Feasibility Study
Downtown Moorhead Railroad Grade Separation
Moorhead, Minnesota
July 2008

INTRODUCTION

The City of Moorhead (City), along with the Fargo-Moorhead Metropolitan Council of Governments (FM Metro COG), performed a study to evaluate the feasibility of constructing a new railroad grade separation in downtown Moorhead. While the overall study area includes all existing at-grade railroad crossings in the downtown area, the **focused study area** is bounded by 10th Street on the west, 15th Street on the east, 2nd Avenue South on the south, and 2nd Avenue North on the north (see **Figure 1.1**). BNSF has two major railroad lines passing through the study area:

- The main double-track line known as the KO Subdivision Line (KO Line), located between Main Avenue and Center Avenue (approximately 63 trains per day).

- The single-track Prosper Subdivision Line (Prosper Line), located between Center Avenue and 1st Avenue North (approximately 31 trains per day, including passenger train traffic).

Needs for a railroad grade separation include decreasing the number of train-vehicle exposures in downtown Moorhead, improving safety for pedestrians and bicyclists, reducing delays to emergency response times, and reducing traffic congestion/delays for vehicles traveling in downtown Moorhead.

FEASIBILITY STUDY OBJECTIVES

- To identify the most feasible location(s) for a railroad grade separation in the downtown area.
- To determine whether a railroad grade separation in downtown Moorhead is feasible, from a constructability and cost standpoint.
- To provide the public an opportunity for project involvement.
- To initiate communication with the BNSF Railway (BNSF) concerning a railroad grade separation in downtown Moorhead.
- To identify future traffic analysis needs.
- To determine realistic right-of-way needs.
- To supply cost information for decision making, prioritization, and budgeting.
- To provide a baseline for future engineering efforts.

AGENCY AND PUBLIC INVOLVEMENT

A Study Review Committee (SRC) assisted in the guidance and direction of this Study. The SRC consisted of members from the City, FM Metro COG, Mn/DOT, Clay County, BNSF, HDR Engineering, and Ulteig Engineers. Three separate meetings with the SRC were held during the Study.

In addition, two public input meetings were held during this Study, the first in May 2007 and the second in May 2008. In general, most comments at the two public meetings fell into the following subject areas:

- Location of underpass (11th Street vs. 14th Street)
- Impacts to side streets
- Impacts to properties and access
- Costs (both overall project cost and assessed costs)
- Overpass vs. underpass
- Impacts during construction

FATAL FLAW SCREENING OF POTENTIAL CROSSING LOCATIONS

The analysis of crossing locations was divided into two stages: Fatal Flaw Screening and Comparison Screening. For each stage of analysis, decision criteria were established and matrices were developed to help organize and evaluate the data:

- **Fatal Flaw Screening**: Use matrix to determine which locations go to the Comparison Screening.

- **Comparison Screening**: Use comparison matrix to evaluate remaining locations and determine the location(s) where a grade separation is most feasible.

Figure 3.2 shows the results of the Fatal Flaw Screening. Of the 7 existing downtown at-grade railroad crossings (as of December 2006), 3 crossing locations – 8th Street, 11th Street, and 14th Street – were carried forward to the comparison screening for additional analysis.

COMPARISON SCREENING ANALYSIS

The SRC agreed on eight main criteria categories for the Comparison Screening:

Property Impacts	Constructability & Design
Safety	Environmental Impacts
Emergency Vehicle Access	Costs/Economics
Traffic Capacity/Mobility	Railroad Issues

The following 5 options were evaluated:

- **Option #1:** 8th Street Grade-separation at both KO and Prosper
- **Option #2:** 8th Street Grade-separation at KO only, Prosper crossing remains at-grade
- **Option #3:** 11th Street Grade-separation at both KO and Prosper
- **Option #4:** 11th Street Grade-separation at KO only, Prosper crossing remains at-grade
- **Option #5:** 14th Street Grade-separation at both KO and Prosper

After some initial analysis and discussion by the SRC, Options #2 and #4 were eliminated from further consideration. It was determined that these options do not meet several of the Study needs and objectives, since an at-grade crossing would still remain along the corridor.

Figure 3.3 and Figure 3.4 show the results of the Comparison Screening. When measured against the criteria, Option #3 (11th Street) and Option #5 (14th Street) fared best among the remaining three options. The SRC determined that **Option #3 - 11th Street** and **Option #5 – 14th Street** should be advanced for further concept development and comparison against each other.

EXISTING CONDITIONS AT 11TH STREET & 14TH STREET

Elements of note related to existing conditions include:

- All potentially affected major streets in the Study area (11th St, 14th St, Main Ave, Center Ave, 1st Ave N) have a significant number of private access points.
- Several track turnouts, crossovers, and switches are located just east of 14th Street on both the KO Line and Prosper Lines. These devices are required to move train traffic back and forth between these railroad lines and the P Line that heads north. Maintaining the interaction among all these railroad lines is critical to BNSF operations.
- City storm sewer, sanitary sewer, and watermain are present throughout the Study area.
- Existing storm sewer lines all drain west or north to the Red River.

ALTERNATIVE DEVELOPMENT AND EVALUATION

Notes on alternative development and evaluation:

- For the purposes of this study, the Study Review Committee (SRC) chose to focus solely on underpass crossing alternatives. An overpass alternative would need to be approximately 28-30 feet into the air due to the 23-foot track clearance requirements and the associated bridge structure depth.
- BNSF indicated during project discussions that the railroad tracks could be raised by a maximum of one foot. At this time, BNSF has not committed to a grade raise. Therefore, for the purposes of this study, it was assumed that the railroad tracks would remain at current elevations and would not be raised.

Figure 6.1 shows a proposed underpass layout for 11th Street. **Figure 6.4** shows a proposed underpass layout for 14th Street. **Table E.1** on the next page compares the 11th Street location to the 14th Street location, using the eight main criteria categories.

The table shows that while 11th Street and 14th Street are both feasible locations for a railroad grade separation, **11th Street is a more desirable and favorable location for an underpass than 14th Street.**

STUDY CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were reached in this Study:

- 11th Street and 14th Street are the most feasible locations for a railroad grade separation.
- From constructability and operational standpoints, a railroad grade separation at either 11th Street or 14th Street is feasible.
- However, it would be difficult to construct the temporary shoofly tracks at 14th Street without incurring significant costs or potentially impacting BNSF operations.
- 11th Street is the more favorable location for a railroad grade separation, based on direct comparisons using the eight main criteria categories developed for this study.

The financial component of project feasibility is more difficult to determine. The availability of funding for planning, environmental studies, design, and construction is a significant factor in a project of this magnitude. Realistically securing funding and following through the project development process could take approximately 8 to 17 years (see **Table E.2** on the next page).

Table E.1

● More Favorable ● Less Favorable = Relatively Equal

11th Street		Criteria	14th Street	
●	11 Potential Property Acquisitions - 5.7 Acres	**Property Impacts/Business Relocations**	●	13 Potential Property Acquisitions - 6.3 Acres
		Costs		
=	$3.0 - $4.0 million (approx.)	- Right-of-Way Costs	=	$3.0 - $4.0 Million (approx.)
●	$27.0 - $33.0 million (approx.)	- Const./Engineering Costs	●	$29.5 - $36.0 Million (approx.)
		Traffic Capacity/Mobility		
=	2005 ADT = 4,400 vehicles	- Traffic Volumes	=	2005 ADT = 3,900 vehicles
●	¼ mile closer to downtown	- Proximity to Downtown	●	¼ mile further from downtown
●	Continuous from 28th Ave S to Wall Street	- North-South Continuity	●	Continuous from 28th Ave S to 15th Ave N
=	Impacts to 1st Ave N grades more significant	**Constructability/ Utility Issues**	=	More storm sewer required, fewer impacts to 1st Ave N grades
		Railroad Issues		
●	Less temporary track, Less impact to track operations	- Shoofly Construction	●	Approx. $2.0 - 2.5 million more,2 times as much temporary track
●	555,200 exposures eliminated	- Train/Vehicle Exposures	●	363,500 exposures eliminated
●	Turnouts/crossovers unaffected	- Coordination with BNSF Operations	●	More impacts to turnouts/crossovers and existing rail operations
=		**Safety Impacts**	=	
=	Response times faster to SW	**Emergency Vehicle Access**	=	Response times faster to SE

Table E.2

Project Phase	Approximate Duration	Estimated Year of Completion	
		Funding	Project
Complete Feasibility Study	3 - 6 months		2008
Secure Funding for Preliminary Engineering & EA (Accomplished through Congressional Appropriation Process)	1 - 5 years	2009 - 2013	
Complete Preliminary Engineering & EA/EAW or EIS	2 years		2011 - 2015
Obtain FONSI/Negative Declaration	6 months - 1 year		2012 - 2016
Secure Funding for Final Design & ROW Acquisition (Accomplished through Congressional Appropriation Process)	1 - 5 years	2010 - 2018	
Complete Final Design & ROW Acquisition/Property Purchases	2 years		2014 - 2020
Secure Funding for Construction (Accomplished through Congressional Appropriation Process)	1 - 5 years	2011 - 2023	
Complete Construction	2 years		2016 - 2025

Definitions

EA = Environmental Assessment
EAW = Environmental Assessment Worksheet
EIS = Environmental Impact Statement
FONSI = Finding of No Significant Impact
ROW = Right-of-Way

Federal funds will be required for the City to finance this project. Typically, projects of this type are funded 80% Federal and 20% local. At this point, no funds have been allocated or programmed beyond this Feasibility Study.

The level of cost participation from BNSF will also need to be determined. Federal regulation 23 CFR Part 646.210(b)(3) states the following: *"On projects for the elimination of existing grade crossings at which active warning devices are in place … the railroad share of the project costs shall be 5 percent."* In cases where the above statute is not used, BNSF in the past has contributed between $10,000 and $15,000 to projects that include closure of existing at-grade crossings.

A detailed analysis of construction costs was not included in the scope of this study. At this stage in the project development process, it is difficult to determine how much a grade separation project would cost due to the number of unknowns and variables related to construction cost. Project elements that will have a significant impact on cost include, but are not limited to:

- Funding availability and timing
- Property acquisitions
- Business relocations
- Utility needs and impacts
- Railroad operational needs and impacts
- Bridge or tunnel structures
- Retaining walls
- Construction cost inflation
- Property value fluctuation

Approximate conceptual-level costs were developed for the three primary locations that were evaluated at the Comparative Screening stage. **Table E.3** lists approximate cost ranges for construction and right-of-way acquisition for the alternatives at 8th Street, 11th Street, and 14th Street (in 2008 dollars).

Table E.3
Approximate Right-of-Way Acquisition and Construction Costs for Concepts at 8th Street, 11th Street, and 14th Street

	8th Street	11th Street	14th Street
Right-of-Way Cost - Includes ROW and easement acquisition, business relocation	$6.0 - $7.5 million	$3.0 - $4.0 million	$3.0 - $4.0 million
Construction Cost - Includes Engin., Const. Admin., Roadway, Bridge, Shoofly, and Util.	$32.5 - $39.5 million	$27.0 - $33.0 million	$29.5 - $36.0 million
Total	**$38.5 - $47.0 million**	**$30.0 - $37.0 million**	**$32.5 - $40.0 million**

Note: All costs are in 2008 dollars.