

QUIET ZONE ASSESSMENT

Grand Forks, North Dakota and East Grand Forks, Minnesota

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TABLE OF CONTENTS

INTRODUCTION AND BACKGROUND.....	1
EXISTING CONDITIONS	4
QUIET ZONE ANALYSIS	8
Diagnostic Meeting Results	8
Quiet Zone Risk Assessment	9
Quiet Zone Improvement Options and Scenarios.....	11
PUBLIC PARTICIPATION PROCESS	11
Public Open House Meeting.....	11
Grand Forks and East Grand Forks City Council Presentations.....	11
CONCLUSIONS AND RECCOMENDATIONS.....	12
Recommended Quiet Zone Improvements.....	12
Pedestrian Safety Improvements.....	26
IMPLEMENTATION ACTIVITIES.....	26

LIST OF FIGURES

FIGURE 1: STUDY AREA.....	3
FIGURE 2: SOUTH 4TH STREET CROSSING IMPROVEMENTS	14
FIGURE 3: SOUTH 5TH STREET CROSSING IMPROVEMENTS	15
FIGURE 4: DEMERS AVENUE (WEST) CROSSING IMPROVEMENTS.....	17
FIGURE 5: NORTH 55TH STREET CROSSING IMPROVEMENTS	18
FIGURE 6: DEMERS AVENUE (EAST) CROSSING IMPROVEMENTS.....	19
FIGURE 7: UNIVERSITY AVENUE CROSSING IMPROVEMENTS.....	21
FIGURE 8: GATEWAY DRIVE (US HIGHWAY 2) CROSSING IMPROVEMENTS.....	22
FIGURE 9: NORTHEAST 3RD STREET CROSSING IMPROVEMENTS	24
FIGURE 10: CENTRAL AVENUE NORTHWEST CROSSING IMPROVEMENTS	25

LIST OF TABLES

TABLE 1: CROSSING CHARACTERISTICS	5
TABLE 2: BASE SCENARIO RISK ASSESSMENT	10
TABLE 3: CROSSING IMPROVEMENT PLAN FOR THE DOWNTOWN GRAND FORKS QUIET ZONE	13
TABLE 4: CROSSING IMPROVEMENT PLAN FOR THE WEST GRAND FORKS QUIET ZONE	16
TABLE 5: CROSSING IMPROVEMENT PLAN FOR THE GLASSTON QUIET ZONE .	20
TABLE 6: CROSSING IMPROVEMENT PLAN FOR THE EAST GRAND FORKS QUIET ZONE.....	23
TABLE 7: QUIET ZONE IMPLEMENTATION SUMMARY	27

LIST OF APPENDICIES

APPENDIX A – RAIL CROSSING AERIAL PHOTOGRAPHS	
APPENDIX B – U.S. DOT GRADE CROSSING INVENTORY SHEETS	
APPENDIX C – WEST GRAND FORKS EXISTING CONDITIONS – FRA EMAIL	
APPENDIX D – DIAGNOSTIC MEETING MINUTES AND CONSENSUS	
APPENDIX E – BASE SCENARIO FRA CALCULATOR RESULTS	
APPENDIX F – QUIET ZONE IMPROVEMENT SCENARIOS AND SSM/ASM AND ROADWAY IMPROVEMENT LAYOUTS	
APPENDIX G – PUBLIC PARTICIPATION SUMMARY	
APPENDIX H – QUIET ZONE SCENARIO TECHNICAL MEMORANDUMS	
APPENDIX I – RECOMMENDED SCENARIO FRA CALCULATOR RESULTS	
APPENDIX J – WEST GRAND FORKS PEER REVIEW – FRA LETTER	

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INTRODUCTION AND BACKGROUND

The Grand Forks and East Grand Forks Metropolitan Planning Organization (MPO) is investigating options to improve safety for at-grade highway rail crossings and to minimize the impacts of train horn noise throughout the community. The Quiet Zone Final Rule, issued by the Federal Railroad Administration (FRA) in June 2005, offers an opportunity to accomplish this objective. The Rule specifies the procedures and actions necessary to establish a train whistle-free quiet zone for at-grade highway rail crossings. The MPO retained the services of SRF Consulting Group, Inc. to assist in preparing a quiet zone feasibility study that identifies improvements needed to comply with the FRA Final Rule. SRF has prepared numerous Quiet Zone Assessment Reports and has extensive experience and familiarity with the quiet zone development process.

Fifteen at-grade rail crossings were identified for review and included in this study. Four of the crossings are located within the City of East Grand Forks and 11 crossings are in the City of Grand Forks. These crossings are located along three different railway subdivisions, all running through or within the limits of the Grand Forks and East Grand Forks Metropolitan Area. All of the railroad tracks and equipment are owned and maintained by the Burlington Northern Santa Fe Railway (BNSF).

For the purpose of this assessment, the crossings are divided into five separate quiet zones, based on railroad subdivision, geographic location, and jurisdictional boundaries. Each zone includes a range of one to four at-grade crossings, and has one or more possible combinations of treatments to achieve an acceptable quiet zone risk rating. The proposed quiet zones and their respective crossings are listed below:

East Grand Forks

Northwest 3rd Street
Central Avenue Northwest
2nd Avenue Northeast
NE 4th Street/US Business Highway 2

Downtown Grand Forks

South 3rd Street
South 4th Street
South 5th Street
North 42nd Street

West Grand Forks

Demers Avenue (west of 55th Street)
North 55th Street
Demers Avenue (east of 55th Street)

Glasston

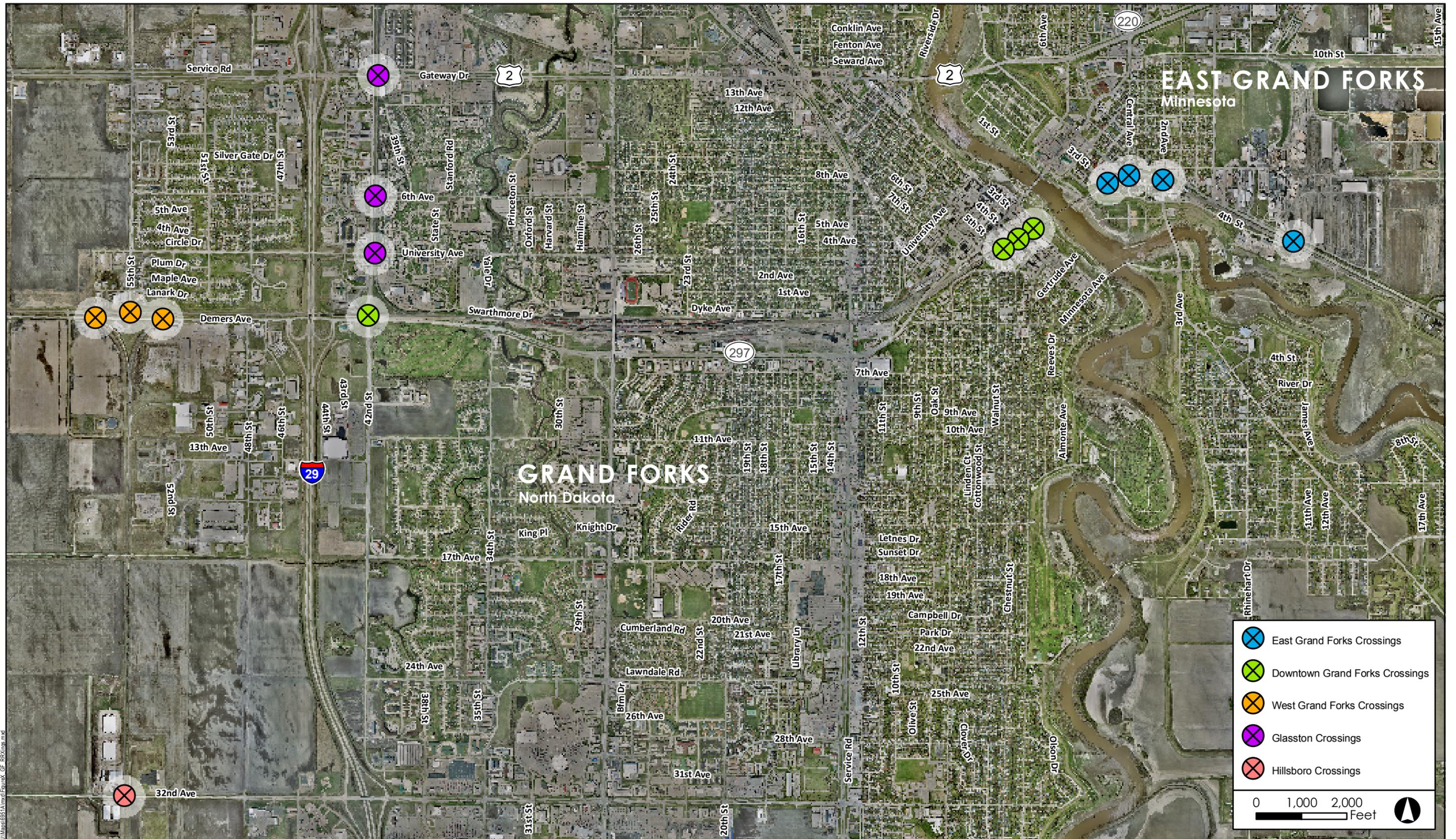
University Avenue
6th Avenue North
Gateway Drive/US Highway 2

Hillsboro

32nd Avenue S./County Road 32

Note that the three railroad crossings within the proposed West Grand Forks configuration were initially considered as a single quiet zone, due to their close proximity and common railroad subdivision (Grand Forks Subdivision). However, based on FRA direction, each of these crossings must be considered as a separate quiet zone for the purpose of the quiet zone risk assessment, because they are located on separate railroad line segments. These crossings are treated as a single crossing group, or quiet zone, throughout this report, but each will be implemented independently and will include a separate risk analysis.

In addition to the quiet zones listed above, a sixth quiet zone configuration was considered as part of this study. Under this quiet zone option, all of the crossings in the Downtown Grand Forks and West Grand Forks Quiet Zones are combined. Further, the N 42nd Street crossing was initially included in the West Grand Forks Quiet Zone, however, as the study progressed it was determined that it would be more practical to include this crossing with the Downtown Grand Forks Quiet Zone configuration. Figure 1 on the following page presents the location of the fifteen at-grade crossings, color coded by quiet zone.



Grand Forks/East Grand Forks Quiet Zone Assessment-Study Area

Railroad Crossing Study
 Grand Forks and East Grand Forks MPO
 Grand Forks, North Dakota and East Grand Forks, Minnesota

Figure 1

EXISTING CONDITIONS

As part of this study, SRF conducted a site visit at all 15 at-grade rail crossings. Measurements were taken of the existing roadway and rail characteristics at each crossing. Prior to determining the future quiet zone safety improvements necessary, it was important to examine each crossing's existing characteristics. The FRA Final Rule states that in order for an at-grade rail crossing to be quiet zone eligible, it must be equipped with active warning devices comprising both flashing lights and two quadrant vehicle gates, and conform to the standards contained in the Manual on Uniform Traffic Control Devices (MUTCD). In addition, each crossing must be equipped with constant warning time train detection (CWT) and power out indicators where appropriate, and the rail corridor must be at least one-half mile in length. Table 1 on the following page highlights the existing traffic and train characteristics such as train volume, train speeds, annual average daily traffic (AADT), and the quiet zone eligibility status of each crossing (i.e., meets the minimum requirements listed above, or if not, what improvements are needed in order to meet these requirements).

Aerial photographs of the crossings, showing the surrounding land use, intersecting roadways, and possible access issues near each crossing are provided in Appendix A. The United States Department of Transportation (US DOT) provides an inventory of crossing characteristics for all rail crossings throughout the United States. These inventory forms document location, train movements, train speeds, safety devices present, physical characteristics and highway/traffic information for each crossing. The US DOT Grade Crossing Inventory Forms for each of the crossings in Grand Forks and East Grand Forks, updated during field investigation, are provided in Appendix B.

The following is an overview of the existing conditions for each of the proposed quiet zones, including railroad characteristics, existing crossing safety features, and any other issues that may impact the implementation of a quiet zone.

East Grand Forks

There are four at-grade railroad crossings within the proposed East Grand Forks Quiet Zone, all located on the Grand Forks Subdivision. The Grand Forks Subdivision runs east to west through the cities of East Grand Forks and Grand Forks, passing through both downtowns and bordering residential areas in both Cities. The three crossings in downtown East Grand Forks (NW 3rd Street, Central Avenue NE, and 2nd Avenue NE) are on the Grand Forks Subdivision mainline track and the NE 4th Street/US Business Highway 2 crossing is on the Crystal Sugar line. As noted in Table 1, the Grand Forks Subdivision mainline carries approximately seven trains per day, traveling at a maximum speed of 20 miles per hour. The Crystal Sugar line is primarily used for switching movements and accommodates seven trains per day at a maximum speed of 20 miles per hour.

**TABLE 1
EXISTING CROSSING CHARACTERISTICS**

	CROSSING (U.S. DOT NUMBER)	NUMBER OF TRAINS PER DAY	MAXIMUM TRAIN SPEED (MPH)	AVERAGE DAILY TRAFFIC VOLUME (YEAR)	MEETS QZ REQUIREMENT	ADDITIONAL SAFETY FEATURES PRESENT
West Grand Forks* Quiet Zone	Demers Avenue (west) (086876F)	12	10	3,198 (2008)	No (needs CWT)	none
	N 55th Street (086750Y)	9	25	2,230 (2008)	No (needs CWT)	none
	Demers Avenue (east) (086875Y)	13	10	5,425 (2008)	No (needs CWT)	none
Hillsboro Quiet Zone	32nd Avenue S/County Road 32 (086739Y)	14	70	3,275 (2008)	No (spur track outside of gate arm on west side, gate needs to be relocated, or exclude spur track from the quiet zone)	none
Glasston Quiet Zone	University Avenue (062501A)	3	25	8,075 (2008)	Yes	none
	6th Avenue N (062502G)	3	25	4,940 (2008)	Yes	none
	Gateway Drive, US Hwy 2 (062505C)	3	25	21,045 (2008)	Yes	Non-traversable medians (east > 100', west = 22')
Downtown Grand Forks Quiet Zone	S 3rd Street (062505C)	7	20	2,105 (2008)	No (CWT to be added 2010)	none
	S 4th Street (081283W)	7	20	2,740 (2008)	No (CWT to be added 2010)	none
	S 5th Street (081284D)	5	20	4,610 (2008)	Yes	none
	N 42nd Street (081329H)	14	10	12,580 (2008)	Yes	Non-traversable medians (north = 22', south = 22')
East Grand Forks Quiet Zone	NW 3rd Street (081280B)	7	20	1,930 (2005)	No (needs gates and CWT)	none
	Central Avenue NW (081277T)	7	20	530 (2005)	No (needs gates and CWT)	none
	2nd Avenue NE (081276L)	7	20	6,075 (2005)	No (needs CWT)	none
	NE 4th Street/US Bus. Hwy. 2 (081260P)	7	20	4,000 (2006)	No (needs CWT, driveway inside gate arm needs to be relocated)	none

*Includes train volumes agreed upon by the City of Grand Forks and the FRA (see Appendix C)

Each of the crossings in the proposed East Grand Forks Quiet Zone will require railroad equipment/crossing upgrades in order to meet the minimum active warning device requirements for quiet zone implementation. The 3rd NW and Central Avenue NW crossings have lights, but need two-quadrant vehicle gates and CWT. The 2nd Avenue NE crossing has lights and gates, but needs CWT. In addition, there are currently public intersections or driveways within close proximity (less than 60 feet) to the NW 3rd Street, Central Avenue NW, and 2nd Avenue NE crossings which complicate possible crossing improvement options, particularly at the NW 3rd Street crossing. The Minnesota Department of Transportation (Mn/DOT) has dedicated funds in 2011 for railroad crossing improvements that would upgrade either the NW 3rd Street or the Central Avenue NW crossing to improve safety (90 percent federal funds/10 percent local funds). The crossing upgrades would include installation of an active warning device system consisting of vehicle gates and CWT, which would bring the crossing into compliance with the minimum quiet zone requirements.

The NE 4th Street/US Business Highway 2 crossing has gates and lights, but needs CWT. In addition, there is an existing driveway on the north side of the crossing inside of the railroad crossing vehicle gates. This driveway would need to be closed or relocated in order for the crossing to meet the minimum quiet zone eligibility requirements. The MPO and Crystal Sugar Processing Plant have discussed the following treatment options for this crossing:

1. Relocate the driveway to the west, outside of the existing vehicle gate. This would create a new private crossing as the new driveway alignment would cross the railroad tracks before intersecting with NE 4th Street/US Business Highway 2.
2. Relocate the driveway to the east and move the existing vehicle gate west, so that the relocated driveway is outside of the gate arm.
3. Close the driveway with a locked gate and only allow it to be open during the harvest season (approximately four weeks per year).

Based on preliminary discussions, FRA and BNSF Railway officials have indicated that they would not be favorable to relocating the driveway to the west (option 1), as it would introduce additional risk by creating a new crossing. They also are not favorable to leaving the driveway open only during harvest season, as it would still allow access inside of the existing gates. Based on these discussions, the FRA and BNSF Railway are most supportive of moving the existing westbound gate to the west and shifting the driveway to the east, outside of the relocated gate (option 2). Discussions regarding the preferred improvements at this crossing are still ongoing and a final decision will be made at a later date.

Downtown Grand Forks

There are four at-grade railroad crossings within the proposed Downtown Grand Forks Quiet Zone. All of these crossings are located on the Grand Forks Subdivision. The N 42nd Street crossing has approximately 14 trains per day traveling at a maximum speed of 10 miles per hour and there are seven trains per day at a maximum speed of 20 miles per hour at the S 3rd Street, S 4th Street, and S 5th Street Crossings. The S 3rd Street and S 4th Street crossings have lights and gates, but need CWT in order to meet the minimum active warning device requirements for quiet zone implementation. The NDDOT has these improvements programmed and is under contract with the BNSF Railway for installation in 2010. The S 5th Street and N 42nd Street crossings currently meet the minimum quiet zone requirements and N 42nd Street is equipped with pre-existing non-traversable medians which extend 22-feet from the gate arm on both sides

of the crossing. In addition, there are currently public intersections or driveways within close proximity (less than 60 feet) at both the S 4th Street and S 5th Street crossings, which complicate possible crossing improvement options.

West Grand Forks

There are three at-grade railroad crossings within the proposed West Grand Forks configuration, all of which are located on the east/west oriented Grand Forks Subdivision. Due to their close proximity and common railroad subdivision (Grand Forks Subdivision), these crossings were initially considered as a single quiet zone. However, based on FRA direction each crossing must be considered as a separate quiet zone for the purpose of risk assessment, because they are located on separate railroad line segments. These crossings are treated as a single crossing group below, but each will be implemented independently.

The N 55th Street crossing is on the Grand Forks Subdivision mainline, which carries approximately 9 trains per day at a maximum speed of 25 miles per hour. Each of the two Demers Avenue crossings (east and west of N 55th Street) are located on separate side tracks at the junction between the Grand Forks and Hillsboro Subdivisions. The eastern most Demers Avenue crossing (086875Y) carries approximately 13 trains per day and the western Demers Avenue crossing (086876F) carries 12 trains per day, both at a maximum train speed of 10 miles per hour. Both of the Demers Avenue crossings and the N 55th Street crossing are equipped with gates and lights, but not CWT.

Note that throughout the study process the train volumes for the West Grand Forks crossings changed a number of times as new data became available. This report includes the most recent train volumes agreed upon by the City of Grand Forks and the FRA. Appendix C includes an email from the FRA verifying the train and traffic volumes, as well as the quiet zone risk indices for each crossing.

Glasston

There are three at-grade railroad crossings within the proposed Glasston Quiet Zone, all located on the Glasston Subdivision mainline. The Glasston Subdivision mainline runs north and south through the City of Grand Forks, parallel to N 42nd Street. This rail line passes through a residential development and the University of North Dakota campus. The Glasston Subdivision mainline carries approximately three trains per day, traveling at a maximum speed of 25 miles per hour.

All of the crossings in this quiet zone meet the minimum active warning device requirements for quiet zone implementation. The Gateway Drive (U.S. Highway 2) crossing is currently equipped with pre-existing non-traversable medians which extend 22-feet from the gate arm on the west side of the crossing and more than 100-feet on the east side. In order to receive credit as a quiet zone improvement, these medians will need to be reconstructed to a minimum height of six inches.

Hillsboro

The proposed Hillsboro Quiet Zone consists of one crossing (32nd Avenue S/County Road 32) on the Hillsboro Subdivision mainline. This line runs on a north/south orientation along the

western border of the City of Grand Forks. There is another crossing located along this rail line at 17th Avenue S, which is north of the 32nd Avenue S/County Road 32 crossing. Based on discussions with MPO staff and the diagnostic team meeting results, the 17th Avenue S crossing will not be included in the quiet zone at this time (i.e., train horns will sound at this crossing) because it is outside of the Grand Forks city limits. The Hillsboro Subdivision mainline carries 14 trains per day at a maximum speed of 70 miles per hour.

The 32nd Avenue S/County Road 32 crossing is equipped with vehicle gates, lights, and CWT; however, it does not meet the minimum quiet zone requirements because a side track (west of the mainline) is outside of the gate arm. In order to meet the minimum active warning device requirements for quiet zone implementation, the gates would need to be relocated to include the side track (i.e., moved west of the side track), or the side track would need to be excluded from the quiet zone. Based on discussions with MPO staff and the diagnostic team meeting results, the side track will not be included in the quiet zone at this time (i.e., trains horns will sound on this track).

QUIET ZONE ANALYSIS

Diagnostic Meeting Results

A diagnostic team meeting was held on October 27, 2009. Representatives from the Grand Forks and East Grand Forks MPO, City of Grand Forks, City of East Grand Forks, Federal Railroad Administration (FRA), the North Dakota Department of Transportation (NDDOT), Minnesota Department of Transportation (Mn/DOT), Grand Forks Police Department, and SRF were in attendance.

The diagnostic team met at the East Grand Forks City Hall and was provided background information about the crossings and the quiet zone assessment process. The diagnostic team then completed a field inspection of each crossing and discussed possible Supplemental Safety Measure (SSM) or Alternative Safety Measure (ASM) improvement options at each crossing, which could be considered by the MPO in the development of its quiet zone plan.

SSMs are highway-rail crossing safety improvements determined by the FRA to be effective in reducing risk levels upon the cessation of train whistles at highway-rail crossings. SSMs deemed acceptable by the Final Rule for quiet zone implementation include: 100-foot non-traversable medians or channelization delineators (60-foot medians/delineators are acceptable if intersected by a public street), four-quadrant vehicle gates, one-way pairs, and street closures. In accordance with FRA rules, these SSMs must be installed in addition to the prerequisite quiet zone crossing requirements identified earlier, to satisfy risk reduction objectives. If a community chooses to establish a quiet zone using the FRA pre-approved SSMs, then it may designate and implement a quiet zone after appropriate notification and installation of the SSMs, without an FRA application. Wayside horns can also be used as an alternative to the routine sounding of train horns. Wayside horns are not an SSM, but are an FRA approved substitute for train whistles.

ASMs are highway-rail crossing safety improvements which are not pre-approved for implementation by the Final Rule, and as such are subject to approval upon application and review by the FRA Associate Administrator of Rail Safety. This application process is more

time consuming than the designation process described above, but is an acceptable alternative to the designation method. Typical ASMs include: reduced length non-traversable medians (i.e. less than the required length for SSM medians), three-quadrant vehicle gates, programmed/photo enforcement, public awareness education, and other geometric improvements.

The suitability of a particular SSM/ASM depends on various rail crossing factors. For example, four-quadrant vehicle gates are a very effective measure, but have a very high cost. The installation of medians generally has a low relative cost and is effective in reducing risk, but is sometimes not acceptable because it can reduce or eliminate access for existing driveways along the roadway.

During the diagnostic team field review of the Grand Forks and East Grand Forks crossings, the feasibility and constructability of various SSM/ASM improvements were fully evaluated. A copy of the diagnostic meeting minutes and sign-in sheets, as well as the potential SSM/ASM treatments determined by consensus of the diagnostic team, are included in Appendix D.

Quiet Zone Risk Assessment

After diagnostic team input, an evaluation of the area's quiet zone options using the FRA internet-based calculator was conducted. The internet-based calculator has been made available by FRA to determine the risk reduction benefits achieved by various SSMs. Because ASMs are not pre-approved and have no established effectiveness rating, they cannot be evaluated using the internet-based calculator, but instead are evaluated on an individual basis using the FRA ASM Calculation Spreadsheet.

In order to implement a quiet zone, a rail corridor's Quiet Zone Risk Index (QZRI) must be reduced below the Risk Index With Horns (RIWH) or the Nationwide Significant Risk Threshold (NSRT). The QZRI is the risk to the motoring public after the corridor's risk level is adjusted for the increased risk due to a lack of locomotive horn sounding and the reduced risk due to the implementation of acceptable safety measures. The RIWH is the level of risk that would exist in the quiet zone if horns were sounded at every public crossing. The NSRT is a measure of risk, calculated on a nationwide basis, which reflects the average level of risk to the motoring public at public at-grade rail crossings equipped with vehicle gates and flashing lights and at which the locomotive horns are sounded. It should also be noted that a quiet zone can be established if the existing QZRI is below the NSRT. It may be possible to establish one or more of the proposed quiet zones on the basis that the current QZRI is below the NSRT.

Quiet zones that are below the NSRT, but not the RIWH, are susceptible to changes in the NSRT, which the FRA recalculates annually based on nationwide rail crossing statistics. These quiet zones are reviewed by the FRA annually, to ensure that the QZRI remains below the NSRT. The current NSRT for all crossings, established by the FRA, is 18,775. Since the Quiet Zone Final Rule was released in 2005, the NSRT has been as high as 19,047 and as low as 17,610. As the NSRT may change from year to year, there is no guarantee that this type of quiet zone will remain qualified. If the QZRI level exceeds the NSRT, the FRA will notify the public authority responsible for the quiet zone. Upon receipt of FRA notification, the public authority would be required to submit a written commitment to the FRA detailing the steps they will take to lower the QZRI back below the NSRT. The public authority would then be required to

complete the installation of the additional SSMs/ASMs noted in the written statement within three years of the receipt of FRA notification. Quiet zones that are at, or below the RIWH are not subject to periodic FRA recalculations of the NSRT or annual FRA review. These quiet zones are still subject to regular periodic updates and FRA review every 2.5 to five years.

Using the FRA internet-based calculator, the QZRI and the RIWH for each of the proposed quiet zones was developed, based on the existing conditions. This existing conditions analysis assumes that all crossings currently meet or will be upgraded to meet the minimum active warning device requirements for quiet zone implementation, as previously described. For the purposes of this study, the existing condition calculator results will be considered the Base Scenario. Note that based on FRA direction, the three crossings within the proposed West Grand Forks configuration are considered separate quiet zones for the purpose of the quiet zone risk assessment, because they are located on separate railroad line segments. Each will implemented independently and will include a separate risk analysis. The Base Scenario QZRI and RIWH for each of the proposed quiet zones are displayed in Table 2. Copies of the FRA internet-based calculator and ASM calculation spreadsheet results for the base scenarios are included in Appendix E.

In order to qualify for a quiet zone at these fifteen crossings, the QZRI for each quiet zone must be below the NSRT or RIWH. As shown in Table 2, all but one of the proposed quiet zones (Hillsboro Quiet Zone) would currently qualify for quiet zone status as the QZRI for each is below the NSRT. As noted earlier, quiet zones that are below the NSRT, but not the RIWH, are susceptible to changes in the NSRT. As the NSRT may change from year to year, there is no guarantee that a quiet zone implemented under this method will remain qualified. In order to establish a quiet zone that is not subject to periodic fluctuations in the NSRT, additional crossing safety measures are needed to reduce the QZRI below the RIWH.

The Hillsboro Quiet Zone will require additional SSM/ASM improvements in order to reduce the QZRI to below the RIWH. Note that for the Hillsboro Quiet Zone configuration, the RIWH is higher than the NSRT. This is not true for any of the other quiet zone configurations included in this study.

**TABLE 2
BASE SCENARIO RISK ASSESSMENT RESULTS**

QUIET ZONE	QZRI¹	RIWH	NSRT
East Grand Forks	10,747	6,443	18,775
Downtown Grand Forks	17,464	10,470	18,775
Glasston	16,533	9,912	18,775
Hillsboro	38,315	22,970	18,775
Downtown/West Grand Forks	16,455	10,205	18,775
West Grand Forks ²			
<i>Demers Avenue (west of 55th St)</i>	18,501	11,092	18,775
<i>N 55th Street</i>	16,207	9,716	18,775
<i>Demers Avenue (east of 55th St)</i>	15,996	9,590	18,775

¹Assumes all crossings meet the minimum active warning device standards (gates, lights, and CWT).

² For the purpose of risk assessment each of the three West Grand Forks crossings is treated as an independent quiet zone.

Quiet Zone Improvement Options and Scenarios

Each of the proposed quiet zones configurations has one or more possible combinations of crossing treatments to achieve an acceptable quiet zone risk rating. Based on direction from MPO and City staff, several quiet zone improvement scenarios were developed and evaluated for each quiet zone. The alternatives evaluated include a minimum qualifying scenario for each zone and one or more scenarios showing various combinations of crossing treatments. The improvement scenarios considered, including planning-level cost estimates, quiet zone risk levels, and layouts illustrating the proposed improvement options are included in Appendix F. Note that the quiet zone crossing configurations and risk assessment inputs, such as train and traffic volumes, have changed numerous times throughout the QZ process, as new data becomes available. The improvement scenarios included in Appendix F represent the conditions present at the time the analysis was conducted.

PUBLIC INPUT

Public Open House Meeting

A public open house meeting was held on November 19, 2009 at the Grand Forks City Hall. The purpose of this meeting was to inform residents, business owners and others in attendance about the quiet zone process, present the proposed quiet zone improvement options and scenarios (as described above), and to solicit input from the public. The meeting followed an open house style format with a formal presentation given by the project team. Attendees viewed informational exhibits and engaged in one-on-one discussions with the project staff, then participated in a question and answer discussion as a group following the formal presentation.

The material presented at the meeting included information showing the rail crossing locations, possible improvement options, improvement costs and related risk levels. Meeting attendees were highly encouraged to submit written comments either directly after the meeting (comment forms were provided), by mail, or by e-mail. Meeting attendees and other stakeholders were generally very supportive of the project. The comments received included general statements of support and suggestions for potential improvement options. In addition there were questions about the quiet zone process which was discussed in detail at the meeting. A summary of this meeting as well as the comments received, including several emails expressing stakeholder support, are included in Appendix G.

Grand Forks and East Grand Forks City Council Presentations

After considering the input received from stakeholders and the general public, a revised set of quiet zone improvement scenarios were developed for each of the proposed quiet zones within the Cities of Grand Forks and East Grand Forks. These scenarios illustrate the minimum qualifying quiet zone configuration and a configuration with the preferred improvements for each crossing. Appendix H includes two technical memorandums documenting these scenarios (i.e., one for the City of Grand Forks and one for the City of East Grand Forks). Note that the improvement scenarios presented in the technical memorandums represent the conditions present at the time the analysis was conducted. As previously discussed, the quiet zone crossing

configurations and risk assessment inputs have changed numerous times throughout the QZ process.

These improvement scenarios were presented to both the Grand Forks and East Grand Forks City Council for consideration. After reviewing the staff recommendations and stakeholder input, each City Council selected a preferred quiet zone improvement scenario for the crossings within its jurisdiction. These scenarios are explained in further detail in the Conclusions and Recommendations section below.

CONCLUSIONS AND RECOMENDATIONS

Recommended Quiet Zone Improvements

After an evaluation of the quiet zone improvement options, a recommended crossing improvement plan for each of the proposed zones was developed. While the quiet zone risk level and improvement costs played an important part; railroad, vehicular, and pedestrian safety, as well as public input and anticipated funding opportunities, were also given significant weight. The following is an overview of the minimum qualifying/base scenarios and the recommended crossing improvements for each of the proposed quiet zones.

Note that due to financial constraints, the city is considering implementing a quiet zone under the base scenario, using the designation method. The city intends to pursue the proposed crossing improvements over time, as funding becomes available. The FRA calculator results for the recommended crossing improvement configurations for each quiet zone are included in Appendix I. As previously noted, the calculator results for the base scenarios are included in Appendix E.

Downtown Grand Forks

The recommended crossing improvements for the proposed Downtown Grand Forks Quiet Zone include construction of a 60-foot non-traversable median on the south side of both the S 4th Street and S 5th Street crossings, and inclusion of the pre-existing medians at the N 42nd Street crossing. The north side of the S 4th Street and S 5th Street crossings cannot be treated with a median because of the close proximity to Kittson Avenue, and as such, these improvements are considered an ASM. Further, because the medians currently in place at the N 42nd Street crossing do not meet the minimum length requirement for an SSM, they will be considered a pre-existing ASM. In addition, the access to the parking lot in the southwest quadrant of the S 4th Street crossing will need to be reconfigured so that there are no driveways within 60-feet of the crossing. Prior to construction of the proposed ASMs, an application to the FRA must be completed and approved. Refer to the Implementation Activities section of this report for more information on the Quiet Zone implementation process.

With the implementation of the recommended improvements, the QZRI will be reduced below the NSRT, hence qualifying for quiet zone status. As noted earlier, quiet zones that are below the NSRT, but not the RIWH, are susceptible to changes in the NSRT. As the NSRT may change from year to year, there is no guarantee that a quiet zone implemented under this method will remain qualified. In order to establish a quiet zone that is not subject to periodic fluctuations

in the NSRT, additional crossing safety measures are needed to reduce the QZRI below the RIWH.

The base scenario and the recommended crossing improvements for the Downtown Grand Forks Quiet Zone are presented in Table 3, along with planning-level cost estimates and the quiet zone risk levels. Layouts illustrating the proposed crossing improvements are included in Figures 2 and 3. Since no additional roadway improvements are being proposed for the S 3rd Street or N 42nd Street crossings at this time, no layout was prepared. Refer to Appendix I for the FRA calculator results for the recommended crossing improvements.

**TABLE 3
CROSSING IMPROVEMENT PLAN FOR THE DOWNTOWN GRAND FORKS QUIET ZONE**

CROSSING	BASE SCENARIO	PROPOSED TREATMENTS
S 3rd Street	Railroad improvements scheduled for 2010 (CWT)*	Railroad improvements scheduled for 2010 (CWT)*
S 4th Street	Railroad improvements scheduled for 2010 (CWT)*	Non-traversable median (ASM) - \$29,000 Railroad improvements scheduled for 2010 (CWT)* (Fig. 2)
S 5th Street	Do nothing	Non-traversable median (ASM) - \$28,300 (Fig. 3)
N 42nd Street	Do nothing	Do nothing (pre-existing non-traversable medians (ASM))
Quiet Zone Risk Level	17,464	13,884
Risk Level With Horns	10,470	11,162
National Risk Level	18,775	18,775
Est. Cost**	\$0	\$57,300

*Improvements programmed by the BNSF Railway for construction in 2010

**Includes pedestrian mazes at the S 4th Street and S 5th Street crossings

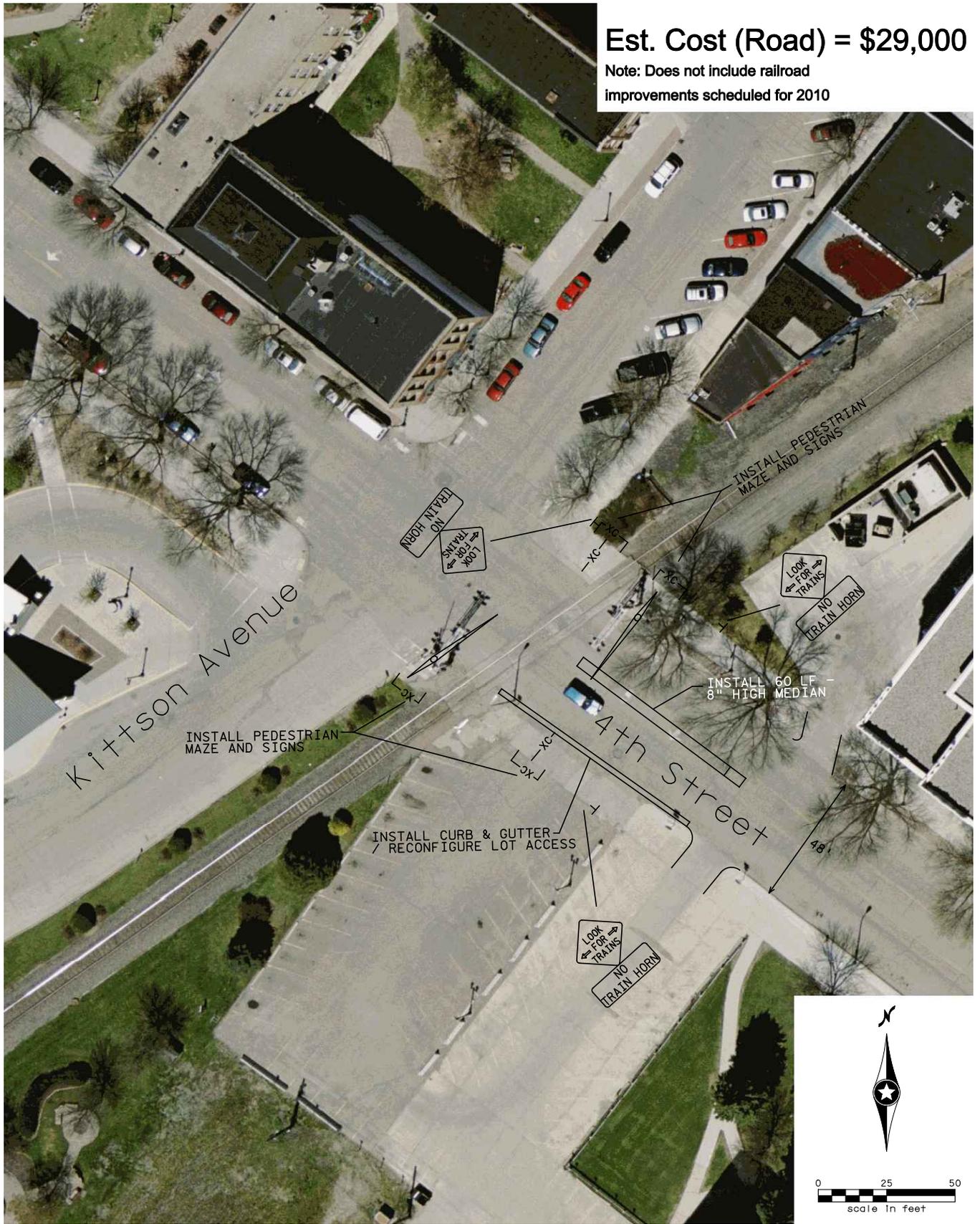
West Grand Forks

The recommended improvements for the proposed West Grand Forks configuration include SSM treatments at the Demers Avenue (west), N 55th Street, and Demers Avenue (east) crossings. The crossing improvements will include non-traversable medians, which extend 100-feet from the gate arm on both sides of the crossing.

At the request of the City of Grand Forks and the MPO, the FRA conducted a review of the West Grand Forks crossings to determine the practicality of installing CWT at the Demers Avenue (west), N 55th Street, and Demers Avenue (east) crossings. Based on this review, the FRA determined that because of the low train speeds (10 mph) on both of the Demers Avenue crossings (086876F, 086875Y), the installation of CWT is not reasonable practical. The N 55th Street crossing will need to be equipped with CWT in order to meet the minimum active warning device standard for quiet zones. A letter documenting the FRA review and findings is included in Appendix J.

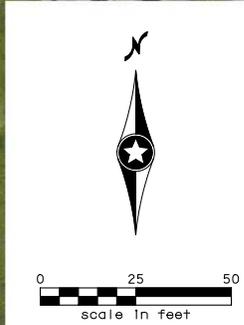
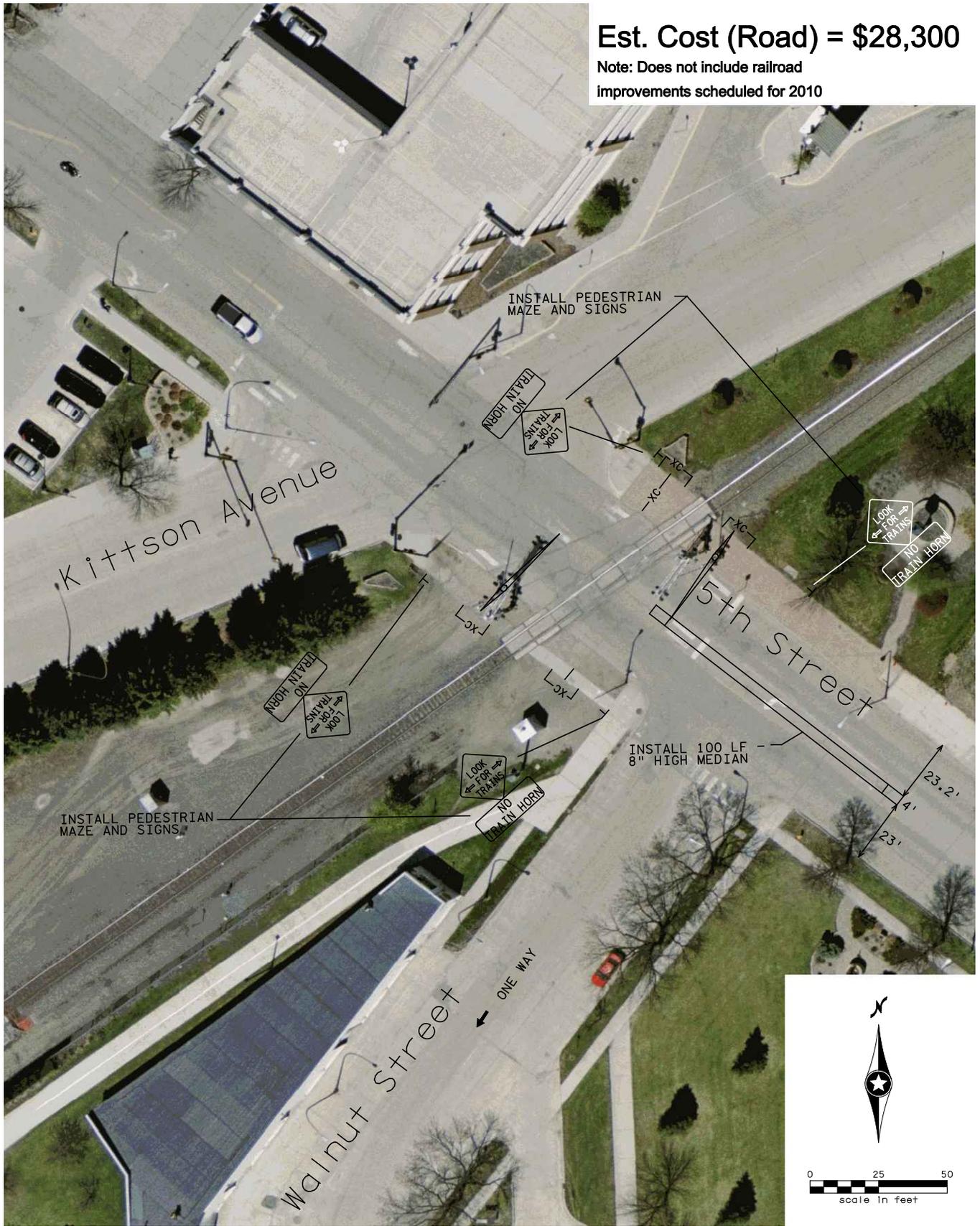
Est. Cost (Road) = \$29,000

Note: Does not include railroad improvements scheduled for 2010



Est. Cost (Road) = \$28,300

Note: Does not include railroad improvements scheduled for 2010



5th Street - Crossing No. 081284D - South Median Only

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Grand Forks, North Dakota and East Grand Forks, Minnesota

Figure 3

Note that the three railroad crossings within the proposed West Grand Forks configuration were initially considered as a single quiet zone, due to their close proximity and common railroad subdivision (Grand Forks Subdivision). However, based on FRA direction, each of these crossings must be considered as a separate quiet zone for the purpose of the quiet zone risk assessment, because they are located on separate railroad line segments. As such, each must be implemented independently and will include a separate risk analysis. Refer to the Implementation Activities section of this report for more information on the Quiet Zone implementation process.

Upon implementation of the recommended improvements, the QZRI for each of the three crossings will be reduced below both the RIHW and NSRT, hence qualifying for quiet zone status. The baseline scenario and the recommended crossing improvements for each of the West Grand Forks Quiet Zones, as well as planning-level cost estimates and the quiet zone risk levels are presented in Table 4. Layouts illustrating the proposed crossing improvements are included in Figures 4, 5, and 6. Please refer to Appendix I for the FRA calculator results for the recommended crossing improvements.

**TABLE 4
CROSSING IMPROVEMENT PLAN FOR THE WEST GRAND FORKS QUIET ZONE**

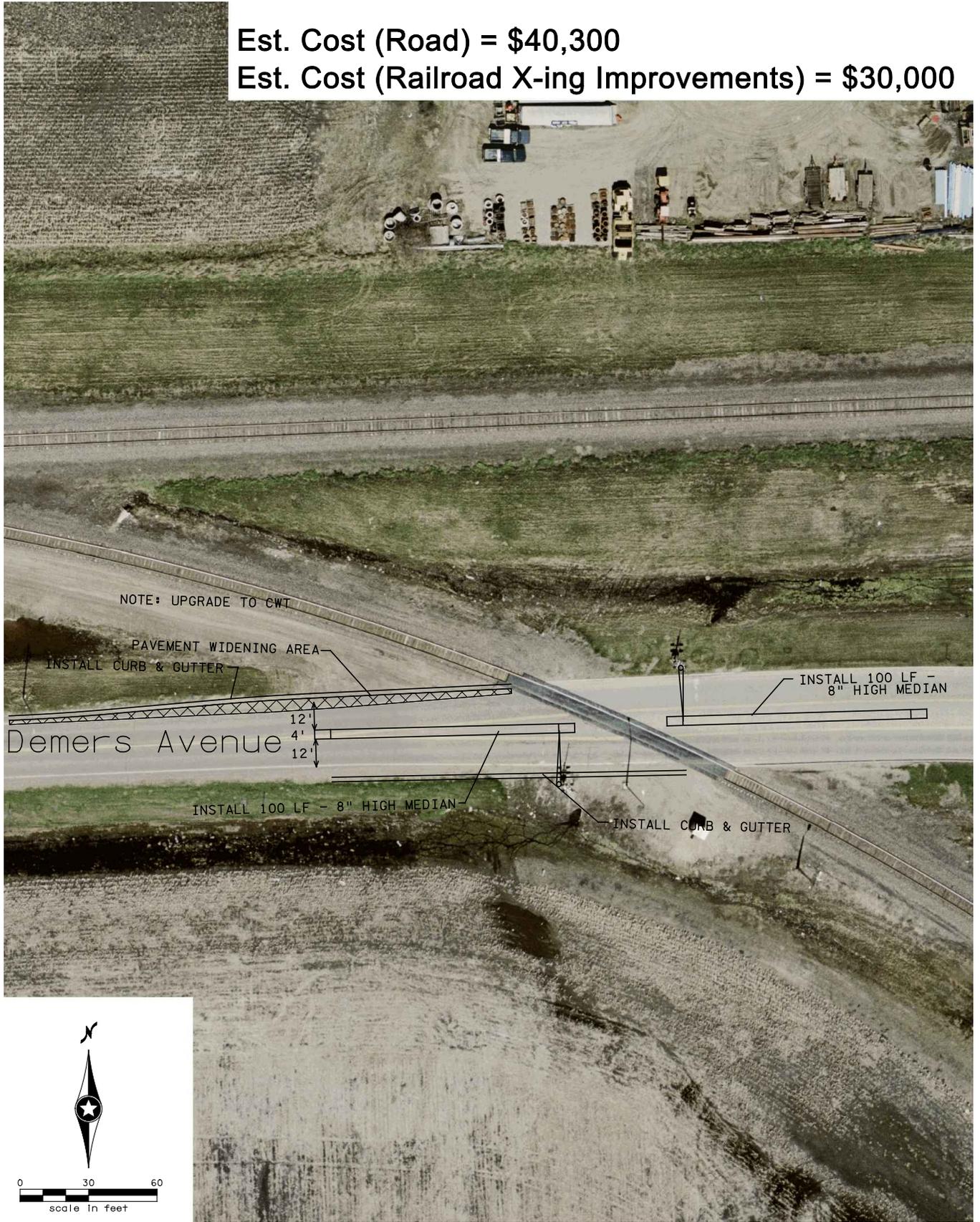
CROSSING	BASE SCENARIO	PROPOSED TREATMENTS
Demers Avenue (west)	Do nothing	Install non-traversable medians (SSM) (Fig. 4)
Quiet Zone Risk Level	18,501	3,700
Risk Level With Horns	11,092	11,092
National Risk Level	18,775	18,775
Est. Cost*	\$0	\$40,300
Demers Avenue (west)	Install CWT**	Install CWT, non-traversable medians (SSM) (Fig. 5)
Quiet Zone Risk Level	16,207	3,241
Risk Level With Horns	9,716	9,716
National Risk Level	18,775	18,775
Est. Cost*	\$30,000	\$50,900
Demers Avenue (east)	Do nothing	Install CWT, non-traversable medians (SSM) - \$52,600 (Fig. 6)
Quiet Zone Risk Level	15,996	3,199
Risk Level With Horns	9,950	9,950
National Risk Level	18,775	18,775
Est. Cost*	\$0	\$22,600
West Grand Forks Total Est. Cost*	\$30,000	\$113,800

*CWT, gate installation, and other railroad equipment costs may vary, based on detailed railroad engineering

**Includes \$30,000 for CWT installation. Final costs to be determined by BNSF

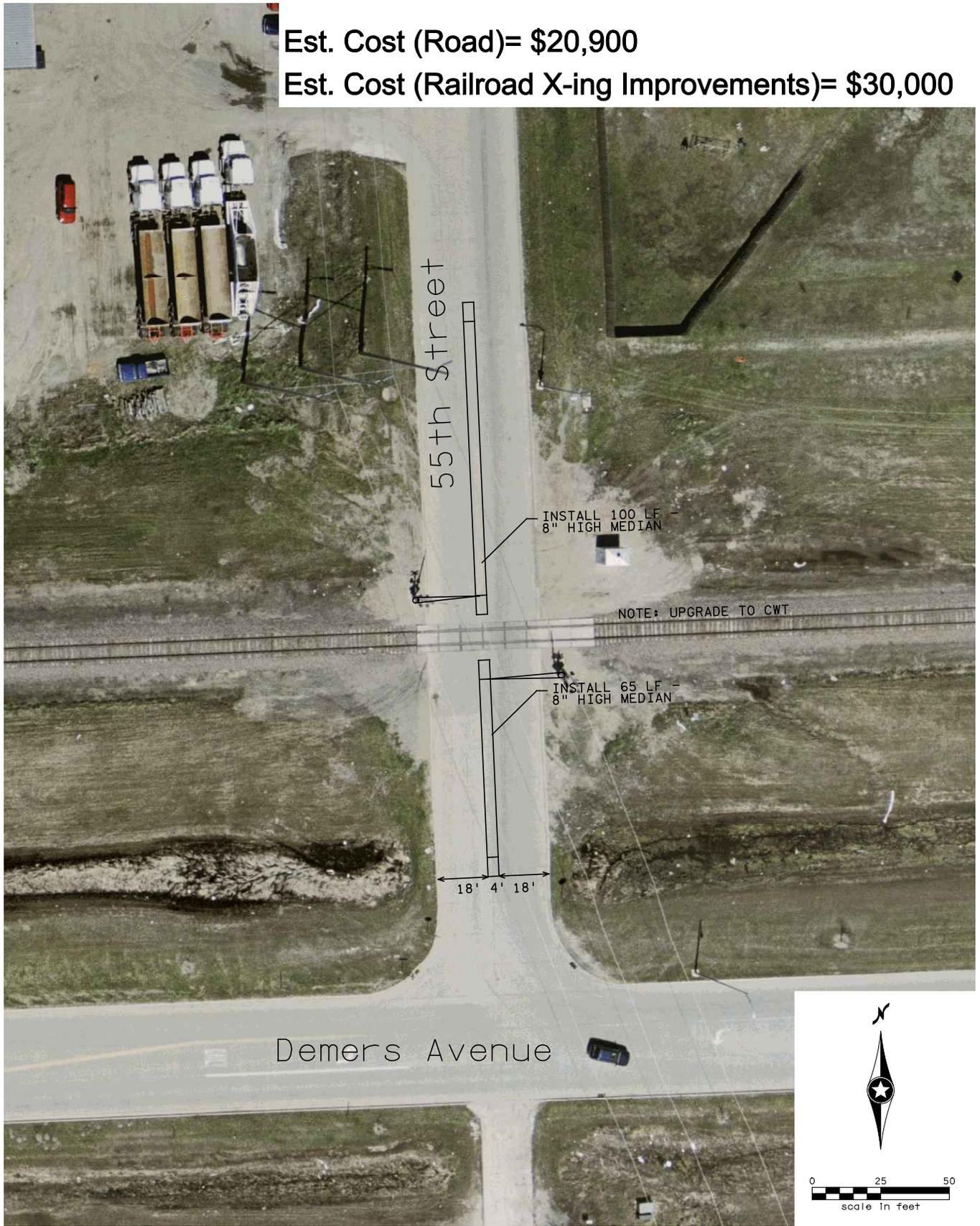
Est. Cost (Road) = \$40,300

Est. Cost (Railroad X-ing Improvements) = \$30,000



Est. Cost (Road)= \$20,900

Est. Cost (Railroad X-ing Improvements)= \$30,000



Est. Cost (Road) = \$22,600

Est. Cost (Railroad X-ing Improvements) = \$30,000



Demers Avenue - Crossing No. 086875Y - Medians

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Grand Forks, North Dakota and East Grand Forks, Minnesota

Figure 6

Glasston

The recommended crossing improvements for the proposed Glasston Quiet Zone include constructing non-traversable medians at the University Avenue crossing and reconstructing the existing medians at the Gateway Drive (US Highway 2) crossing. The medians at the University Avenue crossing would extend 100-feet from the gate arm on the east side of the crossing and 10-feet on the west side, due to the intersection with N 42nd Street. As the east median does not meet the minimum length requirement for an SSM, this crossing improvement will be considered an ASM. In addition, the medians currently in place at the Gateway Drive (US Highway 2) crossing will be included as a pre-existing ASM improvement. In order to receive quiet zone credit, these medians will need to be reconstructed to a minimum height of 6-inches. Prior to construction of the proposed improvements, an application to the FRA must be completed and approved. Refer to the Implementation Activities section of this report for more information on the Quiet Zone implementation process.

Upon implementation of the recommended improvements, the QZRI will be reduced below both the NSRT and RIWH, hence qualifying for quiet zone status. The baseline scenario and the recommended improvements for the Glasston Quiet Zone, along with planning-level cost estimates and the quiet zone risk levels are presented in Table 5. Layouts illustrating the proposed crossing improvements are included in Figures 7 and 8. Since no additional roadway improvements are being proposed for the 6th Avenue N crossing, no layout was prepared. Refer to Appendix I for the FRA calculator results for the recommended crossing improvements.

**TABLE 5
CROSSING IMPROVEMENT PLAN FOR THE GLASSTON QUIET ZONE**

CROSSING	BASE SCENARIO	PROPOSED TREATMENTS
University Avenue	Do nothing	Non-traversable medians (ASM) - \$30,800 (Fig.7)
6th Avenue N	Do nothing	Do nothing
Gateway Drive (US Hwy 2)	Do nothing	Reconstruct pre-existing medians (ASM) - \$24,800 (Fig. 8)
Quiet Zone Risk Level	16,533	13,932
Risk Level With Horns	9,912	17,082
National Risk Level	18,775	18,775
Est. Cost*	\$0	\$55,600

*Includes pedestrian mazes at the University Avenue and Gateway Drive crossings

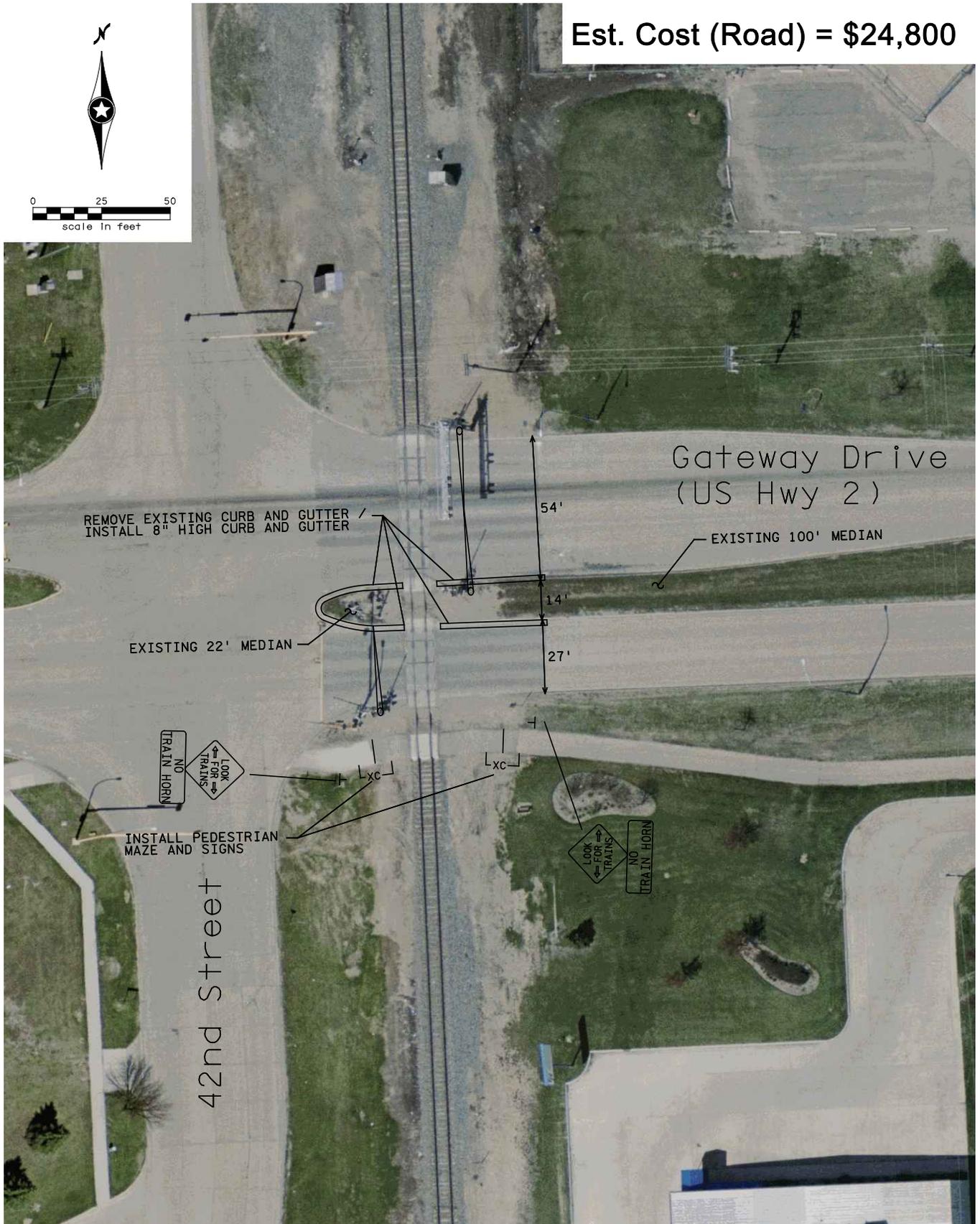
Hillsboro

The City of Grand Forks does not intend to pursue a quiet zone along the Hillsboro Subdivision at this time. As a result, the 32nd Avenue S/County Road 32 crossing will not be included in a quiet zone.

Est. Cost (Road) = \$24,800



0 25 50
scale in feet



East Grand Forks

The recommended crossing improvement plan for the East Grand Forks Quiet Zone is to upgrade all crossings to meet the minimum FRA active warning device requirements. In order to accommodate the railroad crossing improvements at the NW 3rd Street and Central Avenue NW crossings, some roadway reconstruction will be required (i.e., new curb and gutter, pavement removal, etc.). Upon implementation of the recommended improvements, the QZRI will be reduced below the NSRT, hence qualifying for quiet zone status. After construction of the proposed improvements, a quiet zone can be designated. Refer to the Implementation Activities section of this report for more information on the Quiet Zone implementation process.

The baseline scenario and the recommended improvements for the East Grand Forks Quiet Zone are presented in Table 6, along with planning-level cost estimates and the quiet zone risk levels. Layouts illustrating the proposed crossing improvements are included in Figures 9 and 10. Since no additional improvements are being proposed for the 2nd Avenue NE crossing, no layout was prepared. The FRA calculator results for the recommended crossing improvements are included in Appendix I.

**TABLE 6
CROSSING IMPROVEMENT PLAN FOR THE EAST GRAND FORKS QUIET ZONE**

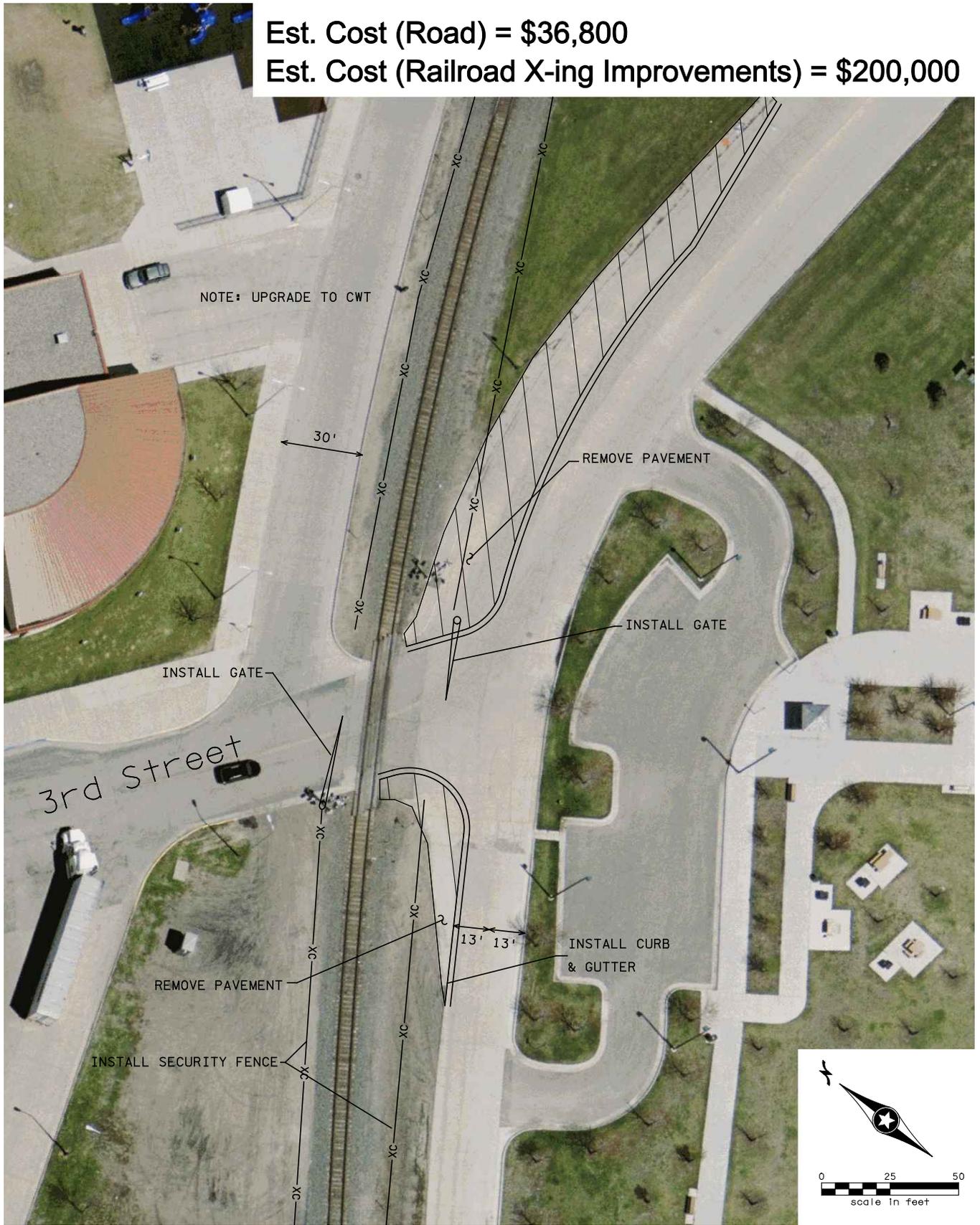
CROSSING	BASE SCENARIO	PROPOSED TREATMENTS*
NW 3rd Street*	Install Gates and CWT - \$236,800 (Fig.9)	Install Gates and CWT - \$236,800 (Fig.9)
Central Avenue NW*	Install Gates and CWT - \$23,600 (local contribution)** (Fig.10)	Install Gates and CWT - \$23,600 (local contribution)** (Fig.10)
2nd Avenue NE*	Install CWT - \$30,000	Install CWT - \$30,000
Quiet Zone Risk Level	11,653	11,653
Risk Level With Horns	6,986	6,986
National Risk Level	18,775	18,775
Est. Cost	\$290,400	\$290,400

*Includes \$30,000 for CWT installation. CWT, gate installation, and other railroad equipment costs may vary, based on detailed railroad engineering

**10 percent of total estimated cost (90 percent Mn/DOT funds/10 percent local funds)

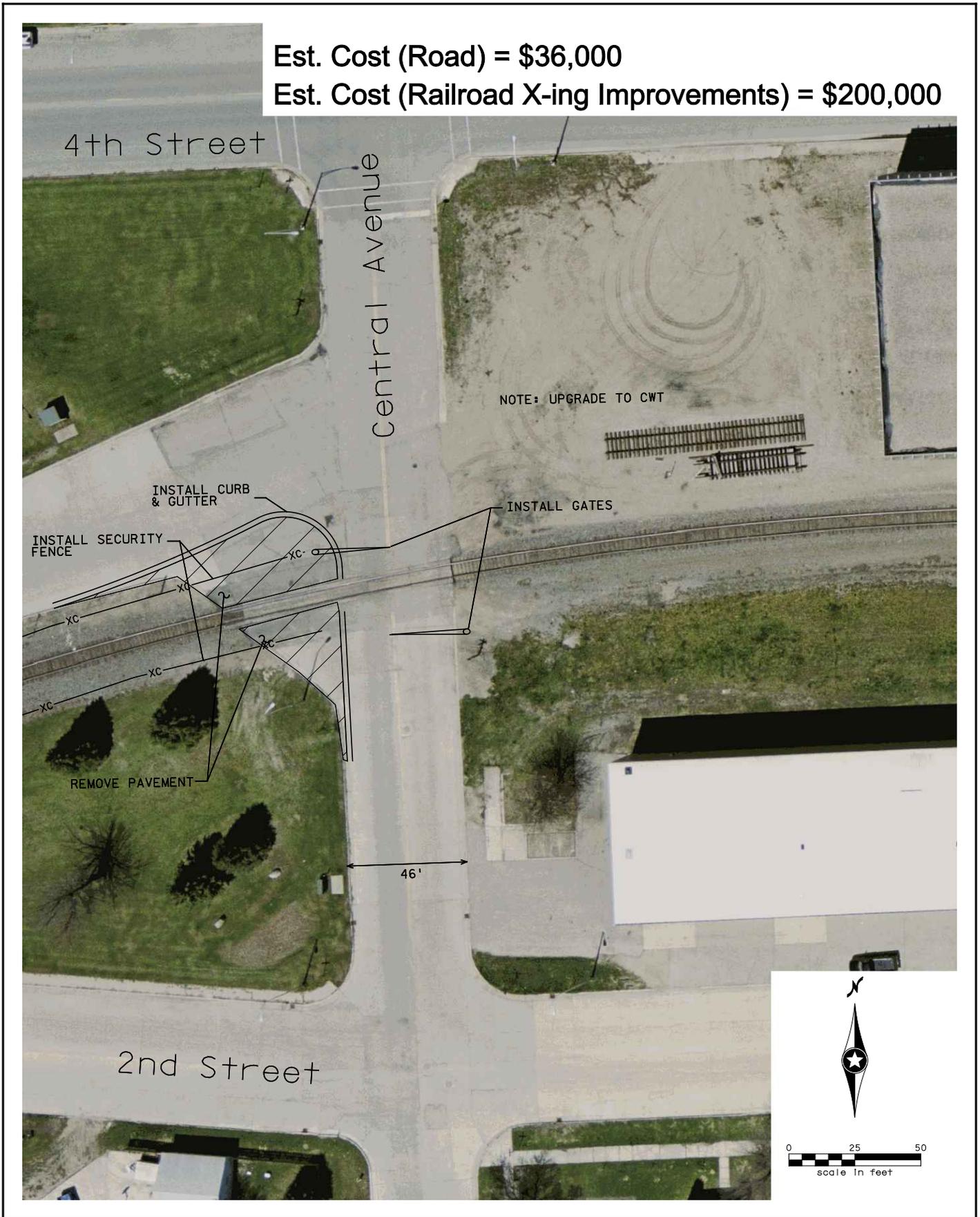
Est. Cost (Road) = \$36,800

Est. Cost (Railroad X-ing Improvements) = \$200,000



Est. Cost (Road) = \$36,000

Est. Cost (Railroad X-ing Improvements) = \$200,000



Central Avenue - Crossing No. 081277T - Gates

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Grand Forks, North Dakota and East Grand Forks, Minnesota

Figure 10

Pedestrian Safety Improvements

In addition to the roadway improvements discussed above, Grand Forks city staff has indicated that the City intends to install pedestrian mazes at all crossings with existing pedestrian facilities. Pedestrian mazes increase railroad crossing safety by forcing all sidewalk/trail traffic (i.e. pedestrians, bicycles, etc.) to stop and look in both directions along the railroad tracks before crossing. While pedestrian mazes are used as an intentional obstacle within the sidewalk/trail to slow people down and force them to look both ways at the railroad crossing, they may create an inconvenience for users, even when there are no trains at the crossing. This issue was discussed and the City feels that the safety benefits provided justify for this inconvenience. Note that all pedestrian improvements will be designed and constructed in compliance with the current Manual on Uniform Traffic Control Devices (MUTCD) and Americans with Disability Act (ADA) standards.

For the purpose of this report, a planning-level cost of \$2,000 for each pedestrian maze was used (\$4,000 per crossing). Pedestrian mazes were included in the cost estimates and layouts for crossings in Grand Forks with existing pedestrian facilities and proposed improvements. These include S 4th Street, S 5th Street, University Avenue, and Gateway Drive.

No official decisions have been made with regard to potential pedestrian improvements at the crossings within the City of East Grand Forks. City staff will determine what pedestrian improvements, if any, will be made prior to filing the Quiet Zone Notice of Intent.

IMPLEMENTATION ACTIVITIES

In order to establish a quiet zone (or zones) within the Cities of Grand Forks and East Grand Forks, a number of implementation activities would be required. The first step is preparing the Quiet Zone Notice of Intent (NOI) for each of the proposed quiet zones and distributing them to the appropriate stakeholders. The required comment period for a Quiet Zone NOI is 60 days.

Following the Notice of Intent, the desired roadway improvements can be designed for each crossing and a Quiet Zone Designation or Application can be prepared and submitted to the FRA and other interested parties (i.e., the same stakeholders receiving the NOI). The FRA Final Rule is very specific on requirements for the design and construction of SSMs/ASMs.

If a community uses the FRA pre-approved SSMs to qualify for a quiet zone, or if the quiet zone already qualifies without implementation of SSMs, a quiet zone may be designated without the need for formal application to, and approval by the FRA. If a community intends to qualify using ASM improvements at one or more crossings, the quiet zone will be subject to approval upon application and review by the FRA Associate Administrator of Rail Safety. The time required for agency and railroad review of a Quiet Zone Application can take a minimum of three to six months, depending on the complexity of the improvements and the number of crossings involved. The application process is more time consuming than the designation process described above, but is an acceptable alternative to the designation method.

Due to financial constraints, the city is considering implementing a quiet zone under the base scenario, using the designation method. The city intends to pursue the proposed crossing improvements over time, as funding becomes available. Table 7 summarizes the implementation method (designation or application) and the planning-level cost estimate for each of the proposed quiet zones in this study. Included are both the minimum qualifying or baseline scenario, and the recommended improvement scenario for each quiet zone.

TABLE 7: QUIET ZONE IMPLEMENTATION SUMMARY

QUIET ZONE	BASE SCENARIO		RECOMMENDED SCENARIO	
	Cost	Implementation	Cost	Implementation
Downtown Grand Forks	\$0	Designation	\$57,300	Application
West Grand Forks* **	\$30,000	Designation	\$113,800	Application
Glasston	\$0	Designation	\$55,600	Application
<i>City of Grand Forks Subtotal</i>	<i>\$30,000</i>		\$226,700	
East Grand Forks**	\$290,400	Designation	\$290,400	Designation
Total Estimated Cost	\$320,400		\$517,100	

*Includes the total estimated cost for each of the three West Grand Forks crossings. Under the base scenario, all three of the West Grand Forks Quiet Zones may be implemented through the designation process.

**Includes \$30,000 for CWT installation. CWT, gate installation, and other railroad equipment costs may vary, based on detailed railroad engineering

Once the design is completed and approved, special attention should be given to the construction and inspection of the improvements. After construction is complete, the city also must file a Quiet Zone Notice of Establishment to FRA and distribute it to interested parties (i.e. the same stakeholders receiving the NOI). Each City will also be required to install advanced warning signs, in conformance with the MUTCD standards, advising motorists that “train horns are not sounded” at the crossings included in the quiet zone. The cessation of train horns would begin 21 days from the date on the Notice of Establishment when mailed to appropriate stakeholders.