



MEMORANDUM
(Form QAP 17.2.3)
Revision 1

TO: Steering Committee

DATE: March 31, 2011

FROM: Hanson Professional Services Inc.

SUBJECT: Hanson Recommendation – Springfield Railroad Corridor Study

Introduction

Description and Location of the Project

The project is accommodating the proposed high speed passenger trains from Chicago to St. Louis and the anticipated growth of Union Pacific, Norfolk Southern and other rail freight traffic through Springfield, Illinois. The study area extends from approximately Stanford Avenue on the south to Sangamon Avenue on the north within the City of Springfield, Sangamon County, Illinois.

The current and projected number of trains on each of the rail lines is shown below.

Number of Trains

	Current (2010) Rail Traffic	Projected (2020) Rail Traffic
Union Pacific	10 Passenger 5 Freight	18 Passenger 22 Freight
Norfolk Southern	16 Freight	24 Freight
Canadian National*	4 Freight	8 Freight
TOTAL	35 Trains	72 Trains

*Includes I&M and KCS traffic on CN

Purpose and Need

Purpose of the Project

The purpose of the project is the same as the overall Chicago to St. Louis High Speed Rail project as stated in the Tier 1 EIS plus the following:

- Address issues related to both passenger and freight rail traffic increases on the three north-south rail corridors through the City and speed increases on the UPRR.

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- Improve safety for vehicles and pedestrians along the rail corridors.
- Reduce city-wide traffic delays caused by rail traffic.
- Maintain overall livability and commercial activity in the study area.
- Reduce train horn noise in the City.

Need

In addition to the items listed in the Tier 1 EIS for the overall Chicago to St. Louis High Speed Rail project, the specific needs for Springfield relate primarily to safety, traffic, and noise.

Safety

Over the years, closures, railroad consolidations, mergers, abandonments and the ongoing effort to consolidate or relocate tracks have reduced the current number of railroad-roadway at-grade crossings to 68. Each one of these represents a dangerous point of conflict between rail traffic and roadway traffic. Each crossing is a concern for the public, the railroads, and the authorities who maintain them. The table below shows the number of at-grade crossings and grade separations.

At-Grade Crossings and Grade Separations by Corridor

	UP	I&M	CN	NS	Total
At-Grade	24	6	18	20	68
Grade Separations	4	0	6	5	15
Total	28	6	24	25	83

Federal Railroad Administration (FRA) and Illinois Commerce Commission (ICC) records of collisions at grade crossings (some as far back as the mid 1950s) show 339 collisions at existing grade crossings in this study corridor. A summary of collision history by corridor is shown below.

At-Grade Crossing Collisions by Corridor

Railroad	Crashes		Fatalities		Injuries	
	Total	10-year	Total	10 year	Total	10-year
NS	147	8	17	1	66	2
UP	102	5	5	0	30	6
CN	66	0	4	0	37	0
I&M	24	0	0	0	6	0
TOTAL	339	13	26	1	139	8

* Source: Illinois Commerce Commission records

Traffic

There are no major east-west streets across Springfield that do not have an at-grade railroad crossing. Many busy streets such as North Grand Avenue, Carpenter, Adams, Washington, Laurel, and Ash Streets cross all three railroads at-grade. A train on any of these tracks can delay traffic through much of the city. The I&M, NS, and CN all have active rail yards in the city. Switching operations in these yards frequently block adjacent crossings with stopped trains or trains involved in back and forth movements.



Using traffic data from IDOT, the rail traffic delays were calculated at each crossing for each hour of the day. These calculations were made using a spreadsheet and the Regional Planning Commissions traffic simulation model. The existing and projected delays are shown below.

Vehicle Delays per Railroad

Existing	Projected
Existing Traffic/2010 Trains	Existing Traffic/2020 Trains
• UP – 6,600 veh.-min.	• UP – 24,900 veh.-min.
• NS – 2,000 veh.-min.	• NS – 5,100 veh.-min.
• CN – 4,100 veh.-min.	• CN – 4,800 veh.-min.
• I&M – 1,100 veh.-min.	• I&M – 1,200 veh.-min.
Total = 13,800 veh.-min.	Total = 36,000 veh.-min.

Noise

Train noise comes from the locomotive engines, air brakes, side to side car movement, slack and bunch car movement, wheels on rail joints, and locomotive horns at grade crossings. Of these, train horns are the most disturbing to residents. The locomotive horn is required to blow from the point where the train is one quarter mile away from the crossing until it occupies the crossing. Due to the close proximity of the at-grade crossings in the rail corridors, trains must blow their horns almost constantly when moving through Springfield. The total duration of train horn noise in the study area is 207 minutes per day.

Each of the existing corridors pass through some residential areas, but the CN (Nineteenth Street) and UP (Third Street) corridors have the most adjacent residential development. The UP corridor passes near many sensitive receptors in the Mid-Illinois Medical District.

Alternatives Considered

No Action Alternative – Baseline

The No Action Alternative (Baseline) consists of maintaining the existing rail and street facilities after completion of the improvements approved by the FRA in the 2004 Record of Decision (ROD Improvements). No additional grade separation or quiet zone would be constructed. Traffic delays and anticipated crashes would increase with growing rail and vehicle traffic. The baseline rail traffic on the Union Pacific Railroad consists of 15 freight and 10 passenger trains daily. The crossing improvements for the baseline alternative include quad gates and quiet zone on the Union Pacific.

Preliminary Alternatives

Preliminary alternatives were considered based on input from the Steering Committee, advisory groups, and our first public meeting in April 2010. Five preliminary alternatives were eliminated from further study based on their ability to meet the purpose and need of the project, impacts to railroad operations and safety, costs, environmental impacts as defined the Federal Railroad Administration’s Procedures for Considering Environmental Impacts, resource agency input, and public comments:



1980's Railroad Relocation - I-55 Corridor

In the late 1970's and early 1980's, it was proposed to relocate the NS, I&M and CN tracks to a new corridor along I-72, on the south side of the City and along I-55 on the east side. The existing UP corridor would remain for passenger train use only, allowing access to downtown. This alternative would achieve the project purpose and need but was eliminated for the following reasons:

- A 2,400 ft longitudinal encroachment on the Sugar Creek floodplain.
- A transverse encroachment of the Sangamon River floodplain.
- Potential for wetland and water quality impacts to Sugar Creek and the Sangamon River.
- Close proximity to state-threatened species habitat (Franklin's ground squirrel, Kirtland's snake).
- Significant impacts to prime and important farmland, severances, adverse travel, uneconomical remnants.
- Many areas that were vacant land at the time of the 1980's study have undergone considerable development.
- The length of operation for each of the railroads would increase an unacceptable amount.
- High initial cost - \$1,200,000,000.

Abandoned CNW Corridor West of City

An alternative of relocating freight traffic west of the City using the abandoned CNW corridor was considered. This alternative would achieve the project purpose and need but was eliminated for the following reasons:

- Impacts new segments of the City that have undergone considerable development.
- The number of horizontal curves in the rail alignment would increase significantly.
- The length of operation for the railroads would increase an unacceptable amount causing higher fuel, labor, and maintenance costs.
- The abandoned corridor has been converted to a public recreational trail which is now a Section 4(f) property.
- The railroad right-of-way traverses through a Section 4(f) property - Centennial Park
- Known colonies of the state-threatened Franklin's ground squirrel are present.
- Noise and vibration impacts to an area currently without rail traffic.
- High cost - \$800,000,000.

Elevate the UP Tracks

An alternative of reconstructing the UP tracks in the Third Street corridor at an elevation about 20 ft above the existing streets was considered. The embankment would need to be about 70 ft wide to accommodate the double tracks and service road. While it would achieve the project purpose and need, this alternative was eliminated from further consideration for the following reasons:

- Aesthetic/Visual impacts to downtown and adjacent historic structures (Section 106).
- Requires that the passenger station platform be located 20 ft above street level making it challenging for the elderly and handicapped to access.
- Additional public safety concern of train crashes.
- Construction staging that would require UP traffic to relocate for about two years.
- Does not address safety, delay or horn noise issues on 10th or 19th Street tracks.
- High cost - \$600,000,000.



Lower UP Tracks

An alternative of reconstructing the UP tracks in the Third Street corridor at an elevation about 30 ft below the existing street level was considered. This alternative would achieve the project purpose and need but was eliminated for the following reasons:

- Requires that the passenger station terminals be located 30 ft below street level.
- Continuous maintenance costs for a system of pumping stations and back-up power supplies.
- Construction staging that would require UP traffic to relocate for about two years.
- Does not address safety, delay or horn noise issues on 10th or 19th Street tracks.
- Potential for amplified noise and vibration impacts to immediately adjacent areas.
- High cost - \$800,000,000.

Consolidation Using I&M Tracks

An alternative of consolidating the UP tracks onto 10th Street and using the I&M corridor from North Grand Avenue was considered. This alternative was eliminated for the following reasons:

- Higher costs and more residential displacements than alternatives not using the I&M corridor.
- Impacts to Lanphier Baseball Park and the adjacent city park constituting a Section 4(f) impact.
- Requires unwanted changes to I&M operations.

Alternatives Retained for Further Study

Seven alternatives were retained for further study. They are shown on the table below.



# Alternative Description	New Grade Separations				Replace/Rehab Rail Bridges		Rail Crossing Closure				Street Closure				Quiet Zone	Abandon Corridor
	UP	10th St	10th St	10th St	UP	10th St	10th St	10th St	UP	10th St	10th St	10th St	10th St	10th St		
1A Double Track UP on 3rd St																
1B Double Track UP on 3rd St - New Grade Separations on UP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Double Track UP on 3rd St - New Grade Separations on UP, NS, CN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2A Shift UP to 10th - 10th St North Alignment																
2B Shift UP to 10th, Fully Grade Separate - 10th St North Alignment																
3A Shift UP & CN to 10th - 10th St North Alignment																
3B Shift UP and CN to 10th, Fully Grade Separate - 10th St North Alignment																



The environmental impacts for each alternative were assessed as defined the Federal Railroad Administration's Procedures for Considering Environmental Impacts, resource agency input, and public comments. Field surveys were conducted for resources that have a potential for impacts. Surveys were conducted for ambient conditions for noise and vibration modeling, historic structures and archaeological sites, endangered and threatened species, and wetlands. Newsletters, a project website, telephone call-in numbers and numerous community presentations were provided for interested neighborhood groups throughout the project area to solicit comments and feedback from the public.

Analysis of Alternatives Retained for Further Study

Public Safety and Delays

Traffic Delays

Traffic delays at grade crossings were computed for the existing and baseline conditions, and for the build alternatives. The delays were calculated using a spreadsheet and the Regional Planning Commission's (SATS) traffic model. Delays were computed using 2010 vehicle traffic only so that future delays due to increased rail traffic could be isolated.

The spreadsheet analyzed each crossing in the study area for each hour of an average day. Daily traffic and distribution for each hour of the day for City streets was taken from IDOT's website. Projected daily train information was obtained from the railroads. Where railroad timetables were not available, the train arrival times were distributed evenly throughout the day.

Crossing blockage time was calculated for each train as it moves through each crossing. This information, along with the vehicle traffic volume information, was used to calculate the number of vehicles blocked by the train, and the average time each vehicle was stopped. Total delays at all of the crossings in an average day could then be calculated.

The SATS traffic model was used to compute the queuing delays at each of the major streets included in the model. The queuing delays were added to the delays calculated in the spreadsheet to determine the total delay at each at-grade crossing. The results of this analysis are shown below.

**Daily Traffic Delays in 2020 in all Corridors
(veh.-min.)**

Baseline	23,700
1A	36,000
1B	17,000
1C	11,300
2A	8,100
2B	4,300
3A	6,300
3B	1,600



Accident Prediction

Vehicle/train accidents, including injuries and fatalities, for each grade crossing were predicted using USDOT Grade Crossing Accident Prediction based on the method published in summary of the IDOT Rail-Highway Crossings Resource Allocation Procedure-Revised, June 1987 and Rail-Highway Crossing Resource Allocation Procedure: User's Guide, Third Edition, August 1987. Vehicle traffic for this analysis and rail traffic were the same as what was used for the traffic delay analysis. The accident prediction calculations were made for the baseline and each of the various alternatives. The resulting predictions are shown below.

Expected Crash Frequency in all Corridors (crashes/year)

Baseline	1.17
1A	1.30
1B	1.19
1C	.53
2A	.23
2B	.07
3A	.26
3B	.07

HAZMAT Incidences

Information on hazardous material releases from railroad cars is tabulated by the U.S. Department of Transportation. This information was used to compute an average of incidents, costs, injuries and deaths per train mile traveled. This was then used to predict the number and cost of incidents in the project area for the various scenarios and used in the lifecycle cost analysis.

Environmental Analysis

The following tables indicate the potential environmental impacts of the alternatives retained for further study. The methodology used for the resources having potential impacts is discussed below.



**Potential Environmental Impacts:
Double Track 3rd Street (UP)
Alternatives 1A, 1B and 1C**

Socio-Economic Factors	<ul style="list-style-type: none"> • Residential displacements • Commercial displacements • Low-income and minority populations present
Historic Sites (National Register Listed or Eligible) <i>* Represents various homes throughout the neighborhood</i>	<ul style="list-style-type: none"> • Dana-Thomas House • H.P. Boulton House • Hickox Apartments • Central Springfield District • Enos Park Neighborhood * • Lincoln Park Neighborhood * • Near South Neighborhood * • Aristocracy Hill Neighborhood*
Noise & Vibration Sensitive Receptors	<ul style="list-style-type: none"> • Historic Sites (listed above) • Memorial Hospital • St. John's Hospital
Special Waste Sites	<ul style="list-style-type: none"> • No National Priority Listed sites identified • 12 Leaking Underground Storage Tank sites identified
Special Lands (Parks & Nature Preserves)	<ul style="list-style-type: none"> • 11th & Black Park (No right-of-way anticipated)
Endangered & Threatened Species	<ul style="list-style-type: none"> • No impacts to Endangered or Threatened species anticipated
Water Quality (Streams & Wetlands)	<ul style="list-style-type: none"> • No impacts to streams or wetlands anticipated

**Potential Environmental Impacts:
3rd Street (UP) Shift to 10th Street (NS)
Alternatives 2A and 2B**

Socio-Economic Factors	<ul style="list-style-type: none"> • Residential displacements • Commercial displacements • Low-income and minority populations present • Adverse travel at street closures
Historic Sites (National Register Listed or Eligible) <i>* Represents various homes throughout the neighborhood</i>	<ul style="list-style-type: none"> • Lincoln Home Site • Lincoln Colored Home • Old Town Theater • Sacred Heart Church • Lincoln Depot • Pillsbury Mills Neighborhood * • Pioneer Park Neighborhood * • Harvard Park Neighborhood*
Noise & Vibration Sensitive Receptors	<ul style="list-style-type: none"> • Historic Sites (listed above) • St. John's Hospital
Special Waste Sites	<ul style="list-style-type: none"> • No National Priority Listed sites identified • 14 Leaking Underground Storage Tank sites identified
Special Lands (Parks & Nature Preserves)	<ul style="list-style-type: none"> • 11th & Black Park (No right-of-way anticipated) • Iles Park (No right-of-way anticipated)
Endangered & Threatened Species	<ul style="list-style-type: none"> • No impacts to Endangered or Threatened species anticipated
Water Quality (Streams & Wetlands)	<ul style="list-style-type: none"> • No impacts to streams or wetlands anticipated

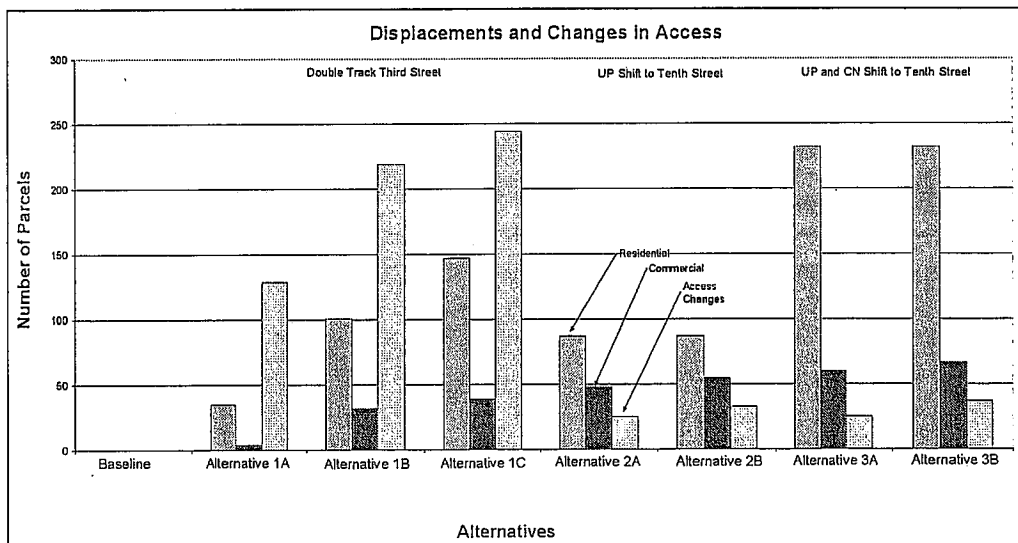


**Potential Environmental Impacts:
3rd Street (UP) & 19th Street (CN) Shift to 10th Street (NS)
Alternatives 3A and 3B**

Socio-Economic Factors	<ul style="list-style-type: none"> • Residential displacements • Commercial displacements • Low-income and minority populations present • Adverse travel at street closures
Historic Sites (National Register Listed or Eligible) <i>* Represents various homes throughout the neighborhood</i>	<ul style="list-style-type: none"> • Lincoln Home Site • Lincoln Colored Home • Old Town Theater • Sacred Heart Church • Lincoln Depot • Pillsbury Mills Neighborhood * • Pioneer Park Neighborhood * • Harvard Park Neighborhood*
Noise & Vibration Sensitive Receptors	<ul style="list-style-type: none"> • Historic Sites (listed above) • St. John's Hospital
Special Waste Sites	<ul style="list-style-type: none"> • No National Priority Listed sites identified • 14 Leaking Underground Storage Tank sites identified
Special Lands (Parks & Nature Preserves)	<ul style="list-style-type: none"> • 11th & Black Park (No right-of-way anticipated) • Iles Park (No right-of-way anticipated) • Hobbs Park (Right-of-way anticipated)
Endangered & Threatened Species	<ul style="list-style-type: none"> • No impacts to Endangered or Threatened species anticipated
Water Quality (Streams & Wetlands)	<ul style="list-style-type: none"> • No impacts to streams or wetlands anticipated

4.2.1 Socioeconomics

The number of residential and commercial displacement for each alternative is shown below. Also shown are the number of properties which will have their existing street access changed. Most of these changes are due to closure of Third Street or construction of grade separations. Most of these access changes will negatively affect the properties. Census data has been reviewed to determine population demographics. This information is currently being updated with 2010 data which has just become available. Various other documents prepared by the Chamber of Commerce and the Springfield Medical District have been reviewed for an economic analysis of the retained alternatives.



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Environmental Justice

Considerations regarding environmental justice as required by Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" have been reviewed. Minority and low-income populations are known to occur on all of the alternatives retained for further study based on census data. Efforts have been made to inform these groups of opportunities for public participation and community presentations. Railroad traffic currently exists within each of the alternatives retained for further study, and no organized groups have expressed disproportionate impacts of the railroad project to-date. In addition, some minority groups are preparing a Community Impacts Agreement for federal, state and local agencies' participation for further development of the recommended alternative.

The retained alternatives have avoided, minimized, and mitigated any potential for disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations. The study team's public engagement process has ensured the full and fair participation by all potentially affected communities in the transportation decision-making process. Efforts will also be made to prevent the denial of, reduction in, or significant delay in the receipt of any benefits agreed to as project commitments to minority and low-income populations.

Noise and Vibration

Noise and vibration studies are being conducted using TNM 2.5 and the FRA's Railroad Noise Emission Compliance Regulations. About 500 residences are located within one block of the Third Street corridor, and about 350 residences are located within one block of the Tenth Street corridor. About 450 residences have been identified along the Nineteenth Street corridor. Field measurements were conducted along the retained alternatives for ambient noise and vibration levels. Sensitive receptors have been identified and detailed modeling will be conducted for the recommended alternative.

Historical Sites

An historical and archaeological investigation of the retained alternatives was conducted to identify significant historic resources within the project area. Numerous sites have been identified throughout the project area, which are either listed or eligible for listing on the National Register of Historic Places. A total of 179 properties have been identified as architecturally significant and/or of architectural interest within or adjacent to the Third Street corridor. A total of 69 properties have been identified as architecturally significant and/or of architectural interest within or adjacent to the Tenth Street corridor. We will be coordinating with the State Historic Preservation Office and the Advisory Council on Historic Preservation for any adverse impacts that may be associated with the recommended alternative.

Wetlands/Water Quality/Floodplains

Wetlands and waters of the United States were identified through the U.S. Fish and Wildlife Service's National Wetland Inventory Mapping and followed up with a field survey of the retained alternatives. No wetlands or waters of the United States have been identified within any of the retained alternatives. Surface drainage of the retained alternatives will enter the city's stormwater sewer system for treatment prior to outflow to a receiving stream. No 100 year floodplains were identified within the project area on Federal Emergency Management Agency (FEMA) mapping.



Endangered and Threatened Species

The U.S. Fish and Wildlife Service and the Illinois Department of Natural Resources were contacted regarding the potential presence of any state or federally listed endangered or threatened. Responses from these agencies did not indicate any known species or preferred habitat within any of the retained alternatives. A response was received from our public outreach from the Friends of the Sangamon Valley. They had concerns about the possible occurrence of the Franklin's ground squirrel which has been identified on abandoned railroad right-of-way on the west side of Springfield. Hanson biologists surveyed the known locations and habitat requirements of the ground squirrel with local researchers and conducted a habitat survey along the retained alternatives. No preferred habitat was identified along any of the alternatives retained for further study.

Recreational Areas

Recreational lands and parks were identified from available mapping and field surveys. Information was also collected to determine if funding from the Land and Water Conservation Fund (Section 6(f)) or from the Department of Housing and Urban Development's "open space" funds. No such properties were located along any the retained alternatives.

Special Wastes

Various federal, state and local databases were queried for previous histories of spills, clean-ups or other reports of hazardous materials near the retained alternatives. A number of Leaking Underground Storage Tanks in various degrees of clean-up were reported throughout the study area. There are nearly an equal number of sites along both the Third Street and Tenth Street corridors. These sites do not pose a significant risk to project development and will be further investigated for the recommended alternative. There were no National Priority Listed sites identified in the study area.

Train Horn Noise

Horn blowing frequency for each alternative is shown below. Due to the large number of at-grade crossings in the City, construction of grade separations have a very small affect on horn frequency. Significant reduction in horn noise can only be accomplished through implementation of quiet zones.

**Horn Blowing Duration
(minutes per day)**

Baseline	258
1A	138
1B	138
1C	0
2A	0
2B	0
3A	0
3B	0

Initial Costs

Design criteria for each alternative were developed from meetings with the railroad companies, and from information in IDOT's Bureau of Design and Environment Manual. Based on this criteria, horizontal



alignment and vertical profile was established for each track centerline and for cross streets. Typical sections for the rail corridor and for the cross streets were also developed. From this analysis, plan and profile drawings and proposed bridge drawings were prepared that show the necessary facilities for each alternative and the right-of-way required. This information was provided to the railroad companies for their review and was used to estimate initial costs for the project.

The initial cost of each alternative in 2011 dollars, was computed. This was based on an estimate of quantities and 2011 unit prices for major construction items and also included engineering, land acquisition and utility relocation. The initial costs for the retained alternatives are shown below.

Initial Cost for Retained Alternatives

Baseline	\$0
1A	\$96,000,000
1B	\$259,000,000
1C	\$389,000,000
2A	\$318,000,000
2B	\$368,000,000
3A	\$468,000,000
3B	\$526,000,000

Lifecycle Cost Analysis

In order to compare the various alternatives, a lifecycle cost analysis was prepared. The assumptions used in this analysis are shown below.

Annual costs were computed for each year of anticipated project period. These include:

- Crossing maintenance.
- Delays based on the traffic delay calculations and an average hourly delay cost.
- Cost for collisions, injuries and fatalities at highway grade crossings as computed by the crash prediction model.
- Emissions and fuel costs due to delayed vehicles.
- Incident, injury and fatality costs for hazardous material releases.

These annual costs were increased due to inflation and any anticipated increases due to rail and vehicle traffic growth. The present worth of these annual costs were computed using the discount rate and anticipated project period.

Lifecycle costs were computed for significant publicly funded improvements that will require replacement or rehabilitation during the project period. These include overpass structures and grade crossings. A return interval and rehabilitation cost were assumed along with anticipated inflation. The present worth of the lifecycle components was computed using the discount rate and project period.

The total present value of initial costs, annual costs and lifecycle costs of the various alternatives were compared for a project period of 75 years.



Economic Analysis Assumptions

Description	Value	Source
Value of Delay Time Per Hour	\$15.00 ⁽¹⁾	USDOT, Revised Departmental Guidance: Valuation of Travel Time in Economic Analysis, February 11, 2003
Fuel prices (average retail gasoline price per gallon, 2011-30)	\$3.33	NHTSA, Corporate Average Fuel Economy for MY 2011 Passenger cars and Light Trucks,
Annual Inflation Rate	1.80%	
Annual Inflation Rate for Construction	3.0%	
Volatile Organic compounds damage cost (\$/ton)	\$1,700	Economic Values for Benefits Computations (2007\$)
Nitrogen oxides damage cost (\$/ton)	\$4,000	
Value of Statistical Life (Fatality)	\$5.8 million	USDOT, Revised Departmental Guidance: Treatment of the Value of Preventing Fatalities and Injuries in Preparing Economic Analysis, February 5, 2008
Value of Reduced Injury	\$1,000,000 ⁽²⁾	
Cost of Property-damage-only crash	\$50,000	FRA Gradedec.net
Discount Rate	4.5%	Office of Management and Budget Circular No. A-94. Appendix C Revised December 2009
Vehicle Traffic Growth (per year)	2.00%	IDOT. Springfield Average
Rail Traffic Growth (per year)	1.20%	FRA. National Average
HAZMAT Incident Each	\$1,420	Office of Hazardous Materials Safety. National Average

Notes:

(1) Escalated to 2011 dollars using CPI-U.

(2) Applied the scaling factors for injury crashes in USDOT Memo (February 11, 2003) to regional crash data.

Track and train signal maintenance costs are the same for all alternatives.

Train operations costs are the same for all alternatives.

Street maintenance costs are the same for all alternatives.

Structure life is 75 years.

Structure rehabilitation every 25 years at 20% of structure cost.

Grade crossing and signal rehab every 20 years.

A reduction in lifecycle and annual costs from the baseline condition reflects a measurable benefit of each alternative, primarily as a reduction of delays and accidents.

Present Value of Annual and Lifecycle Costs

Baseline	\$398,000,000
1A	\$534,000,000
1B	\$334,000,000
1C	\$233,000,000
2A	\$150,000,000
2B	\$96,000,000
3A	\$128,000,000
3B	\$64,000,000



Since the annual and lifecycle costs are reduced to a present value they can be directly compared to the initial costs, and a total cost can be computed for each alternative. This can be used to compare the various alternatives and provide a substantiation of benefits versus any monetary costs in order to weight the alternatives to justify what is carried forward in the NEPA process.

Total costs, initial plus lifecycle and annual costs are shown in the table below.

Baseline	\$398,000,000
1A	\$630,000,000
1B	\$583,000,000
1C	\$622,000,000
2A	\$468,000,000
2B	\$464,000,000
3A	\$596,000,000
3B	\$590,000,000

Resource Agency/Citizen Involvement

The study's second open house was held on Tuesday, November 16, 2010 and 309 citizens attended. The main purpose of this open house was to:

- Present the alternatives for accommodating increasing rail traffic;
- Share the evaluation factors in the alternative selection process; and
- Obtain public input on which alternative would best serve the City of Springfield.

Resource agency coordination letters were mailed to federal, state and local agencies in September 2010. Two public meetings have been held to-date, April 2010 and November 2010. The following summary represents the feedback received at the November public meeting.

Attendees were encouraged to visit 12 stations, three of which featured information on the retained alternatives for accommodating rail traffic. The other stations featured: project information; historic structures; noise and vibration; corridor redevelopment opportunities; land acquisition process; high-speed rail; non-viable alternatives; railroad safety; and public engagement. The alternative stations displayed descriptions, maps and technical comparisons based on evaluation factors such as traffic delays, expected crash frequency and estimated displacements. These three stations represented variations of the following alternatives:

- Double track 3rd Street;
- Shift 3rd Street to 10th Street; and
- Shift 3rd Street and 19th Street to 10th Street.

For those unable to attend the open house, the displays were made available on the study's website in the weeks following the event. Citizens had until Sunday, December 5, to review the information and submit a comment form, either by mail, email or through the website.

Comment Form Results

A total of 233 comment forms were received – 199 at the open house, 31 via the study's website and three via mail and electronic mail.



Preferred Alternative

Respondents were asked to select the alternative that they thought would best address Springfield's need to accommodate increasing rail traffic. With 220 responses to this question, approximately 47% of the respondents selected one of the two alternatives that involved shifting both 3rd Street and 19th Street rail traffic to 10th Street. Forty-two percent selected one of two alternatives that involved shifting only 3rd Street to 10th Street; and the remaining respondents, 11%, favored one of three alternatives to double track 3rd Street.

Evaluation Factors

After selecting their preferred alternative, respondents were asked to choose the top three factors that they used in their decision-making. The available choices included the factors being considered in the alternative selection process. As indicated by the comment forms, the top three factors were *traffic delays, public safety and corridor redevelopment*.

Factors considered in choosing an alternative	Total number of responses received
Traffic Delays	164
Public Safety	163
Corridor Redevelopment	101
Environmental Impacts	88
Displacements	82
Costs	76

Additional Comments

The comment form also contained a section for respondents to add any additional comments about the alternatives or the factors used in the selection process. One hundred and sixteen, about half, of the comment forms included remarks in this section.

Of those who completed this section, 40% used this opportunity to describe why Alternative 1, double tracking 3rd Street, was not the best choice. Citizens cited reasons that generally centered on the following:

- Negative impacts on the local economy, especially on the medical district;
- Disruption to business operations and traffic flow in the downtown area; and
- Overall devastation to the City's downtown, including historical sites.

Another 16% of the comments revealed support for consolidating 3rd Street traffic to 10th Street (either Alternative 2 or 3) because it would create redevelopment and economic development opportunities, both along an abandoned 3rd Street and along an expanded 10th Street corridor; and it would improve traffic flow within and through the City.

There were several comments, approximately 7% of the total provided in this section, which demonstrated concern for or opposition to consolidating rail onto the 10th Street corridor. Reasons cited included the following:

- Further division between the East Side and West Side of the City;
- Impacts on traffic flow and emergency medical access due to road closures; and
- Negative effects on Lanphier High School and the surrounding area.



Close to 10% of the comments focused on which factors to consider in the selection process. Respondents mentioned displacements, corridor redevelopment, vibration and noise, public safety, tourism, people with disabilities, a minimal number of overpasses/underpasses, and long-term planning for the City.

The Medical District Commission provided a study by Northern Illinois University's Regional Development Institute documenting the loss of hundreds of millions of dollars of one-time and annual economic activity, 645 temporary construction jobs, 562 permanent jobs, and substantial attendant economic benefits associated with a new healthcare facility that will not be constructed if a 3rd Street alternative is chosen to accommodate future rail traffic.

Benefit Cost Ratio of Alternatives

Seventy-five year project life, 4.5% discount rate to 2011 Net Present Value (NPV)
Construction/ROW/Engineering Costs in 2011 dollars were used to compute initial cost. The methodology was previously discussed.

NPV Construction/ROW/Engineering (\$ Millions)							
<u>Baseline</u>	<u>1A</u>	<u>1B</u>	<u>1C</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B</u>
\$0	\$96	\$259	\$389	\$318	\$368	\$468	\$526

Vehicle Delay, Train/Vehicle Accident, Energy, Air Quality and Maintenance/Rehab savings from baseline benefits were calculated as previously discussed in life cycle costs.

NPV Vehicle Delay, Accident, Energy, Air Quality Main./Rehab Savings From Baseline (\$ Millions)						
<u>1A</u>	<u>1B</u>	<u>1C</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B</u>
-\$182	\$18	\$120	\$202	\$256	\$225	\$288

Construction employment benefit was calculated by using IDOT's estimate of jobs per \$1 million of construction which is 13. The majority of the dollars for all alternatives, except 1A, are for bridge construction. Engineering was assumed to begin in 2013 and construction was assumed to be complete in 2017 for all alternatives. Obligation of funds was assumed as 10% in 2013, 15% in 2014, 40% in 2015, 30% in 2016 and 5% in 2017. No construction cost increase was assumed as the 13 jobs per \$ million was used for all years. The construction season was assumed to last from April through November. The Average wage was assumed to be \$36.41/hour based on Engineering News-Record Average construction Wage for March, 2011. Wages were assumed to grow at 1.8% annually.

NPV Construction Employment Benefit (\$ Millions)						
<u>1A</u>	<u>1B</u>	<u>1C</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B</u>
\$54	\$146	\$220	\$180	\$208	\$264	\$297

Employment benefits were calculated using an elasticity of employment growth with respect to delay growth. Dr. Kent J. Hymel (*Journal of Urban Economics*, 65(2), March 2009, pp. 127–135) noted "the estimates imply that a 10% increase in congestion, for a city with delay comparable to Los Angeles, would reduce subsequent long-run employment growth by 4%." Dr. Hymel's paper documents an average elasticity of the 10 most populous areas to be -0.27. Springfield is neither as congested nor populated as any of these so an elasticity of -0.1 was used to provide a *conservative* estimate of employment impacts of increasing or decreasing delays. Employment data for the Central Business District and the Medical District were provided by the Springfield-Sangamon County Regional Planning Commission.



Employment Estimate and Forecast		
<u>SSRPC Forecast</u>	<u>2007</u>	<u>2035</u>
Central Business District	11,964	14,691
Medical District	10,249	12,637

Employment Estimate Based On Delay - 2035								
	<u>Baseline</u>	<u>1A</u>	<u>1B</u>	<u>1C</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B</u>
Central Business	14,472	14,166	14,616	14,670	14,768	14,891	14,751	14,891
Medical District	12,456	12,284	12,660	12,728	12,701	12,814	12,690	12,814

Note: Central Business District estimates do not include impact of business relocations due to grade separations. Medical District estimates do not include employment impacts of increased vibration.

The average salary for a Central Business District job was estimated at \$34,706 (the average for all workers in Sangamon County). The average salary for a Medical District job was estimated at \$48,706 (the average for the Springfield MSA medical industry worker).

Employment Benefits Compared To Baseline (NPV \$ Millions)							
	<u>1A</u>	<u>1B</u>	<u>1C</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B</u>
Central Business	-\$288	\$126	\$171	\$278	\$514	\$263	\$514
Medical District	-\$225	\$282	\$371	\$331	\$635	\$316	\$635

The lifecycle cost benefits, construction employment benefits, Central Business and Medical district employment benefits were added to get a total benefit.

Benefit/Cost Ratio (\$ Millions NPV)							
	<u>1A</u>	<u>1B</u>	<u>1C</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B</u>
Benefits Compared To Baseline	-\$641	\$572	\$803	\$992	\$1,614	\$1,069	\$1,735
Construction ROW & Eng. Cost	\$96	\$259	\$389	\$318	368	\$468	\$526
Benefit/Cost Ratio	-6.7	2.2	2.3	3.1	4.4	2.3	3.3

Conclusions/Recommendations

Alternatives Recommended/Eliminated

Alternative 1A is recommended for elimination because it was the least effective in achieving the project purpose and need. It has the highest traffic delays, expected crash frequency and train horn frequency. It also has the highest lifecycle cost and total cost. Alternative 1A fails to address any of the project needs



on Tenth Street or Nineteenth Street. This alternative has the potential for increased noise and vibration impacts to more residences and sensitive noise receptors, including the Dana Thomas House and the hospitals. The public has not supported this alternative based on comments received from the open houses and community presentations. This alternative also has the highest impacts to potential development in the Medical District and the Central Business District and maximizes the number of trains through residential areas.

Alternative 1B is recommended for elimination because it was not as successful as other alternatives in achieving the project purpose and need. It has the second highest delays, expected crash frequency, train horn noise and lifecycle cost. The lengthy overpasses in the downtown area cause serious access and viability impacts to businesses and also will impact more historic structures. The number of displacements and parcels with access changes is higher than other alternatives. Alternative 1B also fails to address any of the project needs on Tenth Street or Nineteenth Street. This alternative has the potential for increased noise and vibration impacts to more residences and sensitive noise receptors, including the Dana Thomas House and the hospitals. The public has not supported this alternative based on comments received from the open houses and community presentations. This alternative also has the highest impacts to potential development in the Medical District and the Central Business District and maximizes the number of trains through residential areas.

Alternative 1C is recommended for elimination because it has higher anticipated delays, crash frequency and train horn frequency than Alternatives 2 or 3. It also has a higher initial cost than Alternative 2A or 2B and a higher total cost than Alternative 2A, 2B, 3A or 3B. The number of displacements and access changes is higher than other alternatives. This alternative has the potential for increased noise and vibration impacts to more residences and sensitive noise receptors, including the Dana Thomas House and the hospitals; and the potential for more historic structure impacts associated with the grade separations. The public has not supported this alternative based on comments received from the open houses and community presentations. This alternative also has the highest impacts to potential development in the Medical District and the Central Business District and maximizes the number of trains through residential areas.

Alternatives 3A and 3B are recommended for elimination because they have the highest initial cost and the third highest total cost of the alternatives. While they do have the lowest delays, the slight reductions from Alternatives 2A and 2B come at a very initial high cost. The crash rates are not lower than 2A and 2B. Alternatives 3A and 3B also have the highest number of residential and commercial displacements, and bisect a park causing a Section 4(f) impact. The additional right-of-way required for these alternatives also causes the potential for increased historic structure impacts as compared to Alternatives 2A and 2B.

Alternative 2B is recommended for elimination because it has a higher initial cost than 2A and more displacements while providing minimal improvements in safety and delays.

Recommended Design Alternative

Alternative 2A is the recommended alternative. It has the second lowest traffic delays, lowest crash frequency, lowest train horn noise, second lowest number of displacements, lowest number of access changes, and lowest total cost. It fulfills the project purpose and need with the lowest total cost while minimizing environmental impacts. This alternative does not cause additional noise and vibration impacts to the Medical District, or a severance to their long-term plans. Impacts to historic structures will be minimized and no Section 4(f) impacts to parks is anticipated. Fewer residences are within one block of the Tenth Street corridor. This alternative has also received public support through the public engagement process.