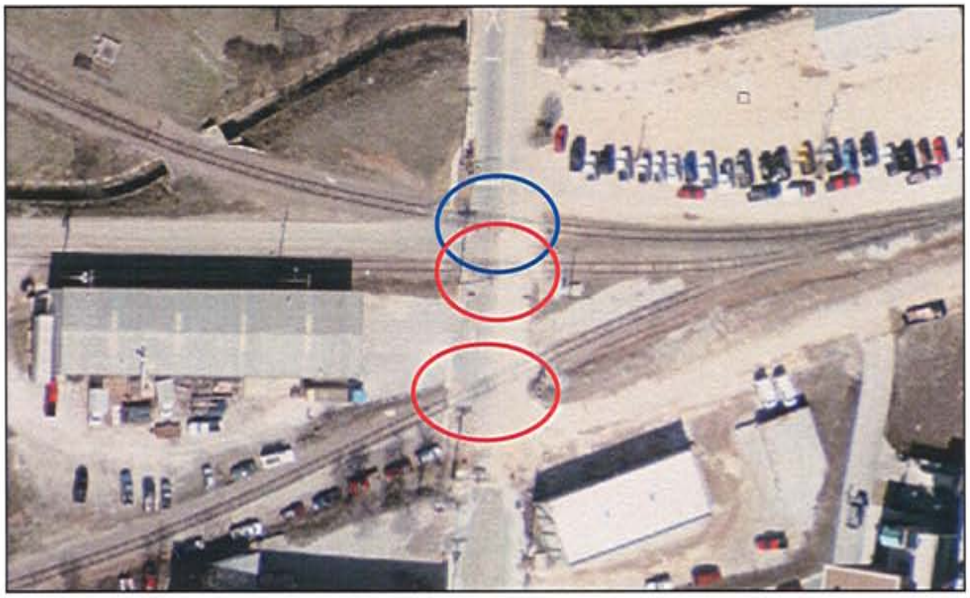
Other Related Benefits

As a result of track removals within Jordan Valley Park as related to the proposed ultimate configuration of the West Meadows Park area, there will be many at-grade, public and private, railroad crossings that will be removed from service. This will reduce the interaction between vehicles, pedestrians and trains.

There are 15 public at-grade crossings and at least 8 private at-grade crossings to be removed. There is an at-grade crossing of Fort Street by UP/M&NA, but it will be replaced with a new crossing at a different location, therefore it is not included in this count.

Of the 15 public at-grade crossings, there are at least 10 that are protected with cross-bucks, gates, flashers and bells or cross-bucks, flashers, bells or Cantilever Flashers, cross-bucks, gates and bells.

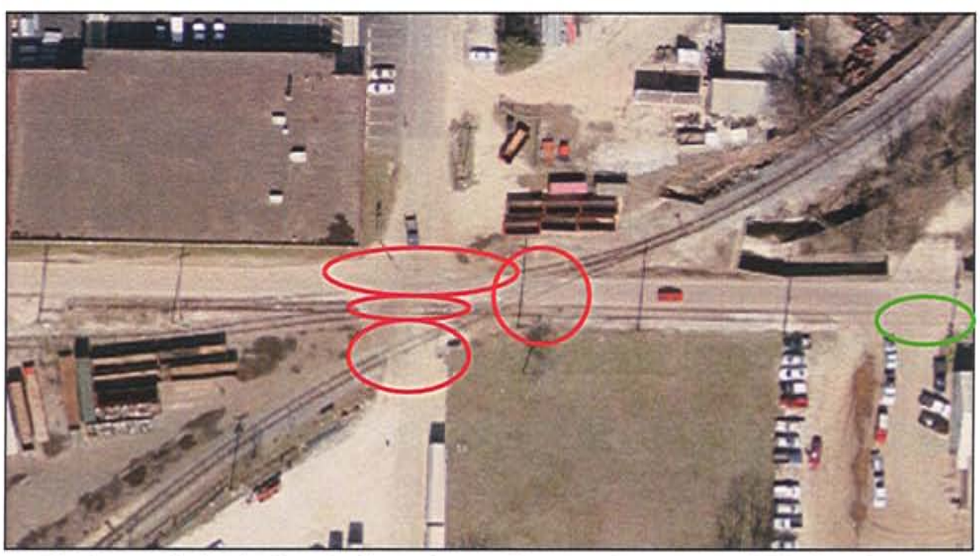
The following images depict at-grade crossings that may be targeted for removal. Red ovals indicate a public crossing, green ovals indicate a private crossing and blue ovals indicate crossing to remain.



Photograph 1 - At-Grade Crossings of Sherman Parkway

Photograph 2 - At-Grade Crossing at Jefferson Avenue

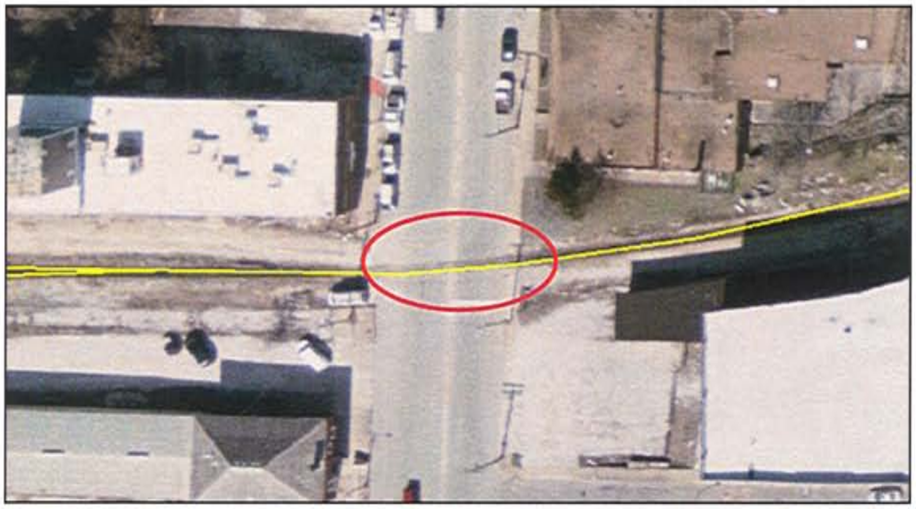
Photograph 3 - At-Grade Crossings at Main Street near Mill Street



Photograph 4 - At-Grade Crossing at Benton Avenue and Phelps Street

Photograph 5 - At-Grade Crossing at Boonville Avenue

Photograph 6 - At-Grade Crossing at Jefferson Avenue



Photograph 7 - At-Grade Crossing at Main Street

Photograph 8 - At-Grade Crossing at a Private Drive east of Grant Avenue Overpass

Photograph 9 - At-Grade Crossing at a private drive west of Grant Avenue overpass

RELATED WEST MEADOWS OFF-SITE ALTERNATIVES

During the course of the study, many locations within the Springfield region were examined as candidate sites for replacement functionality or storage. Working with the railroads and other stakeholders, the following list of improvement sites have been identified as viable contributors to functionality and capacity replacements.

Proposed West Wye Connection Track

One of the first needs identified was replacement functionality of turning trains, particularly rail trains as a result of this lost functionality in the West Meadows Park.

Photograph 10 - Southern Connection - Proposed West Wye Connection Track

Photograph 11 - Northern Connection - Proposed West Wye Connection Track

Photograph 12 - Proposed West Wye Connection Track - Road Crossing Location (easterly viewpoint)

Several locations were examined for creation of a Wye track (see figure below). This site is located west of the Main Yard and is between the Ft. Scott Subdivision tracks to the northwest and the Cherokee Subdivision to the southeast.

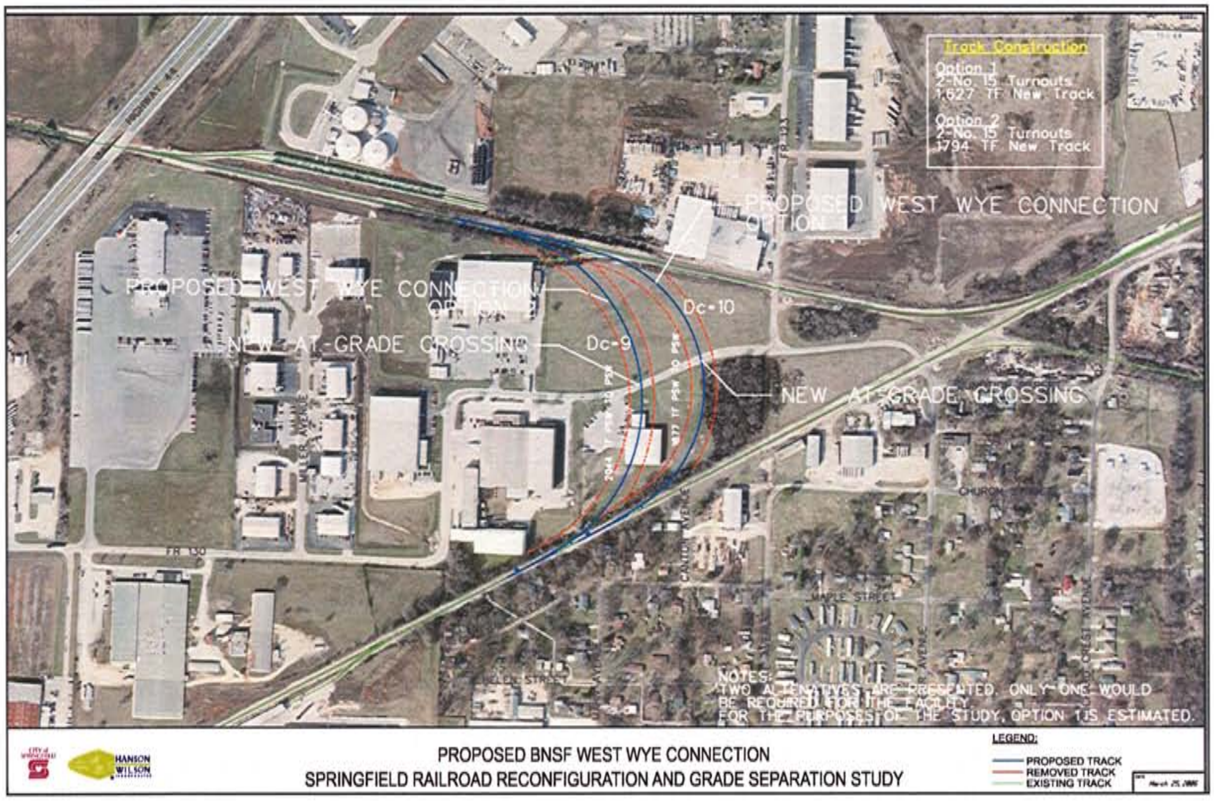


Figure 27 – Proposed West Wye Connection Track

The site offers numerous features and benefits:

- Functionality replacement to turn a train is restored.
- Through-movements for trains traveling between the Ft. Scott and Cherokee subdivision are enhanced as trains will no longer need to enter the Main Yard and perform any locomotive switching. The direct result is improved system velocity. It is not known at this time how many trains are using the Main Yard to continue travel from the Ft. Scott to the Cherokee Subdivision and vice versa. The number of trains that no longer need to use the Main Yard may enable a reduction in local storage requirements at the North Yard and consequently, the number of tracks proposed for construction in the North Yard may be reduced.
- The indirect benefit of trains that travel between the Ft. Scott and Cherokee Subdivision no longer needing to use the Main Yard is that of reduced storage needs. This may enable additional storage capacity that is lost in West Meadows to be replaced within the Main Yard or the North Yard. That

capacity quantity is relative to the number of trains that would travel between the two subdivisions, which is unknown at the time of this writing.

- The site is nearly unencumbered.
- The turnouts that are installed in the mainline tracks will be Centralized Traffic Controlled (CTC) and have switch heaters which will cause the construction cost of the connection to rise. There will also be the need fully protect the new at-grade crossing with warning devices inclusive of Gates, Bells, Cross-bucks and Flashers.
- Two options are identified with varying track curvatures. Option 2 will permit higher train operations speeds but will require the acquisition of the adjacent building. Option 1 is therefore estimated in the study.

Proposed Connection Track and North Yard Storage Additions

The next candidate identified includes the construction of a connection track between the north-south track west of Broadway Avenue that serves West Meadows and the North Yard plus the continuation of the connecting track east of the North Yard to a point just west of National Avenue where the Kissick Subdivision ties-in to the existing Cuba Subdivision.

Photograph 13 - Railroad Bridge at Grant Avenue (Viewpoint North)

This site offers the following features and benefits:

- Because there is lost through train capabilities in West Meadows, it is essential that a replacement connection be available. This proposed connection track provides that replacement connection.
- Today, local switching operations require the use of the existing mainline tracks between the Main Yard and the Kissick Subdivision. The proposed connection track will enable local switching to move independent of the mainline track, thereby indirectly increasing the system velocity and directly reducing delays to switching operations.

Photograph 14 - Railroad Bridge at National Avenue (Viewpoint North)

- Additional storage tracks can be added at the North Yard that will help satisfy lost storage track in the West Meadows area.
- It is possible that the grain elevator located at Broadway may have to be razed in order to construct the connection track.
- A sister railroad bridge will be added to the Grant Avenue overpass on the south side.
- Modifications to the bridges crossing at National will be required to add another track to the south side.

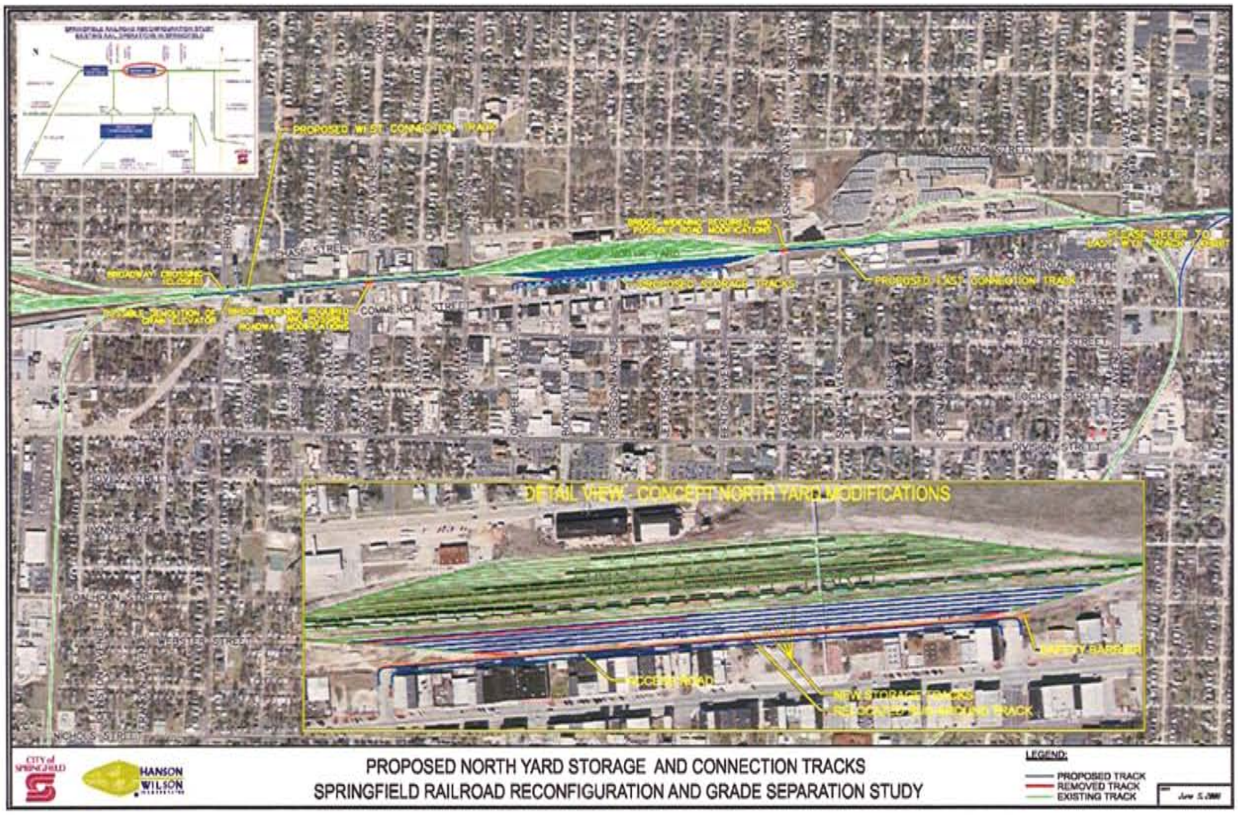


Figure 28 - Proposed Connection Track and North Yard Storage

A general note about bridge modifications along this proposed connection track should be offered. The approach taken to build the additional track was to perform only those modifications to the existing structures that are necessary as required by constructing the additional track. Therefore, replacement of the existing structures is not a consideration of this approach. Clearances beneath the structures are shallow (11'-6" at Grant Avenue and 14'-0" at National Avenue). The study investigated existing utilities beneath the streets at both locations and discovered that Grant Avenue appears to only have a 2" Natural Gas line running under the street. However, Grant Avenue does have a network of storm drainage lines passing beneath and across the road at the bridge (See figure below). Measurements were taken at the manholes and there is only 1.75' from the top of the manhole to the flowline of the pipe. This would be a limiting factor for lowering the road unless the storm lines are relocated or another manhole is identified that the new lines could be routed.

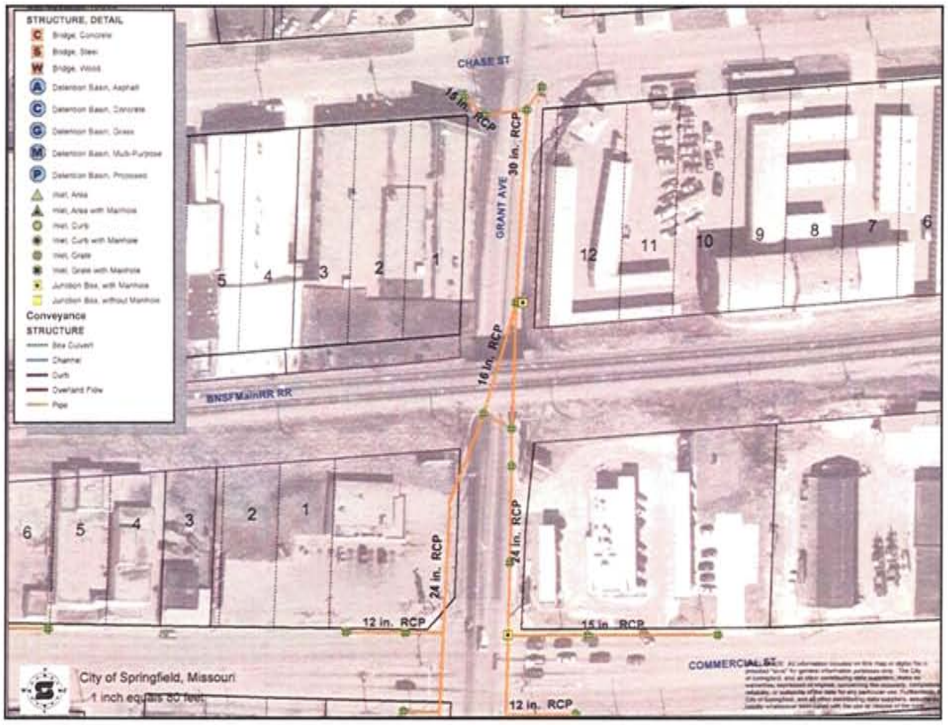


Figure 29 - Grant Street Storm Sewers

The National Avenue bridges do not have as great a clearance issue as Grant Avenue, however it does offer significant utilities challenges. At National Avenue there is a 8" water line and two reinforced concrete pipes on both sides of the street (see following figure). The flowlines on the storm sewer lines are at a similar depth as those at Grant Avenue. There is a measured 1.65' from the top of the manhole to the flowline. This is a limiting factor for lowering the profile grade of the street.

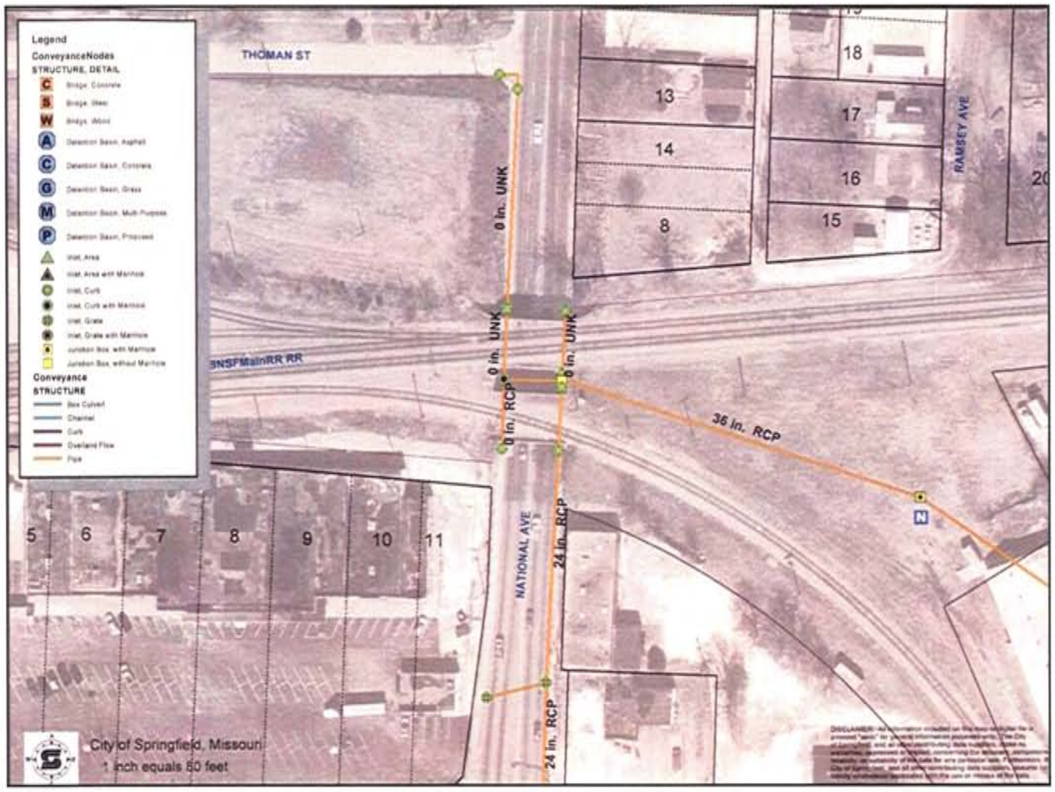


Figure 30 - Storm Sewers at National Avenue

Within the North Yard there appears to be sufficient room to add tracks for replacement of storage tracks lost in the West Meadows. The number of tracks to be added is restricted due to utility easements and pedestrian overpass foundations. There is also an opportunity to provide a separation between the general public and the yard by adding a security barrier between the track and the right-of-way line as depicted in the figure below. Arrangements depicted are subject to final negotiations and agreements between the railroad and the City. The concepts presented do not represent a final concurrence between each of those parties.

Figure 31 - Concept Layout of Storage Tracks in the North Yard

The arrangement depicted in the previous figure will require final adjustments as defined through negotiations between the City and the BNSF. As reference, the BNSF property continues to the face of the adjacent buildings that are addressed off of Commercial Street. There is a 15' utility easement for a natural gas line that runs from the property line north.

Photograph 16 - North Yard (westerly viewpoint)

Photograph 15 - North Yard - Pedestrian Overpass (easterly viewpoint)

The following schematics offer additional layout details for discussions.

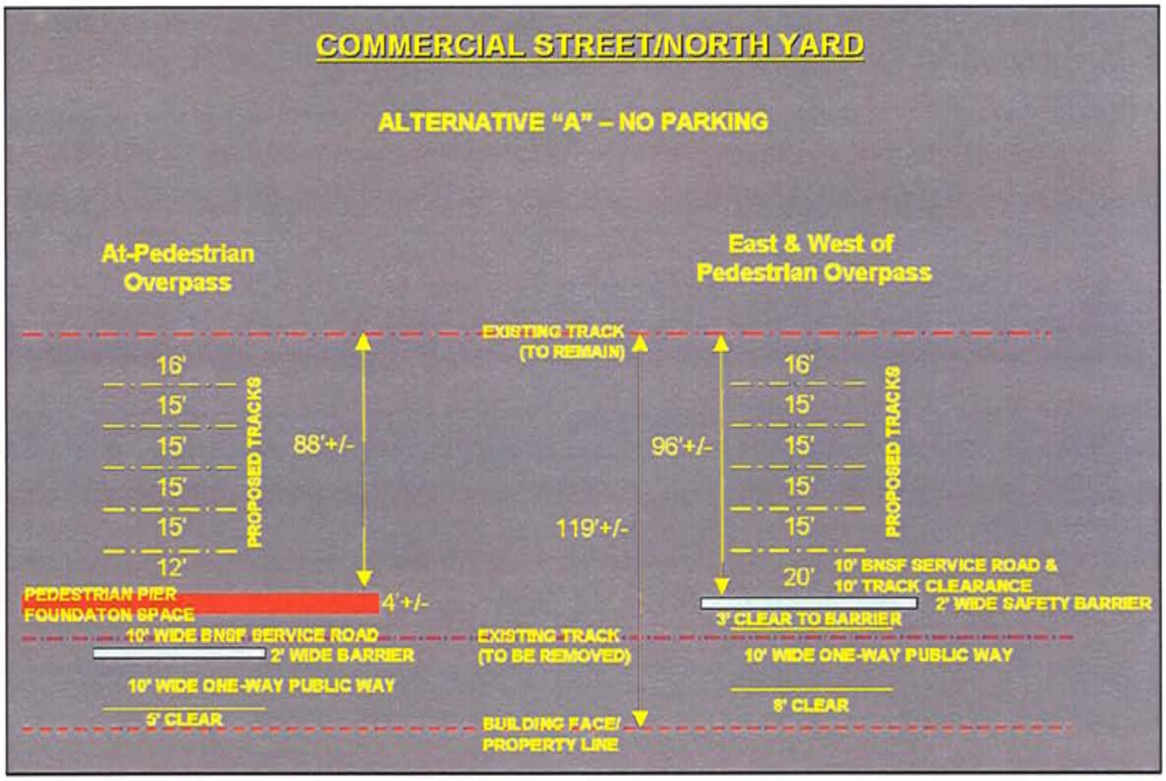


Figure 32 - BNSF North Yard/Commercial Street Alternate "A"

Alternate "A" depicts the development of additional yard tracks on 15' centers throughout the length of the yard. These tracks would contribute to the storage capacity loss seen in West Meadows. A service road for the railroad is also provided as a southerly boundary around the yard. At the pedestrian overpass there appears to be insufficient clearance to continue the service road on the north side of the pier, so it would transition to the south side of the pier. The addition of a "Safety Barrier" that will provide a hard boundary between the existing rail yard and nearby buildings and emergency public way. The arrangement also provides a single direction, one lane public way that is intended for emergency access to the adjacent buildings.

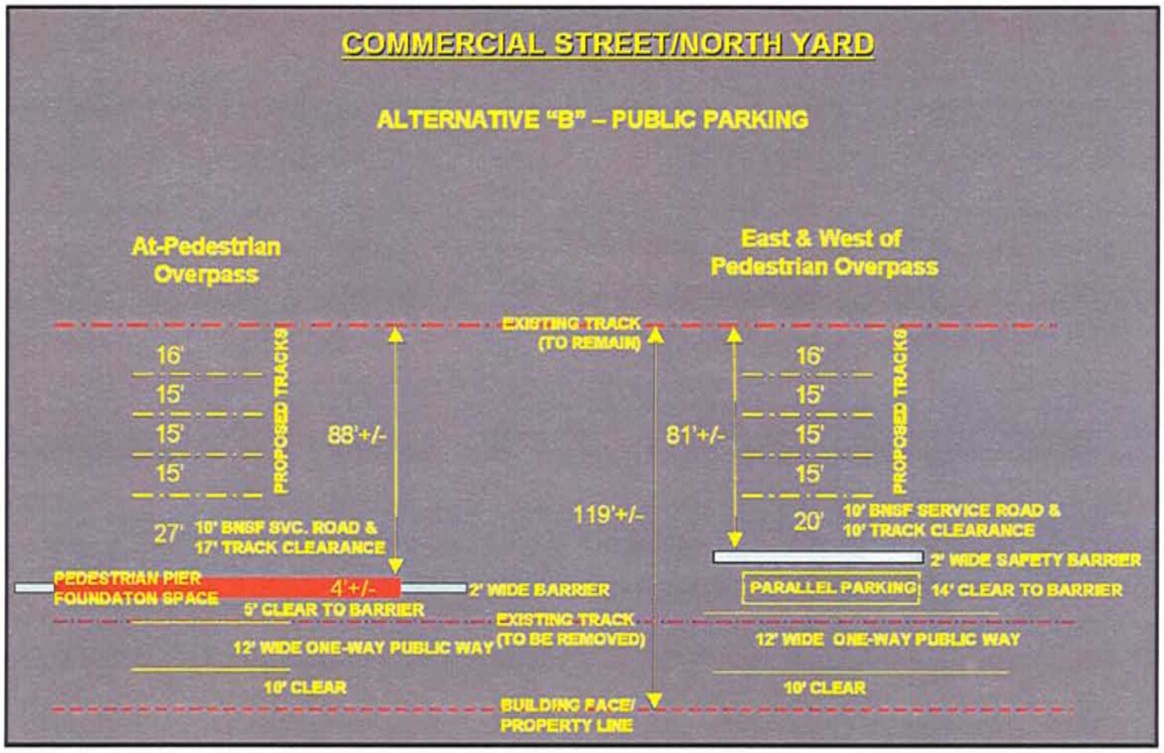


Figure 33 - BNSF North Yard/Commercial Street Alternate "B"

Alternate "B" attempts to accommodate the City's desire to have some parking capabilities north of the buildings addressed on Commercial Street. The geometrics will require that one less track be constructed than that which is offered in Alternate "A". This would require the identification of another location to provide equivalent storage capacity within the Springfield area without degrading train operations.

As in the previous arrangement, Arrangement "B" offers a railroad service road around the south boundary of the rail yard and a proposed one-way public thoroughfare that would be used for emergency and parking access. Limited parallel parking appears feasible along the north side of the public way.

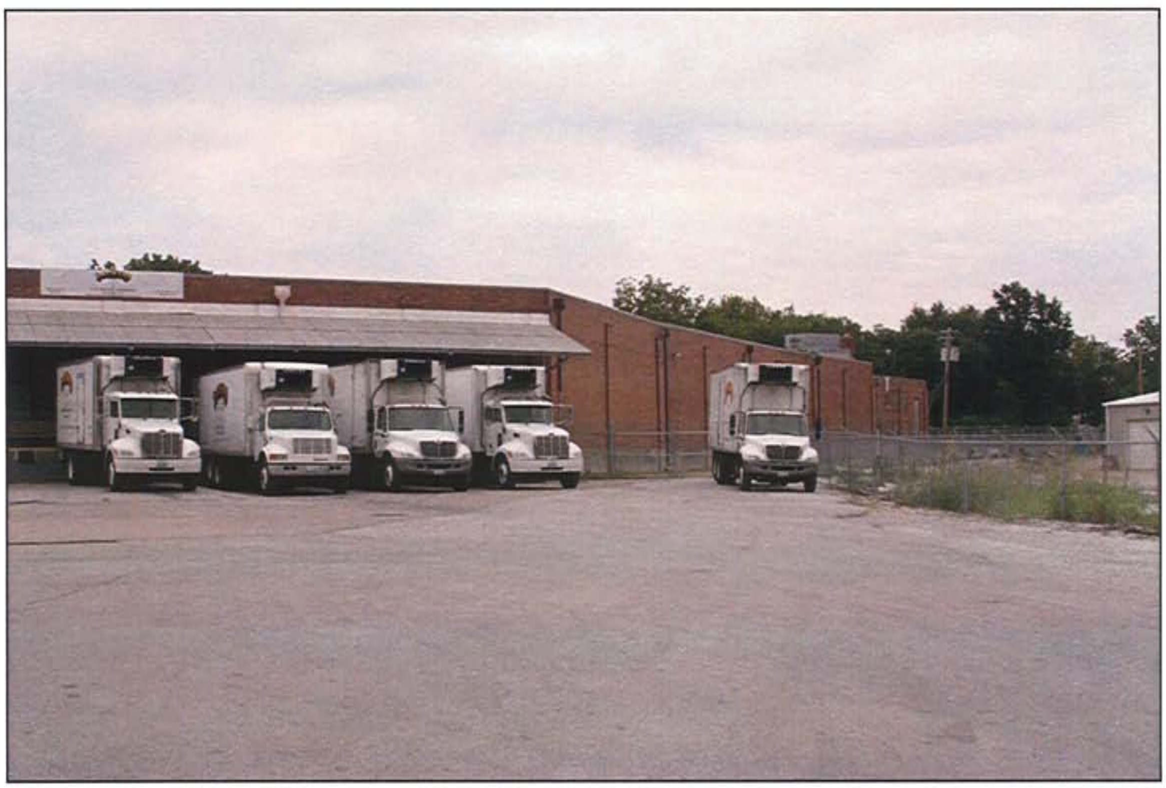
The safety barrier is proposed in this arrangement similar to that of the previous arrangement.

Proposed East Wye Connection Track

The next candidate offsite improvement extends the connection track from the North Yard to a point east of Weller Avenue and reconstructs the southeast leg of a former wye track.

Photograph 19 - Commercial Street at Proposed Crossing (westerly viewpoint)

Photograph 17 - Commercial Street at Existing Crossing (easterly viewpoint)



Photograph 18 - Proposed corridor - east leg of East Wye (northeasterly viewpoint)

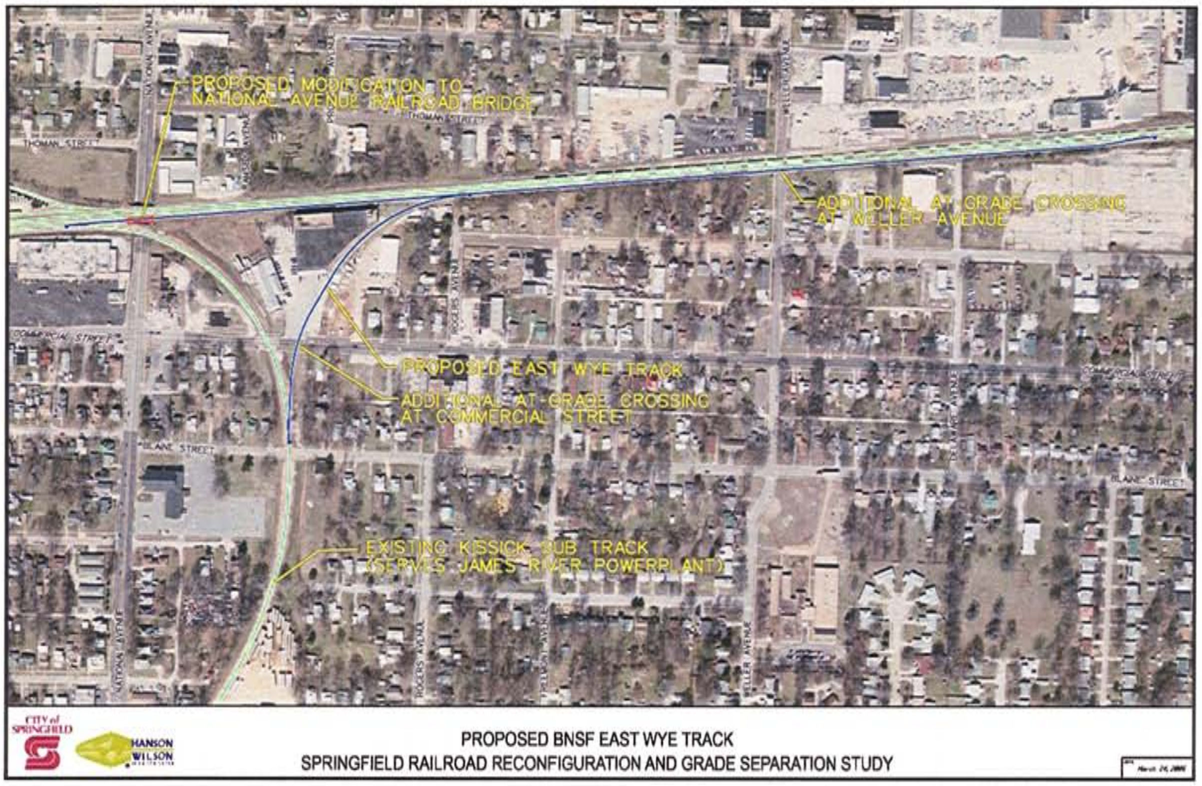


Figure 34 - Proposed East Wye Connection Track

The site offers numerous features and benefits:

- Functionality replacement to turn a train is restored as this represents replacement of the existing east wye within Jordan Valley Park.
- The extended connection track enables rail trains to be turned without affecting mainline traffic. This will contribute to increasing rail system velocities.
- The trackage represents replacement trackage from West Meadows and Jordan Valley Park.
- This will require property acquisition as the easement for the previous wye track has been relinquished to the adjacent property owner.
- An additional at-grade crossing of Weller Street will be required, however, it is anticipated that the southeast wye leg and connection track to the east would have minimal usage.
- A sister bridge would be required at Washington Avenue.

The existing utilities at the Washington Avenue Railroad Bridge includes a 16" water line that runs parallel to and possibly under the street. There are also a variety of storm sewer lines running along each edge of the street underneath the railroad bridge. Similar to Grant and National Avenues, the depth of the flowlines from the pavement elevation has been measured as 2.38' which would limit the ability to lower the grade profile of the street without finding alternative service for the sewer line. (See figure below)

Photograph 20 - Railroad Bridge over Washington Avenue (Viewpoint North)

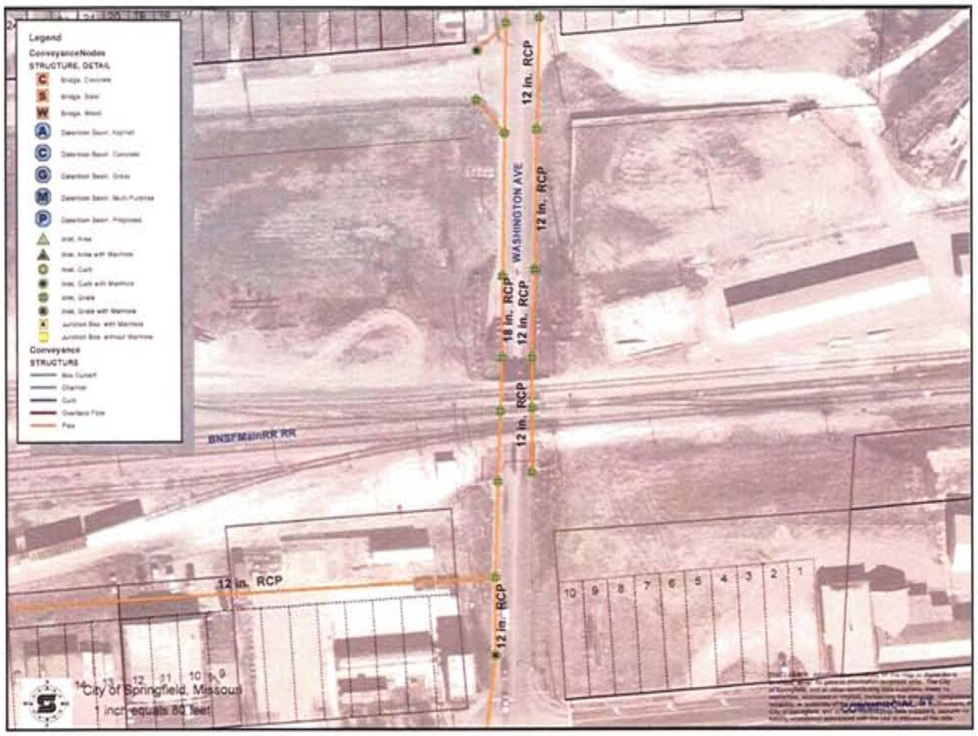


Figure 35 - Storm Sewers at Washington Avenue

Proposed Storage Track near Chestnut Expressway

The next candidate offsite improvement creates a new storage track between Fremont Avenue and Glenston Avenue parallel and between East Chestnut Expressway and East Trafficway. The storage track is direct compensation for local storage capacity lost in the West Meadows Park Development.

The site offers the following features and benefits:

- Local railcar storage capacity replacement.
- The proposed track does not cross any existing roads
- It appears that the track can be constructed on existing Railroad right-of-way.
- Constructing the track on the south side of the existing track will enable any drainage revisions proposed by the Corps of Engineers study to the creek to take place on the North side.

Figure 36 - Proposed Storage Track near Chestnut Expressway

Proposed Storage Track near Bennett Street

The next candidate offsite improvement creates a new storage track between S. Barnes Avenue and S. Willow Lane and between E. Catalpa Street and Bennett Street. The storage track is direct compensation for local storage capacity lost in the West Meadows Park Development.

The site offers the following features and benefits:

- Local railcar storage capacity replacement.
- The proposed track does not cross any existing roads
- It appears that the track can be constructed on existing Railroad right-of-way.

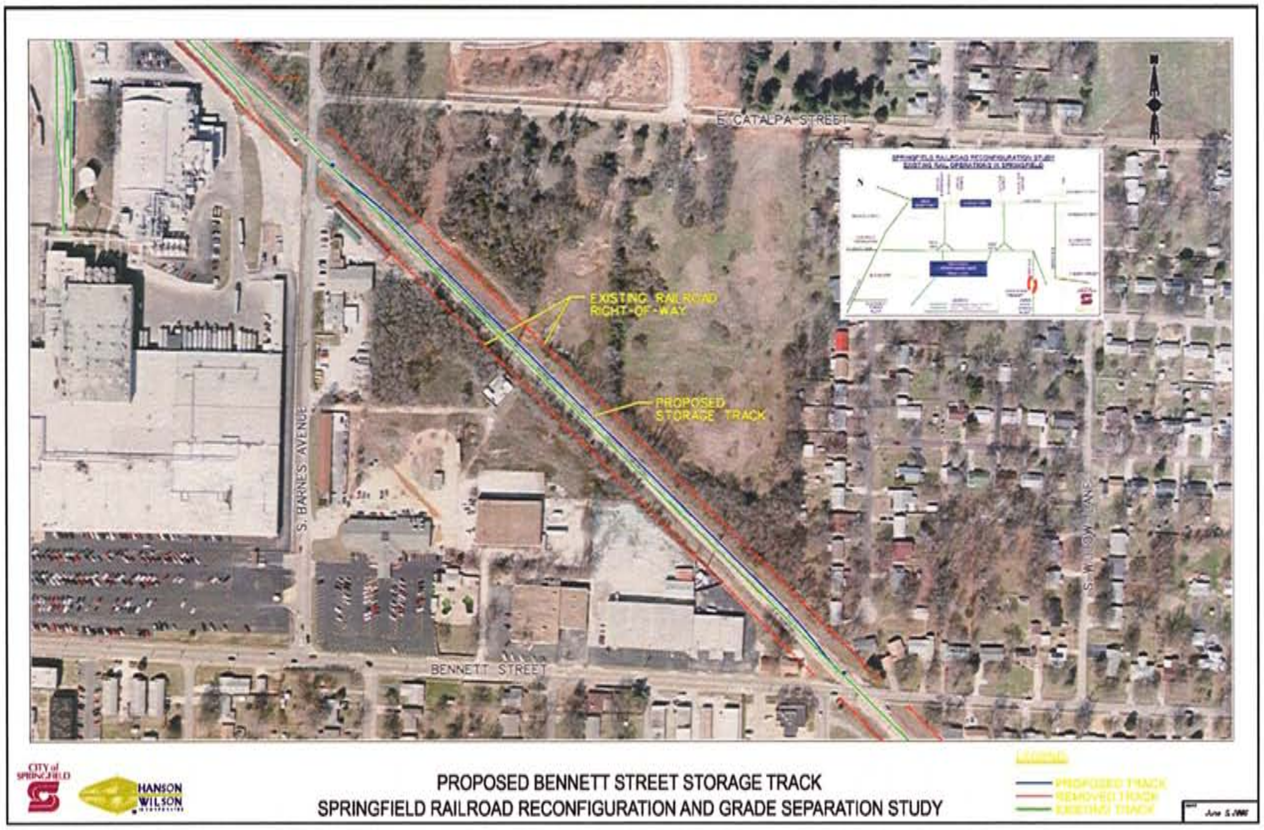


Figure 37 - Proposed Storage Track near Bennett Street

Conceptual Project Sequencing

The order in which construction activities occurs is very important in maintaining businesses that are operating in the area today and offers a clean operating transition for the coordinated delivery of railcars to the new interchange yard while ensuring that funding for each sequence is available (please refer to Section 9 for funding alternatives). Therefore, the following sequences are offered:

General Approach

1. Complete a Memorandum of Understanding between the railroads and the City that identifies the goals and participation of the project.
2. Identify and perform due diligence on properties that may be candidate sites for relocation of rail served customers while partnering with the railroads to develop an agreement regarding all aspects of the customer relocation.
3. Complete engineering for customer sites inclusive of rail access design.
4. Validate that rail service (or other means of commodity transfer) is viable throughout the time period of relocating the customers. (complete a rail operations service plan)
5. Complete customer relocations. It is likely that the timeline for customer relocation will not be coincident with all customers. The rail service plan for each customer must be reviewed to ensure that there are minimal (goal of zero) adverse train operations impacts to serve those customers. Should it be determined that other aspects of the project (such as track removal) could be accomplished prior to moving a customer, then the rail service plan (or alternate freight service plan) must be well defined and approved by the customer and the railroad prior to any work being performed.
6. In conjunction with customer relocations, perform the required environmental permitting work within the West Meadows and proposed off-site improvement locations.
7. In conjunction with all activities above, begin preliminary and final engineering and permitting for on-site and off-site improvements.
8. Complete sequenced offsite property acquisitions.

Site Specific Approach

1. Assume rail customers are relocated or otherwise satisfied.
2. West Wye Connection Track – perform grading, embankment preparation, roadway re-profiling, drainage and landscaping work by a general contractor. Track (ballast, ties, rail and turnouts) and signal work will likely be done thru BNSF. The installation of turnouts will be a time sensitive construction requiring no interruption in service to mainline traffic. Therefore, BNSF will install all mainline turnouts.
3. Connection Track and North Yard Storage Track Additions – perform utility relocations, grading, embankment preparation, structural, roadway re-profiling, drainage and landscaping work by a general contractor. Track (ballast, ties, rail and turnouts) and signal work will likely be done thru BNSF. The installation of

turnouts will be a time sensitive construction requiring no interruption in service to mainline traffic. Therefore, BNSF will install all mainline turnouts.

4. East Wye Connection Track – perform utility relocations, grading, embankment preparation, structural, roadway re-profiling, drainage and landscaping work by a general contractor. Track (ballast, ties, rail and turnouts) and signal work will likely be done thru BNSF. The installation of turnouts will be a time sensitive construction requiring no interruption in service to mainline traffic. Therefore, BNSF will install all mainline turnouts.
5. Chestnut Expressway Storage Track – perform utility relocations, grading, embankment preparation, drainage and landscaping work by a general contractor. Track (ballast, ties, rail and turnouts) and signal work will likely be done thru BNSF.
6. Bennett Street Storage Track – perform utility relocations, grading, embankment preparation, drainage and landscaping work by a general contractor. Track (ballast, ties, rail and turnouts) and signal work will likely be done thru BNSF.
7. Construct new Interchange Yard and Storage tracks within West Meadows – perform utility relocations, demolition, grading, embankment preparation, drainage and landscaping work by a general contractor. Track work (ballast, ties, rail and turnouts) will likely be done thru BNSF, but since it may be considered off-site, a general contractor for the track work should not be ruled out.
8. Adjust local streets alignments as depicted in final design plans.
9. Construct necessary drainage improvements in reflection of the Corps of Engineers flood plain project in the area of the M&NA/BNSF connection track.
10. Construct new M&NA/BNSF connection track within West Meadows – perform utility relocations, demolition, grading, embankment preparation, drainage and landscaping work by a general contractor. Track work (ballast, ties, rail and turnouts) will likely be done thru BNSF, but since it may be considered off-site, a general contractor for the track work should not be ruled out. This will be a time sensitive connection requiring no interruption in service utilizing a "cut and throw" technique to restore train operations.
11. Remove existing track and structures within the remaining areas of Jordan Valley Park – West Meadows.
12. Complete floodplain work.
13. Construct West Meadows Park.

It is anticipated that this effort may require upwards of 7 years to complete design/permitting and construction while coordinating with the availability of funding.

Urban Planning

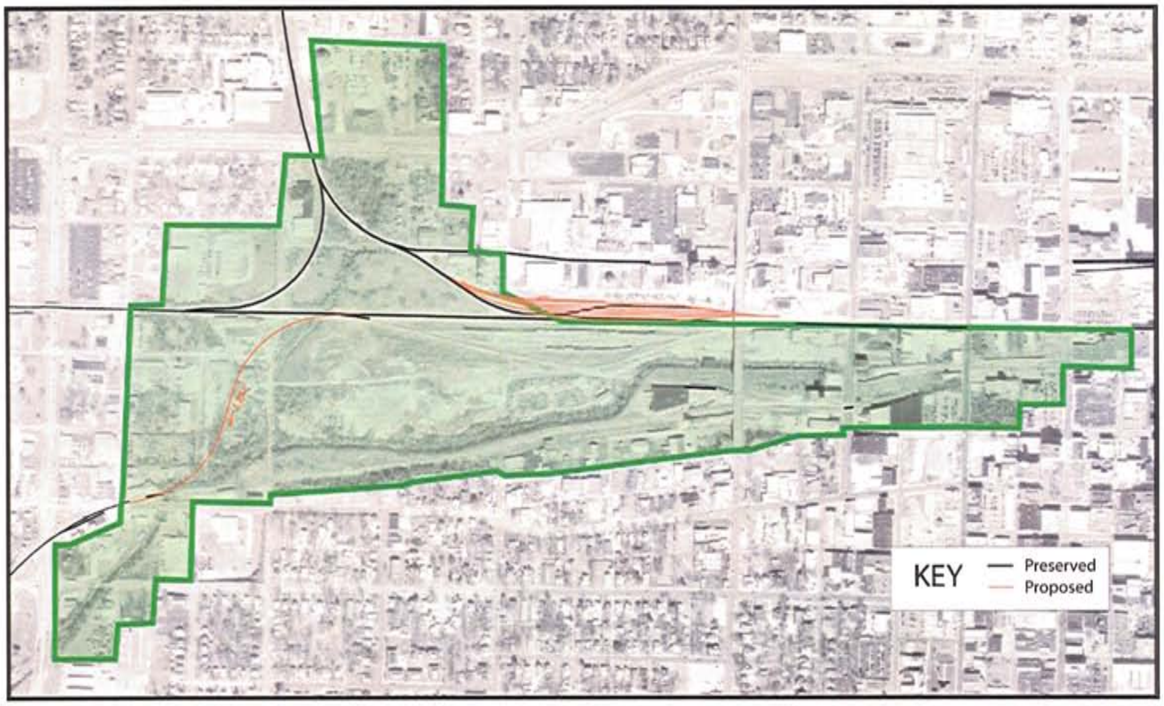


Figure 38 - Proposed West Meadows Boundary with Track Reconfiguration

Buffering Visual and Noise Impacts

Rail Realignment

The new configuration of tracks removes tracks from the central portion of the proposed West Meadows park area, which will allow for a wide range of opportunities for water, habitat, and both active and passive recreation to occur. However, it concentrates rail impacts on the west and north of the park.

In a sense, the new alignment presents a relatively “hard” boundary to West Meadows on those two edges.

It also removes from potential park use a section extending up to Chestnut.

To make the park feel more comfortable to use, the rail traffic will need to be buffered, as noise and vibration could interfere with the enjoyment of the park. Trees planted at close spacing could mitigate the view effects, but trees do little for sound attenuation.

It may be necessary to create earth berms, walls or some combination thereof in some high impact locations so that noise from train operations would be reflected back towards the tracks and away from the park.

Industrial Uses

While the tracks are not directly creating new industrial operations, their consolidation might attract some additional industrial users. Some of these might not have noise or negative visual impacts at all. Indeed, some industrial operations are interesting to watch from a distance. But some might produce distracting noises. The City might want to adopt a noise standard for the area.

Surrounding Uses: Compatibility and Relationships

Active Industries

The history and character of Springfield's city center has been marked by a variety of industrial uses that reflect agricultural products and processing. It is part of what makes the place unique and interesting. Industrial operations used to be strictly segregated from other uses –especially residential – because of what were considered noxious impacts. The was certainly true for some uses, such as steel mills and meat processing plants, but today many industries are relatively benign and can co-exist in somewhat close proximity to other uses. Indeed, in some cities, this combination is viewed as marketable; many prospective residents enjoy the idea of living in a lively, bustling area.

However, it is also the case that people in dwellings have a need for sleep during the night. There may well be some industrial uses that require compressors, early morning truck loading or deliveries, or have round-the- clock shifts with trucks and fork lifts emitting backing-up warning sounds. These characteristics do make it difficult to comfortably mix industry and housing. (Industry with retail and office is less problematic.)

The existing master plan suggests new uses like housing on the north side of West Meadows. Given that this area contains industries that will likely remain for some time, locating residential there is probably imprudent. Moreover, the downtown core, which is rapidly acquiring many residential conversions and new residential construction still has considerable long term potential for much new housing. Therefore, blocks in the vicinity of the south edge of West Meadows would be good candidates for housing, with the north side reserved (at least for the near/mid term future) for industry. The result would be a lively mixed-use area in which the park would be a centerpiece and an amenity for residents.

Existing and New Commercial

Downtown Springfield is in the process of being transformed. Once a retail center with department stores and many blocks of shops and services, it is finally moving out of a period of disinvestments one marked by a robust interest by the private sector. Small, locally-owned shops and restaurants are increasingly prevalent and a wide range of venues for music and culture have created new reasons for people to come downtown.

Downtown is also being seen as a popular place to live, with conversions of older structures into lofts as well as new development. The presence of residents is a key to attracting new retail. But the amount will still be limited, as it simply takes a lot of density to support significant amounts of retail business. Downtown Springfield may be echoing a pattern seen in many other older North American cities which a re evolving into a combination of living, entertainment, and small, unique shops, and eating places.

Future Uses, including Residential

In recent years, property owners have discovered that older historic commercial buildings can have a new life as residential uses. This phenomenon is being seen all across the country and it is certainly the case in Springfield. Conversions help establish the downtown as a viable place to live, especially among many people in the in their 20's and "empty-nesters" who are looking to downsize but live near enjoyable amenities, such as parks and restaurants. These tow demographic groups are influencing changes in the market place in many communities.

But eventually, developers will exhaust the inventory of older buildings that can be cost-effectively converted. Surface parking lots then become prime sites for infill development, and finally some older, less valuable buildings are demolished and replaced with new development. This can occur over decades, but in some cases, development can be accelerated with demand.

There is, however, a potential dilemma with the track relocation as currently configured. The over-arching, long-term objective is to create a park space in West meadows that can be enjoyed by the community as a unique pastoral setting within the city center. The secondary benefit of this is that such an amenity, if done right, can attract private investment, particularly in the form of residential development that can fuel demand for other economic activities.

However, in the configuration, rail yard operations continue, and perhaps are even enhanced by a more efficient layout of mainline tracks and sidings. If the rail operations produces noise, day and night, such as would occur from cars banging into one another, this could impair the desirability of the park and the likelihood of compatible development. So, it is not merely the physical arrangement of tracks that are important, but the operational characteristics as well.

Overlay District / Design Guidelines

Whenever a City contemplates dramatically altering the form and appearance of a district, it is important to adopt a new regulatory framework to ensure a desired character and quality of development. This is especially the case when a significant public investment is made in a place like West Meadows. Good developers want to be assured that if they bring in high quality projects, that what eventually surrounds them will also be of the same or better quality. All it takes is one or two low-grade projects to dissuade people from investing.

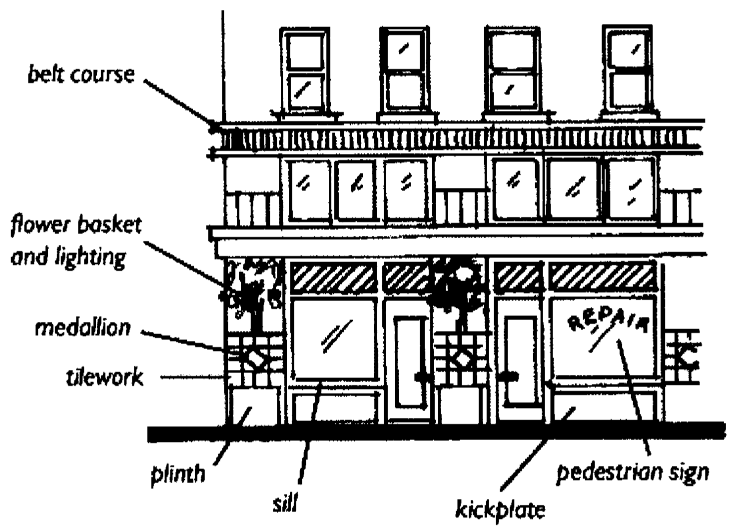


Figure 39 - Example Design Guideline for Redevelopment

The City should very soon embark upon an effort to bring its land use codes up to date. This should include simplifying them, disposing of old "baggage" and providing inspirational, illustrated standards that clearly convey expectations. The City should also be careful not to “sanitize’ the place too much, squeezing out the vitality and quirkiness. Much of the appeal of downtown Springfield in general and the area around West meadows comes from it being a wonderful mixture of old and new, big and small, refined and rough.

Street Network / Connectivity

Enhanced Streets / Streetscape / Sidewalks

The positive economic impacts of a new park like West Meadows can be significantly enhanced by upgrading surrounding streets. Such streets can be both an extension of the park and serve as a clear boundary. Enhanced streetscapes can also signal an approach to the place and can draw its energy and appearance into nearby areas.

Moreover, it is usually best to clearly separate development from park space so that the public realm is not usurped as private space. Streets make a clean distinction between the public and private domains. It is also frequently the case that large parks like West meadows can accommodate major civic functions with large crowds arriving by bus or on foot from parking lots. Adjacent streets should be able to be temporarily blocked off to control traffic or allow for spillover.

The City has already upgraded sidewalks in certain locations of downtown using a family of street fixtures, colors, and materials. These should be extended to the park to present a seamless continuity with the rest of downtown. But the park may also contain so features that are unique, such as water or artwork, so that it can become a place in its own right.

Finally, the management of parking should not be overlooked. On-street parking should be the primary parking source, so that park land does not get consumed for this function. Most park use occurs off-peak from other functions in downtown, so usually there is plenty of supply. But on-street parking should be managed and monitored to ensure that it is truly used by short-term visitors, rather than by employees all day.

New Streets

West Meadows is large enough to warrant improved access from multiple directions. Right now, access from the west is constrained and may be further separated by a consolidation of rail lines. A logical connection to enhance is West Phelps, which currently is a narrow, two-lane road passing under a railroad trestle having a low clearance.

Phelps could be widened and upgraded with sidewalks an street trees so that it can serve as a boulevard-type entry to West meadows from the West. Because the alignment of Phelps intersects

Figure 40 - Example Enhanced Streetscape

with several of the new rail line locations, this will require some sort of bridge or tunnel structure for the grade separation. The result, however, could be dramatic and even artful.

In addition, there may need to be a new street installed along the west boundary of West Meadows, principally to allow for access by service and emergency vehicles. This road might or might not be open to the general public; it could be a grassy swath reinforced below grade to accommodate vehicle loads and the alignment might incorporate a multi-use trail.

This service road, trail could also serve as a break between the park and the new rail yard to the west. The alignment could be flanked by staggered trees to create a solid green buffer. In addition, some sort of security fencing might need to be installed to prevent people from wandering into the rail yard.

Trails / Linear Park

West Meadows is, of course, one part of Jordan Valley Park, a linear collection of parks, open spaces and trails that are being developed along the north edge of downtown. As this evolves over time, there will be a need to extend walkways, bikeways, and trails into surrounding districts, campuses, and public facilities, so that people will have many choices of how to reach the park and move though it.

This long term vision would benefit from a master plan that will allow projects, whether public or private, buildings or streets, to contribute to the overall network. In some cases, the City may need to fund projects to ensure connectivity in the near term, rather than wait for redevelopment and infill. Some connections should be identified as high priority links to allow for inclusion in a Capital Improvement Program.

Figure 41 - Portland Streetcar System

Transit Potential

One of the interesting aspects of this area is that tracks already lace through the area. While these used to serve many industrial users (and, of course, some still do), there might be a possibility of converting some trackage to rail transit in the future. Many communities are finding that, as new residential development occurs in downtown, having a transit choice becomes important.

This is especially the case in communities that have a high proportion of students, as does Springfield.

Portland State University, in Portland, Oregon, for example, anchors one end of a new streetcar line that passes along the edge of downtown, serves several cultural institutions and a sports arena, and links to several intensifying urban neighborhoods. It is immensely popular and has stimulated restaurants and other retail uses. Along the line are a number of parks and open spaces, so that families are able to parking on the perimeter, hop on the train, and reach these public spaces and facilities without bringing their car tight into the core.

The City of Springfield should commission a feasibility study to examine alignments, technology, costs and revenues, and operational characteristics.

Potential Park Uses and Programs

<u>*Active Recreation: fields, stands, concessions, trails*</u>

West Meadows is a relatively large expanse of somewhat flat terrain. Once the tracks are removed that crisscross through the central area, there will be ample room for different kinds of active recreation. Precisely how many fields, which types and the extent of support facilities needs to balanced against needs for purely passive recreation space.

For the purpose of understanding the extent of area needed for fields, we have shown both a typical complex of four softball diamonds (with stands and concessions in the center) and a soccer field. These are placed in one of many possible simply for illustrative purposes. Further study would determine specific locations and arrangements.

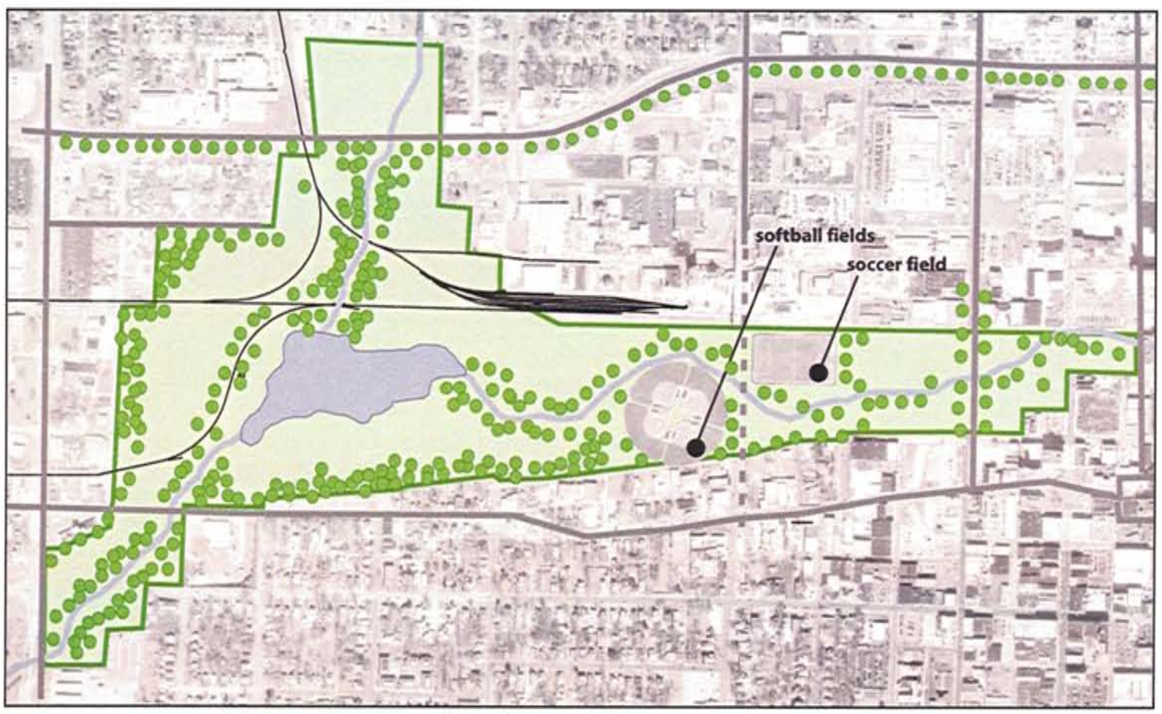


Figure 42 - West Meadows with Proposed Sports Fields

<u>*Passive Recreation: gardens, greens, plazas, squares*</u>

One of the great potentials of West Meadows is to offer a distinctly different set of experiences to the public than other areas of Jordan Valley Park. Although this is essentially a "brownfields" site, the land could be shaped and designed to re-establish vegetation and natural systems. The creek could be expanded and made into a unique body of water with associated wetland plants that can filter and clean run-off from nearby areas.

However, it also possible that some portions of the site should not be disturbed due to contaminants in the soil. In these cases, "caps" would be an approach, with the top made into grassy greens, hard-surfaced plaza areas, formal squares and other public spaces that could accommodate events and festivals where flat, open expanses are desirable. The effect still could be green, with trees and other vegetative understory, planted in both informal and formal ways.

The very term "meadows" embraces the notion of a very broad sweep of grassy space. This central feature could be famed by other smaller places that would provide "eyes" on the place and help animate it throughout the year.

One concept would be to place more formal, active and programmed venues one the east and south edges of West Meadows, with the central and westerly portion allowed to be more natural, pastoral, and passive.

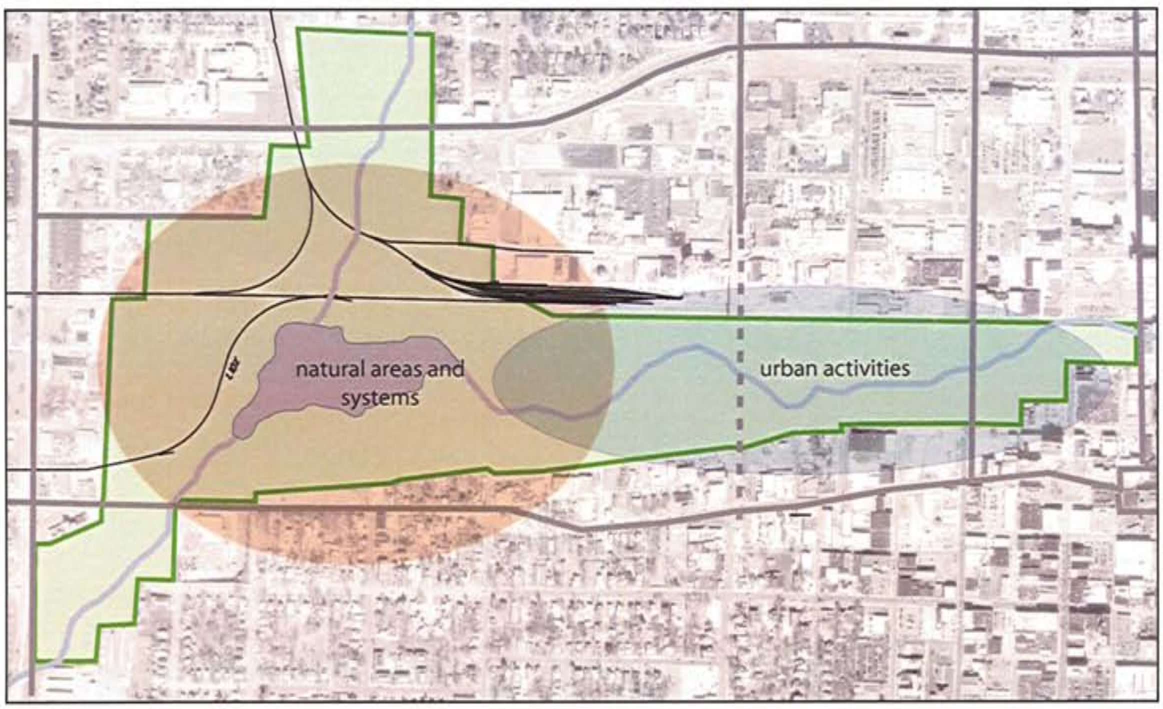


Figure 43 - West Meadows with Natural and Urban Areas

Interpretation: history, hydrology, geology, geography

The West Meadows area has many stories to tell. There is the rich history, involving settlement of the region and the town, the role of the railroad and the old station that used to sit on the site, the Civil War era, and many other aspects. There also the creek and its function and evolution and the rock and other conditions that lay below the surface.

West Meadows could contain a number of ways of interpreting this history so that citizens and visitors can learn about the people, events, and characteristics of the area in general and this location in particular. This could take the form of didactic graphic displays. It could also be done through unique artwork such as inlays in walking surfaces, artifacts placed about, seating or fencing designed with motifs that recall history.

The footprint of the old station might even be enhanced and become part of a hard-surfaced plaza space. In similar park in another city, the foundation of an old school was made into a sitting wall. The "floor" of the school was recreated in grass and serves as a stage for performances.

There will surely be many creative ways in the design of West Meadows to convey a distinct sense of place

Flood Plain / Wetlands / Water Feature

<u>Restoration of Wetlands</u>

The West Meadows site could be designed to incorporate a major wetlands that would be a unique feature of Jordan Valley Park. The creek could help supply the wetlands with a source of water and the combination of water and wetlands-associated vegetation could create a habitat for birds and small mammals.

There a now many successful examples of wetland settings be re-established. The science has advanced in very significant ways in the last ten years. It is also possible that excavation required to create a low spot could be used to cap over other areas of the site and/or to create berms and hillocks. This notion of retaining, reusing and re-arranging soils has become a well-established practice in brownfields sites.

For example, there is a large park in Amsterdam called "Westergasfabriek" which had for more than a century been the site of heavy industry and rail operations. Today, after five years of redevelopment, it includes true wetlands, a canal, a unique water feature that serves as a sort of "urban beach," and a number of plazas and squares for cultural and entertainment uses.

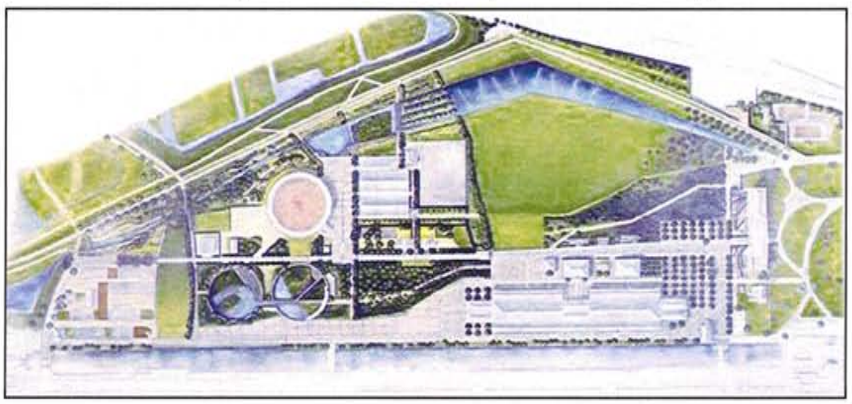


Figure 44 - Westergasfabriek - Amsterdam

Similarly, the former rail yards area on the north side of downtown Spokane, Washington, is now an immensely popular combination of grassy knolls, watercourses, playfield, planted hillocks, and groves of trees, Intersperse among the natural setting are places for concerts, festivals, and annual events like a runner's marathon.

<u>Storm Water Management: retention / detention / release</u>

A development called "Pickering Place" in Issaquah, Washington has a wetlands as a central feature that captures run-off from surrounding development and sends it into a basin lined with grasses and cat-tails. There are footbridges and plaza areas that have incorporated art in surprising ways. Many community events are held there throughout the year.

In an even grander fashion, the Platte River Valley on the north side of downtown Denver has evolved into a near neighborhood. A collection of residential and mixed-use buildings face a broad sweep of waterway and wetlands that has become a great "commons" for both nearby residents and the larger community. The presence green spaces, where there was previously industry and rail lines, have stimulated considerable private sector investment.

Clearly, restoring and creating natural features makes sense not just environmentally, but from and economic and fiscal perspective as well.

Figure 45 - Pickering Place in Issaquah

Permanent / Sustainable Water Bodies: creek, possible pond

In order to create a system of water bodies and waterways that can be sustained over time, will require expertise of botany, biology, urban forestry, hydrology and limnology. Water features have been created that necessitate high degrees of on-going maintenance and operations. But the current approach is to set in motion a set of interactive biological relationships that can maintain themselves with much less human intervention.

This requires the creation of soils, water quality, combinations of sun and shade, water-related plants to create a habitat for a range of fish, birds,a nd small animals. These can co-exist in settings relatively close to where people are living and conducting commerce, so long as there are some areas that are protected from access by people. This requires a careful treatment of shorelines and edges of streams so that abundant vegetation can absorb filter run-off, as well as devices such as boardwalks or permeable paving surfaces rather than hard pathways or trails.

The result for West Meadows could be a splendid new natural amenity that functions serves as an environmental setting as well as a place for people to understand the forces of nature.

Figure 46 - Example Pond with Natural Landscaping

Environmental Review

Refer to the figure below for an inventory of the environmental resources and issues located in the vicinity of the West Meadows study area.

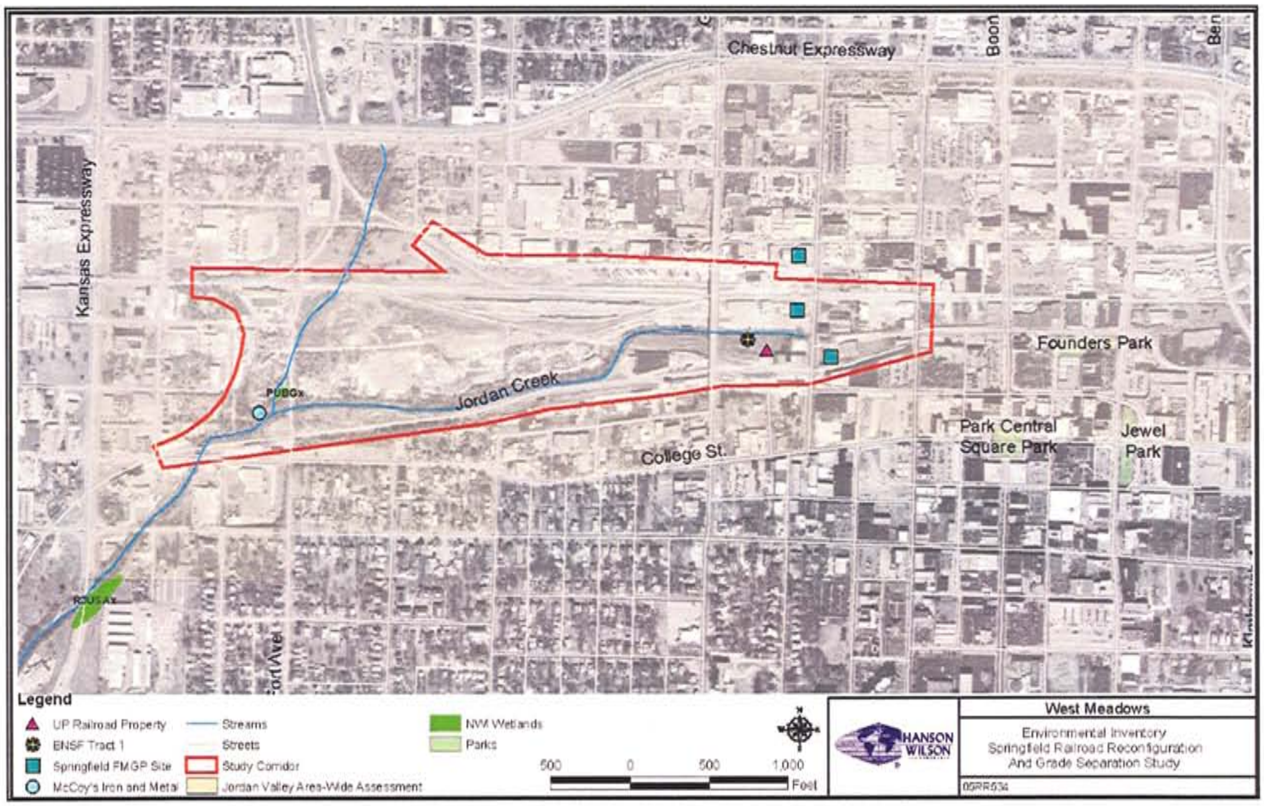


Figure 47 - West Meadows Environmental Inventory

Parks/Recreational Areas

Section 4(f) of the Department of Transportation Act and Section 6(f) of the Land and Water Conservation Act regulates impacts to parks, recreational areas, bike trails, wildlife refuges, and historic sites. If any funding for this project comes from the Federal Highway Administration or the Missouri Department of Transportation, then these properties will be protected and mitigation will likely be required for any impacts by the proposed project.

Available mapping was reviewed and field reconnaissance surveys were conducted to identify existing parks and recreational areas in the vicinity of the West Meadows project area. Founders Park, Jewel Park, and Park Central Square are located to the east of the West Meadows area in downtown Springfield. Zagony Park is located southwest of West Meadows, and Nichols Park is located northwest of West Meadows. Both parks are located west of Kansas Expressway. Based on the park distances from West Meadows, the improvements are not anticipated to have any direct or indirect impacts to these parks. No other recreational areas have been identified within or adjacent to the West Meadows area.

Three parks are located within one-half mile of the East and West Connection and North Yard Storage Tracks study corridor. Grant Beach Park is located south of the BNSF Railroad on the west side of Grant Avenue, Lafayette Park is located north of the railroad tracks on the east side of Boonville Avenue, and Washington Park is located south of the BNSF Railroad southeast of the intersection of Pacific Street and Summit Avenue. Based on the park distances from these project areas, the proposed railroad improvements are not anticipated to impact these three parks.

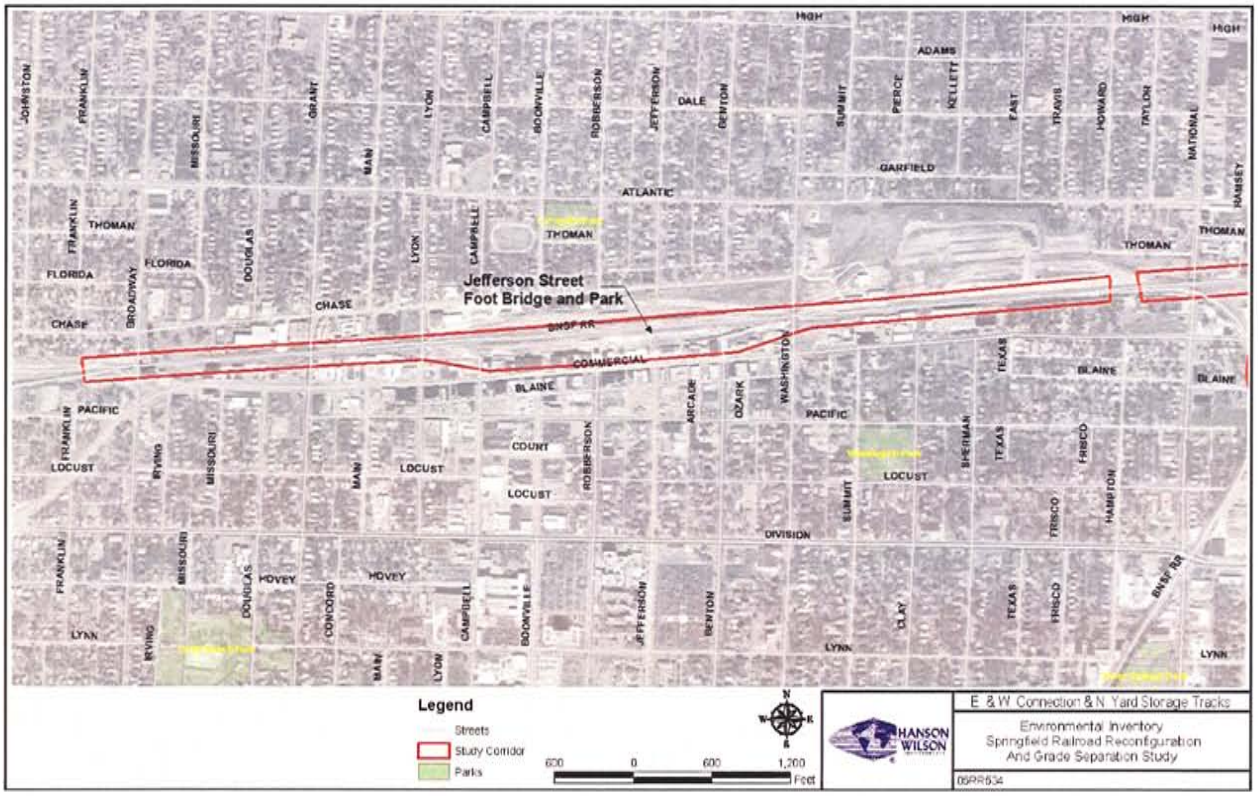


Figure 48 - Environmental Inventory - Connection Track and North Yard Storage

College Street, located south of the West Meadows area, is designated as the Historic Route 66 roadway. This portion of the roadway, if listed on the National Register of Historic Places, will be considered a Section 4(f) resource.

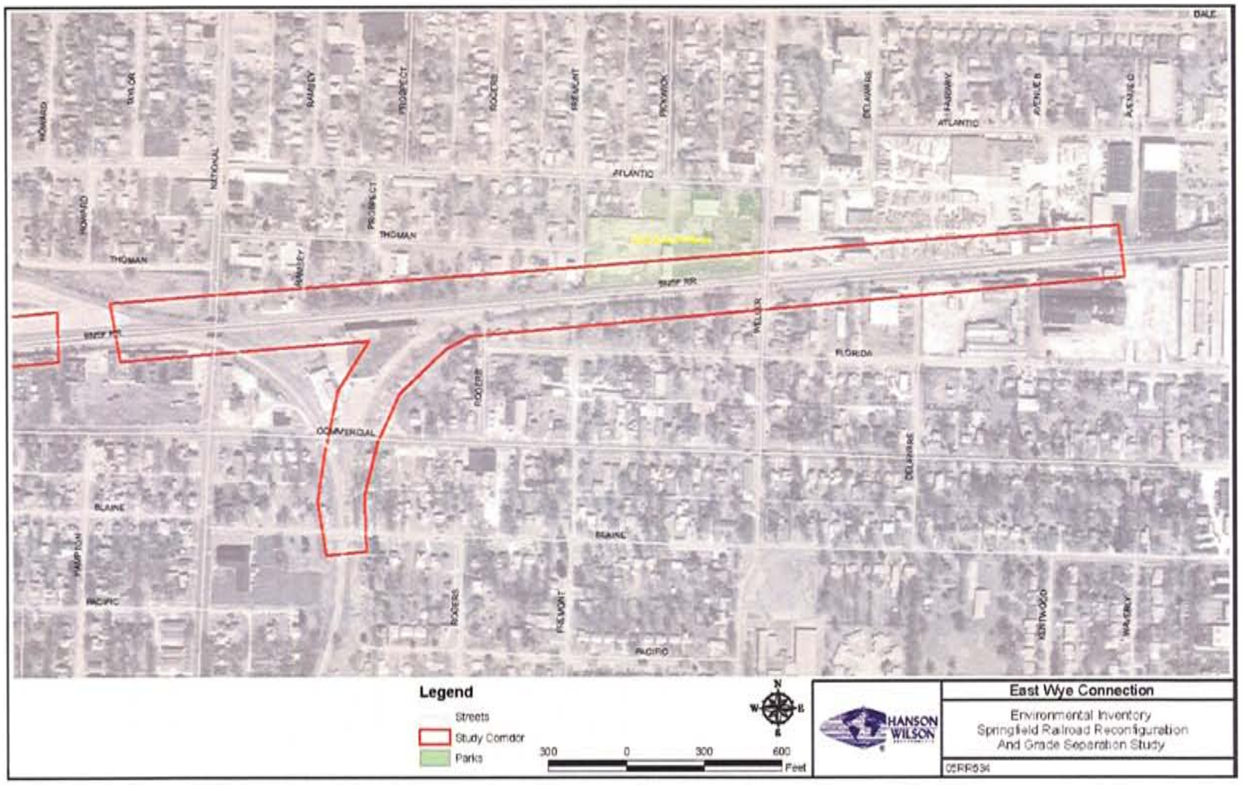


Figure 49 - Environmental Inventory - East Wye Connection Track

East Commercial Street and Weller Street, near the East and West Connection Tracks and North Yard Storage Tracks, are designated shared use, on-road bike routes. Also, Trafficway and Freemont Avenue along the Chestnut Storage track location, and South Barnes Avenue and East Catalpa Street along the Bennett Street Storage track location are designated shared use, on-road bike routes. Temporary disruption to these roads during construction may result in Section 4(f) coordination. Also, the Jefferson Street Footbridge, crossing the North Yard Storage Tracks, is listed on the National Register of Historic Places and therefore is protected as a Section 4(f) resource.

Water Resources

Jordan Creek is a permanent stream which drains from east of the West Meadows area, through the area itself, and to the southwest. The stream converges with Fassnight Creek approximately 1.5 miles to the south to become Wilson Creek. Wilson Creek is one of the largest tributary streams in the James River system and it drains much of the City of Springfield. The Jordan Creek Watershed is approximately 13 square miles and is approximately 10.6 miles in length. Wilson Creek is on the State of Missouri's 303(d) list of impaired waters for unknown toxicity.

An unnamed tributary of Jordan Creek drains from the north into the creek. This intermittent stream originates at Nichols Street and drains south to Jordan Creek within the West Meadows project area just north of College Street.

The South Branch of Jordan Creek flows along the north side of the Chestnut Street Storage area. This stream is considered to be a "Waters of the United States" and will therefore be protected by Section 404 of the Clean Water Act. This stream is outside of the railroad right-of-way and is not anticipated to be impacted by the project.

Construction activities or fill material placed within Jordan Creek or its tributaries will require a Section 404 permit from the Little Rock District of the U.S. Army Corps of Engineers.

Wetlands and Floodplains

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) mapping was reviewed for potential wetlands within the West Meadows study corridor. One small, ponded wetland (palustrine, unconsolidated bottom, intermittently exposed, excavated (PUBGx)) is identified on the NWI mapping north of Jordan Creek on the west side of Fort Avenue. Based on aerial photography and the field reconnaissance, the pond appears to have been filled or drained at this location. A wetlands delineation survey will be required to identify any jurisdictional wetlands within the project area. Impacts to jurisdictional wetlands will require a Section 404 permit from the Little Rock District of the U.S. Army Corps of Engineers

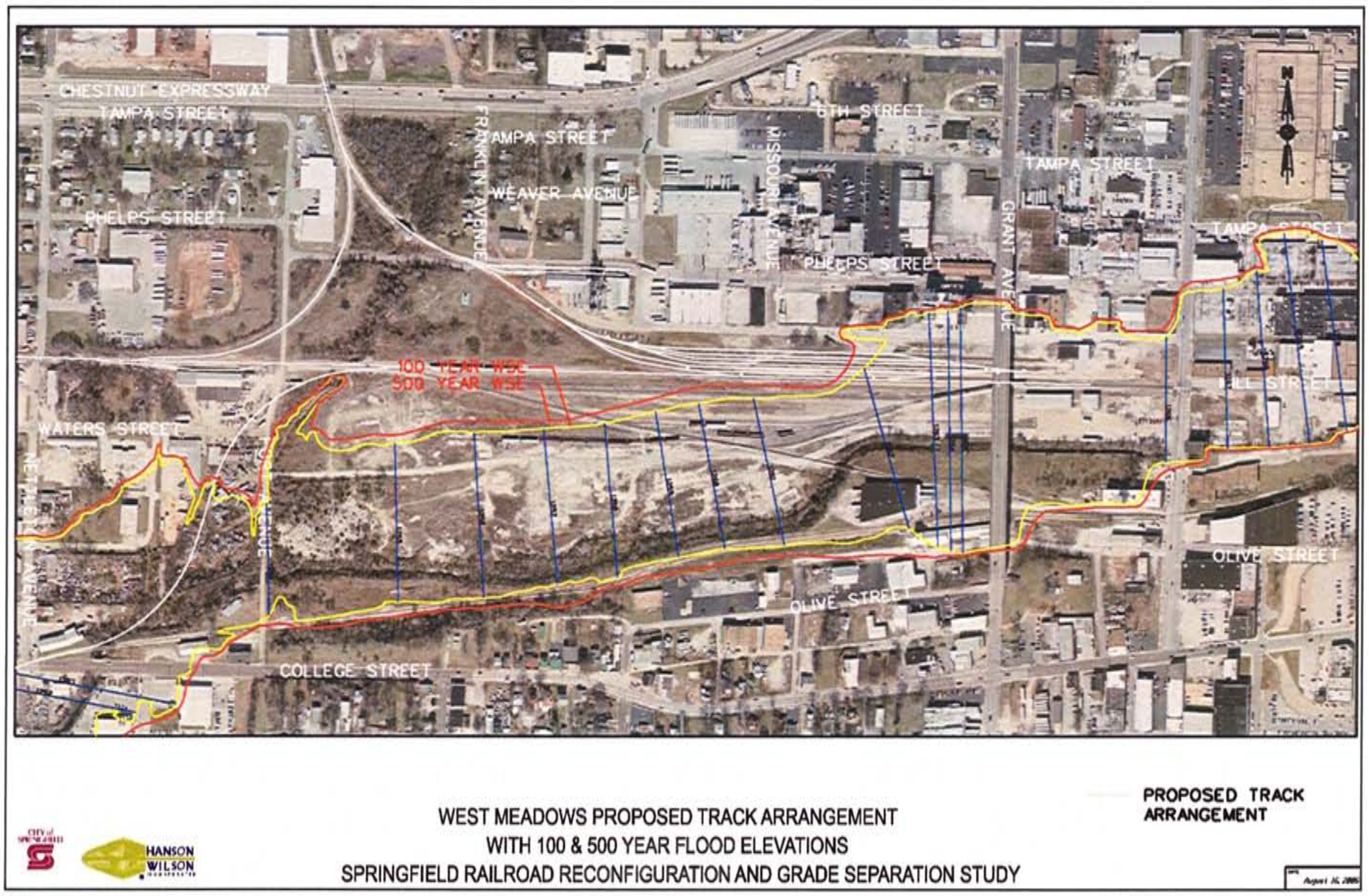


Figure 50 - Proposed WM Track Arrangement with Flood Plain Mapping

The 100-year and 500-year floodplain boundaries associated with Jordan Creek are depicted in the figure below. Proposed development within the floodplain boundaries shall comply with the local Floodplain Management Ordinance" and will require a permit from the City of Springfield for building within a floodplain.

A forested wetland (palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded (PSS1C)) is depicted on the NWI map on the northwest side of the Bennett Street Storage track location. Based on the field reconnaissance visit, this wetland appears to marginally meet the jurisdictional criteria for wetland requiring a Section 404 permit for any impacts. The Phase I study will further verify the significance of this wetland with a wetlands delineation survey. However, the proposed storage track is to be located on the south side of the existing track, therefore this wetland area should not be impacted. No other wetlands or floodplains were identified within the West Meadows and ancillary project areas.

Threatened and Endangered Species

According to the Missouri Department of Conservation, the following species are listed as federal endangered, federal threatened, or state endangered in Greene County, Missouri:

- Bald eagle (*Haliaeetus leucocephalus alascensis)*
- Peregrine falcon (*Falco peregrinus tundrius*)
- Northern Harrier (*Circus cyaneus*)
- Barn owl (*Tyto alba*)
- Bachman's sparrow (*Aimophila aestivalis illinoensis*)
- Interior least tern (*Sterna antillarum athalassos*)
- Ozark cavefish (*Amblyopsis rosae*)
- Niangua darter (*Etheostoma nianguae*)
- Gray bat (*Myotis grisescens*)
- Black-tailed jackrabbit (*Lepus californicus melanotis*)
- Plains spotted skunk (*Spilogale putorius*)
- Geocarpon (*Geocarpon minimum*)
- Missouri bladder pod (*Lesquerella filiformis*)

The bald eagle is listed as federal threatened and state endangered. This large bird of prey inhabits deciduous and mixed forest types near water. During winter, bald eagles concentrate near rivers with open water and in areas with large numbers of wintering waterfowl. This species requires large trees as perch sites near shorelines and prefer areas with limited human activity.

The peregrine falcon is listed as state endangered and prefers savanna/shrub/woodland habitat. This bird of prey requires open country for hunting and uses open woodlands. Historically, the peregrine falcon nested on cliffs, however, tall buildings with nest sites free of human disturbance are also suitable.

The northern harrier is a state endangered bird which inhabits open fields, prairies, native grass plantings and shallow marshes. The harrier prefers dense herbaceous vegetation as habitat, with nearly 100 percent canopy cover, which reaches a height of 10 in. by mid-May.

The barn owl is a state endangered bird and prefers to forage in open grassland or crop fields. The barn owl nests in trees greater than 20 in. dbh which have cavities and in barns and grain elevators.

The Bachman's sparrow is listed as state endangered and inhabits glades, open pinewoods, early successional stage old fields and oak-hickory or shortleaf pine regeneration with canopy cover less than 30 percent. Bare ground and a well-developed herbaceous layer are also important to this bird species.

The least interior tern is a federal and state endangered bird which inhabits sand or gravel bars of streams, ponds, lakes or reservoirs. This shore bird nests in areas where vegetation is sparse or absent.

The Ozark cavefish is listed as federal threatened and state endangered. The cavefish inhabits cave streams and spring outlets with clear, cold water and a predominantly rubble bottom.

The Niangua darter is listed as federal threatened and state endangered. This fish inhabits riffles, pools and runs of clear, silt-free streams with gravel or rock bottoms. It has been known to occur in a few tributaries of the Osage River in southcentral Missouri.

The gray bat is a federal and state endangered mammal which requires undisturbed caves for habitat. The gray bat forages over streams, rivers and reservoirs. A corridor of mature trees between caves and foraging sites is important.

The black-tailed jackrabbit is a state endangered species and inhabits large contiguous native grasslands with adjacent legume and crop fields. The black-tailed jackrabbit prefers grazed areas with scattered clumps of taller vegetation.

The Plains spotted skunk is listed as state endangered. This mammal inhabits fencerows, vegetated gullies and brushy borders with logs, brushpiles, snags, rocky outcrops, open prairies, and riparian woodland areas.

Geocarpon is a federal threatened and state endangered plant species found on shallow, sandy soils on sandstone glades and outcrops. Geocarpon is endemic to southwestern Missouri, a few sites in Arkansas and two sites in Louisiana.

The Missouri bladder pod is listed as federal and state endangered. This plant species occurs in open limestone glades and around limestone outcrops in pastures, lawns, utility corridors, hayfields or roadsides. The Missouri bladder pod occurs in four southwestern counties in Missouri and is endemic to the limestone glades of the Springfield plateau, and is found on two similar glade sites in northern Arkansas.

Marginal habitat exists for the northern harrier, barn owl, and Plains spotted skunk in the West Meadows, the West Wye Connection, and the Bennett Street Storage Track area. Potential habitat for the Plains spotted skunk also exists along the wooded area of the Chestnut Street Storage Track area.

Most of the grassland areas conducive to the northern harrier are periodically mown which is not as preferred as uncut native grasslands over about 12 inches in height. The barn owl is also likely not to inhabit these areas due to the surrounding development of industrial, commercial and residential space, although foraging habitat is available. The Plains spotted skunk is the most likely of these species to occur in the project area. The skunk is a habitat generalist which can utilize most habitat types and is not as sensitive to human encroachment. The skunk can utilize any remaining natural habitat in the project area such as the wooded areas along the railroad rights-of-way, the abandoned structures in the West Meadows area, and stream and drainage way corridors throughout the area. Additional studies for these species will be identified during the Phase I study.

Phase I and II Environmental Site Assessments

The City of Springfield was awarded a U.S. EPA Brownfields Assessment Demonstration Pilot grant in May 2000 for use in Jordan Valley. The **Jordan Valley Area-Wide Assessment** was conducted to serve as both a preliminary assessment of over 600 properties, and as a tool for prioritizing and directing the City's future use of grant funds. The Jordan Valley Area is an approximately 0.8 square mile area in downtown Springfield, Missouri, that corresponds with current and future redevelopment efforts by private developers and the City of Springfield.

The following recommendations were offered in the Jordan Valley Area-Wide Assessment report dated May 13, 2002 by the Forrester Group regarding prioritization of activities and individual site assessments:

- The former MFA mill site and the former Springfield Gas & Electric site (including all three subsites) were the two highest priority facilities for further assessment.
- The railroad yard and other associated properties should be assessed closely.
- Those properties located in Zone 2 (between Grant Avenue and Benton Avenue) should be carefully assessed due to the persistent and concentrated industrial activities over more than 100 years.
- All properties acquired or controlled by the City should have a current, site-specific environmental assessment prior to the City taking ownership or control of the property.
- If the plans for City development change, the characteristics of properties in the revised development area should be re-evaluated to reassess priorities for further environmental assessment.

Table 5-1, Summary of Environmental Assessments within the Study Area, from the report is provided in Section 9 - References.

In October 2004, Environmental Works, Inc. performed a Phase I ESA of the **Union Pacific Railroad property** located within the 300 block of North Main Street. This property is an approximate 1.78-acre tract of land that contains one main rail line and two rail sidings. One historic recognized environmental condition (HREC), involving a vinyl acetate/ethylene copolymer water emulsion spill, and four recognized environmental conditions (REC), involving historical use of the property and adjacent properties and the presence of two unlabeled 55-gallon drums, were identified at the property.

In February 2005, Terracon performed a Phase II ESA at the Union Pacific property. The results of the assessment included the following:

- The Union Pacific property is environmentally impaired. Affected areas of soil are impacted by arsenic, lead, mercury, selenium, and PAHs. Groundwater is impacted by arsenic and naphthalene.
- Major financial and technical investment appears to make restoration of property soils and groundwater to Missouri statewide standards for residential use infeasible, without evaluation or special studies.
- Comparably low to moderate costs of remedy appear feasible to restore affected areas of the property to site-specific, depth-related standards of non-residential protection using property-specific demonstrations and institutional controls.

The site identified as **BNSF Tract 1**, located north of the Union Pacific Railroad property, has been the focus of previous Phase I and II ESA work by multiple parties. The property appears to be impacted by contaminants of concern but feasible for the City to consider redevelopment with consideration of remedy or risk management. Future land use will include business park and greenspace supporting commercial use. Terracon prepared a Cost-To-Remedy Analysis Report of the BNSF Tract 1 site in December 2005 for the City of Springfield. With the exception of elevated lead impact, materials appear reasonably manageable under a risk-based approach until redevelopment occurs. Terracon presented several scenarios for cleanup planning including RBCA Closure, Soil Removal with Groundwater Tier 2/3 RBCA, Soil Removal with Groundwater Pump and Treat Treatment, Soil Capping In-Place with In-Place Groundwater Treatment, and Soil Capping with Aboveground Groundwater Treatment.

Project Resources Inc. was tasked by the U.S. EPA Region 7 Superfund Division to conduct a Phase II Brownfields Targeted Assessment (BTA) at the **Springfield Former Manufactured Gas Plant (FMGP)** site (August 29, 2005). An FMGP was in operation from 1874 to 1930 at three subsites located along North Main Avenue, extending from West Phelps Street to West Water Street. The Phase II BTA identified the following recognized environmental conditions in the site area:

- Numerous FMGP-related contaminants were identified in soil samples collected from the three FMGP subsites. Contaminants detected at concentrations that exceeded their respective Missouri Risked Based Correction Action Guidance (MRBCA) Tier 1 Risk Based Target Levels (RBTL) for non-residential land use were benzene, naphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and total petroleum hydrocarbons – diesel range organics (TPH-DRO).
- Numerous FMGP-related contaminants were identified in groundwater samples collected within the site area. Contaminants detected in groundwater samples at concentrations that exceeded their respective MRBCA RBTLs for domestic water use were arsenic, cadmium, chromium, lead, benzene, acenapthene, fluorine, naphthalene, and TPH-DRO. In addition, coal tar was observed in a monitoring well.
- Concentrations of lead that exceeded its MRBCA RBTL were identified with limited surface soil screening.

Based on the Phase II sampling results, both soil and groundwater appear to have been affected by FMGP-related contaminants. The highest concentrations of FMGP-related contaminants were detected in samples collected from the three FMGP subsites. FMGP-related contamination was also detected properties adjacent to the subsites, indicating off-site migration. Consequently, additional sampling would be required to delineate the overall extent of soil and groundwater contamination related to the site.

A Phase I ESA was conducted of the undeveloped southern portion of a commercial property located at 321 North Fort Avenue. This undeveloped parcel is part of a larger 4-acre parcel which contains **McCoy's Iron and Metal Recycler**. The southern portion is approximately one acre in size. Historically, the 4-acre property was utilized by Energy Sales Company, a bulk petroleum and asphalt distributor.

According to the Phase I ESA report dated July 28, 2005 by Environmental Works Inc., the current and historical use of the McCoy's Iron and Metal Recycler and Energy Sales

Company on the adjacent parcel to the north was identified as one REC for the property. Numerous complaints have been associated with the current metal recycler and the former bulk oil facility. These complaints include petroleum-stained soils, containers of used oil and idle machinery for McCoy's Iron and Metal Recycler, and occurrences of oil spills from the former Energy Sales Company. These processes and disposal practices may have impacted the undeveloped southern portion of the property. Determination of the presence and/or extent of any impact will require a subsurface investigation, including sample collection. The City of Springfield is currently preparing to conduct a Phase II ESA for the subject property.

Cemeteries

Cemeteries within the project study corridor were identified from existing mapping and from the field reconnaissance visit. No cemeteries were identified within the project study limits of the West Meadows area or the ancillary project components.

Agricultural Lands

Agricultural lands were assessed based on their significance as prime or important. Also, agricultural protection zones were investigated based on information received from the Natural Resources Conservation Service of Greene County. There are no prime or important agricultural lands or agricultural protection zones within any of the West Meadows project areas.

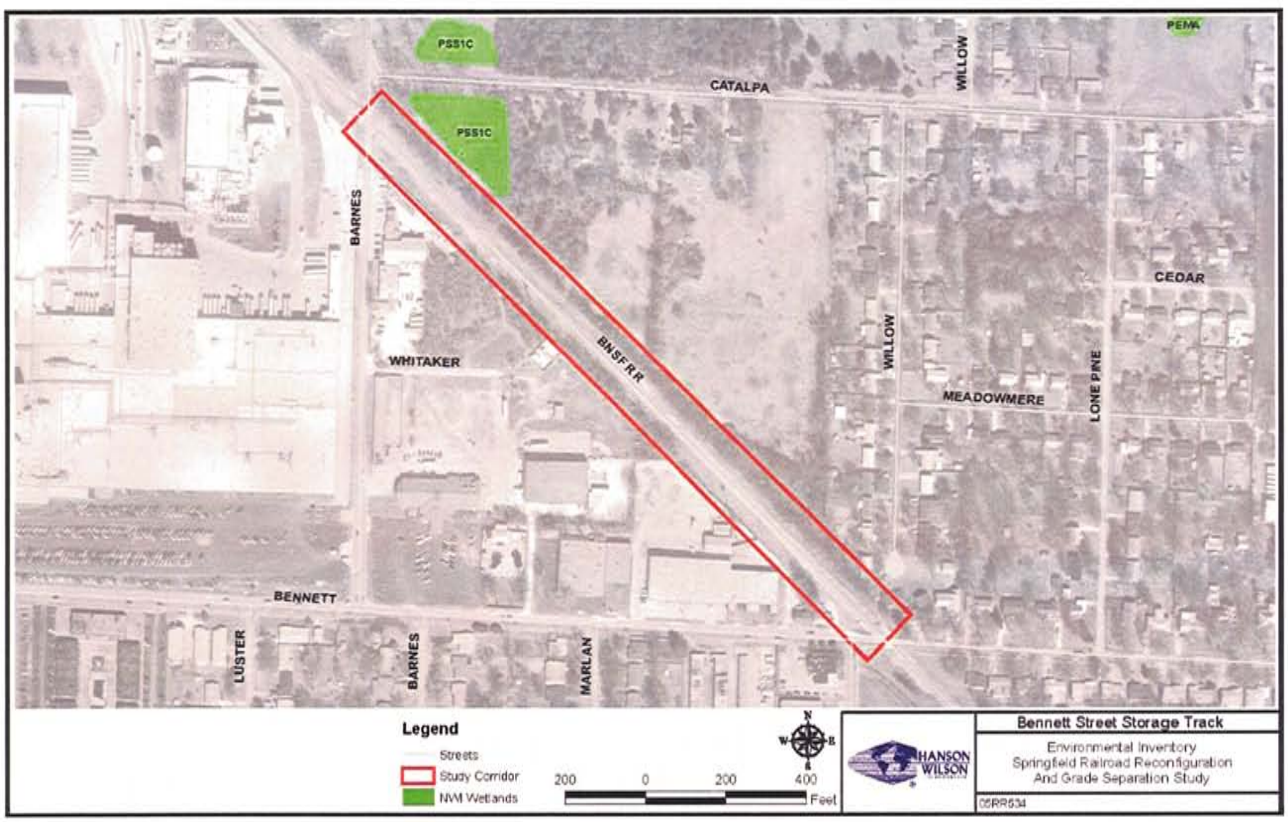


Figure 51 - Environmental Inventory at the Bennett Street Storage Track

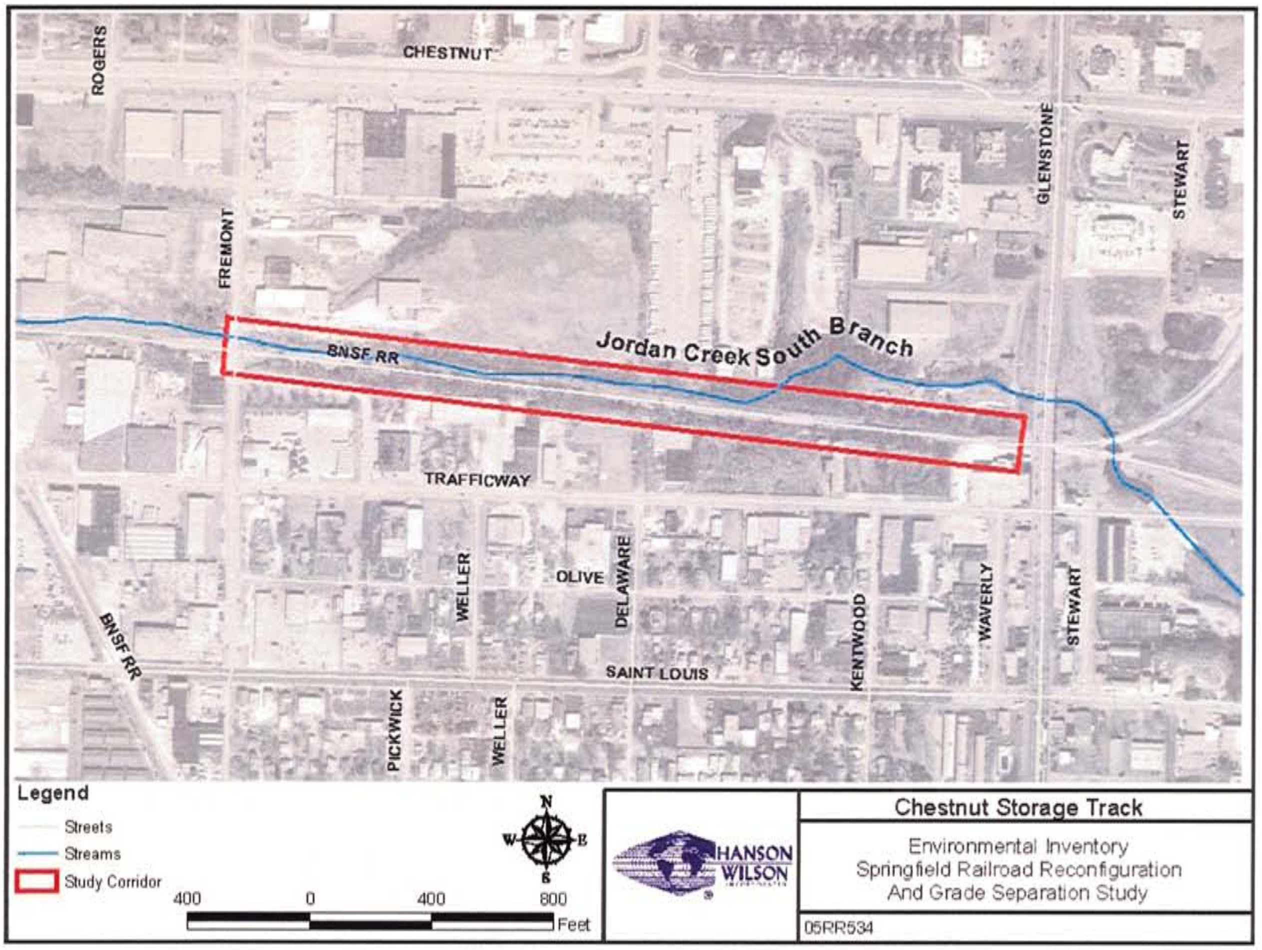


Figure 52 - Environmental Inventory - Chestnut Street Storage Track

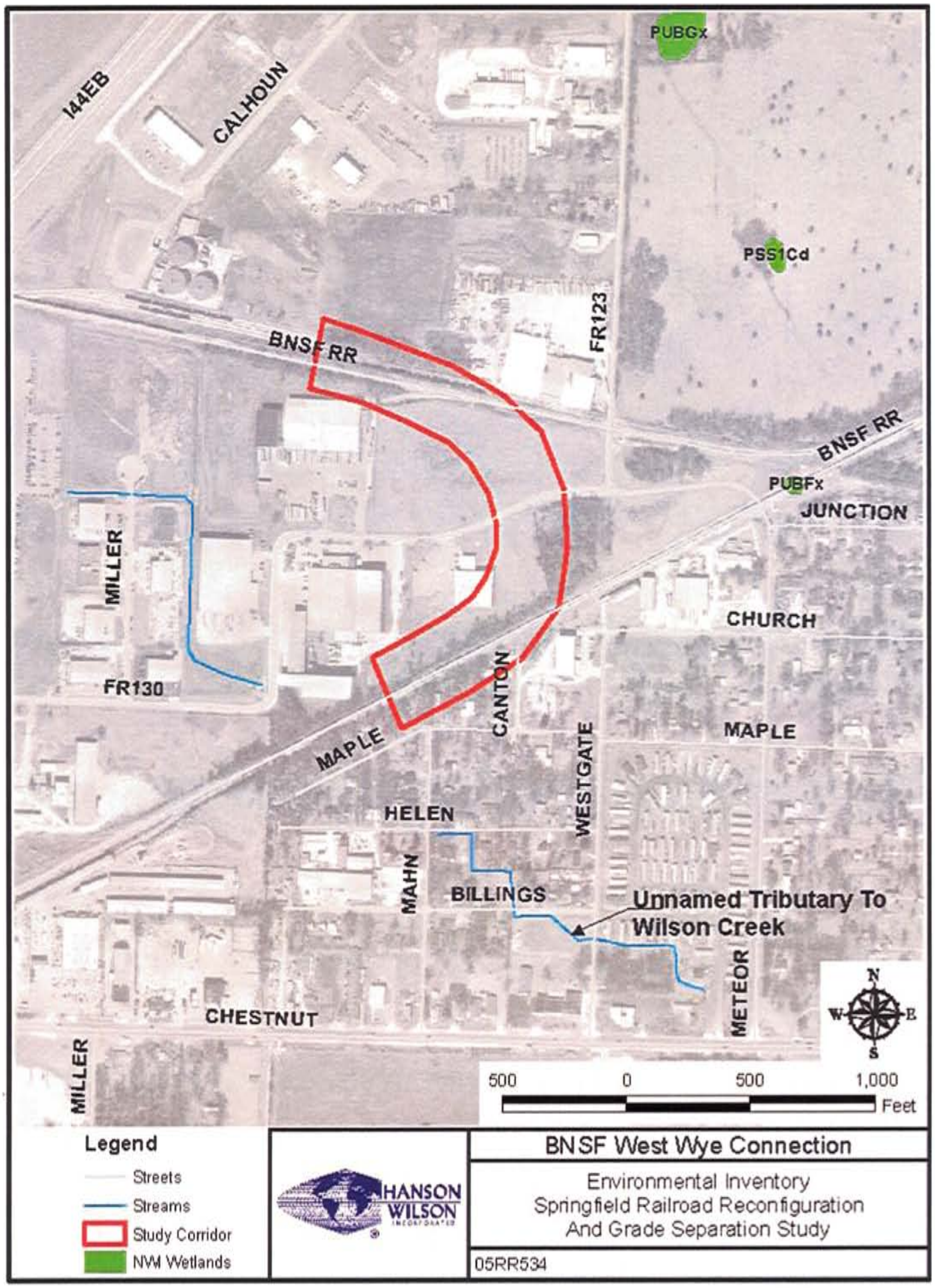


Figure 53 - Environmental Inventory - West Wye Connection

Cultural and Historic Resources

Cultural, archaeological, and architectural histories, as well as Historic Properties as defined (36CFR800.16), were researched to identify site locations, historic significance, and eligibility status for listing on the National Register of Historic Places (NRHP).

The accompanying maps of cultural resources within the study area was constructed in ArcGIS using six U.S.G.S. 7.5' topographic quadrangles: Springfield, Ebenezer, Brookline, Galloway, Ozark, and Nixa. Once CAR received the aerial mosaic provided by the City of Springfield, all shapefiles were adjusted to fit the view and tilt of the aerial to provide a more realistic visual perspective of site locations. All data were projected using North American Datum 1983. This notation describes thematic data included in this assessment and its categorical relevance to the project.

Sites Layer

All recorded archaeological site locations within the study area have been included in the Sites Layer. Sites are identified by a Smithsonian Institution trinomial that includes the state code (23), county alpha-numeric (GR), and the number given at the time of its recordation. For example, 23GR1 represents the first site recorded in Greene County, Missouri. The trinomial is the official designation, and must be used when referencing individual sites, particularly in correspondence with the State Historic Preservation Office. Other recorded attributes in the Sites Layer include the local name (SiteName) where possible; the nature of the cultural deposit(s) (SiteType), whether prehistoric (pre-1500) or historic (post-1500), and NRHP eligibility status (NRHP).

NRHP eligibility status is of key significance to any feasibility study concerning cultural resources. Alternative routes for the proposed project should take into consideration the kinds of known sites within the project corridor(s). The site data information has been categorized and color-coded to permit the viewer to readily discern the eligibility status of each site.

Sites filled with the color red indicate those that are currently listed on the National Register of Historic Places and pose the greatest challenge in terms of mitigating potential adverse effects. Sites filled with the color yellow are those that are considered eligible; that is, they meet one or more of the criteria for listing on the National Register. These sites may not be formally listed for one or more reasons, i.e., the nomination forms have not been filled out; the nomination forms are under consideration for submission by the State Advisory Council on Historic Properties; or, perhaps the forms are currently in review for listing by the Associate Director of Cultural Resources, National Park Service. In any event, sites considered eligible typically require the same level of protective effort as those formally listed. Sites filled with the color green have been determined not eligible for listing on the NRHP *by the site recorder* and may not require mitigation. However, it should be noted that once the project is submitted for review to the Missouri SHPO, the reviewer will define which areas will require survey and which sites will require further attention. The majority of the sites within the study area are not filled with color to indicate that their status for NRHP eligibility has not yet been evaluated. Non-colored sites should raise a flag to decision makers that the Missouri SHPO may request that these sites be tested in terms of the eligibility criteria established by the National Park Service. The current results of this query indicate that there appear to be no sites located within the project study areas.

Figure 54 - Archeological Site Locations

All historic buildings and districts within the study area that are formally listed on the NRHP have been included in the Register Layer. This layer was generated separately to indicate this class as historic architectural features. Attribute data for sites in this layer include the listing name and its physical address, where permissible. Red polygons were used to delineate these structures and districts. These NRHP sites were color-coded red to indicate their status as high profile and protected sites. Avoidance is generally the most acceptable treatment of this kind of site. There are instances in which SHPO's may recommend on-site archaeological monitoring during ground disturbing activities or other protective measures appropriate to the particular property. The three most important factors that SHPO's consider regarding the preservation of NRHP sites are setting, feel, and integrity. Projects that propose to compromise one or more of these factors may be required to enter into extensive consultation with the SHPO and one or more federal agency to formulate a mitigation plan.

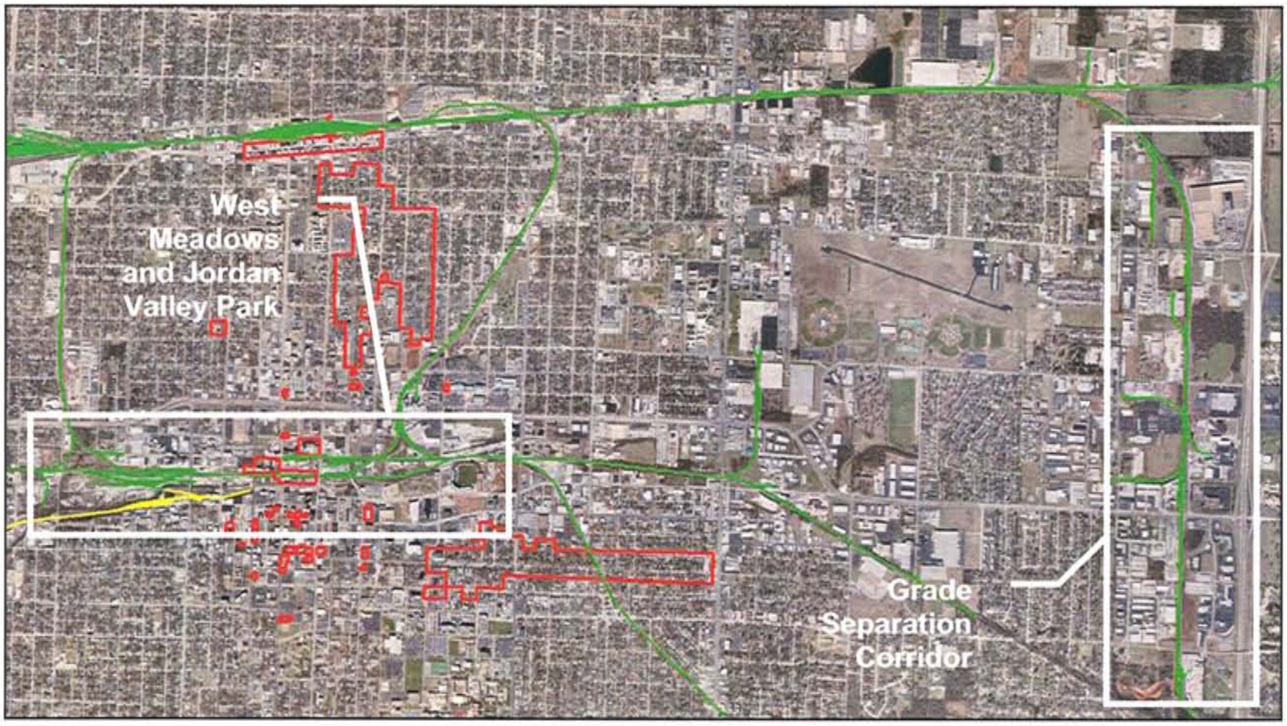


Figure 55 - Registered Historic Structures

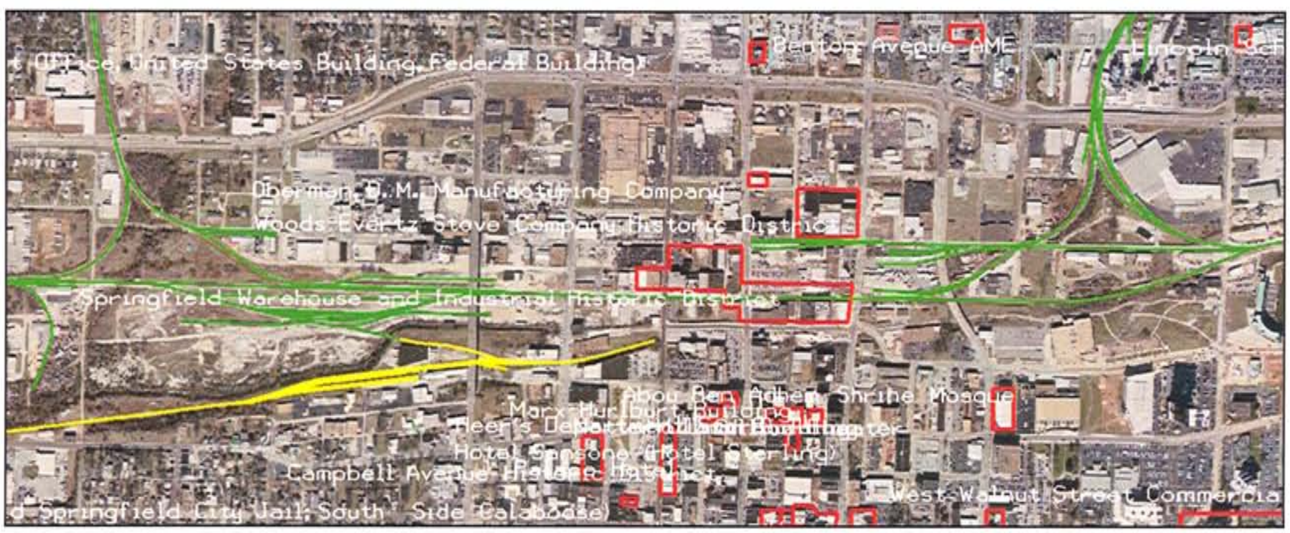


Figure 56 - Registered Historic Sites near Jordan Valley Park

As depicted in Figure 56, there are at least two sites that are within the Jordan Valley Park and project site that would require due diligence consideration. Those sites include the Woods-Evertz Stove Company Historic District and the Springfield Warehouse and Industrial Historic District. Any alternatives that affect any one of these structures would likely trigger actions by the Missouri SHPO to require mitigative efforts to protect these resources.

The next area of concern could be described as the relatively circular delineation of connected waterways that encircle the majority of Springfield proper. These watercourses include Wilson Creek, South Creek, Jordan Creek, the James River, Fassnight Creek, Galloway Creek, Lake Springfield, and various branches of these. It is along these waterways that archaeological site density is greatest. This kind of distribution is routinely found throughout North America with archaeological site frequencies increasing relative to their proximity to water sources. However, of the total of 198 currently recorded archaeological and historic sites, most are unevaluated in terms of their eligibility for listing on the National Register of Historic Places. It is possible that the SHPO may recommend testing of any unevaluated sites within the proposed corridors to ascertain whether these meet any of the criteria of the NRHP.

Conceptual Cost Estimate Summary

Conceptual construction cost estimates have been prepared on the West Meadows Track Reconfiguration and the anticipated off-site improvements. These estimates are considered to be "conceptual" in nature and therefore carry a large contingency. As preliminary and final plans are developed, it is likely that the costs will become more defined and precise. Further, the estimates utilize material and labor costs that are valid for 2006 and should be escalated to the anticipated timeframe that the funds would be required for construction.

There may be significant "discoveries" during the preliminary and final engineering phases. These discoveries may increase or decrease the project costs. An example of a "discovery" would be the identification of competent rock near the surface of the roadway excavations. There may be additional costs in excavation seen because of the need for blasting and it may be determined that retaining walls may not be necessary because of the competence of the rock. This is one of the reasons that a contingency is used and the anticipated construction cost is offered by a range rather than a single value.

Please recognize that there have been no subsurface or field environmental investigations to any of the sites which are examples of how the costs may change throughout the design process. Measurements for track lengths within West Meadows were derived through the use of available aerial photography. Some site survey was undertaken at various locations to determine the viability of geometric solutions. Surveys within West Meadows utilized GPS equipment and therefore provide GPS level accuracy. Surveys at the grade separations utilized traditional surveying techniques and offer good accuracy for this level of study.

West Meadows and Offsite Improvements
Construction Cost Summary
October 12, 2006

	Range			
West Meadows Improvments		***Low***		***High***
Connection & Yard Tracks	**$**	**3,300,000**	**$**	**4,289,000**
Offsite Improvements				
West Wye Connection	$	2,070,000	$	2,690,000
Third Main Track & North Yard	$	13,880,000	$	18,040,000
East Connection Track	$	7,850,000	$	10,210,000
Chestnut Storage Track	$	1,380,000	$	1,790,000
Bennett Street Storage Track	$	690,000	$	900,000
Sunshine Storage Track	$	580,000	$	750,000
Subtotal Offsite Improvements	**$**	**26,450,000**	**$**	**34,380,000**
Total West Meadows Related:	**$**	**29,750,000**	**$**	**38,669,000**

West Meadows Proper Improvements

CONCEPTUAL CONSTRUCTION COST OPINION
Recommended Track Arrangement
M&NA Connection, Interchange and Sorting Yard along Mill Street
May 1, 2006

Description	Unit	Quantity	Cost	Subtotal
M&NA Connection Track				
Construct New Connection Track 119#[1]	TF	1659	$ 130	$ 220,000
Surface Existing Track	TF	2608	$ 40	$ 100,000
Relocate Turnout	EA	1	$ 30,000	$ 30,000
Remove Track				
Active Customer	TF	805	$ 30	$ 20,000
Track Embankment[2]	CY	3318	$ 14	$ 50,000
Subballast	CY	1720	$ 40	$ 70,000
Roadway Modifications				
Fort Street & Waters Street	LF	300	$ 100	$ 30,000
Drainage Improvements				
James Creek Realignment	LS	1	$ 30,000	$ 30,000
Drainage Structure	LS	1	$ 15,000	$ 15,000
Demolition	LS	1	$ 30,000	$ 30,000
Interchange Yard Tracks				
BNSF Run-thru Track 119#	TF	955	$ 130	$ 124,000
BNSF Yard 1 Track - 119#	TF	910	$ 130	$ 118,000
BNSF Yard 2 Track - 119#	TF	1060	$ 130	$ 138,000
BNSF Yard 3 Track - 119#	TF	1300	$ 130	$ 169,000
BNSF Dock Track	TF	625	$ 131	$ 82,000
Relocate Turnout	EA	8	$ 40,000	$ 320,000
Remove Track	TF	1087	$ 30	$ 33,000
Embankment[3]	CY	2112.5	$ 14	$ 30,000
Subballast	CY	6885	$ 40	$ 275,000
Truck Dock	LS	1	$ 40,000	$ 40,000
Drainage Improvements	EA			$ -
Retaining Wall[4]	SF	2436	$ 35	$ 85,000
Demolition[6]	LS	1	$ 30,000	$ 30,000
Sorting Yard Tracks				
MNA Construct West Lead Track 119#	TF	511	$ 131	$ 67,000
MNA Construct Yard 1 Track - 119#	TF	1216	$ 132	$ 161,000
MNA Construct Yard 2 Track - 119#	TF	640	$ 133	$ 85,000
Relocate Turnout	EA	6	$ 40,000	$ 240,000
Remove Track	TF		$ 30	$ -
Embankment[3]	CY	1183.5	$ 14	$ 17,000
Subballast	CY	2455	$ 40	$ 98,000
Drainage Improvements	EA			$ -
Demolition[5]	SF	30000	$ 0.50	$ 15,000
				$ -
Utility Relocations				
Potable Water	LS			$ -
Natural Gas	LS	1	$ 19,000	$ 19,000
Electric	LS	1	$ 60,000	$ 60,000
Sanitary Sewer	LS	1	$ 19,000	$ 19,000
Subtotal				$ 2,820,000
Engineering	%	6%		$ 169,000
Permitting	%	4%		$ 113,000
Construction Management	%	7%		$ 197,000
Subtotal				$ 3,299,000
Contingency	%	30%		$ 990,000
Grand Total				$ 4,289,000

Notes:
1. Assumes reuse of existing track structure not economical.
2. Assumes 2 CY per TF
3. Assumes 1/2 CY per TF
4. Assumes retaining wall is an average of 3' tall and 812' in length
5. Demolition of two old passenger platforms (1000' long, 15' wide)
6. Demolition of one business and clean-up

West Meadows Related Offsite Improvements

CONCEPTUAL CONSTRUCTION COST OPINION
West Wye Connection Track

May 1, 2006

Description	Unit	Quantity	Cost	Subtotal
West Wye Track				
Construct New Track 136#	TF	1600	$ 130	$ 208,000
Construct New No.15 Turnout	EA	2	$ 180,000	$ 360,000
Track Embankment1	CY	3200	$ 20	$ 64,000
Subballast	CY	1659	$ 40	$ 66,370
Roadway Modifications[2]	LS	1	$ 36,000	$ 36,000
Grade Crossing (X-bucks only)	LF	36	$ 400	$ 14,400
OH Electric Adjustment	LS	1	$ 5,000	$ 5,000
Mainline Signalwork	LS	1	$ 1,089,000	$ 1,089,000
Subtotal				$ 1,840,000
Engineering	%	6%		$ 110,000
Permitting	%	4%		$ 70,000
Construction Management	%	7%		$ 130,000
Subtotal				$ 2,150,000
Contingency	%	25%		$ 540,000
Grand Total				$ 2,690,000

Notes:
1. Assumes 2 CY per TF excavation removal
2. Assumes minor profile modifications of 2-lane asphalt road

CONCEPTUAL CONSTRUCTION COST OPINION
West Third Main, North Storage Yard and East Third Main
May 1, 2006

Description	Unit	Quantity	Cost	Subtotal
Third Mainline West of North Yard				
New Track Main Track - 133#	TF	2370	$ 130	$ 308,100
New Turnouts - #9	EA	2	$ 150,000	$ 300,000
Grant Street Bridge	LS	1	$ 2,500,000	$ 2,500,000
Grant Street Adjustments	LS	1	$ 200,000	$ 200,000
Communications line Relocation	EA	20	$ 4,000	$ 80,000
Retaining Walls - 10' high	LF	1900	$ 350	$ 665,000
Embankment	CY	3800	$ 20	$ 76,000
Demolition - Grain Elevators	LS	1	$ 60,000	$ 60,000
North Yard Modifications				
Relocate turnout	EA	1	$ 50,000	$ 50,000
New Turnout - #9	EA	7	$ 150,000	$ 1,050,000
Relocate Track	TF	993	$ 60	$ 59,580
Construct New Storage Track	TF	4803	$ 100	$ 480,300
Construct Run-around Track	TF	1473	$ 100	$ 147,300
Remove Track	TF	1502	$ 30	$ 45,060
Aesthetic Barrier	LF	1935	$ 20	$ 38,700
Third Mainline East of North Yard				
New Track Main Track - 133#	TF	2336	$ 130	$ 303,680
New Mailine Turnout - #11	EA	1	$ 150,000	$ 150,000
New Turnouts - #9	EA	3	$ 130,000	$ 390,000
Washington Street Bridge	LS	1	$ 3,000,000	$ 3,000,000
Washington Street Adjustments	LS	1	$ 500,000	$ 500,000
Turnout Removal	EA	1	$ 35,000	$ 35,000
Signal House Relocation	LS	1	$ 60,000	$ 60,000
Mainline Signalwork[1]	LS	1	$ 1,000,000	$ 1,000,000
Embankment	CY	4672	$ 20	$ 93,440
Retaining Walls - 10' high	LF	2150	$ 350	$ 752,500
Subtotal				$ 12,340,000
Engineering	%	6%		$ 740,000
Permitting	%	4%		$ 490,000
Construction Management	%	7%		$ 860,000
Subtotal				$ 14,430,000
Contingency	%	25%		$ 3,607,500
Grand Total				**$ 18,040,000**

Notes:
1. Placeholder only, BNSF to provide final estimate.

CONCEPTUAL CONSTRUCTION COST OPINION
East Connection Wye Track
May 1, 2006

Description	Unit	Quantity	Cost	Subtotal
New Siding Track - 133#	TF	3383	$ 130	$ 439,790
New Wye Track Construction	TF	962	$ 130	$ 125,060
New Turnouts - #9	EA	3	$ 130,000	$ 390,000
New Turnouts - #11	EA	1	$ 150,000	$ 150,000
National Street Bridge	LS	1	$ 3,000,000	$ 3,000,000
National Street Adjustments	LS	1	$ 500,000	$ 500,000
Weller Street Grade Crossing	LS	1	$ 1,000,000	$ 1,000,000
Commercial Street Grade Crossing	LS	1	$ 1,000,000	$ 1,000,000
Embankment	CY	8690	$ 20	$ 173,800
Utility Adjustments[1]	LS	1	$ 200,000	$ 200,000
Subtotal				$ 6,980,000
Engineering	%	6%		$ 420,000
Permitting	%	4%		$ 280,000
Construction Management	%	7%		$ 490,000
Subtotal				$ 8,170,000
Contingency	%	25%		$ 2,042,500
Grand Total				**$ 10,210,000**

Notes:
1. Placeholder only, utiliies unidentified at this time.

CONCEPTUAL CONSTRUCTION COST OPINION
Chestnut Storage Track
May 1, 2006

Description	Unit	Quantity	Cost	Subtotal
New Siding Track - 133#	TF	2202	$ 130	$ 286,260
Stream Relocation	TF	1572	$ 130	$ 204,360
Embankment Protection	EA	1280	$ 65	$ 83,200
No. 9 Turnouts	LS	2	$ 130,000	$ 260,000
Embankment	CY	7548	$ 20	$ 150,960
Property Acquisition	AC	1.9	$ 20,000	$ 38,000
Utility Adjustments[1]	LS	1	$ 200,000	$ 200,000
Subtotal				$ 1,220,000
Engineering	%	6%		$ 70,000
Permitting	%	4%		$ 50,000
Construction Management	%	7%		$ 90,000
Subtotal				$ 1,430,000
Contingency	%	25%		$ 357,500
Grand Total				**$ 1,790,000**

Notes:
1. Placeholder only, utiliies unidentified at this time.

CONCEPTUAL CONSTRUCTION COST OPINION
Bennett Street Storage Track
May 1, 2006

Description	Unit	Quantity	Cost	Subtotal
New Siding Track - 133#	TF	1511	$ 130	$ 196,430
No. 9 Turnouts	LS	2	$ 130,000	$ 260,000
Embankment	CY	3022	$ 20	$ 60,440
Property Acquisition	AC	0	$ 20,000	$ -
Utility Adjustments[1]	LS	1	$ 100,000	$ 100,000
Subtotal				$ 620,000
Engineering	%	6%		$ 40,000
Permitting	%	4%		$ 20,000
Construction Management	%	7%		$ 40,000
Subtotal				$ 720,000
Contingency	%	25%		$ 180,000
Grand Total				**$ 900,000**

Notes:
1. Placeholder only, utiliies unidentified at this time.

CONCEPTUAL CONSTRUCTION COST OPINION
Sunshine Street Storage Track
May 1, 2006

Description	Unit	Quantity	Cost	Subtotal
New Siding Track - 133#	TF	892	$ 130	$ 115,960
No. 9 Turnouts	LS	2	$ 130,000	$ 260,000
Embankment	CY	1784	$ 20	$ 35,680
Property Acquisition	AC	0	$ 20,000	$ -
Utility Adjustments[1]	LS	1	$ 100,000	$ 100,000
Subtotal				$ 510,000
Engineering	%	6%		$ 30,000
Permitting	%	4%		$ 20,000
Construction Management	%	7%		$ 40,000
Subtotal				$ 600,000
Contingency	%	25%		$ 150,000
Grand Total				**$ 750,000**

Notes:
1. Placeholder only, utiliies unidentified at this time.

Conceptual Cost Estimate Summary

West Meadows and Offsite Improvements
Construction Cost Summary
October 12, 2006

		Range		
West Meadows Improvments		***Low***		***High***
Connection & Yard Tracks	**$**	**3,300,000**	**$**	**4,289,000**
Offsite Improvements				
West Wye Connection	$	2,070,000	$	2,690,000
Third Main Track & North Yard	$	13,880,000	$	18,040,000
East Connection Track	$	7,850,000	$	10,210,000
Chestnut Storage Track	$	1,380,000	$	1,790,000
Bennett Street Storage Track	$	690,000	$	900,000
Sunshine Storage Track	$	580,000	$	750,000
Subtotal Offsite Improvements	**$**	**26,450,000**	**$**	**34,380,000**
Total West Meadows Related:	**$**	**29,750,000**	**$**	**38,669,000**

Section 7

7 Grade Separations

JAMES RIVER FREEWAY AT-GRADE CROSSING

The James River Freeway (JRF) at-grade crossing of the BNSF Kissick line occurs just west of the US 60/65 interchange. This crossing features warning devices for 2 lanes of eastbound and westbound traffic and one ramp.

The JRF at-grade crossing is presently under redesign as a part of the revisions to the 60/65 Interchange by MoDOT. The purpose of this study is to review the need of the crossing from a system-wide rail services perspective. There were multiple options investigated and these are described by the following detail.

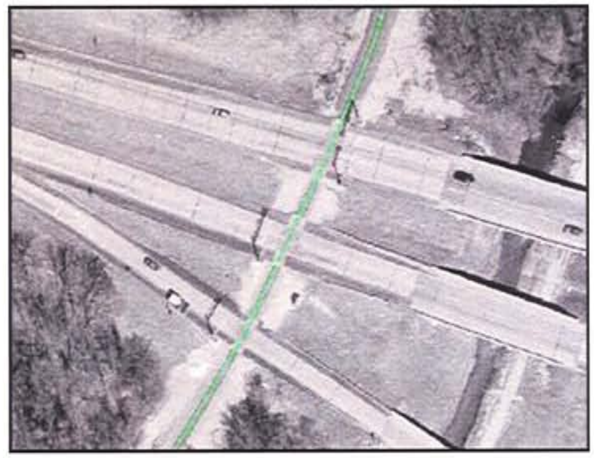


Figure 57 - Existing James River Freeway At-Grade Crossing

Alternatives Evaluation

There are at least 13 alternatives to consider for the at-grade crossing. Some of these alternatives offer different methodologies of providing coal service delivery to the James River Powerplant (JRPP) which is located some 2 miles south of the JRF at-grade crossing. Other alternatives consider the remaining lifespan of the JRPP and potential new sites of a future powerplant. The following is a list of the alternatives considered:

- **Grade Separate JRF with the existing roadway arrangement** – maintain the existing ramp, mainline and track horizontal geometry and modify the profiles to create a grade separation. The Roadway over the track is likely the preferred arrangement. The benefit of this approach reduces the train/vehicle exposure to zero, but does not improve the roadway arrangement.
- **Grade Separate JRF with a redesign of the 60/65 interchange** – develop a new interchange configuration that would allow a grade separation to occur at the track location. This rearrangement would offer a zero train/vehicular exposure and potentially reduce the number of bridges over the track (assuming that roadway over the tracks is the preferred separation approach.)
- **Keep the current at grade crossings with the existing or the redesigned 60/65 interchange** – this is similar to a no-build scenario. In this case, a no-build scenario or a reconstruct similar conditions would not reduce train/vehicular exposure.
- **Terminate the BNSF North of JRF**
  - **Construct a coal slurry line to the plant** – This option ceases train operations across the existing crossing by creating a train to pipeline transfer facility to the north of the crossing. This option eliminates the vehicular/train exposure, but requires that a coal

slurry plant be constructed and associated pipeline to a receiving plant where the coal would be extracted from the slurry and delivered to the plant conveyors. This option will require extensive environmental permitting and management (possible recycling) of conveying water. Maintenance costs on the facility and pipeline will be on-going throughout its lifespan.

- **Construct a conveyor to the plant** – similar to the previous sub-bullet option, this option would cease train operation just north of the existing crossing and would require the construction of a train to conveyor transfer station and a series of conveyors to transfer the coal from the unloading point to the stockpile point at the plant. This option reduces the vehicular/train exposure to zero. However, it would require extensive environmental permitting and on-going maintenance and personnel to operate the system.
- **Construct a train-to-truck transfer facility** - this option would cease train operations at some location north of the existing grade crossing and require the construction of a train to truck coal transfer facility and associated roadway infrastructure improvements be made. The benefit of this scenario is that train/vehicle exposure would be reduced to zero. However, this would require a fleet of transfer trucks, probable roadway improvements and added vehicular congestion on local streets.

- **Close JRPP and deliver coal to new site** – this option is one that would require the construction of a new power plant at a location that offers train serviceability without grade crossings. During the course of this study, City Utilities has been evaluating the longevity of the JRP and trying to determine whether the plant will be upgraded, closed or used as a peaking plant. In itself, the closure of the plant does not eliminate the vehicular/train exposure. However, if there are no other customers south of the JRF crossing, then the track could be removed and appropriate safeguards put into place to prevent trains from reaching the JRF.
- **Close JRPP and expand the Southwest Power Plant (SWPP)** – similar to the previous option, SWPP could become the "new site" and potentially close JRPP.
- **Deliver all coal to the SWPP**
    - **Construct a coal slurry pipeline to JRPP** – This option consolidates regional coal delivery to one location at the SWPP. This option suggests a coal slurry pipeline be constructed to deliver coal from SWPP to JRPP. If the pipeline routing were to generally follow JRF to the existing tracks and then to the JRP, the distance traveled would be about 11.5 miles. Other support facilities such as booster stations and inspection points would be required.
    - **Construct a train-to-truck transfer facility** – Similarly, a single point delivery, such as the SWPP, could facilitate the location of a train to truck coal transfer facility that would then enable the coal

to be trucked to the JRPP. The existing transfer at the JRPP could be modified for truck unloading. This option would eliminate the train/vehicle exposure at the existing crossing, but would require substantial infrastructure improvements and addition of trucks to the James River Freeway.

- **Build a new track between the Thayer Sub and JRPP** – the construction of a new track from either the Thayer Subdivision or the Cherokee Subdivision was considered but deemed not to be a feasible alternative due to environmental permitting, construction costs and the fact that grade separations would have to be constructed at James River Freeway and other locations.
- **Build a new track between the SWPP and JRPP** – one option is to consider constructing a track from the existing loop track at the SWPP to the JRPP. This route would cause extensive property acquisition, environmental permitting and substantial infrastructure expense.
- **Build a new track from M&NA to JRPP** – The M&NA does provide another routing path that was considered. However, utilization of this route would require similar new property acquisition, environmental permitting and substantial infrastructure costs to build the new route. Further, agreements between the M&NA/UP and BNSF would need to be addressed.

Recommendation

After careful consideration, it appears that the economical and ultimately, most opportunistic arrangement would be stay the course that is presently underway with the redesign of the Highway 60/65 interchange and grade separation of the existing tracks on their current alignment. The expenditures to complete this grade separation may pay dividends in the future should the JRPP be closed thereby potentially enabling a corridor for public travel from south of the James River Freeway all the way into the West Meadows area. In the short-term, this arrangement is able to accomplish the goal of reducing the train/vehicle exposure to zero.

DIVISION STREET AND EAST CHESTNUT EXPRESSWAY ANALYSIS

Common Considerations

Urban Planning and Aesthetics

"Context-Sensitive Design"

One of the most important recent movements in the design of street, roads and highways is that of "Context Sensitive Design" or CSD. (This also sometimes goes by a similar name "Context Sensitive Solutions or CSS) Throughout the country, public agencies at the federal, state and local level have prepared manuals and training seminars to address this subject. The Federal Highway Administration has endorsed the concept and has promoted its application as part of funding programs.

Essentially, this involves the notion that road design must not be done in isolation from other community objectives. Major transportation corridors should respect their surroundings, reflect local characteristics, the landscape, adjacent development, historical patterns and other elements. This can end up altering the design in a fundamental way to accomplish this or it can involve elements that are more decorative and purely artistic. An example is the noise walls on many freeways that have cast-in designs that echo vegetation or topography in a region.

The State of Missouri, in fact, has an excellent example of this approach in the recent enhancements to State Highway 71, south of downtown Kansas City. There, overpass structures have incorporated native stone as "facing" on concrete abutments. There are uniquely designed railings on overpasses and special light fixtures. Finally there are even artful structures that suggest whimsical "milepost" markers that used to dot highways in the Midwest in the early part of the Twentieth Century. The total effect is not only interesting to experience, but "fits" the local setting – which is precisely the objective of CSD.

In a similar manner, the grade separations for Chestnut and Division need not have austere, barebones designs but can incorporate landscaping, earth berming, retaining walls, railings and lighting done in an artful manner. Indeed, the reconfiguration of these crossings offers a chance to create distinctive gateways into Springfield from the east.

There a number of possibilities for achieving this result.

Bridge Structures

Columns

The structural supports for overpasses are almost always poured in place on a particular project, since there are so many site specific aspects that prefabircated columns are neither practical nor cost-effective. It is relatively easy to design forms and what are called "form-liners" to create unusual shapes, reveals, patterns or textures, so long as the structural integrity is maintained. Recently, bridges have been constructed with columns that are not just cylindrical or rectangular in shape but oval, tapered, tiered and even splayed or angled. Computer technology allows designers to meet structural requirements and cost parameters, while creating more interesting designs.

Even if it is constraint prevent dramatically different results, it is possible to add surface cladding to create a different visual effect. This is essentially like adding face brick to a building. However, it should be noted that these structures will be railroad bridges and subject to loading criteria that is substantially different from that of typical roadway bridges. Limitations will be seen with "fluting" and other dramatic effects when considering these loads.

Abutments and Bulkheads

Most grade-separations require walls, whether vertical or sloped to hold up end points, retain adjacent soil, or serve as major supports. Similar to columns, these are poured in place and the concrete can be treated, shaped, textured and imprinted in many different ways.

Photograph 21 - Example Formed Concrete Abutment

Aggregated can be colored and exposed in some areas to create different effects. Often these do not impact costs severely, as it is merely a matter of specifying certain liners, admixtures or coating the inside of a liner with chemicals. These walls can also be given shapes that are stepped, tapered, angled, and even curved.

Lighting

In the design of streets and roadways – especially major arterial streets – it has been common practice for decades to use poles and fixtures that are easy to maintain and replace if needed. This usually means a standard "cobra head" top on a galvanized round pole. However, in some communities, "shoe box" fixtures are beginning to appear. Neither one lends a special character to a place; the mainly serve as utilitarian "background" elements. Indeed, some lighting engineers even maintain that is a positive attribute.

But increasingly along certain corridors, cities are installing more unusual fixtures to create a special condition. The "gateway" location of the proposed grade separations in Springfield are an example of this as, the overpasses in a sense serve as portals into the city as one leaves the freeway to the east.

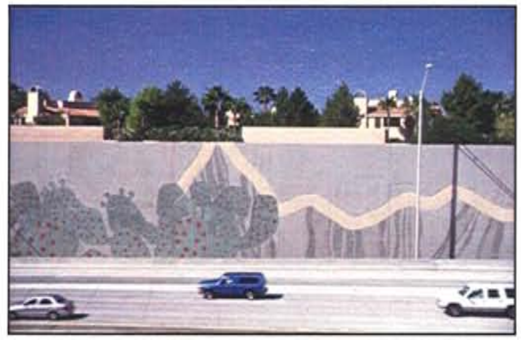
A number of lighting manufacturers have produced poles and fixtures that meet the technical requirements for sufficient intensity of lighting, but also have a unique character. For an arterial street, this is a particular challenge, because the width of the street requires a pattern of light that extends at least to the centerline. Some cities have made the mistake of installing short, pedestrian-scale fixtures that, in fact, do not perform well in these types of locations. Consequently, the cities still install taller, standard cobra-head fixtures to address liability issues. Having both fixtures on a street is not only redundant, but a waste of precious public dollars.

Therefore, if a city desires to install unique, but good performing lighting fixtures, they must work with a company that knows the right combination of height, spacing, wattage, cut-off characteristics, etc. It's a very precise balancing of objectives. But there are many examples where attractive lighting also performs well.

Approach Walls / Slopes

As the roadway dips down to pass under the railroad bridge, there will inevitably be a need to cut into and hold back adjacent earth. In some cases, it will be more cost-effective to build a sloping surface of rock or stonework, and in some case a slope planted with ground cover and shrubs to retain the soil.

In other cases, the adjacent land use might have buildings or parking lots that must be maintained undisturbed. Vertical or slightly-sloped walls may be necessary. These could be treated with planting, a terraced or stepped-back effect, or given designs and textures by casting them in, similar to the bulkheads and abutments.



Photograph 22 - Example Retaining Wall Art

Because these approach slopes or walls are long and "wedge-like," it is often desirable to vary the treatment and combine hardscape with landscape to avoid monotonous repetition.

Streetscape

Because of long slopes, walls, and overpasses that cast deep shadows, these places can be harsh and off-putting, especially to people who are walking on adjacent sidewalks. But by adding certain elements on the sides of the roadway, these can be made safer, more comfortable and even attractive

Photograph 23 - Example Streetscape

Trees are a powerful way of softening a setting dominated by concrete and asphalt. But they must be a certain size (at least 2 ½" in cal at the time of planting) to have a real effect. They must also be planted between the curb and the walking portion of the sidewalk, *not* behind the sidewalk. The line of trees offers a sense of safety between people on foot and vehicles.

Some streetscape designs have added a feature that helps reinforce this demarcation between people and vehicles and add to the visual appeal. That is planting low shrubs or hedges in the space between each pair of street trees. The result is low greenery alternating with vertical greenery. The low hedge planting – ideally evergreen material -- offers a continuous line of green throughout the year.

Instead of low plants or hedges, some major arterial streets have metal posts or railings between trees. These can be painted green to add color. They have the advantage of low, long-term costs. But they are higher in the cost of fabrication and installation. To work in this setting these pieces must be deliberately "oversized" not delicate or fussy.

These "beefy", structural elements can be composed to match any metal work on the overpass, such as railings, so that the total effect is coordinated and cohesive.

Medians

A wide, multi-lane arterial street can be "softened" considerably by the use of a median. The most effective medians are ones that are planted with grass/ground cover and/or trees. But sometimes this requires more space than is available. (Ideally, planted medians are 12-18 feet wide).

Medians can also be paved with brick, stone, or other permanent, durable, low-maintenance materials, but that usually doesn't contribute to a softening effect. Artwork and even lighting can also be placed within a median.

The most visually effective medians combine several of these elements so that initial and long term costs are kept in balance along with a desire to have an attractive corridor.

Existing Railroad Track Corridor

The subject railroad corridor is owned by the BNSF railroad and is called the "Thayer North Subdivision." (please see map at right[3]) The rail line begins in Springfield and travels through southern Missouri into Arkansas toward Memphis, Tennessee. In 2006 it sees 30 to 40 train movements per day.

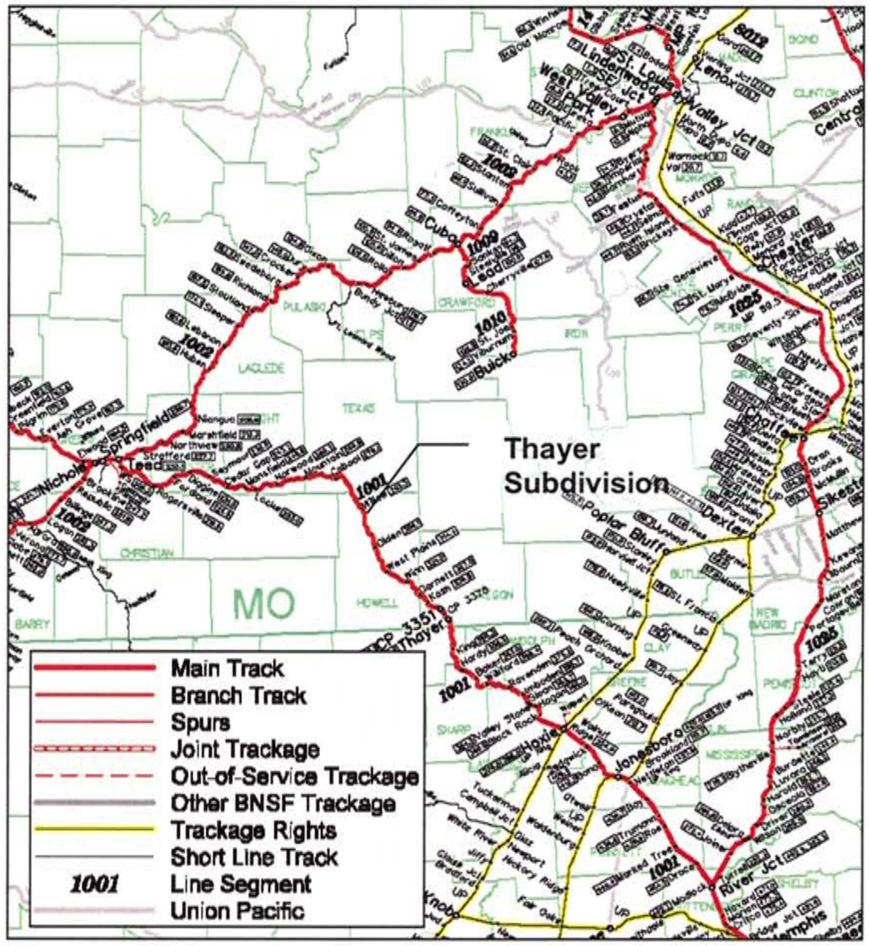


Figure 58 - BNSF System Map - Thayer Subdivision

Within Springfield, the Thayer North Subdivision begins at a location east of Highway 65 (Teed Junction MP 203.2) where it connects to the Cuba Subdivision. Further west is the North Yard and the Main Springfield Yard. The Thayer Subdivision, continuing railroad east from it's origin on the Cuba Subdivision, turns south and runs parallel to Highway 65 approximately 1200' to the west. Just south of it's start, the Thayer crosses Packer Road at-grade and then Division and East Chestnut Expressway. South of East Chestnut Expressway there is an at-grade crossing of Cherry Street and then the track turns east and crosses beneath Highway 65. From there the track winds it's way through the Missouri Ozarks region towards Memphis and beyond.

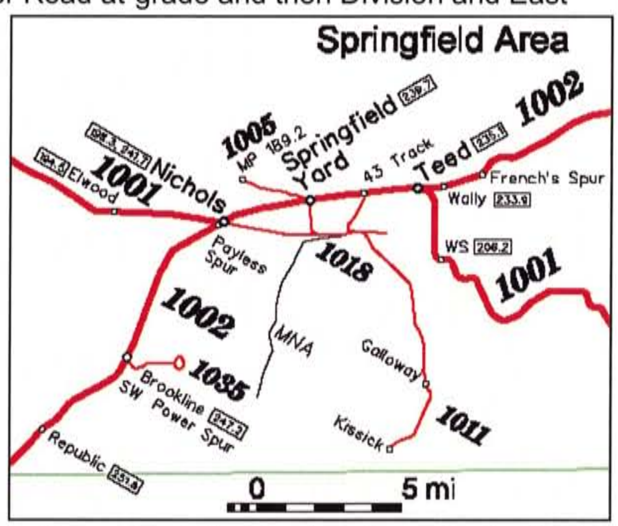


Figure 59 - BNSF System Map - Springfield Area

Within the railroad corridor study area which extends from just south of Packer Road to Highway 65, the trains are dispatched under the guidance of a Centralized Traffic Control (CTC) dispatcher located in Ft. Worth. Train

[3] Railroad System Mapping courtesy BNSF

speeds are controlled to not exceed 35 mph[4]. The horizontal alignment includes tangent and curved track with curves up to 5 degrees 10 minutes. The vertical alignment (profile) has grades ranging from 0 (zero) to 1%. The corridor is presently a single track corridor with 50' of right-of-way on either side of the track.

The at-grade crossings are at the following locations:

- Packer Road – MP 203.46 – DOT# 664100N
- Division Street – MP 204.25 – DOT#664101V
- Pythian Street – MP 204.73 – DOT#664103J
- East Chestnut Expressway – MP 205.26 – DOT#664102C
- Cherry Street – MP 205.73 – DOT# 664106E

The FRA Grade Crossing Safety inventory was polled for accidents at these locations. The table below summarizes the findings.

Street Location	Injury (Date)	Fatality (Date)	Property Damage (# Incidents)
Packer Road		11/24/84	3
Division Street	6/12/04		4
Pythian Street	9/3/94		1
East Chestnut Expressway	7/18/02 (2 injuries) 1/8/82 7/22/87	5/26/04	8
Cherry Street	11/11/05 01/04/88		2

Table 4 - FRA Safety Data - Incidents

Rail Corridor Evaluation Approach

There are very limited number of clear choices for creating a condition where there is no exposure between vehicular/pedestrian and trains. Those choices include:

- Abandon the track
- Close the road
- Relocate the existing track either east or west of the present corridor
- Grade Separate the railroad from the roadway
  - Road over
  - Track over
  - Combination raise/lower the track/road

The first two bullet options, abandoning the track or closing the road are considered not viable alternatives for this project and have been discarded as options to consider.

Upon conclusion of the first public meeting it became clear that an overview of potential other corridors would be necessary.

[4] From BNSF track charts, LS 1001, between MP 203.2 and MP 206.2

Corridor Relocation Alternatives

There were three general considerations for identifying a corridor relocation for the Thayer Subdivision.

1. Is there another existing corridor that could feasibly replace the Thayer corridor?
2. Can the Thayer Subdivision be relocated east of its present location?
3. Can the Thayer Subdivision be relocated west of its present location?

Is there an existing corridor that would replace the Thayer Sub?

The Springfield rail system, see figure below, depicts the rail lines in green, highways in light blue, primary city streets in dark blue and secondary city streets in cyan.

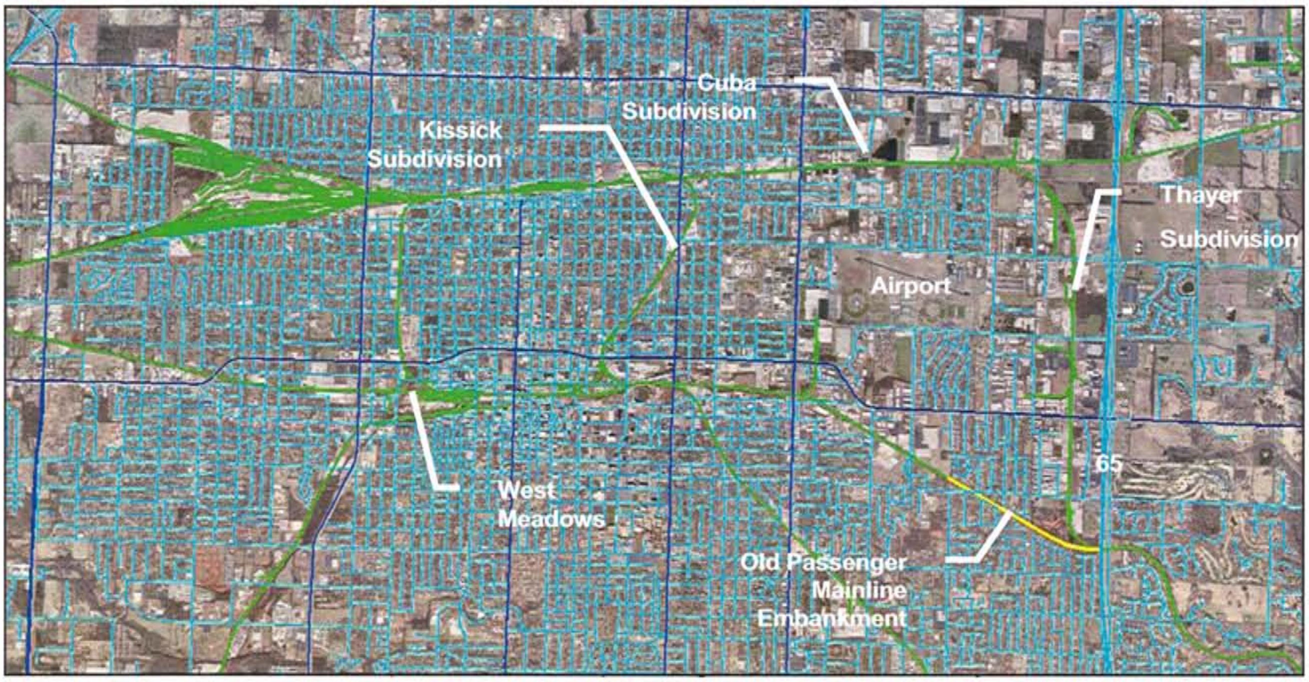


Figure 60 - Springfield Rail System with Roadways

that of the existing Thayer Subdivision.

- Trains formally running on the Thayer Subdivision would be taking the renewed route and therefore there would be a higher train/vehicle/pedestrian exposure using this route.
- There would be additional noise as a result of more trains on the renewed line.
- Customers located on the Thayer Subdivision between the Cuba Subdivision and its' crossing underneath Highway 65 would either have to relocate or the track would remain in service for local deliveries. If left in-service, there would remain at-grade crossings of East Chestnut Expressway, Division Street and Pythian Street.

The conclusion drawn after weighing the impacts was that renewing the old passenger mainline would not be a viable alternative for the project.

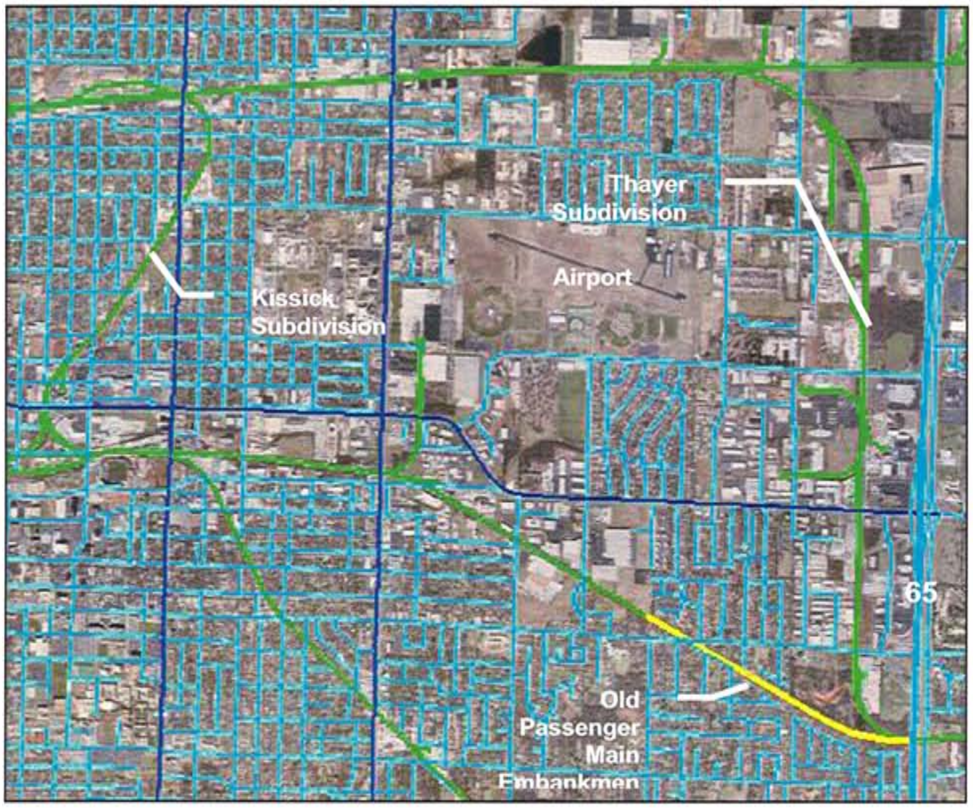
Can the Thayer Subdivision be relocated west of its present location?

The evaluation of moving or creating a replacement corridor to the west of the existing Thayer Subdivision can be proven unsatisfactory by recognizing the following points (please reference the figure below):

- Any corridor that is identified west of the existing Thayer Subdivision will require grade separations at all city and state owned roadways.
- There are a host of secondary schools, colleges, universities and hospitals west of the airport that would have input to the approval process.
- Customers on the existing Thayer Sub would either be relocated or remain in service. If left in service, then the result would be a much lower number of train movements per day, not elimination.
- The logical routing would be to renew the old passenger main connection. Please refer to the previous discussion about using existing rail corridors. Most of the same arguments for that scenario would apply here.
- Significant property acquisitions may be required.

For these reasons, and others, this alternative was carried no further into development.

Figure 61 - Western Corridor Roadblocks



Can the Thayer Subdivision be relocated east of its present location?

The study team spent considerable time listening to the public input about opportunities for creating a corridor east of Highway 65. Several general parameters have been considered for the identification of potential corridors:

- Using available aerial and topographic mapping, does there appear to be a corridor would meet the design requirements of a railroad.
- What are the impacts to landowners?
- Are there significant environmental hurdles to overcome?
- Does the corridor remain within Greene County?
- What order of magnitude would the corridors be?
- Does the approach meet the goals of the project? (remove train/vehicle/pedestrian exposure and minimize adverse business impacts)

The approach taken for analyzing the corridors was to examine available aerial mapping to see if there appeared to be a corridor that would be conducive to a horizontal and vertical track alignment.

Corridors Adjacent to Highway 65

The examination began by reviewing a corridor that shares the Highway 65 corridor. The suggested corridors with tracks routed in three locations:

- Adjacent to the east side of the highway
- Adjacent to the west side of the highway
- Between the divided lanes of the highway.

There are some common considerations for each of these alternatives. Whether the alignment is adjacent or between the vehicular travel lanes, the tracks will still need to be grade separated at Division Street and Chestnut Expressway. The complications with these proposed grade separations are that the interchange with the highway may become very complex and limited to future expansion. The single grade separation structure that might be required on the existing corridor may expand to grade separations for ramps as well as the subject street. Getting to the corridor may require additional property acquisitions and structures. Further, this arrangement may not be able to maintain customer service to all of the rail customers on the corridor today.

There are considerations by MoDOT to expand Highway 65 and improve the interchanges at Division Street and Chestnut Expressway. At the time of this study, the plans for the expansion have not been conceptualized. Close planning for any of these alternatives would be necessitated to avoid limitations and potential rework.

Of these three corridors, the eastern corridor may offer the best opportunity of implementation. The eastern corridor would mandate reconstruction of the interchanges at each of the subject streets and potentially new grade separations of the highway to enable the track to be routed to the west at the south end of the corridor.

The western corridor would require either using the existing grade separation north of Kearny Street as a way to route a new track on the east side or create a new grade separation of the highway and frontage roads. If the existing separation were to be utilized, then in order to accommodate the track design criteria, it is anticipated that additional property acquisition may be required.

For the outer corridor options, aesthetic appeal must be considered. Appropriate screening may be required to enhance the corridor or prevent the corridor from becoming an attractive nuisance to vehicles traveling on the Highway.

One of the interesting thoughts was to arrange a track corridor down the center of the highway corridor between the divided lanes. This arrangement may offer the least impacts to the adjacent businesses and residents; however it would require complete reconstruction of the existing interchanges within the corridor limits and new grade separations of the Highway lanes to reach the center from the east and depart the center median to the west. Further, there may not be sufficient width within the existing median to enable the construction of the track. Therefore, lane reconstruction may be required.

The profile of the track that is conceptualized between the lanes may require that portions of the track corridor be contained within retaining walls.

Because of the potential high costs, property acquisitions, potential adverse impacts to surrounding neighborhoods and the fact the existing rail customers would be unable to be served, these alternatives were dismissed.

Corridors East of Highway 65

There were several ideas of corridors created east of Highway 65 for relocating the Thayer Subdivision. Some of the suggestions were identified in Webster County, while others remained within Greene County. As identified earlier, the focus of the study will stay within Greene County.

Three corridors were examined east of Highway 65.

For purposes of this discussion they are identified as the Blue, Green and Red options. (See Figure below)

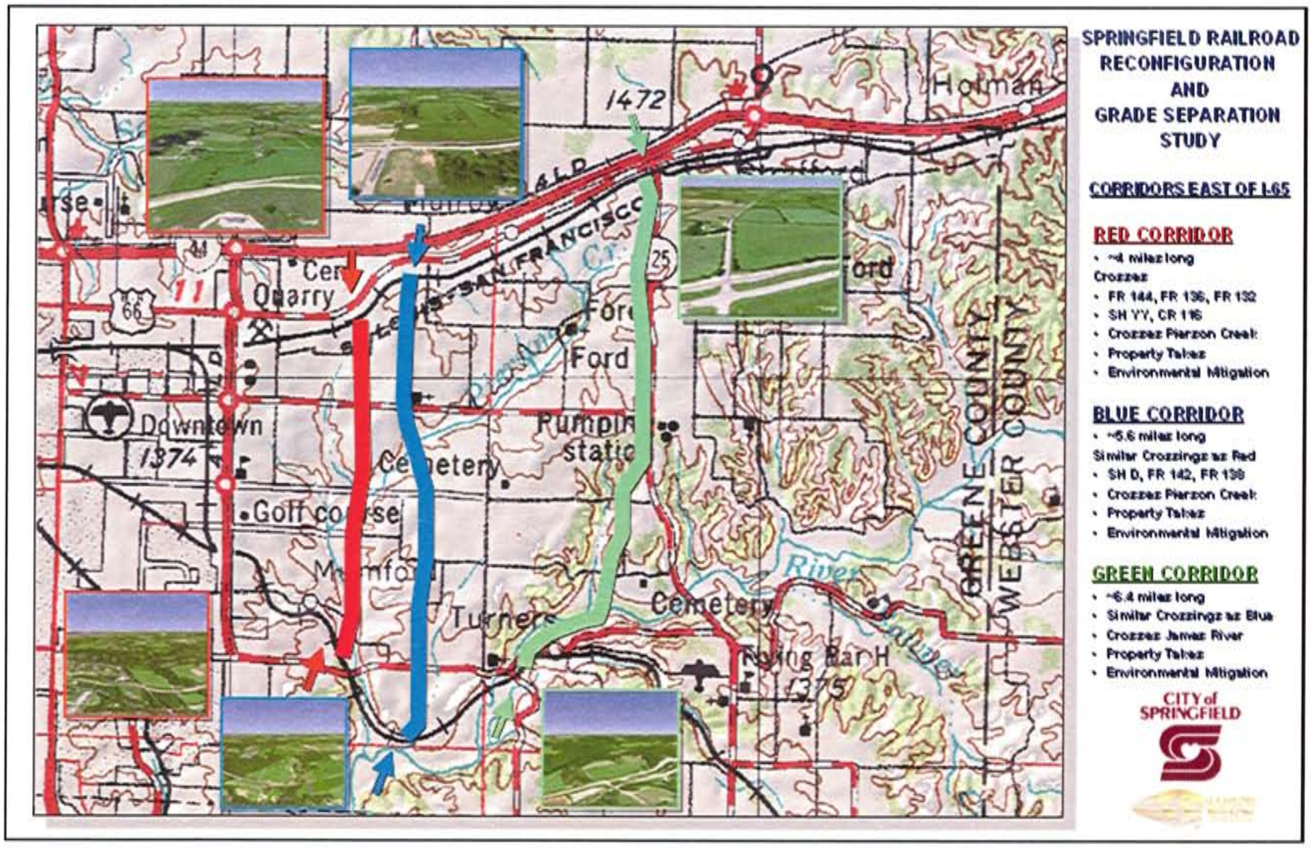


Figure 62 - Corridors East of Hwy 65 (Topographic Map)

Each corridor would be require grade separations at all county roads and would be a double track capable corridor. It would be dispatched under CTC capabilities. In each case, without relocation of the rail customers along the existing Thayer Subdivision, the existing track would remain in-service. Each track would likely also have at least a "wye" connection at the north connection point and associated mainline crossovers to enable westbound and eastbound train service to travel southbound on the Thayer Subdivision. It should also be noted that, as rings true with all new rail corridors, property acquisition will become a major cost impact to the proposal. Property acquisition time and costs were not a consideration at this level of study.

Further, there was extensive discussions within the steering commitee regarding the shifting of the problem rather than determination of a problem resolution. The corridor exists today and has for many years. The point of the study is to try to solve the issues at-hand and not create a situation that would be considered a burden to other landowners or future generations.

It should be noted that a review of this nature should not be considered a "corridor study." It is recommended that if these or other corridors as identified should include a corridor investigation that may include a detailed environmental survey, geotechnical investigation and more detailed mapping and site specific surveys.

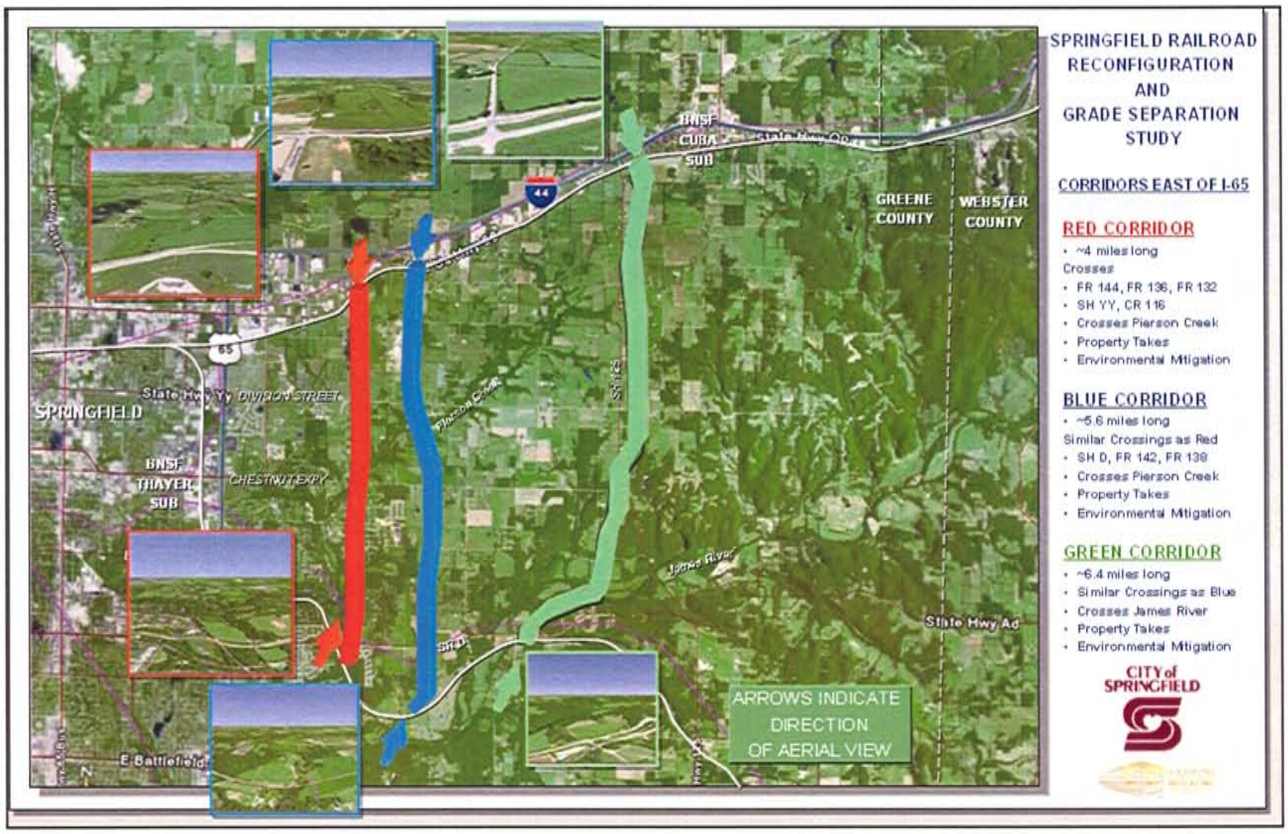


Figure 63 - Corridors East of Hwy 65 (Aerial Photograph)

Red Corridor

The Red Corridor is the shortest and closest corridor to Highway 65. It connects the Cuba Subdivision to the north to the Thayer Subdivision to the south by traversing approximately 4+ miles of Greene County. The corridor crosses the following roads:

- FR 144
- FR 136
- FR 132 (Extension of Chestnut Expressway)
- SH YY (Division Street)
- Cherry Street

- CR 116
- And numerous local streets

There may be other roadway crossing not reflected in the aerial photography or topographic mapping, but it is expected that these crossings may require grade separations.

There are a variety of other drainage structures that would be required to enable storm water drainage or seasonal or year-round creeks or streams to be conveyed. Of note are crossings of Pierson Creek

The corridor also features typical Ozark topography with significant railroad bed embankment construction in fill and cut conditions.

The Red Corridor also skirts and in some cases, divides existing subdivisions. Careful consideration to the evaluation and mitigation of impacts of those subdivisions should be considered.

Blue Corridor

The Blue Corridor, located east of the Red Corridor, is similar to the red in terms of the roadway crossings. In addition there may be grade separations at FR 142 and 138. The Blue Corridor is approximately 5.6 miles in length. One of the greater challenges in this corridor is the crossing of State Route D as the proposed connection point to the Thayer Subdivision would be south of that highway.

Green Corridor

The Green Corridor, located east of the Blue Corridor and generally adjacent to SH 125, is similar to the Red and Blue Corridors. As the corridors considerations move east in Greene County, the topography becomes more challenging with increasing hills and valleys and the introduction of having to cross the James River. The Green Corridor, approximately 6.4 miles in length, begins its route from the north near SH 125. It continues on the east side of SH 125 taking advantage of the gentler profile of the roadway corridor. As it approaches the James River, the corridor attempts to find a reasonable profile grade that would meet railroad design criteria. This is a significant challenge and one that cannot be finalized at this level of study for any of the corridors. The approach logic was to find a grade that would enable the track to descend into the James River valley and follow that valley, crossing SR D and ultimately connecting with the existing Thayer Subdivision. Crossing of the James River would require significant trestle and bridge structures. This crossing, as with the other waterway crossings, would require environmental permitting, possibly resulting in an Environmental Impact Statement being prepared.

After reviewing the identified corridors, the steering committee recommended that the study continue to focus on the grade separations on the present Thayer Corridor within the project limits.

Railroad Alignment Alternatives Analysis

There has been extensive analysis of the existing rail corridor including detailed site surveys and alignment development. The following sections discuss the corridor analysis with the goal of creating grade separations at Division Street and East Chestnut Expressway.

The alternatives analysis begins with a common set of design criteria that is to be used in all cases. The design criteria includes geometric and train service considerations.

The following table describes key design criteria followed during the analysis:

Category	Description	Value
Train Operations		
	Track Design Speed	45 mph
	Customers	All rail customers remain in-service during construction and final configuration
	Corridor	Double-track capable
Geometry		
	Horizontal Curves	Commensurate with Design Speed
	Superelevation	Commensurate with Design Speed
	Grades	Maximum (initially 1.25% later refined) 1% ascending or descending
	Track Centers	Tracks to be spaced on 15' track centers
	Service Road	Not required between Division and Chestnut Expressway
Other	BNSF Design Criteria	Utilize without exception
	No roadway sump conditions	Roadways must gravity drain

Table 5 - Track Design Criteria

In addition to the track design criteria, there were other goals identified for the project:

- Maintain Customer Service at all times
- Do not acquire additional right-of-way (except that needed by future roadway expansion)
- Do not impact Packer Road or Cherry Street

There were several alignments analyzed during the course of the study. Each of these corridors were designated by a color. The nature of the railroad corridor will make it difficult to present legible plans in a study format. The concept plans are included within the body of the text and within the appendix of the report. The reader is encouraged to visit the website (www.rrstudy.com) or request .PDF files from the City for more detailed review.

Initial Evaluations

During the initial corridor evaluation there were several options discussed. Those options included:

- Maintain roadway elevations
  - Depress the existing track into a trench
  - Raise the existing track onto a railroad bridge
- Maintain the railroad elevations
  - Depress the roadways beneath the tracks
  - Raise the roadways over the tracks onto a roadway bridge

Maintain Roadway Elevations

During the examination of potentially lowering the track into a trench, the following key features were identified:

- Geometrically, there is insufficient length to create sufficient structural clearance beneath a roadway bridge at Division Street assuming no impact at Packer Road. Even if Packer Road were considered sacrificial, there are significant drainage issues that may result in the use of a pump station as well as impacts to James Creek near Packer Road.
- Rail service to customers along the route may be disrupted during construction and could ultimately result in requiring customer relocation.
- Significant costs may be incurred in rock excavation and wall construction.
- Safety precautions would need to be taken to prevent trespassers from entering the trench area.
- Expandability by the railroad would become limited.

For these reasons, a trench option was not considered as a viable long-term option.

In terms of raising the track and placing the track on a structure by maintaining the road elevations, the following key features were identified:

- Geometrically, there is insufficient length to create sufficient structural clearance beneath the railroad bridge and roadway. The existing track profile is increasing in grade to the south on a 0.7% rate. Using a 1% grade will not create the required clearances.
- If tracks were able to be raised to the point where clearance could be achieved to the roadway, the existing rail served customers would

lose service because of the steep grade required to descend from the raised track embankment to the service locations.

- Aesthetics play a key role in this option as the viaduct would appear as a east-west divisor to the city. Geometrically, this option fails because it requires modifications to the Highway 65 ramps.
- Potential permanent loss of access by adjacent businesses.

For these reasons, raising the road over the tracks without track elevation modifications was considered not a viable solution.

Similar reasoning exists for the consideration of lowering the roadway beneath the tracks:

- Geometrically, this option fails because it requires modifications to the Highway 65 ramps.
- Potential permanent loss of access by adjacent businesses.

Maintain Track Elevations

During the examination of potentially raising the road over the tracks, the following key features were identified:

- Geometrically, this option fails because it requires modifications to the Highway 65 ramps.
- Potential permanent loss of access by adjacent businesses.
- Unacceptable appearance with the road elevation becoming higher than Highway 65 elevation.
- More extensive right-of-way impacts would be realized.
- Sight distances become a significant deficiency.

For these reasons, raising the road over the tracks without track elevation modifications was considered not a viable solution.

Similar reasoning exists for the consideration of lowering the roadway beneath the tracks:

- Geometrically, this option fails because it requires modifications to the Highway 65 ramps.
- Potential permanent loss of access by adjacent businesses.
- Sight distances become a significant deficiency.
- More extensive right-of-way impacts would be realized.
- Deep excavations will result in a sump condition resulting in the use of a pump station to remove storm drainage. This is an unacceptable solution.

For these reasons, a bridge options without rail elevation changes were considered not a viable alternative.

<u>Red Option</u>

The first option examined was an attempt at raising the tracks at Division and Chestnut while trying to leave as much of the existing rail corridor untouched.

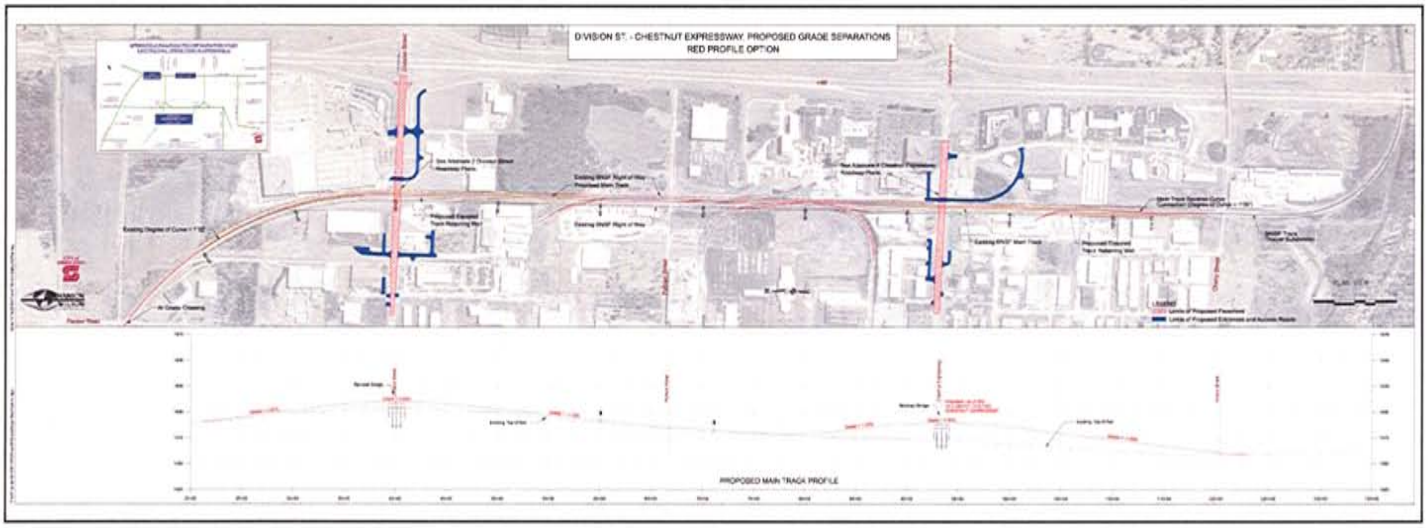


Figure 64 - "Red" Option - Grade Separations

Key Features:

- Horizontal alignment enables a double track corridor to be constructed within available right-of-way.
- All industries are maintained in-service during construction and in the final configuration.
- Maximum vertical grade set at 1.25%
- Minimizes railroad construction by maintaining a minimal track raise through the corridor.
- Pythian Street remains open.
- Train operations are adversely impacted because of the additional "hill" to climb at E. Chestnut Expressway. This is considered a fatal flaw due to the long-term adverse train operations costs.
- The profile grade may end just north of Cherry Street, or Cherry Street would require minor modification to the at-grade crossing.
- Both Division and Chestnut Expressway are modified by lowering the track. Division has a greater depression that ultimately causes pavement work back to Highway 65.

The recommendation is to not consider this alternative as a viable option.

Magenta Option

The Magenta Option utilizes a combination of track raise over Division Street and lowering at E. Chestnut Expressway.

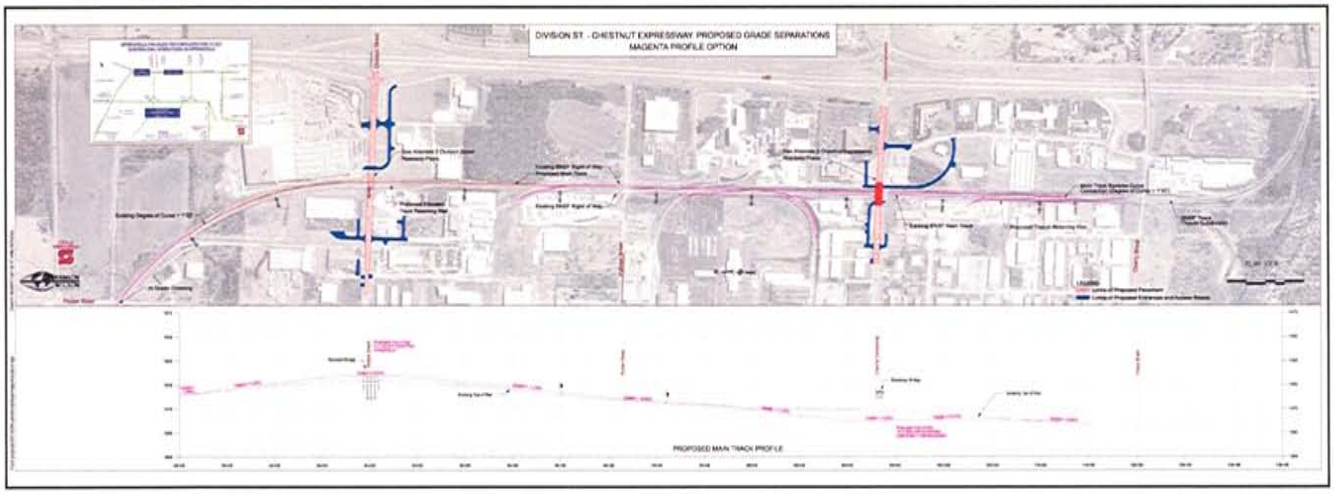


Figure 65 - "Magenta" Option - Grade Separation

Key Features:

- Horizontal alignment enables a double track corridor to be constructed within available right-of-way.
- All industries are maintained in-service during construction and in the final configuration.
- Maximum vertical grade set at 1.25%
- Pythian Street remains open.
- Train operations are adversely impacted because of the inconsistent grade in comparison to the existing profile grade. This is considered a fatal flaw due to the long-term adverse train operations costs.
- The profile grade ends just north of Cherry Street.
- In this scenario, Division Street is lowered and E. Chestnut Expressway is raised. The lowering of Division and the raise at Chestnut are considered the limits of elevation changes without impacting Highway 65.

The recommendation is to not consider this alternative as a viable option.

Gold Option

The "Gold Option" attempts to improve the railroad operations, while maintaining rail customer access and not impacting Highway 65.

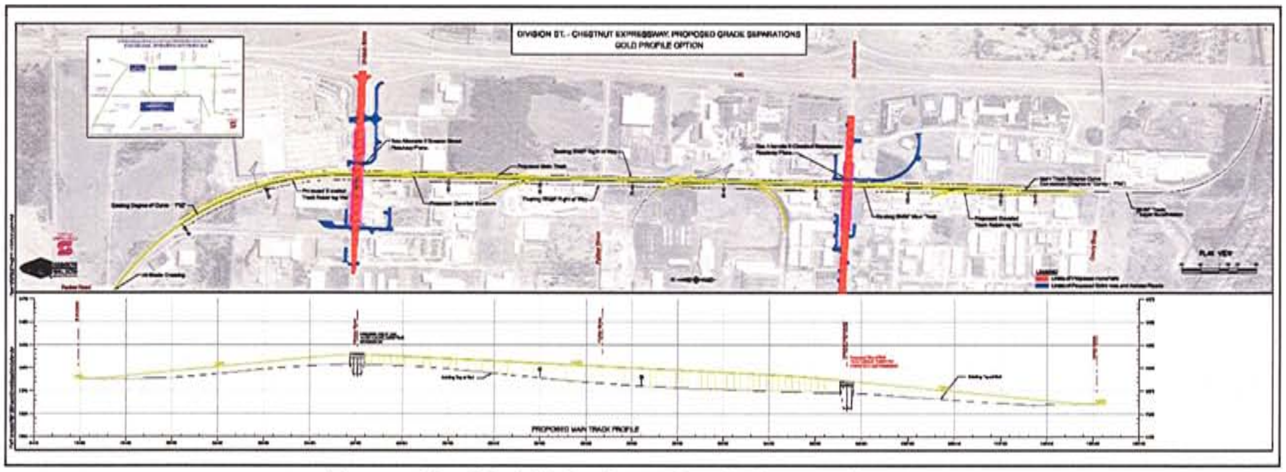


Figure 66 - "Gold" Option - Grade Separations

Key Features:

- Horizontal alignment enables a double track corridor to be constructed within available right-of-way.
- All industries are maintained in-service during construction and in the final configuration.
- Maximum vertical grade set at 1.00%
- Pythian Street is closed. The closure of Pythian Street will require new access to be constructed to maintain access to the customer that is in the southeast quadrant of the Pythian Street at-grade crossing.
- Train operations are adversely impacted because of the inconsistent grade in comparison to the existing profile grade. This is considered a fatal flaw due to the long-term adverse train operations costs.
- The profile grade may end just north of Cherry Street or require minor modifications to Cherry Street.
- In this scenario, Division Street is lowered and E. Chestnut Expressway is raised. The lowering of Division and the raise at Chestnut are considered the limits of elevation changes without impacting Highway 65.

During the design development, it was becoming apparent that the "Gold" option was becoming viable. However, there were several points that raised great concern:

- The costs and maintenance of the trestle may drive the costs of the project beyond the ability to fund.
- There may be some improvements to access for adjacent businesses on the roads.

- Cherry Street should be considered as a grade separation candidate.

The study team derived alternatives for each of these concerns are the option was modified.

Recommended Alternative

The following figure depicts the recommended alternative.

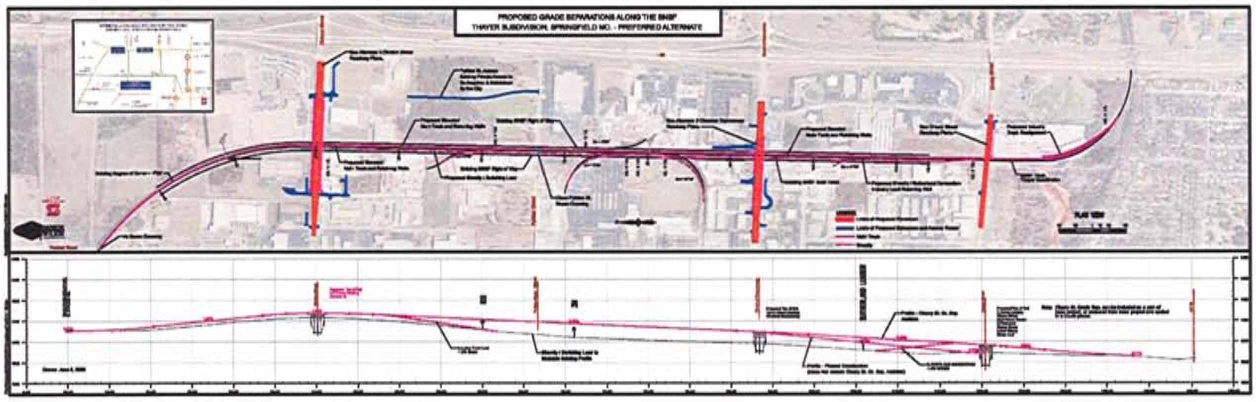


Figure 67 - Recommended Railroad Alternative

Key Features:

- Train operations are not adversely affected by the profile grade.
- Rail customers can be served via a industry track lead on the west side and individual customer tracks on the east side.
- In-lieu of a bridge trestle system, an MSE wall may be used to support the track. This will result in substantial cost savings (long-term and construction).
- Elevation modifications to the roadway profiles and adjustments to meet future Highway 65 design requirements were incorporated.
- Pythian Street remains closed, but a new access road has been conceptualized.
- A new scenario that enables Cherry Street to be grade separated as a part of this project or as a part of a future expansion was created.

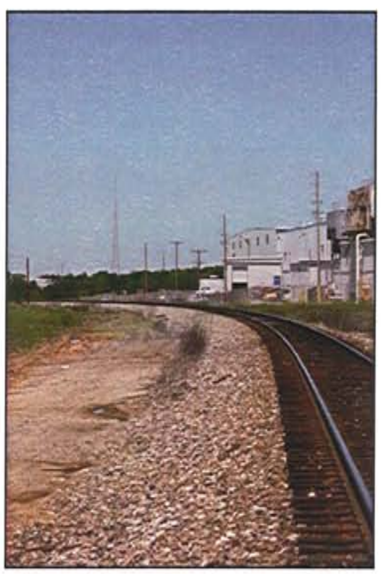
Division Street

Division Street is a state owned route that is presently a 2-lane facility where it crosses the existing BNSF Thayer Subdivision at-grade. The road travels generally east-west and is one of the major corridors into downtown Springfield. As can be seen in the photographs, overhead utilities are running on the north side of the street. The crossing is a concrete panel crossing and the track is continuously welded rail throughout the project limits. The railroad warning protection devices include gates, overhead cantilever flashers, cross-bucks and bells.

There are no sidewalks at the location of the track crossing. Street lighting is on the south side of the street east of the crossing.

Photograph 26 - Division Street At-grade crossing (western viewpoint)

Photograph 24 - Division Street At-grade crossing (eastern viewpoint)



Photograph 25 - Track looking North at Division Street

Photograph 27 - Division Street Track Crossing (southerly viewpoint)

Highway/Railway Structures

The initial consideration for planning of grade separated structures consists of establishing the vertical alignments of the roadway and railroad. Once the preferred scenario has been determined, the next step is to review the required clearances, whether it be railroad over highway or vice versa. Clearance determinations then lead into bridge span lengths and heights which in turn point toward a review of the best options for the type of substructure and superstructure.

Given the preferred option of placing the railroad over the highway at this location, the structure type analysis focused on the optimum number of spans and the depth of the proposed structure. While longer span superstructure allows for a reduction in the number of foundation elements, it often means that a deeper superstructure element is required. Since the roadway will have to be excavated to fit under the railroad, any savings in structure depth equates to a cost savings in roadway construction.

Photograph 28 - Example Concrete Rail Bridge

Therefore, our analysis showed that shorter span lengths with shallow beam elements were the optimum structure type at this location. Pier foundations are to be located in the roadway median and on either side of the road behind the curb and gutter portion of the pavement. This allows for span lengths over the roadway of approximately 40 ft.

Photograph 29 - Example Steel Rail Bridge

The abutment type and locations were reviewed considering the construction sequencing of the bridge. Our analysis lead us to propose design and construction of short abutments located well behind the sidewalk . The groundline is then sloped between face of the abutment and the back of the sidewalk. The shorter abutment allows for expedited construction with the added benefit of opening up the roadway section in lieu of vertical retaining walls and tall closed abutments throughout the roadway section.

The "spill-through" type of abutments proposed require the addition of another span at each end of the bridge. This span would also fall in the 40 ft length range but will vary depending on the preferred slope and location of the sidewalk.

Span lengths like those recommended here can consist of either steel or concrete beams. Steel beams may support a steel plate or a concrete deck to retain the railroad track ballast. Precast concrete beams may be either "I" shaped beams with a concrete deck or box beams that form their own deck when placed tight against one another.

Steel beams would provide a shallower structure when compared to the concrete I-beams. The shallow depth will allow for a cost savings in the roadway construction but may require more long term maintenance than concrete due to painting considerations. Single or double-cell precast, prestressed box beams are also an option for these spans. They would be cost efficient and would not require a cast-in-place deck. However, these type of spans are more difficult to waterproof and may not allow for aesthetic improvements when compared to the steel spans with concrete deck.

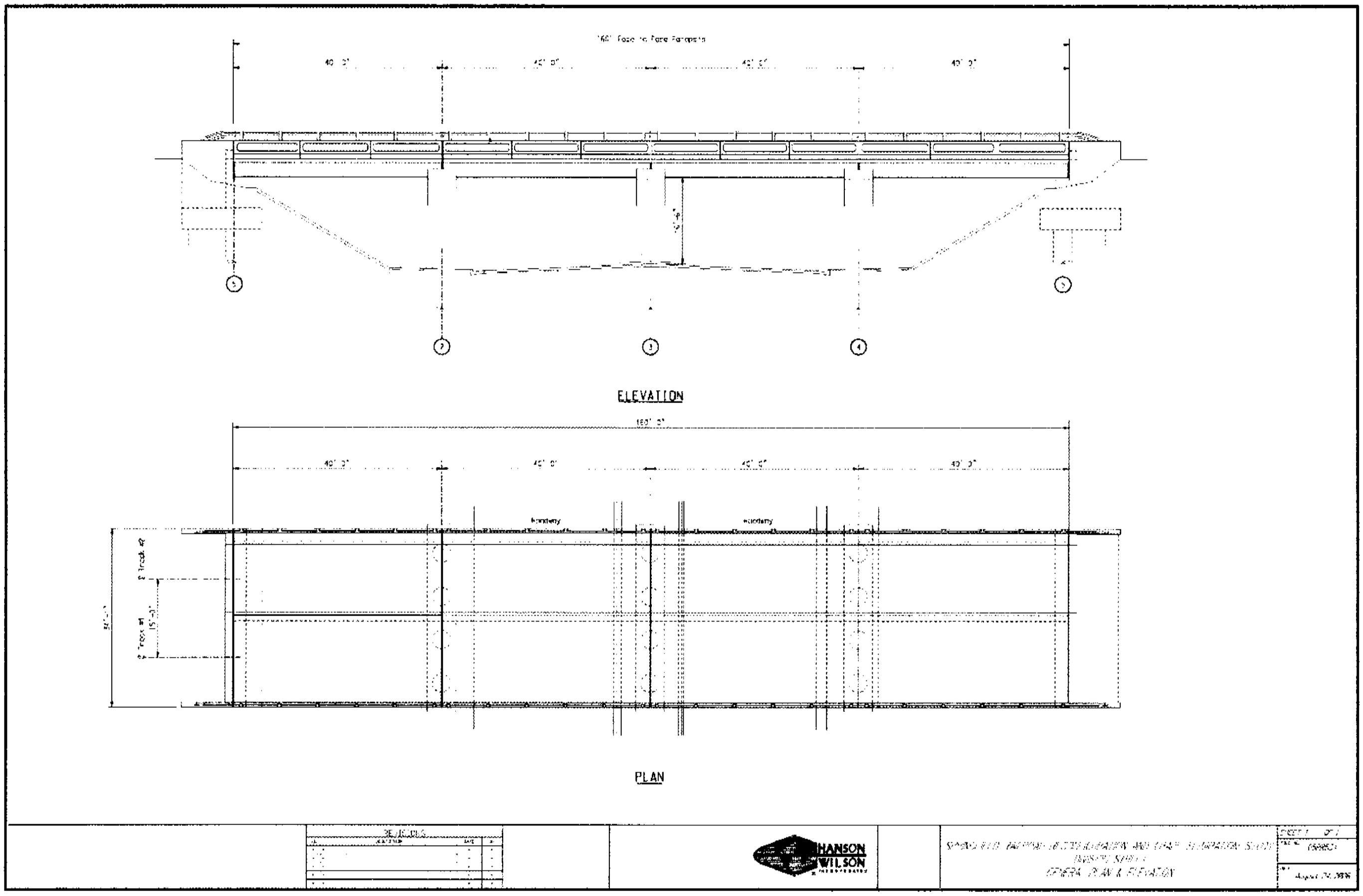


Figure 68 – Division Street – Conceptual Plan and Elevation

The foundation elements are highly dependent upon the subsurface materials at the bridge site. Without any investigation of soils at this location, we have assumed the use of drilled shaft type foundations with piers constructed of concrete columns or walls supporting the bearings. The above grade foundation elements can be formed in a variety of shapes with surfaces or textures included to allow for improved aesthetics. The abutments will also be concrete structures and are to include wingwalls that will allow for retainage of the track embankment and extension of the bridge railing element through the end of the structure. The abutments will also be concrete structures and are to include wingwalls that will allow for retainage of the track embankment and extension of the bridge railing element through the end of the structure.

The proposed overpass structure will carry two tracks and consists of a 4 span bridge with a total length of approximately 160 ft. The superstructure is made up of rolled steel beams with a concrete deck and walkway. The railing type is open to the aesthetic requirements. Foundations will be comprised of concrete elements and will have a "spill-though" type abutment with slope paving between the abutment and sidewalk on each side.

Roadway Alternative Development

A variety of conceptual arrangements were developed during the course of the study of which two, from a roadway perspective, seemed to be the best choices. The selections of these arrangements were driven by the development of trial railroad profiles while meeting the needs of the rail corridor. Therefore, the resultant roadway profile options available in the vicinity of East Division Street were limited in number. Alternatives were initially developed at a concept level to determine their feasibility before proceeding with further refinement.

The initial screening requirements included:

- Satisfying roadway vertical design criteria
- Ability to maintain access to the majority of adjacent properties
- Constructability of the resultant improvements
- Limitation of impacts to the adjoining Route 65 interchange located 1300 feet East of the rail crossing.

A brief synopsis of each alternative and screening results follows:

> Case 1: Lower the elevation of the railroad approximately 33 feet, while maintaining the roadway at the same approximate elevation.

The overall length of the roadway improvement required with this case is approximately 250 feet in length, consisting exclusively of the construction of a new bridge carrying the roadway over the BNSF railroad and construction of adjacent roadway approaches. The proposed improvements under this case would be very limited in scope, and have no adverse geometric impacts to driveway access within the project corridor. The limited extent of work associated with this case avoids impacts to the adjacent interchange and ramp terminals.

This case is extremely desirable from a roadway geometric perspective – incorporating a tangent alignment and tangent profile. These features – when combined with the narrow two-lane nature of the existing pavement, yields a wide latitude for staging operations and handling roadway traffic during construction. While formal costing estimates were not performed during this level of analysis, the anticipated construction cost for this alternative would be extremely favorable relative to other grade separation options.

> Case 2: Elevate the railroad approximately 5 feet above the existing track elevation, and depress Division Street approximately 24 feet below existing grade.

The roadway improvements associated with this case total approximately 2400 feet in length (from 1240 feet east to 1160 feet west of the existing rail crossing), and incorporate a depression of the roadway throughout the improvement limits. At the western end of the improvement, construction would commence approximately 100 feet east of North Packer Road. The eastern terminus would be located adjacent to the Route 65 interchange. Profile options are limited in the vicinity of the interchange due to the excavation depth required in the vicinity of the railroad bridge. While the improvements would not impact the existing Division Street bridge crossing over Route 65, reconstruction of the southbound ramp terminals would be required.

This case would not facilitate use of all existing access points due to the depth of excavation required. While access can ultimately be maintained to all adjoining parcels, it will require the acquisition of private property to construct public access roads serving multiple properties. An example of this is the western side of the Associated Wholesale Grocers property. In order to maintain two access points to this parcel, a connector roadway and bridge structure crossing over Division Street and connecting to existing roadways south of East Division Street was proposed. Construction of this alternative is feasible, but will require multiple stages and complex traffic handling. Lateral shifts of traffic, half width construction of the roadway and staged railroad bridge construction with a brief road closure would all be necessary.

Roadway Alternative Analysis

Although there is a minimal extent of roadway construction required by Case 1, the conclusion drawn was the depth and length of railroad excavation required was too extensive considering initial construction cost and future maintenance cost. Adverse impacts to rail operations and the inability to effectively remove snow in the depressed rail section were cited as the chief shortcomings of this course of action. Therefore, Case 1 was excluded from further consideration.

While the extensive relocation of driveways and complex construction staging requirements were noted as concerns, the study continued with a focus on Case 2. Over the course of the project, the following modifications were made to this alternative:

1. The profile elevation of the railroad was elevated to approximately 10.8 feet above existing grade;
2. The connector roadway and bridge structure serving as access to the western portion of the Associated Wholesale Grocers property was eliminated. This modification reduced the depth of excavation in the vicinity of the crossing to 11.2 feet, and allowed for much greater latitude in developing a proposed profile; and,
3. At the request of MoDOT, the ending grade in the vicinity of Route 65 was modified to facilitate future reconstruction of the interchange. Future improvements completed by MoDOT would include raising the existing bridge approximately 5 feet.

During the process of implementing the above modifications, a modified railroad profile was developed. As a new roadway profile was required, a new roadway alternative designation was assigned. "Alternative 3" represents the resolution of prior design comments, and is the recommended course of action for the East Division Street grade separation.

Summary of Recommended Roadway Alternative

<u>Description of Improvements</u>

The proposed improvements would commence at Sta. 81+70 – a point approximately 270 feet east of the North Packer Road intersection. The profile would match existing grade for approximately 200 feet before the introduction of crest vertical curvature at Sta. 86+05, and subsequent depression of the roadway. A sag vertical curve in the vicinity of the proposed railroad bridge (Sta. 92+90) results in a maximum excavation depth of approximately 11 feet prior to ascent. A final crest vertical curve is introduced at Sta. 100+23 to transition the profile back to existing grade. The improvement would end at Sta. 102+00± – a point approximately 90 feet west of the Route 65 southbound ramp terminals.

The developed character of the corridor and the depth of excavation necessary to clear proposed railroad bridge improvements will require use of abrupt excavation slopes or retaining walls in order to minimize impacts to existing properties and buildings. For purposes of this study, the use of mechanically stabilized earth (MSE) retaining walls was assumed in all excavations exceeding 5 feet in depth.

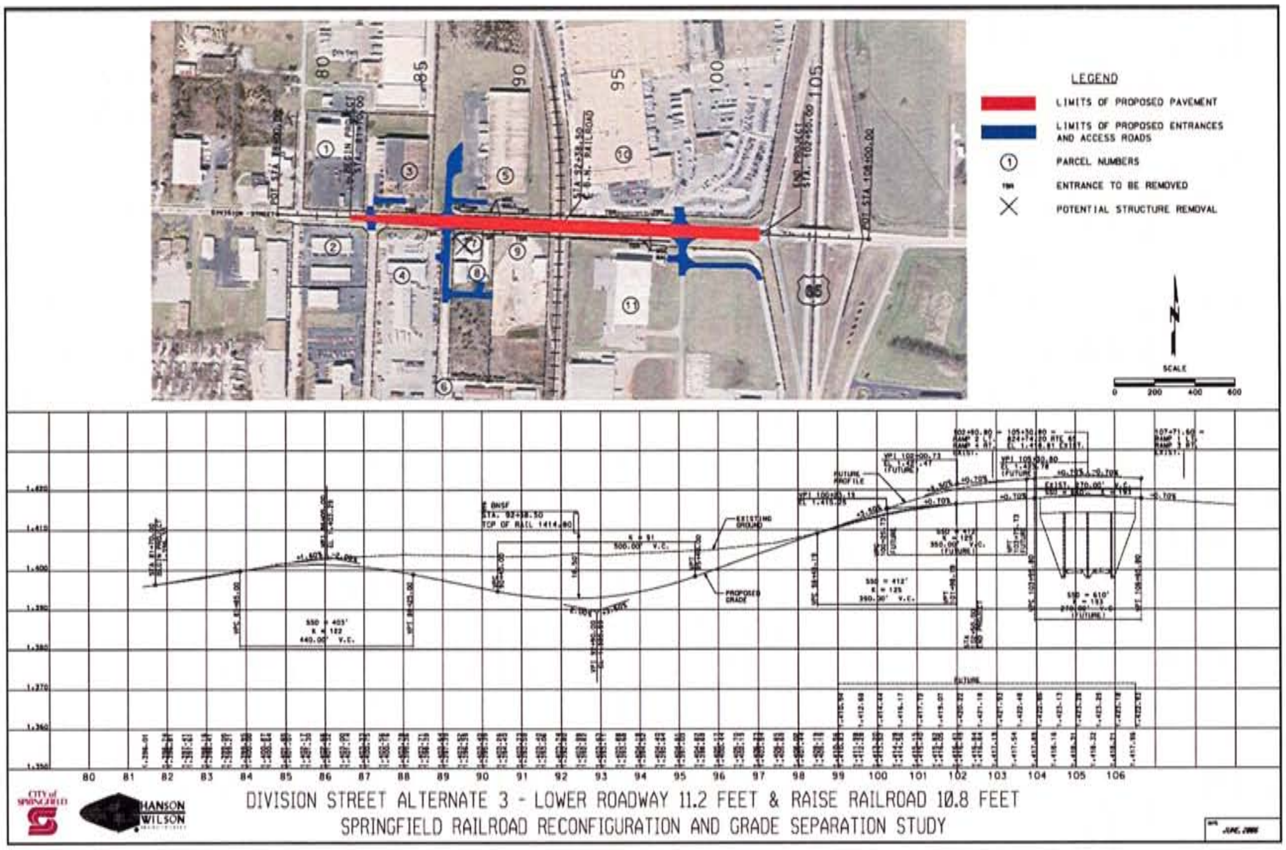


Figure 69 - Recommended Conceptual Division Street Grade Separation

The following figure provides and artists rendering of the recommended alternative.

Figure 70 - Division Street Artist Rendering (Easterly Viewpoint)

Design Criteria

East Division Street in the vicinity of the improvements is maintained by the City of Springfield. The following proposed design criteria were utilized in the development of alternatives:

Functional Classification:	Major Arterial
Design Speed:	45 mph
Max. Gradient:	5.00 %
Min. Stopping Sight Distance:	400 Feet
Minimum K (sag):	90
Min. Vertical Clearance:	16.50 Feet

In the vicinity of the Route 65 interchange and points further to the East, East Division Street becomes State Route YY and maintenance falls under MoDOT's jurisdiction. The following MoDOT design criteria would apply to this portion of the improvements:

Functional Classification:	Principal Arterial Street
Design Speed:	45
Max. Gradient:	5.00%

Min. Stopping Sight Distance:	400 Feet
Minimum K (sag):	90
Min. Vertical Clearance:	16.50 Feet

The recommended design criteria require concurrence by the City of Springfield and MoDOT, should be confirmed by prior to commencing preliminary engineering activities. Pertinent design criteria conform with MoDOT requirements for profile elements.

Typical Section

Existing East Division Street is a two-lane roadway with aggregate shoulders in the vicinity of the grade crossing. Curb and gutters are in evidence along some section of the existing roadway near the western terminus, and auxiliary lanes and channelization are in evidence in the vicinity of the Route 65 interchange. Sidewalks are also sporadically present near the western terminus. The existing roadway functions in an urban environment, but retains many elements typical of rural design.

An urban typical section is proposed for the improvement. Based on design traffic, functional classification and City of Springfield design requirements, the following elements are proposed:

Number of Lanes:	5	(1)
Lane Width:	12 & 14 Feet	(2)
Shoulder Width:	N/A	(3)
Median:	Flush or Channelized	
Curb & Gutter Width:	2.5 Feet	
Sidewalk Width:	6 Feet – Both Sides	
Minimum Right-of-way Width:	100 Feet	

Notes:

1. A flush center left turn lane or raised channelization may be utilized dependent on actual design requirements identified in preliminary design.
2. Outside lanes to be 14 Feet in width; inside and center turn lanes to be 12 Feet in width.
3. A maximum of 9 Feet is proposed between the back of curbs and inside edges of sidewalk. This distance may vary in the vicinity of the railroad bridge.

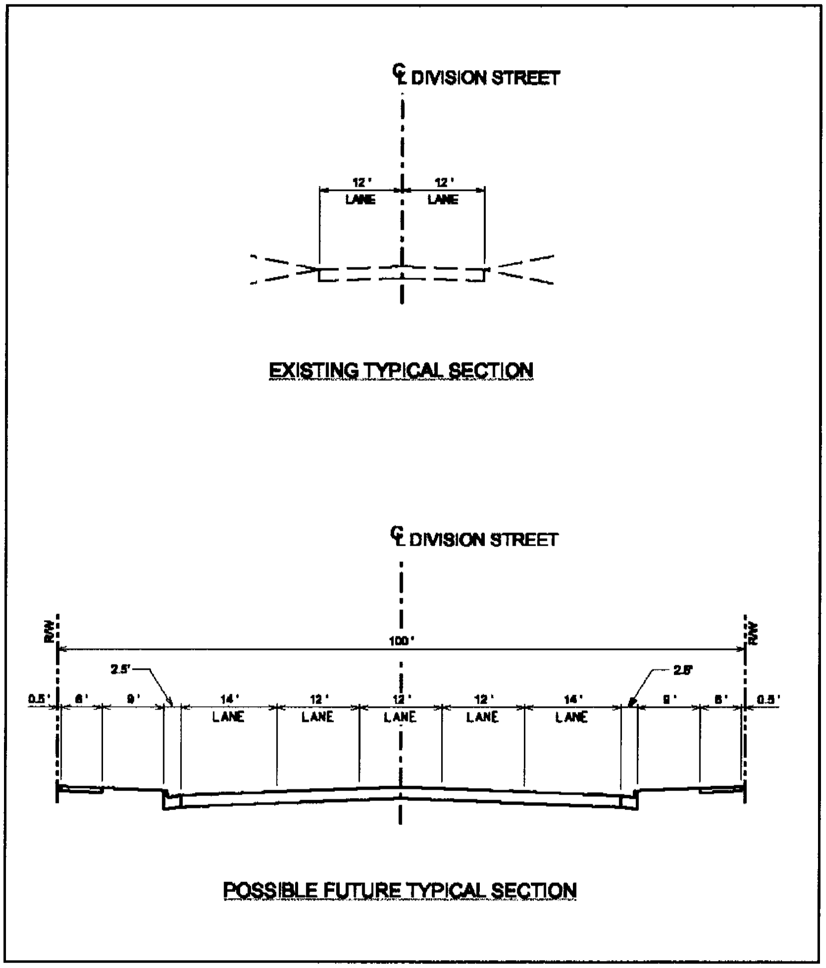


Figure 71 - Division Street Conceptual Typical Section

Traffic Operations

Traffic counts on East Division Street were performed by City personnel in 2005. Forecasts of future traffic volumes for the design year (2025) are based on recommendations for small metropolitan areas developed by the Texas Transportation Institute. While an annual growth rate of 1.33% would typically be applied, a rate of 2.0% was incorporated in East Division forecasts based on the availability of undeveloped land to the west of the project area. Current and future traffic volumes are as follows:

Existing Traffic Volume (2005):	13,100	VPD
Assumed Annual Growth Rate:	2.0	%
Design Traffic Volume (2025):	19,450	VPD

Capacity analyses were performed utilizing both existing and future lane configurations and traffic volumes. Under existing (2005) conditions, East Division Street functions as a major collector operating at approximately 88% of capacity. This corresponds to a

Level of Service (LOS) E. Based on the above future traffic projections, during the design year the existing roadway would operate at 156% of capacity, or LOS F. If the proposed improvements are implemented, the new roadway would function at approximately 58% of capacity, corresponding to LOS C. Analysis of future capacity assumes construction of the grade separation is implemented. Without the grade separation, delay will increase and level of service will decrease.

Capacity analysis also assumed no control of access and a center left turn lane. If future traffic growth exceeds the assumed growth, access management techniques such as a raised median and right-in/right-out entrances could be implemented. No access management improvements appear warranted at this time.

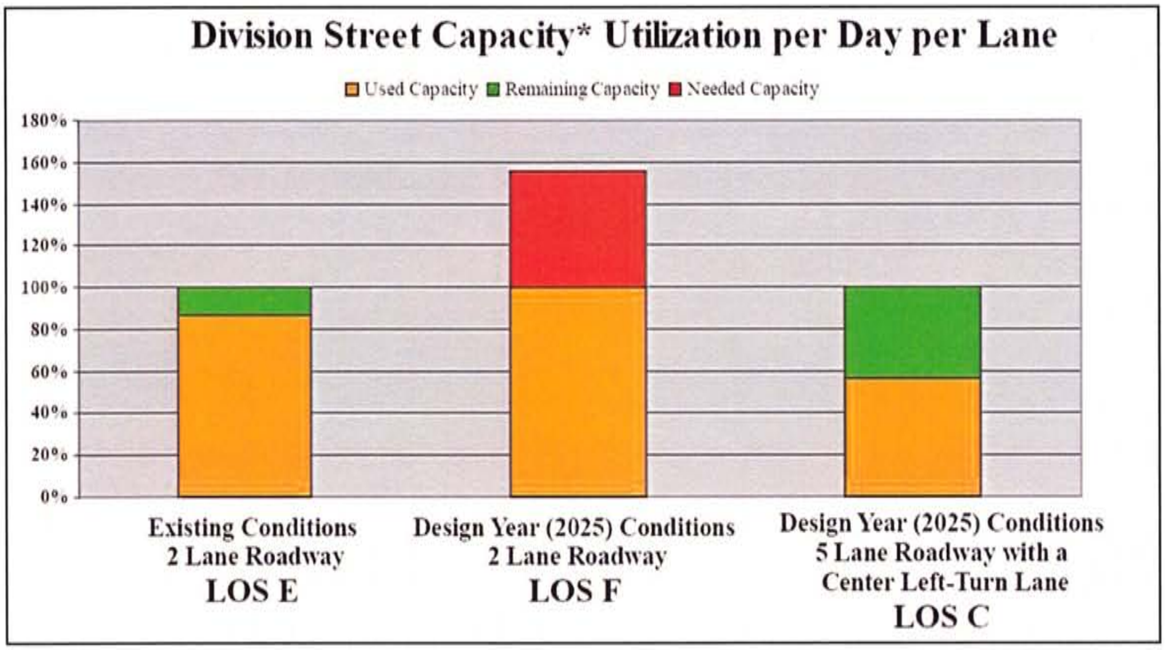


Figure 72 - Division Street Traffic Capacity Projection

While no new traffic signals are proposed in conjunction with this improvement, the potential need for a new installation in the future is addressed in the next section.

Access

The excavation depths and presence of retaining walls noted in prior sections also impact the location, extent and nature of direct access to adjoining parcels. There are currently 14 driveway or side street approaches accessing East Division Street within the limits of the proposed improvements. 8 of these will be closed and re-directed to other locations; 2 will be shifted to new locations; and the remaining 4 will be reconstructed at their current locations. Access to Parcels 6, 7, 8 and 9 – located immediately southwest of the proposed grade separation, would occur through the reconstruction and modification of the driveway that currently serves Parcel 6 (Right Sta. 86+75±). Several connections to this road are necessary to provide access to these parcels, and the resultant improvement will either need to be acquired and maintained by the City as public right-of-way or facilitated via special easements.

Another area of concern is the two existing entrances serving the Associated Wholesale Grocers property. One of these entrances is slated for closure based on its proximity to an area of roadway excavation. If reconstructed in the same location at a gradient acceptable to truck traffic, this entrance would extend well over 150 feet beyond the adjacent curb line of East Division Street. It is proposed to shift the easternmost entrance serving this parcel to Sta. 98+40± Left. This location will limit the extent of reconstruction required for the driveway, and place it opposite an existing access on the south side of the road. This configuration would facilitate future installation of traffic signals – if warranted.

While many access points will change, all properties will continue to access East Division Street in one form or another.

Right-of-Way Requirements

The existing right-of-way corridor is nominally 80 feet wide between Packer Road and the existing rail crossing. East of the crossing, the width varies from a minimum of 120 feet to a maximum of 160 feet in the vicinity of the Route 65 interchange. The majority of this corridor consists of normal right-of-way, with access restrictions based on City building code and ordinances. East of the railroad right-of-way, MoDOT acquired the Division Street right-of-way in conjunction with the original construction of the Route 65 interchange. State requirements regarding driveway construction and access will apply in this region. However, ahead of Sta. 100+00, MoDOT acquired limited access rights along Division Street to protect the utility of the interchange. Access from adjoining parcels to the roadway is typically not allowed in this area. If any future access shifts are contemplated in this region, it is recommended that they be discussed with MoDOT at their inception.

The proposed improvements incorporate a pavement width taper between Sta. 81+70 and Sta. 86+00. In this area, some acquisition of right-of-way will be required to accommodate the widened pavement. Ahead of Sta. 86+00, it is recommended that a minimum right-of-way corridor width of 100 feet be maintained to accommodate the improvements. Additional acquisition of right-of-way or easements will also be required to facilitate construction of excavation slopes, and to provide room for excavation of MSE walls and facilitate placement of the associated wall tie-backs.

It should be noted that exposed rock formations are in evidence in the project vicinity. If competent rock is encountered at shallow depth during roadway excavation, vertical rock excavations could be implemented and negate the need for both retaining walls and additional right-of-way.

Acquisition and removal of one building may be required to facilitate construction of the improvements. This building – located to the right of Sta. 88+00, is in close proximity to the existing right-of-way in an area of excavation. Acquisition of right-of-way for both the improvement corridor and a sight distance triangle associated with the proposed entrance at Sta. 86+75 may adversely impact this structure.

Retaining Walls

To minimize the extent of grading impacts to adjacent developed parcels, the use of mechanically stabilized earth retaining walls is planned for the improvement. Excluding the area in the vicinity of the railroad bridge which would utilize embankment slopes, MSE walls would extend along both sides of the roadway from Sta. 87+00 to Sta. 98+00. Use of MSE walls is recommended for the following reasons:

- Construction costs associated with MSE walls are substantially cheaper than cast in place alternatives;
- The geometry of MSE walls can be easily varied to provide installations conforming with project grading requirements; and,
- Pre-cast panels incorporated in wall faces can be readily fabricated with textures and colors to provide aesthetic enhancement of the improvements.

It should again be noted that the presence of rock excavation within the improvement limits may negate the need for retaining walls.

Drainage

The improvements are located along the boundary between the Jordan Creek North Branch and South Branch watersheds. The western divide of these basins is located immediately to the west of Route 65, placing the project near the basin headwaters. The immediate project vicinity is characterized by relatively shallow-sloping highlands, few well defined drainage outlets and Karst topography. Two north-south trending drainage features are located in the vicinity – ditching along the existing railroad grade, and ditching along Route 65. Diversion of surface water into either feature will be impractical, and contrary to the policies of their respective owners.

The construction of East Division Street along a depressed profile will place the roadway low point well below the elevation of all adjacent drainage outlets. Based on the currently proposed profile and the use of an urban curbed roadway typical section, surface flows emanating from the pavement and adjacent roadway surfaces between Sta. 85+80 and Sta. 105+30 will collect at the low point. The resultant drainage basin will have a tributary area of approximately 4.5 acres. Accordingly, extensive improvements will need to be constructed to collect pavement drainage and provide an outlet for storm water.

The proposed roadway improvements will include curb and gutter along the edges of pavement, and a storm sewer system incorporating curb inlets in conformance with the City's standards. Based on contour evaluations of U.S.G.S. topographic maps and site visits to the locations of the proposed outlets by team personnel, three strategies were identified to address the location of an outlet for these flows:

1. Construction of a pumping station with an adequately sized wet-well discharging to an as-yet undetermined location;
2. Construction of approximately 3600 lineal feet of storm sewer, incorporating both conventional cut/cover and bored construction techniques. This facility would commence in the vicinity of the profile low point, run westward approximately 1200 feet to the Division/Packer intersection, turn to the north and run approximately 2400 feet to an outlet at North Jordan Creek; and,
3. Construction of approximately 2900 lineal feet of storm sewer, incorporating both conventional cut/cover and bored construction techniques. This facility would commence in the vicinity of the profile low point, run westward approximately 900 feet to the Division/Belcrest intersection, turn to the south and run approximately 1300 feet, turn west and run approximately 700 feet to an outlet (an existing drainage/weir structure) near the southeast corner of the Cedar Brook Mobile Home Park.

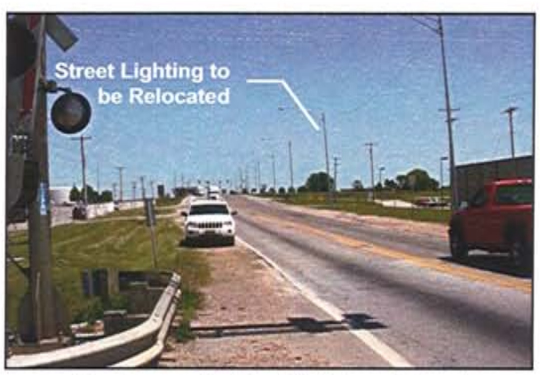
During steering committee meetings, City personnel stated construction of pumped discharge facilities should be eliminated from further consideration based on their long-term operating and maintenance costs. Pumped discharge was therefore excluded from further study. It was also discussed that the proposed storm sewer outlet options would be both expensive and difficult to construct. However in the absence of other alternatives, the storm sewer alternates listed above remain the most viable drainage outlet options available. It was further noted that discharge to an adjacent karst feature would be a more cost effective solution. However no such feature has been identified in close proximity to the project site.

Further study of drainage outlets is warranted during the preliminary engineering phase of this project.

Existing Utilities

Photograph 30 - Division Street (Viewpoint to the West)

At Division Street, there are many utilities that will require relocation or protection. Relocation of existing electric transmission and distribution lines and poles running on the north-west side and street lighting on the south east side of Division Street would be required. Natural gas lines are also present and may require approximately relocation or protection of 4,100 LF of 6" gas line, 100 LF of 6" diameter boring for the relocation under the road and 100 LF of 6" diameter boring for the relocation under the railroad tracks, 400 LF of 2" gas line, and new service tie-overs. There are sanitary sewers present that would require relocation of approximately 1,650 LF of 10" PVC pipe, 5 new manholes, 100 LF of road boring, and 50 SF of pavement replacement. Potable water lines that would require modifications include approximately 360 LF of 36" ductile iron (DI) pipe, 1,100 LF of 12" cast iron (CI) pipe, 950 LF of 16" CI pipe, 100 LF of 16" DI pipe, 5 new hydrants, 132 LF of 46" steel casing, 134 LF of 24" steel casing, and 60 LF of 30" steel casing.



Photograph 32 - Division Street (Viewpoint to the East)

Photograph 31 - Division Street Crossing (Viewpoint to the South)

Environmental

Refer to the following figure for an inventory of the environmental resources and issues located in the vicinity of the Division Street study area.

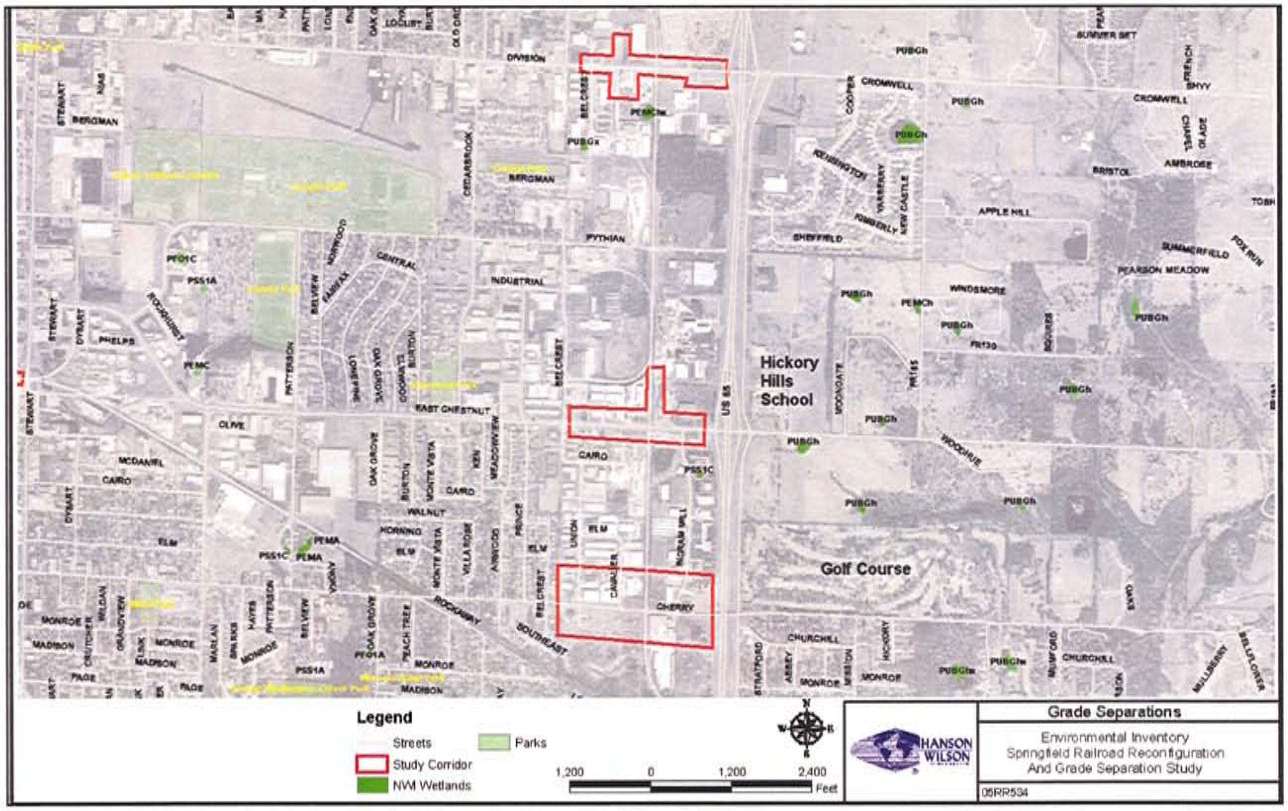


Figure 73 - Environmental Inventory - Division Street to E. Chestnut Expressway

Parks/Recreational Areas

Section 4(f) of the Department of Transportation Act and Section 6(f) of the Land and Water Conservation Act regulates impacts to parks, recreational areas, bike trails, wildlife refuges, and historic sites. If any funding for this project comes from the Federal Highway Administration or the Missouri Department of Transportation, then these properties will be protected and mitigation will likely be required for any impacts by the proposed project.

Available mapping was reviewed and field reconnaissance surveys were conducted to identify existing parks and recreational areas in the vicinity of the Division Street project area. Cooper Park is located about 0.25 miles southwest of the Division Street Grade Separation project area. Based on the park distances from the Division Street project area, the improvements are not anticipated to have any direct or indirect impacts to these parks. No other recreational areas have been identified within or adjacent to the Division Street area.

Water Resources

No water resources or groundwater protection zones were identified within the Division Street project area.

Wetlands and Floodplains

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) mapping was reviewed for potential wetlands within the Division Street study corridor along with a field reconnaissance survey. No wetlands or floodplains were identified within the Division Street project area.

Threatened and Endangered Species

According to the Missouri Department of Conservation, the following species are listed as federal endangered, federal threatened, or state endangered in Greene County, Missouri:

- Bald eagle (*Haliaeetus leucocephalus alascensis)*
- Peregrine falcon (*Falco peregrinus tundrius*)
- Northern Harrier (*Circus cyaneus*)
- Barn owl (*Tyto alba*)
- Bachman's sparrow (*Aimophila aestivalis illinoensis*)
- Interior least tern (*Sterna antillarum athalassos*)
- Ozark cavefish (*Amblyopsis rosae*)
- Niangua darter (*Etheostoma nianguae*)
- Gray bat (*Myotis grisescens*)
- Black-tailed jackrabbit (*Lepus californicus melanotis*)
- Plains spotted skunk (*Spilogale putorius*)
- Geocarpon (*Geocarpon minimum*)
- Missouri bladder pod (*Lesquerella filiformis*)

The bald eagle is listed as federal threatened and state endangered. This large bird of prey inhabits deciduous and mixed forest types near water. During winter, bald eagles concentrate near rivers with open water and in areas with large numbers of wintering waterfowl. This species requires large trees as perch sites near shorelines and prefer areas with limited human activity.

The peregrine falcon is listed as state endangered and prefers savanna/shrub/woodland habitat. This bird of prey requires open country for hunting and uses open woodlands. Historically, the peregrine falcon nested on cliffs, however, tall buildings with nest sites free of human disturbance are also suitable.

The northern harrier is a state endangered bird which inhabits open fields, prairies, native grass plantings and shallow marshes. The harrier prefers dense herbaceous vegetation as habitat, with nearly 100 percent canopy cover, which reaches a height of 10 in. by mid-May.

The barn owl is a state endangered bird and prefers to forage in open grassland or crop fields. The barn owl nests in trees greater than 20 in. dbh which have cavities and in barns and grain elevators.

The Bachman's sparrow is listed as state endangered and inhabits glades, open pinewoods, early successional stage old fields and oak-hickory or shortleaf pine regeneration with canopy cover less than 30 percent. Bare ground and a well-developed herbaceous layer are also important to this bird species.

The least interior tern is a federal and state endangered bird which inhabits sand or gravel bars of streams, ponds, lakes or reservoirs. This shore bird nests in areas where vegetation is sparse or absent.

The Ozark cavefish is listed as federal threatened and state endangered. The cavefish inhabits cave streams and spring outlets with clear, cold water and a predominantly rubble bottom.

The Niangua darter is listed as federal threatened and state endangered. This fish inhabits riffles, pools and runs of clear, silt-free streams with gravel or rock bottoms. It has been known to occur in a few tributaries of the Osage River in southcentral Missouri.

The gray bat is a federal and state endangered mammal which requires undisturbed caves for habitat. The gray bat forages over streams, rivers and reservoirs. A corridor of mature trees between caves and foraging sites is important.

The black-tailed jackrabbit is a state endangered species and inhabits large contiguous native grasslands with adjacent legume and crop fields. The black-tailed jackrabbit prefers grazed areas with scattered clumps of taller vegetation.

The Plains spotted skunk is listed as state endangered. This mammal inhabits fencerows, vegetated gullies and brushy borders with logs, brushpiles, snags, rocky outcrops, open prairies, and riparian woodland areas.

Geocarpon is a federal threatened and state endangered plant species found on shallow, sandy soils on sandstone glades and outcrops. Geocarpon is endemic to southwestern Missouri, a few sites in Arkansas and two sites in Louisiana.

The Missouri bladder pod is listed as federal and state endangered. This plant species occurs in open limestone glades and around limestone outcrops in pastures, lawns, utility corridors, hayfields or roadsides. The Missouri bladder pod occurs in four southwestern counties in Missouri and is endemic to the limestone glades of the Springfield plateau, and is found on two similar glade sites in northern Arkansas.

No suitable habitat for any of these listed species was observed within the Division Street project area during the field reconnaissance survey.

Phase I and II Environmental Site Assessments

No existing Phase I or II Environmental Site Assessments were identified for the Division Street project area. A Phase I assessment would be recommended during the design phase of this project.

Cemeteries

Cemeteries within the Division Street study corridor were identified from existing mapping and from the field reconnaissance visit. No cemeteries were identified within the project study limits of the Division Street area.

Agricultural Lands

Agricultural lands were assessed based on their significance as prime or important. Also, agricultural protection zones were investigated based on information received from the Natural Resources Conservation Service of Greene County. There are no prime or important agricultural lands or agricultural protection zones within the Division Street project area.

Pythian Street Analysis

Below are photographs taken at the at-grade crossing of the BNSF Thayer Subdivision and Pythian Street.

Photograph 33 - Pythian Street (easterly viewpoint)

Photograph 34 - Pythian Street (westerly viewpoint)

Photograph 35 - Pythian Street Crossing (northerly viewpoint)

Photograph 36 - Pythian Street Crossing (southerly viewpoint)

Roadway Alternative Development

In conjunction with the grade separation of East Division Street and East Chestnut Expressway, it is proposed to close the existing grade crossing at Pythian Street. This closure will isolate existing businesses and development fronting Pythian Street between the railroad tracks and Route 65.

Two alternatives were developed to provide connectivity between Pythian Street and East Division Street:

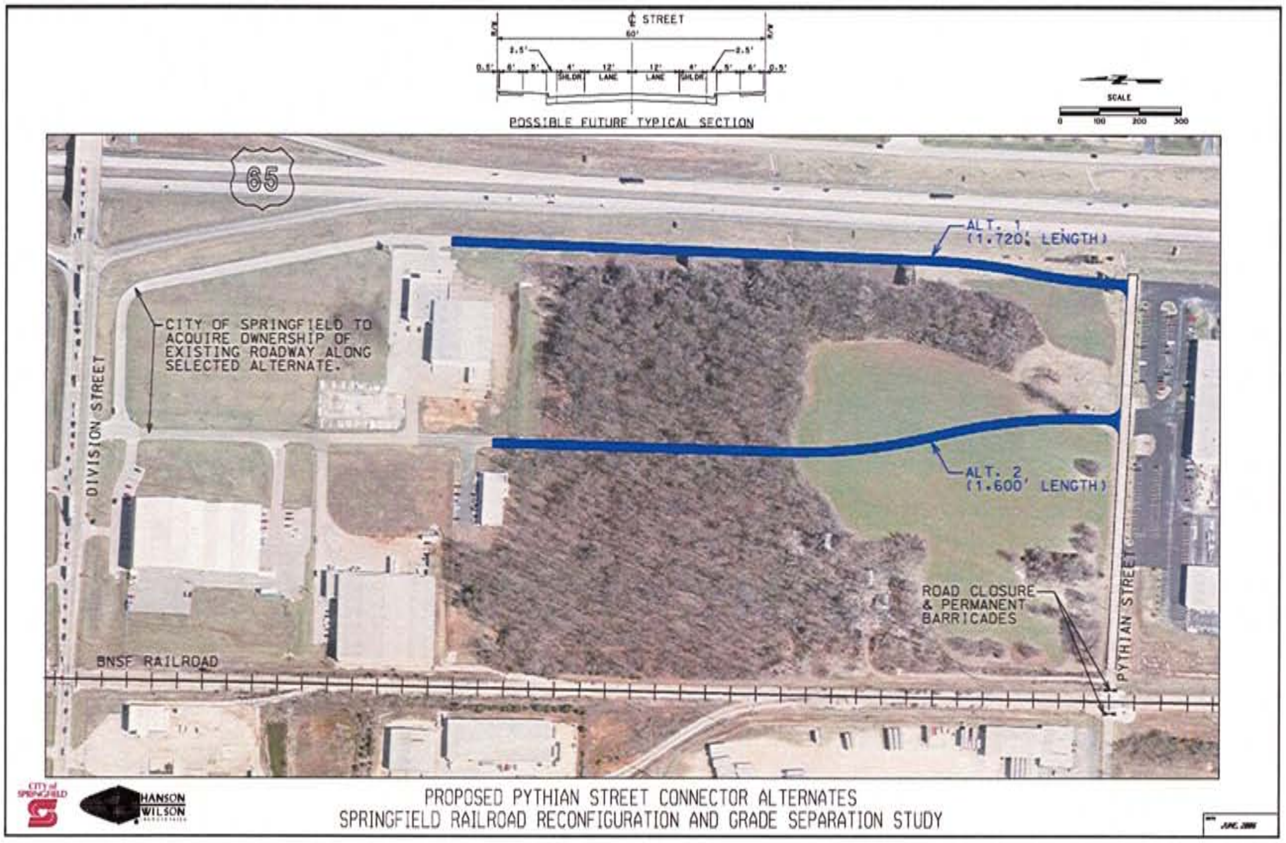


Figure 74 - Conceptual Pythian Street Closure and Connection Roads

> Case 1: Commence at Pythian Street adjacent to its terminus at Route 65. Proceed northward along the existing Route 65 west right-of-way line on new alignment, and meet an existing private access road. Proceed along existing access road to the existing intersection with East Division Street at Sta. 98+50, acquiring existing improvements and adjacent right-of-way.

The overall length of new roadway improvement required with this case is approximately 1720 feet. In addition to this new construction, approximately 1250 feet of existing roadway and associated right-of-way rights would need to be acquired. As the existing roadway to be acquired may not meet current standards for street construction, additional improvements to this section of roadway may also be required. The new improvements will be located along the edge of the existing property.

This case would incorporate a sharp radius curve in the vicinity of the existing Route 65/Division interchange, and complex turning movements immediately adjacent to its intersection with East Division Street. Relocation of 3 existing billboard signs would also be required.

> Case 2: Commence at Pythian Street approximately 750 feet east of the existing railroad crossing. Proceed on new alignment, introducing horizontal reverse curvature, and met an existing private access road. Proceed along access road to the existing intersection with East Division Street at Sta. 98+50, acquiring existing improvements and adjacent right-of-way.

The overall length of new roadway improvement required with this case is approximately 1600 feet. In addition to the new construction, approximately 1050 feet of existing roadway and associated right-of-way rights would need to be acquired. As the existing in this area may not meet current standards for street construction, additional improvements to this section of roadway may be required.

This case would incorporate shallow reverse curvature near the southern end of the new improvement, with radii of 1432 feet (4°). The overall trend of the alignment is tangent in nature, with no abrupt curvature along either the existing or proposed improvements. This alignment would bisect the property through which it crosses.

Roadway Alternative Analysis

No attempt was made to define a preferred or recommended alternate for this improvement. As the new Pythian Street connector requires construction on new alignment, additional coordination and input from stakeholders and property owners will be required. A summary of relative merits and detractions for each case follows:

CRITERIA	CASE 1	CASE 2
Shorter Length of New Improvement	+	-
Shorter Length of Existing Improvement Incorporated	+	-
Less Complex Horizontal Alignment	+	-
Least Amount of New Right-of-way Required	-	+
Maximum Utility for Development of Adjacent Property	+	-
Maximum Utility for Existing Development [1]	-	+
Anticipated Lower Construction Cost	+	-

(1.) Based on comment made at June 14, 2006 public meeting by management of adjacent facility located on the south side of Pythian Street.

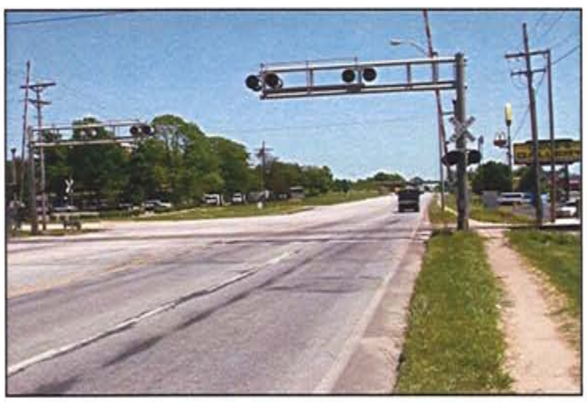
East Chestnut Expressway

ADDENDUM NOTIFICATION

Late in the development of this study, it was requested that a 6-lane template be considered for the improved typical section for East Chestnut Expressway. The reader is referred to Addendum Number 1 attached to the end of this report. The Addendum addresses basic considerations of the 6-lane template. The discussion below remains focused on the use of a 5-lane section applied to the grade separation.

East Chestnut Expressway is a state owned route that is a presently a 5-lane facility which includes a center turning lane where it crosses the BNSF Thayer Subdivision at-grade. The road travels generally east-west and is a primary corridor into downtown Springfield. There is a sidewalk on the south side of the street and overhead utilities on both sides of the street. Street lighting is seen on the south side of the street.

The track crossing is made of concrete panels. The street is fully protected with railroad warning devices including gates, cantilever flashers, bells and cross-bucks.



Photograph 37 - East Chestnut Expressway (easterly viewpoint)

Photograph 38 - East Chestnut Expressway (westerly viewpoint)

Photograph 40 - Looking south at E. Chestnut Expressway

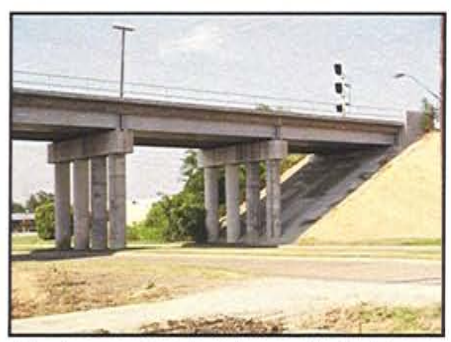
Photograph 39 - Looking north at E. Chestnut Expressway

Structures

Given the preferred option of placing the railroad over the highway at this location, the structure type analysis focused on the optimum number of spans and the depth of the proposed structure. While longer span superstructure allows for a reduction in the number of foundation elements, it often means that a deeper superstructure element is required. Since the roadway will have to be excavated to fit under the railroad, any savings in structure depth equates to a cost savings in roadway construction.

Therefore, our analysis showed that shorter span lengths with shallow beam elements were the optimum structure type at this location. Pier foundations are to be located in the roadway median and on either side of the road behind the sidewalk portion of the pavement. This allows for span lengths over the roadway of approximately 47 ft.

The abutment type and locations were reviewed considering the construction sequencing of the bridge. Our analysis lead us to propose design and construction of short abutments located well behind the sidewalk . The groundline is then sloped between face of the abutment and the piers on either side of the road. The shorter abutment allows for expedited construction with the added benefit of opening up the roadway section in lieu of vertical retaining walls and tall closed abutments throughout the roadway section.



Photograph 41 - Example Bridge - Spill-Through Abutment

The "spill-through" type of abutments proposed require the addition of another span at each end of the bridge. This span would fall in the 33 ft length range but will vary depending on the preferred slope and location of the sidewalk.

Span lengths like those recommended here can consist of either steel or concrete beams. Steel beams may support a steel plate or a concrete deck to retain the railroad track ballast. Precast concrete beams may be either

"I" shaped beams with a concrete deck or box beams that form their own deck when placed tight against one another.

Steel beams would provide a more shallow structure when compared to the concrete I-beams. The shallow depth will allow for a cost savings in the roadway construction but may require more long term maintenance than concrete due to painting considerations. Single or double-cell precast prestressed box beams are also an option for these spans. They would be cost efficient and would not require a cast-in-place deck. However, these type of spans are more difficult to waterproof and may not allow for aesthetic improvements when compared to the steel spans with concrete deck.

Photograph 42 - Example Bridge - Steel Beams

The foundation elements are highly dependent upon the subsurface materials at the bridge site. Without any investigation of soils at this location, we have assumed the use of drilled shaft type foundations with piers constructed of concrete columns or walls supporting the bearings. The above grade foundation elements can be formed in a variety of shapes with surfaces or textures included to allow for improved aesthetics. The abutments will also be concrete structures and are to include wingwalls that will allow for retainage of the track embankment and extension of the bridge railing element through the end of the structure.

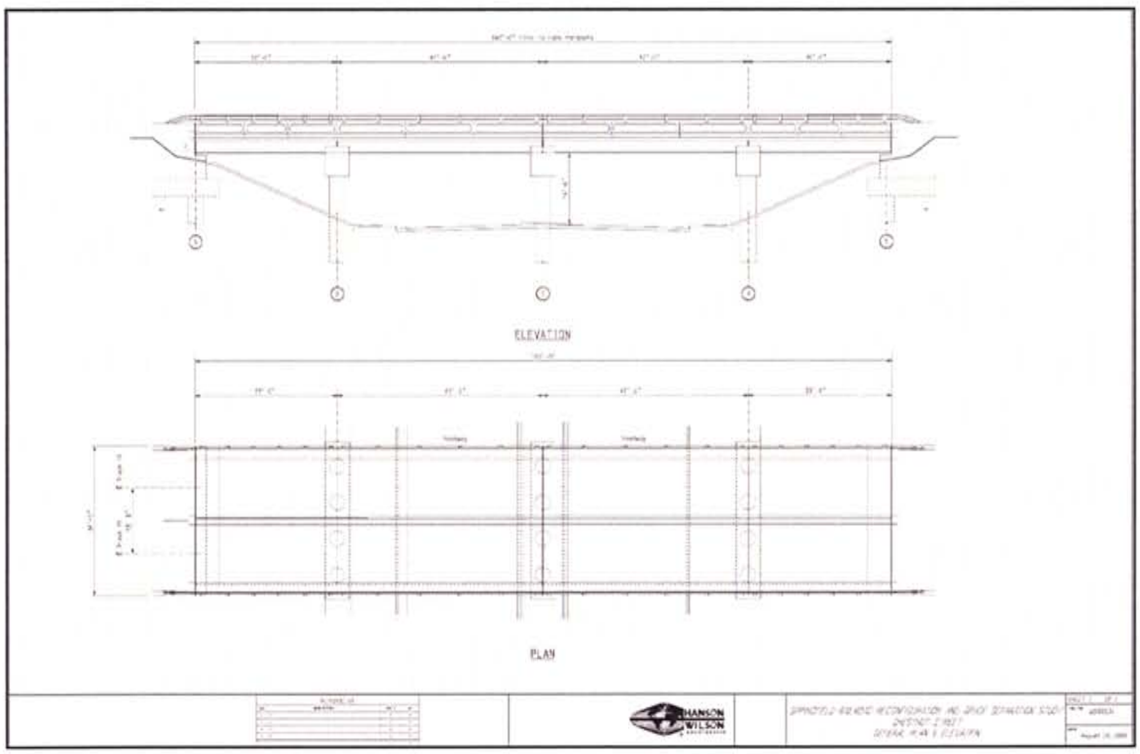


Figure 75 - E. Chestnut Expressway - Conceptual Plan and Elevation

The proposed overpass structure will carry two tracks and consists of a 4 span bridge with a total length of approximately 160 ft. The superstructure is made up of rolled and / or welded steel beams with a concrete deck and walkway. The railing type is open to the aesthetic requirements developed for the project. Foundations will be comprised of concrete elements and will have a "spill-though" type abutment with slope paving between the abutment and piers on each side of the roadway.

Roadway Alternatives Analysis

Five alternative rail and roadway separation configurations were initially evaluated to replace the East Chestnut Expressway grade crossing. Relative to East Division Street crossing, a greater number of rail elevations were available for consideration based on East Chestnut's proximity to the middle of the rail corridor work. Resultant profile options included complete overpass and underpass of the rail improvements in addition to several combinations raising or lowering the roadway. Again, alternatives were developed at a concept level to determine their feasibility from a roadway engineering perspective prior to proceeding with further refinement.

Initial screening requirements included satisfying roadway vertical design criteria, ability to maintain access to the majority of adjacent properties, constructability of the resultant improvements and limitation of impacts to the adjoining Route 65 interchange located 1200 feet east of the rail crossing. A brief synopsis of each alternative and screening results follows:

> Case 1: Maintain railroad at same elevation, and raise roadway elevation approximately 29 feet.

The roadway improvements associated with this case total approximately 2240 feet in length (from 1220 feet east to 1080 feet west of the existing rail crossing), and incorporate a long crest vertical curve over the railroad. At the western end of the improvement, construction will commence approximately 50 feet east of Belcrest Avenue, and terminate in the vicinity of the Route 65 interchange. While no impacts to the existing interchange bridge will occur, reconstruction of the southbound ramp terminal approaches will be required.

Maintaining access to the numerous properties along East Chestnut will be challenging with this case. A combination of frontage roads and collector roadways will be required, in addition to the use of MSE walls to retain roadway embankment and minimize the improvements footprint. A 250 foot long bridge over the railroad is proposed to facilitate traffic movements to adjacent parcels crossing beneath the structure. While access can be provided to all parcels with this alternative, the inclusion of short radius turning movements on some driveways and access routes will prohibit passage of large truck traffic. This condition may result in the loss of utility and value of the effected parcels. Construction of this alternative is feasible, but will require extensive construction staging due to the height of embankment required.

> Case 2: Depress the railroad approximately 11.0 feet below the existing track elevation, and raise East Chestnut 18 feet above existing grade.

This case is similar to Alternative 1, with the exception of the modest lowering of the railroad. The roadway improvements associated with this alternative exceed 1600 feet in length (from 720 feet east to 900 feet west of the existing rail crossing), and incorporate a slightly shallower crest vertical curve than the prior alternative. The western end of the improvement commences approximately 550 feet east of Belcrest Avenue, with the eastern terminus located just west of the Route 65 interchange. The improvements will not impact either the interchange bridge or southbound ramp terminals.

Access to adjacent properties will be similar to the scheme proposed in Case 1. However the access roads and driveways crossing under the bridge will require lower profiles to achieve vertical clearance requirements. The lower embankment height associated with this alternative will also be easier to construct than Alternative 1, but again extensive stage construction and sequencing will be required.

> Case 3: Depress the railroad approximately 29.0 feet below the existing track elevation, and maintain East Chestnut Expressway at the same approximate elevation.

This case requires a minimal amount of roadway work. While the approximate elevation of the roadway will remain the same, some modification to the profile is recommended to remove localized high and low points in the vicinity of the existing railroad crossing. The roadway improvements associated with this alternative exceed 700 feet in length (from 315 feet east to 390 feet west of the existing rail crossing), and will incorporate two shallow vertical curves. The western end of the improvement commences approximately 950 feet east of Belcrest Avenue, with the eastern terminus located approximately 600 feet east of the southbound Route 65 ramp terminals. This improvement will not physically impact the adjacent interchange.

By maintaining a close approximation of the existing roadway profile, the proposed improvements will not change the location or configuration of existing driveways and access points. While construction of the new railroad bridge will entail temporary reductions in the number of through traffic lanes, staging and sequencing delays associated with this alternative will be minimal relative to those proposing an elevation or depression of the roadway.

> Case 4: Elevate the railroad approximately 16.0 feet above the existing track elevation, and depress East Chestnut Expressway approximately 13.0 feet below existing grade.

This case includes partial elevation of the railroad, and partial depression of the roadway. Incorporating a total improvement length of 1660 feet (from 1015 feet east to 645 feet west of the existing rail crossing), this alternative employs three vertical curves to depress and then elevate the roadway. A maximum excavation depth of approximately 14 feet will be required immediately west of the proposed grade separation. Improvement limits will commence approximately 250 feet east of Belcrest Avenue, and end approximately 330 feet east of the southbound Route 65 ramp terminals. No physical impacts will occur in the vicinity of the interchange

Access to adjacent properties will be restricted to varying degrees. While no parcel will completely loose access, a frontage or outer roadway configuration to the west of the grade separation will be required. Some loss of utility will be experienced in this region due to use of tight radii that will not be conducive to truck traffic. Immediately to the east of the proposed grade separation, the existing 3M facility access road will be carried over East Chestnut Expressway. This improvement will require construction of an additional roadway bridge, and approximately 1000' of local access roadway. This access road extend to the south and east, and connect to Ingram Mill Road at a point approximately 700 feet south of East Chestnut Expressway.

This case will be more complex to construct than case 3, but more feasible than Cases 1 or 2 based on less proposed elevation differential between the existing and proposed roadways. The greater extent of work required to provide access to adjoining properties will also result in greater construction costs.

> Case 5: Elevate the railroad approximately 29.0 feet above the existing track elevation, and maintain East Chestnut Expressway at the same approximate elevation.

This case is similar to Case 3, except that in this instance railroad is elevated to clear the roadway rather than depressed. Improvement lengths and termini are identical to those of Case 3, though access requirements may be slightly different. The potential change in access pertains to the 3M facility access road. Located immediately to the east and parallel to the existing railroad tracks, this close proximity to the proposed railroad bridge may require use of unsymmetrical bridge span configuration to allow eastbound left turns from Chestnut, or construction of a right-in/right-out entrance. The latter option will eliminate this facilities access the eastbound lanes of Chestnut.

Alternative Analysis

Cases 1, 2 and 5 incorporate the substantial elevation of either the railroad or roadway facilities. Placement of roadway facilities at or above the elevation of the adjacent Route 65 interchange was not attractive to MoDOT from both operational, sight distance and aesthetic perspectives. Similarly, extensive elevation of the rail facilities was deemed impractical by BNSF due to initial cost concerns and maintenance considerations. Accordingly these three alternatives were eliminated from further consideration.

Case 3 – while extremely attractive from a roadway perspective, will require an excavation of extensive depth and length. Adverse impacts to rail operations and the inability to effectively remove snow in such a depressed rail section were cited as the chief shortcomings of this course of action – similar to the shortcomings of East Division Street Case 1. Consensus opinion again agreed to exclude Case 3 from further consideration.

While the access considerations and staging requirements were noted as major concerns, stakeholders agreed to retain Case 4 for further study. During subsequent stages of analysis, the following modifications were incorporated into this alternative:

1. Alternate vertical design criteria incorporating improved stopping site distance on crest vertical curves and higher "K" values on sag curves were implemented at the request of MoDOT;
2. The profile elevation of the railroad was reduced to approximately 13.4 feet above existing grade; and,
3. The elevated roadway bridge and new access road serving the 3M facility was eliminated. This change enabled the raising of the proposed East Chestnut Expressway profile, and construction of a direct access to 3M's property.

The modified railroad profile and access changes noted in items 2 and 3 above resulted in substantial changes to the design. Accordingly a new roadway alternative designation was assigned. Alternative 6 represents the resolution of prior design comments, and is the recommended course of action for the East Chestnut Expressway grade separation.

Summary of Recommended Alternative

Description of Improvements

The proposed improvements will commence at Sta. 9+80 – a point approximately 240 feet east of the Belcrest Avenue intersection. The profile will immediately deviate from existing and introduce a shallow crest vertical curve and depression of the roadway below existing grade. A sag vertical curve in the vicinity of the proposed railroad bridge (Sta. 20+70) will follow, resulting in maximum excavation depth of approximately 10 feet prior to ascent. A final crest vertical curve will be incorporated at Sta. 25+10 to transition the profile back to existing grade. The improvement will end at Sta. 26+60± – a point approximately 340 feet west of the Route 65 southbound ramp terminals.

The densely developed commercial and industrial character of the corridor and the excavation depths required to clear the proposed railroad bridge improvements will again require use of abrupt excavation slopes or retaining walls to minimize impacts to existing improvements and properties. For purposes of this study, MSE retaining walls were assumed to be required adjacent to most excavations exceeding 5 feet in depth. These improvements were not assumed in areas where excavation slopes could be easily constructed.

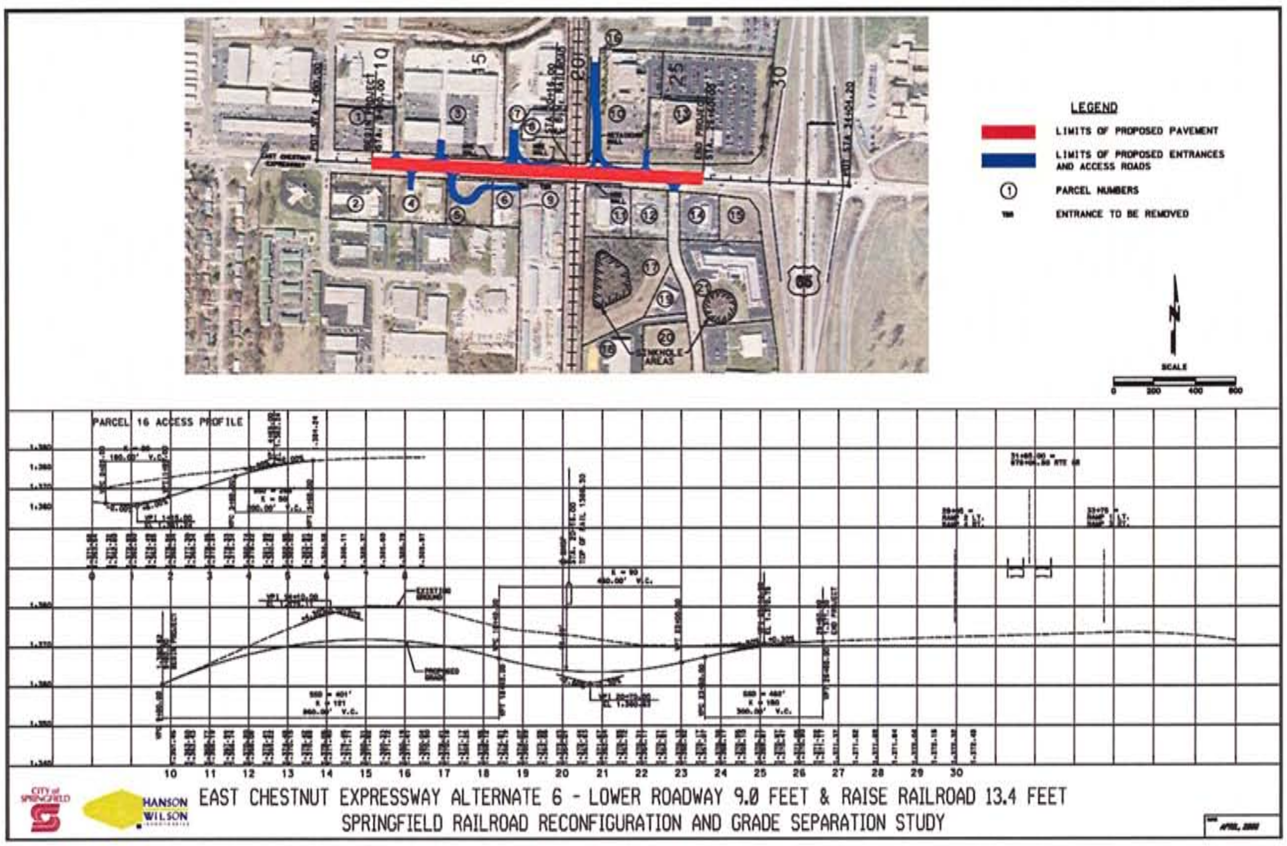


Figure 76 - Preferred Alternative - E. Chestnut Expressway Grade Separation

Design Criteria

East Chestnut Expressway in the vicinity of the improvements is designated as Business Route 65, and owned and maintained by MoDOT. The following design criteria are recommended based on requirements for urban roadways contained in Figure 4-07.1 of MoDOT's Project Development Manual, and comments received from MoDOT personnel:

Functional Classification:	Minor Arterial Street
Design Speed:	45 mph
Max. Gradient:	5.00 %
Min. Stopping Sight Distance:	400 Feet
Minimum K (sag):	90
Min. Vertical Clearance:	16.50 Feet

While the design criteria incorporated in the study of this alternative appear to satisfy MoDOT requirements for profile elements, the actual design criteria implemented during preliminary and final design should be submitted to MoDOT for concurrence and approval.

Typical Section

Existing East Chestnut Expressway in the study area is a multi-lane roadway with improved shoulders and a variable width raised median. Numerous access openings and turn lane approaches are present, preventing this facility from functioning as a true expressway. Curb and gutters are in evidence along most sections of the existing roadway, with sidewalks present for the majority of its length. The existing roadway serves in an arterial capacity, and was designed accordingly.

A similar urban typical section is proposed for the improvement. Based on design traffic, proposed functional classification and MoDOT design requirements, the following elements are proposed:

Number of Lanes:	4	(1)
Lane Width:	12 Feet	
Shoulder Width:	12 Feet	(2)
Median:	14 Foot Min.; Raised/Channelized (3)	
Curb & Gutter Width:	3 Feet	
Sidewalk Width:	5 Feet – Both Sides	
Minimum Right-of-way Width:	100 Feet	

Notes:

1. Additional auxiliary lanes and channelized left turn lanes may be warranted.
2. Modified type "U2" urban shoulders are proposed, consisting of curb and gutter, buffer area and sidewalks.
3. Flush striped medians are standard for this functional classification. Use of a raised median is recommended to afford some measure of access

control and match adjacent improvements, but may require a design exception.

Typical section elements utilized during preliminary and final design should be submitted to MoDOT for concurrence and approval.

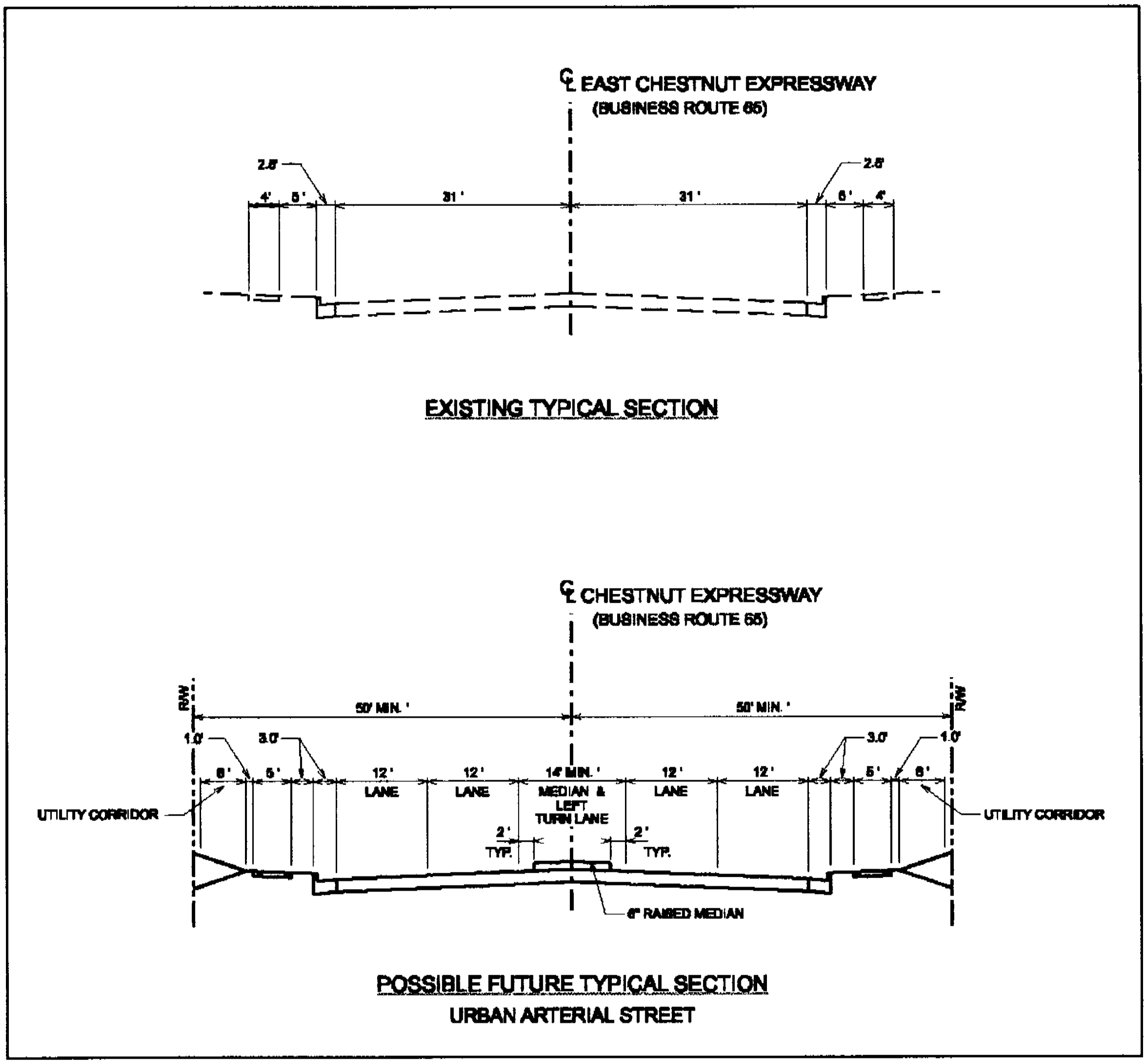


Figure 77 - Conceptual E. Chestnut Expressway Typical Section

Traffic Operations

Traffic counts on East Chestnut Expressway were performed by City personnel in 2005. Forecasts of future traffic volumes for the design year (2025) are based on recommendations for small metropolitan areas developed by the Texas Transportation Institute. An annual growth rate of 1.33% - typical of developed corridors, was incorporated in traffic forecasting. Current and future traffic volumes are as follows:

Existing Traffic Volume (2005):	27,650	VPD
Assumed Annual Growth Rate:	1.33	%
Design Traffic Volume (2025):	36,000	VPD

Capacity analyses were performed utilizing both existing and future lane configurations and traffic volumes. Under existing (2005) conditions, East Chestnut Expressway functions as a minor arterial operating at approximately 79% of capacity. This corresponds to a Level of Service (LOS) D. Based on the above future traffic projections, during the design year the existing roadway will operate at 146% of capacity, or LOS F. If the proposed improvements are implemented, the new roadway will function at approximately 84% of capacity, corresponding to LOS D. Analysis of future capacity assumes construction of the grade separation is implemented, and that the channelization currently present on the existing roadway will be replicated under future conditions. Without the grade separation and channelization improvements, additional delay and deterioration of level of service will be experienced.

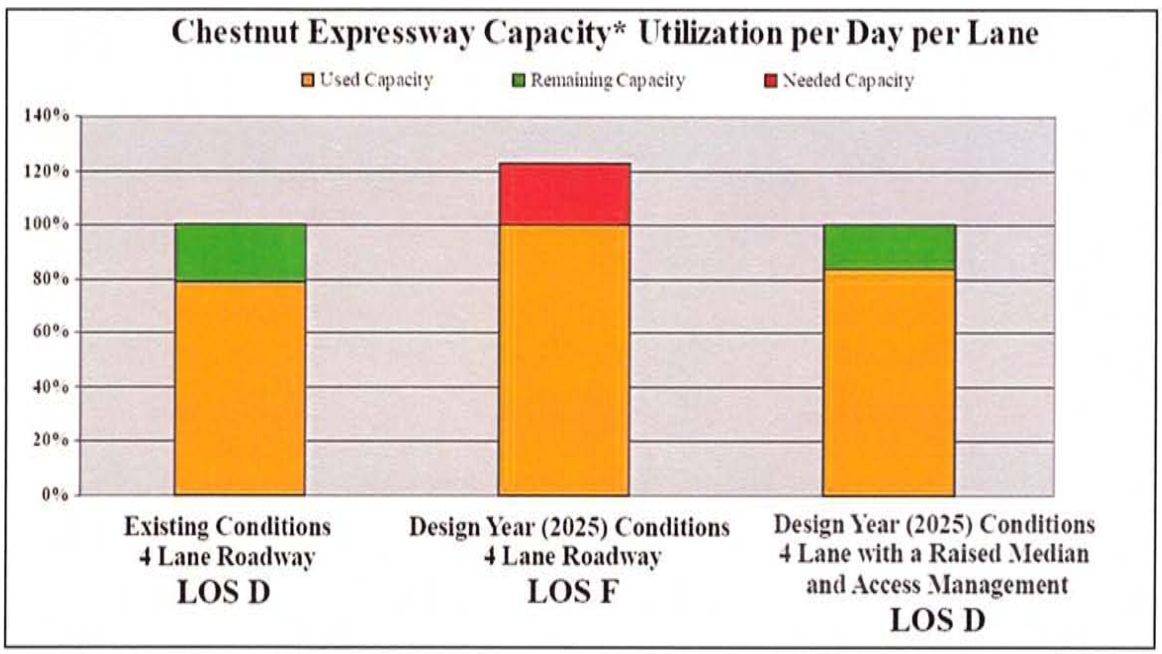


Figure 78 - E. Chestnut Expressway Traffic Capacity Projection

During the initial stages of this study, it was noted that the construction of traffic signal improvements at the Ingram Mill intersection may be imminent. This potential improvement will be completed by others in association with adjacent commercial development. The above capacity analysis assumes no signalization improvements are present at this location. The effects and impact of this traffic signal will require additional study during preliminary design. For cost analysis purposes during this study, it is assumed this improvement already exists and will be replaced.

Access

Heavy development of this corridor has resulted in the presence of 11 entrances or other access points within the project limits. Moderate excavation depths of up to 10 feet are anticipated with this alternative, requiring the relocation or consolidation of several driveways. 2 of these will be closed and re-directed to other locations; 1 will be shifted to a new location; and the remaining 7 will be reconstructed at their current locations. Access to Parcels 5, 6, and 9 – located immediately southwest of the proposed grade separation, will occur through the relocated entrance currently serving Parcel 5 (Right Sta. 14+00±). This improvement will serve as an outer road, and will need to be constructed on public right-of-way. Note that Parcel 9 is currently accessed by large trucks on a frequent basis. The restrictive geometrics associated with the common access may impact the utility of this parcel.

Future access to the 3M facility (Parcel 16) will occur in the same general area as their current access. However a slight shift to the east will be required to facilitate its construction. Based on limited survey of the area and extrapolation of existing data, a 500 foot length will need to be reconstructed to provide for the approximate 9 foot elevation change. Other proposed entrances will be reconstructed in their existing locations. It should be noted that the lengths of driveway reconstruction depicted on the exhibit were developed without the benefit of comprehensive survey information. Some adjustment of their lengths or complete reconfiguration may be required during design of the improvements. While several access points will change, all properties will continue to have access to East Chestnut Expressway.

Right-of-Way Requirements

The existing right-of-way corridor is nominally 120 feet wide between Belcrest Avenue and the existing rail crossing. East of the crossing, the width varies from a minimum of 120 feet to a maximum of 160 feet in the vicinity of the Route 65 interchange. The majority of this corridor consists of normal right-of-way, with access restrictions based on City building code and ordinances. However ahead of Sta. 27+00, MoDOT acquired right-of-way with limited access rights to protect the utility of the interchange. Access from adjoining parcels to the roadway is typically not allowed in this area. If any future access shifts are contemplated in this region, it is recommended that they be discussed with MoDOT at their inception.

The footprint of the proposed improvements will be contained within existing right-of-way. However some additional right-of-way may be required to facilitate construction of excavation slopes, to provide room for excavation of MSE walls, facilitate placement of associated wall tie-backs and provide adequate sight distance. Additional right-of-way will also be required to construct and maintain the access/outer roadway serving parcels 5, 6 and 9. Based on the presence of exposed rock formations in the project vicinity, it is likely that rock will be encountered at shallow depth during roadway excavation. If competent rock is encountered, vertical rock excavations could be implemented, negating the need retaining walls and minimizing acquisition of additional right or way.

The direct acquisition of buildings or other major improvements should not be required to facilitate construction of the improvements. However some parcels may experience damages associated with loss of utility and use.

Retaining Walls

To minimize the extent of grading impacts to adjacent developed parcels, the use of mechanically stabilized earth retaining walls is planned for the improvement. Excluding the area in the vicinity of the railroad bridge which will utilize embankment slopes, MSE walls will extend along the north side of the roadway from Sta. 13+50 to Sta. 20+70, and along the south side of the roadway from Sta. 14+30 to Sta. 22+50. If required, use of MSE retaining walls is recommended over conventional cast in place wall types for the following reasons:

1. Construction costs associated with MSE walls are substantially cheaper than cast in place alternatives;
2. The geometry of MSE walls can be easily varied to provide installations conforming with project grading requirements; and,
3. Pre-cast panels incorporated in wall faces can be readily fabricated with textures and colors to provide aesthetic enhancement of the improvements.

It should again be noted that the presence of rock excavation within the improvement limits may negate the need for retaining walls.

Drainage

The improvements are located within the Jordan Creek South Branch watershed, near its headwaters and the western divide separating it from the Pearson Creek watershed. The immediate project vicinity is characterized by relatively shallow-sloping highlands, few well defined drainage outlets and Karst topography. Again the two prominent north-south trending drainage features in the vicinity are ditching along both the existing railroad grade and along Route 65. Diversion of surface water to either feature is not feasible and against common practice to maintain watershed integrity. An additional drainage feature – a sinkhole, is located immediately to the southeast of the proposed grade separation.

The depressed profile proposed for the East Chestnut Expressway improvements will place the roadway low point well below the elevation of adjacent conventional drainage outlets. Based on the currently proposed profile and the use of an urban curbed roadway typical section, surface flows emanating from the pavement and adjacent roadway surfaces between Sta. 15+00 and Sta. 30+00± will collect at the low point. The resultant drainage basin will have a tributary area of approximately 4.2 acres. Extensive drainage improvements will need to be constructed to collect and outlet storm flows.

The proposed roadway improvements will include curb and gutter along the edges of pavement, and a storm sewer system incorporating curb inlets in conformance with the City's standards. Based on contour evaluations of U.S.G.S. topographic maps and site visits to the locations of the proposed outlets by team personnel, three strategies were identified to address the location of an outlet for these flows:

1. Construction of a pumping station with an adequately sized wet-well discharging to an as-yet undetermined location;
2. Construction of approximately 2000 lineal feet of storm sewer, incorporating both conventional cut/cover and bored construction techniques. This facility will commence in the vicinity of the profile low point, run westward approximately 1350 feet to the Belcrest Avenue intersection, turn to the north and run approximately 650 feet to an outlet at a branch of South Jordan Creek; and,
3. Construction of approximately 400 lineal feet of storm sewer using bored construction techniques. This facility will commence in the vicinity of the profile low point, and run to the southeast 400 feet to an outlet in the adjacent sinkhole.

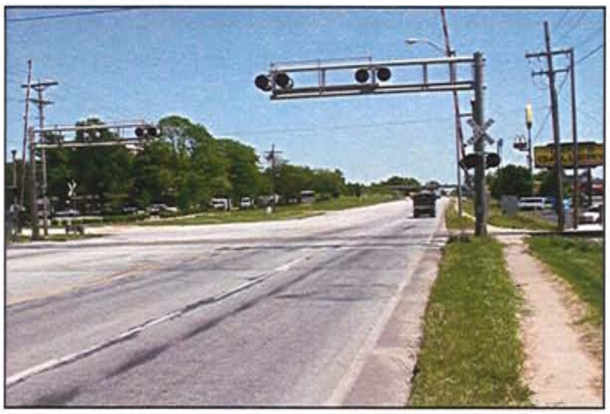
MoDOT personnel in the local Springfield District stated they would not accept use of a pumped discharge facility, and that there are no similar types of improvement in use throughout the state highway system. Accordingly, this strategy was eliminated from further consideration. The remaining conventional drainage systems were retained as options for future study during the improvement design phase. It should be noted that discharge of storm water to a sinkhole – while feasible, may entail special permitting procedures and the construction of specific water quality improvement measures.

Further study of drainage outlet options is warranted during the preliminary engineering phase of this project.

Figure 79 - Artists Rendering of East Chestnut Expressway (Easterly viewpoint)

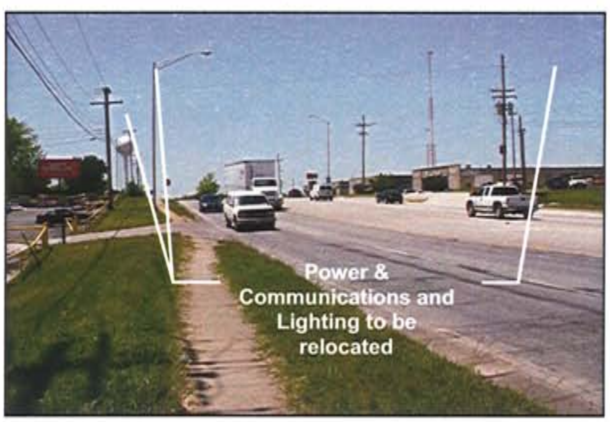
Existing Utilities

Similar to Division Street, the proposed grade separation at East Chestnut Expressway will include significant utilities work. Relocation of both overhead transmission and distribution lines and poles and underground electric service will be required to create the grade separation. Natural Gas line modifications may include relocation of approximately 4,600 LF of 6" diameter line, 100 LF of 6" diameter road boring and 100 LF of 6"diameter railroad boring, and new service tie-overs. Sanitary sewer work would include relocation of approximately 2,200 LF of 10" PVC pipe, 50 LF of Class 200 pipe, 10 new manholes, 50 LF of road boring, 150 LF of concrete encasement, and 1,250 SF of pavement replacement. Potable water modifications would include relocation of approximately 250 LF of 36" ductile iron (DI) pipe, 500 LF of 8" PVC pipe, 150 LF of 8" DI pipe, 2,450 LF of 16" DI pipe, 3 new hydrants, 92 LF of 48" steel casing, and 84 LF of 16" steel casing.



Photograph 43 - E. Chestnut Expressway (Viewpoint to the East)

Photograph 44 - E. Chestnut Expressway (Viewpoint to the South)



Photograph 45 - E. Chestnut Expressway (Viewpoint to the West)

Photograph 46 - E. Chestnut Expressway (Viewpoint to the North)

Environmental

Refer to the following figure for an inventory of the environmental resources and issues located in the vicinity of the East Chestnut Expressway study area.

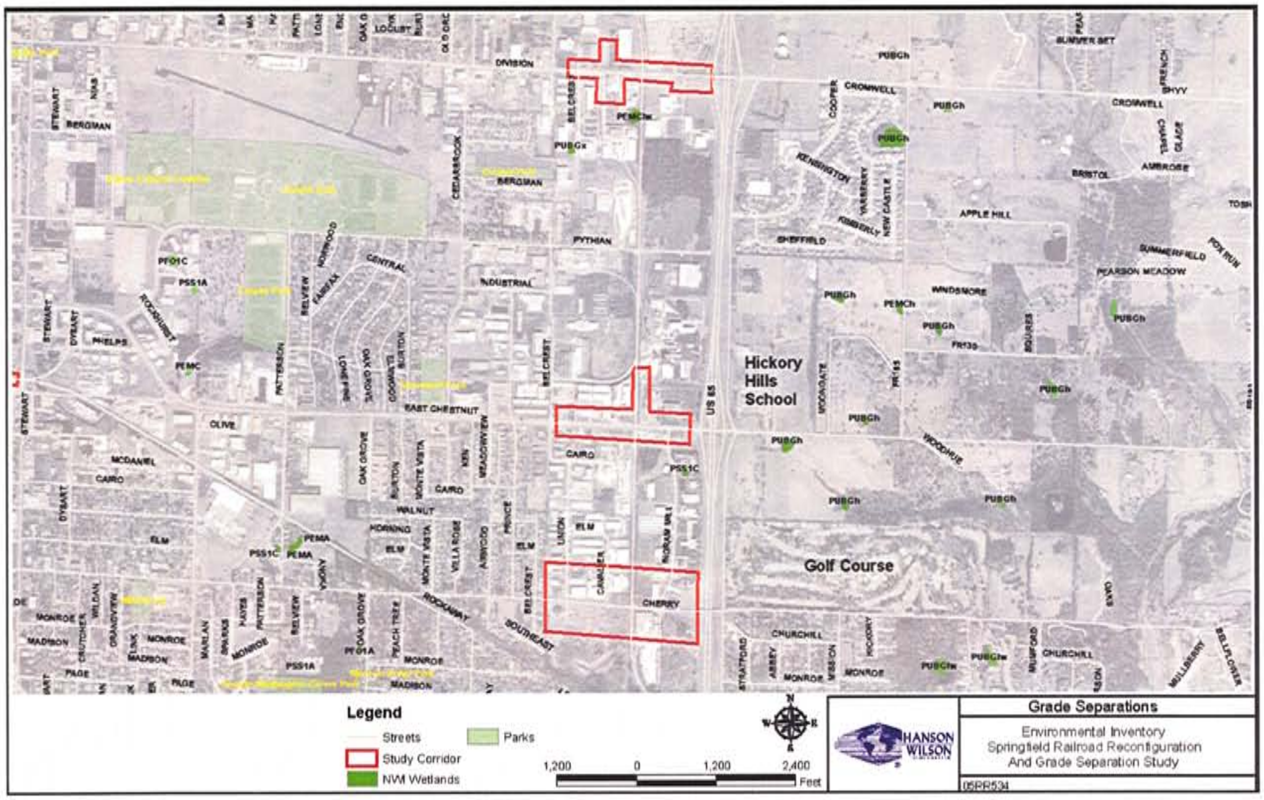


Figure 80 - Environmental Inventory - Division Street to Cherry Street

Parks/Recreational Areas

Section 4(f) of the Department of Transportation Act and Section 6(f) of the Land and Water Conservation Act regulates impacts to parks, recreational areas, bike trails, wildlife refuges, and historic sites. If any funding for this project comes from the Federal Highway Administration or the Missouri Department of Transportation, then these properties will be protected and mitigation will likely be required for any impacts by the proposed project.

Available mapping was reviewed and field reconnaissance surveys were conducted to identify existing parks and recreational areas in the vicinity of the East Chestnut Expressway project area. No parks or other recreational areas were identified within or adjacent to the East Chestnut Expressway area.

Water Resources

No water resources or groundwater protection zones were identified within the East Chestnut Expressway project area.

Wetlands and Floodplains

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) mapping was reviewed for potential wetlands within the East Chestnut Expressway study corridor along with a field reconnaissance survey. No wetlands or floodplains were identified within the East Chestnut Expressway project area.

Threatened and Endangered Species

According to the Missouri Department of Conservation, the following species are listed as federal endangered, federal threatened, or state endangered in Greene County, Missouri:

- Bald eagle (*Haliaeetus leucocephalus alascensis)*
- Peregrine falcon (*Falco peregrinus tundrius*)
- Northern Harrier (*Circus cyaneus*)
- Barn owl (*Tyto alba*)
- Bachman's sparrow (*Aimophila aestivalis illinoensis*)
- Interior least tern (*Sterna antillarum athalassos*)
- Ozark cavefish (*Amblyopsis rosae*)
- Niangua darter (*Etheostoma nianguae*)
- Gray bat (*Myotis grisescens*)
- Black-tailed jackrabbit (*Lepus californicus melanotis*)
- Plains spotted skunk (*Spilogale putorius*)
- Geocarpon (*Geocarpon minimum*)
- Missouri bladder pod (*Lesquerella filiformis*)

The bald eagle is listed as federal threatened and state endangered. This large bird of prey inhabits deciduous and mixed forest types near water. During winter, bald eagles concentrate near rivers with open water and in areas with large numbers of wintering waterfowl. This species requires large trees as perch sites near shorelines and prefer areas with limited human activity.

The peregrine falcon is listed as state endangered and prefers savanna/shrub/woodland habitat. This bird of prey requires open country for hunting and uses open woodlands. Historically, the peregrine falcon nested on cliffs, however, tall buildings with nest sites free of human disturbance are also suitable.

The northern harrier is a state endangered bird which inhabits open fields, prairies, native grass plantings and shallow marshes. The harrier prefers dense herbaceous vegetation as habitat, with nearly 100 percent canopy cover, which reaches a height of 10 in. by mid-May.

The barn owl is a state endangered bird and prefers to forage in open grassland or crop fields. The barn owl nests in trees greater than 20 in. dbh which have cavities and in barns and grain elevators.

The Bachman's sparrow is listed as state endangered and inhabits glades, open pinewoods, early successional stage old fields and oak-hickory or shortleaf pine regeneration with canopy cover less than 30 percent. Bare ground and a well-developed herbaceous layer are also important to this bird species.

The least interior tern is a federal and state endangered bird which inhabits sand or gravel bars of streams, ponds, lakes or reservoirs. This shore bird nests in areas where vegetation is sparse or absent.

The Ozark cavefish is listed as federal threatened and state endangered. The cavefish inhabits cave streams and spring outlets with clear, cold water and a predominantly rubble bottom.

The Niangua darter is listed as federal threatened and state endangered. This fish inhabits riffles, pools and runs of clear, silt-free streams with gravel or rock bottoms. It has been known to occur in a few tributaries of the Osage River in southcentral Missouri.

The gray bat is a federal and state endangered mammal which requires undisturbed caves for habitat. The gray bat forages over streams, rivers and reservoirs. A corridor of mature trees between caves and foraging sites is important.

The black-tailed jackrabbit is a state endangered species and inhabits large contiguous native grasslands with adjacent legume and crop fields. The black-tailed jackrabbit prefers grazed areas with scattered clumps of taller vegetation.

The Plains spotted skunk is listed as state endangered. This mammal inhabits fencerows, vegetated gullies and brushy borders with logs, brushpiles, snags, rocky outcrops, open prairies, and riparian woodland areas.

Geocarpon is a federal threatened and state endangered plant species found on shallow, sandy soils on sandstone glades and outcrops. Geocarpon is endemic to southwestern Missouri, a few sites in Arkansas and two sites in Louisiana.

The Missouri bladder pod is listed as federal and state endangered. This plant species occurs in open limestone glades and around limestone outcrops in pastures, lawns, utility corridors, hayfields or roadsides. The Missouri bladder pod occurs in four southwestern counties in Missouri and is endemic to the limestone glades of the Springfield plateau, and is found on two similar glade sites in northern Arkansas.

No suitable habitat for any of these listed species was observed within the East Chestnut Expressway project area during the field reconnaissance survey. However, some limestone rock outcrops were observed north of East Chestnut Expressway along the railroad right-of-way which might be suitable for the Missouri bladder pod. Further investigations of this area would be recommended during the next phase of this project.

Phase I and II Environmental Site Assessments

No existing Phase I or II Environmental Site Assessments were identified for the East Chestnut Expressway project area. A Phase I assessment would be recommended during the design phase of this project.

Cemeteries

Cemeteries within the East Chestnut Expressway study corridor were identified from existing mapping and from the field reconnaissance visit. No cemeteries were identified within the project study limits of the East Chestnut Expressway area.

Agricultural Lands

Agricultural lands were assessed based on their significance as prime or important. Also, agricultural protection zones were investigated based on information received from the Natural Resources Conservation Service of Greene County. There are no prime or important agricultural lands or agricultural protection zones within any of the East Chestnut Expressway project area.

Cherry Street

Structures

In reviewing the proposed typical roadway section for Cherry Street, it seems reasonable that the grade separation bridge at this location would be very similar to that recommended for Division and East Chestnut. The proposed future right-of-way for the roadway provides for 80 ft from out-to-out of sidewalk. Therefore, we would propose to install one pier in the middle of the roadway section or center median and two more piers outside of each sidewalk. The pier locations would allow for two spans over the roadway in the 42 ft range.

Approach span lengths would be predicated on the height of the bridge and the length required to construct a transition slope between the abutments and piers. We anticipate that spans in the 38 ft range would be reasonable and would result in an overall bridge length of 160 ft.

Foundation elements would also be similar to those proposed at Division and East Chestnut with the use of piers constructed of concrete columns or walls supporting the bearings. The abutments will also be concrete structures and are to include wingwalls that will allow for retainage of the track embankment and extension of the bridge railing element through the end of the structure.

Based on the above described bridge type, it is reasonable to assume that the costs of the new bridge at this location would be similar to the bridge cost proposed for the other grade separation projects.

Roadway Alternatives Analysis

The potential need for the Cherry Street grade separation was identified relatively late in project study. Prior work on the East Division Street and East Chestnut Expressway alternative identified desirable rail profiles which in turn limited options at Cherry Street. Alternatives that completely underpass and overpass the railroad tracks at Cherry Street were both reviewed briefly. However railroad profile analysis indicated the most constructible and favorable track profile at Cherry Street was a slight elevation of the railroad and a modest depression of the roadway. Accordingly, Alternative 1 is the only case fully developed for this location, and is the recommended course of action if a grade separation is implemented at Cherry Street.

The development of the Cherry Street alternate was performed without the benefit of conventional survey of the roadway profile or adjacent features. Sporadic GPS survey of the existing pavement centerline was performed, and supplemented with "as-built" roadway profile information obtained from record MoDOT plans. The information presented herein should therefore be considered approximate and not a definitive analysis of future project limits or conditions.

Description of Improvements

The proposed improvements commence at Sta. 82+00 – a point approximately 200 feet east of the Union Avenue intersection. The profile will immediately deviate from existing and introduce a shallow crest vertical curve and depression of the roadway below existing grade. A sag vertical curve in the vicinity of the proposed railroad bridge (Sta. 89+75) will follow, resulting in maximum excavation depth of approximately 12 feet prior to ascent. An alignment equation was introduced (Sta. 90+00 Bk. = Sta. 0+00 Ahd.) to maintain continuity with prior roadway improvement stationing. The gradient exiting the sag vertical curve will tie into the existing profile tangent at Sta. 5+50, coinciding with the project terminus. The improvement will end at a point approximately 100 feet east of the Ingram Mill Road intersection.

The corridor traverses an area of moderate industrial development, with undeveloped land in evidence along the parts of the south side of the roadway. Immediately east of the existing Route 65 overpass (600 feet east of the project terminus), dense residential and recreational land use is in evidence. The existing Cherry Street profile includes a depression immediately west of the existing railroad crossing, resulting in more moderate excavation depths than for the Division or Chestnut alternatives. However the close proximity of an industrial property immediately to the southeast of the proposed grade separation will again require use of MSE walls or abrupt excavation slopes to minimize impacts to this improvement. With the exception of this improvement, excavation slopes are assumed for the remainder of the improvement.

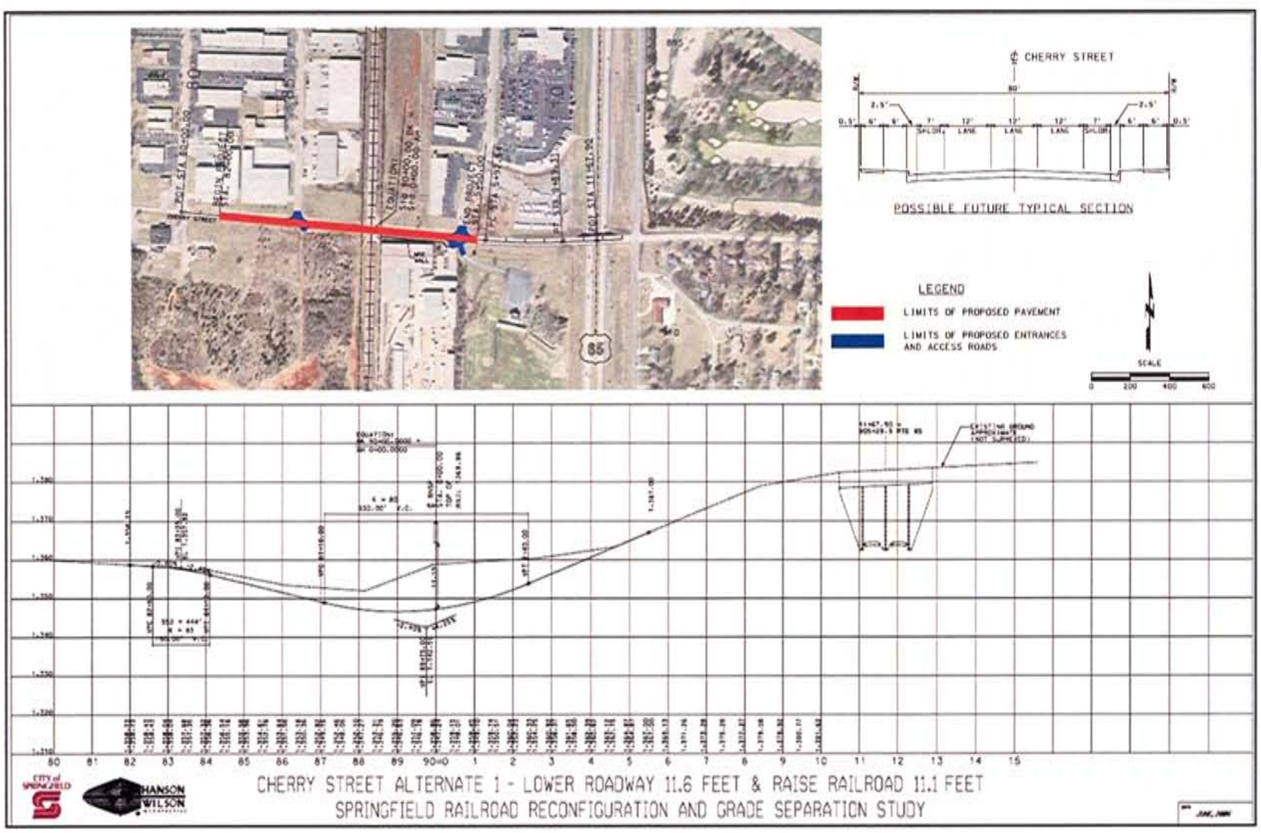


Figure 81 - Recommended Conceptual Cherry Street Grade Separation

Design Criteria

Cherry Street in the vicinity of the improvements currently functions as a collector roadway, and is owned and maintained by the City of Springfield. Immediately east of the project limits, Cherry Street was reconstructed by MoDOT in conjunction with past Route 65 improvements. The status of ownership and maintenance responsibilities for this section of roadway is currently unknown. While any future reconstruction of Cherry Street would be defined by future traffic projects and needs, the following design criteria are recommended in order to maintain the utility of the roadway corridor:

Functional Classification:	Secondary Arterial
Design Speed:	45 mph
Max. Gradient:	5.00 %
Min. Stopping Sight Distance:	325 Feet
Minimum K (sag):	80
Min. Vertical Clearance:	16.50 Feet

While the design criteria incorporated in the study of this alternative appear to satisfy City requirements for profile elements, the actual design criteria implemented during preliminary and final design should be submitted to the City for concurrence and approval.

Typical Section

Existing Cherry Street within the study area is a two-lane roadway with unimproved shoulders. A total of 5 access points (one shared) are currently in use. Shallow ditching and embankment slopes are in evidence along most of the improvement, with no sidewalks present. The existing roadway serves in an collector capacity, and possesses design elements typical of this classification.

An ultimate urban typical section is proposed for the improvement based on the potential future growth. However it should be noted that improvements corresponding to a lower functional classification would likely be implemented on an interim basis – dependant on actual growth in the area. Based on ultimate requirements, the following typical section elements are proposed:

Number of Lanes:	3	
Lane Width:	12 Feet	
Shoulder Width:	7 Feet	(1)
Median:	12 Foot Width; Flush	(2)
Curb & Gutter Width:	2.5 Feet	
Sidewalk Width:	6 Feet – Both Sides	

Minimum Right-of-way Width:70-80 Feet

Notes:

1. Shoulder width excludes area beyond curb and gutter.
2. A flush striped median is recommended to facilitate left turn movements.

Traffic Operations

Traffic counts on Cherry Street were performed by City personnel in 2005. Forecasts of future traffic volumes for the design year (2025) are based on recommendations for small metropolitan areas developed by the Texas Transportation Institute. While an annual growth rate of 1.33% would typically be applied, a rate of 2.0% was incorporated in East Division forecasts based on the availability of undeveloped land to the west of the project area. Current and future traffic volumes are as follows:

Existing Traffic Volume (2005):	4,000	VPD
Assumed Annual Growth Rate:	2.0	%
Design Traffic Volume (2025):	5,950	VPD

Analysis of the capacity of Cherry Street under existing and proposed conditions is beyond the scope of this study. No existing traffic signals are located within the limits of the Cherry Street study area, and there are no proposed installations known. Additional traffic studies of the vicinity should be performed during design of any future improvements.

Access

A total of 5 entrances or other access points are located within the project limits. All existing access points are located in areas requiring minimal excavation. While some modest adjustment of entrance locations and gradients will be required with construction of the improvements, all properties will continue to have access to East Chestnut at the same approximate locations.

Right-of-Way Requirements

Based on MoDOT as-built plans of the Cherry Street overpass, the existing right-of-way corridor varies from approximately 50 feet wide adjacent to the western end of the project, to 165 feet wide at the eastern terminus. The corridor consists entirely of normal right-of-way. Future limitations on access will be based on City building code and ordinances.

The footprint of the proposed project will require additional right-of-way for the majority of its length. Right-of-way will be required to facilitate construction of excavation and embankment slopes, provide room for excavation of retaining walls, and provide adequate sight distance at the Ingram Mill Road intersection. No exposed rock formations were noted in the project vicinity, and it is assumed that the majority of excavation for this project will consist of earth and similar material. The presence of competent rock at shallow depths would be beneficial in terms of negating the need for a retaining wall and minimizing potential impacts to buildings located right Sta. 0+60 to Sta. 3+20.

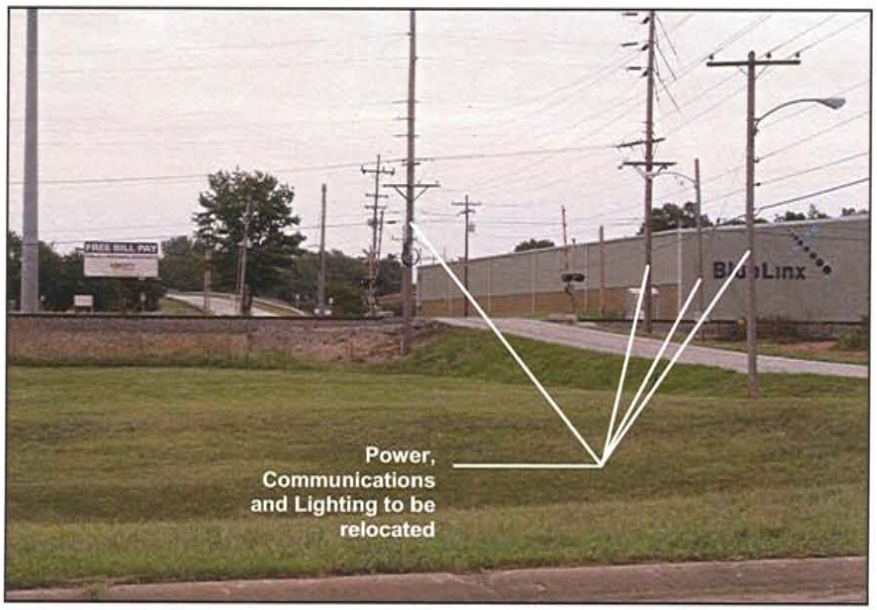
The direct acquisition of buildings or other major improvements should not be required to facilitate construction of the improvements. However the additional acquisition of permanent easements may be required to facilitate construction and maintenance of drainage improvements.

Retaining Walls

To minimize the extent of potential grading impacts, use of a MSE retaining wall is again recommended adjacent to the developed area southeast of the proposed grade separation. Commencing on the south side of the roadway near Sta. 0+50, the wall would begin at an approximate height of 12 feet, and taper to 3 feet in height near its terminus at Sta. 4+00. Dependant on actual wall geometry, subsurface soil conditions and the proximity of the adjacent building, other wall types should be evaluated. The benefits of MSE walls relative to other wall types have been documented in previous sections.

Existing Utilities

At Cherry Street the electric work would include relocating power distribution poles and lines and raising transmission poles and lines. Natural Gas relocations would include approximately 2,300 LF of 6" diameter gas line including the boring of approximately 150 LF beneath the road and new service tie-overs. Sanitary Sewer work would include relocations to approximately 1,500 LF of 10" diameter PVC pipe, 50 LF of 10" diameter Class 200 pipe, installation of 7 new manholes, and boring of 150 LF for pipe installation beneath the roadway. Potable water work may include relocation of approximately 300 LF of 8" diameter CI pipe, installation of 200 LF of 8" diameter DI pipe, and installation of 1 new hydrant.



Photograph 47 - Cherry Street Crossing

(Viewpoint to the Southeast)

Photograph 48 - Cherry Street Crossing (Viewpoint to the West)

Drainage

The improvements are located within the Jordan Creek South Branch watershed, near the headwaters and western divide separating it from the Pearson Creek watershed. The immediate project vicinity is characterized by relatively shallow-sloping highlands, with Karst features located nearby. Adjacent railroad and roadway ditching lacks sufficient depth to serve as a natural gravity drainage outlet for the proposed improvements.

Based on existing topographic information and elevation differential, the only viable drainage outlet identified for the improvements is an existing sinkhole feature located approximately 1200 feet southwest of the proposed grade separation. Use of this feature for an drainage outlet would require construction of storm sewer across undeveloped ground, affording a cost savings relative to bored construction beneath developed properties. Again the presence or absence of rock excavation will determine the most economical construction method.

It should be noted that other karst-type surface depressions are located immediately adjacent to the proposed grade separation. While use of one of these features may afford a substantial cost savings, there is currently insufficient topographic information available on these features to determine their utility to this project.

Environmental

Refer to the following figure for an inventory of the environmental resources and issues located in the vicinity of the Cherry Street study area.

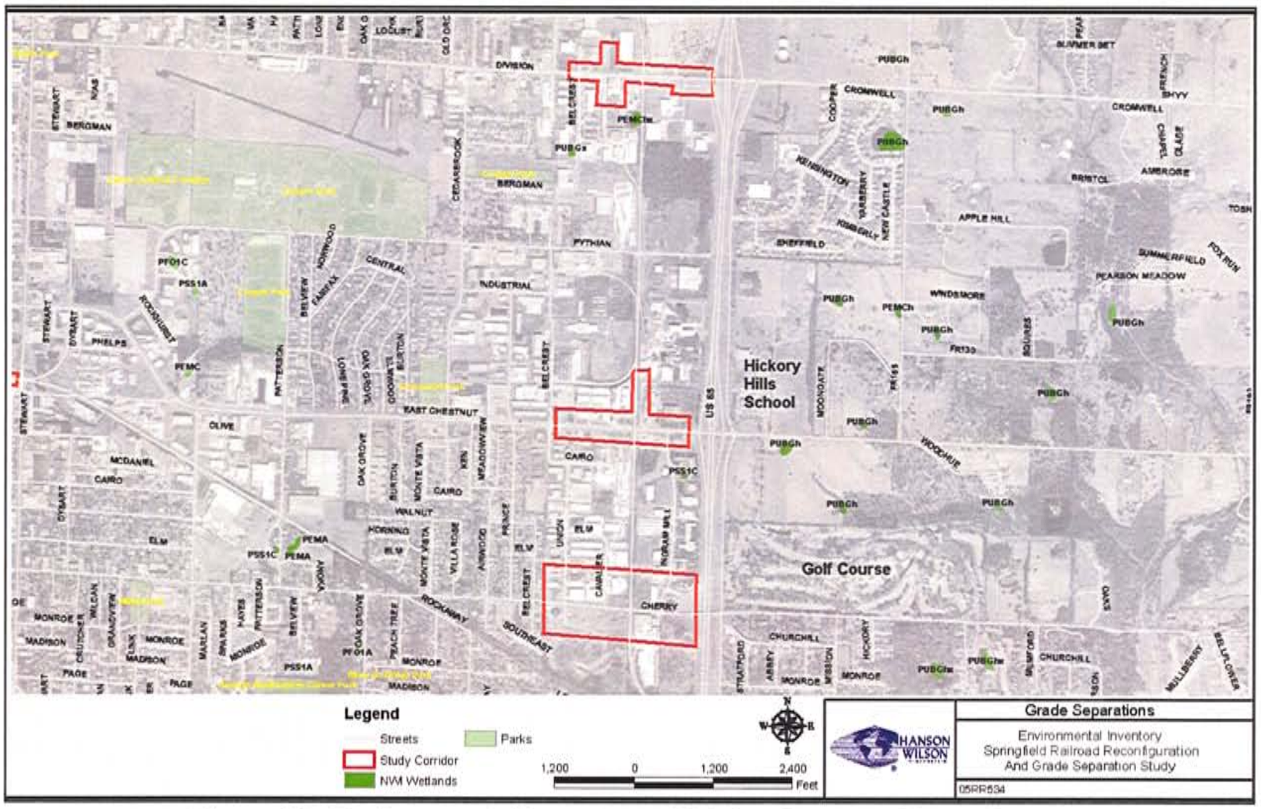


Figure 82 - Environmental Inventory - Division Street to Cherry Street

Parks/Recreational Areas

Section 4(f) of the Department of Transportation Act and Section 6(f) of the Land and Water Conservation Act regulates impacts to parks, recreational areas, bike trails, wildlife refuges, and historic sites. If any funding for this project comes from the Federal Highway Administration or the Missouri Department of Transportation, then these properties will be protected and mitigation will likely be required for any impacts by the proposed project.

Available mapping was reviewed and field reconnaissance surveys were conducted to identify existing parks and recreational areas in the vicinity of the Cherry Street project area. No parks or other recreational areas were identified within or adjacent to the Cherry Street area.

Water Resources

No water resources or groundwater protection zones were identified within the Cherry Street project area.

Wetlands and Floodplains

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) mapping was reviewed for potential wetlands within the Cherry Street study corridor along with a field reconnaissance survey. No wetlands or floodplains were identified within the Cherry Street project area.

Threatened and Endangered Species

According to the Missouri Department of Conservation, the following species are listed as federal endangered, federal threatened, or state endangered in Greene County, Missouri:

- Bald eagle (*Haliaeetus leucocephalus alascensis)*
- Peregrine falcon (*Falco peregrinus tundrius*)
- Northern Harrier (*Circus cyaneus*)
- Barn owl (*Tyto alba*)
- Bachman's sparrow (*Aimophila aestivalis illinoensis*)
- Interior least tern (*Sterna antillarum athalassos*)
- Ozark cavefish (*Amblyopsis rosae*)
- Niangua darter (*Etheostoma nianguae*)
- Gray bat (*Myotis grisescens*)
- Black-tailed jackrabbit (*Lepus californicus melanotis*)
- Plains spotted skunk (*Spilogale putorius*)
- Geocarpon (*Geocarpon minimum*)
- Missouri bladder pod (*Lesquerella filiformis*)

The bald eagle is listed as federal threatened and state endangered. This large bird of prey inhabits deciduous and mixed forest types near water. During winter, bald eagles concentrate near rivers with open water and in areas with large numbers of wintering waterfowl. This species requires large trees as perch sites near shorelines and prefer areas with limited human activity.

The peregrine falcon is listed as state endangered and prefers savanna/shrub/woodland habitat. This bird of prey requires open country for hunting and uses open woodlands. Historically, the peregrine falcon nested on cliffs, however, tall buildings with nest sites free of human disturbance are also suitable.

The northern harrier is a state endangered bird which inhabits open fields, prairies, native grass plantings and shallow marshes. The harrier prefers dense herbaceous vegetation as habitat, with nearly 100 percent canopy cover, which reaches a height of 10 in. by mid-May.

The barn owl is a state endangered bird and prefers to forage in open grassland or crop fields. The barn owl nests in trees greater than 20 in. dbh which have cavities and in barns and grain elevators.

The Bachman's sparrow is listed as state endangered and inhabits glades, open pinewoods, early successional stage old fields and oak-hickory or shortleaf pine regeneration with canopy cover less than 30 percent. Bare ground and a well-developed herbaceous layer are also important to this bird species.

The least interior tern is a federal and state endangered bird which inhabits sand or gravel bars of streams, ponds, lakes or reservoirs. This shore bird nests in areas where vegetation is sparse or absent.

The Ozark cavefish is listed as federal threatened and state endangered. The cavefish inhabits cave streams and spring outlets with clear, cold water and a predominantly rubble bottom.

The Niangua darter is listed as federal threatened and state endangered. This fish inhabits riffles, pools and runs of clear, silt-free streams with gravel or rock bottoms. It has been known to occur in a few tributaries of the Osage River in southcentral Missouri.

The gray bat is a federal and state endangered mammal which requires undisturbed caves for habitat. The gray bat forages over streams, rivers and reservoirs. A corridor of mature trees between caves and foraging sites is important.

The black-tailed jackrabbit is a state endangered species and inhabits large contiguous native grasslands with adjacent legume and crop fields. The black-tailed jackrabbit prefers grazed areas with scattered clumps of taller vegetation.

The Plains spotted skunk is listed as state endangered. This mammal inhabits fencerows, vegetated gullies and brushy borders with logs, brushpiles, snags, rocky outcrops, open prairies, and riparian woodland areas.

Geocarpon is a federal threatened and state endangered plant species found on shallow, sandy soils on sandstone glades and outcrops. Geocarpon is endemic to southwestern Missouri, a few sites in Arkansas and two sites in Louisiana.

The Missouri bladder pod is listed as federal and state endangered. This plant species occurs in open limestone glades and around limestone outcrops in pastures, lawns, utility corridors, hayfields or roadsides. The Missouri bladder pod occurs in four southwestern counties in Missouri and is endemic to the limestone glades of the Springfield plateau, and is found on two similar glade sites in northern Arkansas.

No suitable habitat for any of these listed species was observed within the Cherry Street project area during the field reconnaissance survey.

Phase I and II Environmental Site Assessments

No existing Phase I or II Environmental Site Assessments were identified for the Cherry Street project area. A Phase I assessment would be recommended during the design phase of this project.

Cemeteries

Cemeteries within the Cherry Street study corridor were identified from existing mapping and from the field reconnaissance visit. No cemeteries were identified within the project study limits of the Cherry Street area.

Agricultural Lands

Agricultural lands were assessed based on their significance as prime or important. Also, agricultural protection zones were investigated based on information received from the Natural Resources Conservation Service of Greene County. There are no prime or important agricultural lands or agricultural protection zones within any of the Cherry Street project area.

Preferred Alternative Construction Sequencing

This project is very complicated and will require a very detailed construction sequencing plan. That plan must comply with the following parameters:

- Mainline train service interruption must be kept to a minimum. It is anticipated the only service interruptions would be to perform a "cut and throw" or installation of a turnout.
- Freight service to rail customers must be maintained. This means that if rail service to customers is disrupted beyond their delivery schedule, then alternative means of providing commodity delivery or pick-up must be found.
- Roadways must remain open with at least two lanes of service. There may be a closure of any single road for up to 10 days to accomplish final tie-in work. Only one roadway closure is to occur at one time.
- Utility work must be done in advance of the project.

There are some general construction sequences that are recommended for consideration.

1. Complete all necessary utility relocations prior to any road or railroad work. This will enable the impending construction to proceed free and clear of utility interruptions and reduce the risk of work slow downs or excessive unexpected costs.
2. Construct a new access road to Pythian Street at the earliest convenience. This is an independent activity to the grade separation project and will enable the closure of Pythian Street early in the grade separation project. This closure enables the removal of existing crossing protection and construction of a shoo-fly track to enable uninterrupted train service throughout the life of the construction activities.
3. Do not attempt to perform the construction at Chestnut Expressway, Division Street and Cherry Street (if included) at the same time. If this were done then the risk of added congestion and potential safety concerns rise. It is recommended that the grade separation at Division Street be considered as the first task.
4. Consider utilizing any available ITS systems that may forewarn the traveling public about the construction activities.

Conceptual Division Street Construction Sequencing

The following sequence of sketches offers basic considerations and an approach to the preferred alternative construction sequencing. It should be noted that detailed construction sequencing plans should be developed as a part of the final planning and engineering of the project.

Division Street and Chestnut Expressway may have similar construction sequencing. For discussion purposes, the following example will focus on creating the grade separation at Division Street.

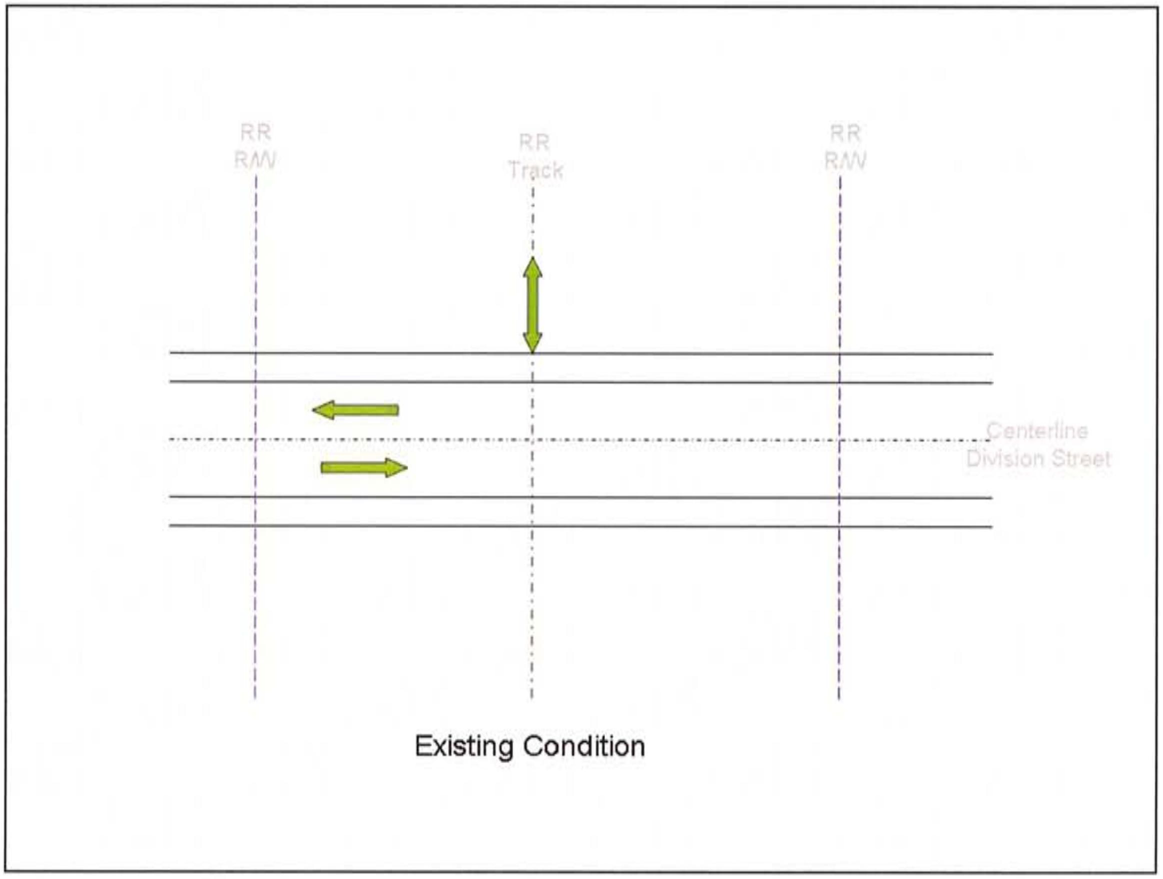


Figure 83 - Division Street Sequencing - Existing Conditions

The above sketch represents existing conditions and assumes that temporary construction easements, property acquisitions and utility relocations have already been accomplished.

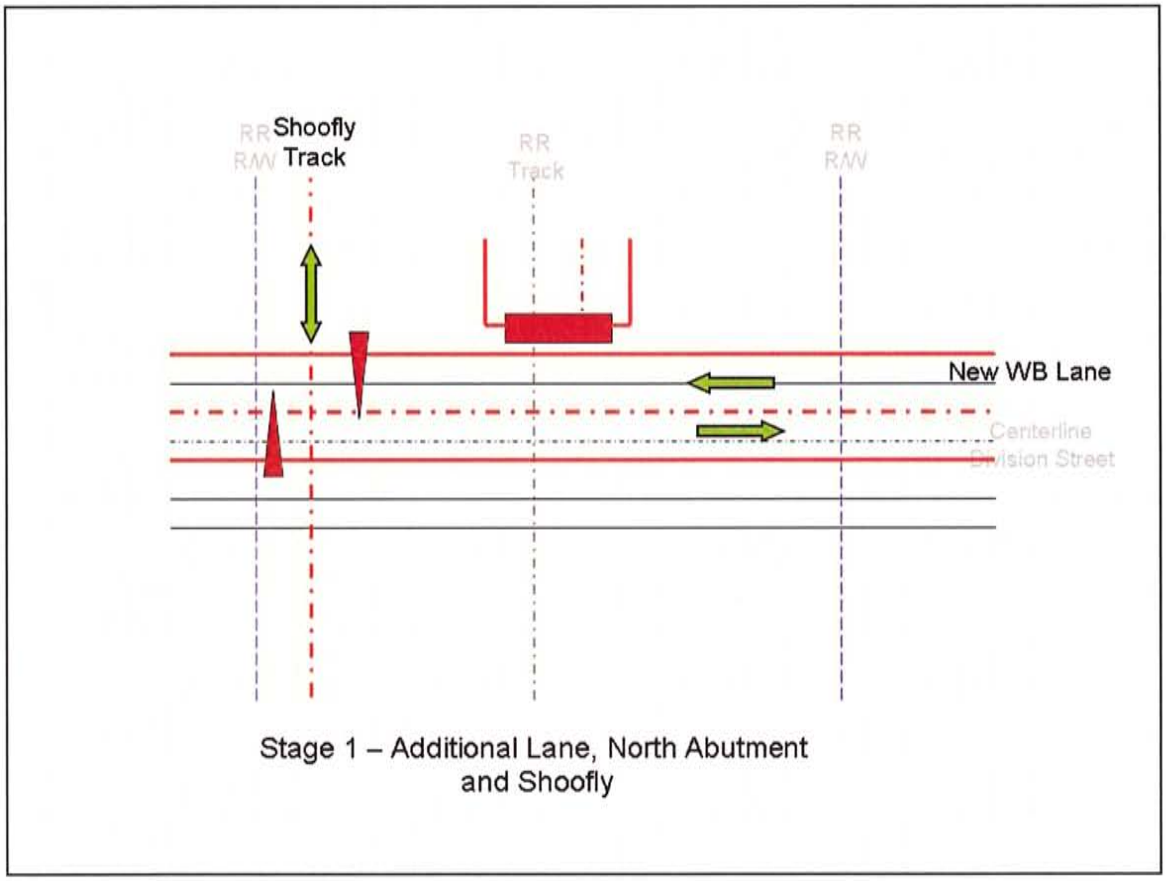


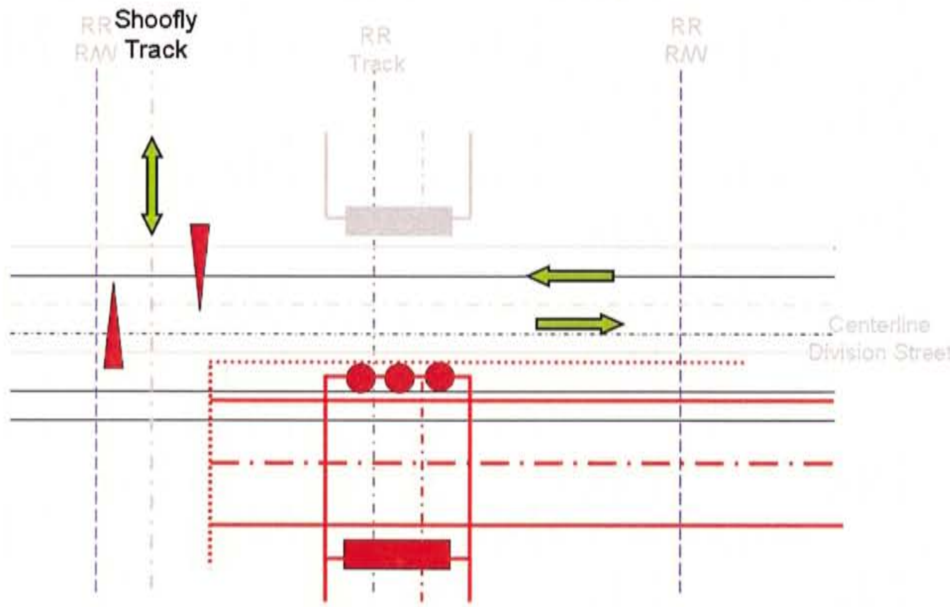
Figure 84 - Division Street Sequencing - Stage 1

Legend:

Red lines indicate new construction
Green Arrows indicate location of current operations.

During this stage, there is an additional temporary lane constructed to the north of the existing northern lane of Division Street. This will enable re-routing of all traffic north of the existing centerline to allow southbound bridge and roadwork. The shoofly track construction enables mainline train traffic to be diverted away from the bridge construction zone. Work that can be completed during this phase is the north abutment construction and wall construction to the north to support track embankment.

Once completed, train traffic and vehicular traffic operations are diverted.



Stage 2 – Shoring, Center Pier, South Abutment and Excavation of south Division Lanes

Figure 85 - Division Street Sequencing - Stage 2

Upon completion of Stage 1, shoring is installed parallel to the existing travel lanes and parallel to the shoofly track to provide excavation protection. Installation of the substructure for the center bridge pier and south abutment may be undertaken and the excavation of the future eastbound lanes may proceed down to the proposed profile grade elevation. Bridge superstructure may be added after the abutment and center pier is complete. It is anticipated that trackwork may be panalized across the bridge with continuous welded rail (CWR) track being constructed up to the abutment from either direction.

Train operations remain on the shoofly and vehicular traffic remains on the northern lanes throughout this stage.

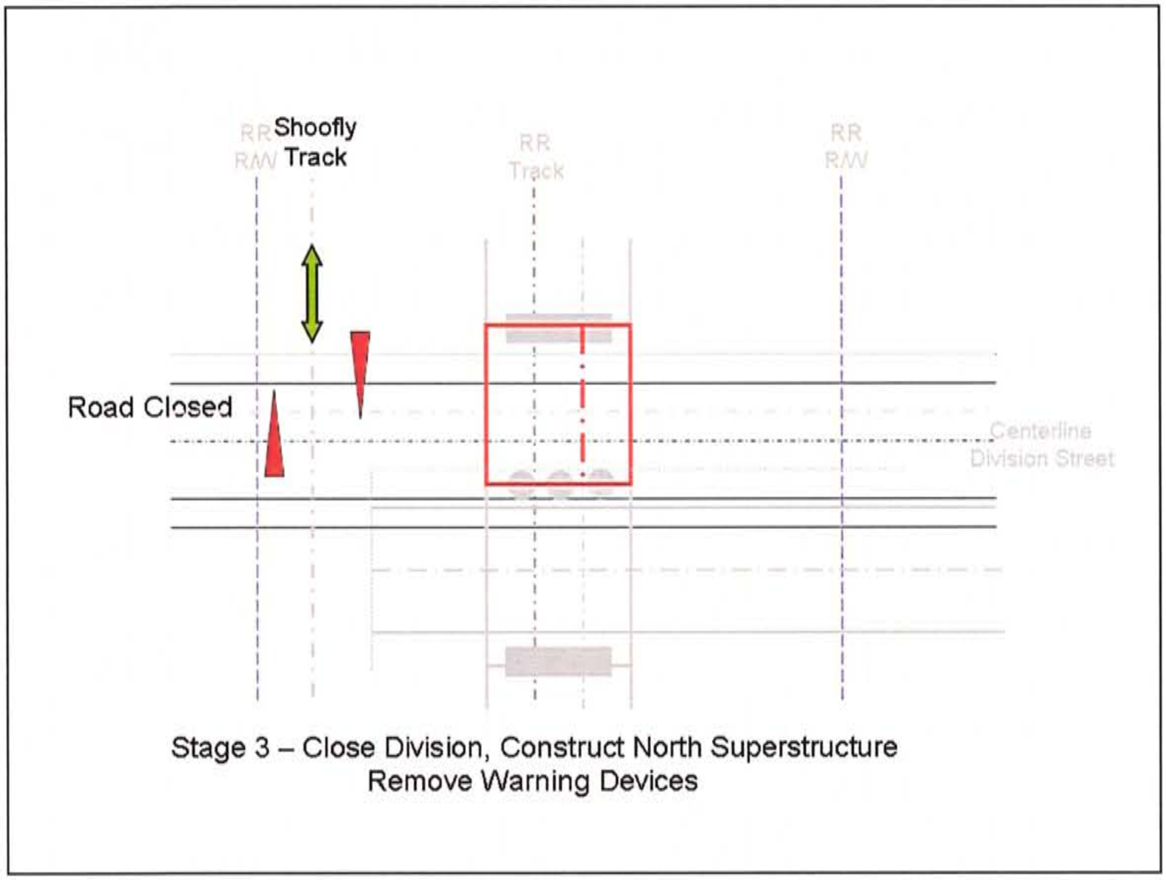


Figure 86 - Division Street Sequencing - Stage 3

Division Street is closed during this short stage. During this stage it is envisioned that the superstructure is set on the north half of the railroad bridge and track is constructed across the bridge. The estimated time for this work is less than 3 days.

During this stage, train operations remain on the shoofly track.

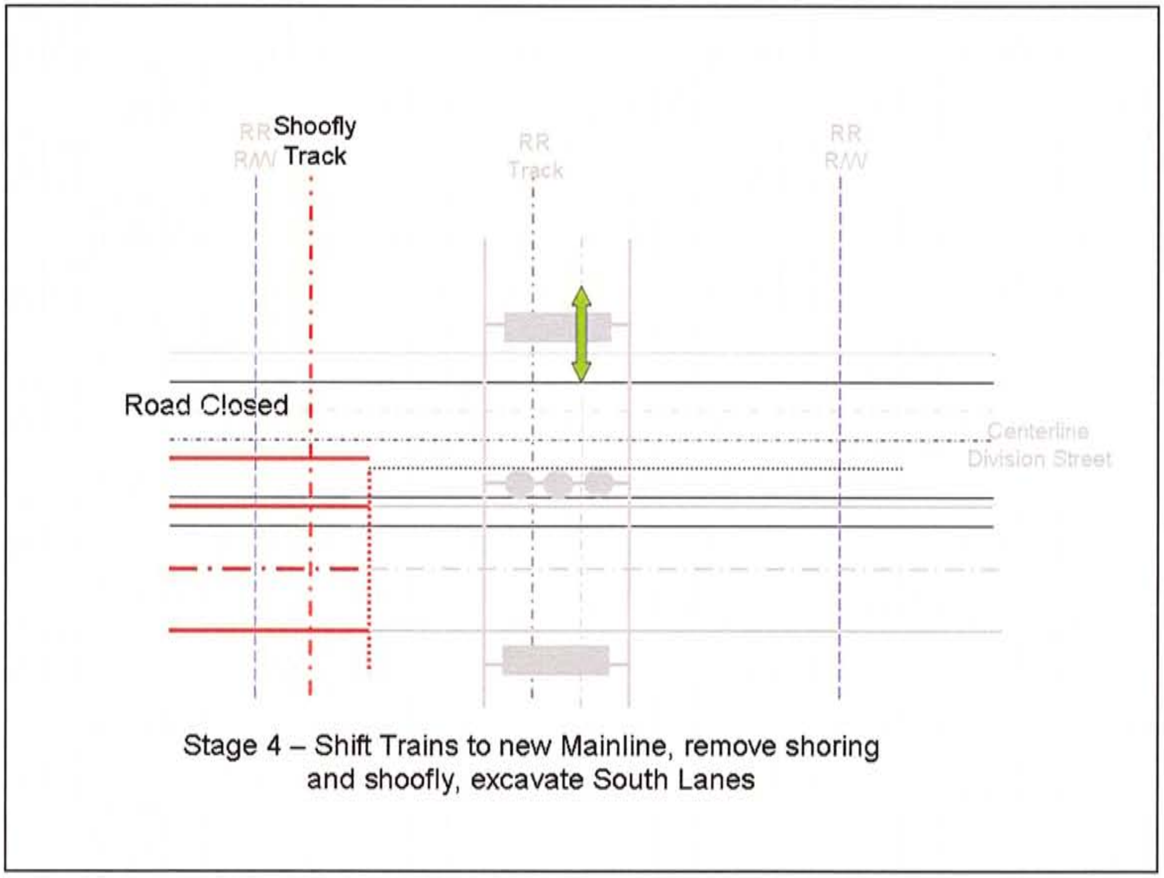


Figure 87 - Division Street Sequencing - Stage 4

Upon completion of the bridgework, the shoofly track may be removed as train operations are shifted to the mainline across the bridge. The grade crossing warning devices may be removed in the previous stage or this stage. Shoring that is protecting the shoofly is removed and excavation would continue to the west to shape the southern (future eastbound) lanes to their final configuration profile grade.

The road remains closed to vehicular traffic during this phase and train operations are on the new mainline track.

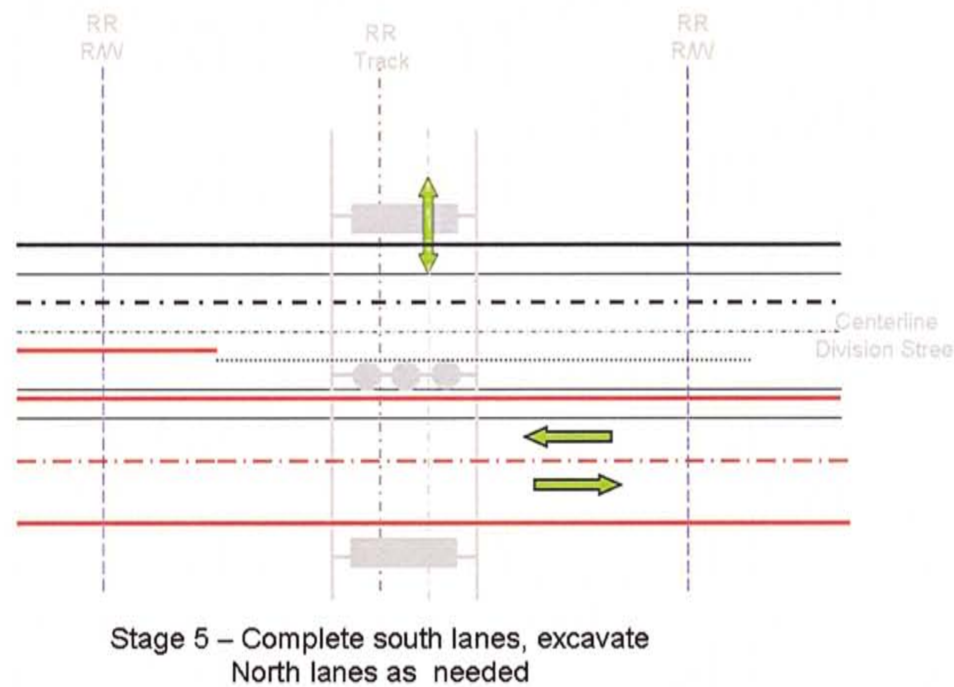
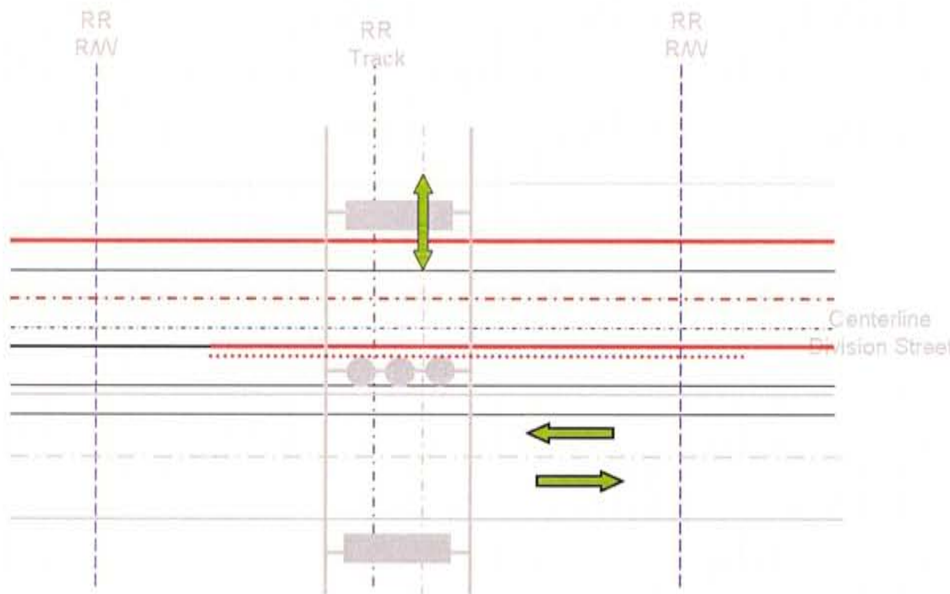


Figure 88 - Division Street Sequencing - Stage 5

Paving on the eastbound lanes would be completed during this phase and the road would be reopened to bidirectional traffic on the future eastbound lanes. It is estimated that stages 4 and 5 would require less than 1 week to complete.

Train operations would continue on the mainline track and vehicular operations would open on the southern lanes.

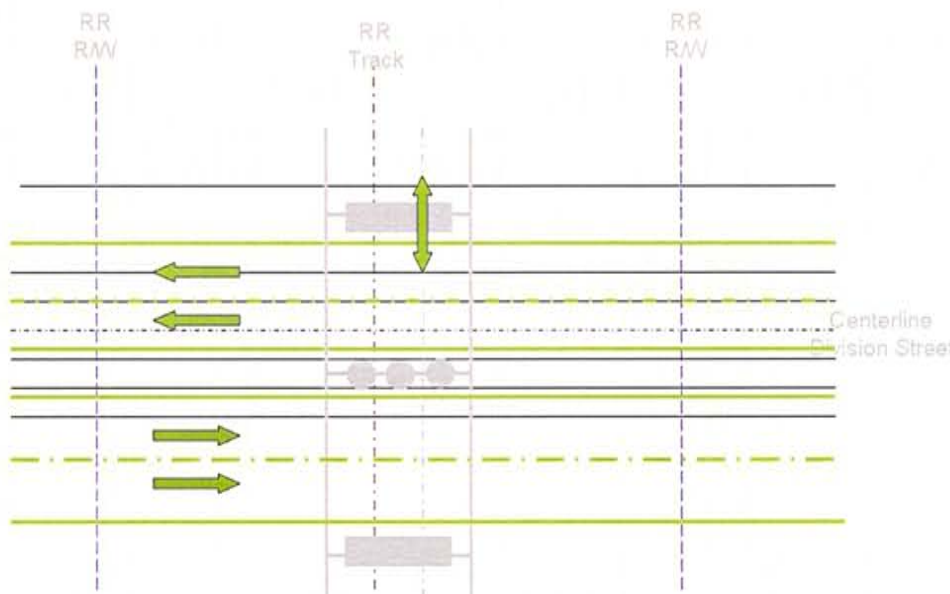


Stage 6 – Remove remaining Shoring
complete north lanes

Figure 89 - Division Street Sequencing - Stage 6

During this stage, the northern lanes would be excavated to achieve the profile grade. Shoring would be removed and paving of the future westbound lanes would be completed.

During this stage vehicular traffic remains on the southern lanes and train service remains on the new mainline.

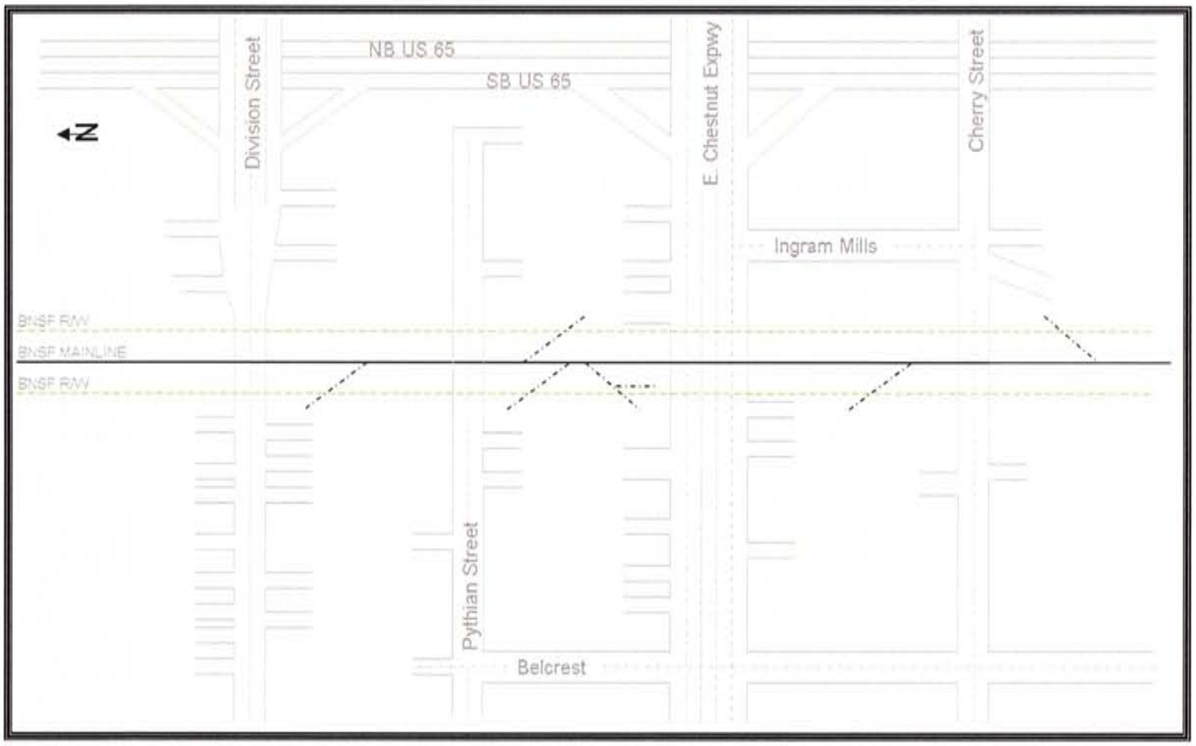


Stage 7 – Completed construction
(Road closed for <10 days)

Figure 90 - Division Street Sequencing - Stage 7

Upon completion of Stage 6, final landscaping and other aesthetic treatments would be applied and the road opened in its final configuration.

General Conceptual Railroad Construction Sequencing



Springfield Railroad Reconfiguration and Grade Separation Study
- Construction Sequencing -
Preferred Alternate - Existing Conditions
August 30, 2006

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Figure 91 – General Conceptual Construction Sequencing - Existing Conditions

The existing conditions sketch depicts the roadway and railway system as it exists today. It is assumed that utility relocations, temporary construction easements and the Pythian Street access roads are constructed prior to the first phase.

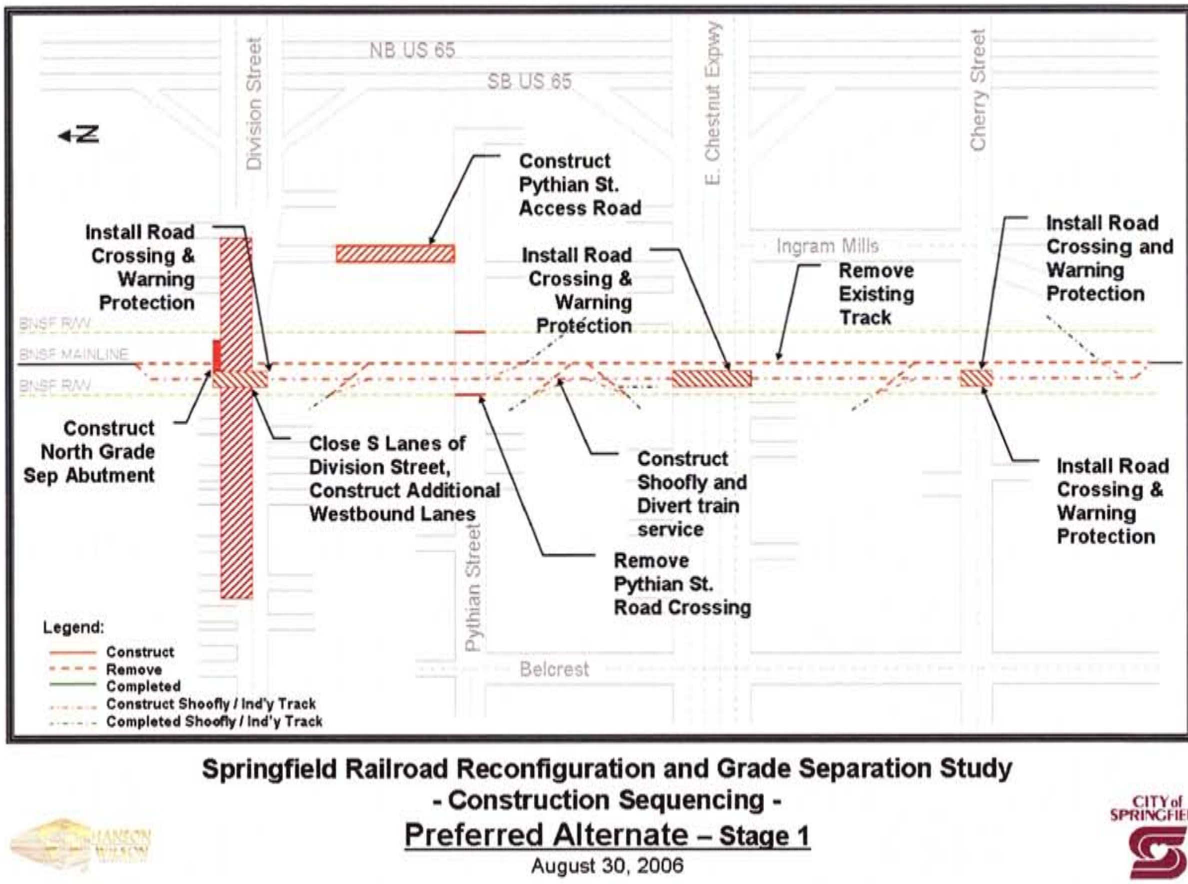


Figure 92 – General Conceptual Construction Sequencing - Stage 1

During Stage 1, the significant activities that occur include:

- Construction of a shoofly track throughout the project limits to enable continuous train service. The shoofly is constructed at the existing grade at both Division and Chestnut and to the west at a distance to enable the construction of the western-most retaining wall. Ultimately the shoofly will become the industrial lead for the rail-served customers on the west side of the corridor.
- One of the three grade separations is undertaken. For purposes of this discussion, it is assumed that Division Street is the subject.

An additional vehicular travel lane is constructed on the north side of Division Street enabling the closure of the eastbound lane and shoulder. The shoofly track is constructed across Division Street with the appropriate warning devices installed on the westbound (north) lane. Industrial tracks are reconnected to the shoofly track to continue train service. Grade crossing warning devices are installed at East Chestnut Expressway and Cherry Street. Pythian Street is permanently closed.

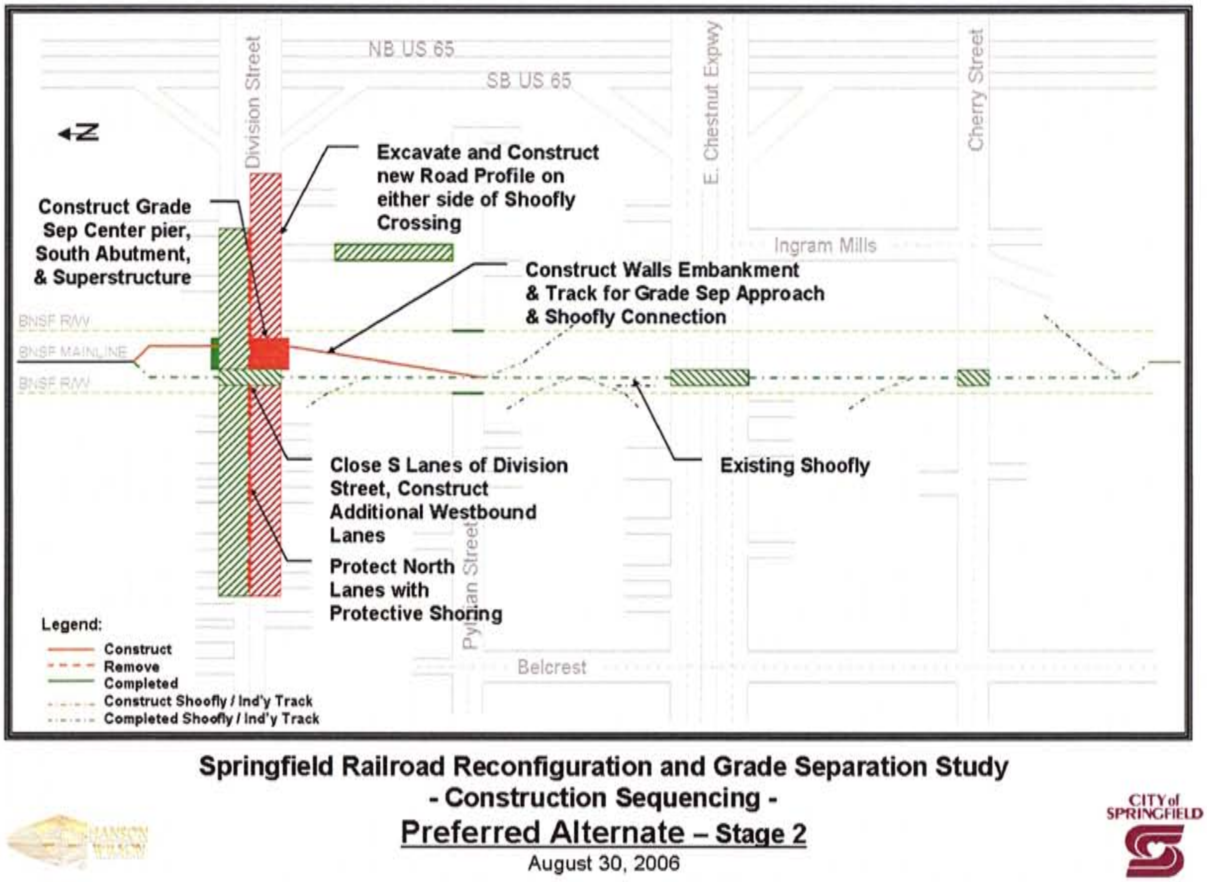


Figure 93 – General Conceptual Construction Sequencing - Stage 2

Eastbound traffic on Division Street is then diverted to the northern lanes. Shoring and excavation of the south lanes of Division is then undertaken. The shoring will protect the roadway lanes to the north and the temporary at-grade crossing of the shoofly track. Modifications of the existing mainline track then takes place by creating the new embankment for the track to be constructed. The center bridge pier and both abutments are constructed during this phase. The superstructure of the south half of the bridge may be placed during this phase. Portions of the east retaining wall are constructed to enable the transition of the proposed track back to the existing track elevations. The western retaining wall may be constructed and will act as a safety barrier separating the shoofly track from construction activities on the raised corridor. This may offer an opportunity to reduce flagging costs.

Walls and embankment are constructed to enable a shoofly connection between the new mainline track and the existing shoofly.

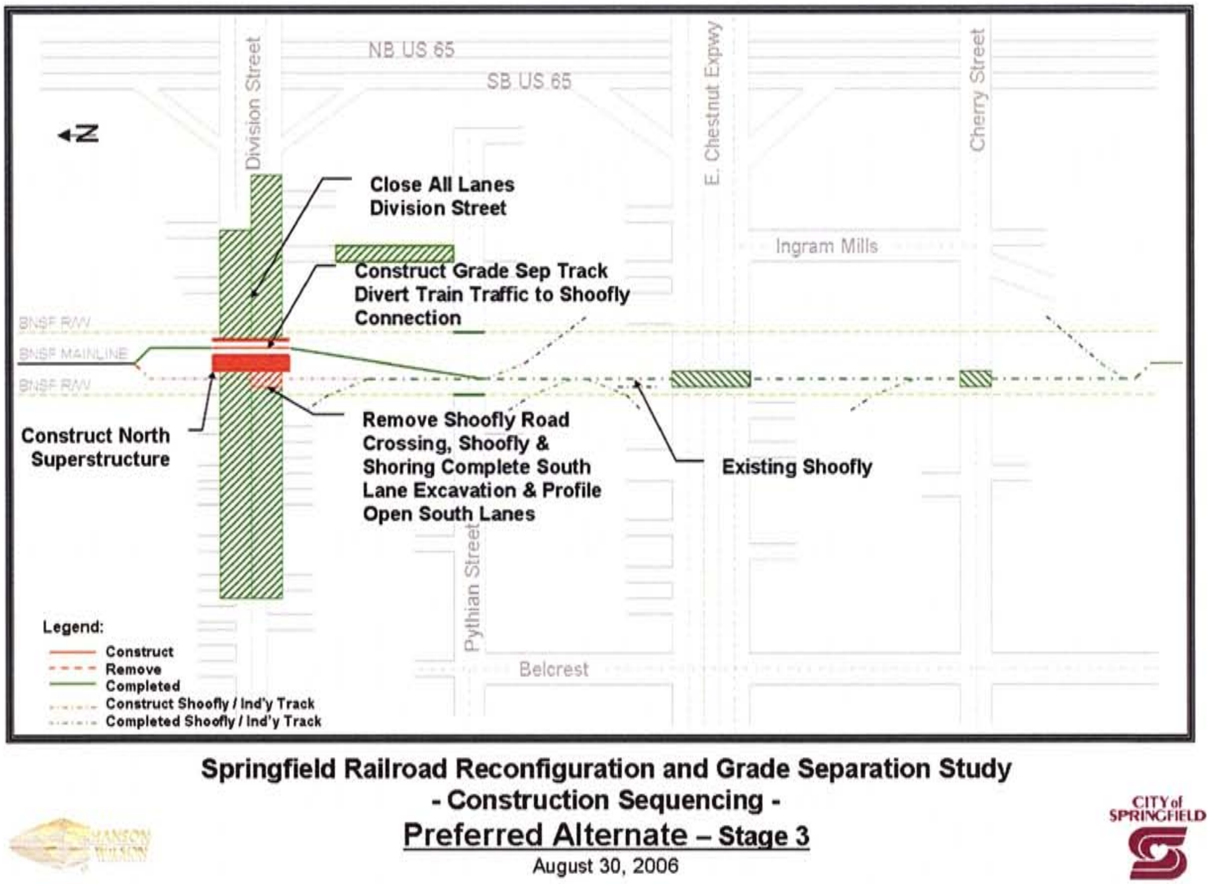


Figure 94 – General Conceptual Construction Sequencing - Stage 3

During Stage 3, the northern portion of the proposed bridge superstructure is set in place and the remainder of the mainline is constructed across the bridge. Mainline traffic is then diverted off of the shoofly track to the new alignment.

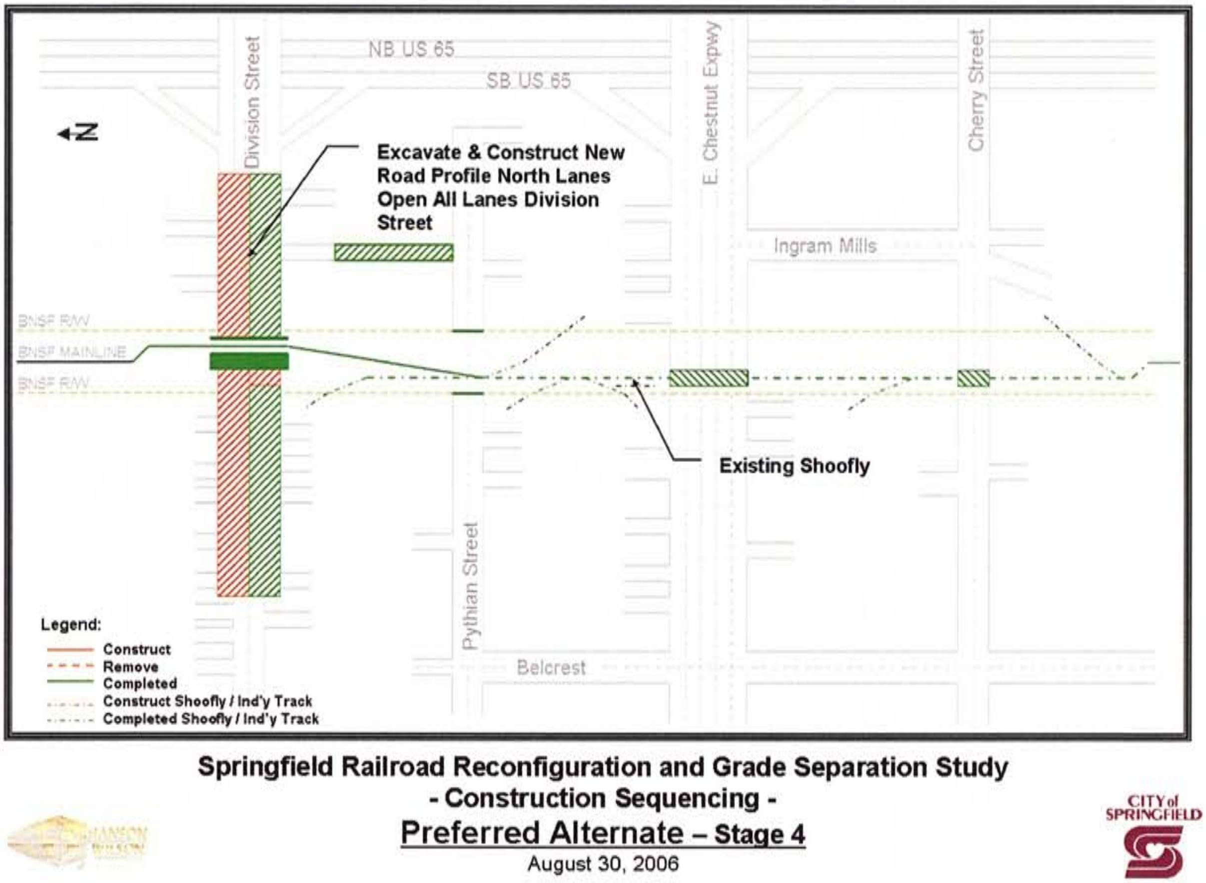


Figure 95 – General Conceptual Construction Sequencing - Stage 4

In this stage, the roadway is completed and all lanes are opened to traffic. Train service remains on the new alignment with its connection to the shoofly.

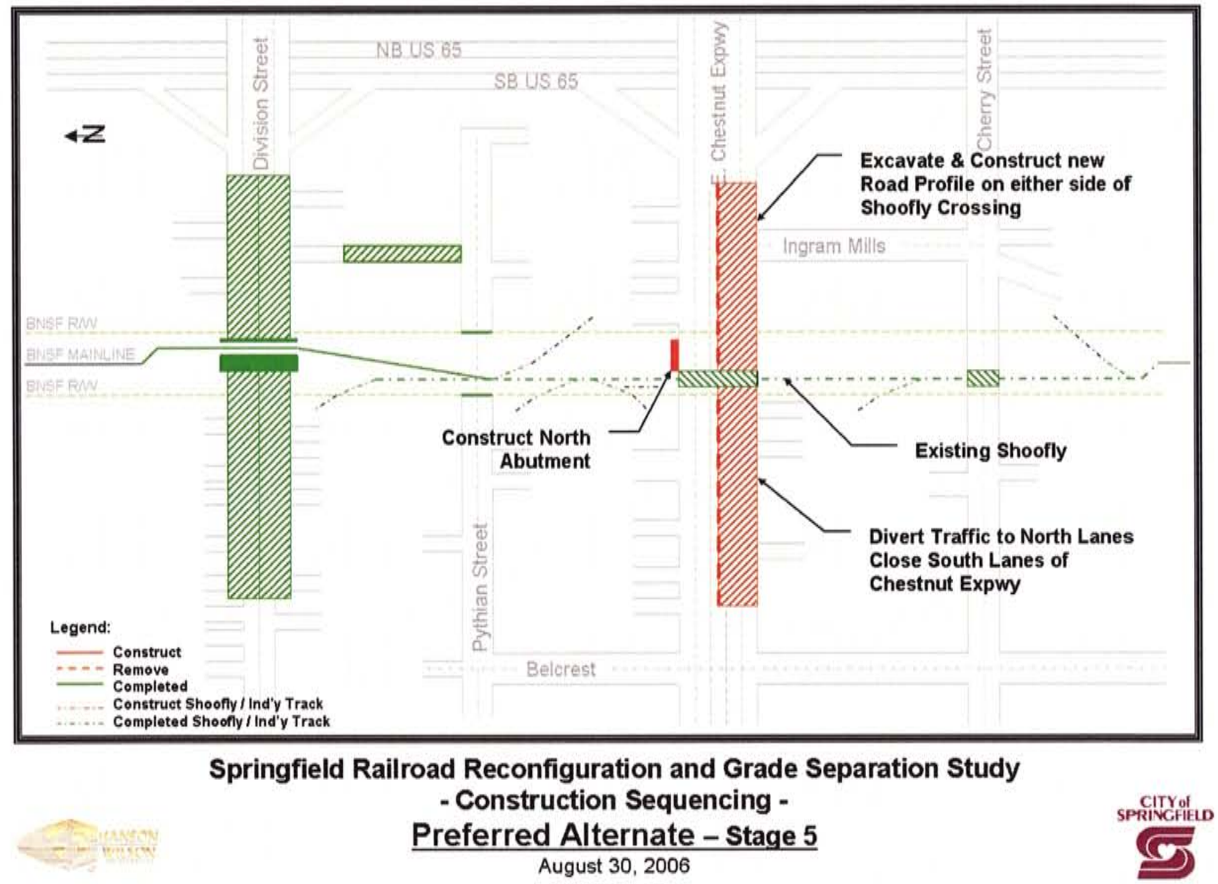


Figure 96 – General Conceptual Construction Sequencing - Stage 5

With train service active on the shoofly track, the vehicular traffic on E. Chestnut Expressway is diverted to the northern lanes. The southern lanes are excavated to the shoring protection of the shoofly track, in a similar fashion as Division Street (See Division Street Sequencing – Stage 2). The north abutment of the bridge is constructed during this stage.

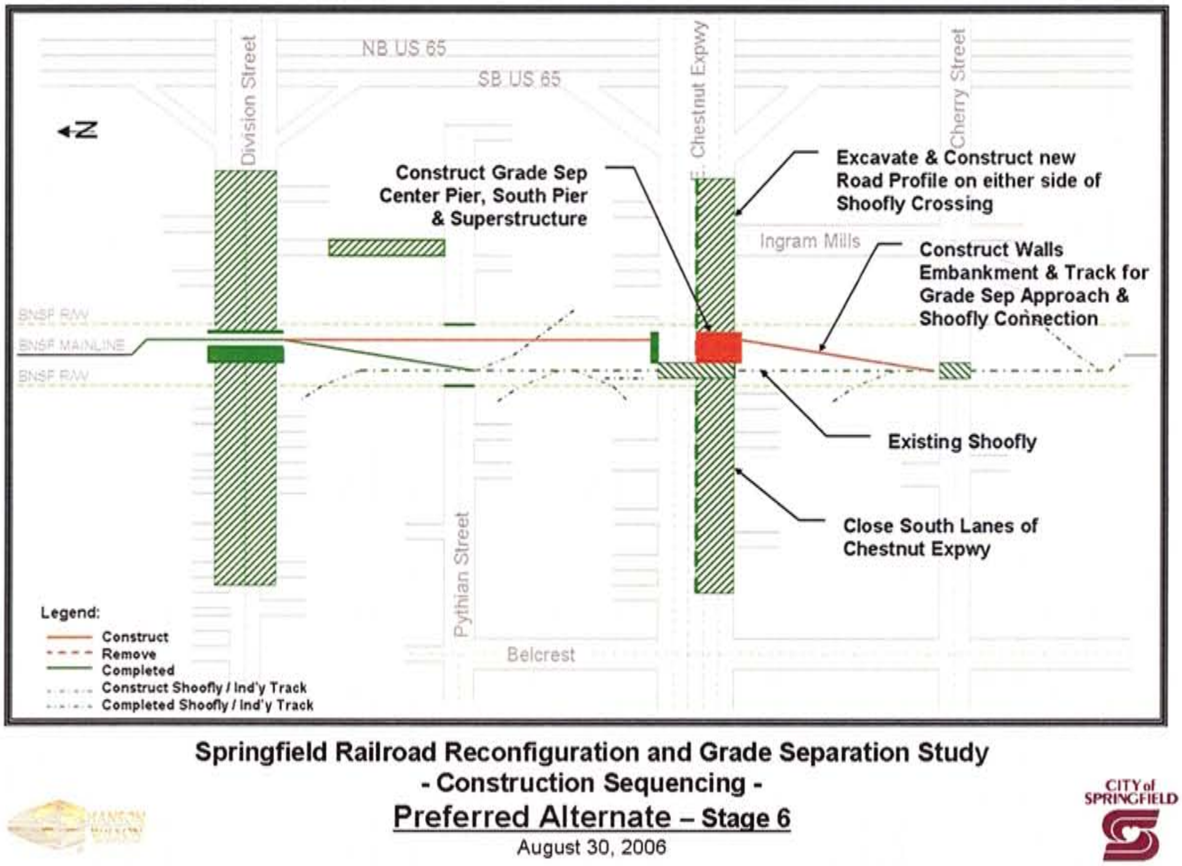


Figure 97– General Conceptual Construction Sequencing - Stage 6

With vehicular traffic on the northern lanes, the southern lanes are excavated and the bridge substructure and southern half of the superstructure are erected. New mainline embankment and track are constructed north and south of the work area. Train service remains active on the shoofly at-grade crossing for all lanes of traffic.

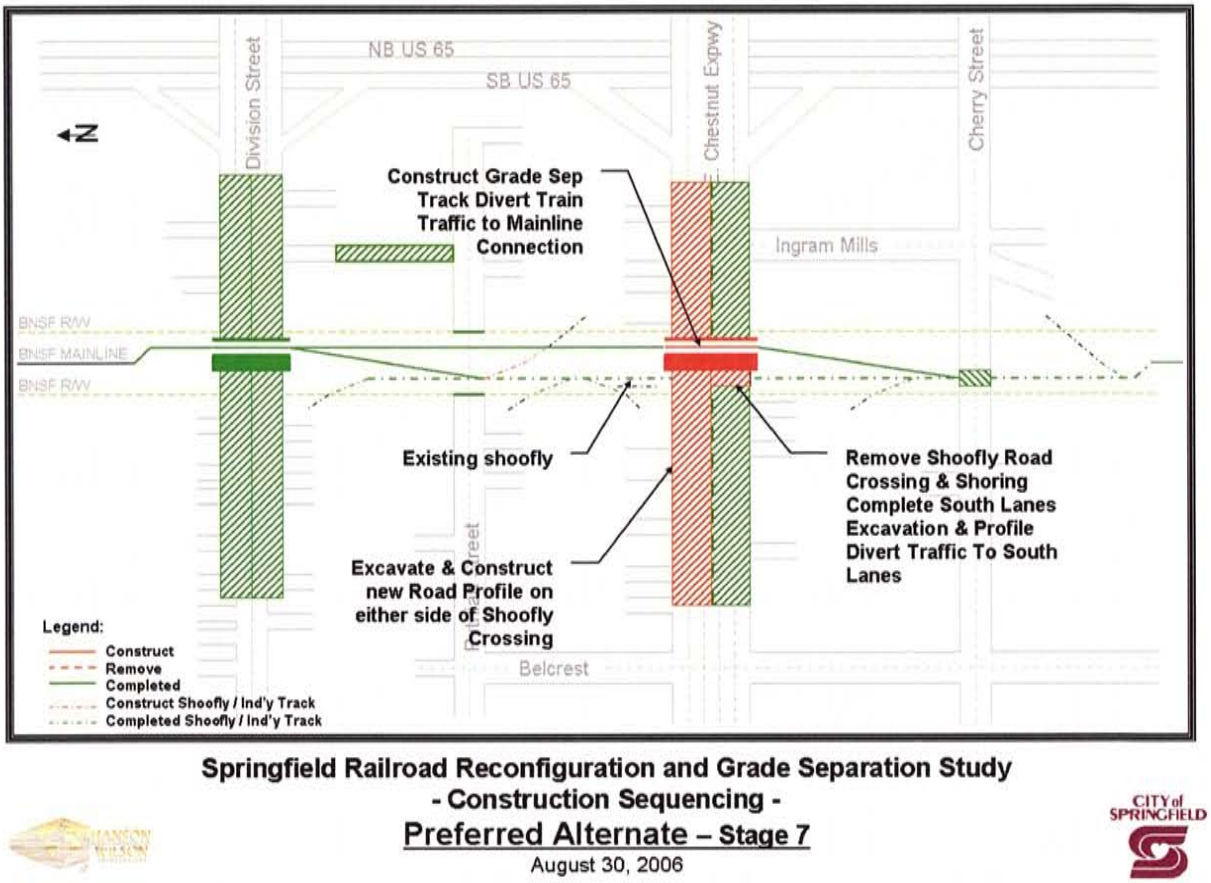
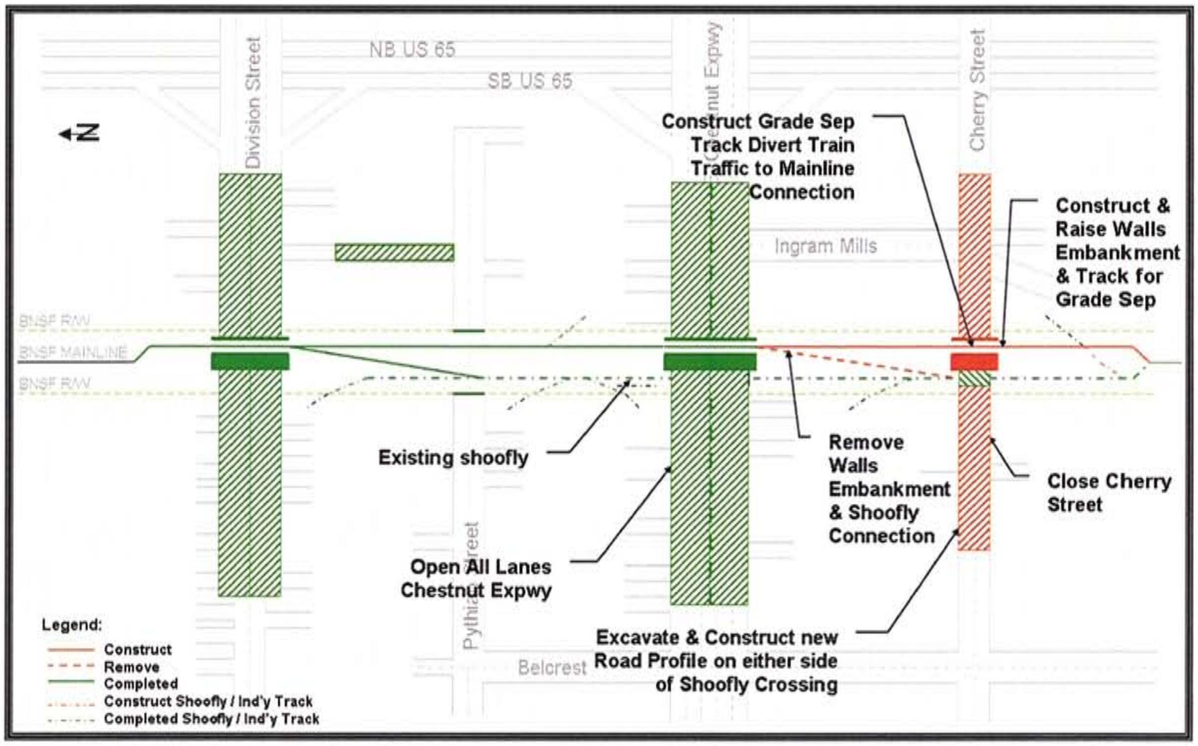


Figure 98– General Conceptual Construction Sequencing - Stage 7

During this phase vehicular traffic is closed on E. Chestnut Expressway for a period not to exceed 1 week. The 1 week construction timeframe assumes 24-hour construction over the period of 1 week. During that time, the remainder of the bridge superstructure is erected, track constructed. Upon completion of the track work, train service is routed to the new alignment. The shoofly track is then converted to the industrial lead between Division and E. Chestnut Expressway.



Springfield Railroad Reconfiguration and Grade Separation Study
- Construction Sequencing -
Preferred Alternate – Stage 8
August 30, 2006

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During this phase, Cherry Street may either be closed, or it can be sequenced in a similar fashion as Division Street. Upon completion of the bridge sub and superstructure, mainline track is completed and train service is diverted to the new alignment. It should be noted that the choice of temporary shoofly embankment wall material may be such that it could be sacrificial and remain in-place after its use is completed. This may reduce costs in the final stages.

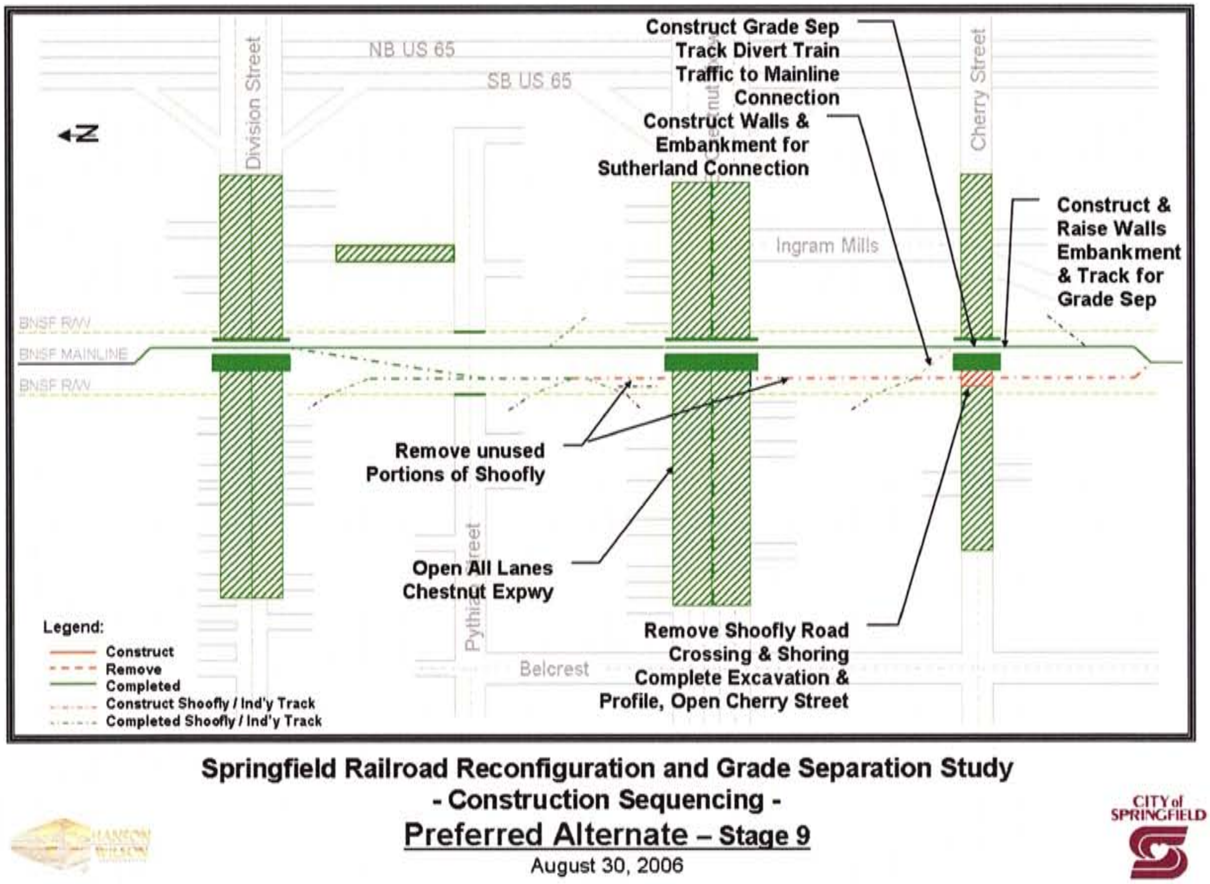


Figure 100– General Conceptual Construction Sequencing - Stage 9

In the final construction stage, portions of the shoofly track that are not required for serving industrial customers are removed. Warning protection devices are removed from Cherry and the remainder of the excavation and roadway work is completed.

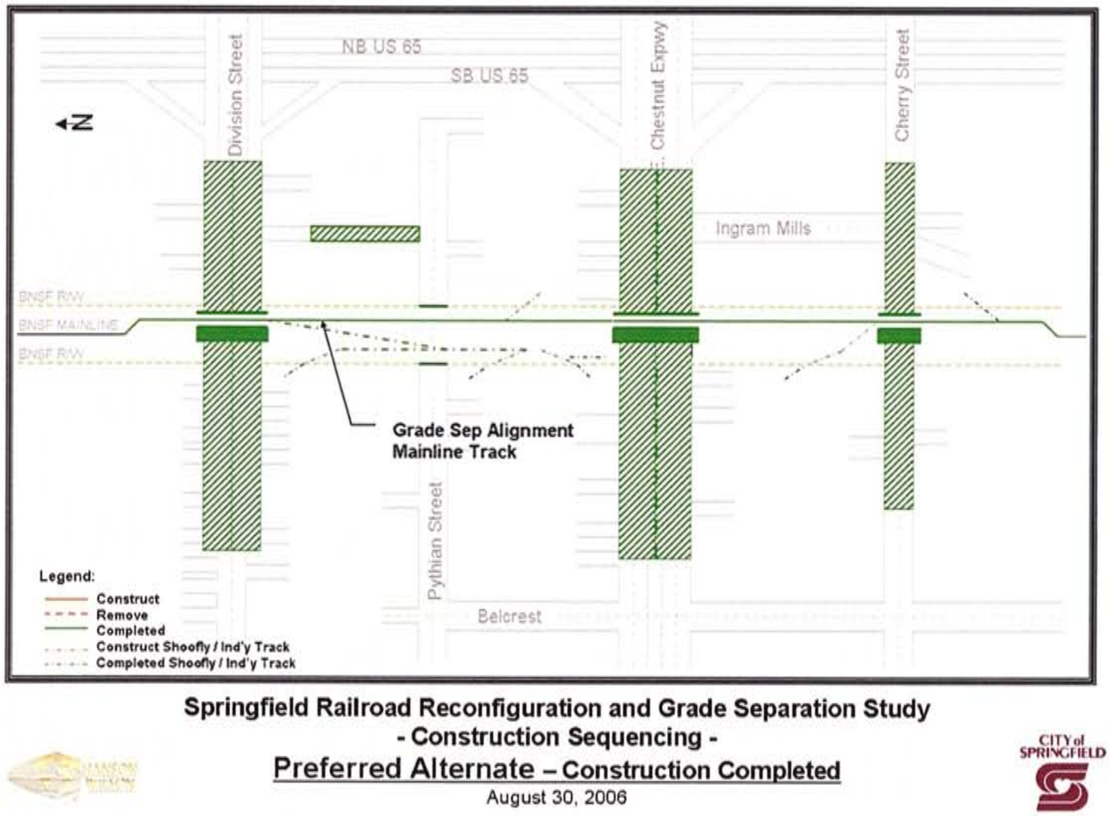


Figure 101– General Conceptual Construction Sequencing - Completed Construction

The final constructed condition offers an arrangement that provides for future double-tracking and continues train service to all rail customers within the corridor.

It should be noted that detailed sequencing plans should be created to depict acces during construction to all businesses along affected roadways.

Preferred Alternative Conceptual Cost Estimate Summary

Summary Project Costs

SPRINGFIELD RAILROAD RECONFIGURATION
AND
GRADE SEPARATION STUDY

CONCEPTUAL CONSTRUCTION COST ESTIMATE

GRADE SEPARATIONS

October 15, 2006

		Estimated Minimum	Estimated Maximum
Base Project (One Phase)			
Grade Separate Division and East Chestnut Expressway			
	Road Work	$ 12,880,000	$ 18,900,000
	Railroad Work	$ 28,160,000	$ 35,200,000
	Total	**$ 41,040,000**	**$ 54,100,000**
Expanded Project (One Phase)			
Grade Separate Division, East Chestnut Expressway and Cherry Street			
	Road Work	$ 14,960,000	$ 21,600,000
	Railroad Work	$ 38,720,000	$ 48,400,000
	Total	**$ 53,680,000**	**$ 70,000,000**
Add Cherry Street Grade Separation to Base Project (Future)			
Grade Separate Cherry Street			
	Road Work	$ 2,000,000	$ 2,700,000
	Railroad Work	$ 13,200,000	$ 16,500,000
	Total	**$ 15,200,000**	**$ 19,200,000**

Notes:
1. All estimated costs are in 2006 dollars. No future escalation applied.
2. All utility relocation costs included in "Road Work" line item.
3. 25% contingency is included.
4. For minimum, some walls removed due to rock excavation and no contingencies have been applied.

Preferred Option Excluding Cherry Street– Railroad Estimate

PREFERRED OPTION - RAILROAD ESTIMATE

Work Item	Quantity	Unit	Unit Cost	Cost
North Tie In to Cherry St.				
Intial Shoofly Construction				
Embkm't - North Tie In to Division: Shoofly	5,000	CY	$ 4.00	$ 20,000
Excvtn - N. Tie In to Division: Shoofly	3,000	CY	$ 8.00	$ 24,000
Subballast - Division to Chestnut Shoofly	2,000	CY	$ 35.00	$ 70,000
T-Wall - Division to Chestnut: Shoofly	26,000	SF	$ 64.00	$ 1,664,000
Select Backfill - Division to Chestnut: Shoofly	16,000	CY	$ 15.00	$ 240,000
Excvtn - Division to Chestnut: Shoofly	11,000	CY	$ 8.00	$ 88,000
Cast Concrete Ret Wall - Shoofly Ditch	4,200	SF	$ 100.00	$ 420,000
Subballast - Division to Chestnut Shoofly	5,000	CY	$ 35.00	$ 175,000
T-Wall : Chestnut to Cherry Tie In: Shoofly	13,000	SF	$ 64.00	$ 832,000
Select Backfill - Chestnut to Tie In: Shoofly	8,000	CY	$ 15.00	$ 120,000
Excvtn - Chestnut to Tie In: Shoofly	0	CY	$ 8.00	$ -
Shoofly Track - N. Tie In to Cherry Tie In	10,900	TF	$ 120.00	$ 1,308,000
Grading - Ind'y Trk/Shoofly Connections	17,500	CY	$ 8.00	$ 140,000
Shoofly Turnouts (Relocate from Main Line)	4	EA	$ 25,000.00	$ 100,000
Division St Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Pythian St. Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Chestnut Expwy Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Shoofly Signal Modifications	1	LS	$ 900,000.00	$ 900,000
Crossing Signal Relocation	1	LS	$ 400,000.00	$ 400,000
Remove Main Trk - N.Tie In to S. Tie In	10,900	TF	$ 25.00	$ 273,000
Subtotal				**$ 6,822,000**
Double Main Trk Walls and Grading: N. Tie In to Division				
T-Wall - N. Tie In to Division: Main E. Side	0	SF	$ 64.00	$ -
T-Wall - N. Tie In to Division:: Main W. Side	0	SF	$ 64.00	$ -
Select Backfill - N. Tie to Division	0	CY	$ 15.00	$ -
Embnt - N Tie In to Division: Main Trk	11,000	CY	$ 4.00	$ 44,000
Excvtn - N. Tie In to Division: MainTrk	0	CY	$ 8.00	$ -
Subtotal				**$ 44,000**
Double Main Trk Walls and Grading: Division to Chestnut				
T-Wall - Division to Chestnut: Main E. Side	24,000	SF	$ 64.00	$ 1,536,000
T-Wall - Division to Chestnut: Main W. Side	61,000	SF	$ 64.00	$ 3,904,000
Select Backfill - Division to Chestnut: Main Trk	84,000	CY	$ 15.00	$ 1,260,000
Subtotal				**$ 6,700,000**
Double Main Trk Walls and Grading: Chestnut to Cherry Tie In				
T-Wall - Chestnut to Cherry Tie In: Main E. Side	28,000	SF	$ 64.00	$ 1,792,000
T-Wall - Chestnut to Cherry Tie In: Main W. Side	22,000	SF	$ 64.00	$ 1,408,000
Select Backfill - Chestnut to Cherry Tie In: Main Trk	40,000	CY	$ 15.00	$ 600,000
Subtotal				**$ 3,800,000**
Main Track Construction - North Tie to South Tie In				
Mainline Subballast	10,500	CY	$ 35.00	$ 368,000
Mainline Track	10,900	TF	$ 145.00	$ 1,581,000
Remove Shoofly Trk N/R for Ind'y Trk Leads	7,300	TF	$ 25.00	$ 182,500
Remove Shoofly Subballast N/R for Ind'y Trk Leads	7,000	CY	$ 4.00	$ 28,000
Mainline Signal Modifications	1	LS	$ 900,000.00	$ 900,000
Subtotal				**$ 3,060,000**
West Side Ind'y Trk Ramp and Connections				
Remove Shoofly Trk in Conflict with Ramp	1,600	TF	$ 25.00	$ 40,000
Remove Shoofly Trk in Conflict with Ramp	800	TF	$ 25.00	$ 20,000
Remove Subballast - Shoofly Ramp	1,500	CY	$ 4.00	$ 6,000
T-Wall - Raise Shoofly Wall to Accommodate Ind'y Trk Ramp	10,000	SF	$ 64.00	$ 640,000
Select Backfill - Ind'y Trk Ramp	10,000	CY	$ 15.00	$ 150,000
M/L TO - Indy Trk Connection	1	EA	$ 150,000.00	$ 150,000
Subballast (recycled) - West Side Ind'y Trk Connections	1,500	CY	$ 4.00	$ 6,000
Industry Trk Connection- Reinstall Shoofly	1,600	TF	$ 45.00	$ 72,000
Replace Ind'y Trk Connections	800	TF	$ 45.00	$ 36,000
Subtotal				**$ 1,120,000**

Preferred Option Excluding Cherry Street– Railroad Estimate - Continued

3M Ind'y Trk Connection				
T-Wall - 3M Connection Ramp	5,000	SF	$ 64.00	$ 320,000
Select Backfill - 3M Connection Ramp	3,000	CY	$ 15.00	$ 45,000
Replace Ind'y Trk Connectiion	500	TF	$ 45.00	$ 23,000
Reinstall M/L TO - Indy Trk Connection	1	EA	$ 25,000.00	$ 25,000
Subtotal				**$ 413,000**
Sutherland Lumber Ind'y Trk Ramp and Connection				
T-Wall - Raise Shoofly Wall to Accommodate Ind'y Trk Ramp	2,500	SF	$ 64.00	$ 160,000
Select Backfill - Ind'y Trk Ramp	2,400	SF	$ 15.00	$ 36,000
Install M/L TO - Indy Trk Connection	1	EA	$ 150,000.00	$ 150,000
Subballast (recycled) - West Side Ind'y Trk Connection	1,300	CY	$ 4.00	$ 5,200
Industry Trk Connection- Reinstall Shoofly	1,300	TF	$ 45.00	$ 58,500
Subtotal				**$ 410,000**
Structures				
Double Trk Br Underpass - Division St	160	LF	$ 7,500.00	$ 1,200,000
Double Trk Br Underpass - E Chestnut Expwy	160	LF	$ 7,500.00	$ 1,200,000
Subtotal				**$ 2,400,000**
Site Improvements				
ROW Drainage Improvements	10,900	LF	$ 30.00	$ 327,000
Seeding and Landscaping	15	AC	$ 5,000.00	$ 75,000
Subtotal				**$ 402,000**
Project Total: North Tie In to Cherry St. Tie In				**$ 25,171,000**

Cherry St. Grade Sep Addition

Work Item	Quantity	Unit	Unit Cost	Cost
Shoofly Construction				
Remove TO - M/L Sutherland Connection	1	EA	$ 10,000.00	$ 10,000
Remove Trk - Sutherland Connection	1,300	TF	$ 25.00	$ 32,500
Remove Subballast - Sutherland Connection	1,300	CY	$ 4.00	$ 5,200
Remove T-Wall - Sutherland Connection Ramp	2,500	SF	$ 20.00	$ 50,000
Excvt'n - Remove Sutherland Ramp Select Fill	2,400	CY	$ 4.00	$ 9,600
T-Wall (recycled) - Raise Shoofly Wall for M/L to Shoofly Ramp	0	SF	$ 20.00	$ -
T-Wall - Raise Shoofly Wall for M/L to Shoofly Connection Ramp	23,000	SF	$ 64.00	$ 1,472,000
Select Backfill (recycled) - M/L to Shoofly Connection Ramp	2,400	CY	$ 4.00	$ 9,600
Select Backfill (new) - M/L to Shoofly Connection Ramp	19,000	CY	$ 15.00	$ 285,000
Subballast (recycled) - M/L to Shoofly Connection Ramp	2,400	CY	$ 4.00	$ 9,600
T-Wall - Shoofly Extension for Cherry St. Grade Sep	5,000	SF	$ 64.00	$ 320,000
Select Backfill - Shoofly Extension	5,000	CY	$ 15.00	$ 75,000
Excvt'n - Shoofly Extension to S. Tie In	2,000	CY	$ 8.00	$ 16,000
Embkm't - Shoofly Extension to S. Tie In	3,000	CY	$ 4.00	$ 12,000
Subballast (new) - Shoofly Extension to S. Tie In	2,000	CY	$ 35.00	$ 70,000
Reinstall Shoofly Trk - M/L Ramp to Shoofly (rem'd Sutherland Trk)	1,300	TF	$ 45.00	$ 58,500
Reinstall Trk - Shoofly Connection to S. Tie In	2,000	TF	$ 45.00	$ 90,000
Cherry St Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Shoofly Signal Modifications	1	LS	$ 200,000.00	$ 200,000
Crossing Signal Relocation	1	LS	$ 100,000.00	$ 100,000
Subtotal				**$ 2,841,000**
Double Main Track Walls and Grading				
Remove Trk - M/L: From Shoofly Ramp to S. Tie In	4,500	TF	$ 25.00	$ 112,500
Remove TO - Ind'y Trk	1	EA	$ 10,000.00	$ 10,000
T-Wall - M/L East Addition for N. Cherry St. Grade Sep Approach	20,300	SF	$ 64.00	$ 1,299,200
T-Wall - M/L West Addition for N. Cherry St. Grade Sep Approach	20,300	SF	$ 64.00	$ 1,299,200
Select Backfill - N. Cherry St M/L Grade Sep Approach	41,000	CY	$ 15.00	$ 615,000
T-Wall - M/L East Addition for S. Cherry St. Grade Sep Approach	7,500	SF	$ 64.00	$ 480,000
T-Wall - M/L West Addition for S. Cherry St. Grade Sep Approach	9,400	SF	$ 64.00	$ 601,600
Select Backfill - S. Cherry St M/L Grade Sep Approach	21,000	CY	$ 15.00	$ 315,000
Embkm't - S. Cherry St: M/L	3,100	CY	$ 4.00	$ 12,400
Excvtn - S. Cherry St Tie In: M/L	2,800	CY	$ 8.00	$ 22,400
Subballast (new) - to S. M/L Tie In	4,300	CY	$ 35.00	$ 150,500
Remove Trk - S. Cherry Ind'y Track	500	TF	$ 25.00	$ 12,500
T-Wall for Ind'y Tr Approach S. of Cherry	7,500	SF	$ 64.00	$ 480,000
Select Fill - Ind'y Trk Connection S. of Cherry	3,000	CY	$ 15.00	$ 45,000
Grading - Ind'y Trk Connection S. of Cherry	10,500	CY	$ 4.00	$ 42,000
Subballast (new) - Ind'y Trk Connection S. of Cherry	1,400	CY	$ 35.00	$ 49,000
Industry Trk Connection - Shoofly	500	TF	$ 45.00	$ 22,500
Subtotal				**$ 5,568,800**

Preferred Option Excluding Cherry Street– Railroad Estimate - Continued

Main Track Construction - Cherry St. Grade Sep Addition						
Reinstall M/L Trk - M/L Ramp to S. Tie In	4,500	TF	$	45.00	$	202,500
Reinstall M/L TO - Indy Trk Connection	1	EA	$	15,000.00	$	15,000
Mainline Signal Modifications	1	LS	$	200,000.00	$	200,000
Subtotal					**$**	**417,500**
Recreate Sutherland Ind'y Trk Connection						
Remove Trk - Shoofly Trk	4,500	TF	$	25.00	$	112,500
Excvt'n - Remove Subballlast M/L Ramp to Shoofly	4,300	CY	$	4.00	$	17,200
Excvt'n - Select Backfill M/L Ramp to Shoofly	21,400	CY	$	4.00	$	85,600
Remove T-Wall - M/L Ramp to Shoofly	23,000	SF	$	20.00	$	460,000
T-Wall - Sutherland Ind'y Trk Connection Ramp	10,600	SF	$	64.00	$	678,400
Select Backfill (recycled) - Sutherland Ind'y Track Connection	10,200	CY	$	4.00	$	40,800
Subballast (recycled) - Sutherland Indy Track Connection	1,300	CY	$	4.00	$	5,200
Reinstall M/L TO - Sutherland Connection	1	EA	$	25,000.00	$	25,000
Industry Connection Trk- Reinstall Shoofly	1,300	TF	$	45.00	$	58,500
Subtotal					**$**	**1,484,000**
Structures						
Double Trk Br Underpass - Cherry St	1	LS	$	1,400,000.00	$	1,400,000
Subtotal					**$**	**1,400,000**
Site Improvements						
ROW Drainage Improvements	1,500	LF	$	30.00	$	45,000
Seeding and Landscaping	3	AC	$	5,000.00	$	15,000
Subtotal					**$**	**60,000**
Project Total: Cherry St. Grade Separation					**$**	**11,772,000**
Project Total: North Tie to South Tie In (Includes Cherry St Grade Separation					**$**	**36,943,000**

Preferred Option including Cherry Street – Railroad Estimate

PREFERRED OPTION - RAILROAD ESTIMATE

Work Item	Quantity	Unit	Unit Cost	Cost
North Tie In to Cherry St.				
Intial Shoofly Construction				
Embkm't - North Tie In to Division: Shoofly	5,000	CY	$ 4.00	$ 20,000
Excvtn - N. Tie In to Division: Shoofly	3,000	CY	$ 8.00	$ 24,000
Subballast - Division to Chestnut Shoofly	2,000	CY	$ 35.00	$ 70,000
T-Wall - Division to Chestnut: Shoofly	26,000	SF	$ 64.00	$ 1,664,000
Select Backfill - Division to Chestnut: Shoofly	16,000	CY	$ 15.00	$ 240,000
Excvtn - Division to Chestnut: Shoofly	11,000	CY	$ 8.00	$ 88,000
Cast Concrete Ret Wall - Shoofly Ditch	4,200	SF	$ 100.00	$ 420,000
Subballast - Division to Chestnut Shoofly	5,000	CY	$ 35.00	$ 175,000
T-Wall : Chestnut to Cherry Tie In: Shoofly	13,000	SF	$ 64.00	$ 832,000
Select Backfill - Chestnut to Cherry Grade Sep: Shoofly	8,000	CY	$ 15.00	$ 120,000
Excvtn - Chestnut to Cherry Grade Sep: Shoofly	0	CY	$ 8.00	$ -
T-Wall - Cherry St. Grade Sep to S. Tie In: Shoofly	5,000	SF	$ 64.00	$ 320,000
Select Backfill - Cherry St Grade Sep to S. Tie In: Shoofly	5,000	CY	$ 15.00	$ 75,000
Excvt'n - Cherry St Grade Sep to S. Tie In: Shoofly	2,000	CY	$ 8.00	$ 16,000
Embkm't - Cherry St Grade Sep to S. Tie In: Shoofly	3,000	CY	$ 4.00	$ 12,000
Subballast - N. Tie In to S. Tie In: Shoofly	12,400	CY	$ 35.00	$ 434,000
Shoofly Track - N. Tie In to S. Tie In	12,900	TF	$ 120.00	$ 1,548,000
Grading - Ind'y Trk/Shoofly Connections	17,500	CY	$ 8.00	$ 140,000
Shoofly Turnouts (Relocate from Main Line)	6	EA	$ 25,000.00	$ 150,000
Division St Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Pythian St. Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Chestnut Expwy Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Cherry St Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Shoofly Signal Modifications	1	LS	$ 1,100,000.00	$ 1,100,000
Crossing Signal Relocation	1	LS	$ 500,000.00	$ 500,000
Remove Main Trk - N.Tie In to S. Tie In	12,900	TF	$ 25.00	$ 323,000
Subtotal				**$ 8,335,000**
Double Main Trk Walls and Grading: N. Tie In to Division				
T-Wall - N. Tie In to Division: Main E. Side	0	SF	$ 64.00	$ -
T-Wall - N. Tie In to Division:: Main W. Side	0	SF	$ 64.00	$ -
Select Backfill - N. Tie to Division	0	CY	$ 15.00	$ -
Embnt - N Tie In to Division: Main Trk	11,000	CY	$ 4.00	$ 44,000
Excvtn - N. Tie In to Division: MainTrk	0	CY	$ 8.00	$ -
Subtotal				**$ 44,000**
Double Main Trk Walls and Grading: Division to Chestnut				
T-Wall - Division to Chestnut: Main E. Side	24,000	SF	$ 64.00	$ 1,536,000
T-Wall - Division to Chestnut: Main W. Side	61,000	SF	$ 64.00	$ 3,904,000
Select Backfill - Division to Chestnut: Main Trk	84,000	CY	$ 15.00	$ 1,260,000
Subtotal				**$ 6,700,000**
Double Main Trk Walls and Grading: Chestnut to Cherry Grd Sep				
T-Wall - Chestnut to Cherry Tie In: Main E. Side	48,300	SF	$ 64.00	$ 3,091,200
T-Wall - Chestnut to Cherry Tie In: Main W. Side	42,300	SF	$ 64.00	$ 2,707,200
Select Backfill - Chestnut to Cherry Tie In: Main Trk	81,000	CY	$ 15.00	$ 1,215,000
Subtotal				**$ 7,013,400**
Double Main Trk Walls and Grading: Cherry Grd Sep to S. Tie In				
T-Wall - M/L East Addition for S. Cherry St. Grade Sep Approach	7,500	SF	$ 64.00	$ 480,000
T-Wall - M/L West Addition for S. Cherry St. Grade Sep Approach	9,400	SF	$ 64.00	$ 601,600
Select Backfill - S. Cherry St M/L Grade Sep Approach	21,000	CY	$ 15.00	$ 315,000
Embkm't - Cherry St Grade Sep to S. Tie In: M/L	3,100	CY	$ 4.00	$ 12,400
Excvtn - Cherry St Grade Sep to S. Tie In: M/L	2,800	CY	$ 8.00	$ 22,400
Subtotal				**$ 1,432,000**

S Cherry St Ind'y Track Ramp and Connections					
Remove Trk - S. Cherry Ind'y Track		500	TF	$ 25.00	$ 12,500
T-Wall for Ind'y Tr Approach S. of Cherry		7,500	SF	$ 64.00	$ 480,000
Select Fill - Ind'y Trk Connection S. of Cherry		3,000	CY	$ 15.00	$ 45,000
Grading - Ind'y Trk Connection S. of Cherry		10,500	CY	$ 4.00	$ 42,000
Subballast (new) - Ind'y Trk Connection S. of Cherry		1,400	CY	$ 35.00	$ 49,000
Industry Trk Connection - Shoofly		500	TF	$ 45.00	$ 22,500
	Subtotal				**$ 651,000**
Main Track Construction - North Tie In to South Tie In					
Mainline Subballast		12,400	CY	$ 35.00	$ 434,000
Mainline Track		12,900	TF	$ 145.00	$ 1,871,000
Remove Shoofly Trk N/R for Ind'y Trk Leads		7,300	TF	$ 25.00	$ 182,500
Remove Shoofly Subballast N/R for Ind'y Trk Leads		7,000	CY	$ 4.00	$ 28,000
Mainline Signal Modifications		1	LS	$ 1,100,000.00	$ 1,100,000
	Subtotal				**$ 3,616,000**
West Side Ind'y Trk Ramp and Connections					
Remove Shoofly Trk in Conflict with Ramp		1,600	TF	$ 25.00	$ 40,000
Remove Indy Trk Connections		800	TF	$ 25.00	$ 20,000
Remove Subballast - Shoofly Ramp		1,500	CY	$ 4.00	$ 6,000
T-Wall - Raise Shoofly Wall to Accommodate Ind'y Trk Ramp		10,000	SF	$ 64.00	$ 640,000
Select Backfill - Ind'y Trk Ramp		10,000	CY	$ 15.00	$ 150,000
M/L TO - Indy Trk Connection		1	EA	$ 150,000.00	$ 150,000
Subballast (recycled) - West Side Ind'y Trk Connections		1,500	CY	$ 4.00	$ 6,000
Industry Trk Ramp Swithcing Lead Connection - Shoofly		1,600	TF	$ 45.00	$ 72,000
Replace Industry Trk TO Connections - Shoofly		800	TF	$ 45.00	$ 36,000
	Subtotal				**$ 1,120,000**
3M Ind'y Trk Connection					
T-Wall - 3M Connection Ramp		5,000	SF	$ 64.00	$ 320,000
Select Backfill - 3M Connection Ramp		3,000	CY	$ 15.00	$ 45,000
Replace Ind'y Trk Connectiion		500	TF	$ 45.00	$ 23,000
Reinstall M/L TO - Indy Trk Connection		1	EA	$ 25,000.00	$ 25,000
	Subtotal				**$ 413,000**
Sutherland Lumber Ind'y Trk Ramp and Connection					
Remove Trk - Shoofly Trk		1,300	TF	$ 25.00	$ 32,500
Excvt'n - Remove Subballlast: Shoofly		1,300	CY	$ 4.00	$ 5,200
T-Wall - Sutherland Ind'y Trk Connection Ramp		10,600	SF	$ 64.00	$ 678,400
Select Backfill (recycled) - Sutherland Ind'y Track Connection		10,200	CY	$ 15.00	$ 153,000
Embkm't - Accommodate New Ind'y Trk Connection		1,400	CY	$ 4.00	$ 5,600
Subballast (recycled) - Sutherland Indy Track Connection		1,300	CY	$ 4.00	$ 5,200
Reinstall M/L TO - Sutherland Connection		1	EA	$ 25,000.00	$ 25,000
Industry Connection Trk- Reinstall Shoofly		1,300	TF	$ 45.00	$ 58,500
	Subtotal				**$ 964,000**
Structures					
Double Trk Br Underpass - Division St		160	LF	$ 7,500.00	$ 1,200,000
Double Trk Br Underpass - E Chestnut Expwy		160	LF	$ 7,500.00	$ 1,200,000
Double Trk Br Underpass - Cherry St.		1	LS	$ 1,400,000.00	$ 1,400,000
	Subtotal				**$ 3,800,000**
Site Improvements					
ROW Drainage Improvements		12,900	LF	$ 30.00	$ 387,000
Seeding and Landscaping		18	AC	$ 5,000.00	$ 90,000
	Subtotal				**$ 477,000**
	Project Total: North Tie In to South Tie In (Includes Cherry St Grade Sep in Original Construction)				**$ 34,565,400**

Drainage

Storm Sewer Outlet Costs

Work Item	Quantity Division	Quantity Chestnut	Quantity Cherry	Unit	Unit Cost	Cost Division	Cost Chestnut	Cost Cherry
Roadway Improvements								
Bored 24" tunnel w/ 18" carrier pipe*	1,250	400	0	L.F.	$ 600.00	$ 750,000	$ 240,000	$ -
18" storm sewer (cut & cover)	2,350	0	1,200	L.F.	$ 34.00	$ 79,900	$ -	$ 40,800
Trench Excavation in Rock	3,430	0	1,980	CU. YD.	$ 30.00	$ 102,900	$ -	$ 59,400
18" Outlet	1	1	1	L.S.	$ 1,500.00	$ 1,500	$ 1,500	$ 1,500
Surface Restoration (5' width)	1,420	0	0	Sq. Yd.	$ 58.00	$ 82,360	$ -	$ -
Outlet Construction Subtotals:						**$ 1,017,000**	**$ 242,000**	**$ 102,000**

* Price calculated using 2004 R.S. Means
Heavy Construction Cost Data:
Microtunneling, 24"-48" @ $640/ft. (Assume $560/ft.)
Carrier Pipe @ $40/ft.

Pythian Street Connector

PYTHIAN STREET CONNECTOR COSTS

Work Item	Quantity	Unit	Unit Cost	Cost
Roadway Improvements				
Demolition & Removal of Improvements	1	L.S.	$ 12,000.00	$ 12,000
Excavation (Roadway - Unclassified Material)	4,300	CU. YD.	$ 8.00	$ 34,400
Embankment	6,880	CU. YD.	$ 6.00	$ 41,300
Pavement - 11" P.C.C. (Mainline)	0	SQ. YD.	$ 58.00	$ -
Pavement - 8" P.C.C. (Sideroads & Connections)	6,120	SQ. YD.	$ 49.00	$ 299,900
Pavement - 7" Asphalt (Entrances & Connections)	0	SQ. YD.	$ 29.00	$ -
Concrete Curb & Gutter	3,440	L.F.	$ 16.00	$ 55,100
Concrete Sidewalk - 4" Thick	2,300	SQ. YD.	$ 26.00	$ 59,800
Aggregate Base Course, 4"	6,900	SQ. YD.	$ 4.80	$ 33,200
Storm Drainage	1,700	L.F.	$ 50.00	$ 85,000
Storm Inlets	10	EACH	$ 1,500.00	$ 15,000
Storm Outlet (Bored and Cut & Cover)	0	L.S.	$ -	$ -
Traffic Signals (@ Ingram Mill)	0	EACH	$ 150,000.00	$ -
Seeding and Landscaping	1	L.S.	$12,000.00	$ 12,000
Roadway Construction Subtotal:				**$ 647,700**

Cherry Street Alternate 1

CHERRY STREET IMPROVEMENTS - ALTERNATE NO. 1

Work Item	Quantity	Unit	Unit Cost	Cost
Roadway Improvements				
Demolition & Removal of Improvements	1	L.S.	$ 12,000.00	$ 12,000
Excavation (Roadway - Unclassified Material)	21,100	CU. YD.	$ 8.00	$ 168,800
Embankment	500	CU. YD.	$ 6.00	$ 3,000
Pavement - 11" P.C.C. (Void)	0	SQ. YD.	$ 58.00	$ -
Pavement - 8" P.C.C. (Sideroads & Connections)	7,500	SQ. YD.	$ 49.00	$ 367,500
Pavement - 7" Asphalt (Entrances & Connections)	930	SQ. YD.	$ 29.00	$ 27,000
Concrete Curb & Gutter	2,700	L.F.	$ 16.00	$ 43,200
Concrete Sidewalk - 4" Thick	1,800	SQ. YD.	$ 26.00	$ 46,800
Aggregate Base Course, 4"	9,500	SQ. YD.	$ 4.80	$ 45,600
Storm Drainage	910	L.F.	$ 50.00	$ 45,500
Storm Inlets	8	EACH	$ 1,500.00	$ 12,000
Storm Outlet (Bored and Cut & Cover)	1	L.S.	$ 102,000.00	$ 102,000
Traffic Signals (@ Ingram Mill)	0	EACH	$ 150,000.00	$ -
Seeding and Landscaping	1	L.S.	$8,000.00	$ 8,000
Structural Improvements				
Roadway Bridges (1 Bridge)	0	SQ.FT.	$ 80.00	$ -
Excavation (Structural/MSE Wall)	1,030	CU YD	$ 32.00	$ 32,960
Structural Backfill (Granular)	780	CU YD	$ 18.00	$ 14,040
MSE Walls	3,480	SQ.FT.	$ 45.00	$ 156,600
Roadway Construction Subtotal:				**$ 1,085,000**

East Chestnut Expressway Alternate 6 – 4-Lanes

EAST CHESTNUT EXPRESSWAY IMPROVEMENTS - ALTERNATE NO. 6

Work Item	Quantity	Unit	Unit Cost	Cost
Roadway Improvements				
Demolition & Removal of Improvements	1	L.S.	$ 150,000.00	$ 150,000
Excavation (Roadway - Unclassified Material)	42,700	CU. YD.	$ 8.00	$ 341,600
Embankment	1,000	CU. YD.	$ 6.00	$ 6,000
Pavement - 11" P.C.C. (Mainline)	11,600	SQ. YD.	$ 58.00	$ 672,800
Pavement - 8" P.C.C. (Sideroads & Connections)	4,240	SQ. YD.	$ 49.00	$ 207,800
Pavement - 7" Asphalt (Entrances & Connections)	2,990	SQ. YD.	$ 29.00	$ 86,800
Concrete Curb & Gutter	3,360	L.F.	$ 16.00	$ 53,800
Concrete Sidewalk - 4" Thick	1,870	SQ. YD.	$ 26.00	$ 48,700
Aggregate Base Course, 4"	21,100	SQ. YD.	$ 4.80	$ 101,300
Storm Drainage	1,410	L.F.	$ 50.00	$ 70,500
Storm Inlets	12	EACH	$ 1,500.00	$ 18,000
Storm Outlet (Bored and Cut & Cover)	1	L.S.	$ 242,000.00	$ 242,000
Traffic Signals (@ Ingram Mill)	1	EACH	$ 150,000.00	$ 150,000
Seeding and Landscaping	1	L.S.	$ 25,000.00	$ 25,000
Structural Improvements				
Roadway Bridges	0	SQ.FT.	$ 80.00	$ -
Excavation (Structural/MSE Wall)	6,980	CU YD	$ 32.00	$ 223,400
Structural Backfill (Granular)	5,240	CU YD	$ 18.00	$ 94,400
MSE Walls	15,700	SQ.FT.	$ 45.00	$ 706,500
Roadway Construction Subtotal:				**$ 3,198,600**

Division Street Alternate 2

DIVISION STREET IMPROVEMENTS - ALTERNATE NO. 2

Work Item	Quantity	Unit	Unit Cost	Cost
Roadway Improvements				
Demolition & Removal of Improvements	1	L.S.	$ 65,000.00	$ 65,000
Excavation (Roadway - Unclassified Material)	64,250	CU. YD.	$ 8.00	$ 514,000
Embankment	1,000	CU. YD.	$ 4.00	$ 4,000
Pavement - 11" P.C.C. (Mainline)	14,590	SQ. YD.	$ 58.00	$ 846,300
Pavement - 8" P.C.C. (Sideroads & Connections)	2,135	SQ. YD.	$ 49.00	$ 104,700
Pavement - 7" Asphalt (Entrances & Connections)	5,320	SQ. YD.	$ 29.00	$ 154,300
Concrete Curb & Gutter	4,480	L.F.	$ 16.00	$ 71,700
Concrete Sidewalk - 4" Thick	2,990	SQ. YD.	$ 26.00	$ 77,800
Aggregate Base Course, 4"	24,700	SQ. YD.	$ 4.80	$ 118,600
Storm Drainage	2,290	L.F.	$ 50.00	$ 114,500
Storm Inlets	18	EACH	$ 1,500.00	$ 27,000
Storm Outlet (Bored and Cut & Cover)	1	L.S.	$ 1,017,000	$ 1,017,000
Traffic Signals	0	EACH	$ 150,000	$ -
Seeding and Landscaping	1	L.S.	$ 25,000	$ 25,000
Structural Improvements				
Roadway Bridges (1 Bridge)	0	SQ.FT.	$ 80.00	$ -
Excavation (Structural/MSE Wall)	18,440	CU YD	$ 32.00	$ 590,100
Structural Backfill (Granular)	13,830	CU YD	$ 18.00	$ 249,000
MSE Walls	31,120	SQ.FT.	$ 45.00	$ 1,400,400
Roadway Construction Subtotal:				**$ 5,379,400**

Summary Railroad Construction Costs Cherry Not included –

GRADE SEPARATIONS (CHERRY ST. PHASED IN FUTURE) - CONCEPTUAL CONSTRUCTION COSTS

Work Item	*Division Alt. 2*	*Chestnut Alternate 6*	*Cherry Alt. 1*	*Pythian Connector*
Roadway Improvements				
Demolition & Removal of Improvements	$ 65,000	$ 150,000	$ 12,000	$ 12,000
Excavation (Roadway - Unclassified Material)	$ 514,000	$ 341,600	$ 168,800	$ 34,400
Embankment	$ 4,000	$ 6,000	$ 3,000	$ 41,300
Pavement - 11" P.C.C. (Mainline)	$ 846,300	$ 672,800	$ -	$ -
Pavement - 8" P.C.C. (Sideroads & Connections)	$ 104,700	$ 207,800	$ 367,500	$ 299,900
Pavement - 7" Asphalt (Entrances & Connections)	$ 154,300	$ 86,800	$ 27,000	$ -
Concrete Curb & Gutter	$ 71,700	$ 53,800	$ 43,200	$ 55,100
Concrete Sidewalk - 4" Thick	$ 77,800	$ 48,700	$ 46,800	$ 59,800
Aggregate Base Course, 4"	$ 118,600	$ 101,300	$ 45,600	$ 33,200
Storm Drainage	$ 114,500	$ 70,500	$ 45,500	$ 85,000
Storm Inlets	$ 27,000	$ 18,000	$ 12,000	$ 15,000
Storm Outlet (Bored and Cut & Cover)	$ 1,017,000	$ 242,000	$ 102,000	$ -
Traffic Signals (Chestnut @ Ingram Mill)	$ -	$ 150,000	$ -	$ -
Seeding and Landscaping	$ 25,000	$ 25,000	$ 8,000	$ 12,000
Structural Improvements				
Excavation (Structural/MSE Wall)	$ 590,100	$ 223,400	$ 32,960	$ -
Structural Backfill (Granular)	$ 249,000	$ 94,400	$ 14,040	$ -
MSE Walls	$ 1,400,400	$ 706,500	$ 156,600	$ -
Roadway Construction Subtotals:	**$ 5,379,400**	**$ 3,198,600**	**$ 1,085,000**	**$ 647,700**
Work Zone Traffic Control (Est. @ 2% of Roadway Construction):	$ 107,600	$ 64,000	$ 21,700	$ -
Construction Staging & Shoring (Est. @ 7% of Roadway Construction):	$ 376,600	$ 223,900	$ 76,000	$ -
Roadway Construction Grand Totals:	**$ 5,864,000**	**$ 3,487,000**	**$ 1,183,000**	**$ 648,000**
Grade Separation Option Grand Totals:		***$11,182,000***		
Potential savings for omission of MSE walls (assumes 75% of wall cost recovered):	($1,831,000)	($837,000)	($166,000)	($0)
		($2,834,000)		

Division and Chestnut Railroad Improvements	
North Tie In to Cherry St.	*Cost*
Intial Shoofly Construction	$ 6,822,000
Double Main Trk Walls and Grading: N. Tie In to Division	$ 44,000
Double Main Trk Walls and Grading: Chestnut to Cherry Tie In	$ 6,700,000
Double Main Trk Walls and Grading: Chestnut to Cherry Tie In	$ 3,800,000
Main Track Construction - North Tie to Cherry St. Tie In	$ 3,060,000
West Side Ind'y Trk Ramp and Connections	$ 1,120,000
3M Ind'y Trk Connection	$ 413,000
Sutherland Lumber Ind'y Trk Ramp and Connection	$ 410,000
Structures	$ 2,400,000
Site Improvements	$ 402,000
Railroad Construction Total: North Tie In to Cherry St. Tie In	$ 25,171,000
Roadway Engr'g & Construction Services -12%	$ 1,200,000
Railroad Engr'g & Construction Services - 12%	$ 3,021,000
Roadway Construction Contingency - (25%)	$ 2,800,000
Railroad Construction Contingency - (25%)	$ 7,048,000
Land Acquisition: R/W, Easments, Relocations & Buy-Outs	
Utility Modifications	$ 4,892,000
Division and Chestnut Street Grade Sep Grand Total	**$ 54,131,000**

Summary Railroad Construction Costs Cherry Not included – continued

Cherry St Grade Sep - Phased Addition	
Shoofly Construction	$ 2,841,000
Double Main Track Walls and Grading	$ 5,568,800
Main Track Construction - Cherry St. Grade Sep Addition	$ 417,500
Recreate Sutherland Ind'y Trk Connection	$ 1,484,000
Structures	$ 1,400,000
Site Improvements	$ 60,000
Railroad Construction Total: Cherry St. Grade Separation	$ 11,772,000
Roadway Engr'g & Construction Services -12%	$ 142,000
Railroad Engr'g & Construction Services - 12%	$ 1,413,000
Roadway Construction Contingency - (25%)	$ 332,000
Railroad Construction Contingency - (25%)	$ 3,297,000
Land Acquisition: R/W, Easments, Relocations & Buy-Outs	
Utility Modifications	$ 1,026,000
Cherry St Grade Sep Addition	**$ 19,165,000**
Total Project Costs	***$ 73,296,000***

Summary Railroad Construction Costs Cherry Street included

GRADE SEPARATIONS (CHERRY ST. INCLUSIVE) - CONCEPTUAL CONSTRUCTION COSTS

Work Item	*Division Alt. 2*	*Chestnut Alternate 6*	*Cherry Alt. 1*	*Pythian Connector*
Roadway Improvements				
Demolition & Removal of Improvements	$ 65,000	$ 150,000	$ 12,000	$ 12,000
Excavation (Roadway - Unclassified Material)	$ 514,000	$ 341,600	$ 168,800	$ 34,400
Embankment	$ 4,000	$ 6,000	$ 3,000	$ 41,300
Pavement - 11" P.C.C. (Mainline)	$ 846,300	$ 672,800	$ -	$ -
Pavement - 8" P.C.C. (Sideroads & Connections)	$ 104,700	$ 207,800	$ 367,500	$ 299,900
Pavement - 7" Asphalt (Entrances & Connections)	$ 154,300	$ 86,800	$ 27,000	$ -
Concrete Curb & Gutter	$ 71,700	$ 53,800	$ 43,200	$ 55,100
Concrete Sidewalk - 4" Thick	$ 77,800	$ 48,700	$ 46,800	$ 59,800
Aggregate Base Course, 4"	$ 118,600	$ 101,300	$ 45,600	$ 33,200
Storm Drainage	$ 114,500	$ 70,500	$ 45,500	$ 85,000
Storm Inlets	$ 27,000	$ 18,000	$ 12,000	$ 15,000
Storm Outlet (Bored and Cut & Cover)	$ 1,017,000	$ 242,000	$ 102,000	$ -
Traffic Signals (Chestnut @ Ingram Mill)	$ -	$ 150,000	$ -	$ -
Seeding and Landscaping	$ 25,000	$ 25,000	$ 8,000	$ 12,000
Structural Improvements				
Excavation (Structural/MSE Wall)	$ 590,100	$ 223,400	$ 32,960	$ -
Structural Backfill (Granular)	$ 249,000	$ 94,400	$ 14,040	$ -
MSE Walls	$ 1,400,400	$ 706,500	$ 156,600	$ -
Roadway Construction Subtotals:	**$ 5,379,400**	**$ 3,198,600**	**$ 1,085,000**	**$ 647,700**
Work Zone Traffic Control (Est. @ 2% of Roadway Construction):	$ 107,600	$ 64,000	$ 21,700	$ -
Construction Staging & Shoring (Est. @ 7% of Roadway Construction):	$ 376,600	$ 223,900	$ 76,000	$ -
Roadway Construction Grand Totals:	**$ 5,864,000**	**$ 3,487,000**	**$ 1,183,000**	**$ 648,000**
Grade Separation Option Grand Totals:		***$11,182,000***		
Potential savings for omission of MSE walls (assumes 75% of wall cost recovered):	($1,831,000)	($837,000)	($166,000)	($0)
		($2,834,000)		

Railroad Improvements - North Tie In to South Tie In

	Cost
Intial Shoofly Construction	$ 8,335,000
Double Main Trk Walls and Grading: N. Tie In to Division	$ 44,000
Double Main Trk Walls and Grading: Division to Chestnut	$ 6,700,000
Double Main Trk Walls and Grading: Chstn't to Cherry Grd Sep	$ 7,013,400
Double Main Trk Walls and Grdng: Chr'y Grd Sep to S. Tie In	$ 1,432,000
S Cherry St Ind'y Track Ramp and Connections	$ 651,000
Main Track Construction - North Tie In to South Tie In	$ 3,616,000
West Side Ind'y Trk Ramp and Connections	$ 1,120,000
3M Ind'y Trk Connection	$ 413,000
Sutherland Lumber Ind'y Trk Ramp and Connection	$ 964,000
Structures	$ 3,800,000
Site Improvements	$ 477,000
Railroad Construction Total: North Tie In to South Tie In	**$ 34,565,400**
Roadway Engr'g & Construction Services -12%	$ 1,342,000
Railroad Engr'g & Construction Services - 12%	$ 4,148,000
Roadway Construction Contingency - (25%)	$ 3,131,000
Railroad Construction Contingency - (25%)	$ 9,679,000
Land Acquisition: R/W, Easments, Relocations & Buy-Outs	
Utility Modifications	$ 5,918,000
Division and Chestnut Street Grade Sep Grand Total	**$69,965,400**
	$67,131,400.00

Section 8

8 Funding Options

The development of funding options for a project such as this requires a clear understanding of the project design parameters in conjunction with the:

1. Development of regional economic impact analyses emanating from positive rail relocation, reconfiguration and grade separations and;
2. Development of a conceptual menu of public-private sector funding options relevant to achieving the objectives of total project implementation over a ten-year Capital Improvement Program project horizon.

Significant use is made of recent Federal Transportation Reauthorization Legislation known as SAFETEA-LU, passed and signed into law by the President on August 10, 2005. The effort proceeds with a description of the total set of funding opportunities which may be considered for each component major project of the Springfield reconfiguration and grade separation project, including notation of local and private sector funding opportunities capable of being integrated with such Federal legislation. Costs for the component projects in this study are stated, as detailed from the above report, in conjunction with the phasing schedule developed by the Consulting team with consensus of the City. Finally, a subset of the above are presented as recommended options for consideration for implementation.

MAJOR STUDY PROJECT COMPONENTS-RELATED COSTS

The Study addresses two major component project arenas requiring major implementation and funding resources. They are the Jordan Valley-West Meadows Park component and the individual grade separations at Division Street, the East Chestnut Expressway and the related Cherry Street grade separation. In addition, commentary is offered on resolution of the James River Freeway crossing problem currently being addressed under other study programs, with notation of likely future usage of rail line in that vicinity.

Jordan Valley-West Meadows Park

This 60-acre major rail yard in the near downtown vicinity has significant quality of life potential for the City, conditioned on the relocation of the major interchange yard which exist in its locus. The engineering proposal described in Chapter 6 of the report calls for removal of a significant portion of trackage and relocation of a new interchange yard and storage tracks south of Wall Street as illustrated in Figure 22 – "West Meadows Reconfiguration – Recommended Track Reconfiguration," on Page 6-21 of the report. The entirety of available resulting free space would be converted into a major urban park, with trails, vegetation, wetlands, and a stream and pond focal point. It is perceived some multi-family development will occur on the edges of this development, due to its proposed aesthetics and resultant urban landscape view.

Grade Separations: Division, Chestnut And Cherry

The three grade separations, Division Street, East Chestnut Expressway and Cherry Street, are key to reducing at-grade street travel – rail conflicts on the eastern edge of the City. These conflicts are significant, and result in notable auto travel time delay and congestion as will be referenced further in the study. Solutions for each of the above sites are conceptually illustrated within Section 7. They call for a combination of depressing the roadway to a lower street profile and raising the rail line to a higher profile yielding a pure grade separation with no surface conflict points between rail and surface street traffic. They represent a marked improvement in regional travel capabilities for both street and rail in the Greater Springfield Region, and a highly improved visual and aesthetic environment. Further, a reduced train/vehicle/pedestrian exposure results for the community.

Related Costs

The engineering analysis has detailed the following costs for the above components:

Jordan Valley – West Meadows Park	$ 38,500,000
All Grade Separations	$ 70,000,000
Total Program Costs	$108,500,000

Call $110,000,000 for funding analysis purposes.

The above costs of $110,000,000 will be used throughout the rest of this discussion as the target value upon which to relate funding strategies and Appropriations.

Basic Funding Options Commentary

The table below illustrates potential Federal, State and private sector programs which may be considered options for development of a funding menu for the above project components.

MATRIX MENU OF PRELIMINARY FUNDING OPTIONS

PROJECT	CLASSIC LINE ITEM APPROPRIATIONS	HWY. SAFETY-RAIL GRADE CROSSING SAFETEA-LU COMPONENT	FREIGHT INTERMODAL DISTRIBUTION PILOT PROGRAM	RAIL LINE RELOCATION CAPITAL GRANT PROGRAM	FEDERAL PRIVATE ACTIVITY BONDS	FEDERAL RAIL REHAB. & IMPROVE. FIN. LOANS	LOCAL MUNY BOND PROGRAM	U. S. DEPT. OF INTERIOR	MO. DNR - CONSERV. COMM.
Jordan Valley - West Meadows Park	X		X	X	X		X	X	X
Division Street Grade Separation	X	X		X		X	X		
East Chestnut Street Expressway Grade Separation	X	X		X		X	X		
Related Cherry Street Grade Separation	X	X		X		X	X		
James River Alternative Status Quo - Relation to Potential Urban Transit	X								

Table 6 - Matrix of Preliminary Funding Options

It should be noted that the most recent Federal Transportation Reauthorization Legislation, referenced above as SAFETEA-LU, has the strongest rail-specific set of funding opportunities ever made available in a public transportation legislative format. The Staggers Rail Reauthorization Act of 1980 yielded very broad policy changes for rail economic reorganization in the U.S. However, SAFETEA-LU goes further to offer specific project level potentials for funding. This can be particularly helpful for an emerging relocation program, as currently in formulation in the City of Springfield. The options for consideration are as follows:

1. Use of a Classic Line Item Appropriation for Segments of Rail Relocation – particularly those areas involving pure grade separations and potential bridge overpasses. U.S. DOT discretionary money may be appropriate. This is a traditional approach, used in conjunction with targeted Congressional Representative and Senatorial delegation processing of a request for funding in the annual Appropriations Bill. It should be noted that any or all of the rail relocation effort and associated implications for surface roadway relocation and related traffic operations may be eligible for annual discretionary appropriations line item activity.

2. The new Highway Safety Improvement Program – Rail Grade Crossing Section of the Bill. Historically, the U.S. DOT has provided resources for rail grade crossing programs to each state; the new program, reorganized under the most recent legislation offers significantly greater resource levels and flexibility in application, with up to $220,000,000 available annually across the nation. It will be appropriate to review opportunities that may be offered in this rail grade crossing funding section, due to the current conflicts and disruptive nature of pedestrian, vehicle and business interference patterns existent in Springfield in conjunction with current daily rail travel patterns. This Federal program has commenced its organizational initiatives in calendar 2006, and offers robust funding for addressing and remedying such disruptive patterns within existent land uses.

3. Use of the Freight Intermodal Distribution Pilot Grant Program – which is a new grant program offered to the state via Federal legislation which allows the facilitation and support of initiation at state and local levels to relieve congestion and improve safety and encourage public-private partnerships in rail capital improvement efforts. Springfield would appear to uniquely qualify for this approach, given issues of local traffic congestion, safety and economic development progress now underway in the downtown area.

4. Capital Grants for Rail Line Relocation Projects - wherein Federal money is available to the state for any and all capital projects which involve realignment of the rail bed either vertically or horizontally, and such realignment is carried out for the purpose of mitigating the adverse effects of rail traffic on safety, motor vehicle traffic flow, community quality of life, or economic development. Again, Springfield would appear to be an appropriate candidate for such funding. A 10 percent match is required, payable by any non-Federal entity. This program should be reviewed by virtue of the fact that the entirety of relocation and the related necessity of vertical and/or horizontal realignment, in conjunction with trackage and overpass relocation and reconstruction could qualify for such a funding approach.

5. Utilization of Private Activity Bonds – the development of financing for components of the project by virtue of tapping the newly created $15,000,000,000 Transportation Bond Program which will be treated as tax

exempt for Federal tax purposes. This program allows the opportunity for sponsorship and issuance of such tax exempt bonds by private sector and/or not-for-profit entities including transportation modal components, community, neighborhood and industrial development organizations and foundations. It is focused on local and regional economic development related to qualified highway or surface freight facilities, including rail-truck transfer facilities. A revenue stream and repayment capabilities must be identifiable, in conjunction with due diligence review and bond counsel opinion.

6. Federal Rail Rehabilitation and Improvement Financing Loans – A new program offered in the legislation which offers loans and loan guarantees to state and local governments, without collateral with up to six years before initiation of repayment of principal, while interest accrues from date of disbursement. This program would offer an excellent credit rating for a local bond issue with such a Federal loan guarantee. In this sense, the loan guarantee program acts in the same manner as classic bond insurance does to yield a high credit rating for a Muny Bond program for the City of Springfield.

7. U. S. Department of Interior – appropriate joint funding beginning to emerge from the U.S. Department of Interior and the U.S. Department of Transportation involving development of coordinated use of open space and public facilities for transportation. While notably used for national parks and other major regional recreational areas, it is worthwhile to investigate potentials of funding for uses of urban open space in conjunction with the Springfield downtown related land use revitalization.

OVERVIEW OF ELIGIBILITY OF PROJECT COMPONENTS

It should be noted that the Jordan Valley West Meadows Park can be conceptualized as an urban park once completed, and therefore may have potential for use of U.S. Department of Interior Urban Open Space funding potentials in conjunction with some matching funds from Missouri DNR. Further potential state funding for such urban parks may exist in relation to the Missouri Conservation Commission within DNR related to wildlife preservation and proliferation. While it is noteworthy that some economic development may result immediately south of the park by virtue of aesthetic and view potential, this is difficult to calibrate at this time. However, it is conceivable the long run presence of this park may yield increased amenities relating to the entirety of downtown renewal and adjacent mixed-use development and housing, offering true economic benefits not yet capable of calibration. It is recommended further interaction and dialogue with City of Springfield development personnel be continued on this matter.

Several relevant common points are noteworthy with respect to the Division Street, East Chestnut Expressway and related Cherry Street grade separations. The highway safety – rail grade crossing component in SAFETEA-LU may not apply, since we are grade separating all sites; however, due to the large amount of money and flexibility of this program, it should be reviewed at the outset, as a first screen on all monetary potentials prior to considering other approaches. All of the projects, including Jordan Valley – West Meadows Park and the above noted specific grade separations, should be place marked with the Federal sector by virtue of formal dialogue with the Missouri Delegation with respect to possible future Appropriations. As noted in Table 6, the Jordan Valley projects on an initial screening process appear eligible for classic line item Appropriation, the freight intermodal distribution pilot program, the rail line relocation capital grant program, private activity bonds, and a local Muny Bond Program and the above noted Department of Interior – DNR parks efforts. All of the grade separations, as shown in Table 6, appear eligible for classic line item Appropriations, a rail grade crossing component, the relocation Capital Grant Program, Federal rail rehabilitation and improvement financial loans and a local Muny Bond Program. These comprehensive statements of eligibility will be refined to a subset for further recommended consideration by the City.

Previous reference to the James River grade crossing alternative has indicated that the site will be treated by redesign and reconfiguration of the interchange and the rail vertical profiles yielding a depressed rail section with pure grade elevated highway facilities. However, it is worthy to note that this particular line has long-term potential for urban transit relating to the Springfield region. There is merit in consideration of population levels and community boundaries to determine potential eligibility for the new Federal Transit Authority Small Starts Program in Transit, specifically developed in this Federal Reauthorization Legislation for cities roughly the size of Springfield.

Such pursuit of a formal transit program, while likely constructive for the City, will require awareness of the necessity to perform Federally specified urban transportation planning – transportation engineering studies, relating to travel demand, travel supply and delivery component processes, ultimately yielding compliance with MPO and TIP placement and related STIP placement issues

ECONOMIC IMPACTS

Economic impacts related to the above implementation, based on a $110,000,000 total rail relocation program, are truly significant for the Springfield region. They utilize DOT research data provided to the U.S. Congress during SAFETEA-LU Reauthorization testimonial periods which indicate that $5.70 in economic activity are generated per $1 expended in infrastructure. Over the ten year Rail Capital Improvement Program period, this yields $627,000,000 in Regional Value Added in New Dollars to Southwest Missouri and the Springfield region, generating some 5,225 estimated jobs. The bulk of the above Value Added will likely reside within the City of Springfield proper, estimated at $447,260,000 over the above Capital Improvement period.

Concurrently, worthy of isolated discussion, are the surface travel benefits resultant by virtue of eliminating rail grade crossing delays at the above noted grade crossings. Using the provided data of 40 trains per day, with an estimated 10 minute wait per train, given an 8,000 foot train length and estimated 2025 ADT traffic forecasts provided in the study, a conservative forecast of travel savings is $205,000 daily in travel, and a resultant $64,165,000 in annual travel benefits, based on a six-day week, utilizing a value of user travel time of $50 per hour, exclusive of fuel costs and wear and tear on the vehicle. Given the elimination of surface street congestion remaining after crossing gates are raised and traffic is dispersed, the grade separations could yield a forecast travel savings possibly triple the above values, depending on time of day. Thus the maximum travel delay savings could be as high as $615,000 daily and $192,495,000 annually.

OPTIONS RECOMMENDED FOR FURTHER CONSIDERATION

Table 7, see page 8-7, illustrates the first of two options recommended for further consideration for funding of the Jordan Valley-West Meadows Project. This approach utilizes a $20,000,000 Private Activity Bond in conjunction with $20,000,000 of cooperative State Rail Line Relocation Capital Grants. The Private Activity Bond eligibility exists due to the presence of a rail-truck surface freight transfer facility in the relocated yards. While its issuance is programmed for year one of the capital improvement program, it should be noted that its usage is expended over the first five years of the seven-year period of construction seasons involved with Jordan Valley. Concurrently, the capital grant program is initialized in year one at $3,000,000 and varies in levels over all seven years. The ten percent matching requirement for the grant program is met by the contribution of the private sector through the Private Activity Bond issuance. This spread of financing allows the entirety of staged hardcore yard relocation activities to be undertaken from the initial period of commencement and project engineering and be continued through site enhancement in the latter years of the stage construction. The seven-year period is warranted in light of the significant relocation of rail equipment and yard switching facilities to be performed in conjunction with simultaneous conversion of a land use site into that of an urban open space with significant natural and park like amenities. The Private Activity Bond Program, as noted above, has been developed by the U.S. DOT and the Congress to stimulate significant private participation in economic development. They are recommended in this case with the goal of stimulating the interest of the railroads and the private and community related economic development groups involved with Springfield growth. However, these private entities will be required to organize and develop a structure for revenue, repayment and collateralization of any economic development private bond issues related to such rail yard activities noted herein. In many cases, a joint private development effort, including the real estate community, private industry and the railroads coalesce to form a Rail Yard Redevelopment Authority or Coalition to achieve these activities. The U.S. Department of Transportation is significantly interested in moving community infrastructure towards this approach, in conjunction with other Federal aid that can be offered. As such, combining this approach with Federal Cooperative State Rail Grant Programs to Missouri, which can be applied for and used in the City of Springfield for relocation activities as specified in SAFETEA-LU, appears to be a worthwhile objective to move community consensus forward towards achievement of this project. Discussion with City elected and administrative leadership indicates that their perception of the capability to form such a private construct to yield the above and develop a basis for bond repayment could be difficult. As such, there is wisdom in offering another alternative which concentrates solely on grants.

ALTERNATIVE FUNDING PORTFOLIO USING PRIVATE ACTIVITY BONDS

JORDAN VALLEY - WEST MEADOWS

($'s in Milliions)

YEAR	RAIL LINE RELOCATION CAPITAL GRANT	PRIVATE ACTIVITY BONDS	PROJECT EXPENDITURE	REMAINING AVAILABLE FUNDING	CONSTRUCTION SEASONS
1	$ 3.0	$ 4.0	$ 1.5	$ 5.5	Design/R/W Acq./Permitting West Wye
2	$ 3.0	$ 4.0	$ 8.7	$ 3.8	Design/Permitting/Const - East 3rd Main & West Wye
3	$ 5.0	$ 4.0	$ 11.6	$ 1.2	Construct West 3rd Main/North Yard/Chestnut/Bennet/Sunshine Storage
4	$ 3.0	$ 4.0	$ 0.7	$ 7.5	Design/Permitting/East Connection
5*	$ 3.0	$ 4.0	$ 9.4	$ 5.1	East Connection Track
6	$ 2.0		$ 2.5	$ 4.6	North Yard Storage
7	$ 1.0		$ 4.0	$ 1.6	West Meadows Alterations
	TOTAL AVAILABLE =	$ 40.0			

* - Corresponds to Year 1 of the Grade Separations Project

Table 7 - West Meadows Funding – Private Activity Bonds

In light of the above, Table 8, see page 8-8, illustrates an alternative approach utilizing only Rail Line Relocation Capital Grants in conjunction with the State of Missouri. As noted, a $40,000,000 program is proposed, with the required ten percent of shared cost by the City of Springfield which can be through any cash, Muny Bond or in-kind related resources or donorships. While this is appealing in that it does not require debt service by any sector entity, it should be understood that the development of $36,000,000 of continual Federal grant programming over seven years of activity will require significantly visible evidence of progress towards results in this project and vigilant monitoring of all grant related activities. Further implications may be relevant to this usage, depending on how grants are employed in the grade separation program, as will be discussed immediately further in the text.

ALTERNATIVE FUNDING USING ONLY RAIL LINE RELOCATION CAPITAL GRANTS

JORDAN VALLEY - WEST MEADOWS

($'s in Milliions)

YEAR	RAIL LINE RELOCATION CAPITAL GRANT	LOCAL MATCH	PROJECT EXPENDITURE	REMAINING AVAILABLE FUNDING	CONSTRUCTION SEASONS
1	$ 6.0	$ 0.6	$ 1.5	$ 5.1	Design/R/W Acq./Permitting West Wye
2	$ 6.0	$ 0.6	$ 8.7	$ 3.0	Design/Permitting/Const - East 3rd Main & West Wye
3	$ 9.0	$ 0.6	$ 11.6	$ 1.1	Construct West 3rd Main/North Yard/Chestnut/Bennet/Sunshine Storage
4	$ 5.0	$ 0.6	$ 0.7	$ 6.0	Design/Permitting/East Connection
5*	$ 5.0	$ 0.6	$ 9.4	$ 2.2	East Connection Track
6	$ 4.0	$ 0.6	$ 2.5	$ 4.3	North Yard Storage
7	$ 1.0	$ 0.4	$ 4.0	$ 1.6	West Meadows Alterations

TOTAL AVAILABLE = $ 40.0

* - Corresponds to Year 1 of the Grade Separations Project

Table 8 - West Meadows Funding - Grants Only

Table 9, see page 8-9, illustrates the recommended portfolio for further consideration for funding of the grade separations. Treatment of the grade separations will require invocation of a shorter timeframe to achieve increased efficiency for the railroads and their utilization of two construction seasons during a calendar year to minimize downtime of main line trackage. It focuses on a heavier usage of Congressional line item Appropriations, with five years of requested Appropriations of $6,000,000 each year. In the second year, it also requires pursuit of a $15,000,000 Rail Line Relocation Grant followed by a third year grant request of $15,000,000, a fourth year request of $5,000,000 and a final grant request of $5,000,000 in the fifth year. The ten percent local match required for the $40,000,000 of capital grants, which totals $4,500,000, is suggested to be made in the first year of the capital improvement program as an up-front contribution to the entire match program. Again, this local match can be a local Muny Bond Issue or cash and in-kind contributions by state, local and private sector-railroad resources. The two subset projects do not need to begin in the same first year. In fact, it is recommended that the first project to start funding requests would be the Jordan Valley-West Meadows project followed by the start of the Grade Separation Project in year 5 to create a total development timeline of 10-years. The interface of the two projects is noted by asterisk in the year 1 for the grade separations and year 5 for the West Meadows Project.

ALTERNATIVE FUNDING PORTFOLIO USING APPROPRIATIONS & CAPITAL GRANTS

GRADE SEPARATIONS

($'s in Milliions)

YEAR	LINE ITEM APPROPRIATIONS	RAIL RELOCATION CAPITAL GRANTS	LOCAL MATCH	PROJECT EXPENDITURE	REMAINING AVAILABLE FUNDING	CONSTRUCTION SEASONS
1*	$ 6.0		$ 4.5	$ 4.5	$ 6.0	Design/Permitting
2	$ 6.0	$ 15.0		$ 20.5	$ 6.5	R/W/Utility Relocations/Pythian/Shoofly
3	$ 6.0	$ 15.0		$ 21.2	$ 6.3	Division Street
4	$ 6.0	$ 5.0		$ 15.8	$ 1.6	Chestnut Expressway
5	$ 6.0	$ 5.0		$ 10.1	$ 2.5	Cherry Street

TOTAL AVAILABLE = $ 74.5

* - Corresponds to Year 5 of the West Meadows Project

Table 9 - Grade Separations Funding – Appropriations & Capital Grants

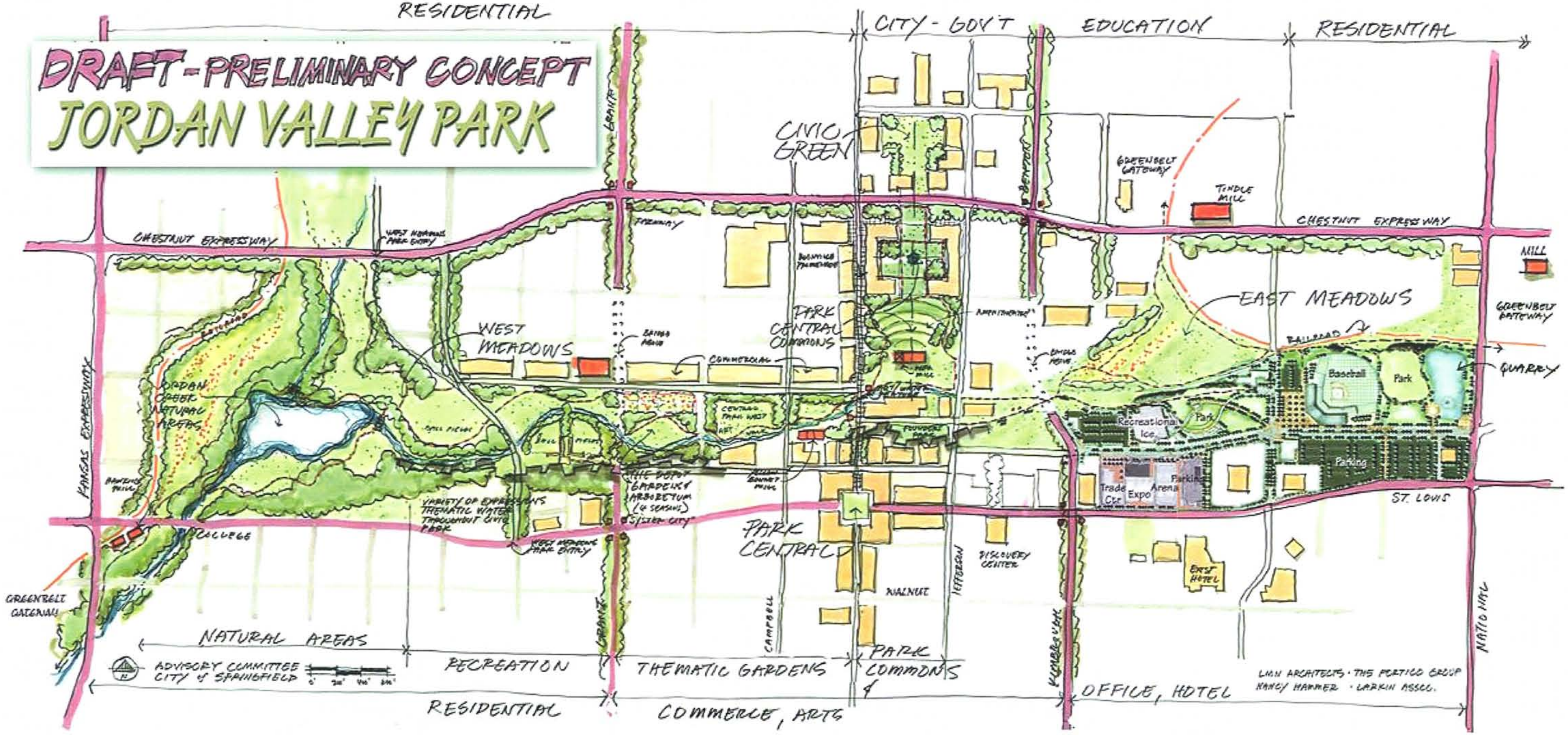
Several comments are worthy of note for City elected officials and administrators to consider with respect to ultimate pursuit of an implementation trajectory. Total dependence on grants for all aspects of Jordan Valley-West Meadows and the grade separations will yield the necessity of $76,000,000 of continuous grant requests over ten years. While this is an achievable goal, it will require continual performance towards successful implementation, and representation before the Missouri Congressional Delegation, the State Legislature and the State Department of Transportation with respect to project justification and efforts towards aggressive achievement of Appropriations in the case of the grade separations. However, it will minimize potential needs for the City of Springfield to consider formal Municipal Bond issuance for a major portion of the project and/or the need for community leadership to attempt private sector organization to move forward through Private Activity Bonds and the related organization, collateralization, and repayment issues corollary to such processes. Should a major real estate developer and/or industrial facility, possibly in conjunction with the railroads, consider the joint intermodal public-private income producing land use-logistics-warehousing opportunities possible in or near the vicinity of the rail yards, a Private Activity Bond approach may be most appropriate at some point in the future.

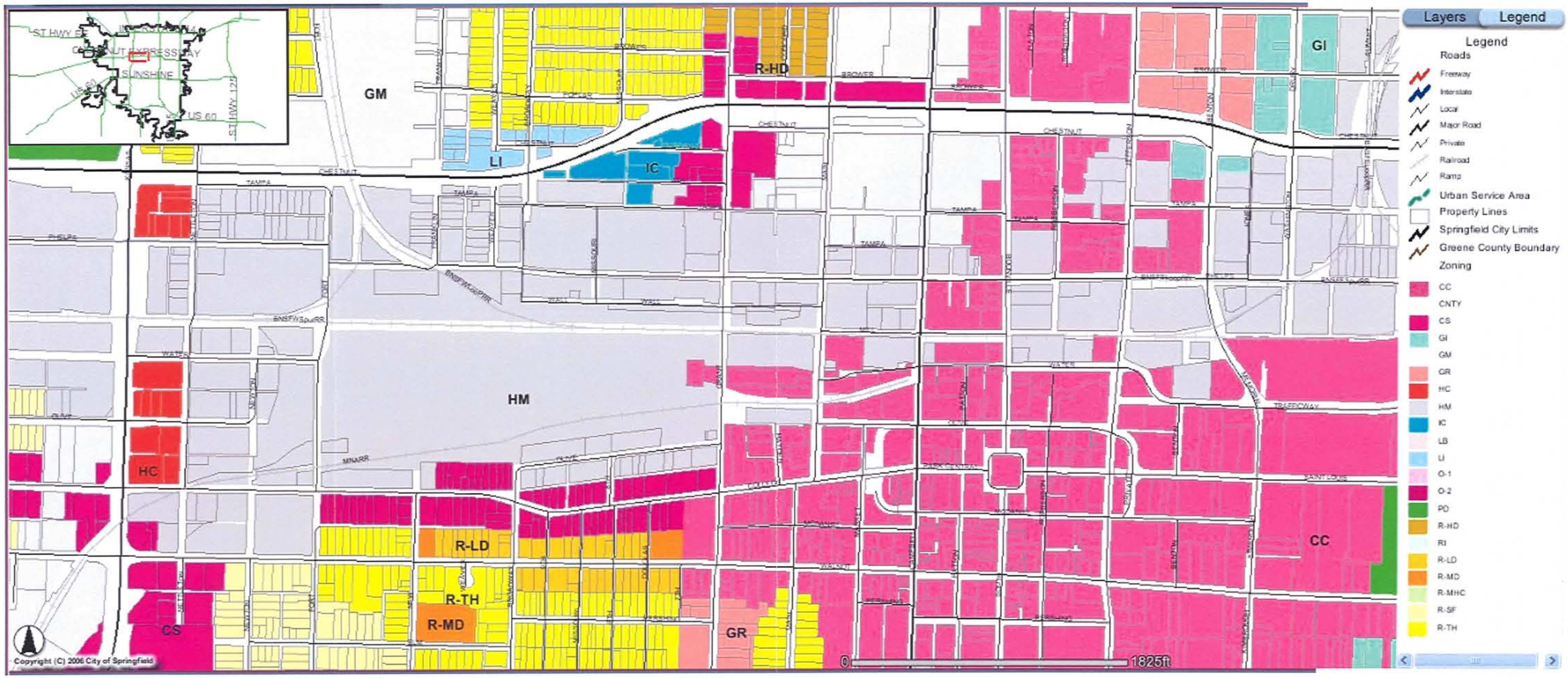
Further, it should be understood that one if not two Federal Transportation Reauthorization Bills are likely to be rewritten in the next decade of this Capital Improvement Program. Hence, close monitoring must prevail with respect to tactics and Congressional dialogue relating to line items and the potential awareness of the opportunity to secure multi-year authorization commitments for part of this project during the years that Reauthorization Bills will be rewritten. Last, it must be made clear to the railroads that their investment, in any form of participation, in the Springfield rail relocation program is an investment in the efficiency of their future and the economic health of their industry and corporate activity. As previously noted, the economic benefits for the region and surface travel are significant, and such economic impact findings must be a key part of input for Congressional working papers, Committee testimony and legislative markup. Any and all formal Municipal Bond and investment banking financial advisory work must be undertaken under appropriate NASD, SEC and MSRB regulations and all individual project and/or combinations thereof must ultimately conform to the Federal implementation processes of the MPO and will be placed on the TIP and the STIP.

CONCLUSIONS

In conclusion, it should be noted that the Springfield railroad reconfiguration and grade separation effort is a highly challenging and aggressive approach undertaken by City government. It has resulted in a series of sophisticated recommendations for engineering alternatives to achieve critically important goals for the City of Springfield. These implementation objectives may be capable of being met using a very narrow range of funding options in a creative combination which is now available through new Federal Transportation Reauthorization allowing public-private funding effort. The process will require adequate dialogue and Congressional representation. The forthcoming Memorandum of Understanding between the City of Springfield and the railroads should reflect all of the above.

The concepts developed in this study reflect a long-term vision initiated by the Vision 20/20 plan and includes the thoughts and insights offered by the general public, railroads, City of Springfield, MoDOT and a variety of other participating agencies, businesses and groups. Achieving the vision of the completed project will require incremental steps, not only to begin the process but to maintain the momentum throughout the development lifetime. Each of these incremental steps must show mutual benefits for all parties involved. The funding strategy, incremental project components and the MOU will play vital roles in achieving the vision.


DRAFT - PRELIMINARY CONCEPT
JORDAN VALLEY PARK
RESIDENTIAL
CITY - GOV'T
EDUCATION
RESIDENTIAL
CIVIC GREEN
CHESTNUT EXPRESSWAY
PARK CENTRAL COMMONS
EAST MEADOWS
WEST MEADOWS
COMMERCIAL
Baseball
Park
QUARRY
Recreational Ice
Trade Ctr
Expo
Arena
Parking
ST. LOUIS
PARK CENTRAL
COLLEGE
KANSAS EXPRESSWAY
DISCOVERY CENTER
WALNUT
JEFFERSON
CAMPBELL
KIMBROUGH
NATIONAL
GRANT
EAST HOTEL
TINDLE MILL
MILL
GREENBELT GATEWAY
NATURAL AREAS
RECREATION
THEMATIC GARDENS
PARK COMMONS
ADVISORY COMMITTEE CITY of SPRINGFIELD
RESIDENTIAL
COMMERCE, ARTS
OFFICE, HOTEL
LMN ARCHITECTS · THE PORTICO GROUP
NANCY HAMMER · LARKIN ASSOC.


Layers
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Ramp
Urban Service Area
Property Lines
Springfield City Limits
Greene County Boundary
Zoning
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CNTY
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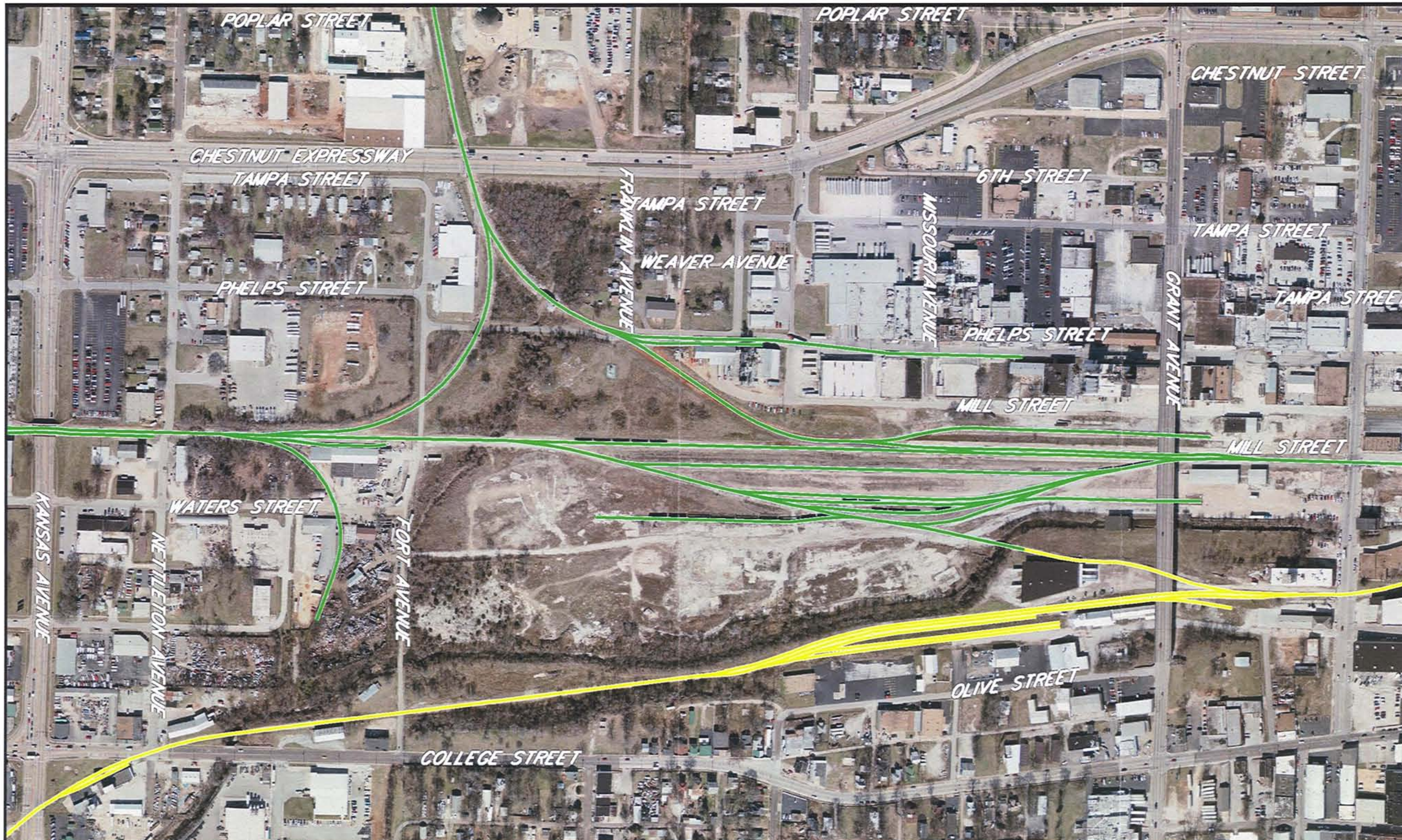


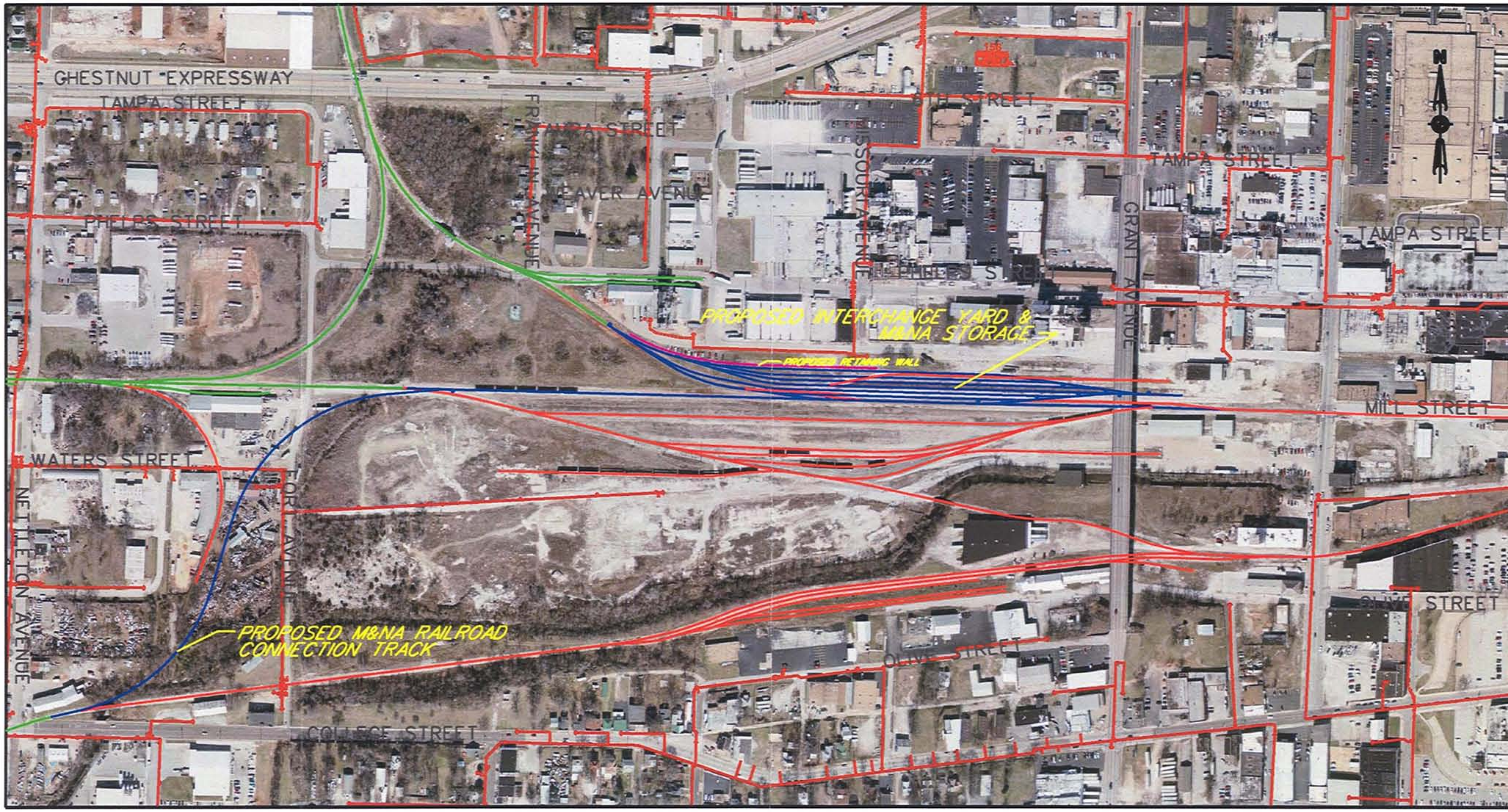
CITY of SPRINGFIELD

HANSON WILSON INCORPORATED

WEST MEADOWS TRACK OWNERSHIP
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

EXISTING BNSF
EXISTING UP/M&NA

DATE JANUARY 25, 2006



LEGEND:

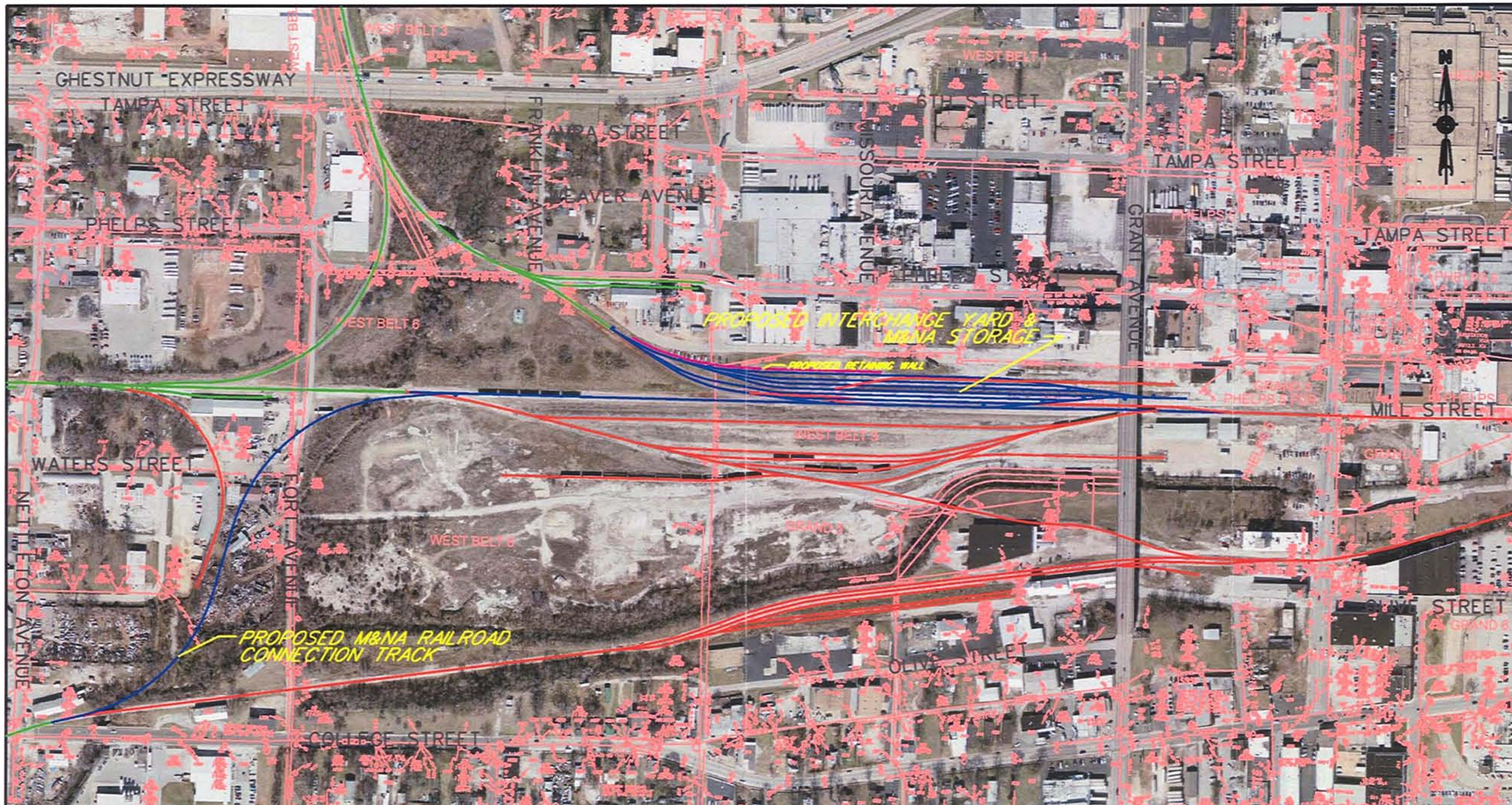
- PROPOSED TRACK
- REMOVED TRACK
- EXISTING TRACK

WEST MEADOWS PROPOSED
TRACK REARRANGEMENT AND EXISTING NATURAL GAS LINES
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

CITY of SPRINGFIELD

HANSON WILSON INCORPORATED

DATE June 5, 2006



LEGEND:

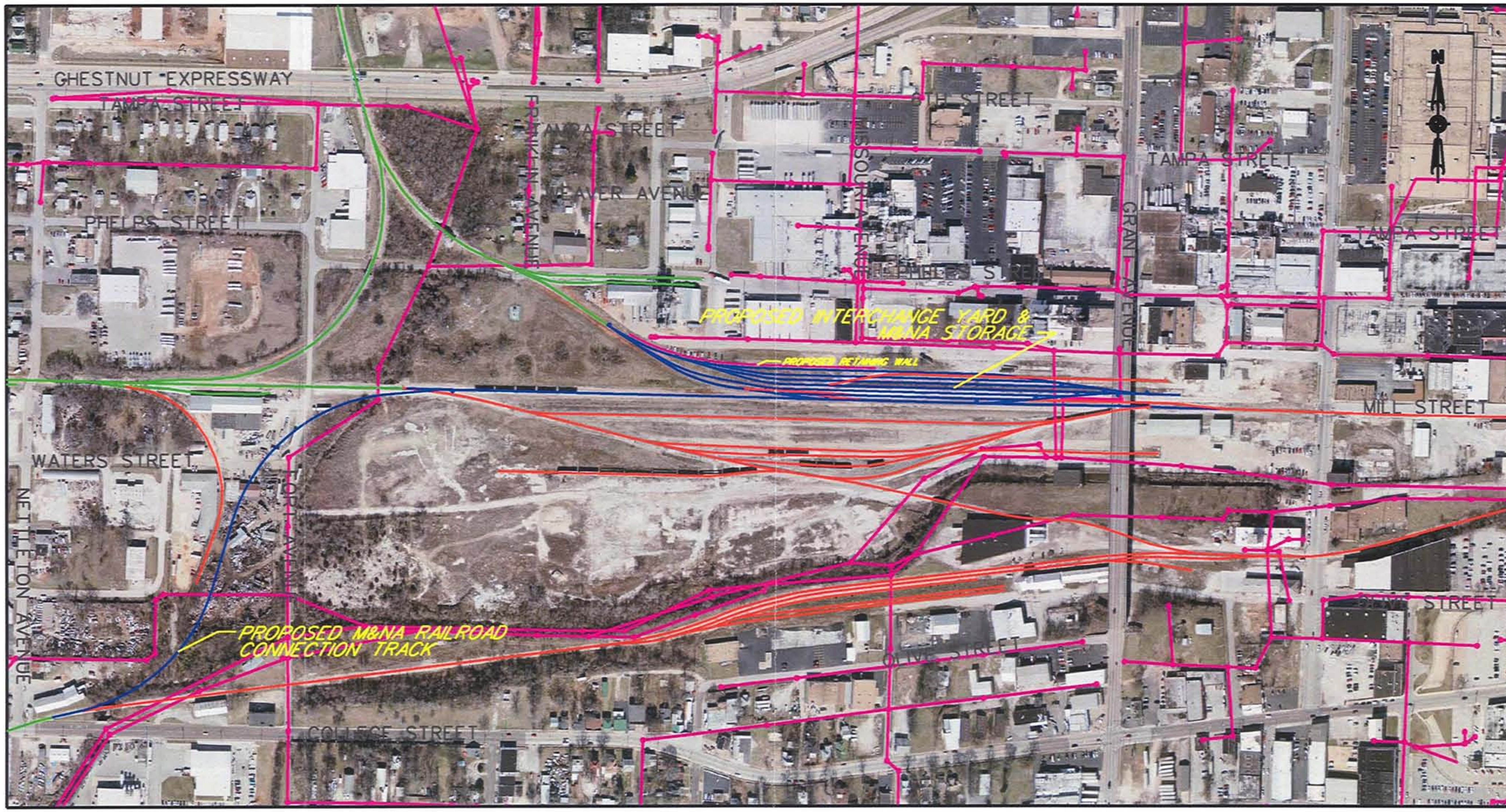
PROPOSED TRACK
REMOVED TRACK
EXISTING TRACK

WEST MEADOWS PROPOSED
TRACK REARRANGEMENT AND EXISTING ELECTRIC LINES
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

CITY of SPRINGFIELD

HANSON WILSON INCORPORATED

DATE June 5, 2006



LEGEND:

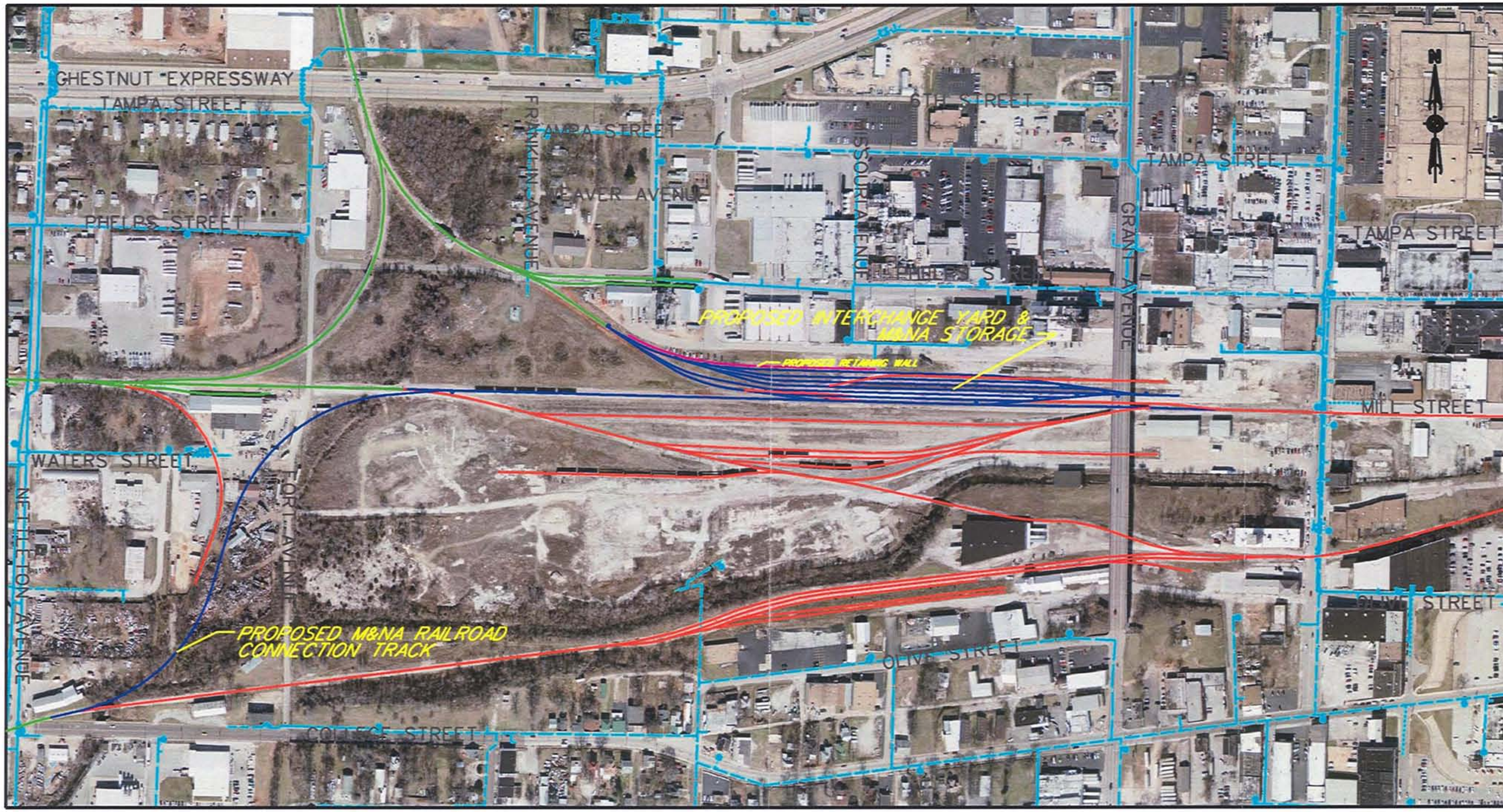
- PROPOSED TRACK
- REMOVED TRACK
- EXISTING TRACK

CITY of SPRINGFIELD

HANSON WILSON INCORPORATED

WEST MEADOWS PROPOSED
TRACK REARRANGEMENT AND EXISTING SEWER LINES
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

DATE June 5, 2006

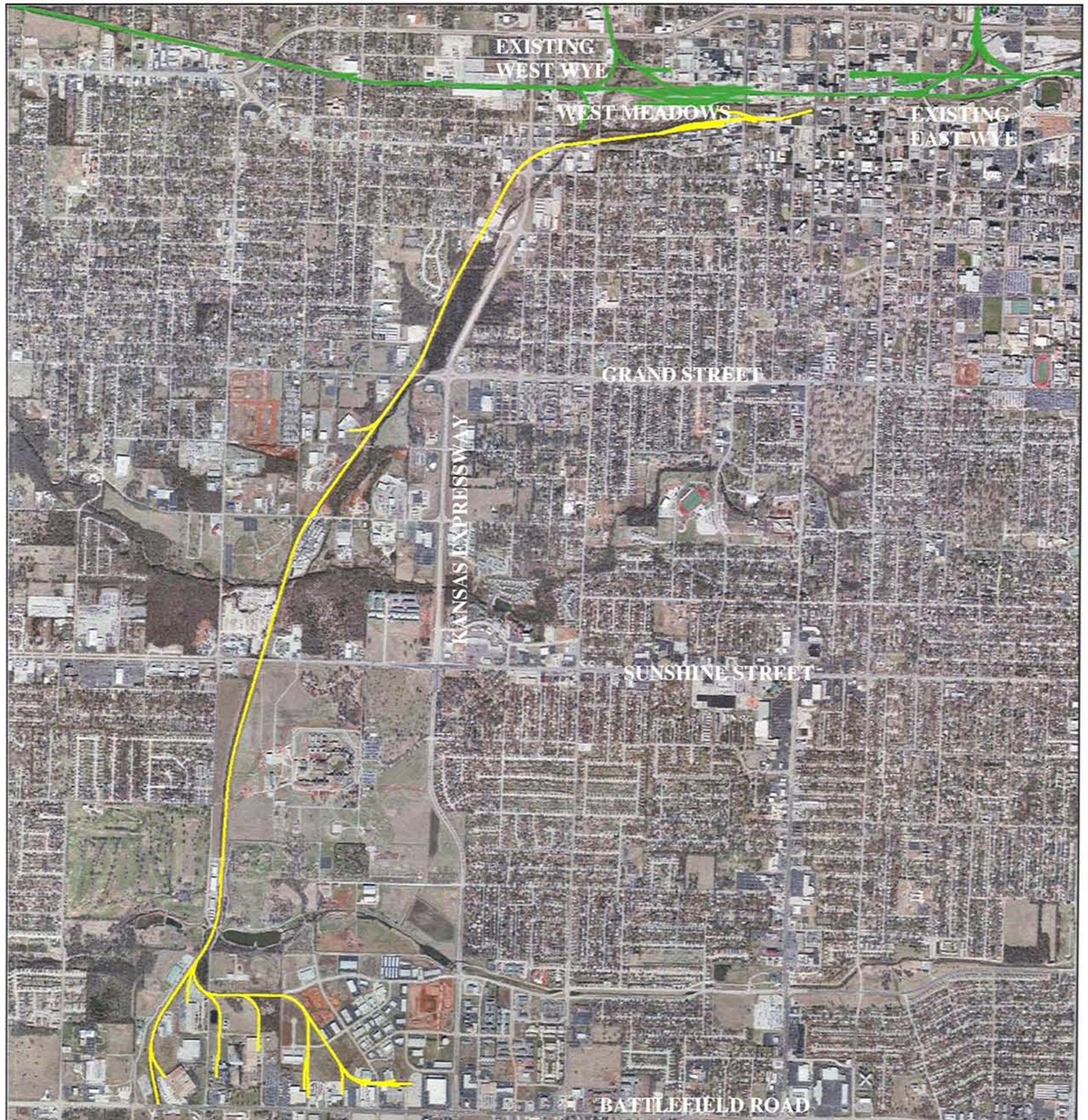


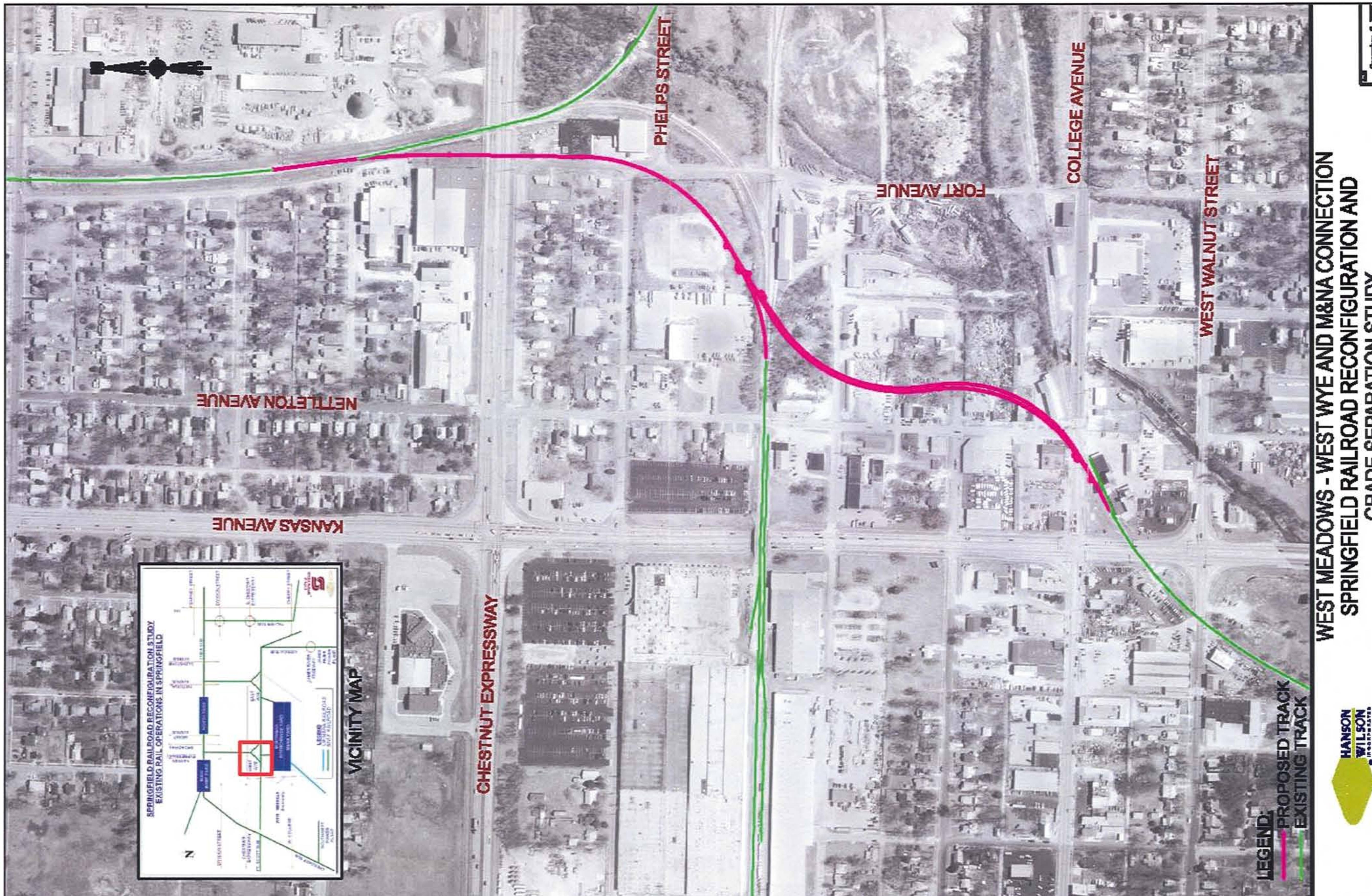
WEST MEADOWS PROPOSED
TRACK REARRANGEMENT AND EXISTING WATER LINES
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

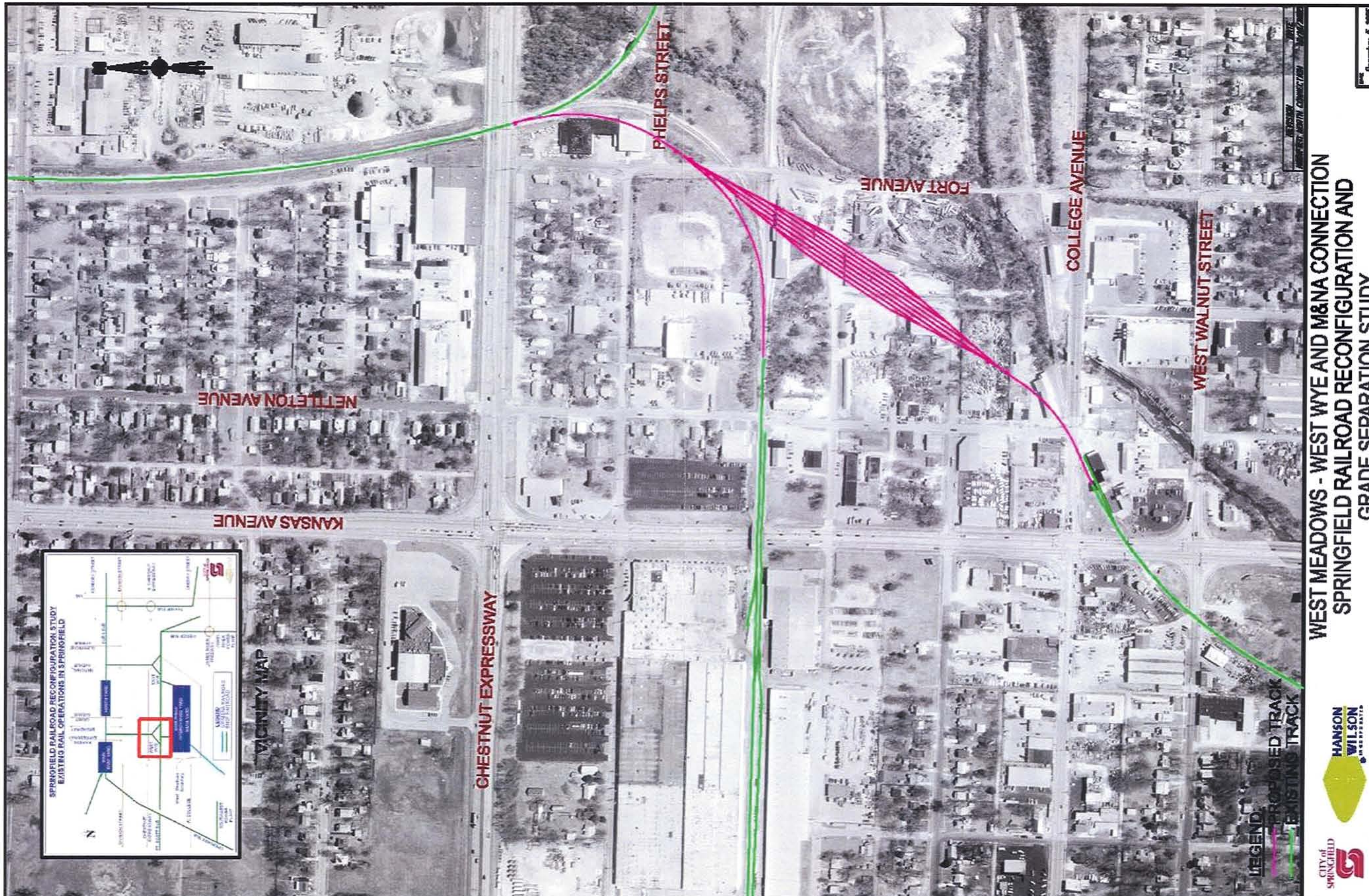
CITY of SPRINGFIELD

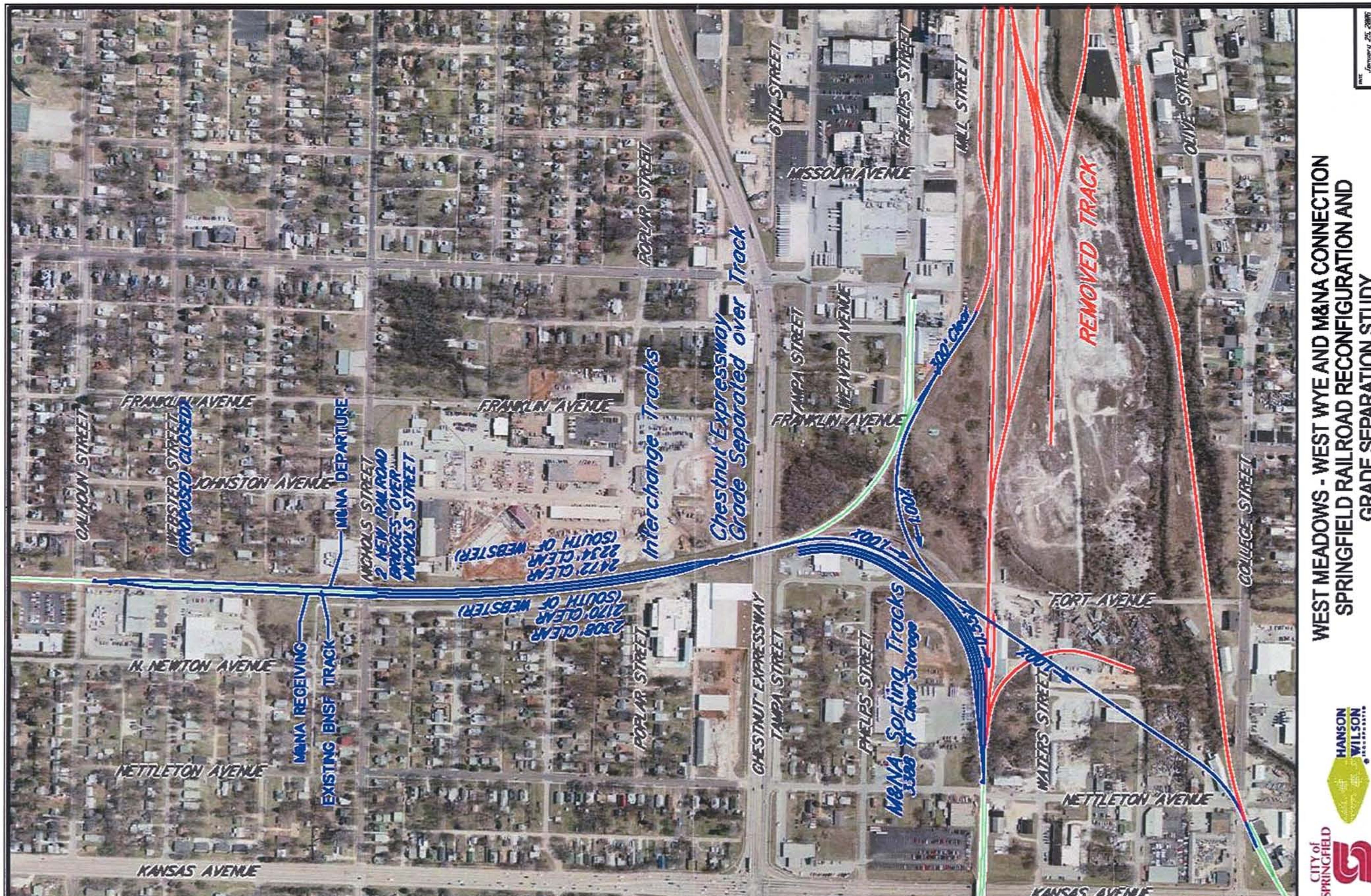
HANSON WILSON INCORPORATED

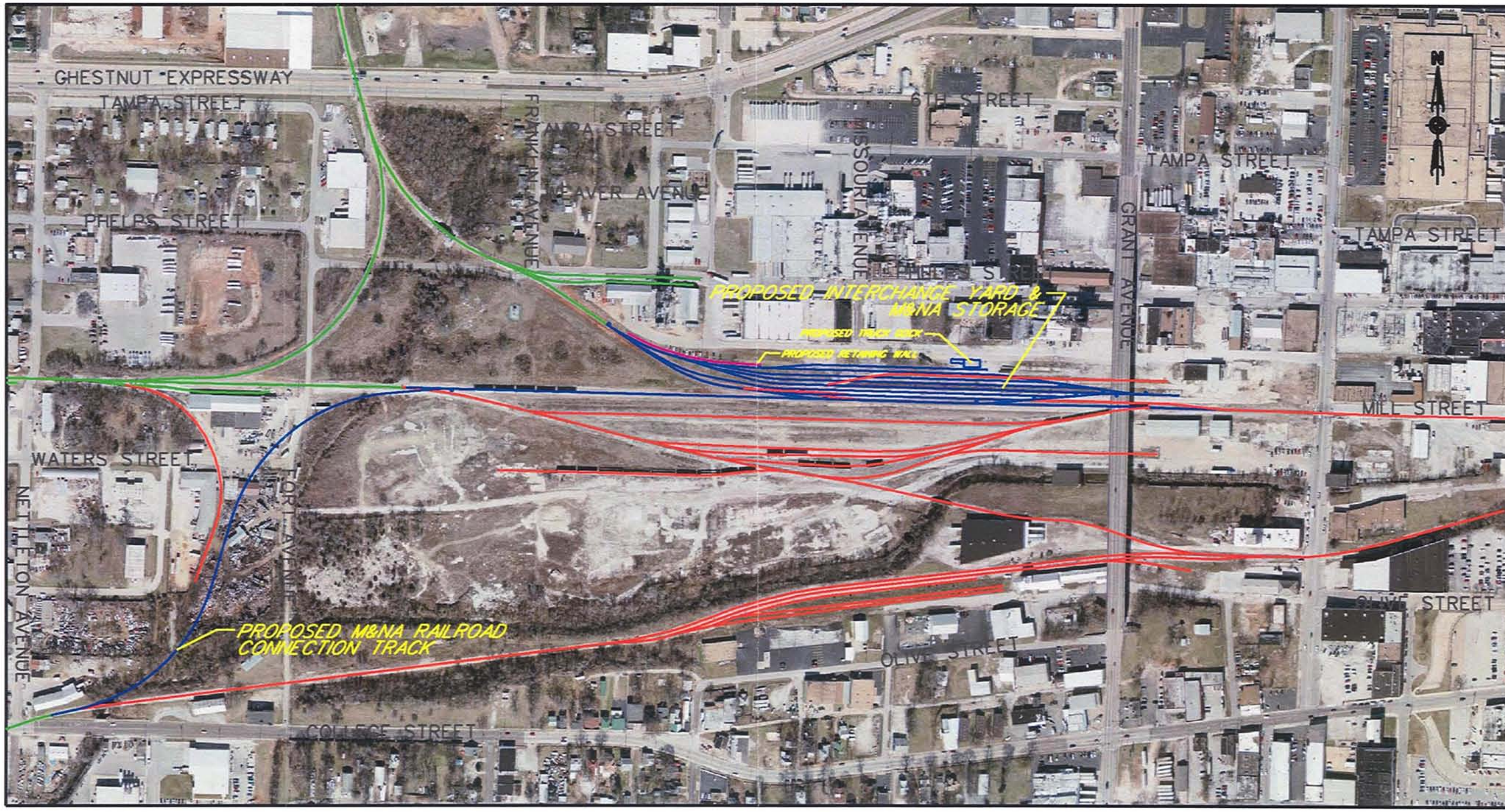
DATE June 5, 2006


EXISTING
WEST WYE
WEST MEADOWS
EXISTING
EAST WYE
GRAND STREET
KANSAS EXPRESSWAY
SUNSHINE STREET
BATTLEFIELD ROAD


WEST MEADOWS - WEST WYE AND M&NA CONNECTION
SPRINGFIELD RAILROAD RECONFIGURATION AND
GRADE SEPARATION STUDY
PHELPS STREET
FORT AVENUE
COLLEGE AVENUE
WEST WALNUT STREET
NETTLETON AVENUE
KANSAS AVENUE
CHESTNUT EXPRESSWAY
VICINITY MAP
SPRINGFIELD RAILROAD RECONFIGURATION STUDY
EXISTING RAIL OPERATIONS IN SPRINGFIELD
LEGEND:
PROPOSED TRACK
EXISTING TRACK
HANSON
WILSON


PHELPS STREET
FORT AVENUE
COLLEGE AVENUE
WEST WALNUT STREET
NETTLETON AVENUE
KANSAS AVENUE
CHESTNUT EXPRESSWAY
VICINITY MAP
SPRINGFIELD RAILROAD RECONFIGURATION STUDY
EXISTING RAIL OPERATIONS IN SPRINGFIELD
WEST MEADOWS - WEST WYE AND M&NA CONNECTION
SPRINGFIELD RAILROAD RECONFIGURATION AND
GRADE SEPARATION STUDY
LEGEND
PROPOSED TRACK
EXISTING TRACK
HANSON
WILSON
CITY of
SPRINGFIELD


WEST MEADOWS - WEST WYE AND M&NA CONNECTION
SPRINGFIELD RAILROAD RECONFIGURATION AND
GRADE SEPARATION STUDY
REMOVED TRACK
Chestnut Expressway
Grade Separated over Track
Interchange Tracks
M&NA DEPARTURE
M&NA RECEIVING
EXISTING BNSF TRACK
M&NA Sorting Tracks
2 NEW RAILROAD BRIDGES OVER NICHOLS STREET
2472' CLEAR
2234' CLEAR
(SOUTH OF WEBSTER)
2308' CLEAR
2170' CLEAR
(SOUTH OF WEBSTER)
300' Clear
FRANKLIN AVENUE
JOHNSTON AVENUE
N. NEWTON AVENUE
NETTLETON AVENUE
KANSAS AVENUE
FORT AVENUE
MISSOURI AVENUE
CALHOUN STREET
WEBSTER STREET
(PROPOSED CLOSED)
NICHOLS STREET
POPLAR STREET
CHESTNUT EXPRESSWAY
TAMPA STREET
WEAVER AVENUE
PHELPS STREET
6TH STREET
MILL STREET
OLIVE STREET
COLLEGE STREET
WATERS STREET
CITY of SPRINGFIELD
HANSON WILSON



LEGEND:

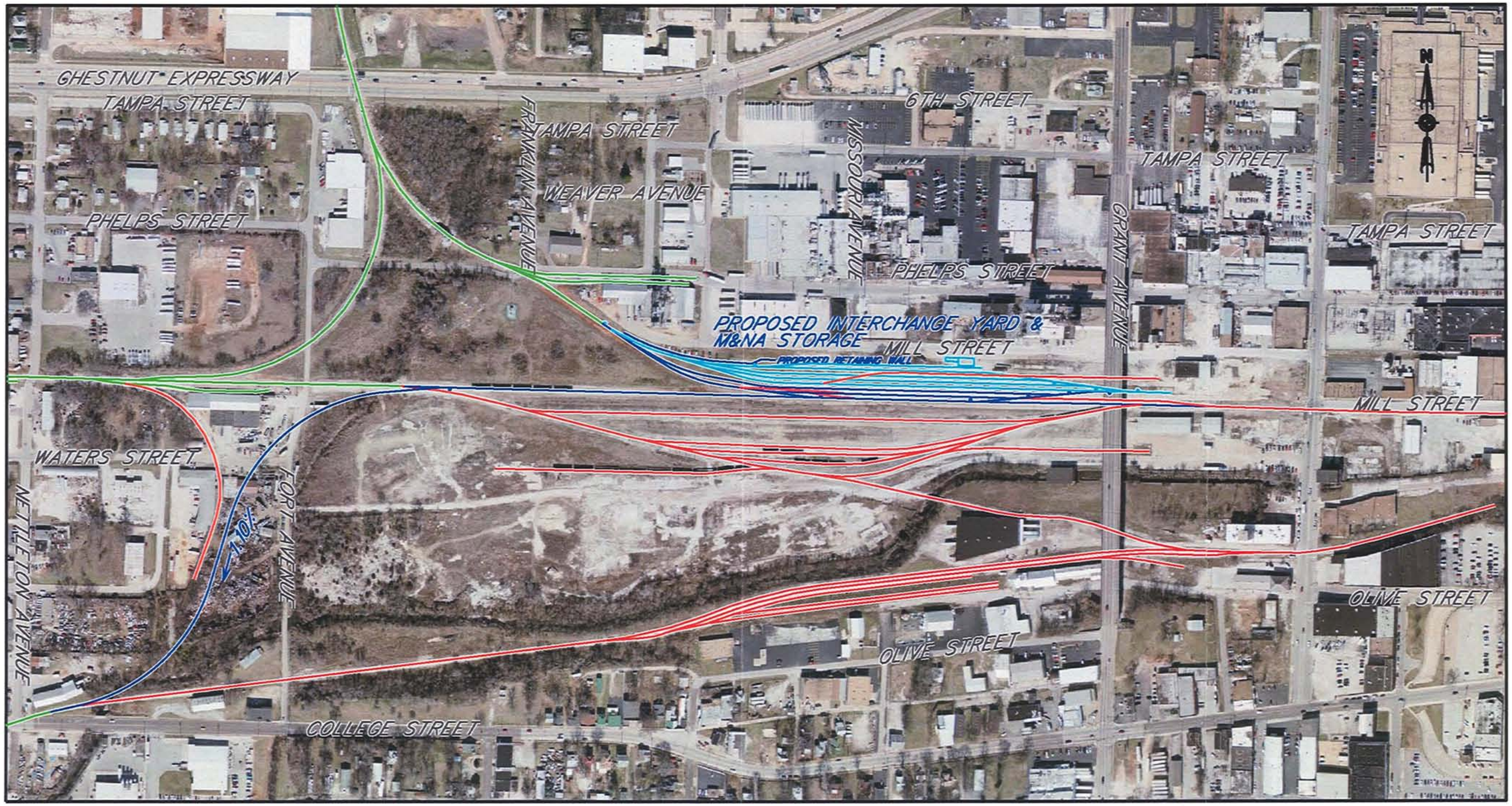
- PROPOSED TRACK
- REMOVED TRACK
- EXISTING TRACK

CITY of SPRINGFIELD

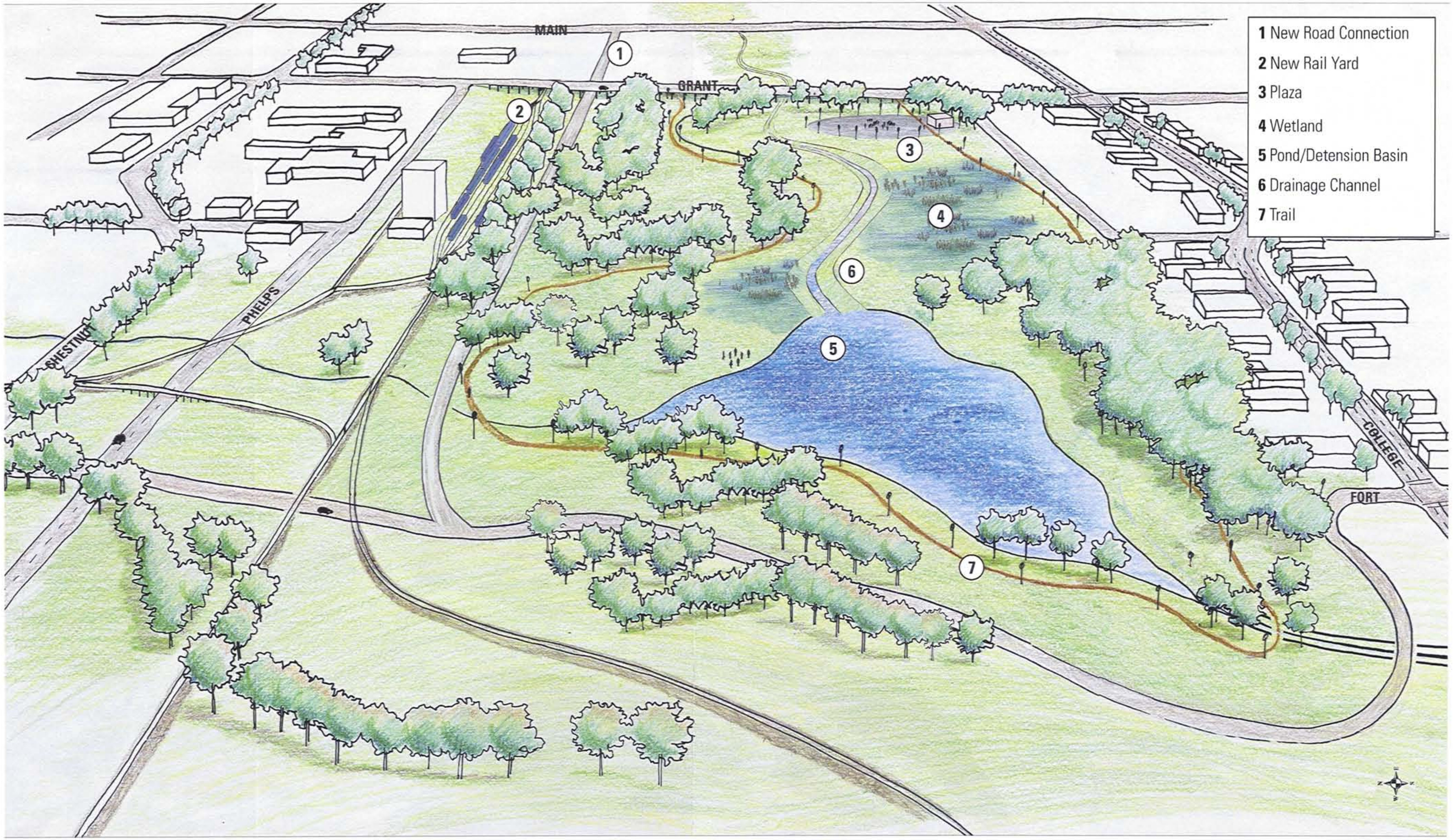
HANSON WILSON INCORPORATED

WEST MEADOWS PROPOSED
TRACK CONSTRUCTION AND REMOVAL
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

DATE June 5, 2006

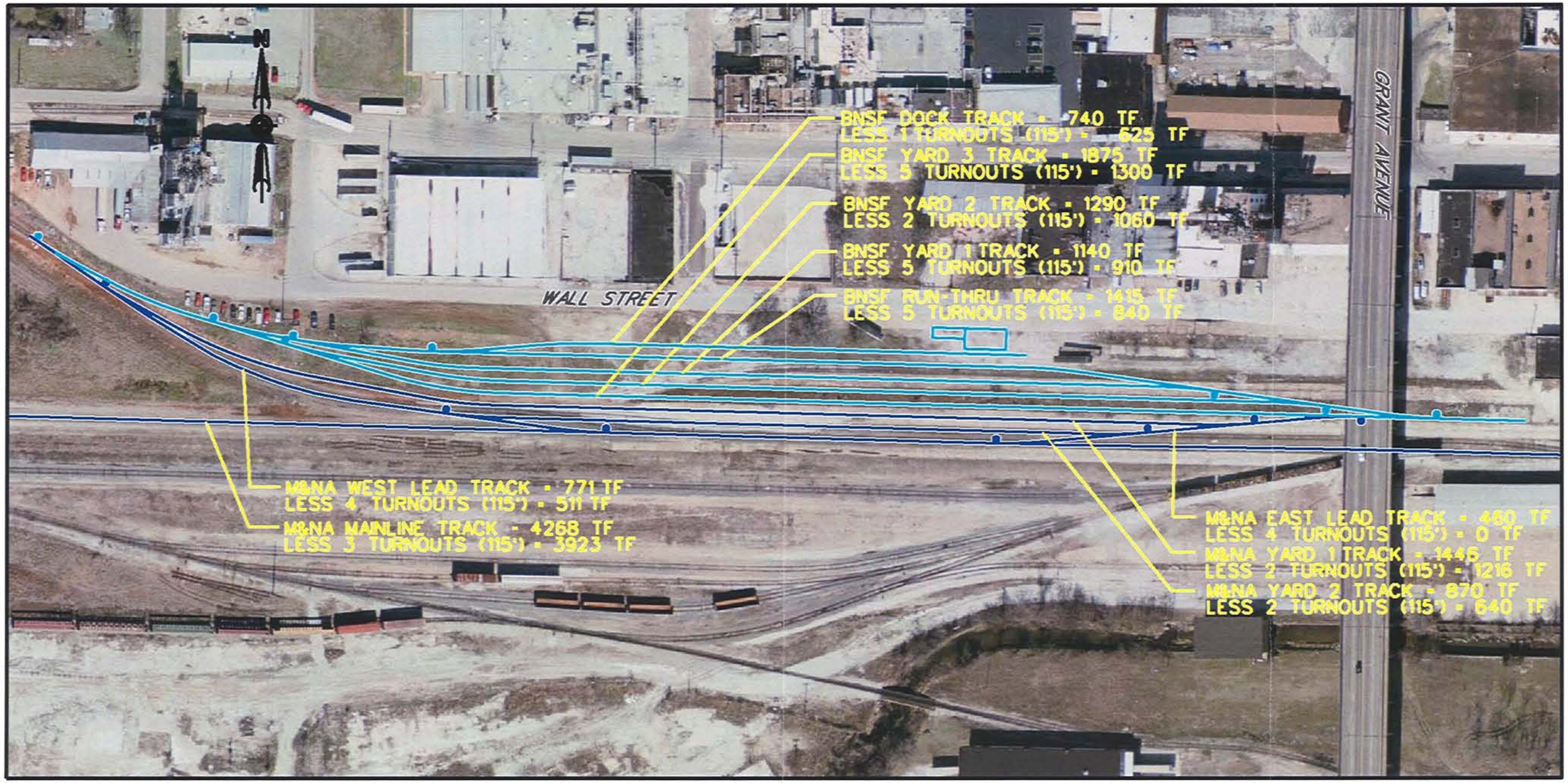


WEST MEADOWS PROPOSED
TRACK CONSTRUCTION AND REMOVAL
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY



Jordan Valley Park

General Concept for West Meadows



LEGEND:

- PROPOSED BNSF TRACK
- PROPOSED M&NA/UP TRACK

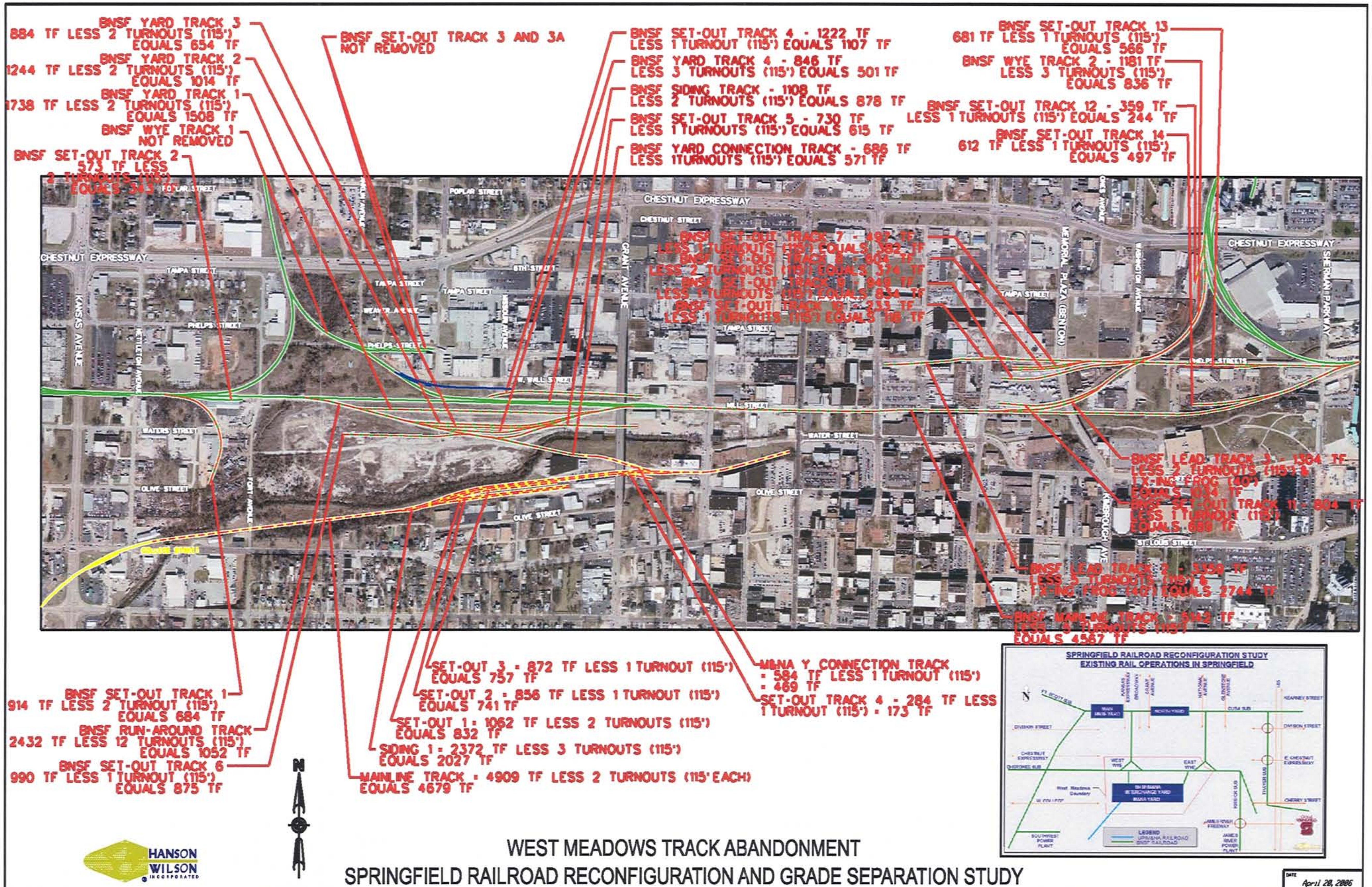
CITY of SPRINGFIELD

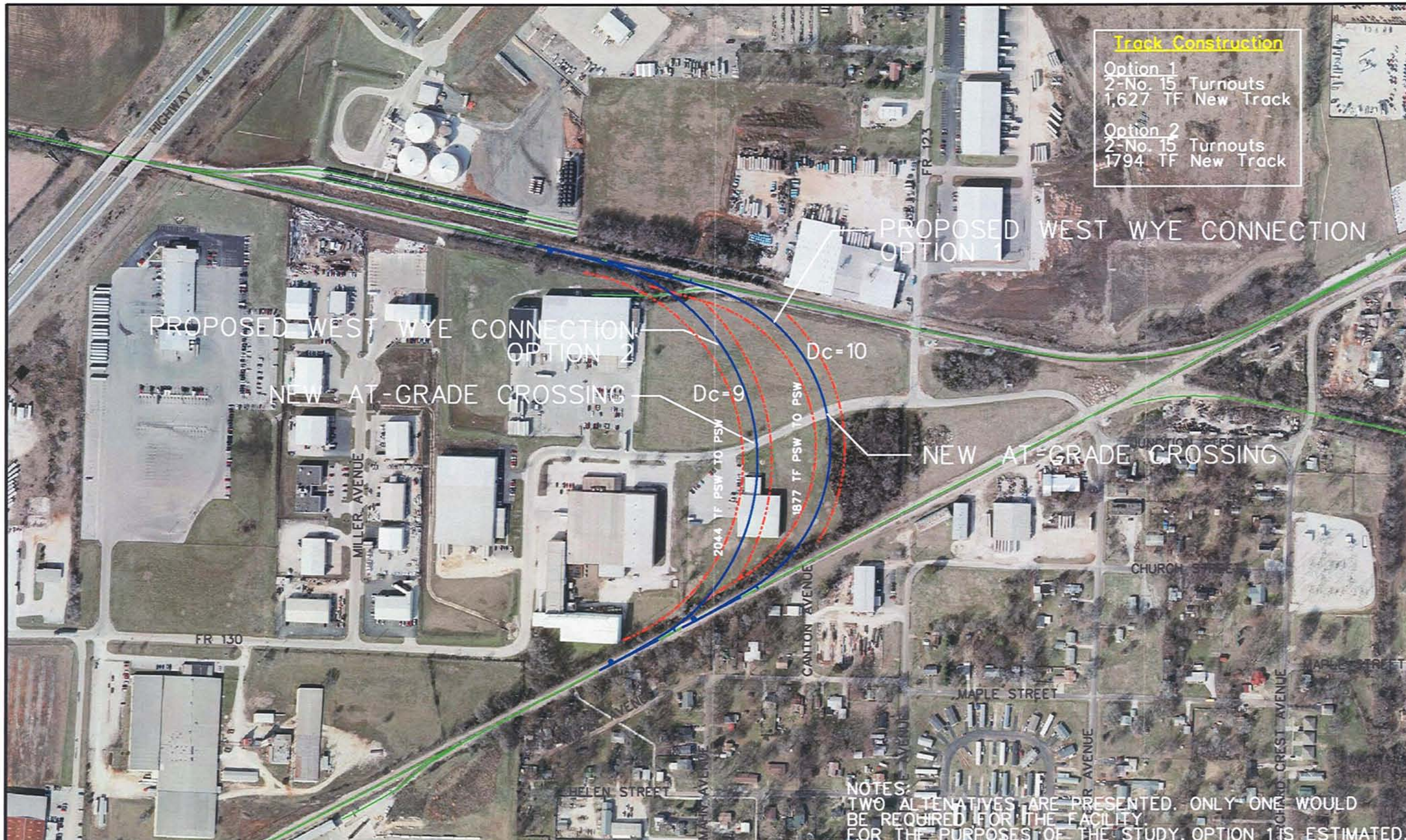
HANSON WILSON INCORPORATED

WEST MEADOWS PROPOSED INTERCHANGE OWNERSHIP AND TRACK LENGTHS

SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

DATE April 28, 2006


BNSF YARD TRACK 3
884 TF LESS 2 TURNOUTS (115')
EQUALS 654 TF
BNSF YARD TRACK 2
1244 TF LESS 2 TURNOUTS (115')
EQUALS 1014 TF
BNSF YARD TRACK 1
1738 TF LESS 2 TURNOUTS (115')
EQUALS 1508 TF
BNSF WYE TRACK 1
NOT REMOVED
BNSF SET-OUT TRACK 2
573 TF LESS
2 TURNOUTS (115')
BNSF SET-OUT TRACK 3 AND 3A
NOT REMOVED
BNSF SET-OUT TRACK 4 - 1222 TF
LESS 1 TURNOUT (115') EQUALS 1107 TF
BNSF YARD TRACK 4 - 846 TF
LESS 3 TURNOUTS (115') EQUALS 501 TF
BNSF SIDING TRACK - 1108 TF
LESS 2 TURNOUTS (115') EQUALS 878 TF
BNSF SET-OUT TRACK 5 - 730 TF
LESS 1 TURNOUTS (115') EQUALS 615 TF
BNSF YARD CONNECTION TRACK - 686 TF
LESS 1TURNOUTS (115') EQUALS 571 TF
BNSF SET-OUT TRACK 13
681 TF LESS 1 TURNOUTS (115')
EQUALS 566 TF
BNSF WYE TRACK 2 - 1181 TF
LESS 3 TURNOUTS (115')
EQUALS 836 TF
BNSF SET-OUT TRACK 12 - 359 TF
LESS 1 TURNOUTS (115') EQUALS 244 TF
BNSF SET-OUT TRACK 14
612 TF LESS 1 TURNOUTS (115')
EQUALS 497 TF
POPLAR STREET
CHESTNUT EXPRESSWAY
CHESTNUT STREET
TAMPA STREET
PHELPS STREET
KANSAS AVENUE
GRANT AVENUE
MEMORIAL PLAZA (BENTON)
SHERMAN PARKWAY
MILL STREET
WATER STREET
OLIVE STREET
ST LOUIS STREET
BNSF LEAD TRACK 3 - 1304 TF
LESS 2 TURNOUTS (115') &
1 X-ING FROG (40')
BNSF SET-OUT TRACK 11 - 804 TF
LESS 1 TURNOUT (115')
BNSF LEAD TRACK 2 - 3359 TF
LESS 5 TURNOUTS (115') &
1 X-ING FROG (40') EQUALS 2744 TF
BNSF MAINLINE TRACK - 5142 TF
LESS 5 TURNOUTS (115')
EQUALS 4567 TF
SET-OUT 3 - 872 TF LESS 1 TURNOUT (115')
EQUALS 757 TF
SET-OUT 2 - 856 TF LESS 1 TURNOUT (115')
EQUALS 741 TF
SET-OUT 1 - 1062 TF LESS 2 TURNOUTS (115')
EQUALS 832 TF
SIDING 1 - 2372 TF LESS 3 TURNOUTS (115')
EQUALS 2027 TF
MAINLINE TRACK - 4909 TF LESS 2 TURNOUTS (115' EACH)
EQUALS 4679 TF
M&NA Y CONNECTION TRACK
- 584 TF LESS 1 TURNOUT (115')
- 469 TF
SET-OUT TRACK 4 - 284 TF LESS
1 TURNOUT (115') - 173 TF
BNSF SET-OUT TRACK 1
914 TF LESS 2 TURNOUT (115')
EQUALS 684 TF
BNSF RUN-AROUND TRACK
2432 TF LESS 12 TURNOUTS (115')
EQUALS 1052 TF
BNSF SET-OUT TRACK 6
990 TF LESS 1 TURNOUT (115')
EQUALS 875 TF
N
SPRINGFIELD RAILROAD RECONFIGURATION STUDY
EXISTING RAIL OPERATIONS IN SPRINGFIELD
HANSON WILSON INCORPORATED
WEST MEADOWS TRACK ABANDONMENT
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY
DATE April 28, 2006



PROPOSED BNSF WEST WYE CONNECTION
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

LEGEND:
PROPOSED TRACK
REMOVED TRACK
EXISTING TRACK

DATE March 25, 2006

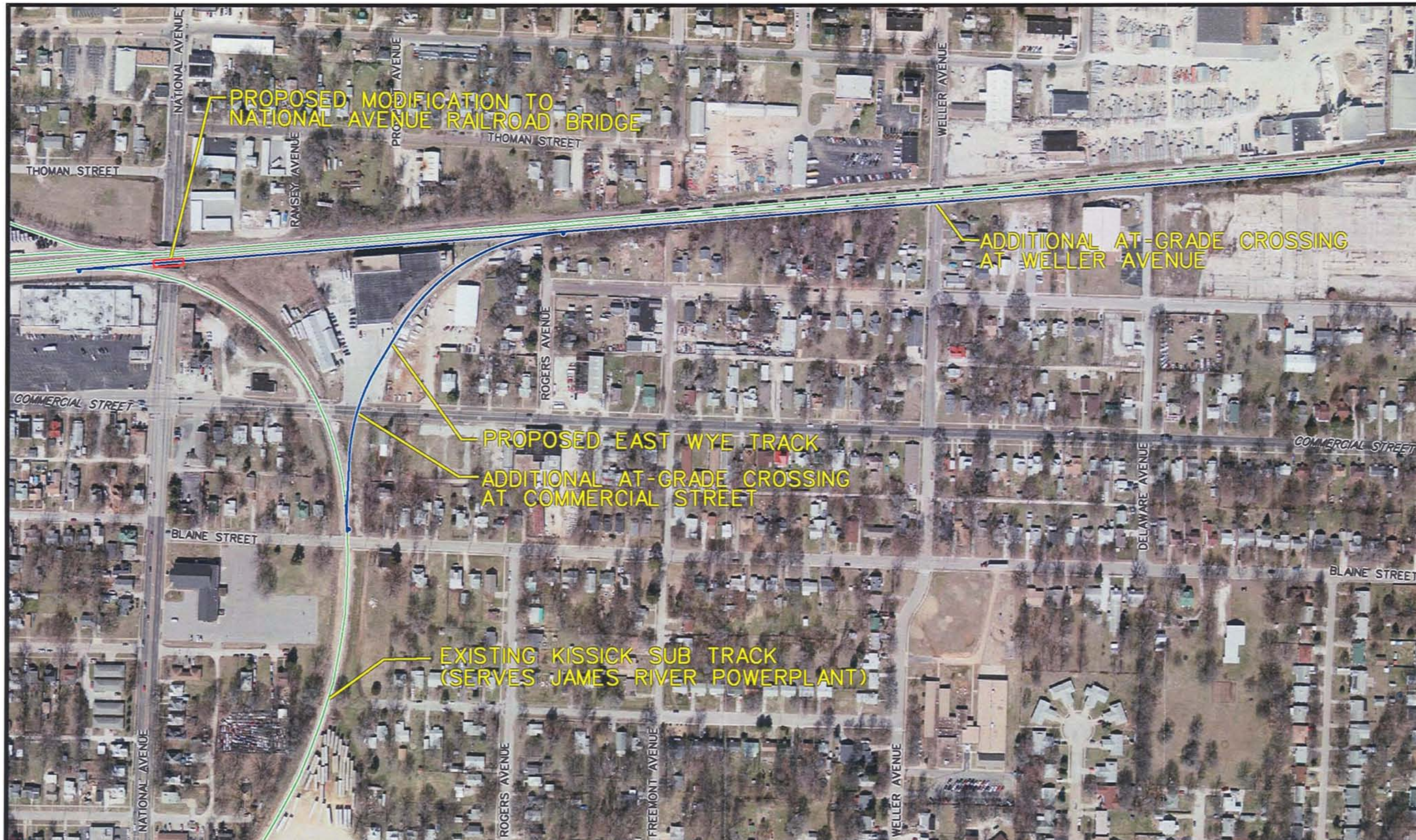
CITY of SPRINGFIELD

HANSON WILSON INCORPORATED

PROPOSED NORTH YARD STORAGE AND CONNECTION TRACKS
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

LEGEND:
PROPOSED TRACK
REMOVED TRACK
EXISTING TRACK

DATE June 5, 2006



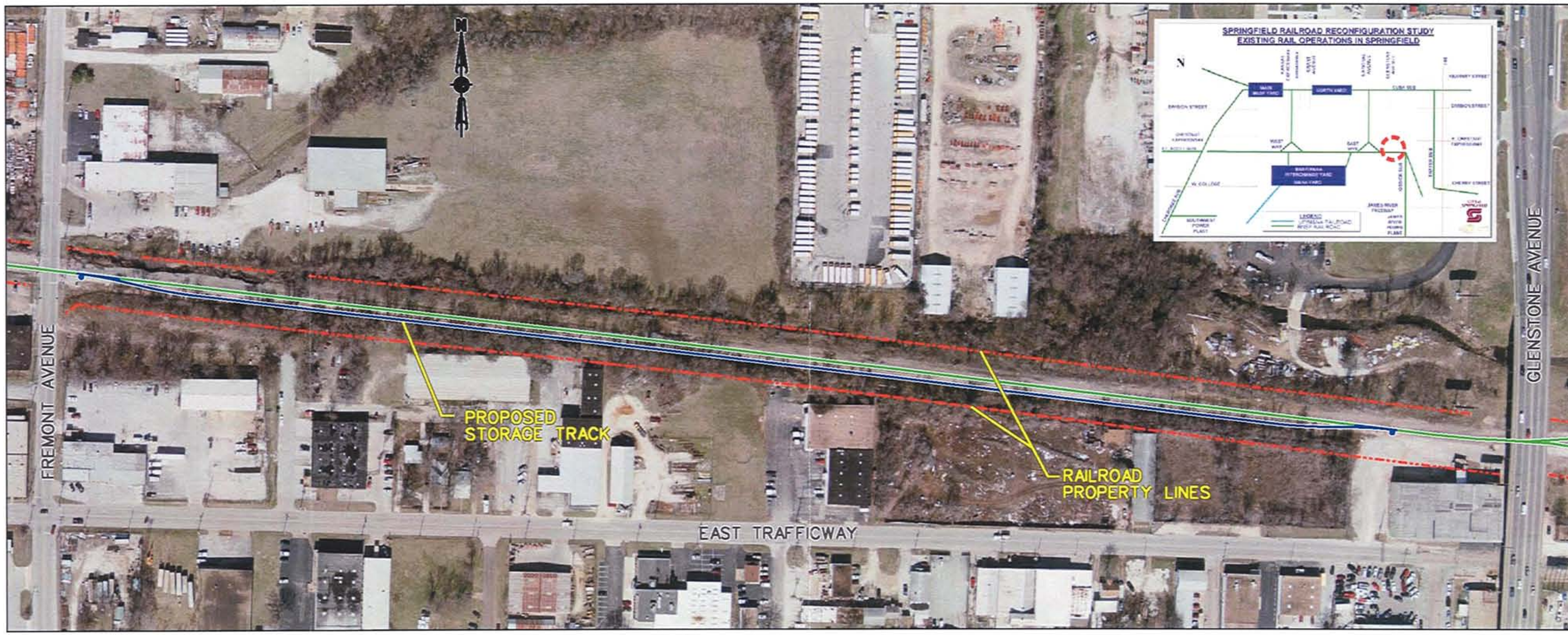
CITY of SPRINGFIELD

HANSON WILSON INCORPORATED

PROPOSED BNSF EAST WYE TRACK

SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

DATE March 24, 2006



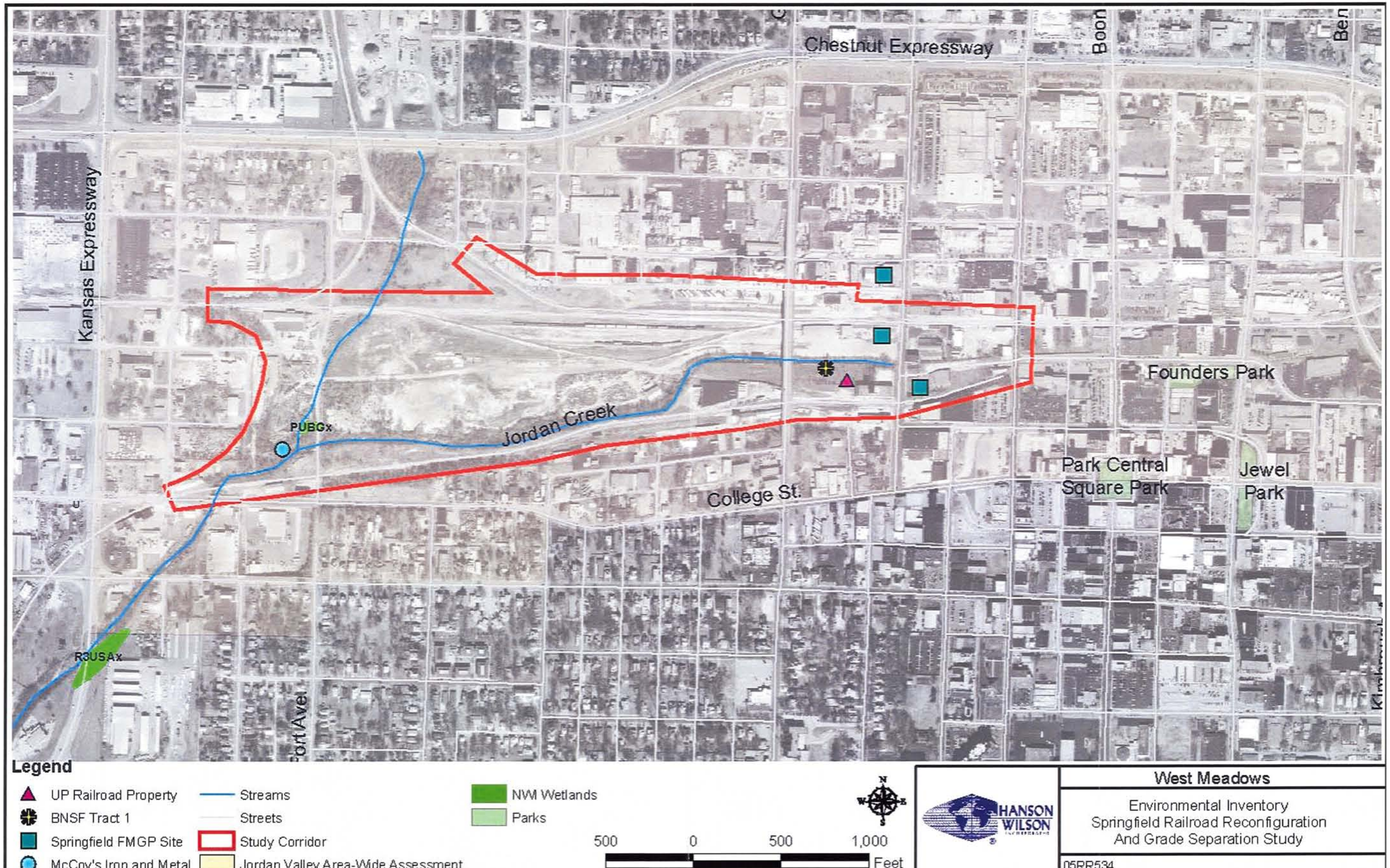
LEGEND:
PROPOSED TRACK
REMOVED TRACK
EXISTING TRACK

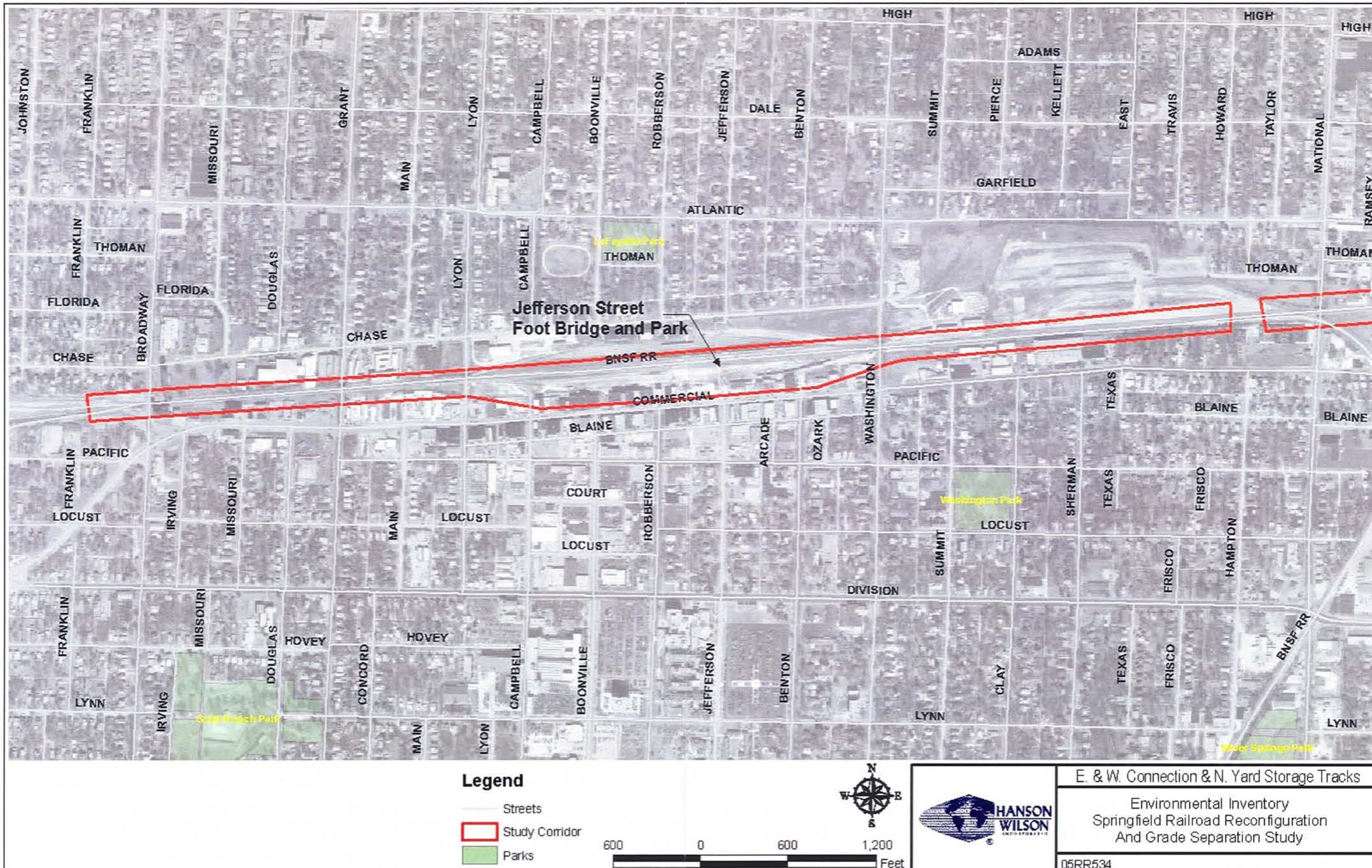
CITY of SPRINGFIELD

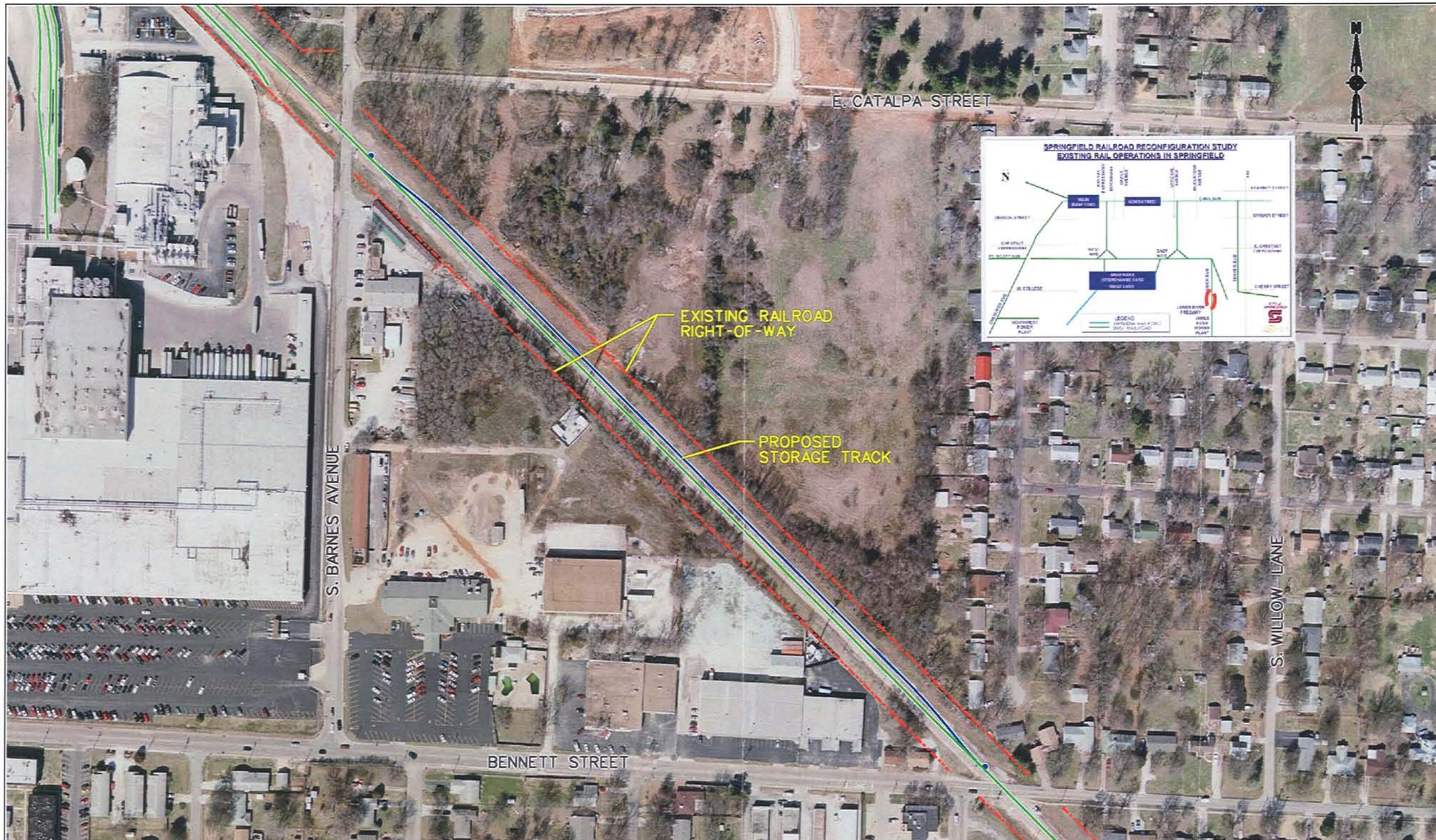
HANSON WILSON INCORPORATED

PROPOSED CHESTNUT STORAGE TRACK
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

DATE June 5, 2006


Chestnut Expressway
Kansas Expressway
Founders Park
Jordan Creek
PUBGx
College St.
Park Central Square Park
Jewel Park
R3USAx
Fort Ave.
Legend
UP Railroad Property
BNSF Tract 1
Springfield FMGP Site
McCoy's Iron and Metal
Streams
Streets
Study Corridor
Jordan Valley Area-Wide Assessment
NWI Wetlands
Parks
500 0 500 1,000
Feet
HANSON WILSON
West Meadows
Environmental Inventory
Springfield Railroad Reconfiguration
And Grade Separation Study
05RR534


Jefferson Street
Foot Bridge and Park
BNSF RR
HIGH
ADAMS
DALE
GARFIELD
ATLANTIC
THOMAN
FLORIDA
CHASE
COMMERCIAL
BLAINE
PACIFIC
COURT
LOCUST
DIVISION
HOVEY
LYNN
JOHNSTON
FRANKLIN
MISSOURI
GRANT
MAIN
LYON
CAMPBELL
BOONVILLE
ROBBERSON
JEFFERSON
BENTON
SUMMIT
PIERCE
KELLETT
EAST
TRAVIS
HOWARD
TAYLOR
NATIONAL
RAMSEY
BROADWAY
DOUGLAS
WASHINGTON
ARCADE
OZARK
TEXAS
SHERMAN
FRISCO
HAMPTON
IRVING
CONCORD
CLAY
Washington Park
Legend
Streets
Study Corridor
Parks
600
0
600
1,200
Feet
N
W
E
S
HANSON WILSON
E. & W. Connection & N. Yard Storage Tracks
Environmental Inventory
Springfield Railroad Reconfiguration
And Grade Separation Study
05RR534



CITY of SPRINGFIELD

HANSON WILSON INCORPORATED

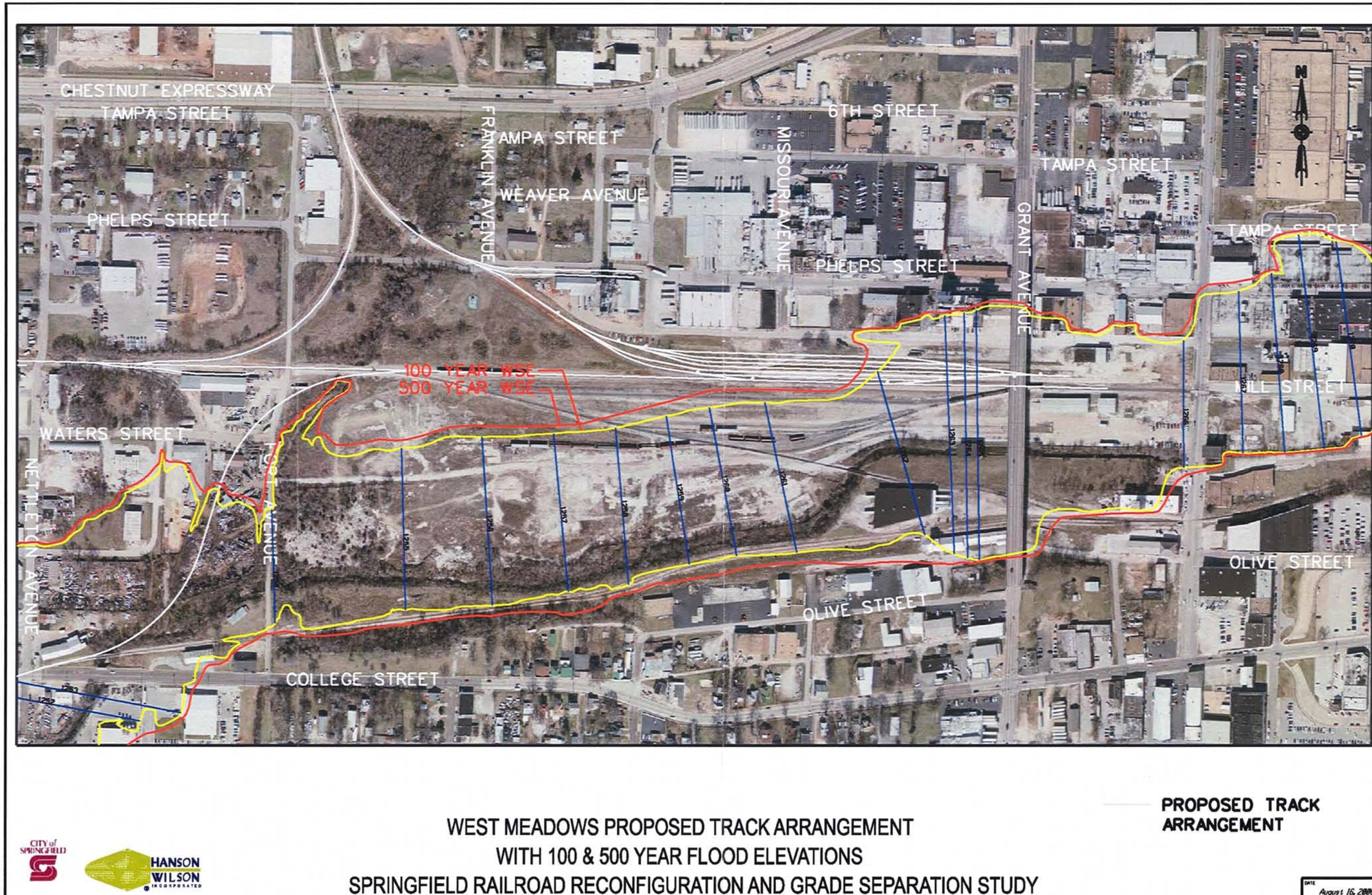
PROPOSED BENNETT STREET STORAGE TRACK

SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

LEGEND:

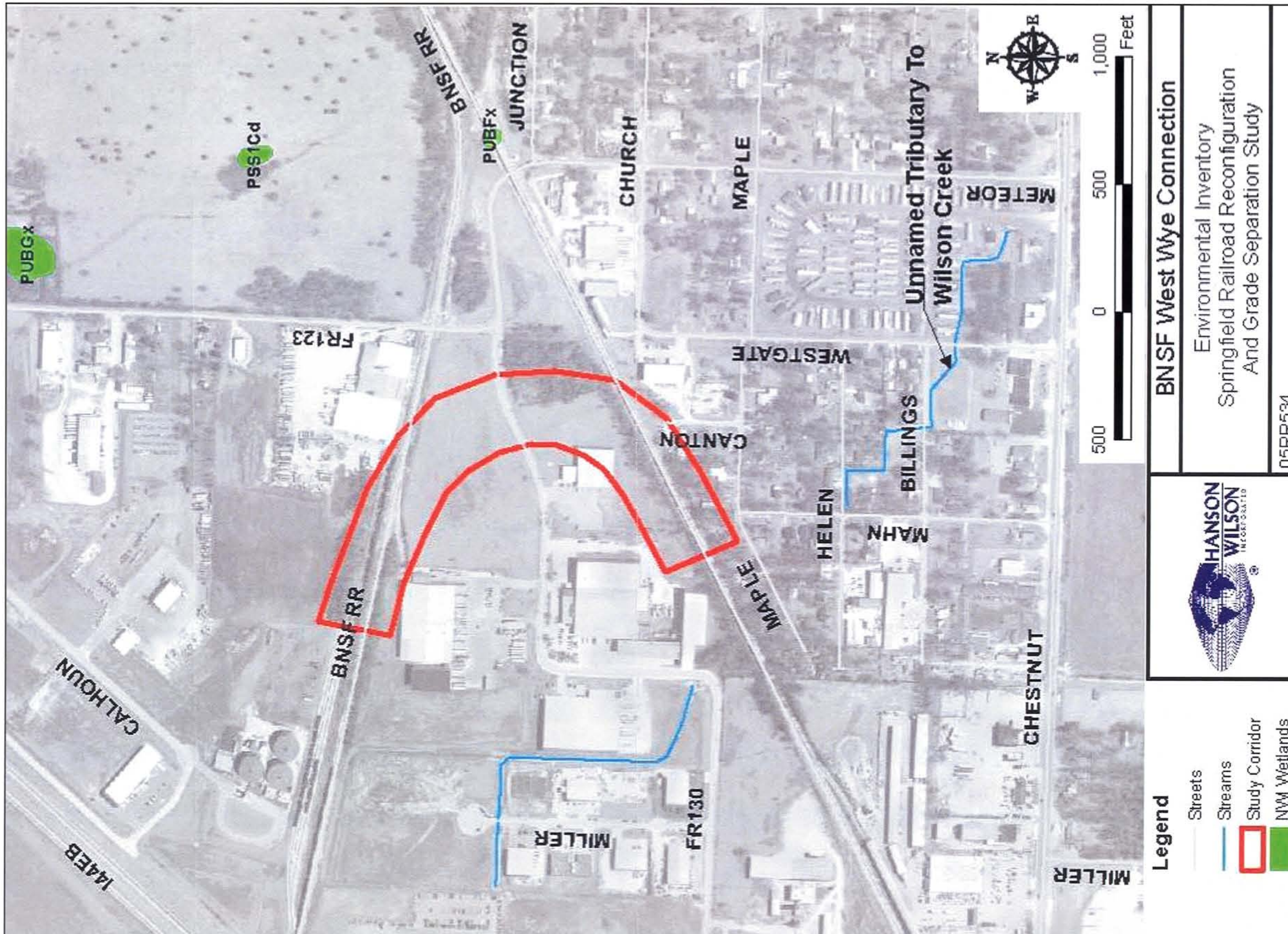
- PROPOSED TRACK
- REMOVED TRACK
- EXISTING TRACK

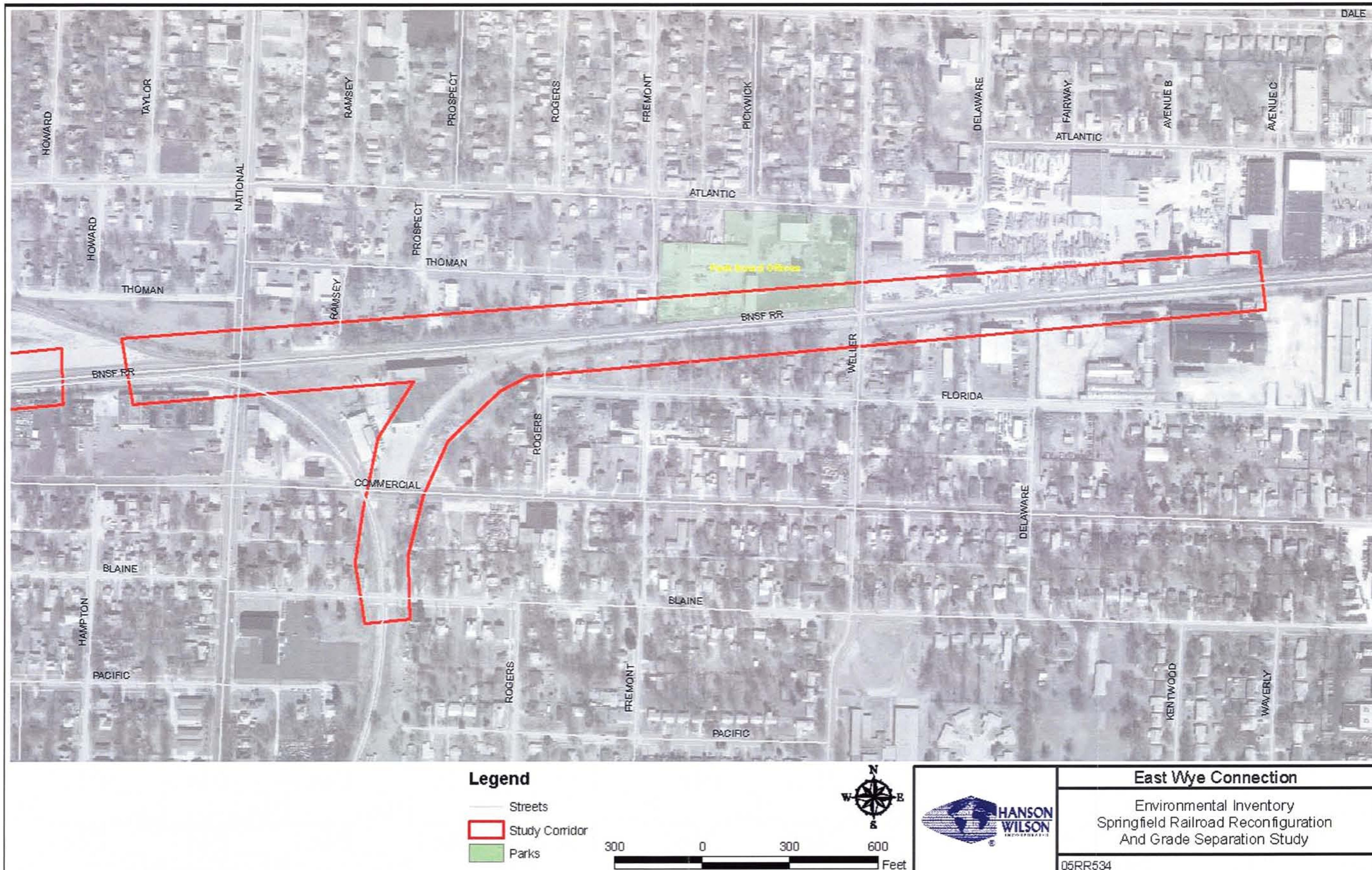
DATE June 5, 2006



WEST MEADOWS PROPOSED TRACK ARRANGEMENT
WITH 100 & 500 YEAR FLOOD ELEVATIONS
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY


CHESTNUT
ROGERS
FREMONT
GLENSTONE
STEWART
BNSF RR
Jordan Creek South Branch
TRAFFICWAY
OLIVE
WELLER
DELAWARE
KENTWOOD
WAVERLY
STEWART
BNSF RR
SAINT LOUIS
PICKWICK
WELLER
Legend
Streets
Streams
Study Corridor
400
0
400
800
Feet
N
S
E
W
HANSON WILSON
Chestnut Storage Track
Environmental Inventory
Springfield Railroad Reconfiguration
And Grade Separation Study
05RR534


BNSF West Wye Connection
Environmental Inventory
Springfield Railroad Reconfiguration
And Grade Separation Study
05RR534
HANSON WILSON
Legend
Streets
Streams
Study Corridor
NWI Wetlands
500
0
500
1,000
Feet
N
E
S
W
BNSF RR
JUNCTION
PUBFx
PSS1Cd
PUBGx
CHURCH
MAPLE
METEOR
Unnamed Tributary To
Wilson Creek
WESTGATE
FR123
CANTON
BILLINGS
HELEN
MAHN
MAPLE
BNSF RR
CALHOUN
I44EB
CHESTNUT
FR130
MILLER
MILLER


DALE
HOWARD
TAYLOR
NATIONAL
RAMSEY
PROSPECT
ROGERS
FREMONT
PICKWICK
DELAWARE
FAIRWAY
AVENUE B
AVENUE C
ATLANTIC
THOMAN
BNSF RR
WELLER
FLORIDA
COMMERCIAL
BLAINE
HAMPTON
PACIFIC
KENTWOOD
WAVERLY
Legend
Streets
Study Corridor
Parks
300
0
300
600
Feet
N
E
S
W
HANSON WILSON
East Wye Connection
Environmental Inventory
Springfield Railroad Reconfiguration
And Grade Separation Study
05RR534

Legend

Streets
Study Corridor
NWI Wetlands

200 0 200 400 Feet

N E S W

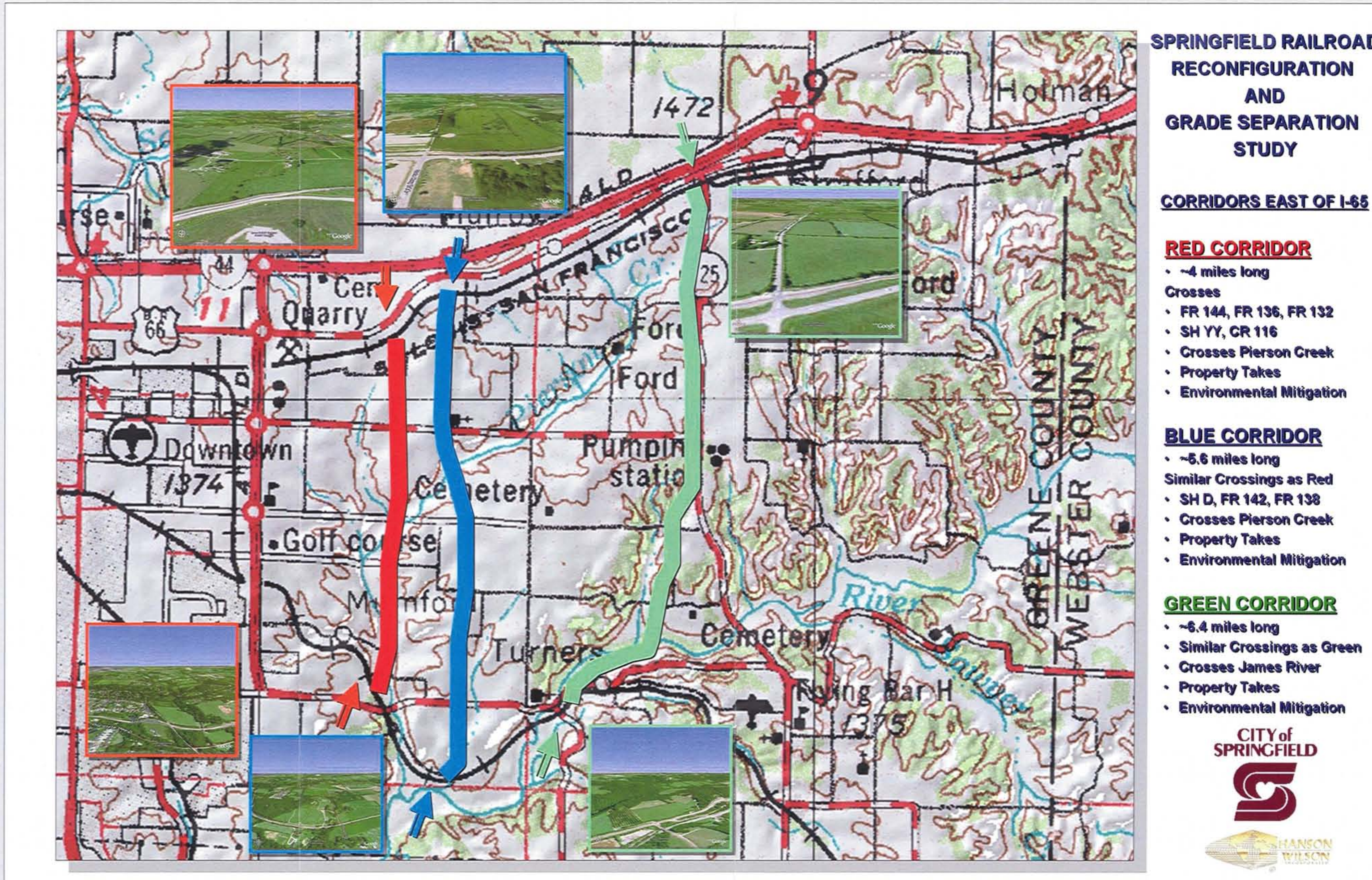
HANSON WILSON

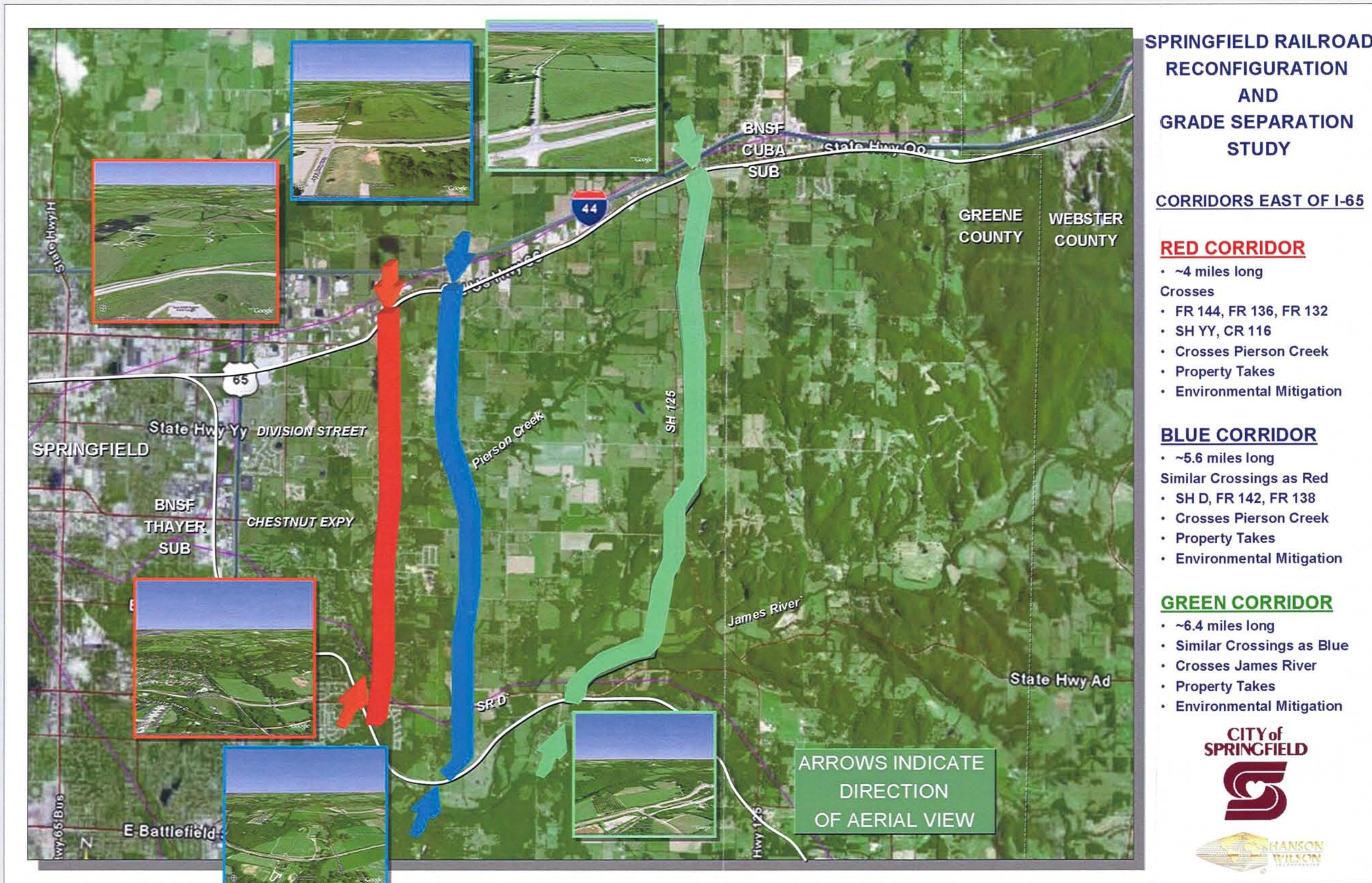
Bennett Street Storage Track

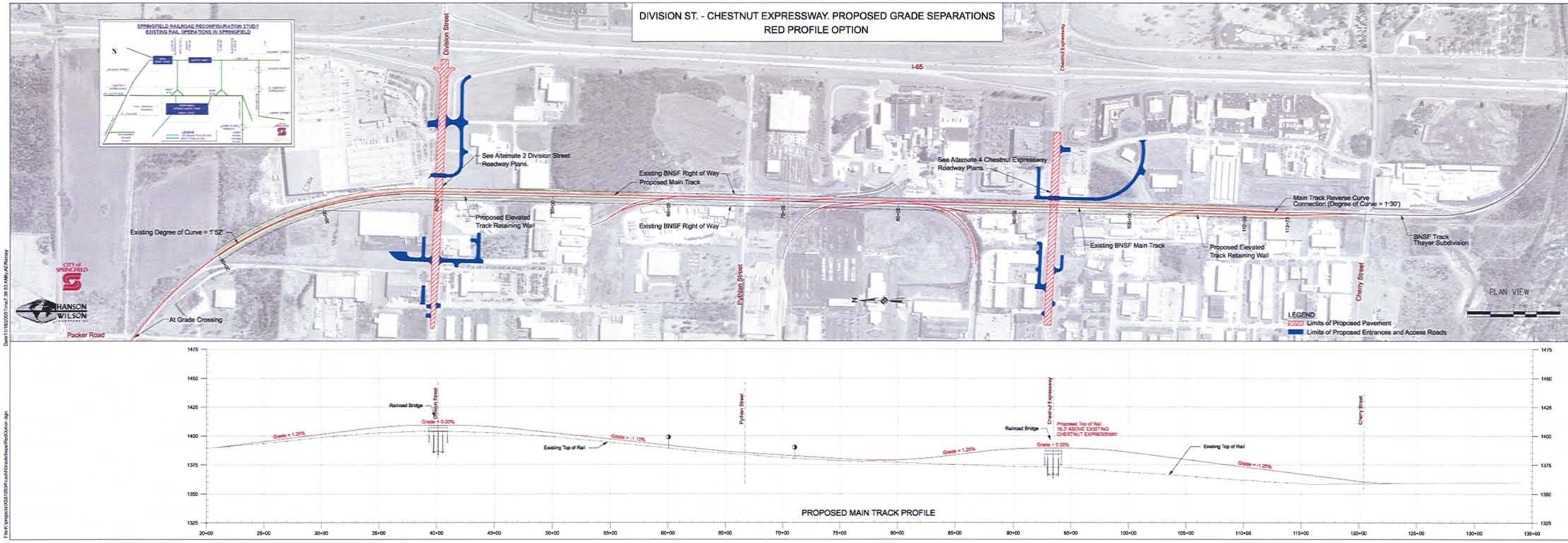
Environmental Inventory
Springfield Railroad Reconfiguration
And Grade Separation Study

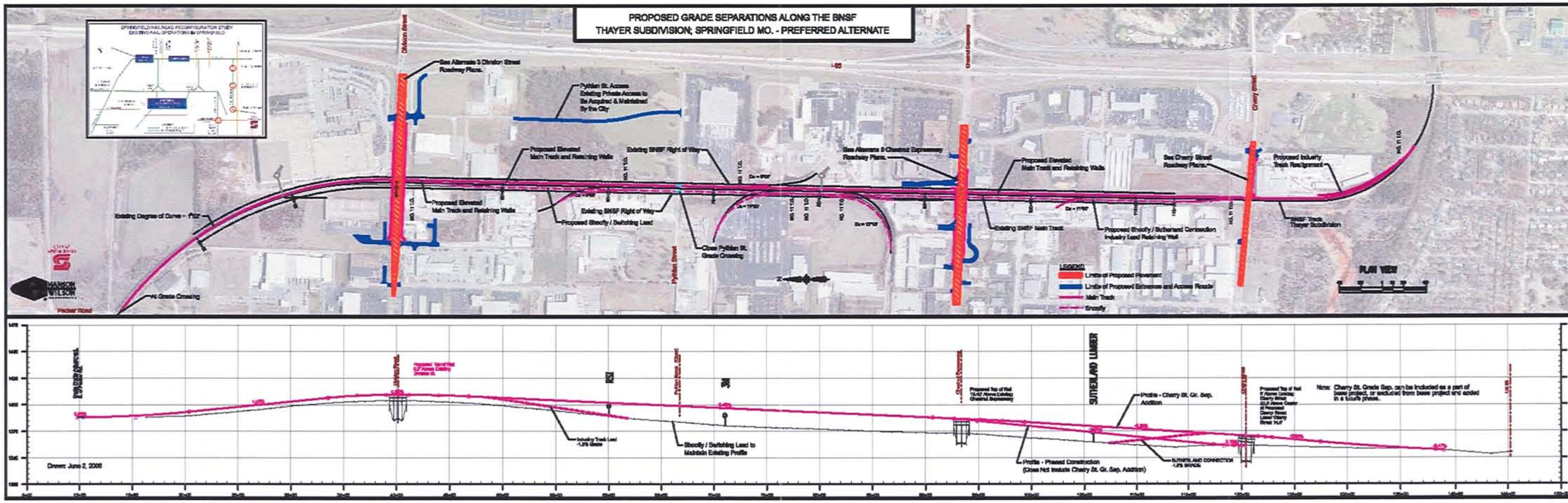
05RR534

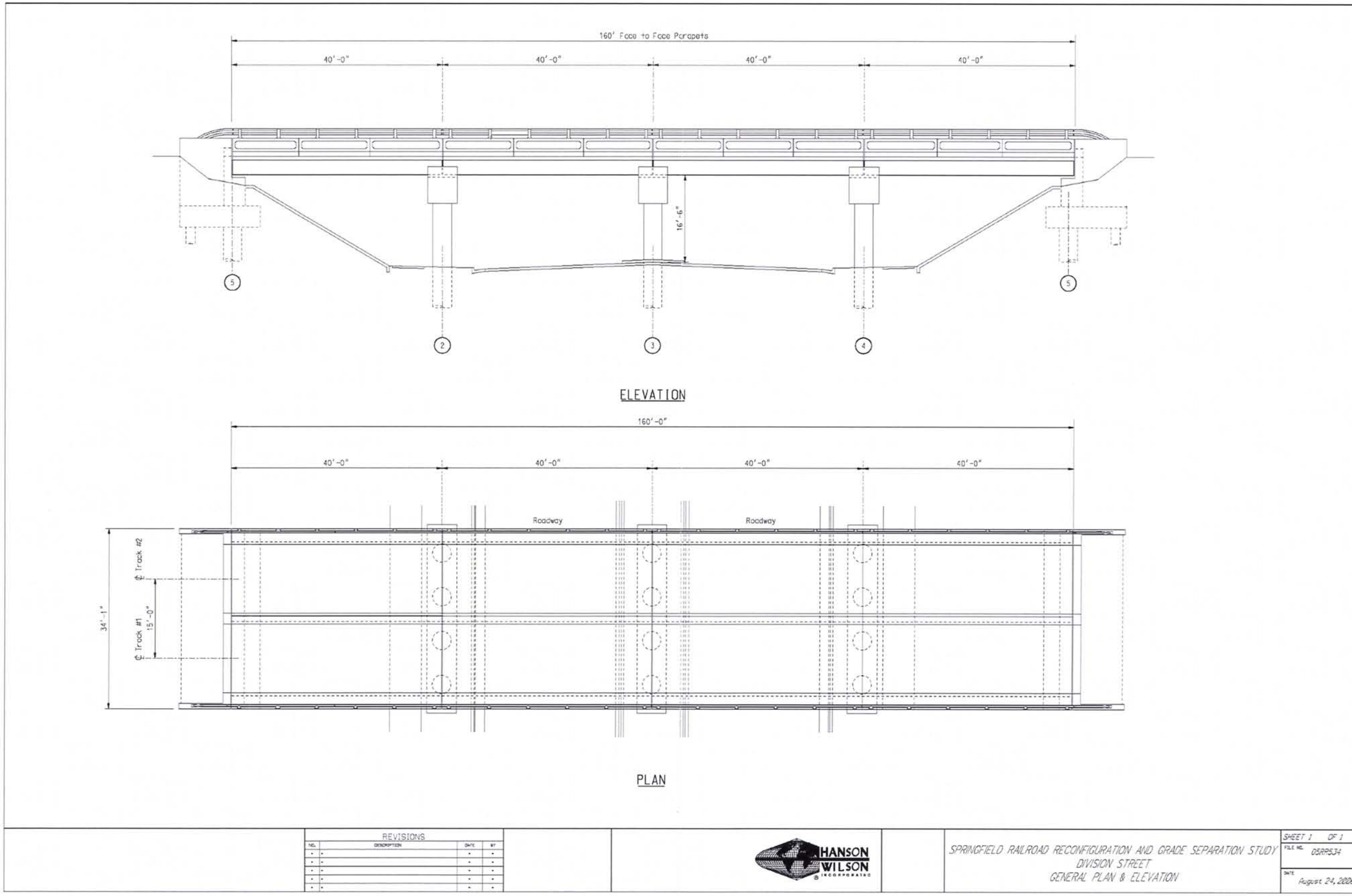
GRADE SEPARATIONS

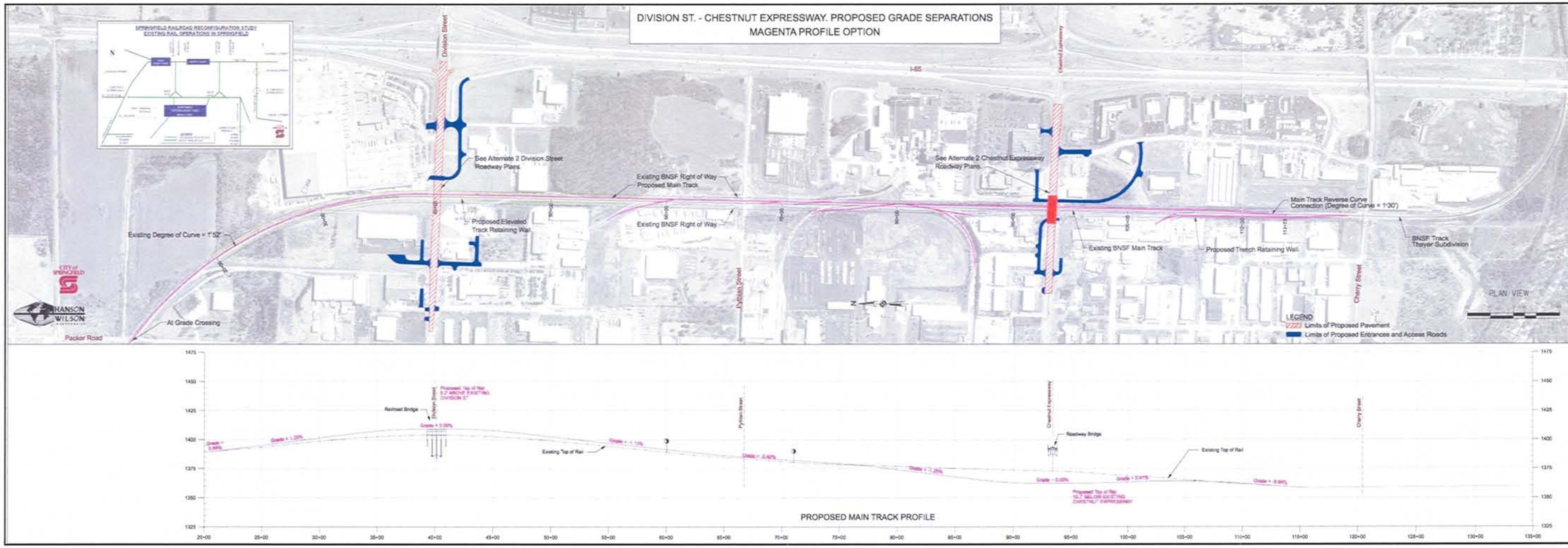

SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY
CORRIDORS EAST OF I-65
RED CORRIDOR
• ~4 miles long
Crosses
• FR 144, FR 136, FR 132
• SH YY, CR 116
• Crosses Pierson Creek
• Property Takes
• Environmental Mitigation
BLUE CORRIDOR
• ~5.6 miles long
Similar Crossings as Red
• SH D, FR 142, FR 138
• Crosses Pierson Creek
• Property Takes
• Environmental Mitigation
GREEN CORRIDOR
• ~6.4 miles long
• Similar Crossings as Green
• Crosses James River
• Property Takes
• Environmental Mitigation
CITY of SPRINGFIELD
Holman
1472
Quarry
Ford
Pumping station
Downtown
1374
Cemetery
Golf course
Turners
Cemetery
River
1375
GREENE COUNTY
WEBSTER COUNTY

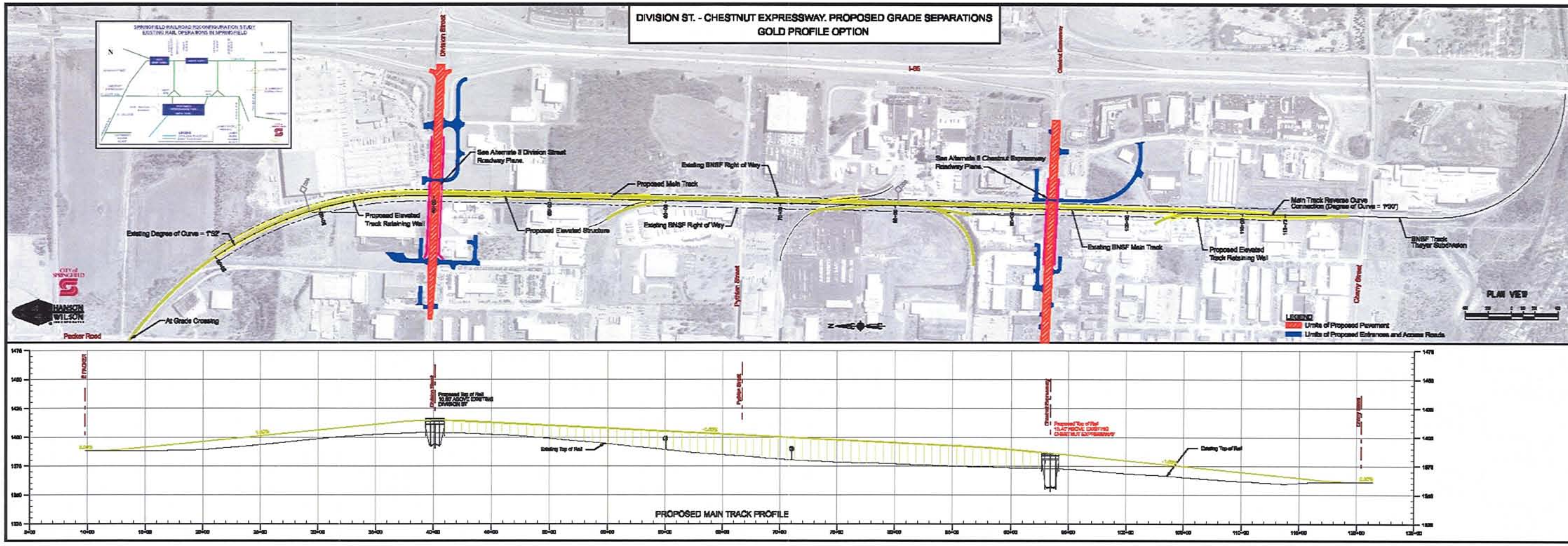

SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY
CORRIDORS EAST OF I-65
RED CORRIDOR
• ~4 miles long
Crosses
• FR 144, FR 136, FR 132
• SH YY, CR 116
• Crosses Pierson Creek
• Property Takes
• Environmental Mitigation
BLUE CORRIDOR
• ~5.6 miles long
Similar Crossings as Red
• SH D, FR 142, FR 138
• Crosses Pierson Creek
• Property Takes
• Environmental Mitigation
GREEN CORRIDOR
• ~6.4 miles long
• Similar Crossings as Blue
• Crosses James River
• Property Takes
• Environmental Mitigation
CITY of SPRINGFIELD
HANSON WILSON
ARROWS INDICATE DIRECTION OF AERIAL VIEW
BNSF CUBA SUB
State Hwy Oo
44
GREENE COUNTY
WEBSTER COUNTY
65
State Hwy H
State Hwy Yy
DIVISION STREET
SPRINGFIELD
Pierson Creek
SH 125
BNSF THAYER SUB
CHESTNUT EXPY
James River
State Hwy Ad
SR D
E Battlefield
Hwy 65 Bus
Hwy 125

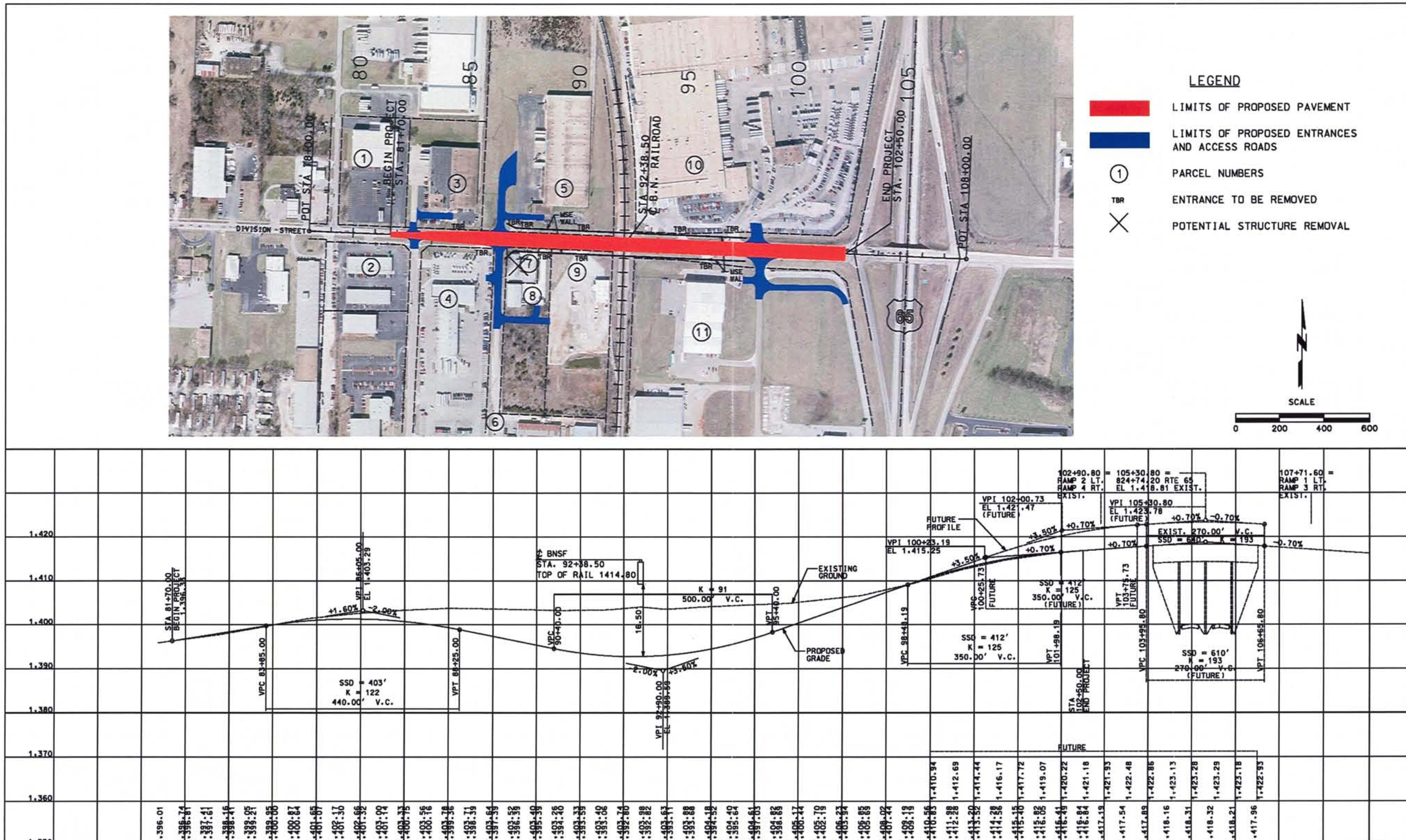

DIVISION ST. - CHESTNUT EXPRESSWAY. PROPOSED GRADE SEPARATIONS
RED PROFILE OPTION
Division Street
Chestnut Expressway
I-65
Pythian Street
Cherry Street
Packer Road
See Alternate 2 Division Street Roadway Plans.
See Alternate 4 Chestnut Expressway Roadway Plans.
Existing BNSF Right of Way
Proposed Main Track
Proposed Elevated Track Retaining Wall
Existing Degree of Curve = 1°52'
Existing BNSF Right of Way
Main Track Reverse Curve Connection (Degree of Curve = 1°30')
Existing BNSF Main Track
Proposed Elevated Track Retaining Wall
BNSF Track Thayer Subdivision
At Grade Crossing
CITY of SPRINGFIELD
HANSON WILSON
PLAN VIEW
LEGEND
Limits of Proposed Pavement
Limits of Proposed Entrances and Access Roads
Railroad Bridge
Grade = 1.26%
Grade = 0.00%
Grade = -1.13%
Existing Top of Rail
Grade = 1.26%
Proposed Top of Rail
ABOVE EXISTING CHESTNUT EXPRESSWAY
Grade = -1.26%
PROPOSED MAIN TRACK PROFILE
1475
1450
1425
1400
1375
1350
1325
20+00
25+00
30+00
35+00
40+00
45+00
50+00
55+00
60+00
65+00
70+00
75+00
80+00
85+00
90+00
95+00
100+00
105+00
110+00
115+00
120+00
125+00
130+00
135+00


PROPOSED GRADE SEPARATIONS ALONG THE BNSF
THAYER SUBDIVISION; SPRINGFIELD MO. - PREFERRED ALTERNATE


160' Face to Face Parapets
40'-0"
40'-0"
40'-0"
40'-0"
16'-6"
ELEVATION
160'-0"
Roadway
Roadway
¢ Track #2
¢ Track #1
15'-0"
34'-1"
PLAN
REVISIONS
HANSON WILSON
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY
DIVISION STREET
GENERAL PLAN & ELEVATION
SHEET 1 OF 1
05RR534
August 24, 2006


DIVISION ST. - CHESTNUT EXPRESSWAY. PROPOSED GRADE SEPARATIONS
MAGENTA PROFILE OPTION
Division Street
Chestnut Expressway
I-65
See Alternate 2 Division Street Roadway Plans
Existing BNSF Right of Way
Proposed Main Track
Proposed Elevated Track Retaining Wall
Existing BNSF Right of Way
Existing Degree of Curve = 1°52'
At Grade Crossing
Packer Road
Pythian Street
See Alternate 2 Chestnut Expressway Roadway Plans
Existing BNSF Main Track
Proposed Trench Retaining Wall
Main Track Reverse Curve Connection (Degree of Curve = 1°30')
BNSF Track Thayer Subdivision
Cherry Street
PLAN VIEW
LEGEND
Limits of Proposed Pavement
Limits of Proposed Entrances and Access Roads
HANSON WILSON
PROPOSED MAIN TRACK PROFILE


DIVISION ST. - CHESTNUT EXPRESSWAY. PROPOSED GRADE SEPARATIONS
GOLD PROFILE OPTION
Division Street
See Alternate 3 Division Street Roadway Plans.
Existing BNSF Right of Way
Proposed Main Track
Proposed Elevated Track Retaining Wall
Proposed Elevated Structure
Existing BNSF Right of Way
Existing Degree of Curve = 1°52'
At Grade Crossing
Packer Road
Pythian Street
I-65
See Alternate 8 Chestnut Expressway Roadway Plans.
Main Track Reverse Curve Connection (Degree of Curve = 1°30')
Existing BNSF Main Track
Proposed Elevated Track Retaining Wall
BNSF Track Thayer Subdivision
Cherry Street
PLAN VIEW
LEGEND
Limits of Proposed Pavement
Limits of Proposed Entrances and Access Roads
Existing Top of Rail
PROPOSED MAIN TRACK PROFILE



CITY of SPRINGFIELD

HANSON WILSON

DIVISION STREET ALTERNATE 3 - LOWER ROADWAY 11.2 FEET & RAISE RAILROAD 10.8 FEET

SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

DATE JUNE, 2006

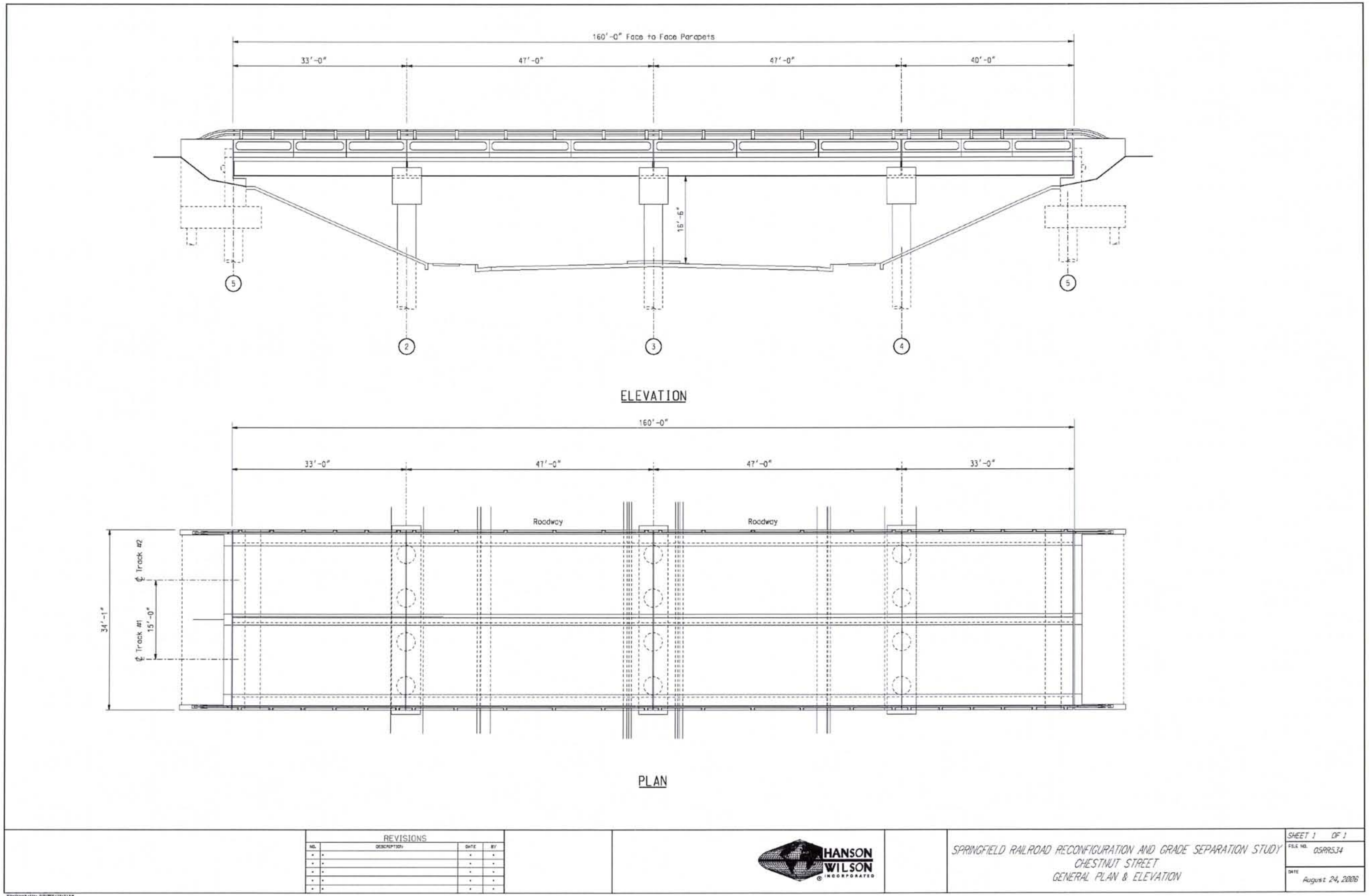
HANSON WILSON INCORPORATED

N

ARTIST'S RENDERING
CONCEPTUAL GRADE SEPARATION - DIVISION STREET - VIEW EAST
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

CITY of SPRINGFIELD

DATE June 12, 2006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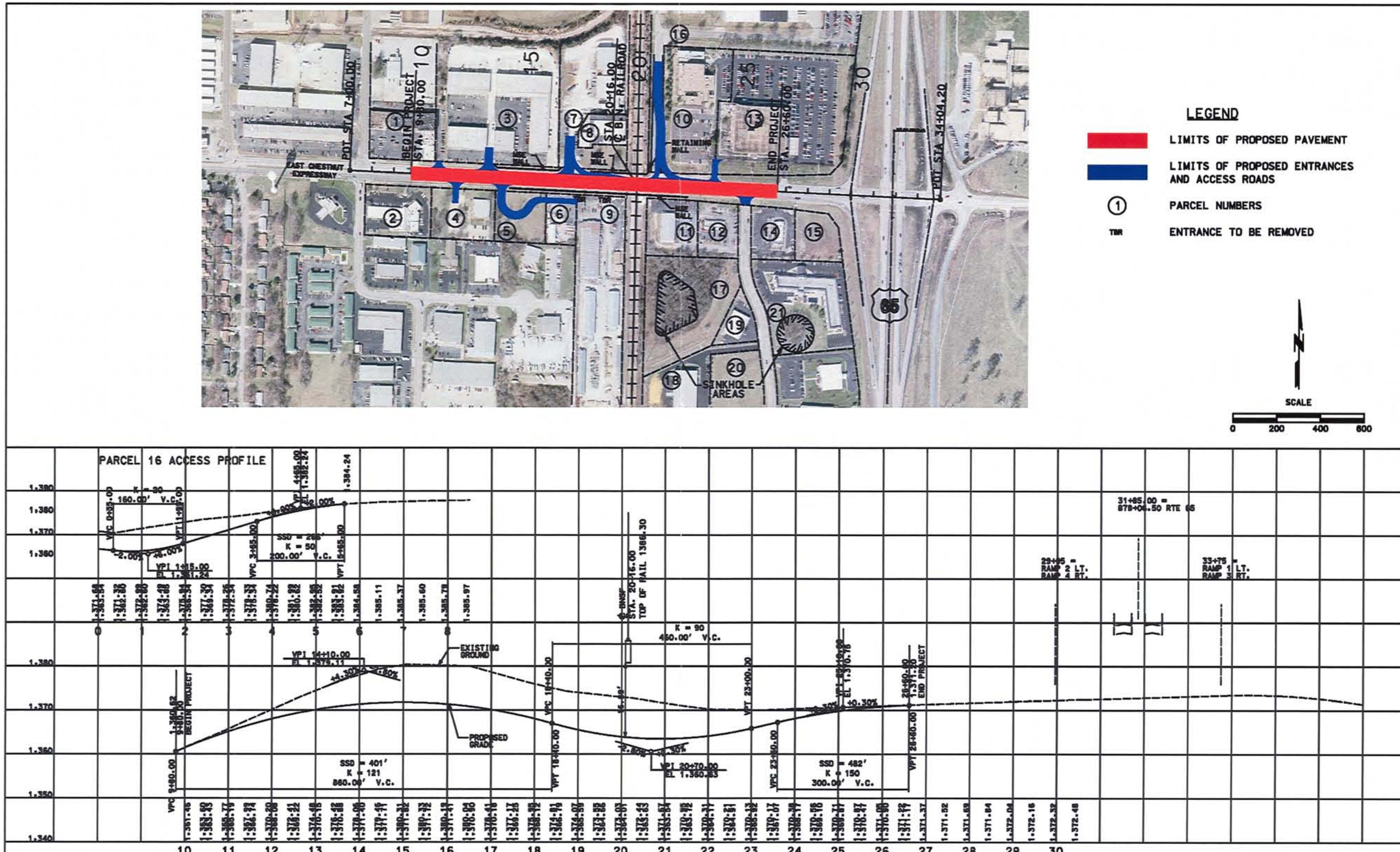
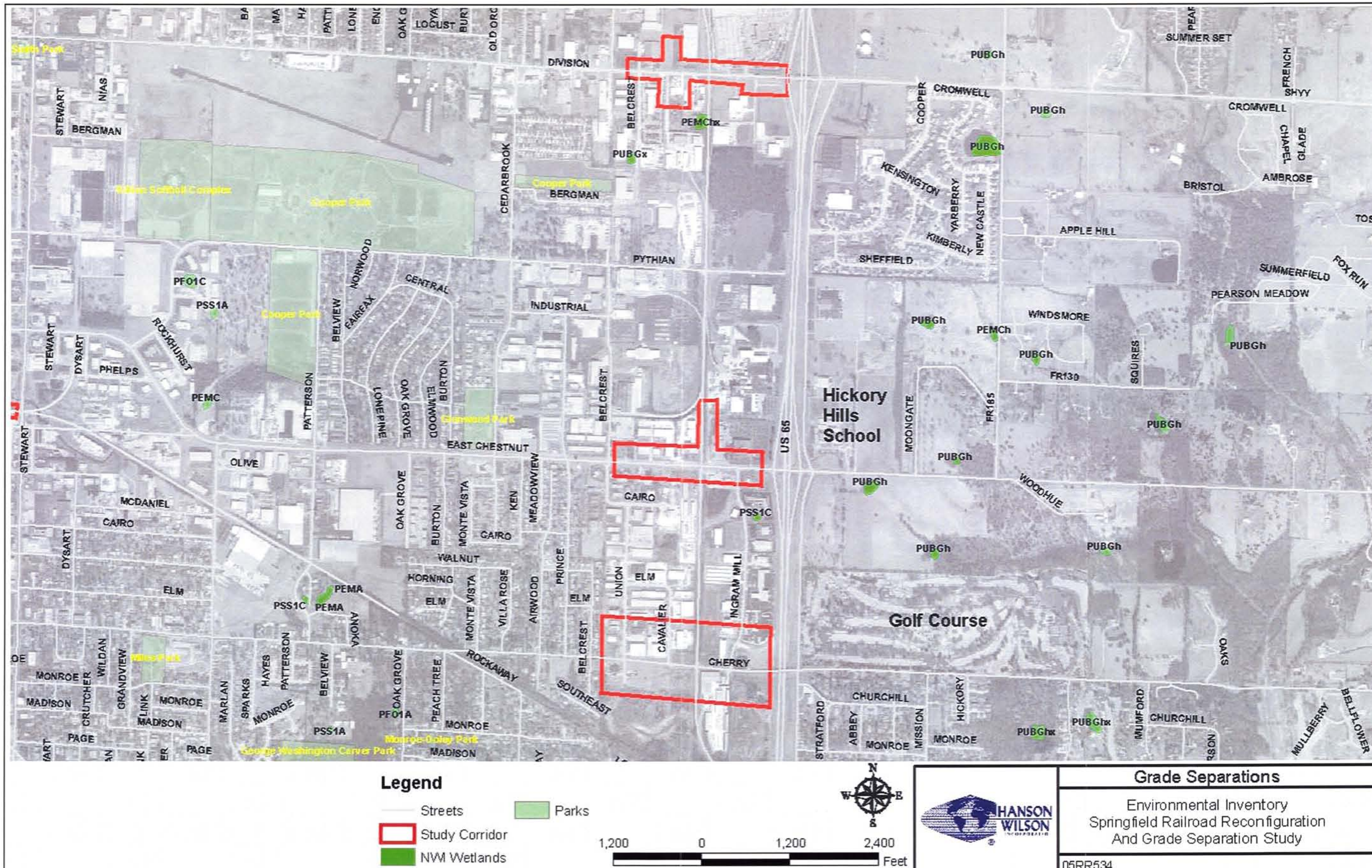
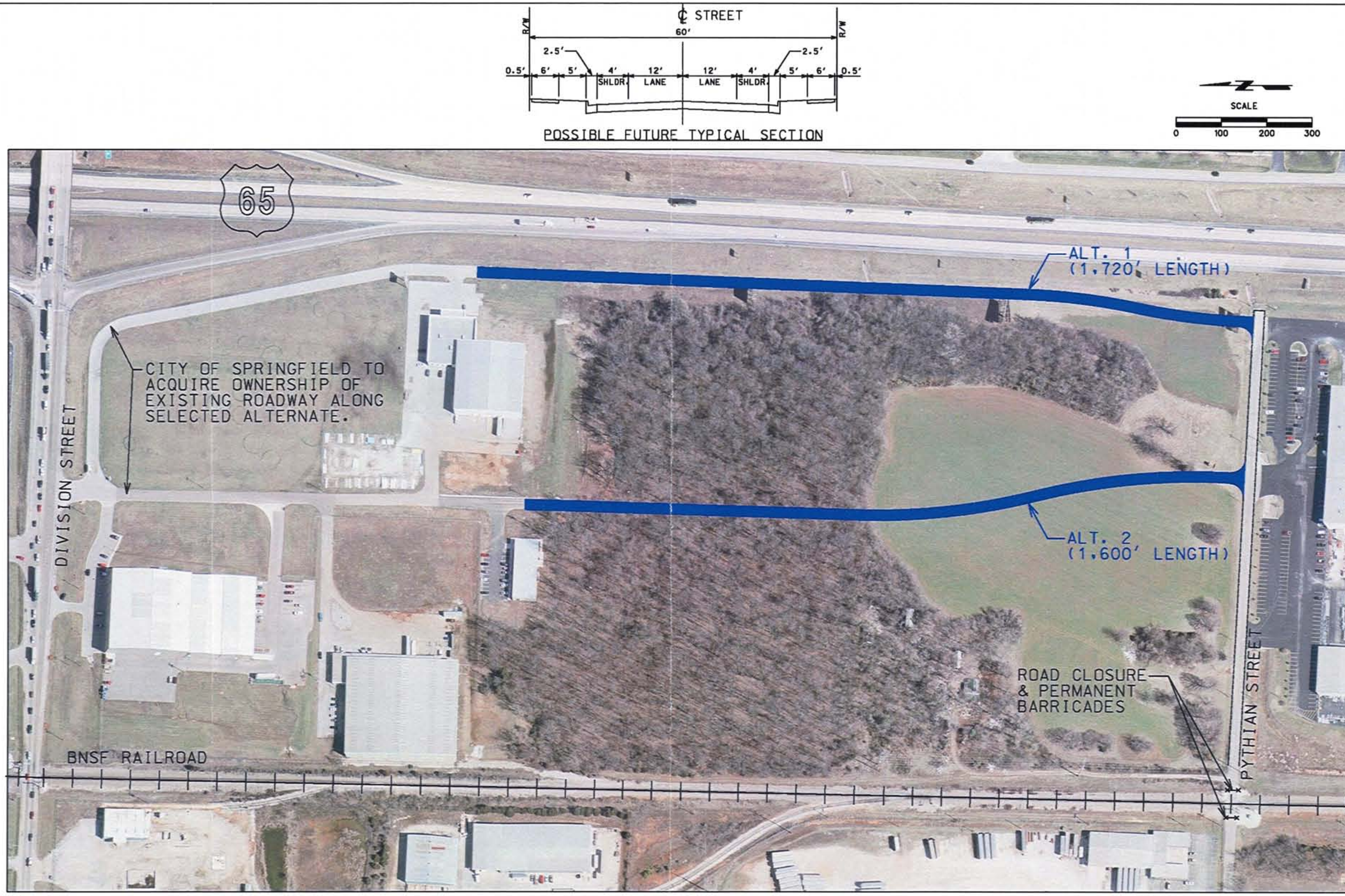
33'-0"
47'-0"
47'-0"
40'-0"
16'-6"
5
2
3
4
5
ELEVATION
160'-0"
33'-0"
47'-0"
47'-0"
33'-0"
Roadway
Roadway
¢ Track #2
¢ Track #1
15'-0"
34'-1"
PLAN
REVISIONS
HANSON
WILSON
INCORPORATED
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY
CHESTNUT STREET
GENERAL PLAN & ELEVATION
SHEET 1 OF 1
FILE NO. 05RR534
DATE
August 24, 2006



EAST CHESTNUT EXPRESSWAY ALTERNATE 6 - LOWER ROADWAY 9.0 FEET & RAISE RAILROAD 13.4 FEET
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY


Grade Separations
Environmental Inventory
Springfield Railroad Reconfiguration
And Grade Separation Study
05RR534
HANSON WILSON
Legend
Streets
Parks
Study Corridor
NWI Wetlands
1,200
0
1,200
2,400
Feet
N
S
E
W
Hickory Hills School
Golf Course
US 65
DIVISION
CROMWELL
BERGMAN
PYTHIAN
CENTRAL
INDUSTRIAL
EAST CHESTNUT
CAIRO
WALNUT
ELM
CHERRY
ROCKAWAY
SOUTHEAST
MONROE
MADISON
PAGE
CHURCHILL
BELCREST
INGRAM MILL
CAVALIER
UNION
SHEFFIELD
KENSINGTON
WOODHUE
APPLE HILL
PEARSON MEADOW
SUMMERFIELD
WINDSMORE
PUBGh
PEMCh
PUBGx
PSS1C
PSS1A
PFO1C
PFO1A
PEMC
PEMA
Cooper Park



CITY of SPRINGFIELD

HANSON WILSON

PROPOSED PYTHIAN STREET CONNECTOR ALTERNATES
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

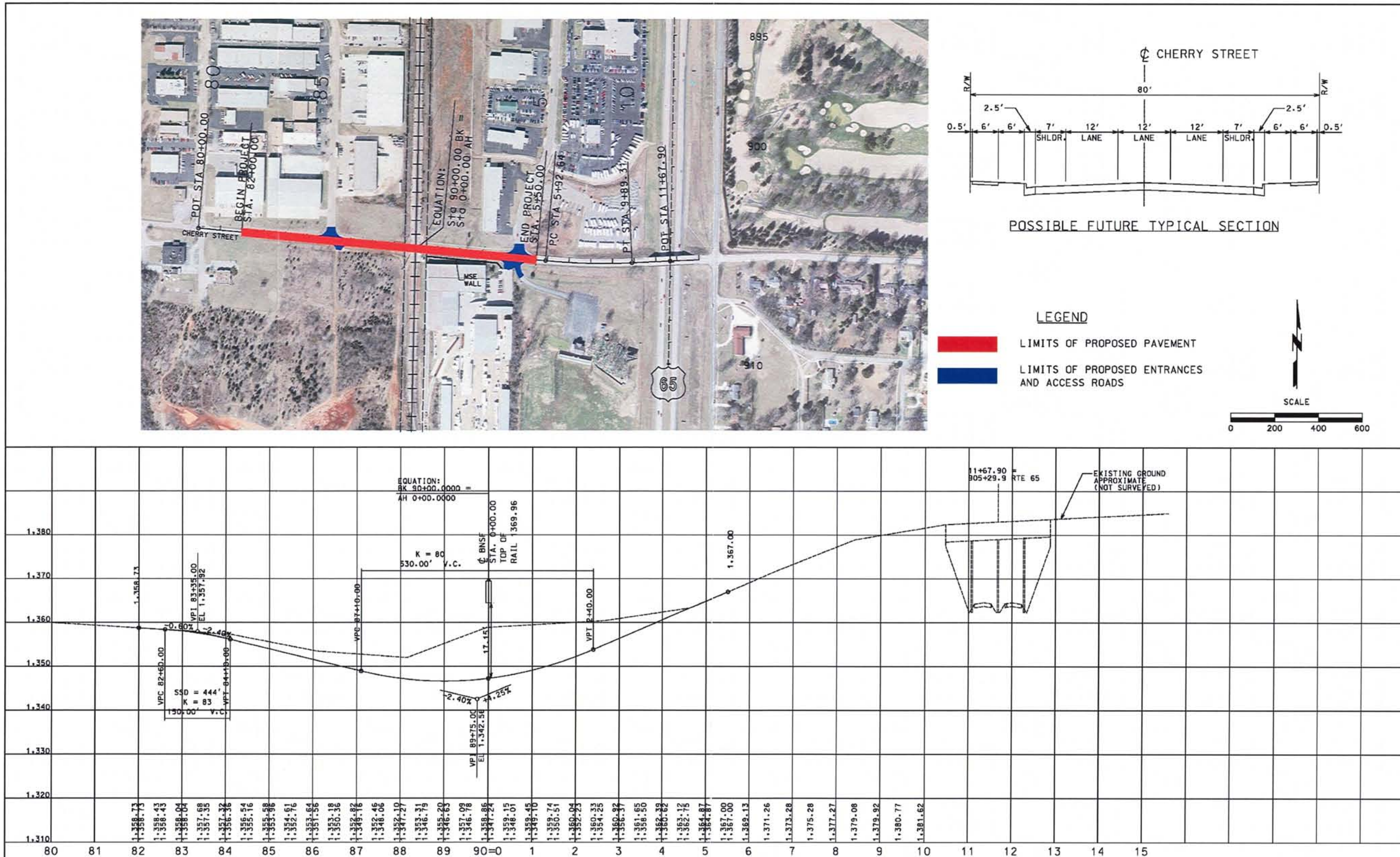
DATE JUNE, 2006

N ←

ARTIST'S RENDERING
CONCEPTUAL GRADE SEPARATION - E. CHESTNUT EXPRESSWAY - VIEW EAST
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

HANSON WILSON INCORPORATED

DATE June 12, 2006



CHERRY STREET ALTERNATE 1 - LOWER ROADWAY 11.6 FEET & RAISE RAILROAD 11.1 FEET
SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

DATE JUNE, 2006

Section 10

10 REFERENCES

DATA TABLE

SPRINGFIELD RAILROAD RECONFIGURATION AND GRADE SEPARATION STUDY

LOG OF BACKGROUND DATA

Item	Originated or Gathered (O/G)	Date Available	Received From	Confidential (Y/N)	Description
1	G	6/6/2005	BNSF	Y	Superintendents Report - Volume and Revenue Report - 1/2004 thru 12/2004
2	G	6/6/2005	MoSHPO	Y	All archaeological site forms for sites within the study area to June 2005
3	G	6/6/2005	NPS	N	All sites listed on the National Register of Historic Places within study area
4	O	6/6/2005	Goehri	Y	Thematic GIS map indicating site locations, site type, and NRHP eligibility status
5	O	6/6/2005	CAR	N	Map Notation describing thematic GIS map and recommendations
6	G	5/23/2005	City	N	Jordan Valley Park Masterplan - Concept Plan - April 12, 2005
7	G	6/6/2005	City	N	Traffic Volumes - 2005.xls Screenline Cutline Comparison
8	G	6/7/2005	City	N	Springfield - Green County Comprehensive Plan - Center City Plan Element - 5/1998
9	G	6/7/2005	OTO	N	BOD Meeting Notes - 4/21/2005 including 2005-2007 Transportation Improvement Program
10	G	6/7/2005	City	N	Springfield - Branson Corridor Transportation Study Summary Report - May, 2000
11	G	5/15/2005	City	Y	2001 Aerial Mapping of the City with various GIS Layers
12	G	6/7/2005	City	N	Springfield-Green County Comprehensive Transportation Plan - June, 2001
13	G	6/7/2005	City	Y	Springfield Regional Travel Demand Model - 2020 Daily Trip Table (Hardcopy map only)
14	G	6/28/2005	City	N	1996 FEMA Floodplain Mapping
15	G	6/28/2005	City	Y	2004 FEMA Floodplain Mapping Update (Under Review - final June, 2006)
16	G	6/28/2005	City	Y	Electronic Mapping of Sinkholes and other features within the City
17	G	5/28/2005	City Utilities	N	Headline Articles regarding CU Plans, Power Plant Data (Originated by Kuhn at CU Meeting)
18	G	6/6/2005	Newspaper	N	Opinion of Robert Stoviak re: BNSF plans between Grant and Kansas Avenue Closures
19	G	5/15/2005	BNSF	Y	Sketch of Springfield Tracks and BNSF Customer locations
20	G	5/15/2005	BNSF	Y	Sketch on Station Maps of suggested track abandonments due to West Meadows (2 Sheets)
21	G	5/15/2005	BNSF	Y	Two suggested connections between BNSF & MNARR in West Meadows
22	G	5/15/2005	BNSF	Y	Sketch on Station Maps of suggested interchange yard replacement at North Yard
23	G	Pending	MoDOT	Y	As-built data for 65/Division and 65/East Chestnut Expressway Interchanges
24	O	7/15/2005	SCE	Y	Survey of Division Street Grade Crossing
25	O	7/15/2005	SCE	Y	Survey of East Chestnut Expressway Grade Crossing
26	G	6/6/2005	BNSF	Y	Train Volumes on various lines within Springfield, customer service volumes (noted on plans)
27	G	Pending	City Utilities	Y	Utility mapping - Electric, Water, & Gas
28	G	6/22/2005	SCE	N	Detailed Traffic Volumes at various intersections within Springfield

JORDAN VALLEY AREA-WIDE ASSESSMENT (MAY 1, 2002)

TABLE 5-1
SUMMARY OF ENVIRONMENTAL ASSESSMENTS WITHIN THE STUDY AREA

MAP ID	PROPERTY NAME OR FORMER USE	ADDRESS	TRANSACTION SCREEN ASSESSMENT AND PHASE I ENVIRONMENTAL ASSESSMENT RECOMMENDATIONS	FOLLOW-UP WORK, IF APPLICABLE
			SAINT LOUIS STREET (NORTH SIDE OF THE STREET)	
1	Thompson Sales Company	727 East Saint Louis Street	• Potential petroleum impact may exist from three former USTs and a used oil spill in 1996 located in an inaccessible area. • Potential asbestos-containing building materials ("ACBM") should be tested.	• Four soil samples were collected and analyzed for OA1/OA2, MTBE and BTEX. Groundwater was not encountered. • No petroleum contamination above MDNR cleanup levels was detected. • Phase II report stated some excavation may be required in the northwest portion of the property. Additional sampling was recommended to prepare for excavation and disposal of soils. • An asbestos inspection determined ACBM to be present.
2	Greyhound Liners, Inc.	803 and 805 East Saint Louis Street	• Potential ACBM should be tested prior to demolition.	
3	Best Budget Inn	1001 East St. Louis Street	• A walk-through inspection should be performed after possession of the property. • Test for asbestos prior to demolition.	
4	Hawkins Petroleum and Kordalis Used Cars	1015-1017 and 1021 East St. Louis Street	• Localized soil staining was observed. A future walk-through and a more complete visual inspection of the soil was recommended. • Test for asbestos prior to demolition.	
5	Special Interest Motors	1025 East St. Louis Street	• Test for asbestos prior to demolition.	

MAP ID	PROPERTY NAME OR FORMER USE	ADDRESS	TRANSACTION SCREEN ASSESSMENT AND PHASE I ENVIRONMENTAL ASSESSMENT RECOMMENDATIONS	FOLLOW-UP WORK, IF APPLICABLE
6	Weaver Auto Company, Auto Detailing, and Leffert's Auto Care	1045 and 1045-A East St. Louis Street and 1050 East Trafficway	• During demolition the contractor should take note of any unusual staining or odors.	
7	Woody's Used Cars	1101 East St. Louis Street	• Test for asbestos prior to demolition.	
8	Au Naturel and Bay Square Apartments	1131 through 11351 ½ East St. Louis Street	None	
9	Hoffman Supply Company	1110-1120 East Trafficway and 1117 East St. Louis Street	• Used motors and/or compressors should be stored under cover. • Oil should be drained from stored equipment to prevent any leaks or spills. Any oil on pavement be absorbed and properly disposed. • If pavement is removed in the future, underlying soil should be inspected for possible staining.	
			EAST TRAFFICWAY (SOUTH SIDE OF THE STREET)	
10	United Methodist Church District Office	946 East Trafficway	None	
11	Edward J. Rice Co. and HTD Battery Supply	952 and 954 East Trafficway	None known.	
12	Sterling Electric	1000 East Trafficway	None	
13	Vacant Lots (Virginia Bay lots)	East Trafficway and 1033-1035 East St. Louis Street, between Sherman Parkway and North Hampton Avenue	None	
14	Advanced Metal Fabricators	1034 East Trafficway	None	
			EAST TRAFFICWAY (NORTH SIDE OF THE STREET)	
15	American Legion Post 69	149 Memorial Plaza	• The soil beneath the concrete foundation should be inspected for evidence of adverse impact when the foundation is removed. • The former railroad right-of-way should be inspected during site development.	• A visual inspection was completed. No adverse environmental conditions were observed. Further sampling or investigative work was not recommended.

MAP ID	PROPERTY NAME OR FORMER USE	ADDRESS	TRANSACTION SCREEN ASSESSMENT AND PHASE I ENVIRONMENTAL ASSESSMENT RECOMMENDATIONS	FOLLOW-UP WORK IF APPLICABLE
16	DaBryan Coach Builders	601 East Trafficway	• Phase II investigation was recommended to determine potential impact to soils or groundwater from USTs and hazardous materials such as paints and solvents. • Asbestos-containing materials were identified that must be removed prior to demolition.	• An asbestos inspection determined ACBM were present. • Eight soil samples were collected and analyzed for OA1/OA2, MTBE and BTEX. Groundwater was not encountered. • No petroleum contamination above MDNR cleanup levels was detected. The Phase II report recommended removal and closure of three UST's and excavation of petroleum-impacted soils.
17	Sears Warehouse	635 East Trafficway	• Phase II investigation was recommended to determine potential impact to soils or groundwater from USTs. • Potential ACBM should be tested prior to demolition.	• An asbestos inspection determined ACBM to be present. • Three soil samples were collected and analyzed for OA1/OA2, MTBE and BTEX. Groundwater was not encountered. • No petroleum contamination above MDNR cleanup levels was detected. The Phase II report recommended removal and closure of one UST.

MAP ID	PROPERTY NAME OR FORMER USE	ADDRESS	TRANSACTION SCREEN ASSESSMENT AND PHASE I ENVIRONMENTAL ASSESSMENT RECOMMENDATIONS	FOLLOW-UP WORK, IF APPLICABLE
18	Thompson Sales Company	645 and 709 East Trafficway	• A request should be made to City Utilities regarding the integrity of pole mounted transformers. • Potential ACBM should be tested.	• Phase II investigation was performed in conjunction with the other two Thompson properties. • Five soil samples were collected and analyzed for OA1/OA2, MTBE and BTEX. Groundwater was not encountered. • No petroleum or VOC contamination was detected at levels above MDNR cleanup standards, with the exception of one sample on the northeast portion of the property, where diesel range organics were detected at 260 ppm. • An asbestos inspection determined ACBM to be present.
19	Thompson Sales Company	807 East Trafficway	• Phase II investigation was recommended to determine impact to soils or groundwater from former UST. • Potential ACBM should be tested.	• Four soil samples were collected and analyzed for OA1/OA2, MTBE and BTEX. Groundwater was not encountered. • No petroleum contamination was found. • An asbestos inspection determined ACBM to be present.

MAP ID	PROPERTY NAME OR FORMER USE	ADDRESS	TRANSACTION SCREEN ASSESSMENT AND PHASE I ENVIRONMENTAL ASSESSMENT RECOMMENDATIONS	FOLLOW-UP WORK, IF APPLICABLE
20	Tri-States / Whitely Laundry Six tracts with different addresses and owners, as follows: • 909 East Trafficway • No address • 405 and 411 North Sherman • 325 and 327 North Dollison • 301 and 323 North Dollison • 723 and 725 East Trafficway	North of East Trafficway, between North Sherman Avenue and North Clay Avenue.	• Phase II investigation was recommended to determine potential impact to soils or groundwater from former dry cleaning operations, potential historical dumping of petroleum fluids, USTs on the subject property, and a former bulk oil storage facility adjacent to the property. • Potential ACBM should be tested prior to demolition.	• Sixteen soil and groundwater samples were collected and analyzed for OA1/OA2, MTBE and BTEX. Groundwater was not encountered. • No petroleum or VOC contamination was detected at levels above MDNR cleanup standards, with the exception of three samples west of 405/411 N. Sherman and north of 323/325 N. Dollison, near the former bulk oil storage facility. Two samples had high levels of DRO as diesel and one sample had high levels of DRO as motor oil. • The Phase II report identified two areas of soil contamination: One area approximately 90 ft x 120 ft and 10 ft deep near the former bulk oil tank farm, and one area approximately 20 ft x 30 ft and 10 ft deep near the former UST on the east side of the 301 N. Dollison building. • An asbestos inspection determined several ACBM to be present. • The site is currently enrolled in the MDNR Voluntary Cleanup Program ("VCP") to address TCE contamination in groundwater.
21	Pitman	951 East Trafficway	None	
22	ColorGraphic Printing, Inc.	925 East Trafficway	• ColorGraphic should re-evaluate materials and waste management practices to assure compliance with RCRA hazardous waste generator and reporting requirements.	

MAP ID	PROPERTY NAME OR FORMER USE	ADDRESS	TRANSACTION SCREEN ASSESSMENT AND PHASE I ENVIRONMENTAL ASSESSMENT RECOMMENDATIONS	FOLLOW-UP WORK, IF APPLICABLE
23	O'Reilly Automotive Machine Shop & Engine Parts	937 East Trafficway	• Crankshaft parts sprayed with WD-40 should be within a pan that provides secondary containment and that prevents the release of WD-40 to the concrete floor. • Determine whether wastewater and solids from the hot water rinse basin that settle in the floor sump are hazardous or non-hazardous, to confirm compliance with discharge and disposal regulations. • O'Reilly Automotive should remove all materials and wastes from the subject property prior to acquisition by the City.	
24	Valley Paint & Supply	1007 East Trafficway	• Collect several soil samples from the upper foot of soil for analysis of volatile organic compounds ("VOC's") and RCRA metals. Alternatively, more detailed inspections could be performed during demolition.	• Two soil samples were collected from an area of stained soil and analyzed for VOC's and metals. VOC's were not detected and metals were not detected at levels above regulatory guidelines. • No further sampling or investigative work was recommended.
25	Unibody Repair Specialists	1015 East Trafficway	None	
26	Sheet Metal Workers Training Center	1035 East Trafficway	None	

MAP ID	PROPERTY NAME OR FORMER USE	ADDRESS	TRANSACTION SCREEN ASSESSMENT AND PHASE I ENVIRONMENTAL ASSESSMENT RECOMMENDATIONS	FOLLOW-UP WORK, IF APPLICABLE
27	Ash Grove and Conco Quarry Properties • Conco Quarry • Increte of the Ozarks • Tracts E & F	North of East Trafficway, between National Avenue and Sherman Parkway	• As planned by Conco, a wash basin should be constructed for cleaning readymix trucks. Discharges to the quarry property should be discontinued. • In the truck cleaning building located at the northern end of the Increte Property, secondary containment for tanks and drums of truck cleaning chemicals was recommended. Additionally, wastewater generated in this building from truck cleaning should be contained and tested to determine if it meets sanitary sewer discharge requirements. If so, this wastewater should be discharged to the sanitary sewer. No recommendations for Tracts E & F.	• The site is currently enrolled in the MDNR VCP to investigate the generation of methane gas. Soil gas samples and water samples from the former quarry have been collected and analyzed.
MISCELLANEOUS				
28	Missouri Farmers Association Incorporated	524 North Boonville Avenue	• One or more soil representative samples be collected and analyzed to determine whether fumigant application has impacted soil at the subject property. • Additional information on the source of standing water in the basement should be collected, or alternatively, the quality of the water could be examined to determine if an environmental condition exists.	• A site-specific Sampling and Analysis Plan ("SAP") has been prepared and submitted to EPA for review and approval.

MAP ID	PROPERTY NAME OR FORMER USE	ADDRESS	TRANSACTION SCREEN ASSESSMENT AND PHASE I ENVIRONMENTAL ASSESSMENT RECOMMENDATIONS	FOLLOW-UP WORK, IF APPLICABLE
29	Former Solid State Circuits	616 North Boonville Avenue	The site was at one time proposed to be listed on the Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri. Investigation was conducted under the state Superfund authority and some cleanup activities were conducted with department oversight. The current status of the site is "No Further Remedial Action Planned" and no institutional controls were identified that would limit future use of the property. No recommendations were made for further investigation.	
30	Arthur B. Agee property	Boonville Avenue and Water Street	None	
31	Vacant building at 333 North Campbell Avenue	333 North Campbell Avenue	• City of Springfield should obtain a copy of and review the Preliminary Assessment of the former manufactured gas plant ("MGP") performed by the USEPA. The City should monitor USEPA and MDNR activities with regard to the former MGP.	
32	Meek's	330 North Jefferson Avenue	None	
33	Former agricultural mill, behind Git-N-Go	610 to 620 North National Avenue	• One or more representative soil samples should be collected and analyzed to determine potential impact from the past uses of fumigants. • Electrical equipment should be tested for PCBs prior to disposal.	
34	Railroad Property north of the former Creamery	West of North Sherman Avenue and south of former Phelps Street	• Depending upon anticipated use of the subject property, the past use of herbicides on the property may be investigated further.	

Section 11

11 ADDENDUM NUMBER 1

This narrative describes proposed modifications to the East Chestnut Expressway recommended alternate (Case 6), the related expansion of work and impacts to the project corridor associated with a proposed change in roadway typical section.

PROJECT LIMIT REVISIONS

The proposed roadway profile grade is driven by vertical clearance requirements at the proposed grade separation. A preliminary review of bridge depth associated with the revised railroad overpass structure was performed. While increased bridge span lengths will be required, no substantial changes in the overall depth of the structure that would adversely affect the proposed roadway or railroad profiles are envisioned.

The previously developed longitudinal improvement limits of Sta. 9+80± (approximately 240 feet east of the Belcrest Avenue intersection) and Sta. 26+60± (approximately 340 feet west of the Route 65 southbound ramp terminals) remain valid, encompassing a total project length of approximately 1700 feet. Slight shifts in these termini may occur based on the inclusion of lane addition and drop tapers near the project limits. For estimating purposes, an expanded length of 1800 feet is assumed to address these conditions.

DESIGN CRITERIA REVISIONS

Aside from an increase in the number of through lanes from 4 to 6, no change to either the functional classification or design criteria associated with this improvement is required.

TYPICAL SECTION REVISIONS

Substitution of a 6-lane (3 through lanes in each direction) typical section for the previously proposed 4-lane typical section. The proposed typical section meets MoDOT design criteria for an urban expressway. The through lanes will be separated by a concrete median barrier in lieu or the previously proposed raised concrete median strip. The median barrier would be continuous through the project limits, with breaks occurring only at adjacent signalized intersection. Paved shoulders would abut the median barrier, providing a minimum median width of 14 feet. Increases in the median width and termination of the median barrier would occur immediately in advance of signalized intersections.

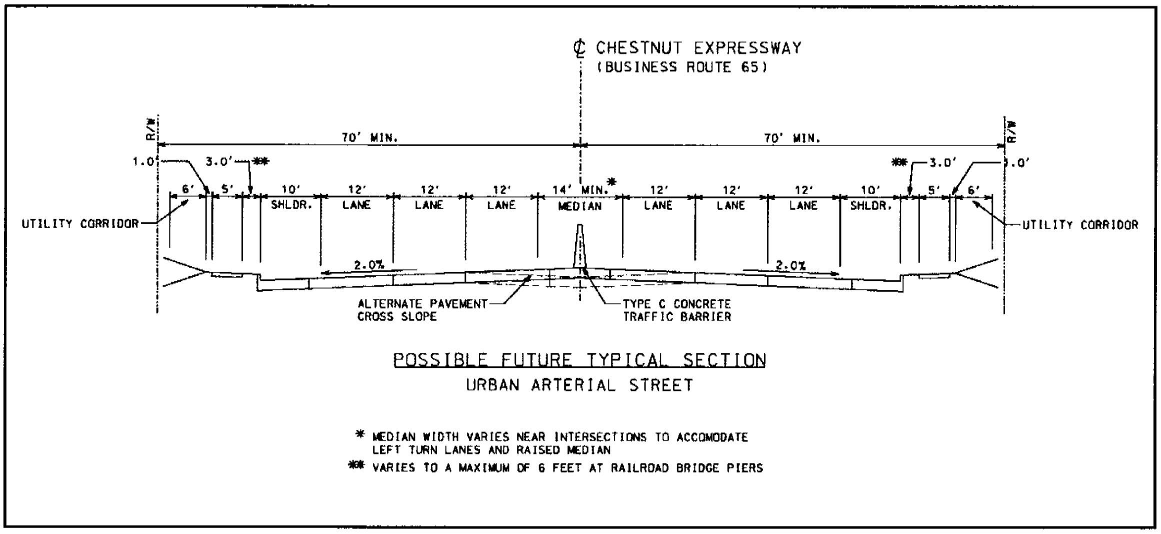


Figure 102 - Proposed 6-Lane Typical Section at E. Chestnut Expressway

In addition to the increased number of through lanes, another major change to the proposed typical section is the inclusion of external paved shoulders. Prior recommendations with the 4-lane typical section included use of concrete curb and gutter immediately adjacent to the outside lanes. The addition of lanes will change driver perception of the facility, inducing higher travel speeds. Based on the increased number of lanes and inclusion of a median barrier, use of external paved shoulders is now recommended. Inclusion of shoulders will help maintain the safety of the proposed improvements by providing additional lateral buffer space and room for disabled vehicles. Subject to review and concurrence by MoDOT and the City, a 10 foot external shoulder width is proposed.

It should be noted that two - pavement cross slope options have been identified in conjunction with the revised typical section:

1. A compound cross slope (crowned section) for each direction of travel; and,
2. A uniform 2% cross slope extending across all three lanes in each direction of travel.

Use of a compound cross slope is standard for a facility of this width. The benefits of its use would include a modest reduction in the depth of excavation relative to the use of a uniform cross slope, and a reduction in sheet flow across the exterior lanes. Use of a uniform cross slope would reduce the number of drainage structures required for this facility, and may afford a better fit of existing improvements at the project termini. Further study of this design feature is recommended during preliminary design.

TRAFFIC OPERATIONS REVISIONS

Based on an anticipated future traffic volume of 36,000 AADT and proposed use of a 6-lane typical section with traffic signal improvements at adjacent access points, a Level of Service (LOS) of C can be anticipated. This assumes ultimate construction of 6-lane improvements is performed on adjacent sections of East Chestnut Expressway, and that coordination of adjacent traffic signals occurs.

ACCESS REVISIONS

Implementation of a wider typical section in association with construction of the depressed grade separation will negatively impact access to adjoining properties. The general nature of these impacts is as follows:

Driveway Location	Parcel(s) Served	Impacts
11+00, Lt.	3	Moderate length and gradient increase; Temporary easement required.
11+80, Rt.	4	Moderate length and gradient increase.
13+25, Lt.	3	Increase in grade; Proximity of buildings may impact design.
14+00, Rt.	5,6 & 9	Increase in gradient and amount of R/W required
17+00, Lt.	7 & 8	Drastic increase in gradient or length. ***Providing access to parcel 8 may no longer be possible.***
21+00, Lt.	16	Moderate length and gradient increase (Serves 3M parcel)
23+75, Lt.	10 &13	Moderate length or gradient increase.
25+25, Rt.	Ingram Mill Rd.	Moderate length or gradient increase.

It should be noted that the above statements should be considered general in nature, and that additional site surveys should be completed to validate the feasibility or extent of driveway construction under the proposed conditions.

RIGHT-OF-WAY REQUIREMENT REVISIONS

The existing right-of-way corridor is nominally 120 feet wide between Belcrest Avenue and the existing rail crossing. East of the crossing, the width varies from a minimum of 120 feet to a maximum of 160 feet in the vicinity of the Route 65 interchange. Proposed changes to the typical section will require a minimum R/W corridor width of 140 feet, with additional right-of-way required to facilitate construction of excavation slopes or to provide room for excavation of MSE walls. In areas where MSE walls are required, a conceptual R/W width of 160 feet should be planned.

The direct acquisition of buildings or other major improvements should not be required to facilitate the physical construction of the improvements. However the building located on Parcel 8 may not be directly accessible post-construction. Damages to other parcels associated with loss of utility and use may also increase.

RETAINING WALLS

Use of MSE type retaining walls is still recommended in association with the proposed work – subject to future verification of the presence and extent of rock excavation. Modest increases or decreases in wall heights associated with the expanded lateral extent of the project are anticipated. Slight increases in overall wall lengths are also likely based on the omission of entrances and change conditions at wall ends. For estimating purposes, a 10% increase in wall area relative to that associated with the previously proposed 4-lane typical section is assumed.

DRAINAGE

Based on the preliminary nature of this study, no major revisions to the drainage schemes developed with the 4-lane typical section are warranted at this time. Slight increases in total pipe length and the number of inlets required are envisions based on optional pavement cross slope configurations and wider pavement.

RAILROAD BRIDGE CONSIDERATIONS

An additional lane of traffic in each direction will increase the length of the two interior spans by approximately 12 ft each. The original preliminary beam design utilized a conservative approach and the addition of the additional span length appears to be within the tolerances of the initial design results. Consequently, the bridge type does not substantially change with this change. Below is the plan and elevation view of the bridge that would accommodate a proposed 6-lane roadway.

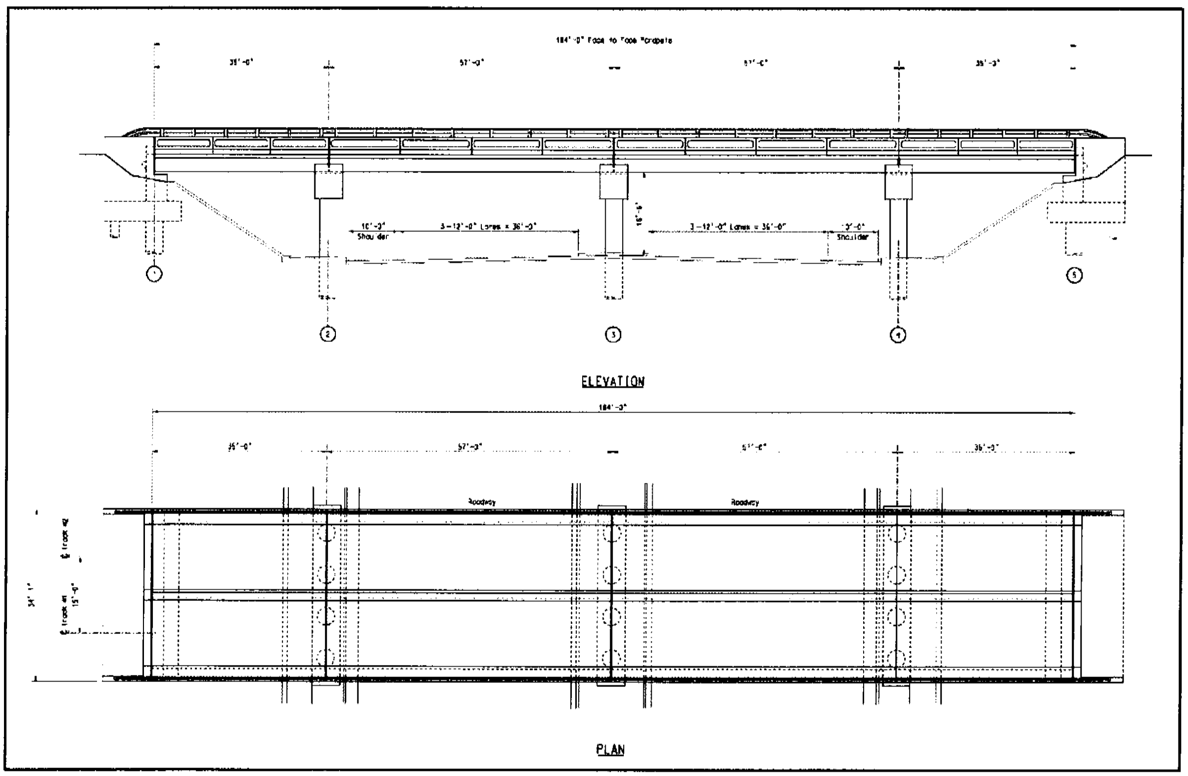


Figure 103 - Proposed Railroad Bridge to Accommodate 6-Lane Section

CONSTRUCTION COST IMPACTS

The following cost estimates include applicable revisions pertaining to a 6-lane typical section at E. Chestnut Expressway.

Conceptual Construction Cost Summary

SPRINGFIELD RAILROAD RECONFIGURATION
AND
GRADE SEPARATION STUDY

CONCEPTUAL CONSTRUCTION COST ESTIMATE

GRADE SEPARATIONS

October 15, 2006

		Estimated Minimum	Estimated Maximum
Base Project (One Phase)			
Grade Separate Division and East Chestnut Expressway			
	Road Work	$ 13,840,000	$ 20,200,000
	Railroad Work	$ 28,160,000	$ 35,200,000
	Total	**$ 42,000,000**	**$ 55,400,000**
Expanded Project (One Phase)			
Grade Separate Division, East Chestnut Expressway and Cherry Street			
	Road Work	$ 15,920,000	$ 22,900,000
	Railroad Work	$ 38,720,000	$ 48,400,000
	Total	**$ 54,640,000**	**$ 71,300,000**
Add Cherry Street Grade Separation to Base Project (Future)			
Grade Separate Cherry Street			
	Road Work	$ 2,000,000	$ 2,700,000
	Railroad Work	$ 13,200,000	$ 16,500,000
	Total	**$ 15,200,000**	**$ 19,200,000**

Notes:
1. All estimated costs are in 2006 dollars. No future escalation applied.
2. All utility relocation costs included in "Road Work" line item.
3. 25% contingency is included.
4. For minimum, some walls removed due to rock excavation and no contingencies have been applied.

Preferred Option Excluding Cherry Street – Railroad Estimate

PREFERRED OPTION - RAILROAD ESTIMATE

Work Item	Quantity	Unit		Unit Cost		Cost
North Tie In to Cherry St.						
Intial Shoofly Construction						
Embkm't - North Tie In to Division: Shoofly	5,000	CY	$	4.00	$	20,000
Excvtn - N. Tie In to Division: Shoofly	3,000	CY	$	8.00	$	24,000
Subballast - Division to Chestnut Shoofly	2,000	CY	$	35.00	$	70,000
T-Wall - Division to Chestnut: Shoofly	26,000	SF	$	64.00	$	1,664,000
Select Backfill - Division to Chestnut: Shoofly	16,000	CY	$	15.00	$	240,000
Excvtn - Division to Chestnut: Shoofly	11,000	CY	$	8.00	$	88,000
Cast Concrete Ret Wall - Shoofly Ditch	4,200	SF	$	100.00	$	420,000
Subballast - Division to Chestnut Shoofly	5,000	CY	$	35.00	$	175,000
T-Wall : Chestnut to Cherry Tie In: Shoofly	13,000	SF	$	64.00	$	832,000
Select Backfill - Chestnut to Tie In: Shoofly	8,000	CY	$	15.00	$	120,000
Excvtn - Chestnut to Tie In: Shoofly	0	CY	$	8.00	$	-
Shoofly Track - N. Tie In to Cherry Tie In	10,900	TF	$	120.00	$	1,308,000
Grading - Ind'y Trk/Shoofly Connections	17,500	CY	$	8.00	$	140,000
Shoofly Turnouts (Relocate from Main Line)	4	EA	$	25,000.00	$	100,000
Division St Temp Shoofly Xing	20	TF	$	800.00	$	16,000
Pythian St. Temp Shoofly Xing	20	TF	$	800.00	$	16,000
Chestnut Expwy Temp Shoofly Xing	20	TF	$	800.00	$	16,000
Shoofly Signal Modifications	1	LS	$	900,000.00	$	900,000
Crossing Signal Relocation	1	LS	$	400,000.00	$	400,000
Remove Main Trk - N.Tie In to S. Tie In	10,900	TF	$	25.00	$	273,000
Subtotal					**$**	**6,822,000**
Double Main Trk Walls and Grading: N. Tie In to Division						
T-Wall - N. Tie In to Division: Main E. Side	0	SF	$	64.00	$	-
T-Wall - N. Tie In to Division:: Main W. Side	0	SF	$	64.00	$	-
Select Backfill - N. Tie to Division	0	CY	$	15.00	$	-
Embnt - N Tie In to Division: Main Trk	11,000	CY	$	4.00	$	44,000
Excvtn - N. Tie In to Division: MainTrk	0	CY	$	8.00	$	-
Subtotal					**$**	**44,000**
Double Main Trk Walls and Grading: Division to Chestnut						
T-Wall - Division to Chestnut: Main E. Side	24,000	SF	$	64.00	$	1,536,000
T-Wall - Division to Chestnut: Main W. Side	61,000	SF	$	64.00	$	3,904,000
Select Backfill - Division to Chestnut: Main Trk	84,000	CY	$	15.00	$	1,260,000
Subtotal					**$**	**6,700,000**
Double Main Trk Walls and Grading: Chestnut to Cherry Tie In						
T-Wall - Chestnut to Cherry Tie In: Main E. Side	28,000	SF	$	64.00	$	1,792,000
T-Wall - Chestnut to Cherry Tie In: Main W. Side	22,000	SF	$	64.00	$	1,408,000
Select Backfill - Chestnut to Cherry Tie In: Main Trk	40,000	CY	$	15.00	$	600,000
Subtotal					**$**	**3,800,000**
Main Track Construction - North Tie to South Tie In						
Mainline Subballast	10,500	CY	$	35.00	$	368,000
Mainline Track	10,900	TF	$	145.00	$	1,581,000
Remove Shoofly Trk N/R for Ind'y Trk Leads	7,300	TF	$	25.00	$	182,500
Remove Shoofly Subballast N/R for Ind'y Trk Leads	7,000	CY	$	4.00	$	28,000
Mainline Signal Modifications	1	LS	$	900,000.00	$	900,000
Subtotal					**$**	**3,060,000**
West Side Ind'y Trk Ramp and Connections						
Remove Shoofly Trk in Conflict with Ramp	1,600	TF	$	25.00	$	40,000
Remove Shoofly Trk in Conflict with Ramp	800	TF	$	25.00	$	20,000
Remove Subballast - Shoofly Ramp	1,500	CY	$	4.00	$	6,000
T-Wall - Raise Shoofly Wall to Accommodate Ind'y Trk Ramp	10,000	SF	$	64.00	$	640,000
Select Backfill - Ind'y Trk Ramp	10,000	CY	$	15.00	$	150,000
M/L TO - Indy Trk Connection	1	EA	$	150,000.00	$	150,000
Subballast (recycled) - West Side Ind'y Trk Connections	1,500	CY	$	4.00	$	6,000
Industry Trk Connection- Reinstall Shoofly	1,600	TF	$	45.00	$	72,000
Replace Ind'y Trk Connections	800	TF	$	45.00	$	36,000
Subtotal					**$**	**1,120,000**

Preferred Option Excluding Cherry Street – Railroad Estimate - continued

3M Ind'y Trk Connection				
T-Wall - 3M Connection Ramp	5,000	SF	$ 64.00	$ 320,000
Select Backfill - 3M Connection Ramp	3,000	CY	$ 15.00	$ 45,000
Replace Ind'y Trk Connectiion	500	TF	$ 45.00	$ 23,000
Reinstall M/L TO - Indy Trk Connection	1	EA	$ 25,000.00	$ 25,000
Subtotal				**$ 413,000**
Sutherland Lumber Ind'y Trk Ramp and Connection				
T-Wall - Raise Shoofly Wall to Accommodate Ind'y Trk Ramp	2,500	SF	$ 64.00	$ 160,000
Select Backfill - Ind'y Trk Ramp	2,400	SF	$ 15.00	$ 36,000
Install M/L TO - Indy Trk Connection	1	EA	$ 150,000.00	$ 150,000
Subballast (recycled) - West Side Ind'y Trk Connection	1,300	CY	$ 4.00	$ 5,200
Industry Trk Connection- Reinstall Shoofly	1,300	TF	$ 45.00	$ 58,500
Subtotal				**$ 410,000**
Structures				
Double Trk Br Underpass - Division St	160	LF	$ 7,500.00	$ 1,200,000
Double Trk Br Underpass - E Chestnut Expwy	160	LF	$ 7,500.00	$ 1,200,000
Subtotal				**$ 2,400,000**
Site Improvements				
ROW Drainage Improvements	10,900	LF	$ 30.00	$ 327,000
Seeding and Landscaping	15	AC	$ 5,000.00	$ 75,000
Subtotal				**$ 402,000**
Project Total: North Tie In to Cherry St. Tie In				**$ 25,171,000**

Cherry St. Grade Sep Addition

Work Item	Quantity	Unit	Unit Cost	Cost
Shoofly Construction				
Remove TO - M/L Sutherland Connection	1	EA	$ 10,000.00	$ 10,000
Remove Trk - Sutherland Connection	1,300	TF	$ 25.00	$ 32,500
Remove Subballast - Sutherland Connection	1,300	CY	$ 4.00	$ 5,200
Remove T-Wall - Sutherland Connection Ramp	2,500	SF	$ 20.00	$ 50,000
Excvt'n - Remove Sutherland Ramp Select Fill	2,400	CY	$ 4.00	$ 9,600
T-Wall (recycled) - Raise Shoofly Wall for M/L to Shoofly Ramp	0	SF	$ 20.00	$ -
T-Wall - Raise Shoofly Wall for M/L to Shoofly Connection Ramp	23,000	SF	$ 64.00	$ 1,472,000
Select Backfill (recycled) - M/L to Shoofly Connection Ramp	2,400	CY	$ 4.00	$ 9,600
Select Backfill (new) - M/L to Shoofly Connection Ramp	19,000	CY	$ 15.00	$ 285,000
Subballast (recycled) - M/L to Shoofly Connection Ramp	2,400	CY	$ 4.00	$ 9,600
T-Wall - Shoofly Extension for Cherry St. Grade Sep	5,000	SF	$ 64.00	$ 320,000
Select Backfill - Shoofly Extension	5,000	CY	$ 15.00	$ 75,000
Excvt'n - Shoofly Extension to S. Tie In	2,000	CY	$ 8.00	$ 16,000
Embkm't - Shoofly Extension to S. Tie In	3,000	CY	$ 4.00	$ 12,000
Subballast (new) - Shoofly Extension to S. Tie In	2,000	CY	$ 35.00	$ 70,000
Reinstall Shoofly Trk - M/L Ramp to Shoofly (rem'd Sutherland Trk)	1,300	TF	$ 45.00	$ 58,500
Reinstall Trk - Shoofly Connection to S. Tie In	2,000	TF	$ 45.00	$ 90,000
Cherry St Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Shoofly Signal Modifications	1	LS	$ 200,000.00	$ 200,000
Crossing Signal Relocation	1	LS	$ 100,000.00	$ 100,000
Subtotal				**$ 2,841,000**

Preferred Option Excluding Cherry Street – Railroad Estimate - continued

Double Main Track Walls and Grading						
Remove Trk - M/L: From Shoofly Ramp to S. Tie In	4,500	TF	$	25.00	$	112,500
Remove TO - Ind'y Trk	1	EA	$	10,000.00	$	10,000
T-Wall - M/L East Addition for N. Cherry St. Grade Sep Approach	20,300	SF	$	64.00	$	1,299,200
T-Wall - M/L West Addition for N. Cherry St. Grade Sep Approach	20,300	SF	$	64.00	$	1,299,200
Select Backfill - N. Cherry St M/L Grade Sep Approach	41,000	CY	$	15.00	$	615,000
T-Wall - M/L East Addition for S. Cherry St. Grade Sep Approach	7,500	SF	$	64.00	$	480,000
T-Wall - M/L West Addition for S. Cherry St. Grade Sep Approach	9,400	SF	$	64.00	$	601,600
Select Backfill - S. Cherry St M/L Grade Sep Approach	21,000	CY	$	15.00	$	315,000
Embkm't - S. Cherry St: M/L	3,100	CY	$	4.00	$	12,400
Excvtn - S. Cherry St Tie In: M/L	2,800	CY	$	8.00	$	22,400
Subballast (new) - to S. M/L Tie In	4,300	CY	$	35.00	$	150,500
Remove Trk - S. Cherry Ind'y Track	500	TF	$	25.00	$	12,500
T-Wall for Ind'y Tr Approach S. of Cherry	7,500	SF	$	64.00	$	480,000
Select Fill - Ind'y Trk Connection S. of Cherry	3,000	CY	$	15.00	$	45,000
Grading - Ind'y Trk Connection S. of Cherry	10,500	CY	$	4.00	$	42,000
Subballast (new) - Ind'y Trk Connection S. of Cherry	1,400	CY	$	35.00	$	49,000
Industry Trk Connection - Shoofly	500	TF	$	45.00	$	22,500
Subtotal					**$**	**5,568,800**
Main Track Construction - Cherry St. Grade Sep Addition						
Reinstall M/L Trk - M/L Ramp to S. Tie In	4,500	TF	$	45.00	$	202,500
Reinstall M/L TO - Indy Trk Connection	1	EA	$	15,000.00	$	15,000
Mainline Signal Modifications	1	LS	$	200,000.00	$	200,000
Subtotal					**$**	**417,500**
Recreate Sutherland Ind'y Trk Connection						
Remove Trk - Shoofly Trk	4,500	TF	$	25.00	$	112,500
Excvt'n - Remove Subballlast M/L Ramp to Shoofly	4,300	CY	$	4.00	$	17,200
Excvt'n - Select Backfill M/L Ramp to Shoofly	21,400	CY	$	4.00	$	85,600
Remove T-Wall - M/L Ramp to Shoofly	23,000	SF	$	20.00	$	460,000
T-Wall - Sutherland Ind'y Trk Connection Ramp	10,600	SF	$	64.00	$	678,400
Select Backfill (recycled) - Sutherland Ind'y Track Connection	10,200	CY	$	4.00	$	40,800
Subballast (recycled) - Sutherland Indy Track Connection	1,300	CY	$	4.00	$	5,200
Reinstall M/L TO - Sutherland Connection	1	EA	$	25,000.00	$	25,000
Industry Connection Trk- Reinstall Shoofly	1,300	TF	$	45.00	$	58,500
Subtotal					**$**	**1,484,000**
Structures						
Double Trk Br Underpass - Cherry St	1	LS	$	1,400,000.00	$	1,400,000
Subtotal					**$**	**1,400,000**
Site Improvements						
ROW Drainage Improvements	1,500	LF	$	30.00	$	45,000
Seeding and Landscaping	3	AC	$	5,000.00	$	15,000
Subtotal					**$**	**60,000**
Project Total: Cherry St. Grade Separation					**$**	**11,772,000**
Project Total: North Tie to South Tie In (Includes Cherry St Grade Separation					**$**	**36,943,000**

Preferred Option including Cherry Street – Railroad Estimate

PREFERRED OPTION - RAILROAD ESTIMATE

Work Item	Quantity	Unit	Unit Cost	Cost
North Tie In to Cherry St.				
Intial Shoofly Construction				
Embkm't - North Tie In to Division: Shoofly	5,000	CY	$ 4.00	$ 20,000
Excvtn - N. Tie In to Division: Shoofly	3,000	CY	$ 8.00	$ 24,000
Subballast - Division to Chestnut Shoofly	2,000	CY	$ 35.00	$ 70,000
T-Wall - Division to Chestnut: Shoofly	26,000	SF	$ 64.00	$ 1,664,000
Select Backfill - Division to Chestnut: Shoofly	16,000	CY	$ 15.00	$ 240,000
Excvtn - Division to Chestnut: Shoofly	11,000	CY	$ 8.00	$ 88,000
Cast Concrete Ret Wall - Shoofly Ditch	4,200	SF	$ 100.00	$ 420,000
Subballast - Division to Chestnut Shoofly	5,000	CY	$ 35.00	$ 175,000
T-Wall : Chestnut to Cherry Tie In: Shoofly	13,000	SF	$ 64.00	$ 832,000
Select Backfill - Chestnut to Cherry Grade Sep: Shoofly	8,000	CY	$ 15.00	$ 120,000
Excvtn - Chestnut to Cherry Grade Sep: Shoofly	0	CY	$ 8.00	$ -
T-Wall - Cherry St. Grade Sep to S. Tie In: Shoofly	5,000	SF	$ 64.00	$ 320,000
Select Backfill - Cherry St Grade Sep to S. Tie In: Shoofly	5,000	CY	$ 15.00	$ 75,000
Excvt'n - Cherry St Grade Sep to S. Tie In: Shoofly	2,000	CY	$ 8.00	$ 16,000
Embkm't - Cherry St Grade Sep to S. Tie In: Shoofly	3,000	CY	$ 4.00	$ 12,000
Subballast - N. Tie In to S. Tie In: Shoofly	12,400	CY	$ 35.00	$ 434,000
Shoofly Track - N. Tie In to S. Tie In	12,900	TF	$ 120.00	$ 1,548,000
Grading - Ind'y Trk/Shoofly Connections	17,500	CY	$ 8.00	$ 140,000
Shoofly Turnouts (Relocate from Main Line)	6	EA	$ 25,000.00	$ 150,000
Division St Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Pythian St. Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Chestnut Expwy Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Cherry St Temp Shoofly Xing	20	TF	$ 800.00	$ 16,000
Shoofly Signal Modifications	1	LS	$ 1,100,000.00	$ 1,100,000
Crossing Signal Relocation	1	LS	$ 500,000.00	$ 500,000
Remove Main Trk - N.Tie In to S. Tie In	12,900	TF	$ 25.00	$ 323,000
Subtotal				**$ 8,335,000**
Double Main Trk Walls and Grading: N. Tie In to Division				
T-Wall - N. Tie In to Division: Main E. Side	0	SF	$ 64.00	$ -
T-Wall - N. Tie In to Division:: Main W. Side	0	SF	$ 64.00	$ -
Select Backfill - N. Tie to Division	0	CY	$ 15.00	$ -
Embnt - N Tie In to Division: Main Trk	11,000	CY	$ 4.00	$ 44,000
Excvtn - N. Tie In to Division: MainTrk	0	CY	$ 8.00	$ -
Subtotal				**$ 44,000**
Double Main Trk Walls and Grading: Division to Chestnut				
T-Wall - Division to Chestnut: Main E. Side	24,000	SF	$ 64.00	$ 1,536,000
T-Wall - Division to Chestnut: Main W. Side	61,000	SF	$ 64.00	$ 3,904,000
Select Backfill - Division to Chestnut: Main Trk	84,000	CY	$ 15.00	$ 1,260,000
Subtotal				**$ 6,700,000**
Double Main Trk Walls and Grading: Chestnut to Cherry Grd Sep				
T-Wall - Chestnut to Cherry Tie In: Main E. Side	48,300	SF	$ 64.00	$ 3,091,200
T-Wall - Chestnut to Cherry Tie In: Main W. Side	42,300	SF	$ 64.00	$ 2,707,200
Select Backfill - Chestnut to Cherry Tie In: Main Trk	81,000	CY	$ 15.00	$ 1,215,000
Subtotal				**$ 7,013,400**
Double Main Trk Walls and Grading: Cherry Grd Sep to S. Tie In				
T-Wall - M/L East Addition for S. Cherry St. Grade Sep Approach	7,500	SF	$ 64.00	$ 480,000
T-Wall - M/L West Addition for S. Cherry St. Grade Sep Approach	9,400	SF	$ 64.00	$ 601,600
Select Backfill - S. Cherry St M/L Grade Sep Approach	21,000	CY	$ 15.00	$ 315,000
Embkm't - Cherry St Grade Sep to S. Tie In: M/L	3,100	CY	$ 4.00	$ 12,400
Excvtn - Cherry St Grade Sep to S. Tie In: M/L	2,800	CY	$ 8.00	$ 22,400
Subtotal				**$ 1,432,000**

Preferred Option including Cherry Street – Railroad Estimate - continued

S Cherry St Ind'y Track Ramp and Connections							
Remove Trk - S. Cherry Ind'y Track	500	TF	$	25.00	$	12,500
T-Wall for Ind'y Tr Approach S. of Cherry	7,500	SF	$	64.00	$	480,000
Select Fill - Ind'y Trk Connection S. of Cherry	3,000	CY	$	15.00	$	45,000
Grading - Ind'y Trk Connection S. of Cherry	10,500	CY	$	4.00	$	42,000
Subballast (new) - Ind'y Trk Connection S. of Cherry	1,400	CY	$	35.00	$	49,000
Industry Trk Connection - Shoofly	500	TF	$	45.00	$	22,500
Subtotal					**$**	**651,000**
Main Track Construction - North Tie In to South Tie In						
Mainline Subballast	12,400	CY	$	35.00	$	434,000
Mainline Track	12,900	TF	$	145.00	$	1,871,000
Remove Shoofly Trk N/R for Ind'y Trk Leads	7,300	TF	$	25.00	$	182,500
Remove Shoofly Subballast N/R for Ind'y Trk Leads	7,000	CY	$	4.00	$	28,000
Mainline Signal Modifications	1	LS	$	1,100,000.00	$	1,100,000
Subtotal					**$**	**3,616,000**
West Side Ind'y Trk Ramp and Connections						
Remove Shoofly Trk in Conflict with Ramp	1,600	TF	$	25.00	$	40,000
Remove Indy Trk Connections	800	TF	$	25.00	$	20,000
Remove Subballast - Shoofly Ramp	1,500	CY	$	4.00	$	6,000
T-Wall - Raise Shoofly Wall to Accommodate Ind'y Trk Ramp	10,000	SF	$	64.00	$	640,000
Select Backfill - Ind'y Trk Ramp	10,000	CY	$	15.00	$	150,000
M/L TO - Indy Trk Connection	1	EA	$	150,000.00	$	150,000
Subballast (recycled) - West Side Ind'y Trk Connections	1,500	CY	$	4.00	$	6,000
Industry Trk Ramp Swithcing Lead Connection - Shoofly	1,600	TF	$	45.00	$	72,000
Replace Industry Trk TO Connections - Shoofly	800	TF	$	45.00	$	36,000
Subtotal					**$**	**1,120,000**
3M Ind'y Trk Connection						
T-Wall - 3M Connection Ramp	5,000	SF	$	64.00	$	320,000
Select Backfill - 3M Connection Ramp	3,000	CY	$	15.00	$	45,000
Replace Ind'y Trk Connectiion	500	TF	$	45.00	$	23,000
Reinstall M/L TO - Indy Trk Connection	1	EA	$	25,000.00	$	25,000
Subtotal					**$**	**413,000**
Sutherland Lumber Ind'y Trk Ramp and Connection						
Remove Trk - Shoofly Trk	1,300	TF	$	25.00	$	32,500
Excvt'n - Remove Subballlast: Shoofly	1,300	CY	$	4.00	$	5,200
T-Wall - Sutherland Ind'y Trk Connection Ramp	10,600	SF	$	64.00	$	678,400
Select Backfill (recycled) - Sutherland Ind'y Track Connection	10,200	CY	$	15.00	$	153,000
Embkm't - Accommodate New Ind'y Trk Connection	1,400	CY	$	4.00	$	5,600
Subballast (recycled) - Sutherland Indy Track Connection	1,300	CY	$	4.00	$	5,200
Reinstall M/L TO - Sutherland Connection	1	EA	$	25,000.00	$	25,000
Industry Connection Trk- Reinstall Shoofly	1,300	TF	$	45.00	$	58,500
Subtotal					**$**	**964,000**
Structures						
Double Trk Br Underpass - Division St	160	LF	$	7,500.00	$	1,200,000
Double Trk Br Underpass - E Chestnut Expwy	160	LF	$	7,500.00	$	1,200,000
Double Trk Br Underpass - Cherry St.	1	LS	$	1,400,000.00	$	1,400,000
Subtotal					**$**	**3,800,000**
Site Improvements						
ROW Drainage Improvements	12,900	LF	$	30.00	$	387,000
Seeding and Landscaping	18	AC	$	5,000.00	$	90,000
Subtotal					**$**	**477,000**
Project Total: North Tie In to South Tie In (Includes Cherry St Grade Sep in Original Construction)					**$**	**34,565,400**

Drainage

Storm Sewer Outlet Costs

Work Item	Quantity Division	Quantity Chestnut	Quantity Cherry	Unit	Unit Cost	Cost Division	Cost Chestnut	Cost Cherry
Roadway Improvements								
Bored 24" tunnel w/ 18" carrier pipe*	1,250	400	0	L.F.	$ 600.00	$ 750,000	$ 240,000	$ -
18" storm sewer (cut & cover)	2,350	0	1,200	L.F.	$ 34.00	$ 79,900	$ -	$ 40,800
Trench Excavation in Rock	3,430	0	1,980	CU. YD.	$ 30.00	$ 102,900	$ -	$ 59,400
18" Outlet	1	1	1	L.S.	$ 1,500.00	$ 1,500	$ 1,500	$ 1,500
Surface Restoration (5' width)	1,420	0	0	Sq. Yd.	$ 58.00	$ 82,360	$ -	$ -
Outlet Construction Subtotals:						**$ 1,017,000**	**$ 242,000**	**$ 102,000**

* Price calculated using 2004 R.S. Means
Heavy Construction Cost Data:
Microtunneling, 24"-48" @ $640/ft. (Assume $560/ft.)
Carrier Pipe @ $40/ft.

Pythian Street Connector

PYTHIAN STREET CONNECTOR COSTS

Work Item	Quantity	Unit	Unit Cost	Cost
Roadway Improvements				
Demolition & Removal of Improvements	1	L.S.	$ 12,000.00	$ 12,000
Excavation (Roadway - Unclassified Material)	4,300	CU. YD.	$ 8.00	$ 34,400
Embankment	6,880	CU. YD.	$ 6.00	$ 41,300
Pavement - 11" P.C.C. (Mainline)	0	SQ. YD.	$ 58.00	$ -
Pavement - 8" P.C.C. (Sideroads & Connections)	6,120	SQ. YD.	$ 49.00	$ 299,900
Pavement - 7" Asphalt (Entrances & Connections)	0	SQ. YD.	$ 29.00	$ -
Concrete Curb & Gutter	3,440	L.F.	$ 16.00	$ 55,100
Concrete Sidewalk - 4" Thick	2,300	SQ. YD.	$ 26.00	$ 59,800
Aggregate Base Course, 4"	6,900	SQ. YD.	$ 4.80	$ 33,200
Storm Drainage	1,700	L.F.	$ 50.00	$ 85,000
Storm Inlets	10	EACH	$ 1,500.00	$ 15,000
Storm Outlet (Bored and Cut & Cover)	0	L.S.	$ -	$ -
Traffic Signals (@ Ingram Mill)	0	EACH	$ 150,000.00	$ -
Seeding and Landscaping	1	L.S.	$12,000.00	$ 12,000
Roadway Construction Subtotal:				**$ 647,700**

Cherry Street Alternate 1

CHERRY STREET IMPROVEMENTS - ALTERNATE NO. 1

Work Item	Quantity	Unit	Unit Cost	Cost
Roadway Improvements				
Demolition & Removal of Improvements	1	L.S.	$ 12,000.00	$ 12,000
Excavation (Roadway - Unclassified Material)	21,100	CU. YD.	$ 8.00	$ 168,800
Embankment	500	CU. YD.	$ 6.00	$ 3,000
Pavement - 11" P.C.C. (Void)	0	SQ. YD.	$ 58.00	$ -
Pavement - 8" P.C.C. (Sideroads & Connections)	7,500	SQ. YD.	$ 49.00	$ 367,500
Pavement - 7" Asphalt (Entrances & Connections)	930	SQ. YD.	$ 29.00	$ 27,000
Concrete Curb & Gutter	2,700	L.F.	$ 16.00	$ 43,200
Concrete Sidewalk - 4" Thick	1,800	SQ. YD.	$ 26.00	$ 46,800
Aggregate Base Course, 4"	9,500	SQ. YD.	$ 4.80	$ 45,600
Storm Drainage	910	L.F.	$ 50.00	$ 45,500
Storm Inlets	8	EACH	$ 1,500.00	$ 12,000
Storm Outlet (Bored and Cut & Cover)	1	L.S.	$ 102,000.00	$ 102,000
Traffic Signals (@ Ingram Mill)	0	EACH	$ 150,000.00	$ -
Seeding and Landscaping	1	L.S.	$8,000.00	$ 8,000
Structural Improvements				
Roadway Bridges (1 Bridge)	0	SQ.FT.	$ 80.00	$ -
Excavation (Structural/MSE Wall)	1,030	CU YD	$ 32.00	$ 32,960
Structural Backfill (Granular)	780	CU YD	$ 18.00	$ 14,040
MSE Walls	3,480	SQ.FT.	$ 45.00	$ 156,600
Roadway Construction Subtotal:				**$ 1,085,000**

East Chestnut Expressway - Alternate 6 – 6 lanes

EAST CHESTNUT EXPRESSWAY IMPROVEMENTS - ALTERNATE NO. 6 (6 Lanes)

Work Item	Quantity	Unit	Unit Cost	Cost
Roadway Improvements				
Demolition & Removal of Improvements	1	L.S.	$ 190,000.00	$ 190,000
Excavation (Roadway - Unclassified Material)	67,000	CU. YD.	$ 8.00	$ 536,000
Embankment	1,000	CU. YD.	$ 6.00	$ 6,000
Pavement - 11" P.C.C. (Mainline)	19,440	SQ. YD.	$ 58.00	$ 1,127,600
Pavement - 8" P.C.C. (Sideroads & Connections)	4,240	SQ. YD.	$ 49.00	$ 207,800
Pavement - 7" Asphalt (Entrances & Connections)	2,990	SQ. YD.	$ 29.00	$ 86,800
Concrete Curb	3,560	L.F.	$ 12.00	$ 42,800
Concrete Sidewalk - 4" Thick	1,980	SQ. YD.	$ 26.00	$ 51,500
Aggregate Base Course, 4"	29,800	SQ. YD.	$ 4.80	$ 143,100
Storm Drainage	1,550	L.F.	$ 50.00	$ 77,500
Storm Inlets	16	EACH	$ 1,500.00	$ 24,000
Storm Outlet (Bored and Cut & Cover)	1	L.S.	$ 242,000.00	$ 242,000
Traffic Signals (@ Ingram Mill)	1	EACH	$ 150,000.00	$ 150,000
Seeding and Landscaping	1	L.S.	$ 25,000.00	$ 25,000
Structural Improvements				
Roadway Bridges (1 Bridge)	0	SQ.FT.	$ 80.00	$ -
Excavation (Structural/MSE Wall)	7,680	CU YD	$ 32.00	$ 245,800
Structural Backfill (Granular)	5,760	CU YD	$ 18.00	$ 103,700
MSE Walls	17,270	SQ.FT.	$ 45.00	$ 777,200
Roadway Construction Subtotal:				**$ 4,036,800**

Division Street Alternate 2

DIVISION STREET IMPROVEMENTS - ALTERNATE NO. 2

Work Item	Quantity	Unit		Unit Cost		Cost
Roadway Improvements						
Demolition & Removal of Improvements	1	L.S.	$	65,000.00	$	65,000
Excavation (Roadway - Unclassified Material)	64,250	CU. YD.	$	8.00	$	514,000
Embankment	1,000	CU. YD.	$	4.00	$	4,000
Pavement - 11" P.C.C. (Mainline)	14,590	SQ. YD.	$	58.00	$	846,300
Pavement - 8" P.C.C. (Sideroads & Connections)	2,135	SQ. YD.	$	49.00	$	104,700
Pavement - 7" Asphalt (Entrances & Connections)	5,320	SQ. YD.	$	29.00	$	154,300
Concrete Curb & Gutter	4,480	L.F.	$	16.00	$	71,700
Concrete Sidewalk - 4" Thick	2,990	SQ. YD.	$	26.00	$	77,800
Aggregate Base Course, 4"	24,700	SQ. YD.	$	4.80	$	118,600
Storm Drainage	2,290	L.F.	$	50.00	$	114,500
Storm Inlets	18	EACH	$	1,500.00	$	27,000
Storm Outlet (Bored and Cut & Cover)	1	L.S.	$	1,017,000	$	1,017,000
Traffic Signals	0	EACH	$	150,000	$	-
Seeding and Landscaping	1	L.S.	$	25,000	$	25,000
Structural Improvements						
Roadway Bridges (1 Bridge)	0	SQ.FT.	$	80.00	$	-
Excavation (Structural/MSE Wall)	18,440	CU YD	$	32.00	$	590,100
Structural Backfill (Granular)	13,830	CU YD	$	18.00	$	249,000
MSE Walls	31,120	SQ.FT.	$	45.00	$	1,400,400
Roadway Construction Subtotal:					**$**	**5,379,400**

Summary Railroad Construction Costs – Cherry Not included

GRADE SEPARATIONS (CHERRY ST. PHASED IN FUTURE) - CONCEPTUAL CONSTRUCTION COSTS

Work Item	*Division Alt. 2*	*Chestnut Alternate 6*	*Cherry Alt. 1*	*Pythian Connector*
Roadway Improvements				
Demolition & Removal of Improvements	$ 65,000	$ 190,000	$ 12,000	$ 12,000
Excavation (Roadway - Unclassified Material)	$ 514,000	$ 536,000	$ 168,800	$ 34,400
Embankment	$ 4,000	$ 6,000	$ 3,000	$ 41,300
Pavement - 11" P.C.C. (Mainline)	$ 846,300	$ 1,127,600	$ -	$ -
Pavement - 8" P.C.C. (Sideroads & Connections)	$ 104,700	$ 207,800	$ 367,500	$ 299,900
Pavement - 7" Asphalt (Entrances & Connections)	$ 154,300	$ 86,800	$ 27,000	$ -
Concrete Curb & Gutter	$ 71,700	$ 42,800	$ 43,200	$ 55,100
Concrete Sidewalk - 4" Thick	$ 77,800	$ 51,500	$ 46,800	$ 59,800
Aggregate Base Course, 4"	$ 118,600	$ 143,100	$ 45,600	$ 33,200
Storm Drainage	$ 114,500	$ 77,500	$ 45,500	$ 85,000
Storm Inlets	$ 27,000	$ 24,000	$ 12,000	$ 15,000
Storm Outlet (Bored and Cut & Cover)	$ 1,017,000	$ 242,000	$ 102,000	$ -
Traffic Signals (Chestnut @ Ingram Mill)	$ -	$ 150,000	$ -	$ -
Seeding and Landscaping	$ 25,000	$ 25,000	$ 8,000	$ 12,000
Structural Improvements				
Roadway Bridges	$ -	$ -	$ -	$ -
Excavation (Structural/MSE Wall)	$ 590,100	$ 245,800	$ 32,960	$ -
Structural Backfill (Granular)	$ 249,000	$ 103,700	$ 14,040	$ -
MSE Walls	$ 1,400,400	$ 777,200	$ 156,600	$ -
Roadway Construction Subtotals:	**$ 5,379,400**	**$ 4,036,800**	**$ 1,085,000**	**$ 647,700**
Work Zone Traffic Control (Est. @ 2% of Roadway Construction):	$ 107,600	$ 80,700	$ 21,700	$ -
Construction Staging & Shoring (Est. @ 7% of Roadway Construction):	$ 376,600	$ 282,600	$ 76,000	$ -
Roadway Construction Grand Totals:	**$ 5,864,000**	**$ 4,401,000**	**$ 1,183,000**	**$ 648,000**
Grade Separation Option Grand Totals:		***$12,096,000***		
Potential savings for omission of MSE walls (assumes 75% of wall cost recovered):	($1,831,000)	($921,000) ***($2,918,000)***	($166,000)	($0)

Division and Chestnut Railroad Improvements	
North Tie In to Cherry St.	*Cost*
Intial Shoofly Construction	$ 6,822,000
Double Main Trk Walls and Grading: N. Tie In to Division	$ 44,000
Double Main Trk Walls and Grading: Chestnut to Cherry Tie In	$ 6,700,000
Double Main Trk Walls and Grading: Chestnut to Cherry Tie In	$ 3,800,000
Main Track Construction - North Tie to Cherry St. Tie In	$ 3,060,000
West Side Ind'y Trk Ramp and Connections	$ 1,120,000
3M Ind'y Trk Connection	$ 413,000
Sutherland Lumber Ind'y Trk Ramp and Connection	$ 410,000
Structures	$ 2,400,000
Site Improvements	$ 402,000
Railroad Construction Total: North Tie In to Cherry St. Tie In	$ 25,171,000
Roadway Engr'g & Construction Services -12%	$ 1,310,000
Railroad Engr'g & Construction Services - 12%	$ 3,021,000
Roadway Construction Contingency - (25%)	$ 3,056,000
Railroad Construction Contingency - (25%)	$ 7,048,000
Land Acquisition: R/W, Easments, Relocations & Buy-Outs	
Utility Modifications	$ 4,892,000
Division and Chestnut Street Grade Sep Grand Total	**$ 55,411,000**

Summary Railroad Construction Costs – Cherry Not included (continued)

Cherry St Grade Sep - Phased Addition	
Shoofly Construction	$ 2,841,000
Double Main Track Walls and Grading	$ 5,568,800
Main Track Construction - Cherry St. Grade Sep Addition	$ 417,500
Recreate Sutherland Ind'y Trk Connection	$ 1,484,000
Structures	$ 1,400,000
Site Improvements	$ 60,000
Railroad Construction Total: Cherry St. Grade Separation	$ 11,772,000
Roadway Engr'g & Construction Services -12%	$ 142,000
Railroad Engr'g & Construction Services - 12%	$ 1,413,000
Roadway Construction Contingency - (25%)	$ 332,000
Railroad Construction Contingency - (25%)	$ 3,297,000
Land Acquisition: R/W, Easments, Relocations & Buy-Outs	
Utility Modifications	$ 1,026,000
Cherry St Grade Sep Addition	**$ 19,165,000**
Total Project Costs	***$ 74,576,000***

Summary Railroad Construction Costs – Cherry Street included

GRADE SEPARATIONS (CHERRY ST. INCLUSIVE) - CONCEPTUAL CONSTRUCTION COSTS

Work Item	Division Alt. 2	Chestnut Alternate 6	Cherry Alt. 1	Pythian Connector
Roadway Improvements				
Demolition & Removal of Improvements	$ 65,000	$ 190,000	$ 12,000	$ 12,000
Excavation (Roadway - Unclassified Material)	$ 514,000	$ 536,000	$ 168,800	$ 34,400
Embankment	$ 4,000	$ 6,000	$ 3,000	$ 41,300
Pavement - 11" P.C.C. (Mainline)	$ 846,300	$ 1,127,600	$ -	$ -
Pavement - 8" P.C.C. (Sideroads & Connections)	$ 104,700	$ 207,800	$ 367,500	$ 299,900
Pavement - 7" Asphalt (Entrances & Connections)	$ 154,300	$ 86,800	$ 27,000	$ -
Concrete Curb & Gutter	$ 71,700	$ 42,800	$ 43,200	$ 55,100
Concrete Sidewalk - 4" Thick	$ 77,800	$ 51,500	$ 46,800	$ 59,800
Aggregate Base Course, 4"	$ 118,600	$ 143,100	$ 45,600	$ 33,200
Storm Drainage	$ 114,500	$ 77,500	$ 45,500	$ 85,000
Storm Inlets	$ 27,000	$ 24,000	$ 12,000	$ 15,000
Storm Outlet (Bored and Cut & Cover)	$ 1,017,000	$ 242,000	$ 102,000	$ -
Traffic Signals (Chestnut @ Ingram Mill)	$ -	$ 150,000	$ -	$ -
Seeding and Landscaping	$ 25,000	$ 25,000	$ 8,000	$ 12,000
Structural Improvements				
Roadway Bridges	$ -	$ -	$ -	$ -
Excavation (Structural/MSE Wall)	$ 590,100	$ 245,800	$ 32,960	$ -
Structural Backfill (Granular)	$ 249,000	$ 103,700	$ 14,040	$ -
MSE Walls	$ 1,400,400	$ 777,200	$ 156,600	$ -
Roadway Construction Subtotals:	**$ 5,379,400**	**$ 4,036,800**	**$ 1,085,000**	**$ 647,700**
Work Zone Traffic Control (Est. @ 2% of Roadway Construction):	$ 107,600	$ 80,700	$ 21,700	$ -
Construction Staging & Shoring (Est. @ 7% of Roadway Construction):	$ 376,600	$ 282,600	$ 76,000	$ -
Roadway Construction Grand Totals:	**$ 5,864,000**	**$ 4,401,000**	**$ 1,183,000**	**$ 648,000**
Grade Separation Option Grand Totals:		***$12,096,000***		
Potential savings for omission of MSE walls (assumes 75% of wall cost recovered):	($1,831,000)	($921,000) ***($2,918,000)***	($166,000)	($0)

Railroad Improvements - North Tie In to South Tie In

Item	*Cost*
Intial Shoofly Construction	$ 8,335,000
Double Main Trk Walls and Grading: N. Tie In to Division	$ 44,000
Double Main Trk Walls and Grading: Division to Chestnut	$ 6,700,000
Double Main Trk Walls and Grading: Chstn't to Cherry Grd Sep	$ 7,013,400
Double Main Trk Walls and Grdng: Chr'y Grd Sep to S. Tie In	$ 1,432,000
S Cherry St Ind'y Track Ramp and Connections	$ 651,000
Main Track Construction - North Tie In to South Tie In	$ 3,616,000
West Side Ind'y Trk Ramp and Connections	$ 1,120,000
3M Ind'y Trk Connection	$ 413,000
Sutherland Lumber Ind'y Trk Ramp and Connection	$ 964,000
Structures	$ 3,800,000
Site Improvements	$ 477,000
Railroad Construction Total: North Tie In to South Tie In	**$ 34,565,400**
Roadway Engr'g & Construction Services -12%	$ 1,452,000
Railroad Engr'g & Construction Services - 12%	$ 4,148,000
Roadway Construction Contingency - (25%)	$ 3,387,000
Railroad Construction Contingency - (25%)	$ 9,679,000
Land Acquisition: R/W, Easments, Relocations & Buy-Outs	
Utility Modifications	$ 5,918,000
Division and Chestnut Street Grade Sep Grand Total	**$71,245,400**
Total Project Costs	$68,327,400.00

Railroad Reconfiguration and Grade Separation Study Springfield, Missouri

November 30, 2006

CITY of SPRINGFIELD

HANSON WILSON INCORPORATED