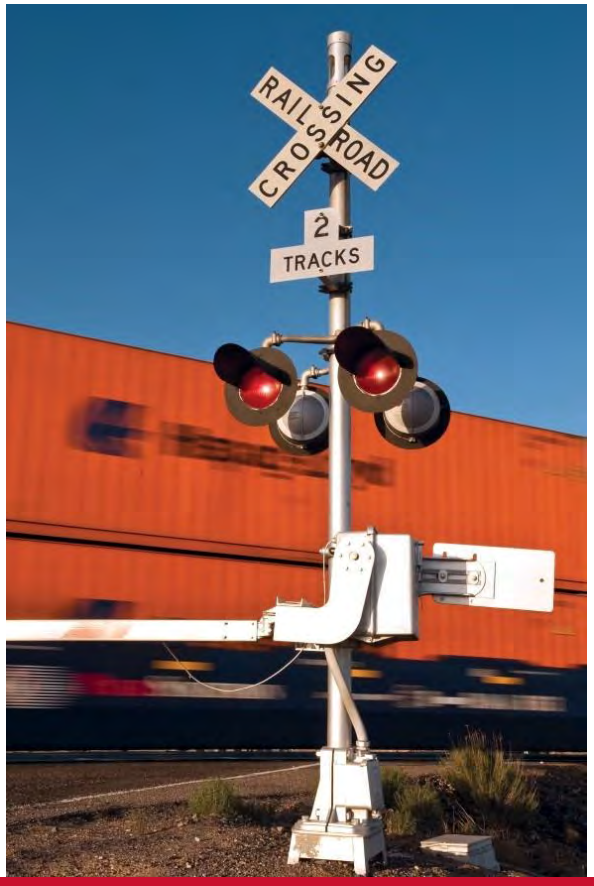

Fargo Moorhead Metropolitan Council of Governments

Regional Railroad Crossing Safety Study

Final Report

Fargo, ND
October 31, 2017

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1 Executive Summary

The Fargo-Moorhead (FM) area, a major metropolitan area along the Red River located across two states, is situated on one of BNSF Railway's main corridors of commerce, and a junction location for several other railroad lines. The FM area grew alongside of and with the railroads that served the area and are part of the fabric of the community. As a result, the region includes numerous crossings of the BNSF Railway and to a lesser extent, that of the Otter Tail Valley and Red River Valley and Western Railroads. In addition to the freight railroads that operate in the region, the area is served by Amtrak's Empire Builder passenger train. Although several major roadways have already been grade separated from those rail lines, most remain as at-grade or level crossings. Each of those locations are shared rail, vehicle, pedestrian and bicycle crossings, and safety is a concern for the citizens that must travel across them, the passengers on board the passenger trains, and the railroads that must operate upon them.

This Railroad Crossing Safety Study applied a systematic approach to evaluating or screening each of the 215 crossings within the FM Metropolitan Council of Governments (Metro COG) boundaries and provides a prioritized listing of improvements at specific locations and also some system wide recommendations.

The primary purpose of this study is to evaluate each of the crossings for predicted accidents based on quantifiable data, review those crossings in the context of local traffic and pedestrian uses, provide a rational basis for ranking of the crossings, and arrive at a prioritized listing of those that merit improvement. This report identifies ten crossings and provides recommendations that would improve the safety at each.

A secondary purpose of this study is to provide a regional context to rail safety by addressing rail safety trends and issues that may assist the FMCOG in developing and implementing a broader, area wide, rail safety plan.

1.1 Findings and Recommendations

1.1.1 At-Grade Crossing Improvements

One of the primary methods for increasing public safety as it relates to the freight railroad network is by reducing at-grade crossing hazards. As part of this study, a grade crossing analysis was conducted to provide a rational basis for ranking at-grade railroad crossings to arrive at a prioritized listing of crossings which merit consideration for further study and potential mitigation measures. Due to the large number of crossings within the study area a tiered screening approach was utilized and conducted in three phases; First Level, Second Level, and Third Level. All crossings within the study area were scored uniformly under an initial screening (First Level) based on analysis using verified data from project stakeholders (local agencies, FRA, NDDOT & MnDOT) and desktop review to develop an initial ranking or score for each crossing.

Following the First Level of screening and consultation with the SRC and Metro COG staff, a selected subset of crossings was advanced to a Second Level screening. Each of the selected crossings in the Second Level screening was reviewed in the field to collect

additional information not readily available via a desktop review or existing data sources and to verify FRA data. Upon completion of the field reviews, crossing scores were updated to include the additional items and the project crossing rankings were adjusted accordingly.

There are a total of 18 items that are included within the first two levels of screening. The items are very similar and in alignment with the NDDOT's grade crossing risk factors. In addition, five items were included within the screening criteria that have origins in the MnDOT grade crossing assessment criteria.

The screening and analysis of the crossings within the FM Metro COG resulted in ten crossings which received recommended improvements in the Third Level analysis. These ten crossings are described in detail in Section 3 of this report but are summarized here:

Crossing and Location	Recommendations
Pedestrian Crossing – Hawley, MN	Upgrade pedestrian crossing surface and approach with pedestrian maze.
Parke Ave – Glyndon, MN	Upgrade crossing with non-mountable median or 4-quad gates. Update adjacent sidewalk with pedestrian maze.
12th Ave S – Moorhead, MN	Upgrade with 4-quad gates or combination gates and median.
1st Ave N – Moorhead, MN	Add gates to existing active warning devices.
50th St S - Sabin, MN (and other crossings on CR 52 corridor)	Additional advance warning signage with warning beacon.
S Main St – Dilworth, MN	Upgrade crossing surface and existing medians.
1st St – Sabin, MN	Add STOP sign to westbound approach.
Partridge Ave – Glyndon, MN	Close crossing in conjunction with Parke Ave upgrades OR upgrade crossing with non-mountable median or 4-quad gates.
230th Ave – Hawley, MN	Improve warning device visibility. Upgrade crossing with 4-quad gates and traffic control barriers for 17th Ave intersection.
CR-17 – Fargo, ND	Realign 32nd Ave east approach OR upgrade crossing with 4-quad gates and traffic control barriers for 32nd Ave east approach.

1.1.2 Region-wide Issues and Concerns

Transport of Hazardous Commodities

There are many commodities that neither originate nor terminate within the FM Metro COG region but move through the area. Some of these commodities move in "unit trains," trains carrying a single commodity (such as crude oil or ethanol) and are referred to as High Hazard Flammable Trains (HHFTs). Derailments and collisions of HHFTs are of special concern if the derailment or collision results in release of those commodities. Section 4.1 of this report describes in greater detail the issues, concerns, and recommendations however in general, we recommend that the FM Metro COG Local

Emergency Planning Committees (LEPCs) include participation by the BNSF Railway and develop a Hazmat Task Force to develop guidance and work with emergency management coordinators to develop incident specific response plans.

Locomotive Horn Quiet Zones

At present, according to the FRA database, there are 24 crossings located within established Quiet Zones. Although the measures used to establish a quiet zone are primarily driven by the desire to silence the horns, these measures serve to enhance the visibility of the warning devices to the traveling public and tend to reduce the risky behaviors that some motorists take by driving around gates. It is our recommendation that whenever crossings are improved or warning devices enhanced at crossings within the FM Metro COG area, they should consider future establishment of additional quiet zones or inclusion within an existing quiet zone.

Emergency Notification Systems (ENS)

The FRA created a rule that requires operating railroads to have an Emergency Notification System (ENS) in place which includes signage posted at every highway-rail grade crossing. The purpose of the ENS sign is to provide the public with critical emergency contact information. The information contained on the ENS sign enables the public to reach the railroad responsible for the crossing and to identify the specific crossing in the event of an emergency. Our recommendation is that that the existence and purpose of these signs be communicated to those that would primarily benefit. This could include general safety awareness campaigns and more targeted information campaigns targeting those that are most likely to arrive at crossings where prompt contact with the operating railroad's train dispatchers is necessary. Those that are responsible for emergency response and establishing a safety perimeter around an incident should know that the zone will be free from passing trains. These responders would include emergency medical responders, tow truck operators, bus drivers, law enforcement, and city, county and state roadway workers.

Trespasser and Pedestrian Issues

Nationwide, there are more railroad related fatalities involving trespassers on railroad rights-of-way and then in any other category, including crossing collisions. The current focus of the FRA and rail safety advocates, such as Operation Lifesaver, are shifting more towards addressing and hopefully reducing this upward trend in trespasser safety. Note that trespass fatalities do not include pedestrians struck at pedestrian crossings but alongside of the tracks on railroad rights of way. The distinction between the two is that Pedestrians are those at controlled locations where they belong and Trespassers who are on railroad rights of way where they should not be.

It is our recommendation that Pedestrian Safety can be improved with enhanced signage, lights, gates and bells which can be more easily seen and heard by those on foot or bicycle. Another approach is to physically direct and control pedestrian movement as they cross the tracks. This can be done with "Z" fencing which forces a pedestrian to dismount a bicycle and/or requires them to focus and pay attention as they travel thru the "Z". The purpose of both of these approaches is the same; provide enhanced visual and audio warning devices, clear visibility of the track zone, and force

those who are not paying attention to focus on crossing the tracks safely. Crossing and sidewalk improvements where pedestrians are anticipated should be an integral part of planning those improvements.

Trespasser Safety is more difficult to control and is primarily a function of identifying problematic areas within the FM Metro COG area and then educating the trespassers individually or targeting student or other demographic groups for education. Law enforcement should include these areas on their normal patrols. We also recommend establishing a dialog and working with the local railroad safety officers and public coordinators to jointly address this issue.

Signal Timing and Coordination

Main Avenue and Center Avenue (also known as Trunk Highway 10) are east-west arterials through the Moorhead, MN downtown area with the BNSF track located between the two streets. The downtown includes five streets that connect Main Avenue and Center Avenue, each with an at-grade crossing at the BNSF track.

Along Main Avenue and Center Avenue, the intersections with the streets crossing the BNSF tracks are signalized with a pre-timed preemption plan that is called when a train travels through the downtown. The common approach to operating traffic signals with railroad preemption is to not allow any green indication towards the at-grade crossing. At the bequest of the downtown business community, special permission was granted by MnDOT to allow all movements at the signalized intersections during a railroad preemption. Queues from the railroad crossing have been observed to extend across the crosswalks and into the intersection. New or upgraded signal controllers could allow the City to operate a different peak period railroad preemption plan, which is when the queues are most often observed. Inexpensive Do Not Block Intersection markings and signing could be deployed, but effectiveness relies on drivers' voluntary compliance.

1.2 Potential Funding Sources

Both the States of Minnesota and North Dakota administer Federal safety funds for improvements at at-grade crossings as well as some state specific funds which may be available for improvements within the FM Metro COG area. Section 5 of this report describes in some detail those funds, eligibility requirements, and methods of applying for those funds. In addition to state and federal funds, the BNSF Railway offers funding assistance for permanent closure of an existing crossing. It is our recommendation that access to these funds (state, federal, and BNSF) be considered.

2 Project Background

The Fargo-Moorhead Metropolitan Council of Governments (Metro COG) serves as the COG and Metropolitan Planning Organization (MPO) for the greater Fargo-Moorhead metropolitan area. As the designated MPO for the Fargo-Moorhead metropolitan area, Metro COG is responsible under federal law to maintain a continuous comprehensive and coordinated transportation planning process. Metro COG represents eleven cities and two counties situated within two States.

As part of its planning process Metro COG retained the services of HDR to provide a railroad crossing study that considered all at-grade crossings within the area and to identify and prioritize locations where safety improvements are warranted for further study and/or implementation of improvements. This report describes the processes and methodologies of that study.

The process specifically included and addressed five work elements or tasks:

1. Taking direction from and working with a Study Review Committee (SRC) composed of Metro COG members review all 215 at-grade crossings within the area and conduct this study with a quantifiable and defensible analysis. In addition to working directly under the direction of the SRC, HDR coordinated with and included local governments, state agencies, and the general public with the process.
2. Develop a Hazard Index for quantifying and ranking of safety issues or factors at the crossings. Whereas the states of Minnesota and North Dakota each use a "Hazard Index" of their own, this study was charged with developing a Hazard Index that was uniformly applied within the two-state region and also addressed characteristics that are unique to the area and may not have been included in statewide indices or rankings.
3. Identify trends and issues that influence safety issues for both freight and passenger movements and their interaction with the traveling public and surface freight movement. This included looking at population, employment, and industrial outlooks for the area. In addition, the study was to address the transport of specific commodities and goods shipped by rail that travel thru the area and the exposure that those commodities has on safety.
4. Include within the scope of the study was a process for soliciting and gathering input from key stakeholders and the general public.
5. The study and analysis provides recommendations to improve safety at specific crossings. This includes, but is not limited to, additional traffic control devices, geometric improvements, crossing improvements, closures or consolidations or groupings of crossings, implementation of intelligent transportation systems deployments, and other measures that might increase the safety at at-grade crossings. The recommended improvements include order of magnitude cost estimates to accomplish the recommendations for each of the crossings in 2017 dollars. Finally, the study identifies potential funding sources for the improvements.

HDR was retained by the Metro COG for the study in the fall of 2016 with the study concluded and completed within approximately a 12 month timeline.

Key Project Milestones

3 At-Grade Crossing Analysis

One of the primary methods for increasing public safety as it relates to the freight railroad network is by reducing at-grade crossing hazards. At-grade crossings are locations where the public, either on foot or in a vehicle, will physically cross over freight railroad tracks; thereby creating a potential exposure for a vehicle/pedestrian collision with a train.

State and Federal standards have been developed to protect both vehicle/pedestrian roadway users and railroad traffic from these potential exposures. Due to the extremely long stopping distance and other operational constraints inherent with railroad train traffic, it is typically incumbent upon the roadway user to avoid potential collisions with the assistance of the crossing warning devices present at crossing.

3.1 Crossing Warning Protection Methods

Various levels of warning protection are used to help roadway users recognize an upcoming at-grade crossing so that they can yield to a train if required or safely crossing the tracks. Crossing warning protection is generally divided into two categories:

- Passive Warning Devices – which include the standard Cross-Buck sign (which is required to be posted at all at-grade crossings) and other Manual on Uniform Traffic Control Devices (MUTCD) roadway signs such as STOP or YIELD signs. Passive crossings have no train detection equipment on the railroad tracks; they are present to make the roadway user aware of the potential conflict while crossing the tracks.
- Active Warning Devices – which include Flashing Light Signals (FLS), automated gate arms, and other devices that utilize train detection systems located on the railroad tracks to inform motorists that a train is either approaching or present at the crossing.

Crossings with active warning devices are typically considered to provide a higher level of safety for roadway users than passive crossings due to their ability to alert motorists of the presence of trains; removing the need for roadway users to make a decision to cross the tracks based on their available sight lines of the track, roadway geometry or other factors. However, both installation and maintenance costs associated with active warning devices and their on-track detection systems can prohibit their use at all at-grade crossing locations within an area.

In addition to standard passive and active warning device crossings, additional features can be added to both crossing types to provide incremental safety improvements at the crossing.

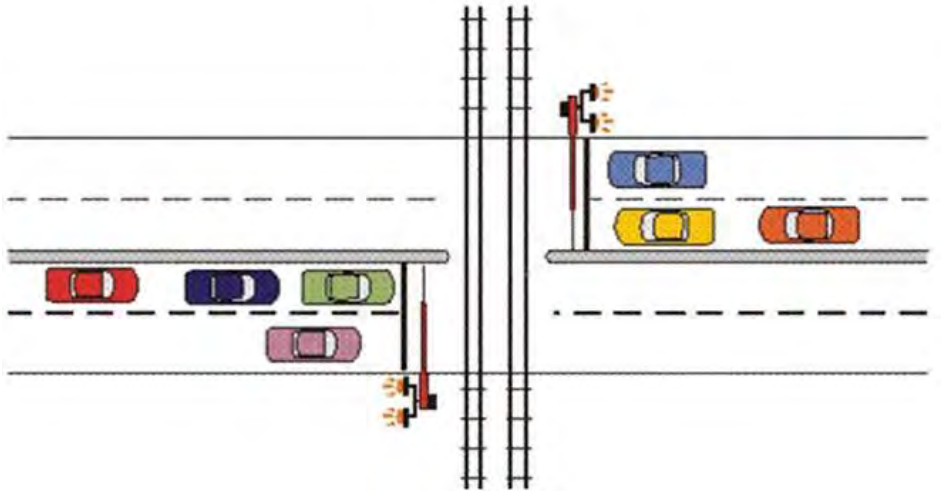
For passive crossings, this may be the installation of additional signage (potentially upgrading a cross-buck to a STOP sign), improving the crossing sight lines by removing visual obstructions such as dense vegetation, or improving the overall crossing condition by upgrading surface materials and lighting.

Typical modern active crossings include the installation of mast mounted FLS indicators with an automated gate arm that physically blocks the oncoming traffic from crossing the tracks. However, many legacy active crossings exist which only include FLS indicators

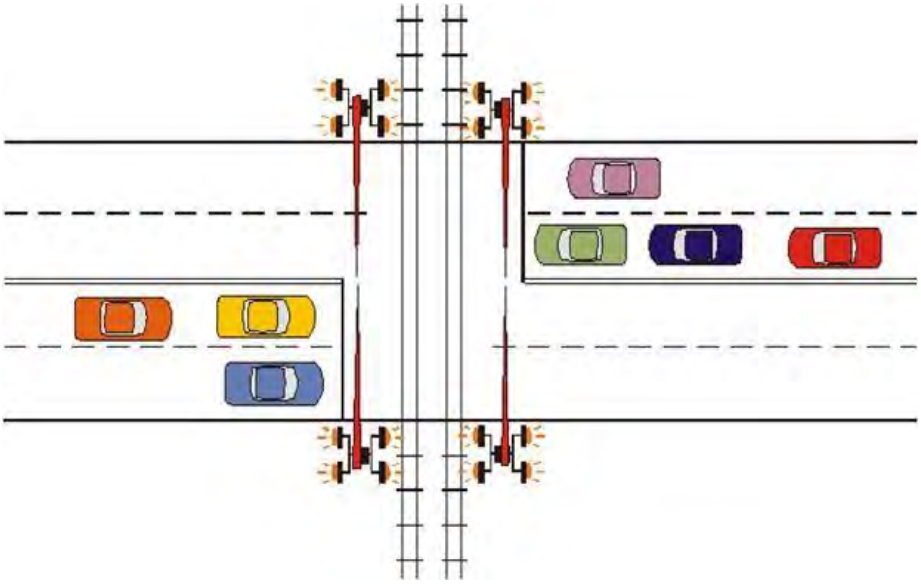
without gates. Upgrading these crossing to include the automated gates can provide a noticeable increase in the safety of the crossing. Mast mounted FLS indicators can also be upgraded to cantilever mounted FLS to further improve visibility of the flashing signals; especially in multi-lane and heavy truck traffic roadway corridors.

Active crossings with both FLS and standard gates (2-quad) can be further upgraded to include either a non-mountable median or a 4-quadrant (4-quad) gates system. Both of these upgrades improve crossing safety by eliminating or greatly reducing the ability for a motorist to either deliberately, or inadvertently drive around a downed automated gate arm. It should be noted that depending on the agreement reached between the road authority and the railroad, the incremental maintenance cost for additional warning devices (such as additional gates in a 4-quad system) may be the responsibility of the road authority.

Non-mountable Median



4-Quad



In some instances, it is advantageous to completely eliminate the potential conflict at the crossing, in those cases two additional options remain.

- Crossing Closure – is the closing of the roadway across the tracks. This approach is typically taken at lower volume roads where viable alternatives exist nearby to otherwise cross over the tracks. Or, where two or more adjacent crossings require safety upgrades, and crossing closures are used to offset costs or other impacts associated with improvements to the adjacent crossings.
- Grade Separation – Is the construction of a structure which physically separates the roadway from the railroad tracks, eliminating the potential conflict. Grade separations typically consist of a highway bridge above the railroad tracks or a highway depression below the railroad tracks (with the tracks on a bridge structure) due to the greater flexibly in roadway alignment geometry over allowable railroad alignment geometry. Grade Separations are costly and are typically reserved for crossing locations with both high vehicular and railroad traffic; and/or other significant public safety concerns such as emergency access.

Various methods have been developed to aid in determining which crossings pose the greatest risk to public safety, and therefore should be a priority when funding upgrades to crossing warning devices or potential closure and grade separation candidates. The Federal Railroad Administration (FRA) and Federal Highway Administration (FHWA) have an accident prediction model which is widely used and forms the basis for the FRA's safety criteria and approach when it evaluates warning device upgrades to at-grade crossings. The model generally applies weightings based on various attributes of the crossing to equations of train and vehicle speeds and number of trains and vehicles per day. It also factors in accident history at that crossing within the most recent 5 year period. The FRA's model is primarily a predictor of how many accidents could be anticipated to occur at that location within a 20 year time frame. This is the basis for evaluation of quiet zone establishment and allows the user to assume various upgrades or improvements and determine of the overall corridor risk index is beneath an allowable threshold.

Each State DOT is required by federal regulation to evaluate the adequacy of warning devices and create its own prioritization statewide for improvement of safety at all of its public at-grade crossings. Many states use the FRA model as a basis of their approaches and adjust it with their own criteria which may include classification of roadway type, sight visibility, land use, geographic distribution, and to a limited extent political or policy based decisions. In addition to the FHWA/FRA model, there are several other generally accepted indexes that other states developed, such as Texas and New Hampshire, and were adopted by other states.

From discussions with both the North Dakota Department of Transportation (NDDOT) and Minnesota Department of Transportation (MnDOT), each state's respective approach was reviewed and formed the basis of the Study's grade crossing analysis methodology. As NDDOT currently uses a hybrid ranking approach based on the FRA model with modifying factors, and MnDOT is transitioning to an index approach looking primarily at the presence of certain risk factors; the methodology implemented by this study looked to synthesize the two approaches to best capture hazardous crossings which would likely receive higher consideration for safety improvements by each State's

respective approach. It should be noted that crossings which received high scores in the First Level and Second Level screening in this study will be considered in a pool with all other at-grade crossings in their respective State's for various funding sources. Crossings which are considered especially hazardous within the Study Area may not score as high when compared against other crossings within the State.

3.2 Project Crossing Analysis Methodology

The purpose of this grade crossing analysis is to provide a rational basis for ranking at-grade railroad crossings to arrive at a prioritized listing of crossings which merit consideration for further study and potential mitigation measures. Due to the large number of crossings within the study area a tiered screening approach was utilized and conducted in three phases; First Level, Second Level, and Third Level. All crossings within the study area were scored uniformly under an initial screening (First Level) based on analysis using verified data from project stakeholders (local agencies, FRA, NDDOT & MnDOT) and desktop review to develop an initial ranking or score for each crossing. The results of the First Level screening were ranked from worst (or greatest concern) to best (least concern).

Following this quantitative analysis, the list was vetted through a qualitative analysis. This review and analysis included input from the Study Review Committee (SRC) and Metro COG staff to review the results and determine if additional crossings warranted consideration for Second Level screening or if some crossings may not benefit from further analysis.

Following the First Level of screening and consultation with the SRC and Metro COG staff, a selected subset of crossings was advanced to a Second Level screening. The Second Level screening is by its nature more subjective than the First Level screening. Each of the selected crossings in the Second Level screening was reviewed in the field to collect additional information not readily available via a desktop review or existing data sources and to verify FRA data. Upon completion of the field reviews, crossing scores were updated to include the additional items and the project crossing rankings were adjusted accordingly.

There are a total of 18 items that are included within the first two levels of screening. The items are very similar and in alignment with the NDDOT's grade crossing risk factors. In addition, five items were included within the screening criteria that have origins in the MnDOT grade crossing assessment criteria. Two of these items are tailored to address a more urban area such as the Fargo-Moorhead Metro COG service area and include proximity to hospitals, fire stations and EMS stations or routes located on designated public bus routes. These factors were included in the First Level screening. The method included three additional factors in the Second Level of screening to address designated pedestrian or bicycle trails, areas of high expected economic or population growth and special use areas.

3.2.1 First Level Screening Methodology

First Level screening was uniformly applied to all crossings in the study area. It includes as its base the FRA accident prediction model, which factors in both highway and train traffic, number of tracks, roadway surface material, train speed, highway type, number of

highway lanes, type of warning devices, and accident history. This accident risk prediction is by its nature a low number as it predicts the probability of an accident occurring at that crossing within one year. FRA collision prediction formulas are provided in Appendix A – FRA Formulas. Under the NDDOT evaluation criteria, this number is multiplied by 1000 to arrive at a whole number that is easier to work with. For example, if the accident prediction is 0.050 (a single predicted accident within 20 years) the score for our First Level screening would be 50. Crossings within the study area are likely to have scores, following the multiplication, in the range of 10 to 80. The FRA accident prediction criteria then serves as the foundation for addition of unique factors that are not included in the FRA formula. Added to this score are points for proximity of hospitals, fire stations and EMS stations and schools. If a crossing is on a public bus route, it gets an additional score. If the posted roadway speeds are greater than 30 miles per hour, a graduated score is also added. If the crossing is located on the designated Amtrak passenger train route, an additional score is added. Finally, a roadway skew score is added depending on the skew angle of the track and crossing. The scoring criteria for First Level screening is shown in Table 3-1:

Table 3-1. First Level Screening Criteria

	Criteria	Score	Description
A	FRA Accident Prediction Formula	Result multiplied by 1000	Likely to be less than a 80 score following multiplication
B	Hospital, Fire Station, or EMS Station Nearby 1/4 mile	20	Nearby sensitive use by infirmed or near emergency call centers
C	School Nearby within 1/4 mile	25	Nearby dense sensitive populations
D	Transit Route (Bus Route)	20	Located on designated public bus routes
E	Roadway Speed > 30 mph	10 - 30	If roadway speed is between 31 and 45 mph = 10 between 46 and 55 mph = 20 greater than 56 mph = 30
F	Passenger Rail (Amtrak) Route	25	Possibility of injury to train passengers
G	Roadway skewed to Track	0 - 20	If roadway angle with track 61 - 90 degrees = 0 31 - 60 degrees = 10 00 - 30 degrees = 20
H	Roadway intersection within 200 feet	20	Possibility of traffic queuing
	Total Score (Level 1 Screening)	-	Sum of all scores

3.2.2 First Level Screening Results

The full First Level screening results are provided in Appendix B – First Level Screening Results. Crossing scores ranged from a low of 0 to a high of 159. Based on a qualitative review of this list along with input from Metro COG and the SRC, the top 25% of the crossings from the First Level screening results (55 crossings from the initial 215) were considered for Second Level screening.

In addition to First Level screening scores, crossings were also vetted against known project lists for scheduled or potential grade separation projects or other improvements; crossing locations which were not viable grade separation candidates due to a variety of site constraints; and locations where in-place active warning systems were already maximized (i.e., 4-quad gate systems or gates and 100' non-mountable medians). Crossings which met these criteria were removed from Second Level screening consideration. A total of 33 roadway crossings and one pedestrian only crossing were selected for Second Level screening.

3.2.3 Second Level Screening Methodology

Each crossing selected for Second Level screening was reviewed in the field and scored with an additional set of criteria that are not included within the FRA formula or readily available from a desktop analysis. Field review forms are provided in Appendix C – Second Level Screening Field Review Forms. Second Level screening includes criteria that are more subjective in nature and the applied scores depend upon the number or severity of the item. These items include the number of school buses per day, if the crossing is located on a truck route where hazardous material transport is routine or a rail segment with a high probability of hazardous material transport, if the crossing is on a designated recreational trail or bike route, if situated in an area planned for high expected economic or population growth, if the crossing is in a highly developed urban area, or if there exist special uses such as near an event center, college/university or entertainment district then the crossing is scored accordingly. These items are weighted based on conditions observed and noted in the field review as well as concerns brought up during stakeholder meetings. Finally, factors for impairment at crossings due to sight obstructions or roadway profile issues are also included in the Second Level screening. Second Level screening scores were added to the crossing's First Level score for a cumulative total.

The scoring criteria for the Second Level screening are shown in Table 3-2.

Table 3-2. Second Level Screening Criteria

	Criteria	Score	Description
J	Number of School Bus Crossings	5 - 25	Higher used crossings get higher score
K	Designated Trail or Bike Route	10	Factors for greater pedestrian use
L	Hazardous Materials Route	5 - 25	Score depends upon level and type
M	High Expected Economic/Population Growth	5 - 20	Score depends upon level of growth
N	Developed or Urban Area	10 - 20	Score depends upon level and type
O	Special Use Area (i.e., CBD or campus)	10 - 20	Score depends upon level and type
P	Local Issue/Concern	5 - 30	Score depends upon level and type
Q	Vertical Curve or Humped Crossing	10 - 40	10 points per quadrant impaired
R	Visual Obstruction or sight lines – gated crossing	5 - 20	5 points per quadrant obstructed
S	Visual Obstruction or sight lines – without gates	25 - 100	25 points per quadrant obstructed
	Total Score (Level 2 Screening)	-	Sum of all scores

School Bus Crossings

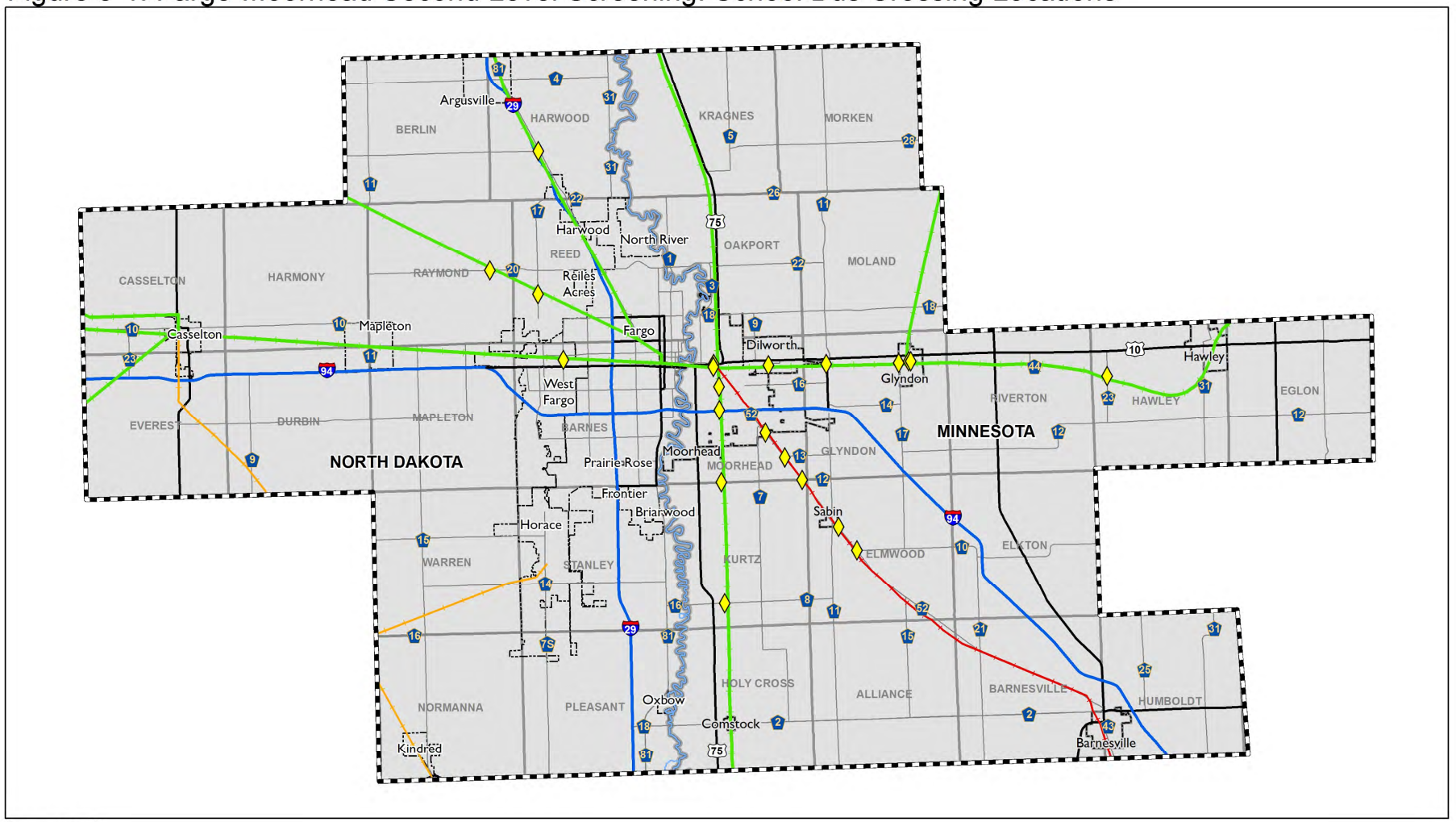
Railroad crossing procedures are one of the most important safety issues for school bus drivers. Every state has different laws and regulations for crossing railroad tracks in a school bus, however, all school bus crossing laws must at a minimum meet the Code of Federal Regulations,49 CFR 392.10. Excerpts from 49 CFR 392.10, ND Century Code, and Minnesota Statute are provided in Appendix D – School Bus Crossing Regulations and Guidelines.

Table 3-3 provides a list of railroad crossings that school busses cross and Figure 3-1 provides a map showing school bus crossing locations in the MetroCOG area.

Table 3-3. School Bus Crossings

Crossing ID	Railroad	Street	City	School District	School Buses Per Day
062901T	BNSF	190TH ST S	HAWLEY	HAWLEY	2
071009F	BNSF	9TH ST EAST	FARGO	WEST FARGO	1
092956M	BNSF	C-0928 (CR-20)	FARGO	WEST FARGO	4
092950W	BNSF	C-0949 (CR-17)	FARGO	WEST FARGO	31
081388K	BNSF	28TH ST SE	HARWOOD	WEST FARGO	5
062589A	BNSF	110 AVE S	COMSTOCK	MOORHEAD	2
071415C	BNSF	1ST AVE NORTH	MOORHEAD	MOORHEAD	21
062576Y	BNSF	12TH AV S	MOORHEAD	MOORHEAD	14
062925G	BNSF	1ST AVE S	MOORHEAD	MOORHEAD	3
062582C	BNSF	60TH AVE S	MOORHEAD	MOORHEAD	1
062577F	BNSF	28TH AVE SO	MOORHEAD	MOORHEAD	17
080730S	OTVR	40TH AVE S	MOORHEAD	MOORHEAD/DGF	6
080738W	OTVR	1ST ST SO	SABIN	MOORHEAD	1
080734U	OTVR	60TH AVE SO	SABIN	MOORHEAD	3
080740X	OTVR	90TH AVE SO	SABIN	MOORHEAD	1
080732F	OTVR	50TH AVE S	SABIN	MOORHEAD	4
062943E	BNSF	S. MAIN ST	DILWORTH	DGF	4
062939P	BNSF	70TH ST S	DILWORTH	DGF	4
062920X	BNSF	PARKE AVE S	GLYNDON	DGF	68
062909X	BNSF	PARTRIDGE AVE	GLYNDON	DGF	4
062911Y	BNSF	100TH ST S	GLYNDON	DGF	6

Figure 3-1. Fargo-Moorhead Second Level Screening: School Bus Crossing Locations



Legend

- School Bus Crossing
- COG Area
- City
- County Boundary
- BNSF Railroad
- OTVR Railroad
- RRVW Railroad
- Red River

N

0 4 8 Miles

The transportation directors of the West Fargo, Fargo, Moorhead, and Dilworth-Glyndon-Felton school districts and the superintendent of Hawley Public Schools provided information on school bus crossings.

The Fargo School District does not use any of the crossings subject to the Second Level screening, although there is some concern that the crossing at 25th St South does not ride very well.

The West Fargo School District has no major issues or concerns with school bus crossings on current bus routes. The district did mention that there was a rough crossing (071086F) but BNSF fixed it after the School District representative called them.

The Hawley Public School District provided concerns with a crossing outside of the Metro COG area on 280th Street North. This crossing is difficult for busses to cross due to visibility and the tracks coming at a skew to the road. This crossing was not included in our analysis as it was outside of the study area; it is recommended that these concerns be brought to the attention of the local road authorities and the railroad.

Designated Bike Trails

The crossings selected for the Second Level screening where crosschecked against the 2017 FM Bikeways Map put out by FM Metro COG. It was found that five crossings in the Second Level screening were located along designated bikeways. These five crossings are 12th Ave S in Moorhead, 50th Ave S in Sabin, S Main St in Dilworth, CR-17 in Fargo, and 28th Ave S in Moorhead.

3.2.4 Second Level Screening Results

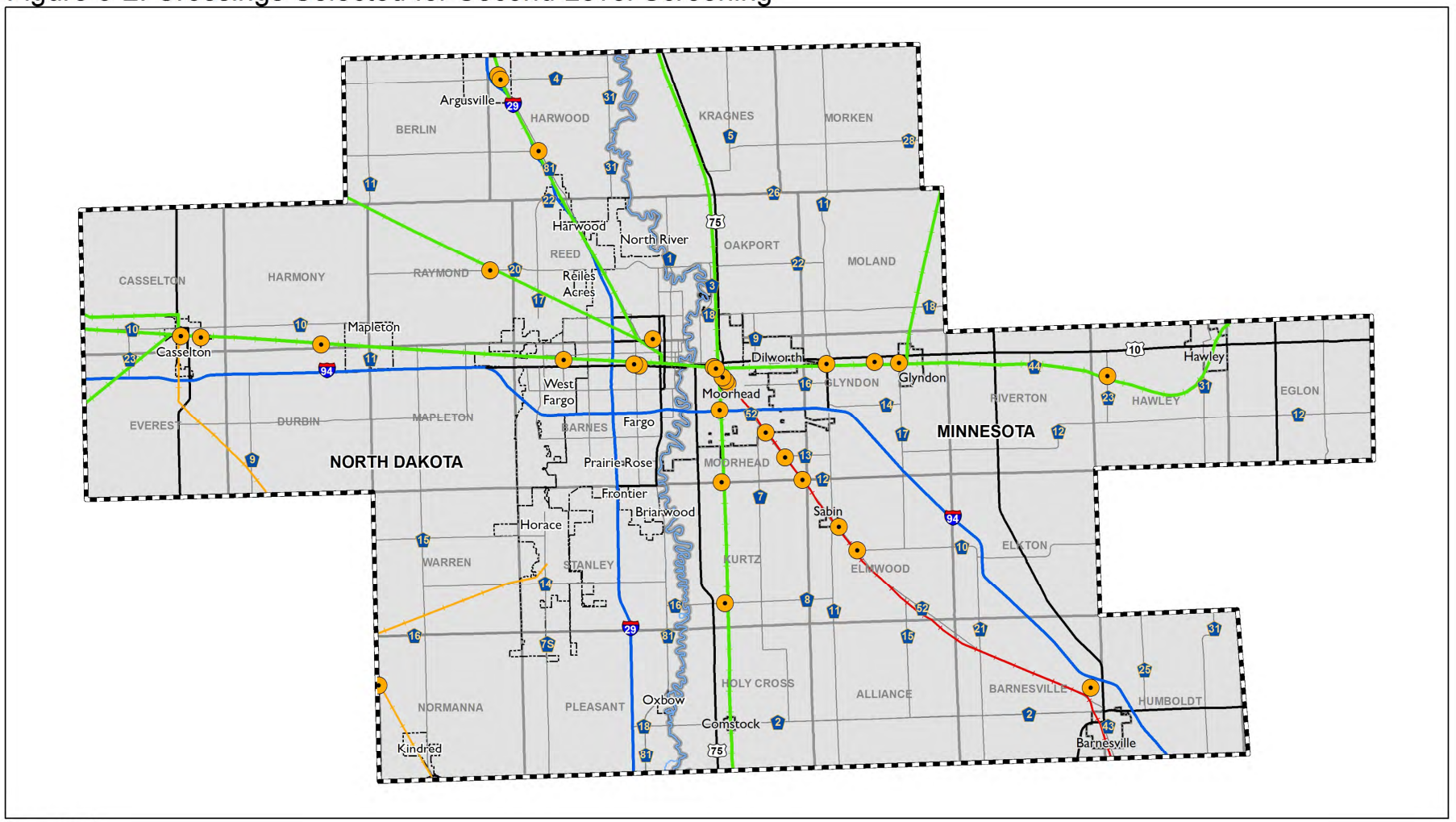
The Second Level Screening results are provided in Appendix E – Second Level Screening Results, a summary table of the results is provided in Table 3-4.

Table 3-4. Second Level Screening Results

Railroad	Street	City	State	Second Level Screening Result
BNSF	PEDESTRIAN PATH	HAWLEY	MN	NA (95)
BNSF	PARKE AVE S	GLYNDON	MN	172
BNSF	12TH AVE S	MOORHEAD	MN	143
BNSF	1ST AVE NORTH	MOORHEAD	MN	140
OTVR	50TH AVE S	SABIN	MN	134
BNSF	S. MAIN ST	DILWORTH	MN	133
OTVR	1ST ST SO	SABIN	MN	128
BNSF	PARTRIDGE AVE	GLYNDON	MN	128
BNSF	230TH ST S	HAWLEY	MN	125
BNSF	CR-17	FARGO	ND	115
BNSF	9TH ST EAST	WEST FARGO	ND	114
BNSF	BOLLEY DRIVE	FARGO	ND	111
BNSF	190TH ST S	HAWLEY	MN	111
BNSF	1ST AVE S	MOORHEAD	MN	109
OTVR	40TH AVE S	MOORHEAD	MN	107
BNSF	3RD AVE	CASSELTON	ND	106
OTVR	60TH AVE SO	SABIN	MN	106
BNSF	161ST AVE SE	MAPLETON	ND	105
BNSF	28TH AVE SO	MOORHEAD	MN	103
OTVR	90TH AVE SO	SABIN	MN	100
BNSF	MAIN AVE	FARGO	ND	99
BNSF	110 AVE S	COMSTOCK	MN	95
BNSF	27TH ST N	FARGO	ND	89
OTVR	150TH AVE SO	BARNESVILLE	MN	87
BNSF	100TH ST S	GLYNDON	MN	84
BNSF	60TH AVE S	MOORHEAD	MN	84
BNSF	28TH ST SE	HARWOOD	ND	80
BNSF	3RD ST	ARGUSVILLE	ND	78
BNSF	CR-20	FARGO	ND	73
BNSF	70TH ST S	DILWORTH	MN	73
BNSF	15TH AVE	CASSELTON	ND	73
BNSF	90TH ST S	GLYNDON	MN	72
RRVW	163RD AVE SE	KINDRED	ND	69
BNSF	1ST STREET	ARGUSVILLE	ND	68

Second Level crossings are also displayed in Figure 3-2. Second Level Crossing Locations

Figure 3-2. Crossings Selected for Second Level Screening



Legend

- Second Level Crossings
- COG Area
- City
- County Boundary
- BNSF Railroad
- OTVR Railroad
- RRVW Railroad
- Red River

N

0 4 8 Miles

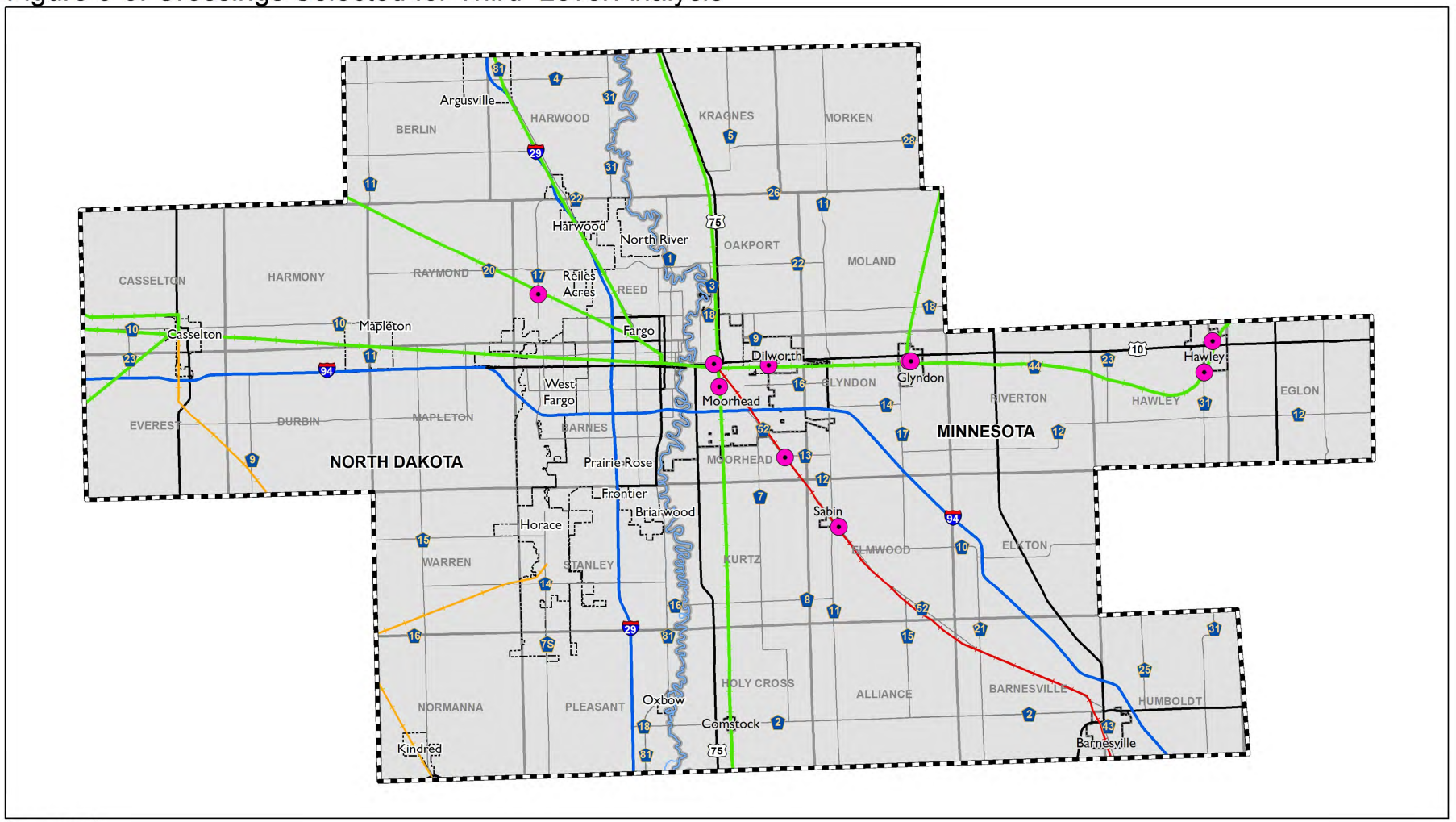
Crossing scores ranged from a low of 58 to a high of 172. Based on a qualitative review of this list along with input from Metro COG and the SRC, the top ten crossings from the Second Level screening were advanced to the Third Level for further analysis. Second Level screening results for those crossings that will not be considered for Third Level analysis can still give valuable insight when prioritizing crossing improvements in the future.

3.2.5 Third Level Analysis Methodology

Crossings included in the Third Level analysis are listed in the following sections and they are shown in Figure 3-3. Third Level Crossing Locations

Each of these crossings has been analyzed individually. Proposed mitigation to address safety concerns at each crossing has been set forth in the following sections. Visual representation of the mitigation as well as initial cost estimates have been compiled for each crossing as well. Note the cost information provided is for planning level purposes only. Unit prices provided are based on past project experience and discussion with project stakeholders. Upgrades to active warning devices (such as adding 4-quad gates to an existing 2-quad gate system) assume the installation of a completely new system due to general upgrades in minimum component requirements for crossing devices circuitry. If the existing equipment is compatible with upgrades to a modern 4-quad or 3-quad system, its possible capital costs could be significantly reduced. Further study and engineering will be required for each crossing to better refine cost information.

Figure 3-3. Crossings Selected for Third Level Analysis



Legend

- Third Level Crossings
- COG Area
- City
- County Boundary
- BNSF Railroad
- OTVR Railroad
- RRVW Railroad
- Red River

N

0 4 8 Miles

3.2.6 Third Level Analysis by Crossing

Pedestrian Path, Hawley, MN – 062894K

Table 3-5. Crossing Summary – Hawley Pedestrian Path

Existing Warning Device	No Signs/Signals
Railroad	BNSF
Trains per Day/Timetable Speed	55 / 75 MPH
AADT/Posted Speed Limit	N/A
First Level Screening Score	N/A (45)
Second Level Screening Score	N/A (95)

The existing crossing is a pedestrian at-grade crossing that serves as the primary pedestrian crossing of the BNSF double track mainline (and one industry siding) through the town of Hawley, MN. The crossing is located just south of the town's grain elevator roughly connecting the existing sidewalk on 5th St west of the tracks with 5th St east of the tracks. The existing crossing surface is gravel with concrete crossing panels on the double track mainline and timber panels crossing the industry siding track. No warning signs are currently present at the crossing.

As the crossing is pedestrian only, it did not receive a First Level screening score (the lack of roadway traffic data or pedestrian counts does not allow for a FRA accident prediction score). Significant local concern for the current state of the crossing, its key function as a pedestrian connection between the west side of Hawley (where the commercial district and school is located) to the east side (with residential developments) and the complete lack of any warning devices at the crossing elevated it in our Risk Index through its Second Level screening score.

Proposed Mitigation

Due to the critical function as a pedestrian connection for the town of Hawley, this crossing was not considered for closure. Further, since there are no other active warning devices along the mainline track in this location, and the existing grade separation at Valley St (approximately 750 feet south) is currently not suitable for pedestrian use due to lack of sidewalk or roadway shoulders through the roadway under track portal; crossing relocation or consolidation was not considered feasible.

Adding active warning devices at this crossing may prove cost prohibitive, as would the construction of a dedicated pedestrian grade separation. Further, active warning devices may be less effective at pedestrian crossings as the public can travel around downed gates much more easily than motor vehicle traffic.

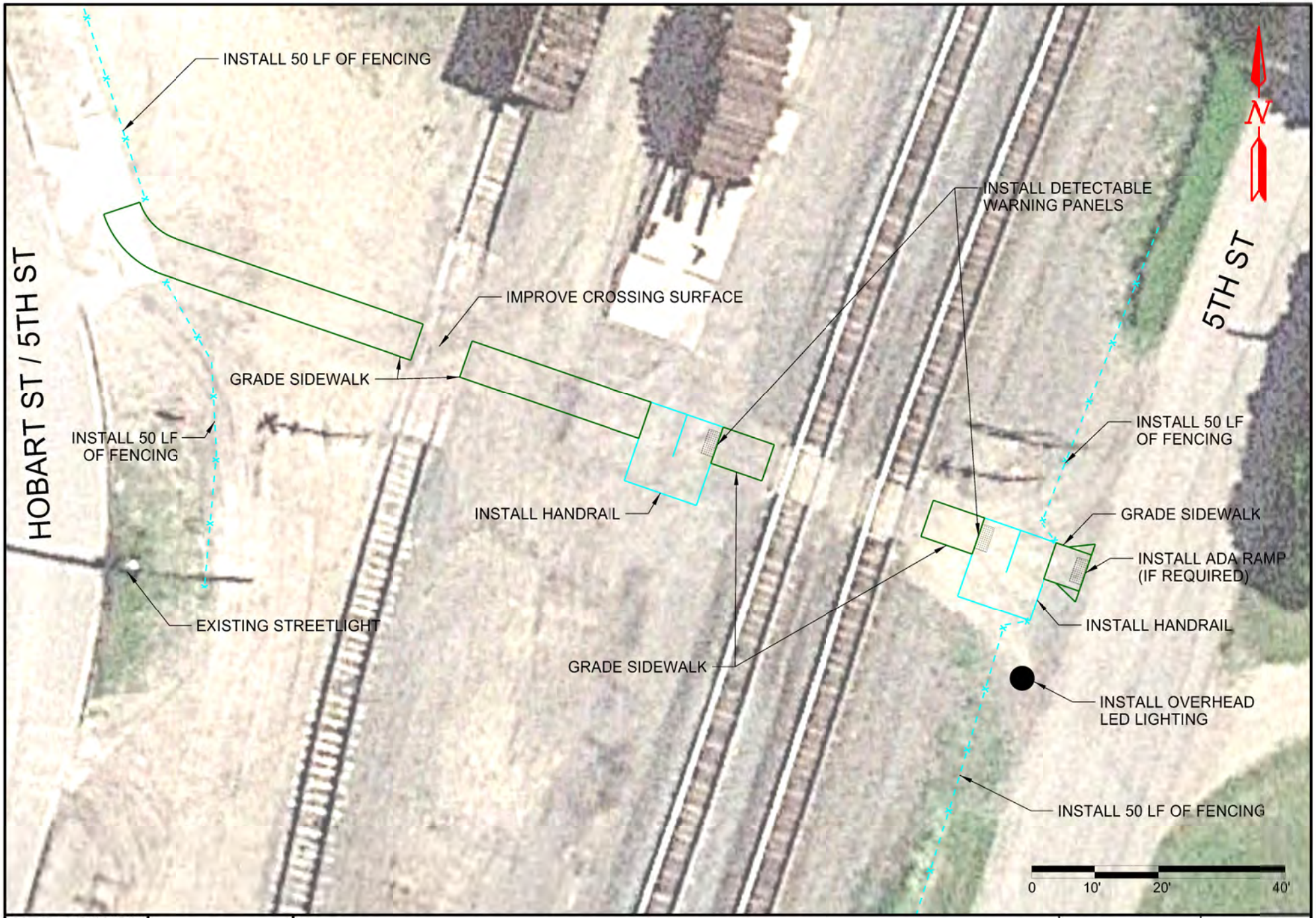
Due to these factors, proposed improvements include the installation of passive pedestrian at-grade crossing signage and the upgrade to the existing crossing surface and crossing approaches to minimum American with Disabilities Act (ADA) standards, which will serve to better define the crossing location and alert both train traffic and pedestrians of the potential for conflict at this specific location (rather than a larger zone

through the town). In addition to general crossing and approach surface improvements, recommended improvements include the installation of pedestrian mazes and tactile warning tiles which meet ADA standards and installing additional site lights through a street light on the east side of the crossing.

Due to the known timetable speeds at the crossing, there is a potential for frequent train traffic which exceeds 70 MPH through the crossing. Further confirmation of typical train speeds should be determined, as they may trigger a recommendation for the installation of active pedestrian trail warning devices per the MUTCD. If recommended, active pedestrian trail warning devices (gates and FLS) would cost approximately $100,000.

Table 3-6. Proposed Mitigation Probable Costs – Hawley Pedestrian Path

Item	Unit	Unit Cost	Quantity	Extension
Passive Signage - per approach	EA	$1,000.00	4	$4,000.00
New Crossing Surface	TF	$1,000.00	24	$24,000.00
New PCC Sidewalk	SF	$4.00	631	$2,524.00
New PCC Ped Ramp/Maze	SF	$10.00	312	$3,120.00
Tactile Warning Tile	SF	$50.00	36	$1,800.00
New Street Light	EA	$5,000.00	1	$5,000.00
Fence	LF	$50.00	208	$10,400.00
Subtotal				$50,844.00
Contingency	LS	30%		$15,253.20
Total				**$66,097.20**



Drawn By: D. BERGERSON
Date: 9/1/2017
Checked By: N. STADEM
Date: 9/5/2017
Revised:

Figure 3-4

062894K - Pedestrian Path, Hawley, MN

Proposed Mitigation

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Parke Ave S, Glyndon, MN – 062920X

Table 3-7. Crossing Summary – Parke Ave S

Existing Warning Device	Gates
Railroad	BNSF
Trains per Day/Timetable Speed	56 / 75 MPH
AADT/Posted Speed Limit	1600 / 30 MPH
First Level Screening Score	122
Second Level Screening Score	172

The at-grade crossing at Parke Ave includes both a paved two lane roadway and adjacent pedestrian sidewalk. Parke Ave acts as the primary north/south roadway in Glyndon, MN; connecting the northern half of the town and access to US Highway 10 with the southern half of the town which includes the local high school. The roadway and sidewalk cross the BNSF double track mainline, which sees over 50 trains a day at a maximum time table speed of 75 MPH. Vehicular traffic is 1600 vehicles per day, and an unknown volume of pedestrians. The crossing location is further complicated by the presence of the industry track spur approximately 125 feet north of the BNSF mainline. Though the rail traffic volumes were considered low for the industry crossing, the crossing acts as an additional site feature for motorists and pedestrians to consider when approaching the much higher volume BNSF mainline from the north; potentially increasing driver confusion.

The crossing did not have a particularly high FRA accident prediction score, owning primarily to the relatively low volume of vehicles and the presence of active warning devices including flashing light signals and gates. The close proximity to the local high school contributed to Parke Ave scoring highly in the Frist Level screening; in addition to the proximity of emergency services and adjacent intersections.

Second Level screening results were impacted by the location of the school, which produces a high volume of school bus crossings and creates a local concern due to the low level of protection for the existing pedestrian sidewalk, which likely sees high volumes of foot traffic in low light situations bother before and after school as well as before and after events taking place at the school and surrounding athletic facilities.

Proposed Mitigation

As Parke Ave serves as the primary north/south roadway through Glyndon; with access to both US Highway 10 and the location high school, this crossing was not considered for closure. The existing crossing has active warning devices with flashing light signals and gates. The addition of a non-mountable roadway median or upgrade to a 4-quad gate system would serve to further improve crossing safety by limiting the ability of motorists to drive around a downed gate arm either inadvertently or to “beat a train”. This may be a greater concern at this location with the close proximity to the high school and more inexperienced drivers.

The installation of non-mountable medians would be the preferred alternative at this location, as there is adequate distance between the crossing and the nearest adjacent

roadway intersection or access point both north and south of the crossing to install a full 100' long median. Further, medians would have a lower capital cost, and would not require potential upgrades to the railroad signal system to allow for vehicle detection or gate down timing (to avoid potentially trapping motorists between the downed gates. Snow removal should be considered if medians are proposed, which may lead to some roadway widening to maintain minimum lane width and truck pull-out lanes (which may also benefit the high volume of school busses crossing at this location).

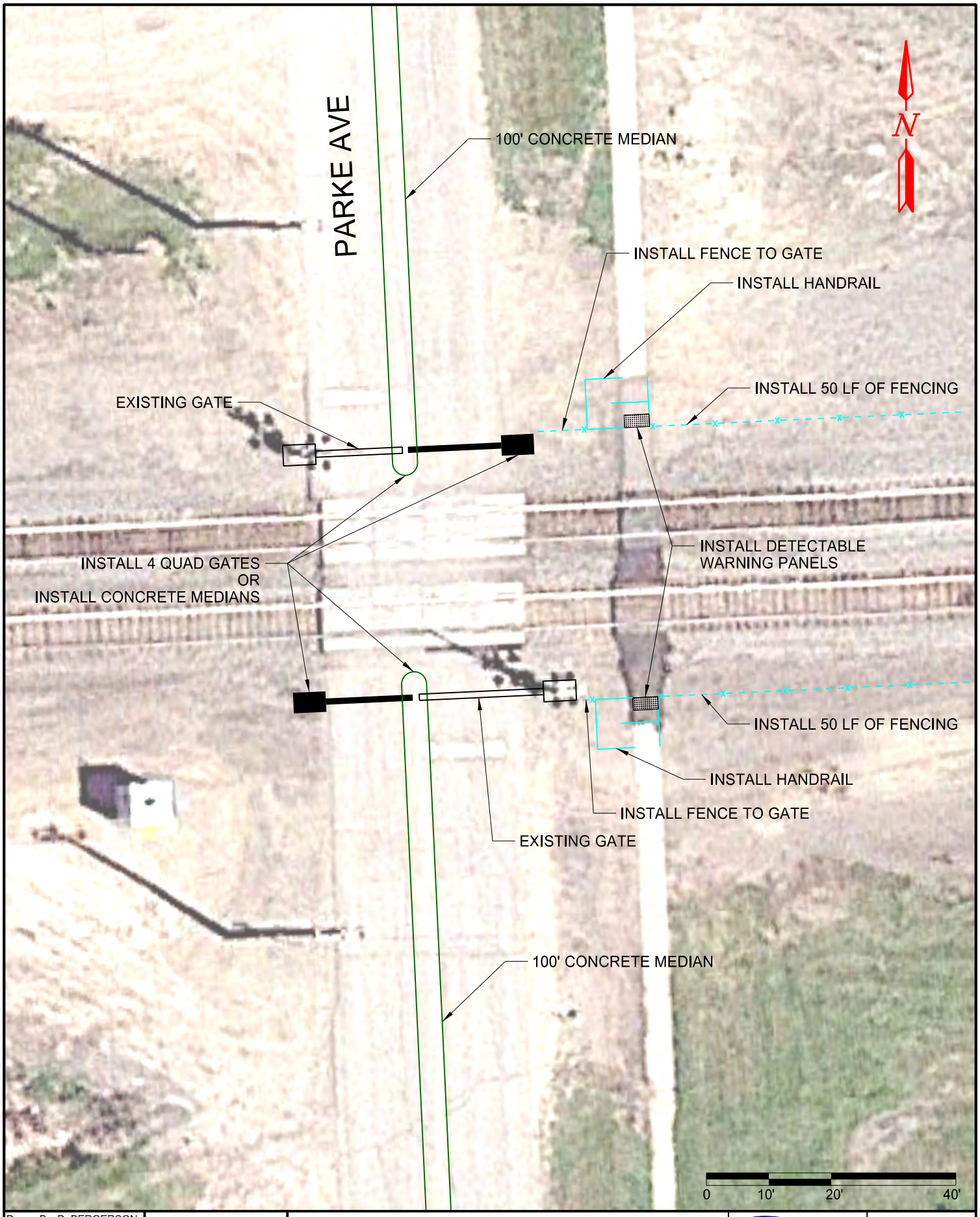
The existing pedestrian sidewalk crossing is approximately 4-5' wide, with a concrete surface and asphalt approaches. There are no passive or active warning devices present at the existing crossing. This pedestrian sidewalk would benefit from an improved crossing surface and walkway leading up to the tracks which meet ADA standards to encourage pedestrian use at the crossing as opposed to potential trespass crossings elsewhere in the relatively open corridor through town. We would also recommend the installation of pedestrian mazes and tactile warning tiles to further improve pedestrian safety at the crossing.

Table 3-8. Proposed Mitigation Probable Costs – Parke Ave S

Item	Unit	Unit Cost	Quantity	Extension
Pedestrian Crossing Upgrade				
Passive Signage - per approach	EA	$1,000.00	2	$2,000.00
New Crossing Surface	TF	$1,000.00	16	$16,000.00
New PCC Sidewalk	SF	$4.00	160	$640.00
New PCC Ped Ramp/Maze	SF	$10.00	312	$3,120.00
Tactile Warning Tile	SF	$50.00	24	$1,200.00
Fence	LF	$50.00	120	$6,000.00
Subtotal				$28,960.00
4-Quad Gate Upgrade				
4-Quad Gate System	EA	$500,000.00	1	$500,000.00
Non-Mountable Median Upgrade				
New Curb & Gutter	LF	$20.00	420	$8,400.00
New PCC Median Pavement	SF	$9.00	1600	$14,400.00
Road Surface Widening	SY	$50.00	260	$13,000.00
Subtotal				$35,800.00
Mitigation Option Totals				
Ped + 4-Quad Subtotal				$528,960.00
Contingency	LS	30%		$158,688.00

Table 3-8. Proposed Mitigation Probable Costs – Parke Ave S

Ped + 4-Quad Total				**$687,648.00**
Ped + Median Subtotal				$64,760.00
Contingency	LS	30%		$19,428.00
Ped + Median Total				**$84,188.00**



Drawn By: D. BERGERSON Date: 9/1/2017 Checked By: N. STADEM Date: 9/5/2017 Revised:	Figure 3-5	062920X-Parke Ave, Glyndon, MN Proposed Mitigation	Metro COG	HDR

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12th Ave S, Moorhead, MN – 062576Y

Table 3-9. Crossing Summary – 12th Ave S

Existing Warning Device	Gates
Railroad	BNSF
Trains per Day/Timetable Speed	8 / 25 MPH
AADT/Posted Speed Limit	4605 / 30 MPH
First Level Screening Score	88
Second Level Screening Score	143

The existing at-grade crossing at 12th Ave S in Moorhead is a paved two lane roadway with a west bound left turn lane on the west side of the crossing. 12th Ave is a major east/west arterial in South Moorhead with access to US Highway 52 east of the crossing and I-94 via 20th St west of the crossing. The surrounding land use is a mix of industrial (to the east) and residential (to the west); with the industrial land use including some potential hazardous material generators for both rail and truck. The roadway crosses the BNSF Moorhead Subdivision mainline and four industry siding tracks, which see approximately 8 trains a day at a maximum time table speed of 25 MPH. Vehicular traffic is 4605 vehicles per day. The large number of tracks crossing the roadway at this location creates a unique situation within the Fargo-Moorhead Metro COG; with this crossing having by far the most amount of tracks crossing the roadway of any location in the study area; which can potentially impact motorist and pedestrian sight lines at the crossing if moving trains and/or parked rail cars are present on one or more tracks while another train passes through the crossing.

In addition to the high number of tracks, there is limited storage space between the west side of the crossing and 20th St S. There is less than 50 feet from the west bound stop bar on 12th Ave at the 20th St intersection to the dynamic envelop to the western most track a the crossing (which is presumably the mainline). The relatively high traffic volumes for both 12th Ave and 20th St have the potential to create traffic queues for westbound vehicles on 12th Ave that could extend across the tracks. Also, the industrial land use (including potential hazardous materials) could create a higher volume of truck traffic, in which a single 40-ft or longer tractor-trailer could take up the entire queue length and potentially foul the tracks. It is understood that signal preemption with the adjacent traffic signals on 20th St is present at the active warning devices at the crossing; though the timing of the preemption and the adequacy to clear a queue (including truck traffic) prior to the arrival of a train is unknown.

The crossing did not have a particularly high FRA accident prediction score, owning primarily to the relatively low train volumes at slower timetable speeds and the presence of active warning devices including flashing light signals and gates. The close proximity to the adjacent 20th St intersection contributed to the Frist Level screening; in addition to the proximity of schools and 12th Ave's use as a transit and bike corridor.

Second Level screening results were impacted by the location of potential hazardous material originators for both rail and, perhaps more significantly due to the issues with storage capacity at the intersection, truck traffic.

Proposed Mitigation

As 12th Ave serves as a major east/west arterial roadway through South Moorhead, this crossing was not considered for closure unless is could be consolidated with other roadways as part of a grade separation project. The close proximity to 20th St, as well as the total number of tracks, makes 12th Ave an unlikely candidate for grade separation itself. The high number of tracks crossing the roadway creates a unique situation and poses a safety hazard to the public using the roadway, as well as reducing functionality of the siding tracks for the railroad. It may be worth discussing with both the serving railroad (BNSF) and the industries which utilize the siding tracks if they could be relocated further south, both reducing the total number of tracks at the 12th Ave crossing as well as increasing the functionality of the railroad siding tracks. If the total number of tracks were reduced, consideration should be given to reducing tracks on the west side of the crossing to increase the storage capacity to 20th St; though it is noted that this would be less desirable from a track geometry standpoint as the current mainline track is on the west.

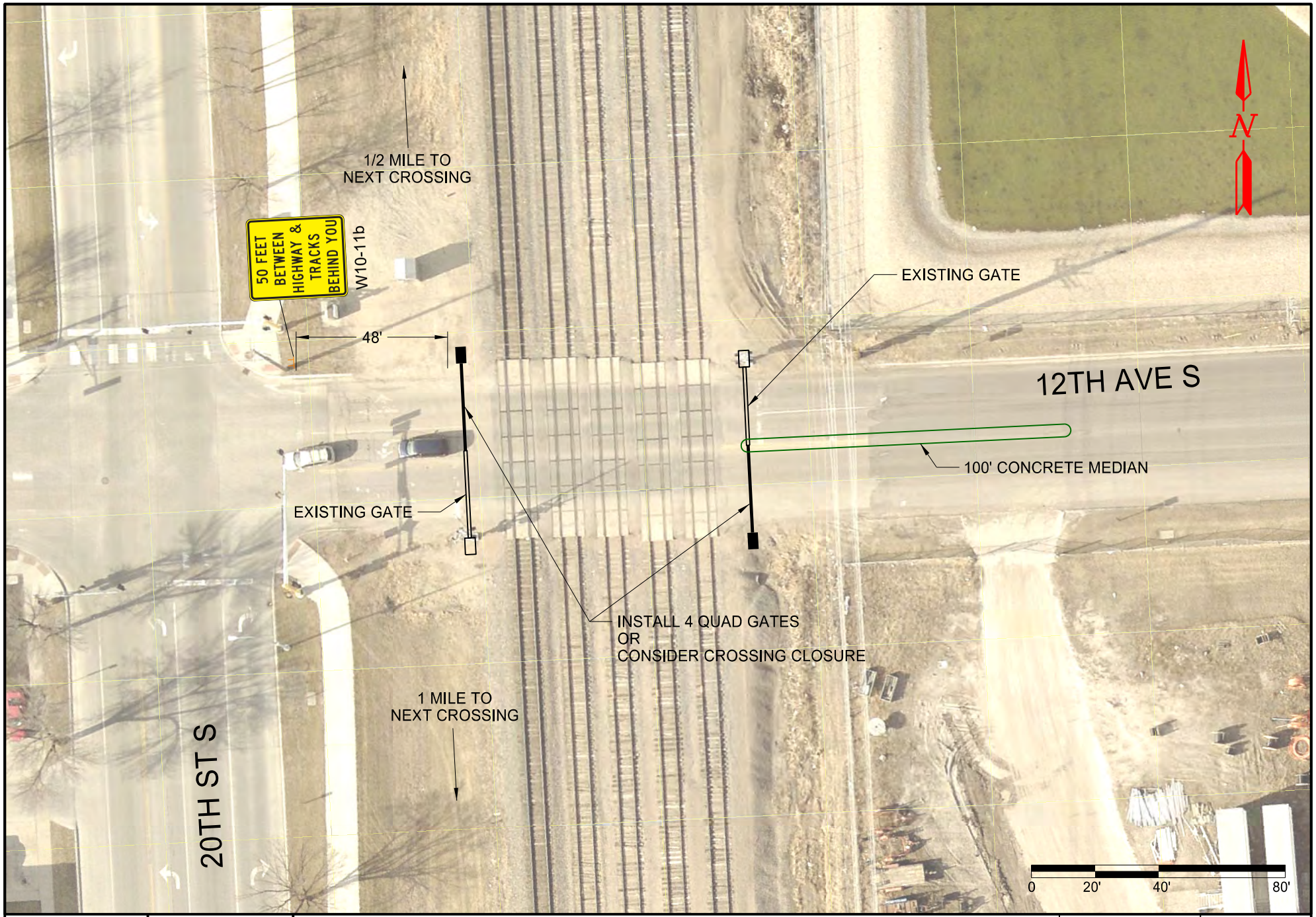
The existing crossing has active warning devices with flashing light signals and gates. The addition of a non-mountable roadway median or upgrade to a 4-quad gate system would serve to further improve crossing safety by limiting the ability of motorists to drive around a downed gate arm either inadvertently or to “beat a train”. This may be greater concern at this location due to the large number of tracks, which may give motorists or pedestrians a false sense that the train which is activating the warning devices has passed and cleared the crossing if it is visually blocked by another train or railcar on an adjacent track between the motorist and the active train.

The installation of non-mountable medians would be feasible on the east side of this crossing, as there is adequate distance between the crossing and the nearest adjacent roadway intersection to install a full 100’ long median; though an access point on the south side of the roadway would be impacted; requiring either restricted (right in, right out) access or relocation . There in not adequate room between 20th St and the crossing to install an effective median on the west side of the crossing; wide turns from trucks entering 12th Ave from 20th St and the existing turn lane also make use of a median unlikely on this approach to the crossing. Medians would have a lower capital cost, and would not require potential upgrades to the railroad signal system to allow for vehicle detection or gate down timing (to avoid potentially trapping motorists between the downed gates. Snow removal should be considered if medians are proposed, which may lead to some roadway widening to maintain minimum lane width and truck pull-out lanes. Though not desirable at a typical crossing, a hybrid median and additional gate system may be considered at this location. However, if an additional gate is to be added at one approach; than the update to a complete 4-quad system should be considered as any additional updates to the railroad signal system will already be in play. Due to the close proximity to the traffic signal at 20th St, costs to install a 3-quad or 4-quad system will likely be higher than at a more isolated location.

Additional advance warning signs, such as W10-11b; which indicates limited storage capacity from an intersection to track behind the motorist, should also be considered at this crossing. The existing traffic signal preemption should be confirmed to be adequate for the traffic using the roadway.

Table 3-10. Proposed Mitigation Probable Costs - 12th Ave S

Item	Unit	Unit Cost	Quantity	Extension
Advanced Warning Signage - per approach	EA	$1,000.00	1	$1,000.00
4-Quad Gate Upgrade				
4-Quad Gate System	EA	$750,000.00	1	$750,000.00
3 Quad & Non-Mountable Median Upgrade				
3-Quad Gate System	EA	$500,000.00	1	$500,000.00
New Curb & Gutter	LF	$20.00	110	$2,200.00
New PCC Median Pavement	SF	$9.00	800	$7,200.00
Road Surface Widening	SY	$50.00	1600	$80,000.00
Subtotal				$589,400.00
Mitigation Option Totals				
4-Quad Subtotal				$751,000.00
Contingency	LS	30%		$225,300.00
4-Quad Total				**$976,300.00**
3-Quad + Median Subtotal				$590,400.00
Contingency	LS	30%		$177,120.00
3-Quad + Median Total				**$767,520.00**



Drawn By: D. BERGERSON Date: 9/1/2017 Checked By: N. STADEM Date: 9/5/2017 Revised:	Figure 3-6	062576Y - 12th Ave S, Moorhead, MN Proposed Mitigation	Metro COG / HDR

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1st Ave N, Moorhead, MN – 071415C

Table 3-11. Crossing Summary – 1st Ave N

Existing Warning Device	Flashing Lights with Medians
Railroad	BNSF
Trains per Day/Timetable Speed	2 / 10 MPH
AADT/Posted Speed Limit	7890 / 30 MPH
First Level Screening Score	100
Second Level Screening Score	140

The at-grade crossing at 1th Ave N is a paved four lane roadway with alternating center medians and left turn lanes. The roadway intersects US 10 east of the crossing, and continues west through downtown Moorhead and across the Red River to downtown Fargo. Currently, nearly 8000 vehicles per day use 1st Ave N, traveling at 30 MPH. The crossing is located near the junction of the BNSF Prosper Subdivision mainline and the BNSF P-Line, which serves the Moorhead American Crystal Sugar plant.

The existing single track crossing has a moderate skew angle with 1st Ave. There are flashing light signals present at the crossing, and 50 foot non-mountable medians.

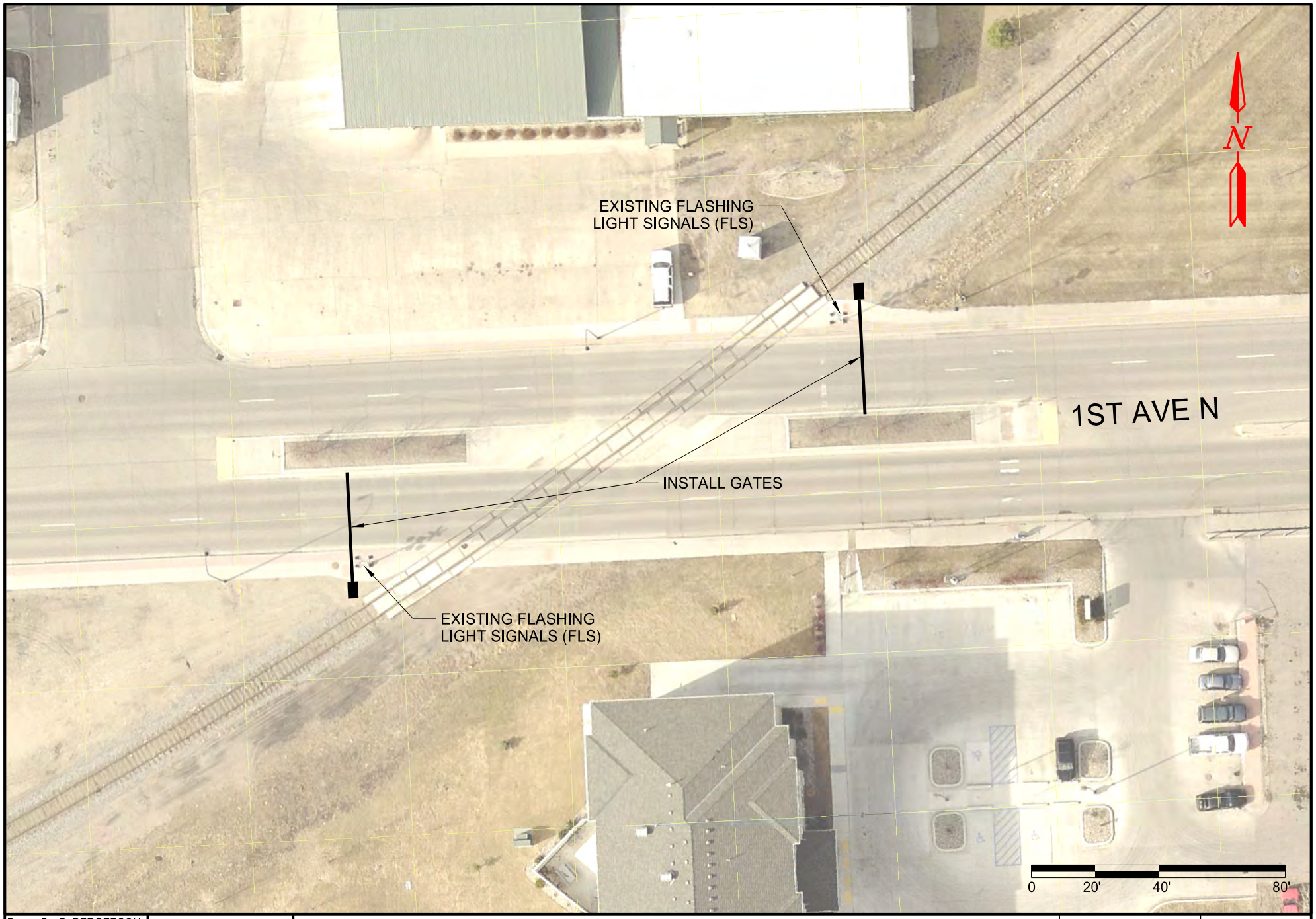
Proposed Mitigation

The current active warning devices does not include and gates or cantilevered flashing light signals. This is likely due to the relatively low volume of rail traffic at the crossing compared to other BNSF lines in the region. However, as this is the only major roadway railroad crossing in the downtown Moorhead area, the lack of gates may create driver confusion, with motorists assuming gates should be present and potentially ignoring the stand along flashing light signals. In addition, which multiple traffic lanes in each direction, it is possible that a larger vehicle on the curb side lane may block the sight line to the FLS for a driving in the center lane approaching the crossing.

As the current crossing already has active warning devices present, and a non-mountable median installed, we recommend completing the active warning device system for 1st Ave N through the installation of a 2-quad gate system to work in tandem with the existing medians.

Table 3-12. Proposed Mitigation Probable Costs - 1st Ave N

Item	Unit	Unit Cost	Quantity	Extension
Install Active 2 Gate System	EA	$200,000.00	1	$200,000.00
Subtotal				$200,000.00
Contingency	LS	30%		$60,000.00
Total				**$260,000.00**



Drawn By: D. BERGERSON Date: 9/1/2017 Checked By: N. STADEM Date: 9/5/2017 Revised:	Figure 3-7	071415C - 1st Ave N, Moorhead, MN Proposed Mitigation

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50th Ave S, Sabin, MN – 080732F

Table 3-13. Crossing Summary – 50th Ave S

Existing Warning Device	Crossbucks
Railroad	OTVR
Trains per Day/Timetable Speed	2 / 40 MPH
AADT/Posted Speed Limit	265 / 55 MPH
First Level Screening Score	64
Second Level Screening Score	134

The existing at-grade crossing at 50th Ave S north of Sabin is a paved two lane highway (CR 75) which intersects County Rd 52 (CR 52) immediately west of the crossing. CR 52 is a major arterial roadway in this area of the study. The roadway has been realigned from its original orientation to create a 90 degree crossing with the railroad and to a perpendicular intersection with CR 52. The intersection with CR 52 is approximately 55 feet west of the crossing. 50th Ave crosses the Ottertail Valley Railroad mainline, which sees approximately 2 trains a day at a maximum time table speed of 40 MPH. Vehicular traffic is 265 vehicles per day at a statutory roadway speed of 55 MPH. The crossing is protected with passive warning devices. Though this particular crossing has some unique characteristics among the numerous section line roads crossing this corridor of the Ottertail Valley railroad, including the realigned roadway geometry, many the characteristics which lead to the crossing scoring highly on the hazard analysis are present at other crossings along this corridor; and mitigation measures applied at this location should be considered at the other section line crossings which intersect CR 52 along this corridor.

The primary concern at his location is the poor sight lines for northbound traffic on CR 52 turning right onto 50th Ave. As both CR 52 and 50th Ave have statutory speed limits of 55 MPH, with no traffic control devices at the highway intersection or railroad crossing; it is possible that motorists making this move may do so at high speeds. The close proximity from the parallel CR 52 to the tracks makes it very difficult for motorist to see a train traveling in the same direction as them coming up from behind. With less than 60 ft between CR 52 and the passive crossing, there is very little time for a motorist to be able to see an oncoming train and make a decision to stop or progress through the crossing. The limited storage space between the west side of the crossing and CR 52 causes a concern for larger vehicles. Westbound traffic may potentially queue onto the tracks while stopping for traffic on the perpendicular CR 52; however the relatively low traffic volumes indicate that this is likely not an issue for most traffic unless long tractor-trailers or farm equipment are on the roadway. This situation is present at other crossing along the CR 52 corridors between South Moorhead and the study area boundary (though the realigned roadway at 50th Ave results in the shortest distance from the intersection with Highway 52 to the crossing for northbound right turn movements):

- 40th Street
- 50th Street
- 60th Avenue

- 70th Avenue

Proposed Mitigation

Installation of active warning devices at the 50th Ave crossing (as well as other crossing along the corridor) would significantly increase safety at these crossing locations. However, due to the overall train and traffic volumes in this area, and the lack of existing active devices; they are likely cost prohibitive.

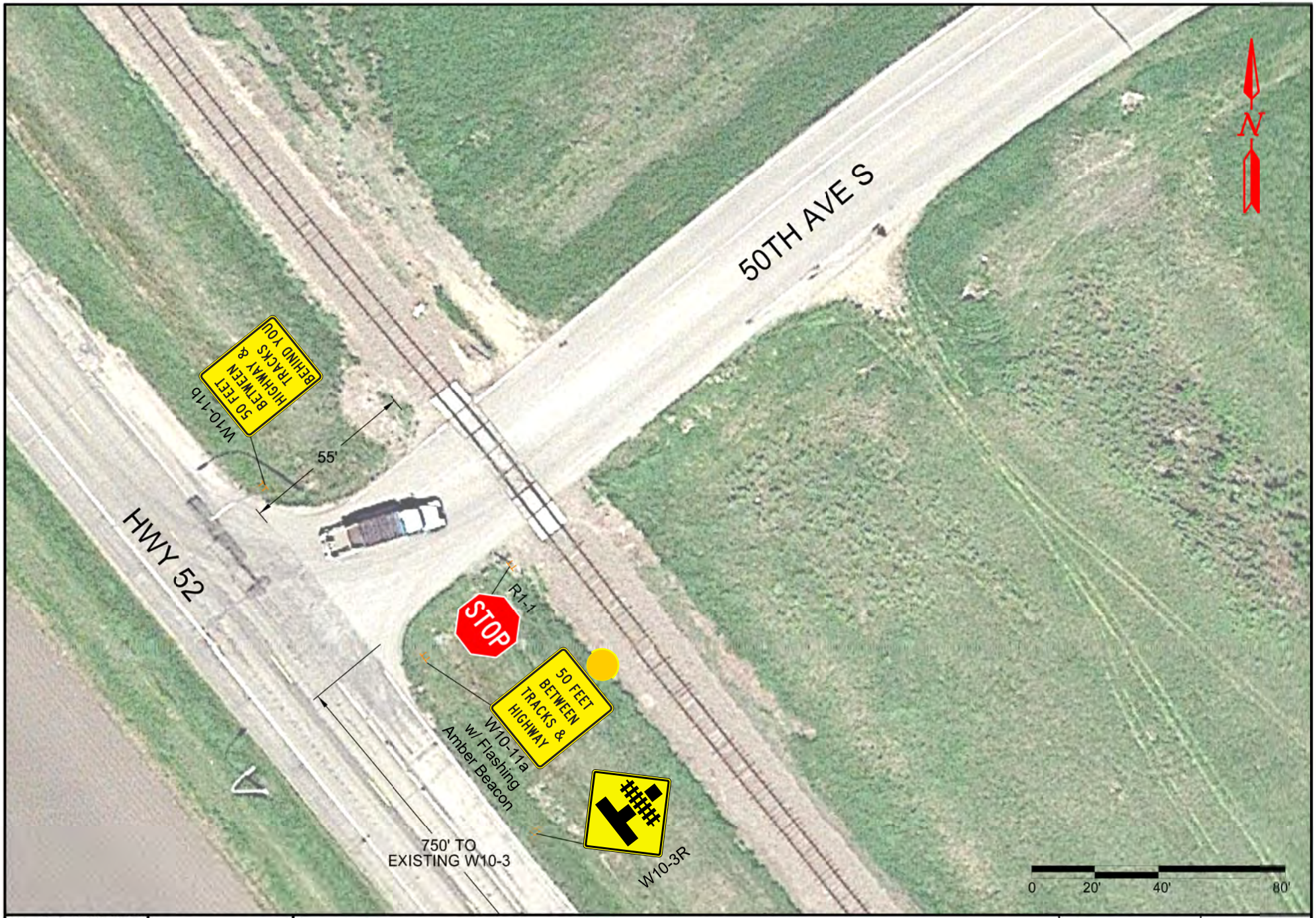
Improving the effectiveness of the passive warning devices is a lower cost approach that can still yield benefits to this individual crossing's safety, as well as other crossings on the corridor. Increasing advance warning signage to make motorists more aware of the upcoming tracks and limited storage distance from CR 52 to the crossing would help to encourage vehicle traffic to be more prepared to stop at the tracks if required. This may be accomplished by adding an additional set of W10-3R advanced warning signs on CR 52 closer to the intersection for 50th Ave to augment the existing W10-3R signs located approximately 750 feet from the intersection. The W10-3R signs could be further reinforced through the addition of a flashing amber beacon or other lighting device. The flashing beacon would not be tired to train traffic and would not require any upgrades to the existing track circuitry, but could be motion activated for vehicular traffic.

Stop signs for eastbound traffic are also a consideration at this location, which would force motorists to stop at the crossing; regardless if a train was present or not. This would eliminate the issue of inadequate driver decision time and would better take advantage of the otherwise adequate sight lines down the tracks in both directions that the existing roadway geometry nullifies. Stops signs would not be required for westbound traffic as the approaching roadway provides sufficient approaching sight distance. If stops signs are installed at this location, W3-1 (stop ahead) signs should also be added to CR 52 with the W10-3R signs.

To address the limited storage, W10-11a (for eastbound traffic) and W10-11b (for westbound traffic) should also be added to 50th Ave, and considered for other crossings along the corridor.

Table 3-14. Proposed Mitigation Probable Costs – 50th Ave S

Item	Unit	Unit Cost	Quantity	Extension
Passive Signage - per approach	EA	$1,000.00	1	$1,000.00
Advanced Warning Signage - per approach	EA	$1,000.00	2	$2,000.00
Solar Powered Amber Beacon	EA	$10,000.00	2	$20,000.00
Subtotal				$23,000.00
Contingency	LS	30%		$6,900.00
Total				**$29,900.00**



Drawn By: D. BERGERSON Date: 9/1/2017 Checked By: N. STADEM Date: 9/5/2017 Revised:	Figure 3-8	080732F - 50th Ave S, Sabin, MN Proposed Mitigation

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S. Main Street, Dilworth, MN – 062943E

Table 3-15. Crossing Summary – S. Main Street

Existing Warning Device	Crossbucks
Railroad	BNSF
Trains per Day/Timetable Speed	68 / 79 MPH
AADT/Posted Speed Limit	300 / 30 MPH
First Level Screening Score	93
Second Level Screening Score	133

The existing at-grade crossing is a paved two lane north/south roadway which crosses over the BNSF double track mainline and one yard lead track in the middle of BNSF's Dilworth Yard. The crossing is located near the middle of the approximately 20,000 foot long yard facility, with the 34th St S overpass located approximately 1 mile to the west and the 70th St at-grade crossing and CR-11 overpass approximately 2 miles to the east. Main St serves a small neighborhood south of the BNSF Yard and provides access to the majority of the town of Dilworth and US Highway 10. The roadway currently sees approximately 300 vehicles per day, traveling at 30 MPH. Further to the south, the frontage on I-94 and growing developments along the east side of Moorhead (around the Horizon Middle School) creates a potential for population growth in the immediate area which may increase vehicular traffic on the roadway. The BNSF double track mainline and yard lead carries approximately 68 trains per day traveling up to 79 MPH, though trains on the yard lead would be traveling at significantly reduced speeds, which can lead to longer crossing blockages as BNSF is switching cars in the yard.

The crossing's First Level screening score was primarily impacted by the proximity to schools and emergency services, plus its location on the high traffic BNSF double main. The Second Level screening score was influenced by the growth potential south of the BNSF yard and the mixture of mainline rail traffic and intra-yard switching moves over the crossing which has a high potential for crossing delays. The existing warning devices include active gates and flashing light signals, with non-mountable medians installed on both the north and south approach, though the south side median is less than the desired 100' length.

Proposed Mitigation

As the crossing already has active gates and flashing lights, as well as non-mountable medians; potential safety upgrades which leave the crossing at-grade are limited. An upgrade to a 100' long median on the south approach may be considered, though the current length is likely due to the existing BNSF yard access. If the median is extended, that access point may be relocated further south, or have limited (right in, right out) access.

Crossing closure may be considered at this location, though the alternative access points crossing the tracks to the west and east, at one and two miles respectively; are at a significant distance to impact local motorists' traffic patterns. It is also likely that local

traffic already funnels to the existing grade separations east and west of Main St due to the existing high volume of train traffic.

Grade separation would be a challenge at this location, with the close proximity to 2nd Ave SW to the north (approximately 200 feet) limiting the ability to place a grade separated structure without impacting the existing street grid north of the crossing. There appears to be adequate room to the south for a structure. The existing structure on 34th St N approximately one mile to the west would likely make a second structure at Main St redundant with current traffic volumes, though future growth may change this consideration. Further, removing the at-grade crossing at this location would greatly benefit BNSF's potential yard operations, allowing for longer tracks which would not block any vehicular traffic. For these reasons, a grade separation may be a future consideration at this crossing.

Based on the current traffic volumes, and assuming that a crossing closure is not feasible due to the distance to alternative crossing locations for the neighborhood immediately south of the BNSF yard, we would recommend improvements to the existing crossing median and roadway surface as an incremental increase for crossing safety.

Table 3-16. Proposed Mitigation Probable Costs - S. Main Street

Item	Unit	Unit Cost	Quantity	Extension
New Curb & Gutter	LF	$20.00	420	$8,400.00
New PCC Median Pavement	SF	$9.00	160	$1,440.00
Road Surface Widening (both approaches)	SY	$50.00	360	$18,000.00
Subtotal				$24,840.00
Contingency	LS	30%		$8,352.00
Total				**$36,192.00**

Drawn By: D. BERGERSON Date: 9/1/2017 Checked By: N. STADEM Date: 9/5/2017 Revised:	Figure 3-9	062943E-Main St S, Dilworth, MN Proposed Mitigation	Metro COG	HDR

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1st St S., Sabin MN – 080738W

Table 3-17. Crossing Summary – 1st St. S

Existing Warning Device	Crossbucks
Railroad	OTVR
Trains per Day/Timetable Speed	2 / 40 MPH
AADT/Posted Speed Limit	170 / 30 MPH
First Level Screening Score	73
Second Level Screening Score	128

The existing at-grade crossing on 1st St in Sabin, MN is a two lane roadway crossing the Ottertail Valley mainline, approximately 115' east of the intersection with CR 52 located near the south side of town. The roadway transitions from a paved local road on the west side of the crossing to a gravel section road (CR-67) to the east. The crossing's existing warning devices are passive crossbucks.

1st Ave had a relatively low FRA accident prediction score due to low traffic volumes on the roadway and railroad. The First Level screening score was increased due to the skew angle of the crossing and the close proximity of the CR 52 intersections. The crossing also had accident history (with the most recent incident occurring in 2014) which contributed to the FRA accident prediction value. The Second Level screening score was increased due to the poor approaching sight lines in the northeast quadrant of the crossing.

As the current conditions allow for motorists to travel over the crossing without coming to a stop and with no active warning devices to indicate if a train is approaching, adequate approaching sight distances are critical at this location. During the Second Level screening field review, approaching and clearing sight distances were assessed for each crossing based on the existing roadway speed limit and maximum timetable speed of the railroad. At this location, a motorist traveling at 30 MPH would need to see a train traveling at 40 MPH at a distance of 396 feet down the tracks while 220 feet from the crossing. The actual observed approaching sight distance down the tracks in the northeast quadrant was 78 feet, a full 318 feet less than required. The sight distance in this quadrant is obstructed by trees and large vegetation on a private residential lot. Existing public road right-of-way and railroad right-of-way is clear of visual obstructions.

Looking west on 1st Ave towards the railroad crossing

Proposed Mitigation

As the unsafe condition at this crossing is caused by poor approaching sight distance in one quadrant, and the visual obstruction which is causing the poor sight distance is located on private property, and unlikely to be removed. The existing roadway and railroad traffic volumes would likely not warrant active warning devices at this location.

Due to the cost prohibitive nature of installing active warning devices and the poor sight conditions in the northeast quadrant of the crossing, it is recommend to install a STOP sign (R1-1) to augment the existing crossbuck for the east approach to the crossing on 1st St/CR-67. Additional advanced warning signs may be required due to the installation of the STOP sign.

Table 3-18. Proposed Mitigation Probable Costs – 1st St. S

Item	Unit	Unit Cost	Quantity	Extension
Passive Signage - per approach	EA	$1,000.00	1	$1,000.00
Subtotal				$1,000.00
Contingency	LS	30%		$300.00
Total				**$1,300.00**

Drawn By: D. BERGERSON Date: 9/1/20147 Checked By: N. STADEM Date: 9/5/2017 Revised:	Figure 3-10	080738W - 1st St S, Sabin, MN Proposed Mitigation	Metro COG / HDR

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Partridge Ave, Glyndon MN – 062909X

Table 3-19. Crossing Summary – Partridge Ave

Existing Warning Device	Gates
Railroad	BNSF
Trains per Day/Timetable Speed	56 / 75 MPH
AADT/Posted Speed Limit	850 / 30 MPH
First Level Screening Score	118
Second Level Screening Score	128

The existing at-grade crossing at Partridge Ave consists of a paved two lane roadway crossing the BNSF double track mainline approximately 350 feet east of Parke Ave. Partridge Ave connects a portion of the northern half of Glyndon, MN to the neighborhood south of the tracks and provides access to US highway 10 to the north. Partridge Ave ends two blocks south of the crossing at the intersection with 7th St in Glyndon. The roadway crosses the BNSF double track mainline, which sees over 50 trains a day at a maximum time table speed of 75 MPH. In addition to the double track mainline, there is an industry spur located within the limits of the crossing for a total of three tracks crossing the roadway; though the rail traffic volumes were considered low for the industry crossing.

The crossing did not have a particularly high FRA accident prediction score, owning primarily to the relatively low volume of vehicles on the roadway and the presence of active warning devices including flashing light signals and gates. The close proximity to the local high school contributed to Partridge Ave scoring highly in the Frist Level screening; in addition to the proximity of emergency services and adjacent intersections.

Second Level screening results were impacted by the location of the school, which produces a moderate volume of school buses.

Proposed Mitigation

The close proximity to Parke Ave allows for the opportunity to close Partridge Ave to help offset costs associated with safety improvements at Parke; as well as completely eliminating a point of conflict between motorists/pedestrians and train traffic. Partridge serves the same neighborhoods of Glyndon north and south of the tracks; which there close proximities do not allow for any potential benefits of having multiple crossings in the same community such as increased emergency service transit options in case of a train blocking the town. As Parke Ave serves as the primary north/south roadway through Glyndon; with access to both US Highway 10 and the high school; while Partridge Ave ends roughly two blocks south of the crossing, this crossing was considered a more likely candidate for closure than Parke Ave.

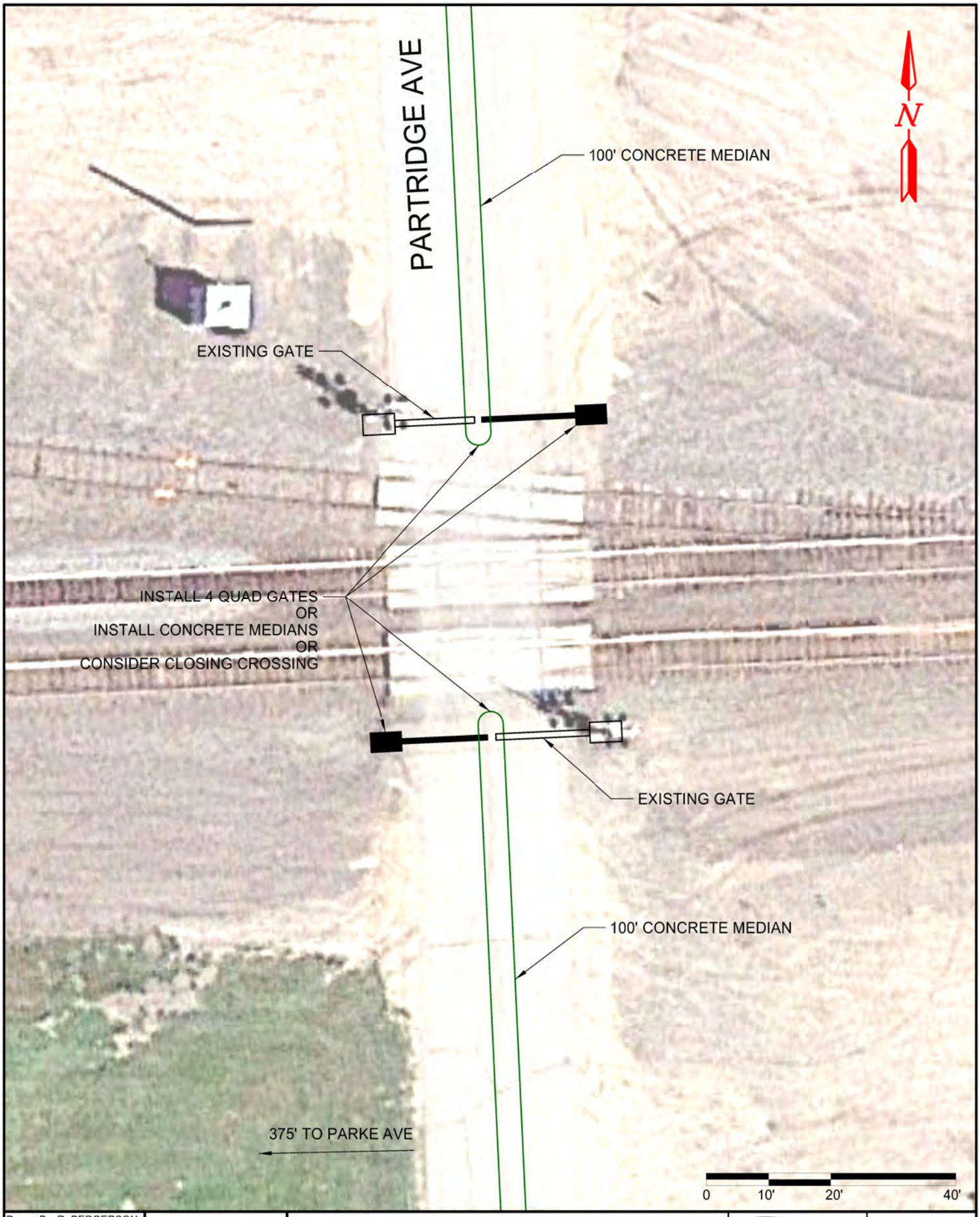
If closure is not considered a feasible mitigation for the crossing, upgrades to the existing warning devices may be considered. The existing crossing has active warning devices with flashing light signals and gates. The addition of a non-mountable roadway median or upgrade to a 4-quad gate system would serve to further improve crossing safety by limiting the ability of motorists to drive around a downed gate arm either inadvertently or

to “beat a train”. This may be greater concern at this location with the close proximity to the high school and more inexperienced drivers.

The installation of non-mountable medians would be the preferred alternative at this location if closure is not considered, as there is adequate distance between the crossing and the nearest adjacent roadway intersection or access point both north and south of the crossing to install a full 100’ long median. Further, medians would have a lower capitol cost, and would not require potential upgrades to the railroad signal system to allow for vehicle detection or gate down timing (to avoid potentially trapping motorists between the downed gates. Snow removal should be considered if medians are proposed, which may lead to some roadway widening to maintain minimum lane width and truck pull-out lanes (which may also benefit the moderate volume of school busses crossing at this location).

Table 3-20. Proposed Mitigation Probable Costs - Partridge Ave

Item	Unit	Unit Cost	Quantity	Extension
4-Quad Gate Upgrade				
4-Quad Gate System	EA	$500,000.00	1	$500,000.00
Non-Mountable Median Upgrade				
New Curb & Gutter	LF	$20.00	420	$8,400.00
New PCC Median Pavement	SF	$9.00	1600	$14,400.00
Road Surface Widening	SY	$50.00	260	$13,000.00
Subtotal				$35,800.00
Mitigation Option Totals				
4-Quad Subtotal				$500,000.00
Contingency	LS	30%		$150,000.00
4-Quad Total				**$650,000.00**
Median Subtotal				$35,800.00
Contingency	LS	30%		$10,740.00
Median Total				**$46,540.00**



Drawn By: D. BERGERSON Date: 9/1/2017 Checked By: N. STADEM Date: 9/5/2017 Revised:	Figure 3-11	062909X-Partridge Ave, Glyndon, MN Proposed Mitigation	Metro COG	HDR

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230th St S, Hawley MN – 062898M

Table 3-21. Crossing Summary – 230th St S

Existing Warning Device	Gates
Railroad	BNSF
Trains per Day/Timetable Speed	56 / 75 MPH
AADT/Posted Speed Limit	1150 / 55 MPH
First Level Screening Score	105
Second Level Screening Score	125

The existing at-grade crossing is located on 230th St/CR-31 approximately one mile south of Hawley, MN. The highway is a paved two lane road; 17th Ave S intersects the highway approximately 100 feet north of the crossing. The highway crosses the BNSF double track mainline at an extremely skewed angle, with a large gravel approach located immediately south of the intersection with 17th Ave, which provides access to the current active warning device bungalow. The existing warning devices consist of active gates and flashing light signals.

The crossing's First Level screening score was impacted by the acute skew angle, nearby intersection and high roadway speed. The Second Level screening score was further increased by the potential for growth in the Hawley area, as 230th serves as a primary access to I-94 to the south (via CR-10) and access to US 10 to the north. The large gravel area immediately adjacent to the crossing and outside of the limits of the existing southbound active gate arm also contributed to the Second Level score. The large gravel area provides a means of egress for motorists traveling north on 17th Ave to potentially drive around the gate arm.

Proposed Mitigation

Improvements to the existing roadway geometry would best serve this crossing location, including providing an increase in tangent roadway on 230th Ave on both side of the crossing, and relocating the 17th Ave intersection further from the tracks. However, it was assumed that significant roadway realignment would be cost prohibitive and would require significant right-of-way acquisition due to the existing extreme skew angle.

Overall crossing safety could be improved by introducing non-mountable medians or 4-quad gates at this location to reduce the ability to drive around the current single gate system and increase driver visibility leading up to the skewed crossing. The existing roadway geometry for both northbound and southbound 230th Ave curves slightly when approaching the railroad in order to create a more perpendicular crossing angle in the immediate vicinity of the tracks. This slight curvature creates a condition where motorists approaching the crossing do not "line-up" with the gate arms until they are a few hundred feet from the tracks. However, warning device visibility and sight stopping distance appear to be adequate for the roadway, despite the skew angle. Constructing non-mountable medians would create a potential issue for snow removal on the highway in the winter, and not completely address the access issue in the northwest quadrant of the intersection. 4-quad gates would require relocation of the existing gate arms due to the

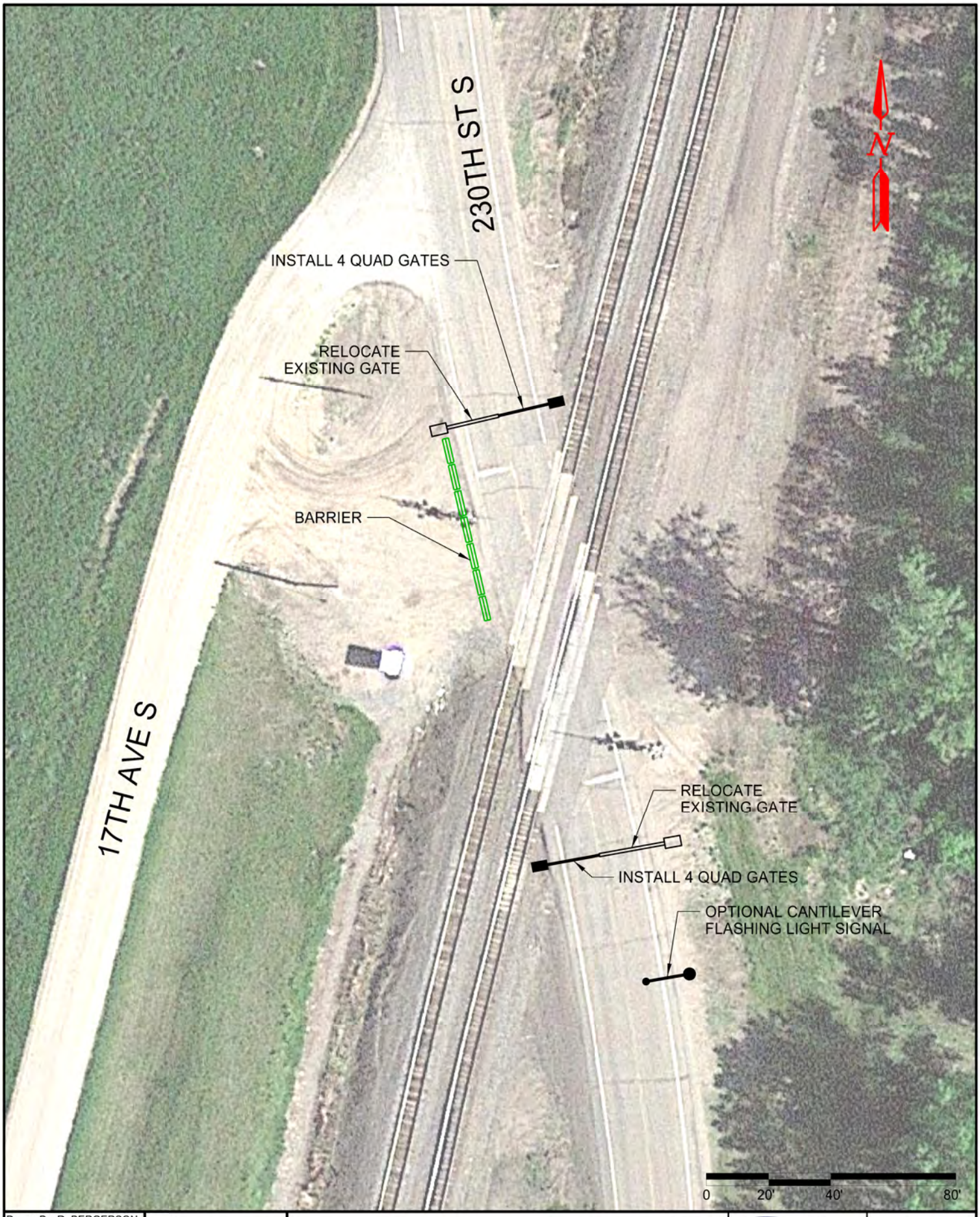
crossing skew in order to “square-up” the gates, which would increase the potential cost of installation, in addition to any upgrades in of the existing active warning device equipment.

An intermediate step to increase warning device visibility without the increase costs and circuitry upgrades of a 4-quad gate system would be the installation of supplemental flashing light signals, either as a cantilevered signal or secondary signal mast on the opposite side of the roadway. The installation of supplemental flashing light signals should not affect the existing crossing gate timing or circuitry.

In either case, installation of a barrier is recommended to eliminate the ability for motorists to drive around the existing or proposed gate arm location in the large gravel area on the north approach to the crossing at the intersection with 17th Ave. This would be a low cost solution that would provide flexibility for temporary conditions (such as removal for maintenance) while further protecting the crossing. The barriers may limit access for BNSF signal crews to the active warning device bungalow off of 230th Ave, though access would still be maintained off of 17th Ave.

Table 3-22. Proposed Mitigation Probable Costs - 230th St S

Item	Unit	Unit Cost	Quantity	Extension
4-Quad Gate Upgrade				
4-Quad Gate System	EA	$500,000.00	1	$500,000.00
Barrier/W-beam Guiderail	LF	$30.00	60	$1,800.00
Subtotal				$501,800.00
Cantilever FLS Upgrade				
Cantilever FLS	EA	$100,000.00	1	$100,000.00
Barrier/W-beam Guiderail	LF	$30.00	60	$1,800.00
Subtotal				$101,800.00
Mitigation Option Totals				
4-Quad Subtotal				$501,800.00
Contingency	LS	30%		$150,540.00
4-Quad Total				**$652,340.00**
Cantilever Subtotal				$101,800.00
Contingency	LS	30%		$30,540.00
Cantilever Total				**$132,340.00**



Drawn By: D. BERGERSON
Date: 9/1/2017
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Date: 9/5/2017
Revised:

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3-12

062898M-230th St S, Hawley, MN
Proposed Mitigation

Metro COG

HDR

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CR-17, Fargo ND – 092950W

Table 3-23. Crossing Summary – CR-17

Existing Warning Device	Gates
Railroad	BNSF
Trains per Day/Timetable Speed	38 / 40 MPH
AADT/Posted Speed Limit	1970 / 55 MPH
First Level Screening Score	65
Second Level Screening Score	115

The existing at-grade crossing on CR-17 consist of a two lane paved north/south highway crossing the BNSF Proposer Subdivision mainline. CR-17 intersects with 32nd Ave both north and south of the crossing, with the west approach being located south of the crossing on CR-17, and the north approach for 32nd Ave being located approximately 50 feet north of the crossing on CR-17. This offset intersection is due to a realignment of 32nd Ave which serves to consolidate both the CR-17 and 32nd Ave crossings to a single location on CR-17. The highway provides north/south access from West Fargo to Harwood, ND with agricultural and residential land use nearby. The highway currently sees 1970 vehicles per day traveling at 55 MPH. The BNSF Proposer mainline sees approximately 38 trains per day traveling at a maximum timetable speed of 40 MPH.

The First Level screening results were impacted by the close proximity of the 32nd Ave intersections and higher roadway speed. There is a recent accident history at the crossing, with an incident occurring there in 2011. The Second Level screening results were further influenced by the 32nd Ave intersection located north of the crossing, which creates a very tight turning radius for westbound vehicles traveling on 32nd Ave to southbound CR-17. The realignment of 32nd Ave created a condition where the turning radius for the intersection runs directly into the crossing surface. Further, the single gate arms for southbound CR-17 are located on the west side of the crossing, leaving he left turn movement from 32nd Ave to CR-17 completely unprotected by gates. A similar condition is present at the south approach, however, due to the larger distance from the crossing to the intersection (approximately 80 feet vs. 50 feet) the issue is less pronounced. A relatively high number of school bus crossings also contributed to the Second Level screening score.

Proposed Mitigation

Alternatives were considered to eliminate the unprotected left turns from westbound 32nd Ave to southbound CR-17. These included both the addition of warning devices at the crossing and a further realignment of the roadway to increase the offset from the intersection of CR-17 to the crossing.

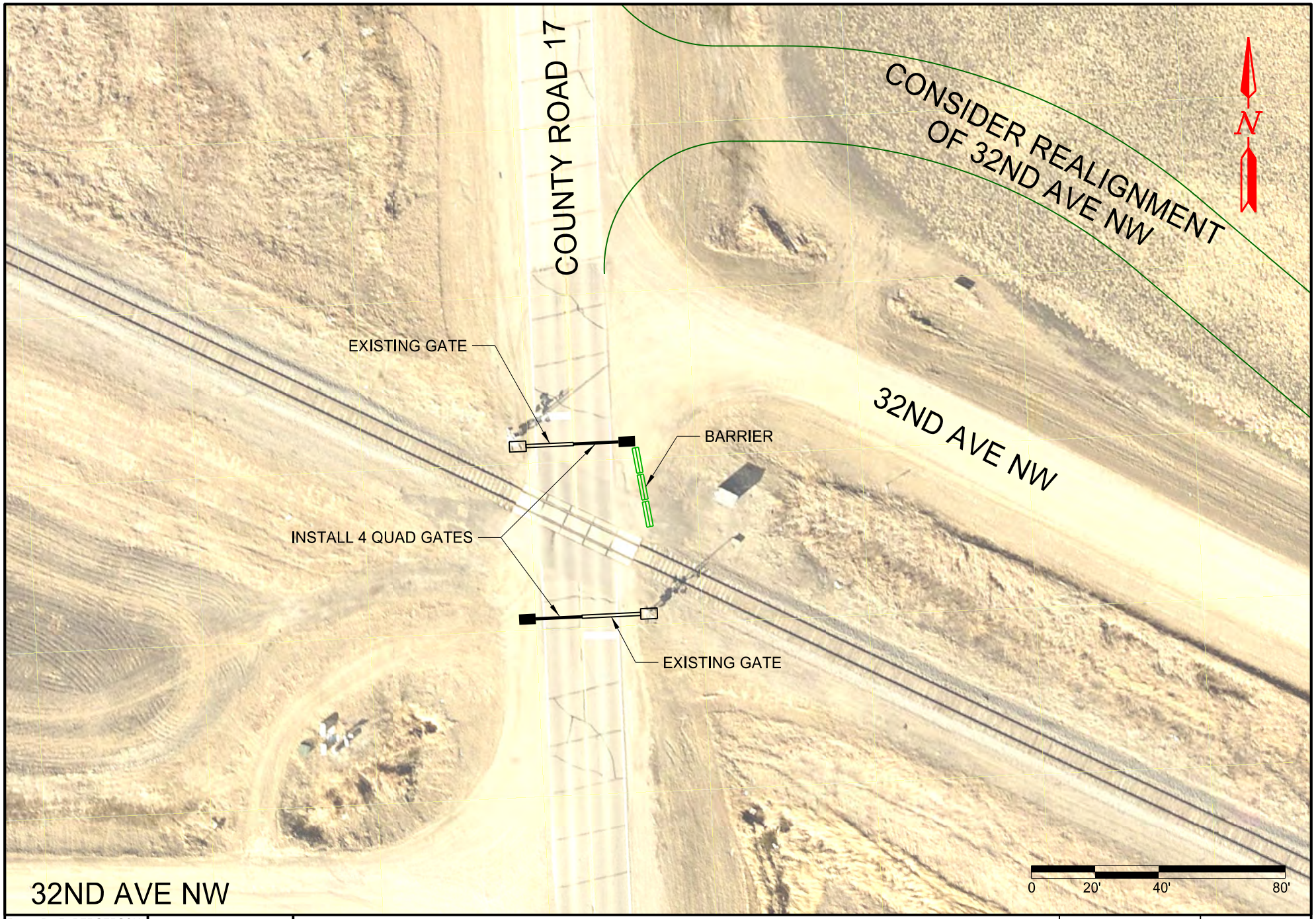
Sidelights (FLS) are present on the existing active warning device mast on the north approach facing east down 32nd Ave, which provides warning to westbound motorists if a train is approaching the crossing. This is particular important for westbound trains, as they would be approaching a westbound motorist from behind and would be difficult to see in advance of the crossing. However, even with the sidelight present, westbound

motorists are still able to easily drive around a downed gate arm due to the roadway geometry. Non-mountable medians are not feasible at this location due to the close proximity to the intersection (though they may be an option if the roadway was re-aligned). An upgrade to a 4-quad gate system would help to reduce the ability for motorists to drive around a downed gate, however the skew of the crossing would likely still require a barrier to block westbound motorists on 32nd Ave from driving around the additional gate mast.

Realignment of the roadway would increase the separation between the crossing and the intersection and allow westbound traffic from 32nd to CR-17 to enter the highway well north of the active warning devices, both providing increased visibility of the crossing, and allowing for the single gate arm to function as it is intended. However, roadway realignment would likely have a higher capital cost than updating the warning devices, while also requiring the acquisition of additional right-of-way. Due to the potential costs associated with both the installation and maintenance of a 4-quad gate system, which would still likely require additional traffic barriers to restrict left turn movements from 32nd Ave to CR 17; roadway realignment would be recommended at this location to create further separation from the crossing to the roadway intersection.

Table 3-24. Proposed Mitigation Probable Costs

Item	Unit	Unit Cost	Quantity	Extension
4-Quad Gate Upgrade				
4-Quad Gate System	EA	$500,000.00	1	$500,000.00
Barrier/W-beam Guiderail	LF	$30.00	25	$750.00
Subtotal				$500,750.00
Roadway Re-alignment				
Construct new gravel section road	LF	$150.00	600	$90,000.00
ROW Acquisition	LS	$50,000.00	1	$50,000.00
Subtotal				$140,000.00
Mitigation Option Totals				
4-Quad Subtotal				$500,750.00
Contingency	LS	30%		$150,225.00
4-Quad Total				**$650,975.00**
Re-alignment Subtotal				$140,000.00
Contingency	LS	30%		$42,000.00
Re-alignment Total				**$182,000.00**



Drawn By: D. BERGERSON Date: 9/1/2017 Checked By: N. STADEM Date: 9/5/2017 Revised:	Figure 3-13	092950W - County Road 17, Fargo, ND Proposed Mitigation	Metro COG / HDR

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4 Trends and Issues

4.1 Hazardous Material Routes

Within the last ten years there has been a significant increase in the transport by rail of crude oil and ethanol in the Northern Plains states. Much of this rail traffic moves in “unit trains,” trains carrying a single commodity (such as crude oil or ethanol) moving intact between origin and destination without intermediate switching or combining with other freight commodities. These trains are referred to as High Hazard Flammable Trains (HHFTs). Derailments and collisions of HHFTs has increased in parallel with the increase in frequency of operation of this type of train. Several major HHFT derailments and collisions have occurred in the U.S., including in the Northern Plains states, which in some cases have included large releases of crude oil and ethanol and subsequent fires. To date in the U.S., one fatality has been attributed to an HHFT derailment or collision, and none to crude oil; however, a major derailment of a crude oil unit train in Canada resulted in multiple fatalities.

In response to the increase in HHFT accidents, the FRA, the Pipeline and Hazardous Materials Safety Administration (PHMSA), and U.S. freight railroads individually and collectively through the Association of American Railroads (AAR) made numerous changes in railroad safety regulations and safety designed to reduce the risk of HHFT derailments and collisions, reduce the risk of impact breach and explosion of tank cars carrying flammable liquids, and improve the response and recovery capability of railroads, and state and local first responders.

Specific to the Fargo-Moorhead area, crude oil shipments by rail from the Bakken Field, many of which pass through Fargo-Moorhead, peaked in late 2014 at approximately 850,000 barrels per day, or approximately 11 HHFT trains daily, and currently is between 2 and 4 HFFT trains per day. This reduction is due to changing market conditions for crude oil. Crude oil transportation by rail is market dependent and future volumes are not predictable with any accuracy.

U.S. railroads are economically regulated by the federal government through the U.S. Surface Transportation Board as common carriers and as such, they must transport any commodity legal for transport that is tendered to them, provided, however, that railroads within a broad limit can establish commercial terms and conditions for transportation services that may render transportation by rail uneconomic for shippers. Economic regulation of goods transported interstate is exclusive to the federal government and states and localities are prohibited by law from enforcing additional regulations. Similarly, the safety of U.S. railroads is regulated by the federal government through the FRA for railroad operations and track and infrastructure safety, and for tank cars by PHMSA. States and localities may enact certain safety regulations provided that they enhance the federal mission and do not inhibit interstate commerce. In practice, state and local regulations are generally limited to being an extension of FRA regulations and are enforced in cooperation with the FRA.

States and localities have enacted effective methods for reducing risk of HHFT accidents, and improving recovery and response. These include:

- Developing cooperative infrastructure improvement programs with railroads to improve track, bridges, and grade crossings, to reduce risk of track- or bridge-caused accidents, grade-crossing collisions with motor vehicles, and programs to install defect detection devices or track and bridge visual and electronic inspections, for earlier detection and repair of defects in track, bridges, and tank cars that could lead to accidents.
- Cooperative programs with railroads to improve safety awareness of motorists at grade crossings.
- Cooperative programs with shippers of crude oil and ethanol to improve tank car inspection for defects that could lead to derailments.
- Cooperative programs with railroads, first responders, and state agencies to improve communication, training, exercises, and response and recovery methods.
- Grade-crossing signal improvement programs and grade-crossing separation and closure programs.

Recommendations

Below is a list of recommended action items for the Metro COG to consider in addressing local emergency preparedness in the event of a hazardous material incident on a rail line within the COG area,

- Local Emergency Planning Committees (LEPC) should actively seek attendance/membership by railroads and shippers.
- Consider developing a HHFT incident response planning committee or Hazmat Task Force to develop guidance and work with LEPCs and emergency management coordinators to develop incident specific response plans.
- Identify ways to improve HHFT incident training, preparedness, and response capabilities for emergency managers and responders.
- Consider conducting a Risk and Vulnerability analysis to identify and map, critical infrastructure and vulnerable populations located within 0.5 mile of all railroad main tracks, HHFT routes, and major yards to determine areas of highest risk.
- Prioritize preparedness, response, or mitigation actions for higher risk areas to reduce the risk and improve response efforts.
- Develop and maintain a response capabilities list/database of all the railroads response capabilities including: equipment caches, location, team training and certification levels, and procedures for activation, deployment, and mobilization.
- Develop and maintain list/database of private contractors operating in the state/region to include capabilities, location, certifications, training, and equipment available to local emergency managers, first responders, and incident responsible parties.
- Identify how railroads are contacted and coordinated with during an incident and share that information with local emergency managers and responders.

4.2 Quiet Zones

A locomotive horn quiet zone is a zone or linear corridor upon which the routine sounding of locomotive horns at crossings is prohibited. The FRA has determined that the audible sounding of locomotive horns as trains approach an at-grade crossing are a warning device, similar to signs, flashers, gates and bells that combined provide warning to motorists and pedestrians. Communities desiring to silence those horns to lessen what some consider being undesirable noise can establish Quiet Zones. The FRA created a rule and provides guidance to communities that allow for the silencing of those horns under normal operations provided that the corridor, or zone, meets certain requirements.

Quiet zones can be established in a number of ways, although each zone must meet a number of minimum requirements. Those requirements are established in Section 222.35 of the Federal Register, Volume 71, Number 159, dated Thursday August 17, 2006:

- Zones must be greater than or equal to one-half mile in length.
- Zones must include active warning devices, consisting of flashing lights, automatic gates and constant warning time circuitry at each crossing. If reasonable and practical, each crossing must also contain power-out indicators.
- Zones must include advance static warning signs on each approach to each crossing. Specifically, these signs shall notify the motorist that train horns are not sounded at the crossing. These signs shall conform to the Manual on Uniform Traffic Control Devices (MUTCD).
- Zones must be equipped with one or more automatic bells.
- All private crossings in the zone must be evaluated by a diagnostic team. Each private crossing must be equipped or treated as recommended by the diagnostic team.
- Sounding of horns at pedestrian crossings is not obligatory unless State Law requires it.
- Each crossing in the zone must be in compliance with the requirements of the MUTCD.

In addition to these minimum requirements, the zone must show that the relative safety of the crossing is not compromised with the silencing of train horns. This is shown through one of three methods.

1. Each crossing within the zone exhibits one or more Supplemental Safety Measures (SSM), defined in the August 17, 2006 Federal Register as “a safety system or procedure…that is determined by the Associate Administrator to be an effective substitute for the locomotive horn in the prevention of highway-rail casualties”.
2. The zone’s Quiet Zone Risk Index (QZRI) falls below the Nationwide Significant Risk Threshold (NSRT) with or without the use of additional safety measures at one or more crossings.
    a. QZRI is defined in the Federal Register as “the measure of risk to the motoring public which reflects the Crossing Corridor Risk Index for a quiet zone, after an

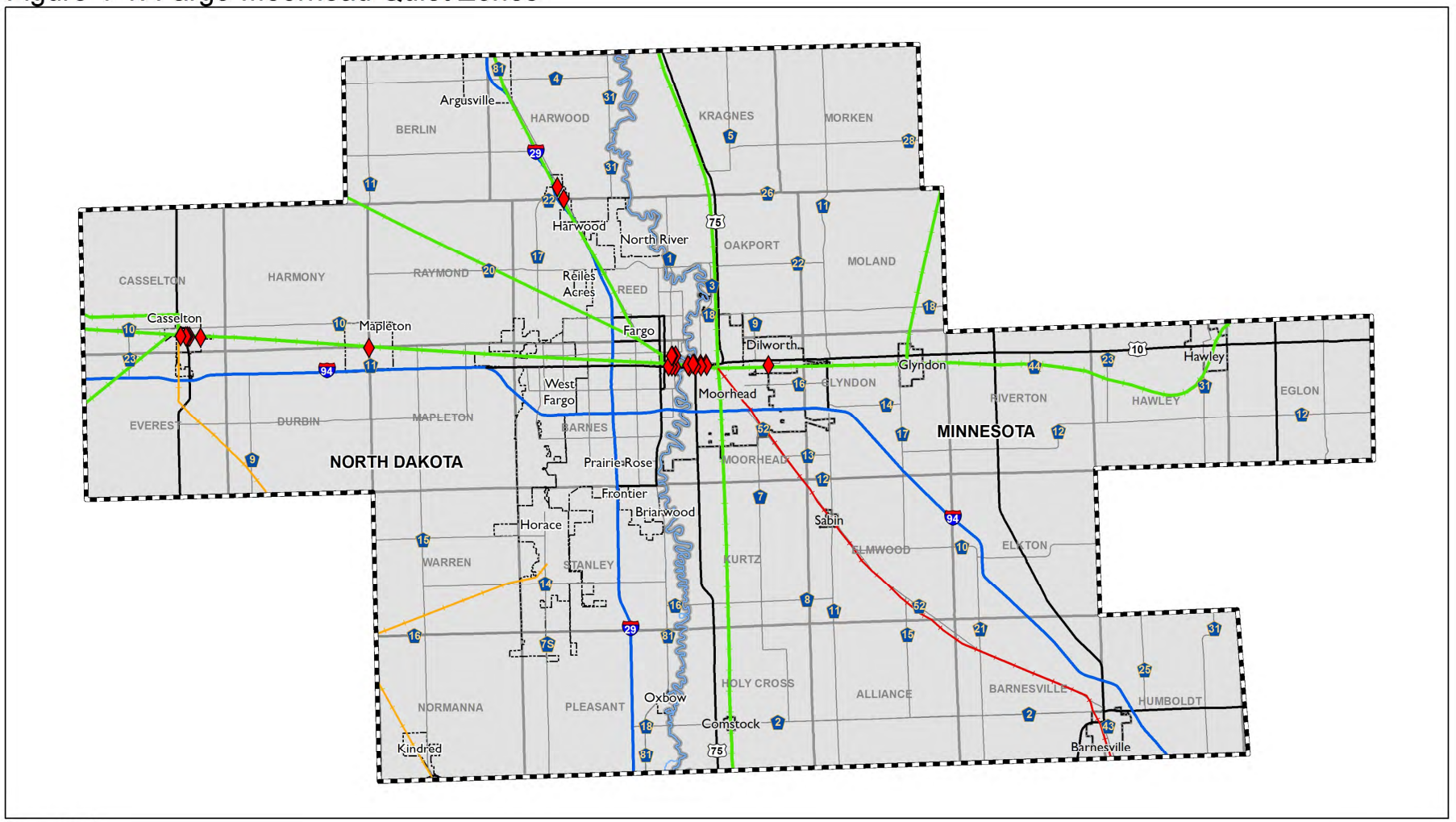
adjustment ti account for increased risk due to lack of locomotive horn use at the crossings within the zone and reduced risk due to implementation, if any, of SSM's and ASM's with the quiet zone".

b. NSRT is defined in the Federal Register as "a number reflecting a measure of risk, calculated on a nationwide basis, which reflects the average level or risk to the motoring public at public highway-rail grade crossings equipped with flashing lights and gates at which locomotive horns are sounded".

3. Safety measures are provided at one or more crossings, which brings the QZRI below the Risk Index with Horns.

According to the FRA database, there are 24 crossings within quiet zones in the FM Metro COG area, as shown in Figure 4-1. Fargo-Moorhead Quiet Zones.

Figure 4-1. Fargo-Moorhead Quiet Zones



Legend

- Quiet Zones*
- COG Area
- City
- County Boundary
- BNSF Railroad
- OTVR Railroad
- RRVW Railroad
- Red River

* All quiet zone data was taken from the FRA database

N

0 4 8 Miles

It should be noted that the establishment of quiet zones does not entirely eliminate the sounding of locomotive horns. Locomotive engineers will continue to sound the horn when he or she has reason to believe that they are appropriate or required by operating rules. Examples of this would include pedestrians or trespassers near the track outside of the crossing areas, pedestrians at the crossing who appear to be distracted, motorists fouling the track or ignoring warning devices, and to alert railroad workers alongside of the track.

Recommendations

Although the measures used to establish a quiet zone are primarily driven by the desire to silence the horns, these measures serve to enhance the visibility of the warning devices to the traveling public and tend to reduce the risky behaviors that some motorists take by driving around gates to avoid what is anticipated to be a lengthy wait while stopped for a passing train. It is our recommendation that whenever crossings are improved or warning devices enhanced at crossings within the study area, they should be done in such a way to qualify for future establishment of a quiet zone. Additionally, this treatment will enhance motorist awareness of crossing safety and result in a “safer” crossing.

4.3 ENS Signs

Following several high profile crossing incidents and collisions in which trucks or equipment became stuck or disabled at a crossing and responders, including emergency responders, failed to notify the railroad of the situation, the FRA created a rule that requires operating railroads to have an Emergency Notification System (ENS) in place, including signage at each crossing. The purpose of the ENS sign is to provide the public with critical emergency contact information in the event of an emergency. These signs are posted at every highway-rail grade crossing. The information contained on the ENS sign enables the public to reach the railroad responsible for the crossing and to identify the specific crossing in the event of an emergency.

Each at-grade crossing within the FMCOG study area is required to have such a sign prominently displayed. Those requirements are established in Section 234.307 of the Federal Register, dated Thursday June 12, 2012:

Emergency Notification System means a system in place by which a railroad receives, processes, and responds to telephonic reports of an unsafe condition at a highway-rail or pathway grade crossing. An Emergency Notification System includes the following components:

1. The signs, placed and maintained at the grade crossings that display the information necessary for the public to report an unsafe condition at the grade crossing to the dispatching railroad by telephone;
2. The method that the railroad uses to receive and process a telephone call reporting the unsafe condition;
3. The remedial actions that a railroad takes to address the report of the unsafe condition; and

4. The recordkeeping conducted by a railroad in response to the report of the unsafe condition at the grade crossing.

INFORMATION TO BE DISPLAYED

Each ENS sign located at each highway-rail or pathway grade crossing as required by §234.311 shall display the necessary information for the dispatching railroad to receive reports of unsafe conditions at the crossing. This information, at a minimum, includes the following:

- The toll-free telephone number
- An explanation of the purpose of the sign (e.g., “Report emergency or problem to __”); and
- The U.S. DOT National Crossing Inventory number assigned to that crossing.

SIGN SIZE AND OTHER PHYSICAL FEATURES.

Each ENS sign shall:

- Measure at least 12 inches wide by 9 inches high;
- Be retroreflective;
- Have legible text (i.e., letters and numerals) with a minimum character height of 1 inch for the information required in paragraph (b) of this section; and
- Have white text set on a blue background with a white border, except that the U.S. DOT National Crossing Inventory number may be black text set on a white rectangular background.

Recommendations

Our recommendations are that the existence and purpose of these signs be communicated to those that would primarily benefit. This could include general safety awareness campaigns and more targeted information provided to those that are likely to arrive at crossings where prompt contact with the operating railroad’s train dispatchers is necessary. It is important for those that are responsible for emergency response and establishing a safety perimeter around an incident to know that the zone will be free from passing trains. These responders would include emergency medical responders, tow truck operators, bus drivers, law enforcement, and city, county and state roadway workers. It is important for them to know how to efficiently and quickly contact the railroad when needed.

4.4 Trespassers and Pedestrians

Nationwide In 2016 there were 787 fatalities in the entire rail industry. Sixty-two percent of those fatalities were trains striking trespassers, 34 percent were either trains striking vehicles or vehicles running into trains at at-grade crossings, and the remaining 6 percent were rail employees, passengers on trains, or others not included above. Historically funding and promoting of rail safety has been focused on reducing accidents between vehicles and trains and this effort has been quite successful. Crossing accidents (of which fatalities is a subset) have decreased by 23 percent over the last 10

years while trespass accidents have risen. The current focus of the FRA and rail safety advocates such as Operation Lifesaver are shifting more towards addressing and hopefully reducing this upward trend in trespasser safety. Note that trespass fatalities do not include pedestrians struck at pedestrian crossings but alongside of the tracks on railroad rights of way. The distinction between the two is that Pedestrians are those at controlled locations where they belong and Trespassers who are on railroad rights of way where they should not be.

Recommendations

Pedestrian safety can be improved with enhanced signage, lights, gates and bells which can be more easily seen and heard by those on foot or bicycle. Another approach is to physically direct and control pedestrian movement as they cross the tracks. This can be done with "Z" fencing which forces a pedestrian to dismount a bicycle and/or requires them to focus and pay attention as they travel thru the "Z". The purpose of both of these approaches is the same; provide enhanced visual and audio warning devices, clear visibility of the track zone, and force those who are not paying attention to focus on crossing the tracks safely. Crossing and sidewalk improvements where pedestrians are anticipated should be an integral part of planning those improvements.

Trespasser safety is more difficult to control and is primarily a function of identifying problematic areas within the Metro COG area and then educating the trespassers individually or targeting student or other demographic groups for education. Law enforcement should include these areas on their normal patrols and stop, talk to, and address the safety concerns with observed trespassers. We also recommend establishing a dialog with the local railroad safety officers and public coordinators who will appreciate the effort and willingly cooperate with you to jointly address this issue.

4.5 Signal Timing

Main Avenue and Center Avenue (also known as Trunk Highway 10) are east-west arterials through the Moorhead, MN downtown area with the BNSF track located between the two streets. The downtown includes five streets that connect Main Avenue and Center Avenue, each with an at-grade crossing at the BNSF track. The streets that cross the BNSF tracks are:

- 4th Street South
- 5th Street South
- 8th Street South
- 11th Street South
- 14th Street South

Between 4th Street S and 14th Street S, the volumes along Center Avenue range from 7100 to 9600 vehicles per day (vpd) while Main Avenue has daily volumes that range from 9500 to 16,600 vpd. Volumes of the streets crossing the BNSF track are 1400 to 3900 vpd, except for 8th Street S with a reported 10,000 vpd crossing the tracks.

Along Main Avenue and Center Avenue, the intersections with the streets crossing the BNSF tracks are all signalized with a pretimed preemption plan that is called when a train

travels through the downtown. The common approach to operating traffic signals with railroad preemption is summarized by MnDOT in their 2015 Traffic Engineering Manual:

If a signalized intersection is near a railroad crossing, the traffic control signals may have a preemption system connected with the railway approach signal system that allows vehicles to safely clear the railroad tracks, and modifies the operation of the signal to allow traffic movements that do not conflict with the train while it is present. (SOURCE: 2015 TRAFFIC ENGINEERING MANUAL. MINNESOTA DEPARTMENT OF TRANSPORTATION, CHAPTER 9 – TRAFFIC SIGNALS, LAST UPDATE APRIL 2017.)

Through special permission granted by MnDOT in 2008 (see Appendix F – City of Moorhead Preemption Documentation), the railroad preemption in downtown Moorhead allows all movements at the intersections, including movements towards the rail grade crossing. The request was sponsored by the business leaders that are located between the railroad tracks and Main Avenue or Center Avenue. Without the special operation of the railroad preemption, the business leaders' concerns were that customers would not be able to reach their access when a train is traveling through the area.

While operating the signals in this manner, the City staff observed that the queue from the railroad crossing will extend into the intersection. The queue typically blocks only a single lane, but longer vehicles have been known to block multiple lanes. While City staff are not aware of any crashes that resulted from queues into the intersection, the behavior presents a greater potential for a crash. Furthermore, stopped vehicles also block the crosswalk at the signals which can create difficulties for pedestrians crossing the intersection.

Recommendations

Two countermeasures have been identified for the City as potential solutions to the observed behavior. The treatments can be used together or separately. The suggestions include:

- Because the queues extending into the intersection are most commonly observed during the peak period, an option is to operate the traffic signals with a different preemption plan during the peak period. In order to operate a signal with different time-of-day railroad preemptions, updated signal controllers or update to the controller software will be required. This change to the signal timing is anticipated to have minimal impact to businesses since most business located between Main Avenue and Center Avenue also have access directly to either Main or Center Avenue.
- Do Not Block Intersection markings with appropriate signing can be used to delineate the area vehicles should not stop. The treatment relies on drivers' voluntary compliance with the markings; therefore, it is not effective in all instances.

5 Economic Considerations

The funding opportunities listed in this report are those that are found to be most relevant for the scope of at-grade crossing safety within the FM Metro COG area:

- State Funds and Federal Funds Administered by Minnesota
- State Funds and Federal Funds Administered by North Dakota
- Nationally Significant Freight and Highway Project (FASTLANE)
- Infrastructure for Rebuilding America (INFRA)
- Transportation Investment Generating Economic Recovery (TIGER)
- Transportation Infrastructure Finance and Innovation Act (TIFIA)
- Railroad Rehabilitation and Improvement Financing (RRIF)
- BNSF Crossing Closure

This report summarizes the project description, eligibility requirements, evaluation criteria, and application process for the listed programs.

5.1 State Funds and Federal-Source Funds Administered by the State - Minnesota

MnDOT administers and manages the state railroad-highway grade crossings improvement program. The FRA maintains an inventory of public crossing. However, MnDOT is expected to provide updates to the information about the crossings and conduct regular reviews of crossings to identify safety concerns and cost-effective mitigation measures that could be implemented within the budgetary allocations. The program is financed primarily through federal aid funds channeled to state agencies (including Minnesota) as well as state funds which may be coming from the general revenues, bond issues, special tax assessments, and other sources.

5.1.1 Section 130 Program (Title 23 of United States Code (USC) Section 130)

Title 23 of USC Section 130 provides funding to states annually for the elimination of hazards at highway-railway crossings. The funding is an annual set-aside for railway-highway crossing improvements under 23 USC 130(e). The funds are set-aside from the Highway Safety Improvement Program (HSIP) apportionment. The total annual amount of funding amounts to about $6 million and is projected to increase to about $6.6 million by 2020.[1]

Section 103 Grade Crossing Safety Program provides federal grants through the Fixing America's Surface Transportation Act (FAST Act) for the elimination of hazards at

[1] FHWA, spreadsheet summary of apportioned funds by state https://safety.fhwa.dot.gov/hsip/xings/.

railway-highway crossings.[2] The funds are set-aside from the Highway Safety Improvement Program (HSIP) apportionment. The Section 130 program funds are eligible for projects at all public crossings including roadways, bike trails and pedestrian paths. Half of a state's apportionment is dedicated for the installation of protective devices at crossings (which are covered at 90% by the funds). The remainder of the funds apportionment can be used for any hazard elimination project, including protective devices.[3] Also, up to 2 percent of the Section 130 funding may be used for compilation and analysis of data to support the reporting requirements.

The following types of projects are eligible for funding under this program:[4]

- Various types of signals and signal upgrades;
- Crossing closures and consolidations;
- Improving sight conditions by removal of visual obstructions, and
- Improving roadway geometrics and/or grades.

Grade crossing surface improvements, or surface improvements on approach roads are not eligible for funding under this program; it is expected that the local authorities would provide funding for this aspect of the improvements.

Specific candidate crossings for improvements are identified in a number of ways including

- Project solicitation from local road authorities and railroads as part of the annual State Transportation Improvement Program (STIP) development process.
- Requests from local authorities or railways.
- Department's staff own knowledge of various crossings and their issues.

Identified crossings are prioritized and entered in a queue of projects. HDR understands that as of Summer 2017, funds have been committed until 2021.[5] Solicitation letters will likely be sent to local road authorities and government agencies this fall for funding requests for projects planned in 2021 and beyond. Projects funded through this program will have a 90-10 split, with 10% of the funding expected to come from the project sponsor (typically, the local road authority or government agency). Successful projects tend to fall under the following categories:

- Upgrade passive warning devices to active/gates
- Crossings with high roadway or train traffic volumes
- Crossings exhibiting a growth in roadway or train volumes
- Crossings with multiple high risk factors present

[2] http://www.dot.state.mn.us/congressional/d4/freight.html

[3] https://safety.fhwa.dot.gov/hsip/xings/

[4] Minnesota Department of Transportation, Office of Freight and Commercial Vehicle Operations, Rail Administration, "Railroad–Highway Grade Crossing Safety Improvement Program Project Development Process"; http://www.dot.state.mn.us/ofrw/PDF/projectdevelopmentprocess.pdf.

[5] Based on communications with MnDOT.

5.1.2 Grade Crossing Safety Account Program

A Minnesota Grade Crossing Safety Account (Minnesota Statutes Section 219.1651) is created in the special revenue fund, consisting of money credited to the account by law. Money in the account is appropriated to the commissioner of transportation for rail-highway grade crossing safety projects on public streets and highways, including engineering costs.[6]

The state Grade Crossing Safety Account Program provides state funding for smaller projects to enhance safety at highway-rail grade crossings. Projects funded through this program typically have total capital costs below $100,000, and demonstrate noticeable safety improvements through “spot” upgrades. Projects include circuitry upgrades, minor roadway geometric changes, vegetation removal, and LED light replacement.[7]

MnDOT Districts 1 & 4 (which include the Study area) typically have $250,000 per year to distribute for these projects. Inquires should be made to the MnDOT District Office or District Project Manager at the Office of Freight and Commercial Vehicles.

5.1.3 Antiquated Equipment Replacement Program

The Minnesota state Antiquated Equipment Replacement Program provides state funding to replace obsolete warning and signal systems at selected grade crossings. This program is a supplement to the federal set-aside which is not sufficient to cover all grade crossings safety needs in the state. Funding is provided from state general obligation bonds. Over the fiscal years 2010-2015, the Minnesota Legislature appropriated annually $2 to $5 million of general obligation bonds for this program. For fiscal year 2017, the appropriation amounted to $1 million. [8]

In addition to this funding, the program receives $1,000,000 annually from the Minnesota Grade Crossing Safety Account in the special revenue fund. This account is used for smaller safety improvements at crossings such as circuitry upgrades.

5.1.4 Other Funding

Other funding from special programs and initiatives may be available from time to time. For example, in March 2015 governor Dayton proposed a Railway Safety Improvements investment package of about $330 million over 10 years. The package was envisioned for funding of safety improvements at 75 grade crossings across the state, grade separations at four major crossings, as well as implementation of quiet zones in communities along busy rail lines, training for emergency managers and first

[6] The Office of the Revisor of Statutes, 2016 Minnesota Statutes; https://www.revisor.mn.gov/statutes/?id=219.1651

[7] Congressional Transportation Status Reports; Freight, Rail and Waterways Sections; http://www.dot.state.mn.us/congressional/d4/freight.html.

[8] Based on State of Minnesota capital budget requests documents.

responders.[9] This proposal called for funding from a combination of assessments on the four largest railroads that operate in Minnesota, state general obligation bonds, and increases to taxes paid by railroads. This proposal was, however, not approved

5.2 State Funds and Federal-Source Funds Administered by the State – North Dakota

Similarly as in Minnesota, NDDOT administers the state Railroad-Highway Crossings Safety Program with the purpose to reduce the number of crashes at public crossings.

As for Minnesota, the key sources of funding are federal funds apportioned through Section 130 (as outlined below). Other sources of funding are rather small.

5.2.1 Section 130 Program (Title 23 of United States Code (USC) Section 130)

Similarly to Minnesota, North Dakota receives federal funding through Title 23 of USC Section 130 for the elimination of hazards at highway-railway crossings. The funds received are subject to similar rules and project eligibility criteria. The amount of funds received in fiscal year 2016 was $3.7 million. Funding is projected to increase to about $4.1 million by 2020.[10]

Specific crossing improvements are determined in a consensus-style manner by a diagnostic team comprised of representatives of the local road authority, operating railroad and the NDDOT. All on-site diagnostic reviews conclude with a consensus decision to implement appropriate safety enhancements. The cost-sharing ratio to install or upgrade a protective device is 90 percent federal and 10 percent local highway authority. If the project is on a township road or in a city of less than 5,000 population, the county is also asked to assist with the local match.[11]

5.2.2 House Bill 102

The 62nd state legislature passed House Bill 102 which amends and reenacts section 57-43.2-19 of the North Dakota Century Code. The amendment provides funding of up to $230,000 that may be used by the Department of Transportation for additional highway-rail grade crossing safety projects. [12]

Beginning in 2011, political subdivisions (such as a city, county, or township) may apply for grants as well. There is an application procedure with an application form that has to be submitted to NDDOT and processed in the order of receipt.

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[9] Office of Governor Mike Dayton and Lt. Governor Tina Smith, March 15, 2015; https://mn.gov/governor/blog/?id=1055-91303

[10] FHWA, spreadsheet summary of apportioned funds by state https://safety.fhwa.dot.gov/hsip/xings/.

[11] Based on: North Dakota department of Transportation, “2040 North Dakota State Rail Plan, Draft Plan”, May 2017, Section 1.10.2.

[12] See application form and background information https://www.dot.nd.gov/forms/SFN59141.pdf.

Grant applicants must provide 10% matching funds for the project costs although no local matching funds are required for a highway-rail grade crossing on a state highway. Grants for a single crossing may not exceed $80,000 and grants for all crossings within a city may not exceed a cumulative amount of $80,000.

Applications are prioritized based on their score from FRAs Accident Prediction System and award grants are provided as fund availability permits.

5.3 Federal Funds – Both States

The federal government operates a few programs that offer funding, mostly grants, for infrastructure projects of national and regional significance. Applicants typically include a state or group of states, metropolitan planning organizations, local governments, tribal governments, and other organizations that may be responsible for some infrastructure and thus have vested interest in infrastructure projects.

Funding is awarded on a competitive basis after a comprehensive review of applications and based on criteria that include project technical feasibility, expected socio-economic outcomes, and readiness for implementation.

These programs are typically envisioned for larger projects with total capital costs in the range of several million dollars. Therefore, most grade crossing safety improvements projects will likely be too small to be eligible, except perhaps for grade separation projects. Also the grants are typically offered only for a share of total project costs and require certain co-share from non-federal (such as local) sources of funds. Below is a brief overview of programs which may be applicable to grade crossings safety improvements projects.

5.3.1 Nationally Significant Freight and Highway Projects (FASTLANE)

This federal grant is meant to provide financial assistance to nationally and regionally significant freight and highway projects that align with the program goals to improve safety, efficiency, and the reliability of the movement of freight and people. Although the FASTLANE program has been replaced by another Federal program, information specific to FASTLANE is provided here for reference purposes as general information regarding eligibility and conditions of federally funded aid programs. The previous version of the grant offered $4.5 billion in assistance from 2016-2020 including $800 million for 2016 from the FAST Act. The application deadline for 2016 Fiscal Year (FY) round of applications was June 1, 2016. For FY 2017, this program was effectively replaced by the INFRA Grants program described next. It is possible that a program similar to the FASTLANE grant with similar eligibility may be made available in the future, contingent on the Federal government funding future versions of the program.

For the 2016 FY opportunities, eligible projects included the following:

- Highway freight projects on the national highway freight network
- Highway or bridge projects on the national highway system including in the national scenic area or meant to add capacity to improve mobility

- Highway grade crossing or grade separation project
- Freight project that is intermodal or freight rail project within boundaries of public or private rail, water or intermodal facility and is necessary to facilitate direct intermodal interchange, transfer or access into or out of the facility or will make significant improvement on the national highway freight network

The project should demonstrate a range of characteristics indicative of its importance to the regional and national transportation of freight and people, for example potential for reduction in bottlenecks, or for improvements in the safety, efficiency, and reliability of transportation.

The grants were divided into those intended for large projects and small projects. 10% of funding was set aside for small projects. 25% of funding was set aside for rural projects defined as those in an area outside an urbanized area with a population of over 200,000.

The minimum size of a large project was set at $100 million for most states and about $50 million in smaller states. There was no minimum size of a small project. However, the minimum grant award was set at $25 million for large projects and $5 million for small projects. For all projects, federal funding from this grant can't exceed 60% of the total eligible project costs and only an additional 20% can come from other sources of federal funding.

5.3.2 Infrastructure for Rebuilding America (INFRA)

The INFRA program provides dedicated, discretionary funding for projects that address critical issues facing highways and bridges.

The INFRA grant program is authorized as the Nationally Significant Freight and Highway Projects program. The INFRA grants were formerly referred to as Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies (FASTLANE) grants. Therefore, this program effectively replaces FASTLANE grants discussed earlier. The FY 2017 funding opportunity was announced August 2, 2017 with the application deadline on November 2, 2017.

INFRA utilizes updated criteria with a key focus on

- Supporting regional and national economic vitality (e.g. reduction in crashes, elimination of bottlenecks, reduction in barriers separating workers from employment centers)
- Leveraging of federal funding
- Potential for innovation in the project delivery and permitting processes, including public-private partnerships

Eligible projects for INFRA grants are: Highway freight projects carried out on the National Highway Freight Network (23 U.S.C. 167); highway or bridge projects carried out on the National Highway System (NHS), including projects that add capacity on the Interstate System to improve mobility or projects in a national scenic area; railway-highway grade crossing or grade separation projects; or a freight project that is (1) an intermodal or rail project, or (2) within the boundaries of a public or private freight rail, water (including ports), or intermodal facility.

The minimum size of a large project is $100 million for most states and about $50 million in smaller states. There is no minimum size of a small project. The minimum grant award was set at $25 million for large projects and $5 million for small projects. For all projects, federal funding from this grant can't exceed 60% of the total eligible project costs and only an additional 20% can come from other sources of federal funding.

INFRA grants may be used for up to 60 percent of future eligible project costs. Other Federal assistance may satisfy the non-Federal share requirement for an INFRA grant, but total Federal assistance for a project receiving an INFRA grant may not exceed 80 percent of the future eligible project costs. Non-Federal sources include State funds originating from programs funded by State revenue, local funds originating from State or local revenue-funded programs, private funds or other funding sources of non-Federal origins.

5.3.3 Transportation Investment Generating Economic Recovery Grants (TIGER)

The Transportation Investment Generating Economic Recovery (TIGER) grant is to be used to fund capital investments in surface transportation infrastructure that will have a significant impact on the nation, a region, or a metropolitan area. This grant will recognize projects that advance key transportation goals such as safety, innovation, and opportunity. The funding is allocated to transit (28.5%), Planning (1.3%), Rail (21.4%), Road (32.7%), Bicycle and Pedestrian (4.6%) and Port (11.4%).

The TIGER grants opportunity been through seven rounds since 2009, providing funding to a total of 381 applications requesting $4.6 billion. The 2017 FY funding opportunity was announced on September 6, 2017 with the application deadline on October 16, 2017.

The range of eligible projects is similar to that in previous rounds of TIGER and includes:

- Highway or bridge projects eligible under title 23
- Public transportation projects eligible under chapter 53 of title 49, US code
- Port infrastructure investments (including inland port infrastructure and land ports of entry)
- Intermodal projects
- Passenger and freight rail transportation projects

Per the FY 2017 Appropriations Act, TIGER Discretionary Grants may be used for up to 80 percent of a project located in an urban area and up to 100 percent of the costs of a project located in a rural area (defined as areas outside an Urbanized Area as designated by the US Census Bureau).

The FY 2017 Appropriations Act specifies that TIGER Discretionary Grants may not be less than $5 million and not greater than $25 million, except that for projects located in rural areas (as defined in Section C.3.ii.) the minimum TIGER Discretionary Grant size is $1 million.

The applicants are evaluated based on the following criteria grouped into primary and secondary criteria.

Primary selection criteria include

- Improved safety
- Economic competitiveness
- State of good repair
- Quality of life
- Environmental Sustainability

Secondary selection criteria include:

- Innovation
- Partnerships

Applicants must demonstrate the responsiveness of a project to pertinent selection criteria with the most relevant information that they can provide, regardless of whether that information has been specifically requested or identified in the notice.

Applicants must also provide evidence of the feasibility of reaching project milestones, financial capacity and commitment in order to support project readiness.

5.3.4 Transportation Infrastructure Finance and Innovation Act (TIFIA)

The TIFIA provides direct loans, loan guarantees and standby lines of credit to finance surface transportation projects of national and regional significance. Eligible applicants include state and local governments, transit agencies, railroad companies, special authorities, special districts, and private entities. The TIFIA credit program is designed to fill market gaps and leverage substantial private co-investment by providing supplemental and subordinate capital, often on more advantageous terms than in the financial market.

This program provides support to following projects:

- Any type of project eligible for federal assistance through existing surface transportation programs is eligible
- International bridges and tunnels
- Intercity passenger bus and rail facilities and vehicles
- Publicly owned freight rail facilities
- Private facilities providing public benefit for highway uses
- Intermodal freight transfer facilities or projects providing access to such facilities
- Service improvements on or adjacent to the national highway system and projects located within the boundary of a port terminal under certain conditions

An eligible project must be included in the applicable State Transportation Improvement Program. Major requirements include a capital cost of at least $50 million (or 33.3

percent of a state's annual apportionment of Federal-aid funds, whichever is less) or $15 million in the case of ITS. TIFIA credit assistance is limited to a maximum of 33 percent of the total eligible project costs. Senior debt must be rated investment grade. The project also must be supported in whole or in part from user charges or other non-Federal dedicated funding sources and be included in the state's transportation plan

The US Department of Transportation notes that the Fixing America's Surface Transportation (FAST) Act included substantive changes to the TIFIA program as well as the RRIF program discussed below. As of the time of writing this report, the Department is working to implement these changes. The Department advises that during the transition period, TIFIA and RRIF remain open for applications, and potential applicants interested in the programs should proceed under existing program guidance. [13]

5.3.5 Railroad Rehabilitation and Improvement Financing (RRIF)

The RRIF program was established by the Transportation Equity Act for the 21st Century (TEA-21) and amended by the Safe Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) .This program provides direct loans and load guarantees up to $35 billion to finance the development of railroad infrastructure. Priority is given to those that provide public benefits, including benefits to public safety, the environment, and economic development. Not less than $7.0 billion is reserved for projects benefiting freight railroads other than Class I carriers. Direct loans can be used to finance up to 100% of a railroad project with repayment periods up to 35 years and interest rates equal to the government cost of borrowing.

Eligible borrowers include railroads, state and local governments, government-sponsored authorities and corporations, joint ventures that include at least one railroad, and limited option freight shippers who intend to construct a new rail connection.

The funding may be used to:

- Acquire, improve, or rehabilitate intermodal or rail equipment or facilities, including track, components of track, bridges, yards, buildings and shops
- Refinance outstanding debt incurred for the purposes listed above
- Develop or establish new intermodal or railroad facilities

As noted under the TIFIA program in the previous section, the RRIF program is currently being revised but remains open to applicants under the current program guidance.

5.3.6 BNSF Crossing Closure

The BNSF, similar to other class I railroads, has the ability to offer funding for grade crossing improvements; typically as part of a larger program that would also include crossing closures in an effort to reduce the total number of at-grade crossings on their system. In addition, they also offer reimbursements to local government agencies for the stand-alone closure of public crossings. The amount received will vary by crossing and location and is subject to the terms of the closure agreement.

[13] See https://www.transportation.gov/buildamerica/programs-services/rrif.

Inquiries into BNSF's crossing closure program should be made to the local Manager of Public Projects.

5.4 Funding Summary

Table 5-1. Third Level Crossings Summary provides a summary of the ten Third Level crossings, with the recommended mitigation measure and budgetary cost estimate. For each of the ten crossings, potential funding sources are noted based on the scope of the mitigation project, potential project costs, and project location.

Table 5-1. Third Level Crossings Summary

Crossing and Location	Recommendation Mitigation	Budgetary Cost Estimate	Section 130 Grade Crossing Safety Program - Minnesota	Grade Crossing Safety Account Program - Minnesota	Antiquated Equipment Replacement Program - Minnesota	Section 130 Grade Crossing Safety Program - North Dakota	House Bill 102 - North Dakota	INFRA/TIGER - Federal	BNSF Crossing Closure
Pedestrian Crossing – Hawley, MN	Upgrade pedestrian crossing surface and approach with pedestrian maze.	$66,000 (ped maze option)		X					
Parke Ave – Glyndon, MN	Upgrade crossing with non-mountable median or 4-quad gates. Update adjacent sidewalk with pedestrian maze.	$85,000 (median with ped maze option)	X	X					X (if Partridge Closure pursued)
12th Ave S – Moorhead, MN	Upgrade with 4-quad gates or combination gates and median.	$770,000 (3-quad with median option)	X	X				Would be a consideration if railroad yard relocation is pursued in the future	
1st Ave N – Moorhead, MN	Add gates to existing active warning devices.	$260,000	x		X				
50th St S - Sabin, MN (and other crossings on CR 52 corridor)	Additional advance warning signage with warning beacon.	$30,000		X					
S Main St – Dilworth, MN	Upgrade crossing surface and existing medians.	$36,000	X	X				Would be a consideration if grade separation is pursued in the future	
1st St – Sabin, MN	Add STOP sign to westbound approach.	$1,300		X					
Partridge Ave – Glyndon, MN	Close crossing in conjunction with Parke Ave upgrades OR upgrade crossing non-mountable median or 4-quad gates.	$47,000 (median option)	X	X					X (if Partridge Closure pursued)
230th Ave – Hawley, MN	Improve warning device visibility. Upgrade crossing with 4-quad gates and traffic control barriers for 17th Ave intersection.	$133,000 (cantilever option)	X						
CR-17 – Fargo, ND	Realign 32nd Ave east approach OR upgrade crossing with 4-quad gates and traffic control barriers for 32nd Ave east approach.	$182,000 (re-alignment option)				X	X		

6 Appendices

Appendix A – FRA Formulas

Appendix B – First Level Screening Results

Appendix C – Second Level Screening Field Review Forms

Appendix D – School Bus Crossing Regulations and Guidelines

Appendix E – Second Level Screening Results

Appendix F – City of Moorhead Preemption Documentation

6.1 Appendix A – FRA Formulas

From the Railroad-Highway Grade Crossing Handbook - Revised Second Edition August 2007

http://safety.fhwa.dot.gov/xings/com_roaduser/07010/sec03.htm

Initial Collision Prediction

$a = K \times EI \times MT \times DT \times HP \times MS \times HT \times HL$ (1)

where:

a = initial collision prediction, collisions per year at the crossing

K = formula constant

EI = factor for exposure index based on product of highway and train traffic

MT = factor for number of main tracks

DT = factor for number of through trains per day during daylight

HP = factor for highway paved (yes or no)

MS = factor for maximum timetable speed

HT = factor for highway type

HL = factor for number of highway lanes

Different sets of equations are used for each of the three categories of traffic control devices: passive, flashing lights, and automatic gates, as shown in Table 16.

The structure of the basic collision prediction formula makes it possible to construct tables of numerical values for each factor. To predict the collisions at a particular crossing whose characteristics are known, the values of the factors are found in the table and multiplied together. The factor values for the three traffic control device categories are found in Tables 17, 18, and 19, respectively.

Table 16. U.S. DOT Collision Prediction Equations for Crossing Characteristic Factors

Crossing Characteristic Factors

Crossing Category	Formula Constant K	Exposure Index Factor EI	Main Tracks Factor MT	Day Thru Trains Factor DT	Highway Paved Factor HP	Maximum Speed Factor MS	Highway Type Factor HT	Highway Lanes Factor HL
Passive	0.002268	$\frac{c \times t + 0.2}{0.2}^{0.2334}$	$e^{0.2004mt}$	$\frac{d + 0.2}{0.2}^{0.1330}$	$e^{0.6160(hp-1)}$	$e^{0.0077ms}$	$e^{-0.1000(ht-1)}$	1.0
Flashing Lights	0.003646	$\frac{c \times t + 0.2}{0.2}^{0.2953}$	$e^{0.1090mt}$	$\frac{d + 0.2}{0.2}^{0.0470}$	1.0	1.0	1.0	$e^{0.1380(hl-1)}$
Gates	0.001088	$\frac{c \times t + 0.2}{0.2}^{0.3118}$	$e^{0.2912mt}$	1.0	1.0	1.0	1.0	$e^{0.1030(hl-1)}$

c = annual average number of highway vehicles per day (total both directions)
t = average total train movements per day
mt = number of main tracks
d = average number of thru trains per day during daylight
hp = highway paved, yes = 1.0, no = 2.0
ms = maximum timetable speed, mph
ht = highway type factor value
hl = number of highway lanes

Final Collision Prediction

$$B = \frac{T_0}{T_0 + T}(a) + \frac{T}{T_0 + T}\left(\frac{N}{T}\right) \qquad (2)$$

where:

B = second collision prediction, collisions per year at the crossing

a = initial collision prediction from basic formula, collisions per year at the crossing

N/T = collision history prediction, collisions per year, where N is the number of observed collisions in T years at the crossing

T_0 = Formula weighting factor,

$$T_0 = \frac{1.0}{(0.05 + a)}$$

The formula provides the most accurate results if all the collision history available is used; however, the extent of improvement is minimal if data for more than five years are used. Collision history information older than five years may be misleading because of changes that occur to crossing characteristics over time. If a significant change has occurred to a crossing during the most recent five years, such as the installation of signals, only the collision data since that change should be used.

The final collision prediction, A, is developed by applying a normalizing constant to keep the procedure matched with current collision trends. The final formula, using constants established for 2003, is shown on page 60. (As of November 2003, these new constants will be in the Personal Computer Accident Prediction System software and an Internet version of the Highway-Rail Crossing Web Accident Prediction System located on the FRA Website.[56])

$$A = Normalizing\ Constant \times B$$

Normalizing Constants	
Passive	0.5086
Flashing Lights	0.3106
Gates	0.4846

where:
A = Final Collision Prediction

Normalizing constants are occassionally updated by the FRA. 2013 is the most recent update, and was used in this study, but they indicated they intend to send out a 2016 update shortly.
The purpose of the Normalizing Constant is to force the summation of all of the predicited accidents to equal what actually occurred. These numbers change over time.

6.2 Appendix B – First Level Screening Results

FM Metro COG Regional Railroad Crossing Safety Study
First Level Screening Results

= Maxed Out Devices, Grade Separation Candidate, or *Low Concern

Adjusted Rank	Rank	Crossing ID	Railroad	Street	City	State	Existing Warning Device (from FRA)	A, FRA Final Collision Prediction x1000	B, Hospital, Firestation, EMS Station within 0.25 mile	C, School within 0.25 mile	D, Transit Route (Bus Route)	E, Roadway Speed > 30 mph	F, Passenger Rail (Amtrak) Route	G, Roadway Skewed to Track	H, Roadway Intersection within 200 ft	First Level Screening Result
	1	070809N	BNSF	BROADWAY	FARGO	ND	Four Quad Gates	93.55	20	25	0	0	0	0	20	159
	2	070807A	BNSF	4TH ST N	FARGO	ND	Four Quad Gates	47.40	20	25	20	0	0	0	20	132
	3	062923T	BNSF	20TH ST S MAIN	MOORHEAD	MN	Flashing Lights w/Medians	80.31	0	0	20	0	0	10	20	130
	4	062930D	BNSF	11TH ST N	MOORHEAD	MN	Gates w/Medians	35.13	20	25	0	0	25	0	20	125
1	5	062920X	BNSF	PARKE AVE S	GLYNDON	MN	Gates	31.99	20	25	0	0	25	0	20	122
	6	070837S	BNSF	BROADWAY	FARGO	ND	Four Quad Gates	29.61	20	25	20	0	25	0	0	120
2	7	062909X	BNSF	PARTRIDGE AV	GLYNDON	MN	Gates	27.92	20	25	0	0	25	0	20	118
	8	070839F	BNSF	ROBERTS ST	FARGO	ND	Gates w/Medians	27.56	20	25	0	0	25	0	20	118
	9	081384H	BNSF	CR 22	HARWOOD	ND	Gates w/Medians	23.29	20	25	0	0	25	0	20	113
	10	062949V	BNSF	11TH ST	MOORHEAD	MN	Four Quad Gates	47.48	20	25	0	0	0	0	20	112
	11	062936U	BNSF	8TH ST N	MOORHEAD	MN	Four Quad Gates	41.16	0	25	0	0	25	0	20	111
	12	070810H	BNSF	8TH ST	FARGO	ND	Four Quad Gates	44.32	20	25	0	0	0	0	20	109
	13	070851M	BNSF	7TH AV N	FARGO	ND	Gates w/Medians	40.56	0	0	0	10	25	10	20	106
	14	071103U	BNSF	LANGER AV/ ND 18	CASSELTON	ND	Four Quad Gates	85.56	0	0	0	0	0	0	20	106
3	15	062898M	BNSF	230TH ST S	HAWLEY	MN	Gates	29.83	0	0	0	20	25	10	20	105
4	16	071009F	BNSF	9TH ST EAST	FARGO	ND	Gates	94.43	0	0	0	10	0	0	0	104
5	17	071108D	BNSF	3RD AV	CASSELTON	ND	Gates	60.52	20	0	0	0	0	0	20	101
	18	062952D	BNSF	8TH ST S	MOORHEAD	MN	Four Quad Gates	55.49	0	25	0	0	0	0	20	100
6	19	071415C	BNSF	1ST AVE NORTH	MOORHEAD	MN	Flashing Lights w/Medians	24.98	0	25	20	0	0	10	20	100
	20	062927V	BNSF	14TH ST N	MOORHEAD	MN	Gates w/Medians	28.69	20	0	0	0	25	0	20	94
7	21	062943E	BNSF	S. MAIN ST	DILWORTH	MN	Gates	23.18	20	25	0	0	25	0	0	93
	22	085966B	BNSF	7TH ST N	MOORHEAD	MN	Four Quad Gates	26.01	0	0	20	0	25	0	20	91
8	23	062576Y	BNSF	12TH AV S	MOORHEAD	MN	Gates	23.11	0	25	20	0	0	0	20	88
9	24	062925G	BNSF	1ST AVE S	MOORHEAD	MN	Gates	29.07	20	0	0	0	25	10	0	84
	25	062946A	BNSF	14TH ST	MOORHEAD	MN	Gates w/Medians	44.33	20	0	0	0	0	0	20	84
10	26	071031T	BNSF	5TH ST SE (19TH AVE)	FARGO	ND	Gates	22.77	0	0	0	20	0	20	20	83
11	27	071095E	BNSF	161ST AVE SE	MAPLETON	ND	Crossbucks	59.60	0	0	0	20	0	0	0	80
12	28	081743W	BNSF	3RD ST	GARDNER	ND	Gates	13.15	20	0	0	0	25	0	20	78
13	29	081380F	BNSF	32ND AVE N	FARGO	ND	Crossbucks	11.70	0	0	0	20	25	0	20	77
14	30	062901T	BNSF	190TH ST S	HAWLEY	MN	Gates	31.34	0	0	0	20	25	0	0	76
*	31	062917P	BNSF	6TH ST	HAWLEY	MN	Crossbucks	10.35	20	25	0	0	0	0	20	75
15	32	081388K	BNSF	28TH ST SE	HARWOOD	ND	Gates	10.05	0	0	0	20	25	0	20	75
16	33	062582C	BNSF	60TH AVE S	MOORHEAD	MN	Gates	54.49	0	0	0	20	0	0	0	74
17	34	070828T	BNSF	27TH ST N	FARGO	ND	Gates	74.30	0	0	0	0	0	0	0	74
18	35	070868R	BNSF	MAIN AVE	FARGO	ND	Flashing Lights	33.53	0	0	0	10	0	10	20	74
19	36	080738W	OTVR	1ST ST SO	SABIN	MN	Crossbucks	42.84	0	0	0	0	0	10	20	73
20	37	071101F	BNSF	15TH AVE	CASSELTON	ND	Crossbucks	31.33	20	0	0	0	0	0	20	71
21	38	080734U	OTVR	60TH AVE SO	SABIN	MN	Stop Signs	20.82	0	0	0	20	0	10	20	71
22	39	080740X	OTVR	90TH AVE SO	SABIN	MN	Crossbucks	19.75	0	0	0	20	0	10	20	70
23	40	062911Y	BNSF	100TH ST S	GLYNDON	MN	Gates	24.40	0	0	0	20	25	0	0	69
	41	062924A	OTVR	21ST ST SO	MOORHEAD	MN	Flashing Lights	28.57	0	0	20	0	0	0	20	69
24	42	081389S	BNSF	1ST STREET	GARDNER	ND	Gates	12.69	20	0	0	10	25	0	0	68
25	43	092956M	BNSF	C-0928	FARGO	ND	Gates	18.11	0	0	0	20	0	10	20	68
26	44	062912F	BNSF	90TH ST S	GLYNDON	MN	Stop Signs	21.77	0	0	0	20	25	0	0	67
27	45	070859S	BNSF	BOLLEY DRIVE	FARGO	ND	Crossbucks	0.90	20	25	20	0	0	0	0	66

FM Metro COG Regional Railroad Crossing Safety Study
First Level Screening Results

= Maxed Out Devices, Grade Separation Candidate, or *Low Concern

Adjusted Rank	Rank	Crossing ID	Railroad	Street	City	State	Existing Warning Device (from FRA)	A, FRA Final Collision Prediction x1000	B, Hospital, Firestation, EMS Station within 0.25 mile	C, School within 0.25 mile	D, Transit Route (Bus Route)	E, Roadway Speed > 30 mph	F, Passenger Rail (Amtrak) Route	G, Roadway Skewed to Track	H, Roadway Intersection within 200 ft	First Level Screening Result
28	**46**	**062589A**	BNSF	110 AVE S	COMSTOCK	MN	**Stop Signs**	24.87	0	0	0	20	0	0	20	**65**
29	**47**	**092950W**	BNSF	C-0949	FARGO	ND	**Gates**	25.24	0	0	0	20	0	0	20	**65**
30	**48**	**080732F**	OTVR	50TH AVE S	SABIN	MN	**Crossbucks**	14.21	0	0	0	20	0	10	20	**64**
31	**49**	**062716Y**	RRVW	163RD AVE SE	KINDRED	ND	**Crossbucks**	4.01	0	0	0	20	0	20	20	**64**
32	**50**	**062577F**	BNSF	28TH AVE SO	MOORHEAD	MN	**Gates**	23.04	20	0	0	0	0	0	20	**63**
	51	**062579U**	BNSF	40TH AVE SO	MOORHEAD	MN	**Four Quad Gates**	22.99	0	0	0	20	0	0	20	**63**
33	**52**	**062939P**	BNSF	70TH ST S	DILWORTH	MN	**Gates**	17.68	0	0	0	20	25	0	0	**63**
*	**53**	**062916H**	BNSF	5TH ST	HAWLEY	MN	**Crossbucks**	21.97	20	0	0	0	0	0	20	**62**
	54	**062932S**	BNSF	11TH ST	MOORHEAD	MN	**Four Quad Gates**	42.49	0	0	0	0	0	0	20	**62**
34	**55**	**080730S**	OTVR	40TH AVE S	MOORHEAD	MN	**Crossbucks**	12.50	0	0	0	20	0	10	20	**62**
35	**56**	**080759P**	OTVR	150TH AVE SO	BARNESVILLE	MN	**Crossbucks**	11.68	0	0	0	20	0	10	20	**62**
	57	**070798D**	BNSF	5TH ST S	MOORHEAD	MN	**Four Quad Gates**	41.41	0	0	0	0	0	0	20	**61**
36	**58**	**071426P**	BNSF	90 AVE N	MOORHEAD	MN	**Crossbucks**	21.15	0	0	0	20	0	0	20	**61**
37	**59**	**102936G**	BNSF	CMC 0930	CASSELTON	ND	**Gates**	31.31	0	0	0	20	0	10	0	**61**
38	**60**	**080751K**	OTVR	120TH ST	BAKER	MN	**Crossbucks**	10.68	0	0	0	20	0	10	20	**61**
39	**61**	**070870S**	BNSF	25TH ST S	FARGO	ND	**Gates**	19.97	0	0	0	10	0	10	20	**60**
40	**62**	**071030L**	BNSF	45TH STREET	FARGO	ND	**Gates**	30.48	0	0	0	10	0	0	20	**60**
41	**63**	**071100Y**	BNSF	157TH AVE SE	CASSELTON	ND	**Crossbucks**	19.58	0	0	0	20	0	0	20	**60**
42	**64**	**080731Y**	OTVR	50TH ST SO	SABIN	MN	**Crossbucks**	9.99	0	0	0	20	0	10	20	**60**
43	**65**	**080748C**	OTVR	120TH AVE S	BAKER	MN	**Crossbucks**	9.99	0	0	0	20	0	10	20	**60**
44	**66**	**071010A**	BNSF	7TH AVE NE	FARGO	ND	**Crossbucks**	48.51	0	0	0	10	0	0	0	**59**
45	**67**	**103769N**	BNSF	WALL ST AVE N	GEORGETOWN	MN	**Crossbucks**	18.86	0	0	0	20	0	0	20	**59**
46	**68**	**080736H**	OTVR	70TH AVE SO	SABIN	MN	**Crossbucks**	9.16	0	0	0	20	0	10	20	**59**
47	**69**	**080737P**	OTVR	KING'S TRAIL NO	SABIN	MN	**Gates**	9.33	20	0	0	0	0	10	20	**59**
48	**70**	**080739D**	OTVR	80TH ST SO	SABIN	MN	**Crossbucks**	8.67	0	0	0	20	0	10	20	**59**
49	**71**	**080744A**	OTVR	100TH ST SO	BAKER	MN	**Crossbucks**	8.67	0	0	0	20	0	10	20	**59**
50	**72**	**080747V**	OTVR	110TH ST SO	BAKER	MN	**Crossbucks**	9.16	0	0	0	20	0	10	20	**59**
51	**73**	**273121B**	OTVR	24TH ST	MOORHEAD	MN	**Gates**	19.43	0	0	20	0	0	0	20	**59**
52	**74**	**070920T**	RRVW	48TH ST SE	DAVENPORT	ND	**Crossbucks**	19.35	0	0	0	20	0	20	0	**59**
53	**75**	**081378E**	BNSF	15TH AVE NW	FARGO	ND	**Crossbucks**	13.36	0	0	0	0	25	0	20	**58**
54	**76**	**080725V**	OTVR	12TH AVE SO	MOORHEAD	MN	**Gates**	17.66	0	0	20	0	0	0	20	**58**
55	**77**	**080741E**	OTVR	100TH AVE SO	SABIN	MN	**Crossbucks**	8.10	0	0	0	20	0	10	20	**58**
56	**78**	**080742L**	OTVR	90TH ST S	BAKER	MN	**Crossbucks**	7.77	0	0	0	20	0	10	20	**58**
57	**79**	**062709N**	RRVW	Elm st	KINDRED	ND	**Crossbucks**	17.90	20	0	0	0	0	0	20	**58**
	80	**070799K**	BNSF	4TH ST S	MOORHEAD	MN	**Four Quad Gates**	35.86	0	0	0	0	0	0	20	**56**
58	**81**	**070832H**	BNSF	4TH STREET N	FARGO	ND	**Gates**	31.38	0	0	0	0	25	0	0	**56**
59	**82**	**071099G**	BNSF	158TH AVE SE	CASSELTON	ND	**Gates**	15.82	0	0	0	20	0	0	20	**56**
60	**83**	**081744D**	BNSF	24TH ST SE	GARDNER	ND	**Crossbucks**	11.08	0	0	0	0	25	0	20	**56**
61	**84**	**080745G**	OTVR	110TH AVE	BAKER	MN	**Crossbucks**	5.87	0	0	0	20	0	10	20	**56**
62	**85**	**062733P**	RRVW	158TH AVE SE	DURBIN	ND	**Gates**	5.91	0	0	0	20	0	10	20	**56**
63	**86**	**062918W**	BNSF	8TH ST	HAWLEY	MN	**Crossbucks**	10.35	20	25	0	0	0	0	0	**55**
64	**87**	**062931K**	BNSF	11TH ST	MOORHEAD	MN	**Gates**	34.83	0	0	0	0	0	0	20	**55**
65	**88**	**071417R**	BNSF	5TH AVE NORTH	MOORHEAD	MN	**Crossbucks**	14.71	0	0	20	0	0	0	20	**55**
66	**89**	**071428D**	BNSF	100TH AVE N	GEORGETOWN	MN	**Crossbucks**	15.10	0	0	0	20	0	0	20	**55**
67	**90**	**081386W**	BNSF	TED AVENUE	HARWOOD	ND	**Gates**	9.09	0	0	0	0	25	0	20	**54**

FM Metro COG Regional Railroad Crossing Safety Study
First Level Screening Results

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Adjusted Rank	Rank	Crossing ID	Railroad	Street	City	State	Existing Warning Device (from FRA)	A, FRA Final Collision Prediction x1000	B, Hospital, Firestation, EMS Station within 0.25 mile	C, School within 0.25 mile	D, Transit Route (Bus Route)	E, Roadway Speed > 30 mph	F, Passenger Rail (Amtrak) Route	G, Roadway Skewed to Track	H, Roadway Intersection within 200 ft	First Level Screening Result
68	**91**	**102939C**	BNSF	151ST AVENUE SE	CASSELTON	ND	**Crossbucks**	24.48	0	0	0	20	0	10	0	**54**
69	**92**	**080756U**	OTVR	140TH AVE NW	BARNESVILLE	MN	**Crossbucks**	4.24	0	0	0	20	0	10	20	**54**
70	**93**	**070857D**	BNSF	16TH ST N	FARGO	ND	**Flashing Lights**	27.68	0	0	0	0	25	0	0	**53**
71	**94**	**071420Y**	BNSF	28TH AVE N	MOORHEAD	MN	**Crossbucks**	13.16	0	0	0	20	0	0	20	**53**
72	**95**	**092957U**	BNSF	185TH AVE SE	FARGO	ND	**Gates**	13.21	0	0	0	20	0	0	20	**53**
73	**96**	**071085Y**	BNSF	38TH STREET W	FARGO	ND	**Gates**	52.37	0	0	0	0	0	0	0	**52**
74	**97**	**086428X**	BNSF	18TH ST N	FARGO	ND	**Crossbucks**	0.99	0	0	20	10	0	0	20	**51**
75	**98**	**071087M**	BNSF	CMC 0941SPUR	MAPLETON	ND	**Gates**	28.84	0	0	0	20	0	0	0	**49**
76	**99**	**071423U**	BNSF	70 AVE N	MOORHEAD	MN	**Stop Signs**	8.77	0	0	0	20	0	0	20	**49**
77	**100**	**080769V**	OTVR	100TH ST	BARNESVILLE	MN	**Crossbucks**	9.39	0	0	0	20	0	0	20	**49**
78	**101**	**071105H**	BNSF	6TH AV	CASSELTON	ND	**Gates**	27.61	0	0	0	0	0	0	20	**48**
79	**102**	**071419E**	BNSF	15TH AVE N	MOORHEAD	MN	**Crossbucks**	28.22	0	0	0	0	0	0	20	**48**
80	**103**	**062708G**	RRVW	ELM ST	KINDRED	ND	**Gates**	8.26	20	0	0	0	0	0	20	**48**
81	**104**	**092972W**	BNSF	30TH ST SE	FARGO	ND	**Crossbucks**	17.42	0	0	0	20	0	10	0	**47**
82	**105**	**103817B**	BNSF	30TH AVE S	MOORHEAD	MN	**Gates**	27.22	0	0	0	0	0	0	20	**47**
83	**106**	**080755M**	OTVR	140TH ST S	BAKER	MN	**Crossbucks**	7.01	0	0	0	20	0	0	20	**47**
84	**107**	**070903C**	RRVW	Center Ave	HORACE	ND	**Crossbucks**	6.76	20	0	0	0	0	0	20	**47**
85	**108**	**062580N**	BNSF	50 AVE S	MOORHEAD	MN	**Crossbucks**	26.41	0	0	0	20	0	0	0	**46**
86	**109**	**070817F**	BNSF	1ST AV N	FARGO	ND	**Gates**	16.00	0	0	0	0	0	10	20	**46**
87	**110**	**071092J**	BNSF	7TH AV/CMC0941	MAPLETON	ND	**Gates**	25.76	0	0	0	0	0	0	20	**46**
88	**111**	**071421F**	BNSF	43RD AVE N	MOORHEAD	MN	**Crossbucks**	6.21	0	0	0	20	0	0	20	**46**
89	**112**	**071429K**	BNSF	110TH AVE N	GEORGETOWN	MN	**Crossbucks**	5.57	0	0	0	20	0	0	20	**46**
90	**113**	**080753Y**	OTVR	130TH ST S	BAKER	MN	**Gates**	5.69	0	0	0	20	0	0	20	**46**
91	**114**	**080757B**	OTVR	150TH ST NW	BARNESVILLE	MN	**Crossbucks**	5.98	0	0	0	20	0	0	20	**46**
92	**115**	**080758H**	OTVR	160TH ST SO	BARNESVILLE	MN	**Crossbucks**	5.98	0	0	0	20	0	0	20	**46**
93	**116**	**071089B**	BNSF	164TH AVE SE	MAPLETON	ND	**Crossbucks**	24.54	0	0	0	20	0	0	0	**45**
94	**117**	**071433A**	BNSF	130TH AVE N	GEORGETOWN	MN	**Crossbucks**	5.15	0	0	0	20	0	0	20	**45**
95	**118**	**062707A**	RRVW	53RD ST SE	KINDRED	ND	**Gates**	5.48	0	0	0	20	0	0	20	**45**
96	**119**	**062735D**	RRVW	157TH AVE SE	DURBIN	ND	**Crossbucks**	4.56	0	0	0	20	0	0	20	**45**
97	**120**	**062741G**	RRVW	38TH ST SE	CASSELTON	ND	**Crossbucks**	4.01	0	0	0	20	0	0	20	**44**
98	**121**	**071425H**	BNSF	80 AVE N	MOORHEAD	MN	**Crossbucks**	3.19	0	0	0	20	0	0	20	**43**
99	**122**	**092961J**	BNSF	32ND ST SE	FARGO	ND	**Crossbucks**	12.75	0	0	0	20	0	10	0	**43**
100	**123**	**062705L**	RRVW	ND HWY 46	KINDRED	ND	**Gates**	13.42	0	0	0	10	0	0	20	**43**
101	**124**	**070914P**	RRVW	47TH ST SE	DAVENPORT	ND	**Crossbucks**	2.97	0	0	0	20	0	20	0	**43**
102	**125**	**070871Y**	BNSF	27TH ST S	FARGO	ND	**Stop Signs**	12.26	0	0	0	0	0	10	20	**42**
103	**126**	**071431L**	BNSF	120TH AVE N	GEORGETOWN	MN	**Crossbucks**	2.25	0	0	0	20	0	0	20	**42**
104	**127**	**062740A**	RRVW	155 1/2 AVE SE	CASSELTON	ND	**Gates**	12.02	0	0	0	30	0	0	0	**42**
105	**128**	**071435N**	BNSF	140TH AVE N	GEORGETOWN	MN	**Crossbucks**	1.29	0	0	0	20	0	0	20	**41**
106	**129**	**086426J**	BNSF	DAKOTA DRIVE	FARGO	ND	**Crossbucks**	1.16	0	0	20	0	0	0	20	**41**
107	**130**	**102937N**	BNSF	DRIVEWAY	CASSELTON	ND	**Gates**	9.91	0	0	0	20	0	10	0	**40**
	131	**086399P**	OTVR	34TH ST S	MOORHEAD	MN	**Four Quad Gates**	19.47	0	0	0	0	0	0	20	**39**
108	**132**	**070861T**	BNSF	GN DRIVE	FARGO	ND	**Crossbucks**	17.70	0	0	0	0	0	0	20	**38**
109	**133**	**071086F**	BNSF	166TH AVE FIELD	FARGO	ND	**Crossbucks**	18.38	0	0	0	20	0	0	0	**38**
110	**134**	**071416J**	BNSF	2ND AVENUE N	MOORHEAD	MN	**Crossbucks**	13.13	0	25	0	0	0	0	0	**38**
111	**135**	**092952K**	BNSF	186TH AVE SE	FARGO	ND	**Crossbucks**	18.17	0	0	0	20	0	0	0	**38**

FM Metro COG Regional Railroad Crossing Safety Study
First Level Screening Results

= Maxed Out Devices, Grade Separation Candidate, or *Low Concern

Adjusted Rank	Rank	Crossing ID	Railroad	Street	City	State	Existing Warning Device (from FRA)	A, FRA Final Collision Prediction x1000	B, Hospital, Firestation, EMS Station within 0.25 mile	C, School within 0.25 mile	D, Transit Route (Bus Route)	E, Roadway Speed > 30 mph	F, Passenger Rail (Amtrak) Route	G, Roadway Skewed to Track	H, Roadway Intersection within 200 ft	First Level Screening Result
112	**136**	**070909T**	RRVW	46TH STREET SE	HORACE	ND	**Crossbucks**	6.75	0	0	0	10	0	20	0	**37**
113	**137**	**071025P**	BNSF	STOCKYARD RD	FARGO	ND	**Crossbucks**	25.73	0	0	0	0	0	10	0	**36**
114	**138**	**071097T**	BNSF	177TH AVE SE	MAPLETON	ND	**Crossbucks**	16.19	0	0	0	20	0	0	0	**36**
115	**139**	**071098A**	BNSF	159TH AVE SE	MAPLETON	ND	**Crossbucks**	16.19	0	0	0	20	0	0	0	**36**
116	**140**	**092962R**	BNSF	183RD AVE SE	FARGO	ND	**Crossbucks**	16.08	0	0	0	20	0	0	0	**36**
117	**141**	**092970H**	BNSF	C-0941	FARGO	ND	**Gates**	16.28	0	0	0	20	0	0	0	**36**
118	**142**	**080750D**	OTVR	MAIN ST	BAKER	MN	**Crossbucks**	16.19	0	0	0	0	0	0	20	**36**
119	**143**	**062712W**	RRVW	164TH AVE SE	KINDRED	ND	**Crossbucks**	6.22	0	0	0	20	0	10	0	**36**
120	**144**	**092966T**	BNSF	MAIN ST.	FARGO	ND	**Crossbucks**	14.97	0	0	0	0	0	0	20	**35**
121	**145**	**092968G**	BNSF	164TH AVE SE	FARGO	ND	**Crossbucks**	14.97	0	0	0	20	0	0	0	**35**
122	**146**	**062585X**	BNSF	80 AVE S	MOORHEAD	MN	**Crossbucks**	13.72	0	0	0	20	0	0	0	**34**
123	**147**	**062596K**	BNSF	BROADWAY/160 AVE	COMSTOCK	MN	**Gates**	13.85	0	0	0	0	0	0	20	**34**
124	**148**	**080724N**	OTVR	OAK WAY	MOORHEAD	MN	**Flashing Lights**	14.04	0	0	0	0	0	0	20	**34**
125	**149**	**080762X**	OTVR	160TH AVE S	BARNESVILLE	MN	**Flashing Lights**	13.96	0	0	0	20	0	0	0	**34**
126	**150**	**062737S**	RRVW	156TH AVE SE	DURBIN	ND	**Crossbucks**	4.01	0	0	0	20	0	10	0	**34**
127	**151**	**062738Y**	RRVW	39TH ST SE	DURBIN	ND	**Crossbucks**	4.01	0	0	0	20	0	10	0	**34**
128	**152**	**092959H**	BNSF	105TH ST N	FARGO	ND	**Crossbucks**	12.75	0	0	0	20	0	0	0	**33**
129	**153**	**092965L**	BNSF	165TH AVE SE	FARGO	ND	**Crossbucks**	12.75	0	0	0	20	0	0	0	**33**
130	**154**	**092974K**	BNSF	162ND AVE SE	FARGO	ND	**Crossbucks**	12.75	0	0	0	20	0	0	0	**33**
131	**155**	**070917K**	RRVW	165TH AVE SE	DAVENPORT	ND	**Crossbucks**	13.45	0	0	0	20	0	0	0	**33**
132	**156**	**103825T**	BNSF	1ST AVE N	FARGO	ND	**Crossbucks**	21.54	0	0	0	10	0	0	0	**32**
133	**157**	**394437V**	BNSF	23RD ST N EXT	FARGO	ND	**Crossbucks**	0.81	0	0	0	0	0	10	20	**31**
134	**158**	**394456A**	BNSF	19TH STREET	FARGO	ND	**Crossbucks**	0.66	0	0	0	0	0	10	20	**31**
135	**159**	**080767G**	OTVR	MAIN AVE W	BARNESVILLE	MN	**Gates**	11.29	20	0	0	0	0	0	0	**31**
136	**160**	**062587L**	BNSF	100 AVE S	COMSTOCK	MN	**Crossbucks**	10.09	0	0	0	20	0	0	0	**30**
137	**161**	**062588T**	BNSF	108 AVE S	COMSTOCK	MN	**Crossbucks**	10.09	0	0	0	0	0	0	20	**30**
138	**162**	**062598Y**	BNSF	100TH ST	COMSTOCK	MN	**Crossbucks**	9.78	0	0	0	0	0	0	20	**30**
139	**163**	**102938V**	BNSF	FIELD	CASSELTON	ND	**Crossbucks**	10.25	0	0	0	20	0	0	0	**30**
140	**164**	**062591B**	BNSF	130 AVE S	COMSTOCK	MN	**Crossbucks**	9.06	0	0	0	20	0	0	0	**29**
141	**165**	**092947N**	BNSF	188TH AVE SE	FARGO	ND	**Gates**	9.18	0	0	0	20	0	0	0	**29**
142	**166**	**921653U**	OTVR	34TH AVE SO	MOORHEAD	MN	**Gates**	8.87	0	0	0	0	0	0	20	**29**
143	**167**	**071033G**	BNSF	57Th	WEST FARGO	ND	**Gates**	8.54	0	0	0	10	0	10	0	**29**
144	**168**	**062714K**	RRVW	51ST ST SE	KINDRED	ND	**Crossbucks**	7.56	0	0	0	20	0	0	0	**28**
145	**169**	**062584R**	BNSF	70 AVE S	MOORHEAD	MN	**Crossbucks**	6.52	0	0	0	20	0	0	0	**27**
146	**170**	**062586E**	BNSF	90 AVE S	MOORHEAD	MN	**Crossbucks**	6.99	0	0	0	20	0	0	0	**27**
147	**171**	**062592H**	BNSF	140TH AVE	COMSTOCK	MN	**Crossbucks**	6.99	0	0	0	20	0	0	0	**27**
148	**172**	**070902V**	RRVW	CENTER AVE	HORACE	ND	**Crossbucks**	6.76	0	0	0	0	0	0	20	**27**
149	**173**	**086420T**	BNSF	12TH AVE N	WEST FARGO	ND	**Gates**	15.82	0	0	0	10	0	0	0	**26**
150	**174**	**062730U**	RRVW	42ND ST SE	DURBIN	ND	**Crossbucks**	6.04	0	0	0	20	0	0	0	**26**
151	**175**	**062590U**	BNSF	120TH AVE SO	COMSTOCK	MN	**Crossbucks**	4.95	0	0	0	20	0	0	0	**25**
152	**176**	**071427W**	BNSF	4TH ST	GEORGETOWN	MN	**Crossbucks**	5.20	0	0	0	0	0	0	20	**25**
153	**177**	**062711P**	RRVW	52ND ST SE	KINDRED	ND	**Crossbucks**	4.79	0	0	0	20	0	0	0	**25**
154	**178**	**062745J**	RRVW	37TH ST SE	CASSELTON	ND	**Crossbucks**	5.36	0	0	0	20	0	0	0	**25**
155	**179**	**062594W**	BNSF	150TH AVE S	COMSTOCK	MN	**Crossbucks**	3.71	0	0	0	20	0	0	0	**24**
156	**180**	**071120K**	BNSF	CR 23/CMC 0927	CASSELTON	ND	**Gates**	13.76	0	0	0	10	0	0	0	**24**

FM Metro COG Regional Railroad Crossing Safety Study
First Level Screening Results

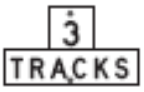
= Maxed Out Devices, Grade Separation Candidate, or *Low Concern

Adjusted Rank	Rank	Crossing ID	Railroad	Street	City	State	Existing Warning Device (from FRA)	A, FRA Final Collision Prediction x1000	B, Hospital, Firestation, EMS Station within 0.25 mile	C, School within 0.25 mile	D, Transit Route (Bus Route)	E, Roadway Speed > 30 mph	F, Passenger Rail (Amtrak) Route	G, Roadway Skewed to Track	H, Roadway Intersection within 200 ft	First Level Screening Result
157	**181**	**092967A**	BNSF	1ST ST SE	FARGO	ND	**Gates**	13.67	0	0	0	0	0	10	0	**24**
158	**182**	**062731B**	RRVW	private	DURBIN	ND	**Crossbucks**	4.01	0	0	0	0	0	0	20	**24**
159	**183**	**070905R**	RRVW	PARK DRIVE	HORACE	ND	**Crossbucks**	2.80	20	0	0	0	0	0	0	**23**
160	**184**	**070910M**	RRVW	168TH AVE SE	HORACE	ND	**Crossbucks**	2.61	0	0	0	20	0	0	0	**23**
161	**185**	**070912B**	RRVW	167TH AVE SE	HORACE	ND	**Crossbucks**	2.61	0	0	0	20	0	0	0	**23**
162	**186**	**070913H**	RRVW	166TH AVE SE	DAVENPORT	ND	**Crossbucks**	2.80	0	0	0	20	0	0	0	**23**
163	**187**	**070918S**	RRVW	164TH AVE SE	DAVENPORT	ND	**Crossbucks**	2.61	0	0	0	20	0	0	0	**23**
164	**188**	**071109K**	BNSF	154TH AVE SE	CASSELTON	ND	**Crossbucks**	21.81	0	0	0	0	0	0	0	**22**
165	**189**	**071436V**	BNSF	150TH AVE N	GEORGETOWN	MN	**Crossbucks**	1.52	0	0	0	0	0	0	20	**22**
166	**190**	**070921A**	RRVW	163rd ave se	DAVENPORT	ND	**Crossbucks**	2.38	0	0	0	20	0	0	0	**22**
167	**191**	**062922L**	BNSF	PARKE AV	GLYNDON	MN	**Crossbucks**	0.99	0	0	0	0	0	0	20	**21**
168	**192**	**062940J**	BNSF	CSAH 11	DILWORTH	MN	**Crossbucks**	1.00	0	0	0	0	0	0	20	**21**
169	**193**	**071301P**	BNSF	PLEASANT ST	GLYNDON	MN	**Crossbucks**	0.54	0	0	0	0	0	0	20	**21**
170	**194**	**394450J**	BNSF	20TH STREET	FARGO	ND	**Crossbucks**	0.66	0	0	0	0	0	0	20	**21**
171	**195**	**394457G**	BNSF	3RD AVE	FARGO	ND	**Crossbucks**	0.66	0	0	0	0	0	0	20	**21**
172	**196**	**071274V**	OTVR	140TH AVE SO	BARNESVILLE	MN	**Crossbucks**	0.40	0	0	0	0	0	0	20	**20**
173	**197**	**071276J**	OTVR	130TH AVE SO	BARNESVILLE	MN	**Crossbucks**	0.40	0	0	0	0	0	0	20	**20**
174	**198**	**070862A**	BNSF	GN DRIVE	FARGO	ND	**Crossbucks**	19.45	0	0	0	0	0	0	0	**19**
175	**199**	**071122Y**	BNSF	152nd Ave SE	CASSELTON	ND	**Crossbucks**	16.13	0	0	0	0	0	0	0	**16**
176	**200**	**071084S**	BNSF	26TH ST W	FARGO	ND	**Gates**	15.19	0	0	0	0	0	0	0	**15**
177	**201**	**071418X**	BNSF	7TH AVE NORTH	MOORHEAD	MN	**Crossbucks**	14.50	0	0	0	0	0	0	0	**15**
178	**202**	**080763E**	OTVR	4TH AV NW	BARNESVILLE	MN	**Crossbucks**	14.63	0	0	0	0	0	0	0	**15**
179	**203**	**086421A**	BNSF	7TH AVE N	WEST FARGO	ND	**Gates**	12.66	0	0	0	0	0	0	0	**13**
180	**204**	**103822X**	BNSF	15TH AVE NW	FARGO	ND	**Crossbucks**	0.90	0	0	0	10	0	0	0	**11**
181	**205**	**071271A**	OTVR	150TH AVE SO	BARNESVILLE	MN	**Crossbucks**	0.54	0	0	0	10	0	0	0	**11**
182	**206**	**062597S**	BNSF	170TH AVE S	COMSTOCK	MN	**Crossbucks**	8.65	0	0	0	0	0	0	0	**9**
183	**207**	**070904J**	RRVW	Park Drive	HORACE	ND	**Crossbucks**	4.54	0	0	0	0	0	0	0	**5**
184	**208**	**070906X**	RRVW	LIBERTY LANE	HORACE	ND	**Crossbucks**	4.54	0	0	0	0	0	0	0	**5**
185	**209**	**070908L**	RRVW	81ST ST S	HORACE	ND	**Crossbucks**	2.80	0	0	0	0	0	0	0	**3**
186	**210**	**071027D**	BNSF	15TH AVE N.	FARGO	ND	**No Signs/Signals**	0.74	0	0	0	0	0	0	0	**1**
187	**211**	**103823E**	BNSF	15TH AVE NW	FARGO	ND	**Gates**	0.62	0	0	0	0	0	0	0	**1**
188	**212**	**103787L**	BNSF	FRONT STREET	CASSELTON	ND	**Crossbucks**	0.48	0	0	0	0	0	0	0	**0**
189	**213**	**927639U**	OTVR	175TH ST SO	BARNESVILLE	MN	**Crossbucks**	0.40	0	0	0	0	0	0	0	**0**

PED	**PED**	**062894K**	BNSF	PEDESTRIAN PATHWY	HAWLEY		**No Signs/Signals**	NA	20	25	0	0	0	0	0	**NA (45)**
PED	**PED**	**071102M**	BNSF	8TH AVE EXTEND	CASSELTON		**NA**	NA	20	0	0	0	0	0	20	**NA (40)**

6.3 Appendix C – Second Level Screening Field Review Forms

Development (Part I of the Inventory Form)				
Residential	Industrial	Open Space	Institutional	Commercial

Regulatory Warning Devices (Part II of the Inventory Form)					
R1-1  STOP SIGN	**R1-2**  YIELD SIGN	**R3-1A**  PREEMPTION BLANK-OUT SIGN	**R8-8**  DO NOT STOP ON TRACKS SIGN	**R8-9**  TRACKS OUT OF SERVICE SIGN	**R8-10**  STOP HERE WHEN FLASHING SIGN
R10-6  STOP HERE ON RED SIGN	**R15-1**  CROSSBUCKS	**R15-2**  NUMBER OF TRACKS SIGN	**R15-3**  EXEMPT SIGN	**R15-8**  LOOK SIGN	 PRIVATE CROSSING SIGN
MINNESOTA STANDARDS	MAST MOUNTED FLASHING LIGHTS	8 INCH LENSES	12 INCH LENSES	LED LENSES	CANTILEVERS
GATE – 1	GATES – 2	GATES – 3	GATES – 4	4 QUAD CROSSING	CANTS & GATES
PED GATES	MEDIAN LENGTH 0-50 FEET	MEDIAN LENGTH 51-100 FEET	MEDIAN LENGTH 101-150 FEET	MEDIAN LENGTH 151-200 FEET	MEDIAN LENGTH OVER 200 FEET
WAYSIDE HORN	BELL	SIGNAL BRIDGE	TUBE DELINEATORS	SIDE LIGHTS	NONE

Crossing Surface (Part III of the Inventory Form)				
Timber	Asphalt	Asphalt and Flange	Concrete	Concrete and Rubber
Rubber	Unconsolidated	Metal	Other (Specify)	

Description Other Tracks (Part III of the Inventory Form)				
Unknown	Spur	Industry	Yard Track	Passing

Advanced Warning Signs (Part IV of the Inventory Form)					
W3-1  STOP AHEAD	**W3-2**  YIELD AHEAD	**W10-X2**  HIDDEN CROSSING	**W10-X3**  LOOK FOR TRAINS	**W10-1**  RXR	**W10-1a**  EXEMPT HIGHWAY-RAIL GRADE CROSSING
W10-2  PARALLEL TRACK	**W10-3**  PARALLEL TRACK	**W10-4**  PARALLEL TRACK	**W10-5**  LOW GROUND CLEARANCE	**W10-8**  TRAINS MAY EXCEED 80 M.P.H.	**W10-9**  NO TRAIN HORN
W10-11  STORAGE SPACE	**W10-11a**  STORAGE SPACE DISTANCE	**W10-11b**  STORAGE SPACE DISTANCE	**W10-12**  SKEWED CROSSING	**W10-14**  NEXT CROSSING	**W10-14a**  USE NEXT CROSSING
W10-15  ROUGH CROSSING	**W13-1**  ADVISORY SPEED	**W14-3**  NO PASSING ZONE	**W16-9p**  AHEAD		

Site Obstruction (Part V of the Inventory Form) *Note: Select the primary approach site obstruction option for each quadrant.*						
Additional Track	Bridges	Brush, Bushes-Vegetation	Building	Crops	Depression	Dike
Hill	Trees	Trucks, Cars in Parking Lot	Wall or Sign	Fence	No Obstruction	

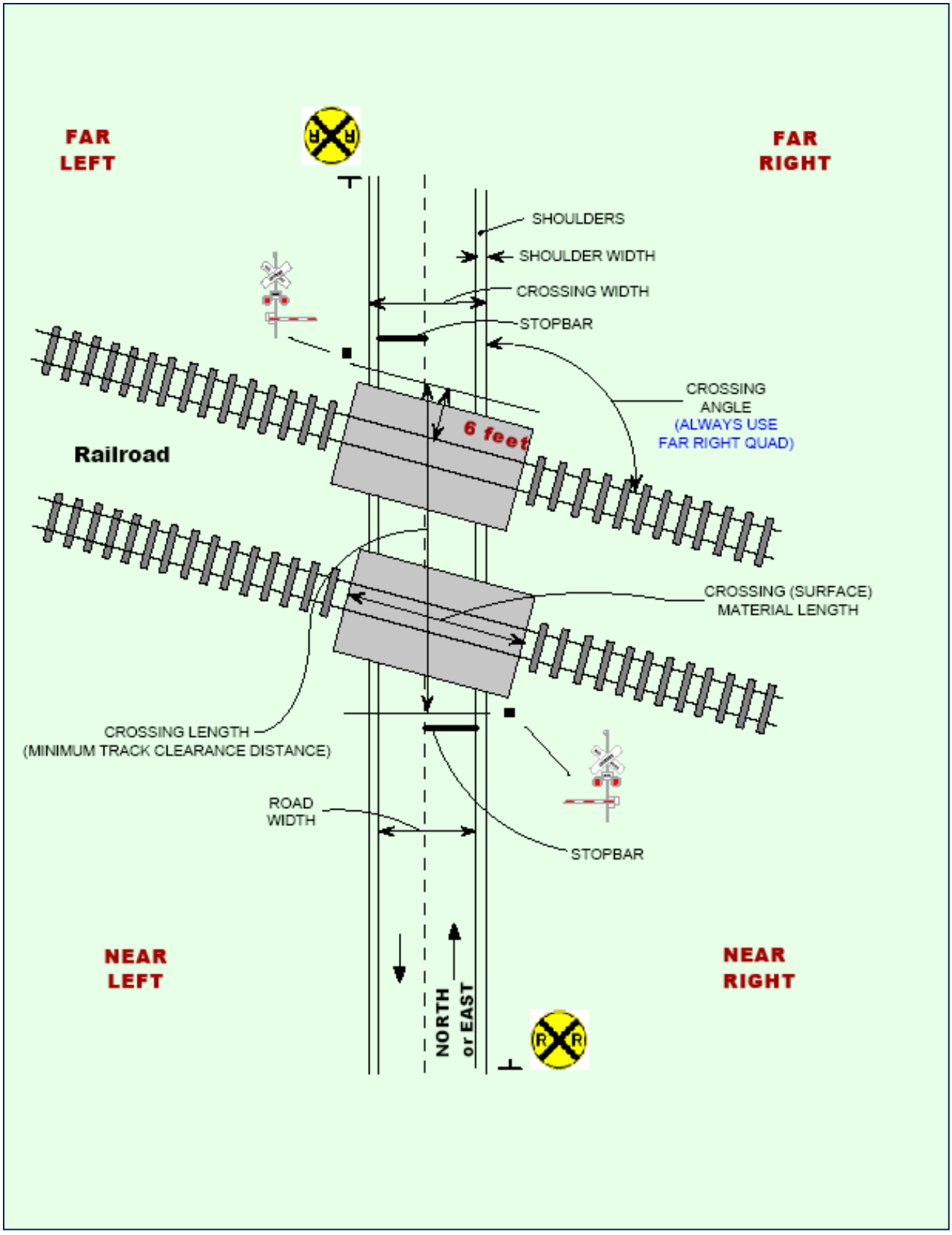
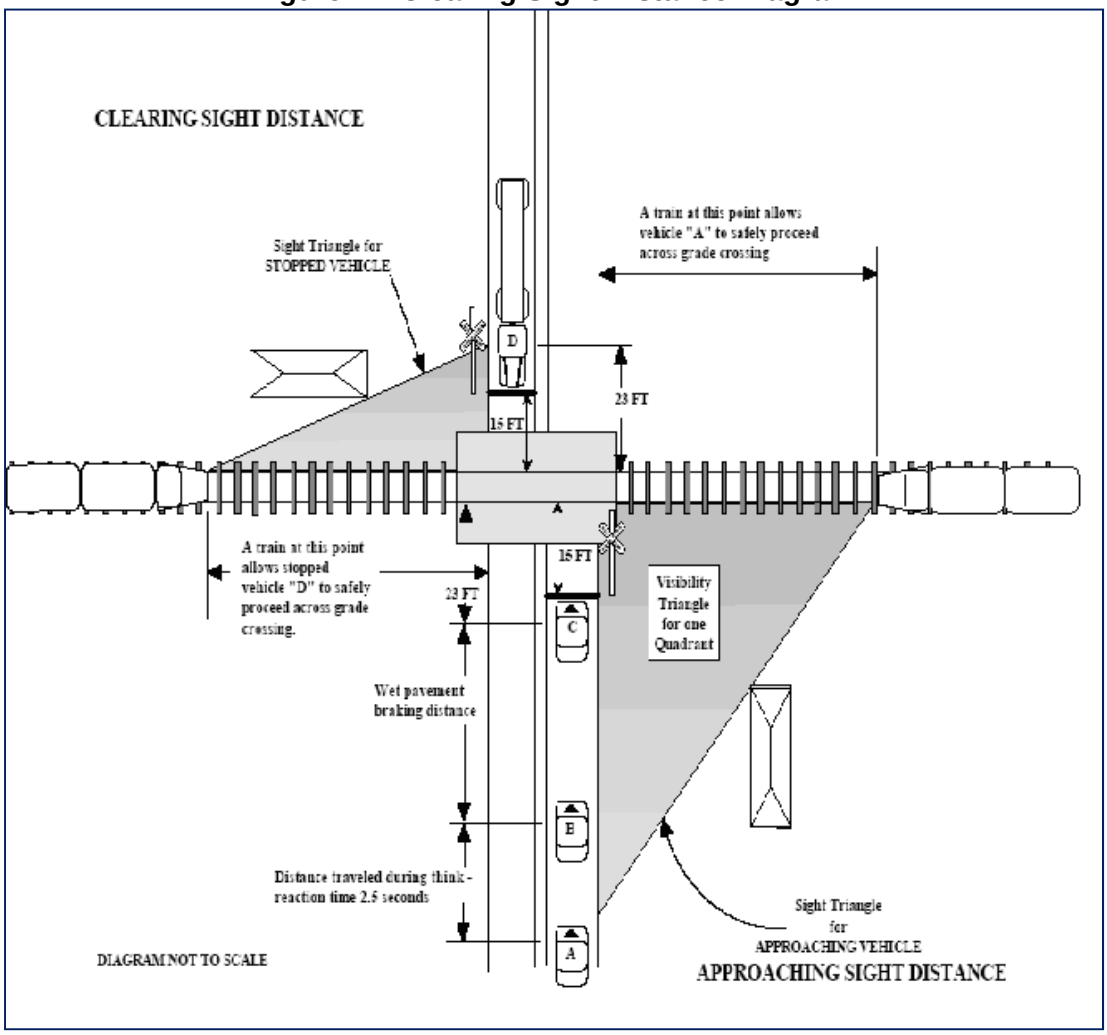

FAR
LEFT
FAR
RIGHT
SHOULDERS
SHOULDER WIDTH
CROSSING WIDTH
STOPBAR
CROSSING
ANGLE
(ALWAYS USE
FAR RIGHT QUAD)
6 feet
Railroad
CROSSING (SURFACE)
MATERIAL LENGTH
CROSSING LENGTH
(MINIMUM TRACK CLEARANCE DISTANCE)
ROAD
WIDTH
STOPBAR
NEAR
LEFT
NEAR
RIGHT
NORTH
or EAST

Figure 4 – Clearing Sight Distance Diagram



Stopping Sight Distance ☑ Field Review Required

The first element pertains to "stopping "or "braking " sight distance, which is the ability to see a train and/or the traffic control device at the crossing ahead sufficiently in advance so that a driver can bring the vehicle to a safe, controlled stop at least 4.5 m (15 ft) short of the near rail, if necessary. This applies to either a passive or active controlled crossing. Stopping sight distance is measured along the roadway and is a function of the distance required for the "design" vehicle, traveling at the posted speed limit to safely stop. Insufficient stopping sight distance is often due to poor roadway geometry and/or surrounding topography. Enter “YES” if the crossing meets the stopping sight distance requirements. If not, enter “NO”.

Exhibit 9-104.Required Design Sight Distances for Combinations of Highway Vehicle and Train Speeds

Train Speed (mph)	Vehicle Speed (mph)							
	0	10	20	30	40	50	60	70
	Distance (d_T) Along Railroad From Crossing (ft)							
10	240	146	106	99	100	105	111	118
20	480	293	212	198	200	209	222	236
30	721	439	318	297	300	314	333	355
40	961	585	424	396	401	419	444	473
50	1201	732	530	494	501	524	555	591
60	1441	878	636	593	601	628	666	709
70	1681	1024	742	692	701	733	777	828
80	1921	1171	848	791	801	838	888	946
90	2162	1317	954	890	901	943	999	1064
	Distance (d_H) Along Highway From Crossing (ft)							
	n/a	69	135	220	324	447	589	751

Assumptions: 65-foot truck crossing a single track at 90 degrees, flat terrain. Adjustments should be made for unusual vehicle lengths and acceleration capabilities, multiple tracks, skewed crossings, and grades.

Source: 2001 AASHTO

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 080759P

Road/Trail Crossing Name: 150TH AVE SO

City/Jurisdiction: BARNESVILLE

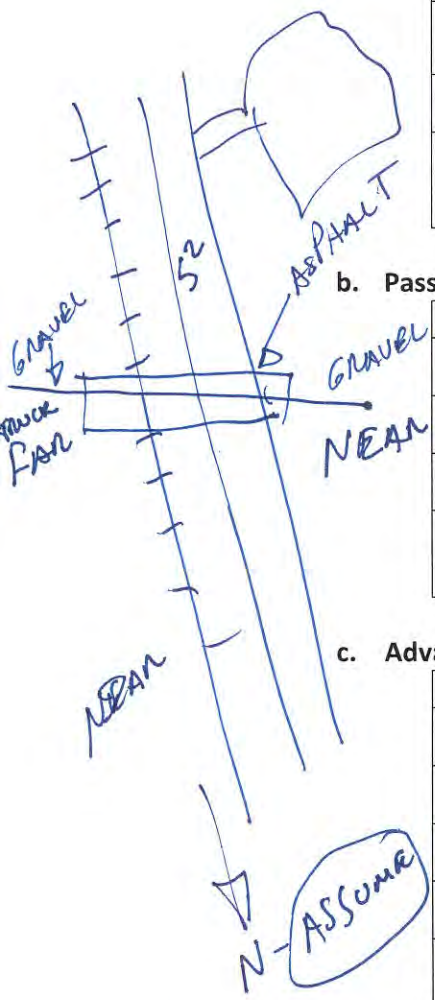
Train Speed: 40 mph

Posted Speed Limit: 55 mph

1. **Warning Devices:**

a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	N	N
Flashers	N	N
Cantilever	N	N
Non-Mountable Medians (length)	N	N
Ped Devices (Gates, Maze, Signage, etc)	N	N
Bell	N	N
Other		

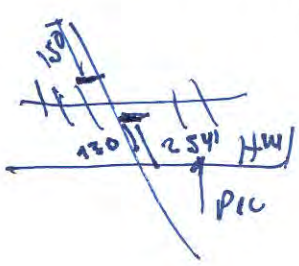


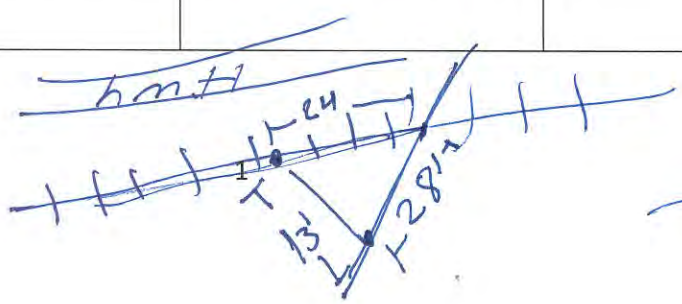
b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	Y	Y
Yield	N	N
Stop	N	N
Other		

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	N	N
No Train Horn	N	N
Stop Bars	N	N
RXR Pavement Marking	N	N
Other		





2. **Roadway Information:**

ROAD 24' W

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	55 mph	
No. Thru Lanes	2	2
Turn Lanes	-	-
Bypass Lanes (School Bus/HazMat)	-	-
Shoulder Width	—	—
Bike/Share-o Lanes	-	-
Horizontal Road Geo	CURVE →	
Vertical Road Geo (grade %)	UP TO TRACKS	FLAT
Road Surface (condition?)	GRAVEL / SOME ASPHALT	GRAVEL
Sidewalk	—	—
Street Lighting	-	-

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	135 Ft (HWY 52)	>500 Ft
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	STOP STREET NAMES	
Driveways/Mid-Block Approaches	>500 Ft	~~>500 Ft~~ 256'
Other	—	—

4. **Visual obstructions (land use type)**
   Double track? N (1 track)
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: FARM
   Northwest: HWY / FARM
   Southeast: FARM
   Southwest: HWY / FARM

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

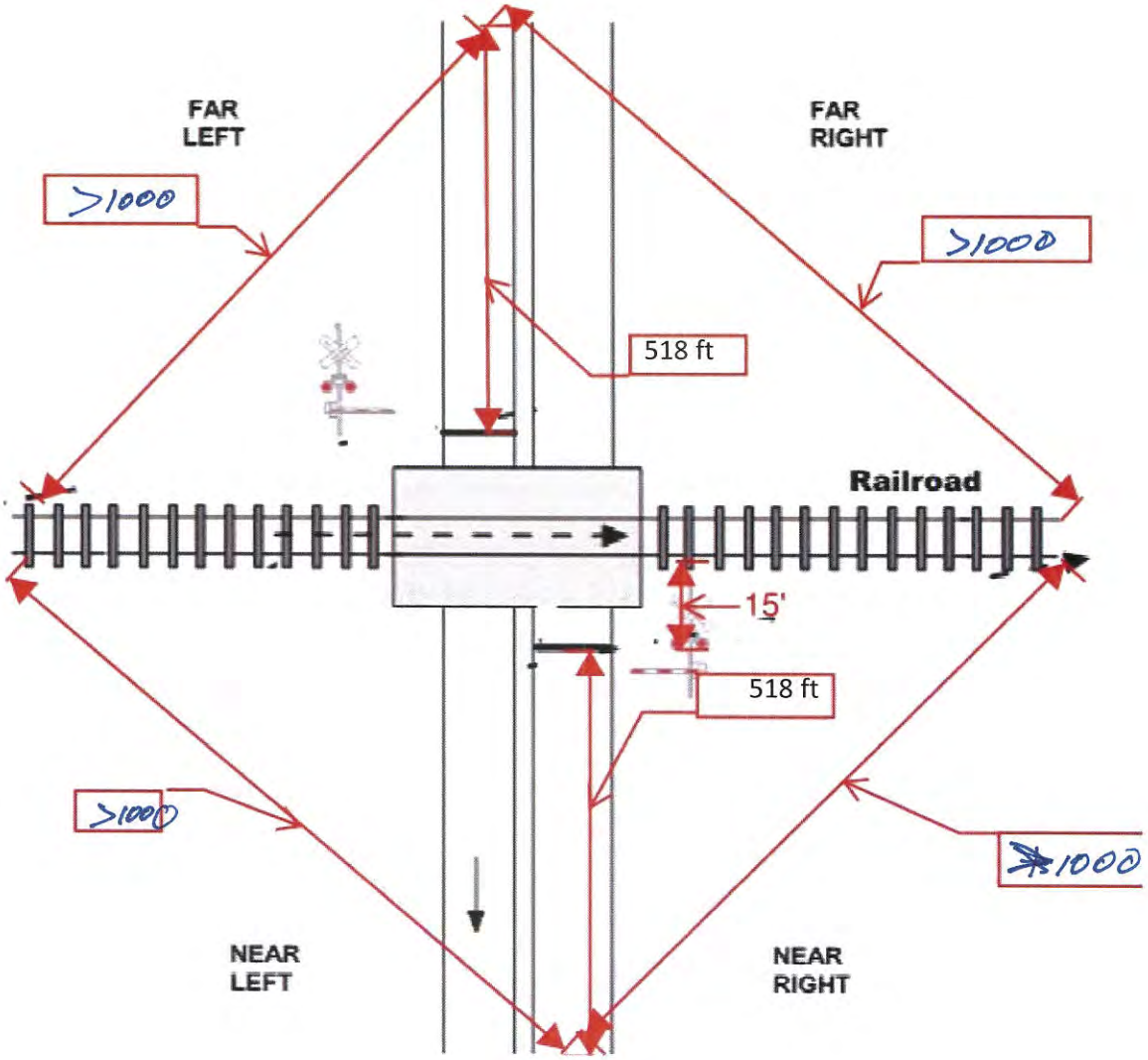
   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 518'
   b. Distance Observed Near (South or West): >518'
   c. Distance Observed Far (North or East): >518'

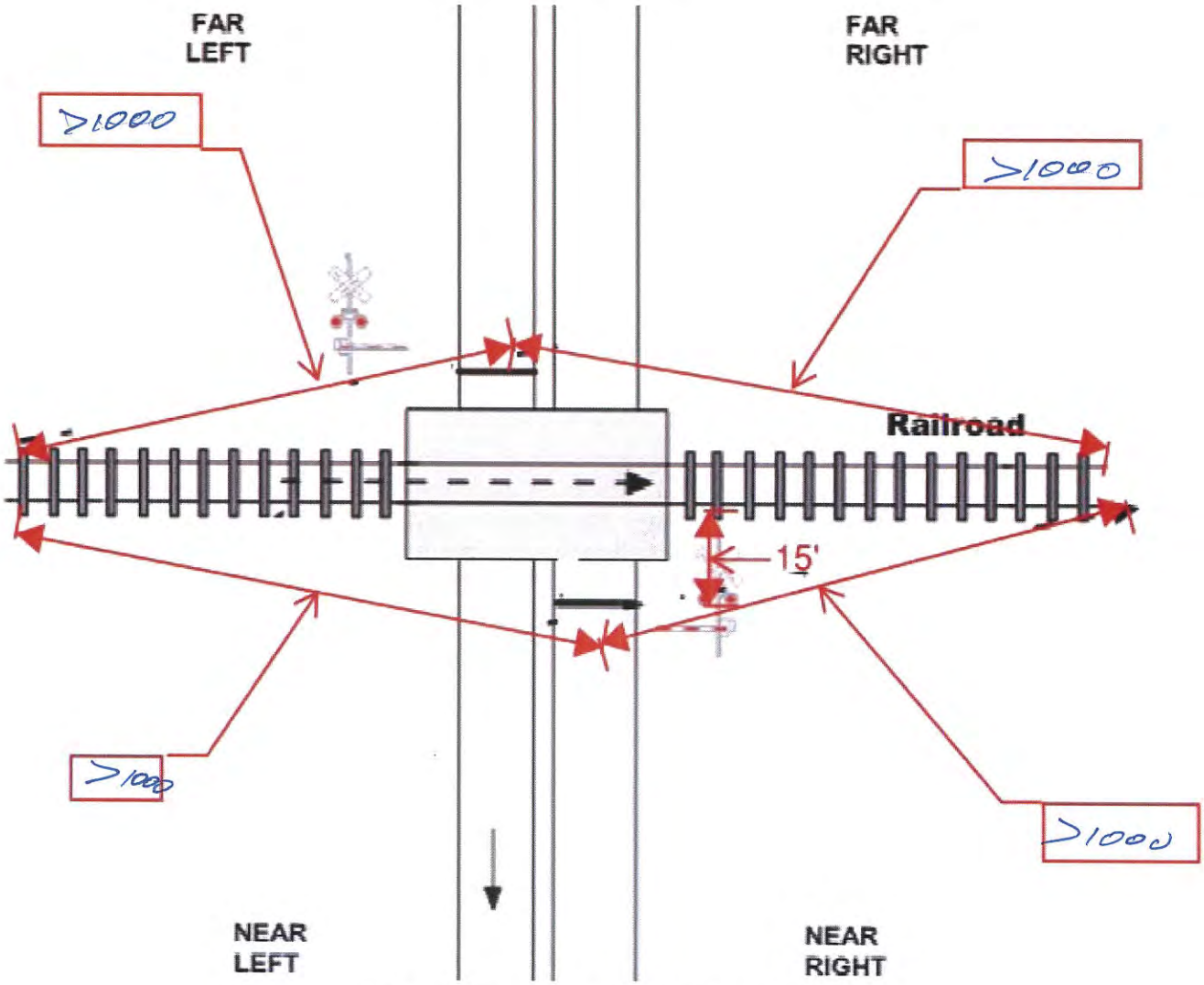
7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 40 mph
   a. Stopping Sight Distance per Table Near: 518 Ft
   b. Stopping Sight Distance per Table Far: 518 Ft
   c. Distance Along Tracks Required per Table: 431 Ft
   d. Distance Along Tracks Observed-Near Right: _____
   e. Distance Along Tracks Observed-Near Left: _____
   f. Distance Along Tracks Observed-Far Right: _____
   g. Distance Along Tracks Observed-Far Left: _____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 40 mph
   a. Clearing Distance Required per Table: 961 Ft
   b. Distance Along Tracks Observed-Near Right: _____
   c. Distance Along Tracks Observed-Near Left: _____
   d. Distance Along Tracks Observed-Far Right: _____
   e. Distance Along Tracks Observed-Far Left: _____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**



APPROACHING SIGHT DISTANCE



CLEARING SIGHT DISTANCE

Google Earth Pro

feet 1000
meters 300

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 071108D

Road/Trail Crossing Name: 3RD AV

City/Jurisdiction: CASSELTON ✓

Train Speed: ~~40~~ 60 Posted Speed Limit: ~~55~~ 25

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	Y ✓	Y
Flashers	Y	Y
Cantilever		
Non-Mountable Medians (length)	Y 105	Y 95 FT
Ped Devices (Gates, Maze, Signage, etc)		
Bell	Y	Y
Other		

   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	Y	Y
Yield	—	—
Stop	—	—
Other		

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	✓	✓
Stop Bars	—	—
RXR Pavement Marking	—	—
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit		
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	—	—
Bike/Share-o Lanes	—	—
Horizontal Road Geo	CURVE	CURVE
Vertical Road Geo (grade %)	UP TO TRACK ⟷	
Road Surface (condition?)	OK	OK
Sidewalk	—	—
Street Lighting	—	—

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	146 1ST ST S	>500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)		
Driveways/Mid-Block Approaches	2 SIGNAL DRIVEWAY ARE LOCATED SOUTH OF THE NEAREST ROADWAY	5
Other		

4. **Visual obstructions (land use type)**
   Double track? _____Y__(2)__
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: RW / LANDSCAPE / STORAGE
   Northwest: RW / HOUSING / INDUSTRIAL
   Southeast: INDUSTRIAL
   Southwest: ~~EARTH / HOUSING~~ RW / HOUSING

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): BUMPY

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 178 fT
   b. Distance Observed Near (South or West): > 178
   c. Distance Observed Far (North or East): > 178

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:_____
   a. Stopping Sight Distance per Table Near:_____
   b. Stopping Sight Distance per Table Far: _____
   c. Distance Along Tracks Required per Table:_____
   d. Distance Along Tracks Observed-Near Right: _____
   e. Distance Along Tracks Observed-Near Left: _____
   f. Distance Along Tracks Observed-Far Right: _____
   g. Distance Along Tracks Observed-Far Left: _____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:_____
   a. Clearing Distance Required per Table: _____
   b. Distance Along Tracks Observed-Near Right: _____
   c. Distance Along Tracks Observed-Near Left: _____
   d. Distance Along Tracks Observed-Far Right: _____
   e. Distance Along Tracks Observed-Far Left: _____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 071101F

Road/Trail Crossing Name: 15TH AVE

City/Jurisdiction: CASSELTON

Train Speed: 60 Posted Speed Limit: 25

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓ ✓
Flashers	✓ ✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	— ✓ 100F	✓ — 110 F
Ped Devices (Gates, Maze, Signage, etc)	~~✓~~	~~✓~~
Bell	~~✓~~	✓ ✓
Other	~~GATES~~/FENCE	~~GATES~~/FENCE

   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	✓
Stop	—	—
Other		

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	✓	✓
Stop Bars	—	—
RXR Pavement Marking	Almost ~~✓~~ DISSAPEARED	~~✓~~
Other	LOOK ~~FOR TRAINS~~ SIGN	~~—~~

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	—	—
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	TYP	TYP
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAL	LINEAL
Vertical Road Geo (grade %)	FLAT UP TO	FLAT UP TO
Road Surface (condition?)	GOOD	GOOD
Sidewalk	✓	✓
Street Lighting	✓	✓

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	113 DEAD END	150 (FRONT ST)
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	—	2WAY STOP
Driveways/Mid-Block Approaches	2	2
Other		

4. **Visual obstructions (land use type)**
   Double track? Y ~~N~~ (3)
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: ~~GAS STATION / ROW~~ COMERCIAL
   Northwest: ~~PARK / ROW~~ COMMERCIAL
   Southeast: ~~ROW / HOUSING COMMERCIAL~~ EMPTY
   Southwest: ~~ROW / COMMERCIAL~~ FARM

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 178
   b. Distance Observed Near (South or West): > 178
   c. Distance Observed Far (North or East): > 178

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:
   a. Stopping Sight Distance per Table Near:
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062589A

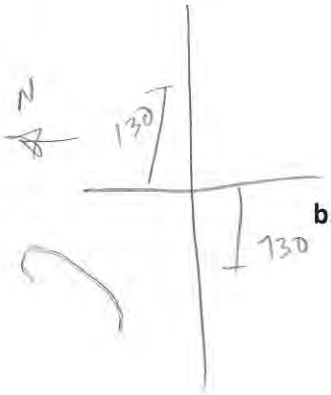
Road/Trail Crossing Name: 110 AVE S

City/Jurisdiction: COMSTOCK

Train Speed: 60 Posted Speed Limit: 55

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	—	—
Flashers	—	—
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	—
Other		



   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	✓	✓
Other	—	—

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	—	—
Stop Bars	—	—
RXR Pavement Marking	✓	✓
Other	LOOK FOR TRAINS W10-X3	LOOK FOR TRAINS W10-X3

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit		
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	6'	8'
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAL	LINEAL
Vertical Road Geo (grade %)	FLAT@	FLAT@
Road Surface (condition?)	GOOD	GOOD
Sidewalk	—	—
Street Lighting	—	—

24'

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	(160') 18TH ST S ~~500~~	>500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	T INTERSECTION 1 WAY STOP	
Driveways/Mid-Block Approaches	1	1
Other		

4. **Visual obstructions (land use type)**

   Double track? N

   Identify the land use/visual or sight line Obstruction for each quadrant:

   Northeast: FARM

   Northwest: DOW/18TH STS

   Southeast: FARM

   Southwest: FARM

5. **Vertical Curve or Humped Crossing**

   Identify Vertical Curves on track alignment: N

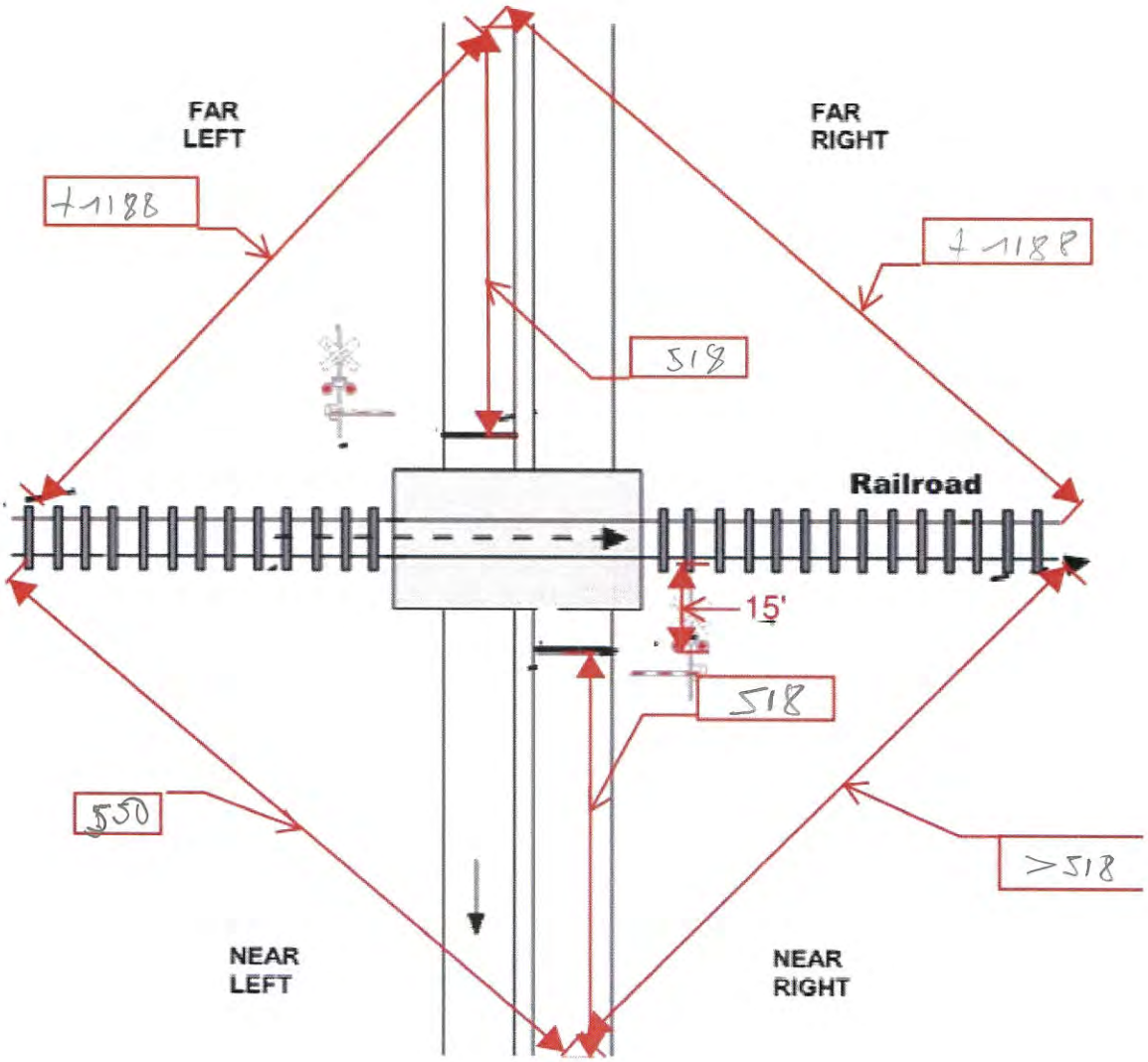
   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 518
   b. Distance Observed Near (South or West): > 518
   c. Distance Observed Far (North or East): > 518

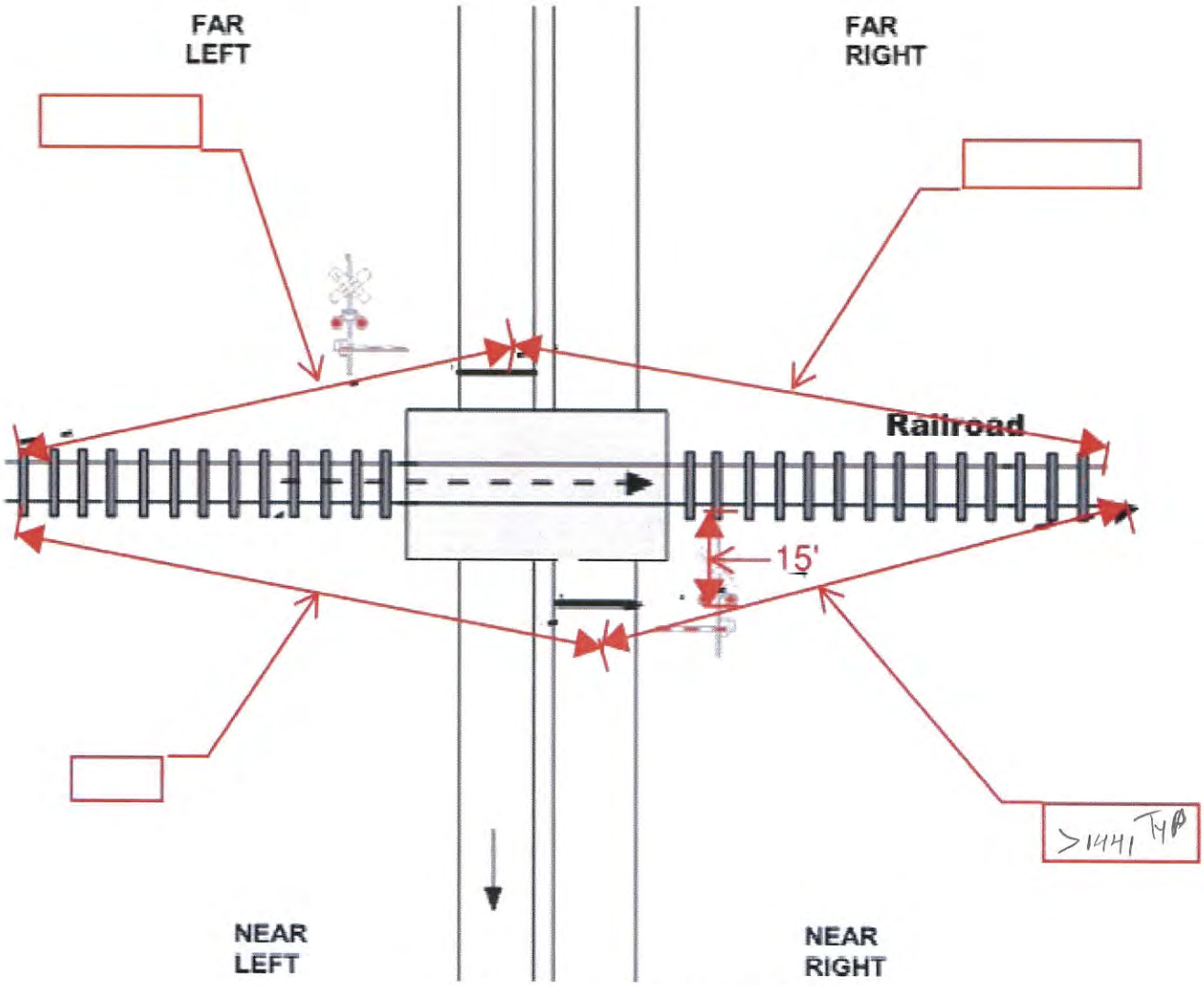
7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 60
   a. Stopping Sight Distance per Table Near: 518
   b. Stopping Sight Distance per Table Far: 518
   c. Distance Along Tracks Required per Table: 666
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 60
   a. Clearing Distance Required per Table: 1441
   b. Distance Along Tracks Observed-Near Right: > 1441
   c. Distance Along Tracks Observed-Near Left: > 1441
   d. Distance Along Tracks Observed-Far Right: > 1441
   e. Distance Along Tracks Observed-Far Left: > 1441

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**



APPROACHING SIGHT DISTANCE



CLEARING SIGHT DISTANCE

7

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062943 E

Road/Trail Crossing Name: Main St. -

City/Jurisdiction: Dilworth

Train Speed: 79 Posted Speed Limit: 30 mph

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	Y	Y
Flashers	Y	Y
Cantilever	N	N
Non-Mountable Medians (length)	59'	100'
Ped Devices (Gates, Maze, Signage, etc)	N	N
Bell	—	Y
Other		

   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other	—	—

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	✓	✓
Stop Bars	✓	✓
RXR Pavement Marking	✓	✓
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	30	30
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	4'	4'
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAR	LINEAR
Vertical Road Geo (grade %)	FLAT	FLAT
Road Surface (condition?)	OK	OK
Sidewalk	N	N
Street Lighting	—	—

26'

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	>500 COUNTY 78, COUNTY 91	~~RSR~~ 220 2ND AVE SE
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	3	0
Driveways/Mid-Block Approaches	3	1
Other		

4. **Visual obstructions (land use type)**
   Double track? Y 3
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: BNSF YARD
   Northwest: EMPTY
   Southeast: " "
   Southwest: " "

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 220 FT
   b. Distance Observed Near (South or West): _____
   c. Distance Observed Far (North or East): _____

7. **Approaching Sight Distance (Passive Only):**
   Train Speed: _____
   a. Stopping Sight Distance per Table Near: _____
   b. Stopping Sight Distance per Table Far: _____
   c. Distance Along Tracks Required per Table: _____
   d. Distance Along Tracks Observed-Near Right: _____
   e. Distance Along Tracks Observed-Near Left: _____
   f. Distance Along Tracks Observed-Far Right: _____
   g. Distance Along Tracks Observed-Far Left: _____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: _____
   a. Clearing Distance Required per Table: _____
   b. Distance Along Tracks Observed-Near Right: _____
   c. Distance Along Tracks Observed-Near Left: _____
   d. Distance Along Tracks Observed-Far Right: _____
   e. Distance Along Tracks Observed-Far Left: _____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

Crossing #: 062943E

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062939P

Road/Trail Crossing Name: 70TH ST S

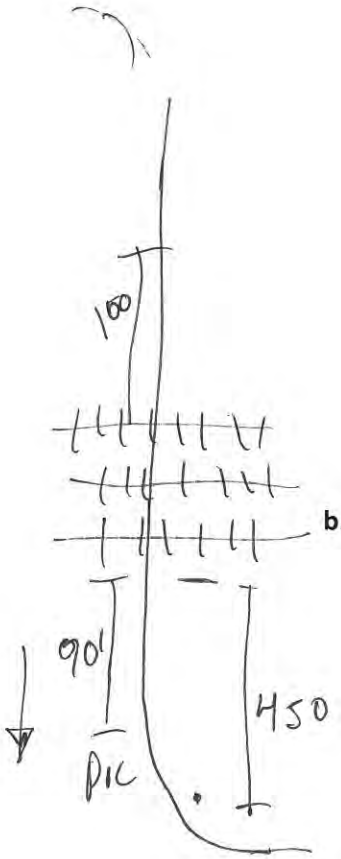
City/Jurisdiction: DILWORTH

Train Speed: 75 Posted Speed Limit: 55

1. **Warning Devices:**

a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	✓	✓
Other		



b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other		

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)		
No Train Horn	—	—
Stop Bars	—	—
RXR Pavement Marking	✓	✓
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	—	—
No. Thru Lanes	✓	✓
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	5'	5'
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAL	450' TO CURVE
Vertical Road Geo (grade %)	FLAT	FLAT
Road Surface (condition?)	XING OK, ROAD BAD	OK
Sidewalk	—	—
Street Lighting	—	—

26'

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	> 500	> 500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	Ⓝ	Ⓝ
Driveways/Mid-Block Approaches	3	2
Other		

4. **Visual obstructions (land use type)**
   Double track? 3
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: INDUSTRIAL
   Northwest: " "
   Southeast: " "
   Southwest: " "

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 518
   b. Distance Observed Near (South or West): >518
   c. Distance Observed Far (North or East): 450

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:
   a. Stopping Sight Distance per Table Near:
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

(4)

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 071009F

Road/Trail Crossing Name: 9TH ST EAST

City/Jurisdiction: FARGO

Train Speed: 60 Posted Speed Limit: 35

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	✓
Other		

   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other	—	—

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	—	✓
No Train Horn	—	—
Stop Bars	—	—
RXR Pavement Marking	—	—
Other	SPEED LIMIT 473 FT FROM TRACK	✓ 270 FROM TRACK

2. Roadway Information:

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	35	35
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	7.5 TYP	7.5 TYP
Bike/Share-o Lanes	—	—
Horizontal Road Geo	UP TO	UP TO
Vertical Road Geo (grade %)	UP TO	UP TO
Road Surface (condition?)	GOOD	GOOD
Sidewalk	—	—
Street Lighting	—	—

3. Roadway Intersections/Traffic

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	> 500	> 500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	—	Y,
Driveways/Mid-Block Approaches	—	1
Other		

4. **Visual obstructions (land use type)**
   Double track? Y (2)
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: INDUSTRIAL
   Northwest: OPEN FIELD GATES
   Southeast: OPEN FIELD
   Southwest: " " , INDUSTRIAL

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 272 FT
   b. Distance Observed Near (South or West): >272
   c. Distance Observed Far (North or East):

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:
   a. Stopping Sight Distance per Table Near:
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

Google Earth Pro

feet 1000
meters 300

(17) (63)

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 070828T

Road/Trail Crossing Name: 27TH ST N

City/Jurisdiction: FARGO

Train Speed: 60 Posted Speed Limit: 25

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	✓	✓
Other		

   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other		

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	Yes	✓
No Train Horn	—	—
Stop Bars	✓	No
RXR Pavement Marking	✓	No
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	25	25
No. Thru Lanes	2	2
Turn Lanes	–	–
Bypass Lanes (School Bus/HazMat)	–	–
Shoulder Width	– std.	– std.
Bike/Share-o Lanes	–	–
Horizontal Road Geo	110' From crossing to curve center	—
Vertical Road Geo (grade %)	slight uphill to crossing	slight uphill to crossing
Road Surface (condition?)	Good	Good. Curbs are poor
Sidewalk	—	—
Street Lighting	✓	

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	>500	~~363~~ 325
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	~~TURN~~, CURVE	INTERSECTION 2 WAY STOP -TRAFFIC STOP
Driveways/Mid-Block Approaches	8	~~6~~ 2 within ~~365~~ 325'
Other	–	–

4. **Visual obstructions (land use type)**
   Double track? Y 2
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: Junkyard
   Northwest: Industrial
   Southeast: Gravel Parking Lot
   Southwest: RR ROW / Commercial

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: No

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): No

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: ≅ 178'
   b. Distance Observed Near (South or West): > 178'
   c. Distance Observed Far (North or East): > 178'

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:_____
   a. Stopping Sight Distance per Table Near:_____
   b. Stopping Sight Distance per Table Far:_____
   c. Distance Along Tracks Required per Table:_____
   d. Distance Along Tracks Observed-Near Right:_____
   e. Distance Along Tracks Observed-Near Left:_____
   f. Distance Along Tracks Observed-Far Right:_____
   g. Distance Along Tracks Observed-Far Left:_____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:_____
   a. Clearing Distance Required per Table:_____
   b. Distance Along Tracks Observed-Near Right:_____
   c. Distance Along Tracks Observed-Near Left:_____
   d. Distance Along Tracks Observed-Far Right:_____
   e. Distance Along Tracks Observed-Far Left:_____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

_____
_____
_____

18

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 070868R

Road/Trail Crossing Name: MAIN AVE

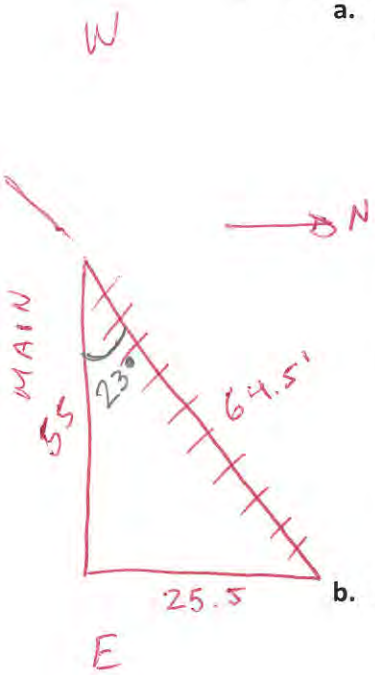
City/Jurisdiction: FARGO

Train Speed: 10

Posted Speed Limit: 35 30

1. **Warning Devices:**

   a. **Active**



	Near (South or West) Side	Far (North or East) Side
Gates	—	—
Flashers	✓	✓
Cantilever	✓	✓
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	✓	✓
Other	—	—

   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other		

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	— ✓ YES	—
No Train Horn	—	—
Stop Bars	3	3
RXR Pavement Marking	✓	✓
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	30	30
No. Thru Lanes	2	2
Turn Lanes	1	1
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	TYP	TYP
Bike/Share-o Lanes	—	—
Horizontal Road Geo	STRAIT LINE ⟷	
Vertical Road Geo (grade %)	FLAT	FLAT
Road Surface (condition?)	GOOD	GOOD
Sidewalk	✓	✓
Street Lighting	✓	✓

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	>500'	35'
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	—	2 T INTERSECTION 1 WAY STOP/EACH
Driveways/Mid-Block Approaches	4	2
Other		

4. **Visual obstructions (land use type)**
   Double track? N 1
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: COMMERCIAL / PK LOT
   Northwest: " "
   Southeast: " "
   Southwest: " " / EMPTY

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: ≅ 272
   b. Distance Observed Near (South or West): > 272
   c. Distance Observed Far (North or East): > 272

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:
   a. Stopping Sight Distance per Table Near:
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 10
   a. Clearing Distance Required per Table: 240'
   b. Distance Along Tracks Observed-Near Right: > 240 (20 FROM TRACK) / > 240 FROM STOP BAR)
   c. Distance Along Tracks Observed-Near Left: > 240 / > 240
   d. Distance Along Tracks Observed-Far Right: > 240 (20 FROM TRACK) / > 240 FROM STOP BAR
   e. Distance Along Tracks Observed-Far Left: 120 (20 FROM TRACK) / > 240 FROM STOP BAR

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**
   STOP SIGN/LIGHT IN NEAR SIDE IS LOCATED 45' WEAST OF TRACK

   If Tint business trailer is parked in roadway or Rail RW - consider enforcing/not allowing to park there.

Google Earth Pro

feet 700
meters 200

27

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 070859S

Road/Trail Crossing Name: BOLLEY DR

City/Jurisdiction: FARGO

Train Speed: 50 MPH

Posted Speed Limit: 15 MPH

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	NO	NO
Flashers	NO	NO
Cantilever	NO	NO
Non-Mountable Medians (length)	NO	NO
Ped Devices (Gates, Maze, Signage, etc)	NO	NO
Bell	NO	NO
Other	NO	NO

   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	~~NO~~ YES	R15-1 YES
Yield	NO YES	NO YES
Stop	~~NO~~	~~NO~~
Other	2 TRACKS	2 TRACKS

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	NO	NO
No Train Horn	NO	NO
Stop Bars	NO	NO
RXR Pavement Marking	NO	NO
Other	R2-1 15 MPH ~~W13-1~~ (3041)	NOT

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	15 MPH	NOT
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	—	—
Bike/Share-o Lanes	—	—
Horizontal Road Geo	—	—
Vertical Road Geo (grade %)	slight up to crossing	slight — up To Crossing
Road Surface (condition?)	GOOD IN XING →	" "
Sidewalk	YES	YES
Street Lighting	—	YES

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	400'	460'
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	SIGNAL	T INTERSECTION 1 WAY STOP
Driveways/Mid-Block Approaches	~~SEVERAL~~ 2	~~SEVERAL~~ 3
Other		

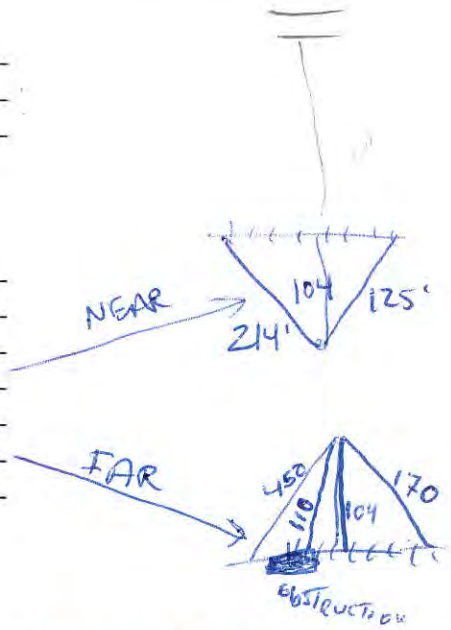
4. **Visual obstructions (land use type)**
   Double track? 4 - 2
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: NDSU CAMPUS
   Northwest: NDSU CAMPUS
   Southeast: NDSU CAMPUS
   Southwest: NDSU PKL

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: NONE

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): NONE

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 104'
   b. Distance Observed Near (South or West): > 104
   c. Distance Observed Far (North or East): > 104

7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 50
   a. Stopping Sight Distance per Table Near: 104
   b. Stopping Sight Distance per Table Far: 104
   c. Distance Along Tracks Required per Table: 379'
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:



8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 50 / 30
   a. Clearing Distance Required per Table: 1200 / 721
   b. Distance Along Tracks Observed-Near Right: 280 TRACKS END AT 280
   c. Distance Along Tracks Observed-Near Left: 240
   d. Distance Along Tracks Observed-Far Right: 335
   e. Distance Along Tracks Observed-Far Left: 300 END OF TRACKS

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**
   - HIGH PED USE (STUDENTS) AND BICYCLE
   - TRAIN SPEED MUCH LOWER THAN 50 MPH.

Google Earth Pro

feet 1000

meters 400

25

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

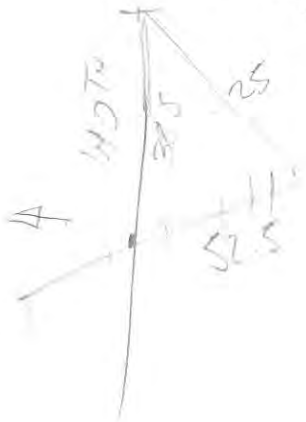
FRA Rail Crossing Number: 092956M

Road/Trail Crossing Name: 40TH AVE NW #C-0928

City/Jurisdiction: FARGO

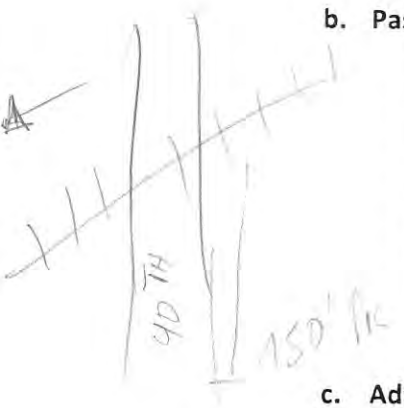
Train Speed: 40 Posted Speed Limit: 55

1. **Warning Devices:**



a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	✓	✓
Other	—	—



b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	
Other		

c. **Advanced Signage/Pavement Markings**

NEAR SIDE ASPHALT ENDS 370' WEST OF THE TRACKS

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓ LOCATED >500 FROM CROSSING
No Train Horn	—	—
Stop Bars	✓	✓
RXR Pavement Marking	✓	— ✓ LOCATED >500 FROM XING
Other	OM3-L	OM3R

* OM3- OBSTRUCTION ADJACENT TO OR WITHIN THE ROADWAY

2. Roadway Information:

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit		
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	7'	7'
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAR	LINEAR
Vertical Road Geo (grade %)	UP TO CROSSING	UP TO CROSSING
Road Surface (condition?)	GOOD	GOOD
Sidewalk	—	—
Street Lighting	—	—

3. Roadway Intersections/Traffic

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	178' (26ST NW)	> 500'
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)		—
Driveways/Mid-Block Approaches	—	—
Other		

4. **Visual obstructions (land use type)**

   Double track? N (1

   Identify the land use/visual or sight line Obstruction for each quadrant:

   Northeast: FARM

   Northwest: _____

   Southeast: "

   Southwest: "

5. **Vertical Curve or Humped Crossing**

   Identify Vertical Curves on track alignment: N

   _____

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: ≥ 518'
   b. Distance Observed Near (South or West): >518'
   c. Distance Observed Far (North or East): >518'

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:_____
   a. Stopping Sight Distance per Table Near: _____
   b. Stopping Sight Distance per Table Far: _____
   c. Distance Along Tracks Required per Table: _____
   d. Distance Along Tracks Observed-Near Right: _____
   e. Distance Along Tracks Observed-Near Left: _____
   f. Distance Along Tracks Observed-Far Right: _____
   g. Distance Along Tracks Observed-Far Left: _____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:_____
   a. Clearing Distance Required per Table: _____
   b. Distance Along Tracks Observed-Near Right: _____
   c. Distance Along Tracks Observed-Near Left: _____
   d. Distance Along Tracks Observed-Far Right: _____
   e. Distance Along Tracks Observed-Far Left: _____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

_____

_____

_____

Google Earth Pro

feet 1000

meters 400

29

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

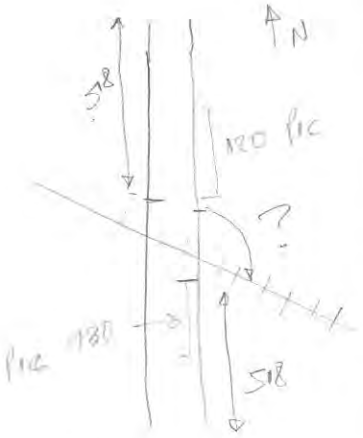
FRA Rail Crossing Number: 092950W

Road/Trail Crossing Name: County Rd 17N / C-0949

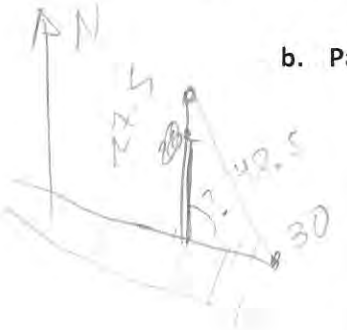
City/Jurisdiction: FARGO

Train Speed: 40 Posted Speed Limit: 55

1. **Warning Devices:**
   a. **Active**



	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	✓	✓
Other		



   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other		

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	—	—
No Train Horn	—	—
Stop Bars	✓	✓
RXR Pavement Marking	—	—
Other		

2. Roadway Information:

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	55	55
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	TYP	TYP
Bike/Share-o Lanes	—	—
Horizontal Road Geo	UNK	UNK
Vertical Road Geo (grade %)	FLAT	FLAT
Road Surface (condition?)	GOOD	GOOD
Sidewalk	—	—
Street Lighting	—	—

3. Roadway Intersections/Traffic

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	32ND AVE NW	32ND AVE NW
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	1 WAY STOP	1 WAY STOP
Driveways/Mid-Block Approaches	—	1
Other		

4. **Visual obstructions (land use type)**
   Double track? N 1
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: FARM
   Northwest: INDUSTRIAL
   Southeast: FARM
   Southwest: HOUSING

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

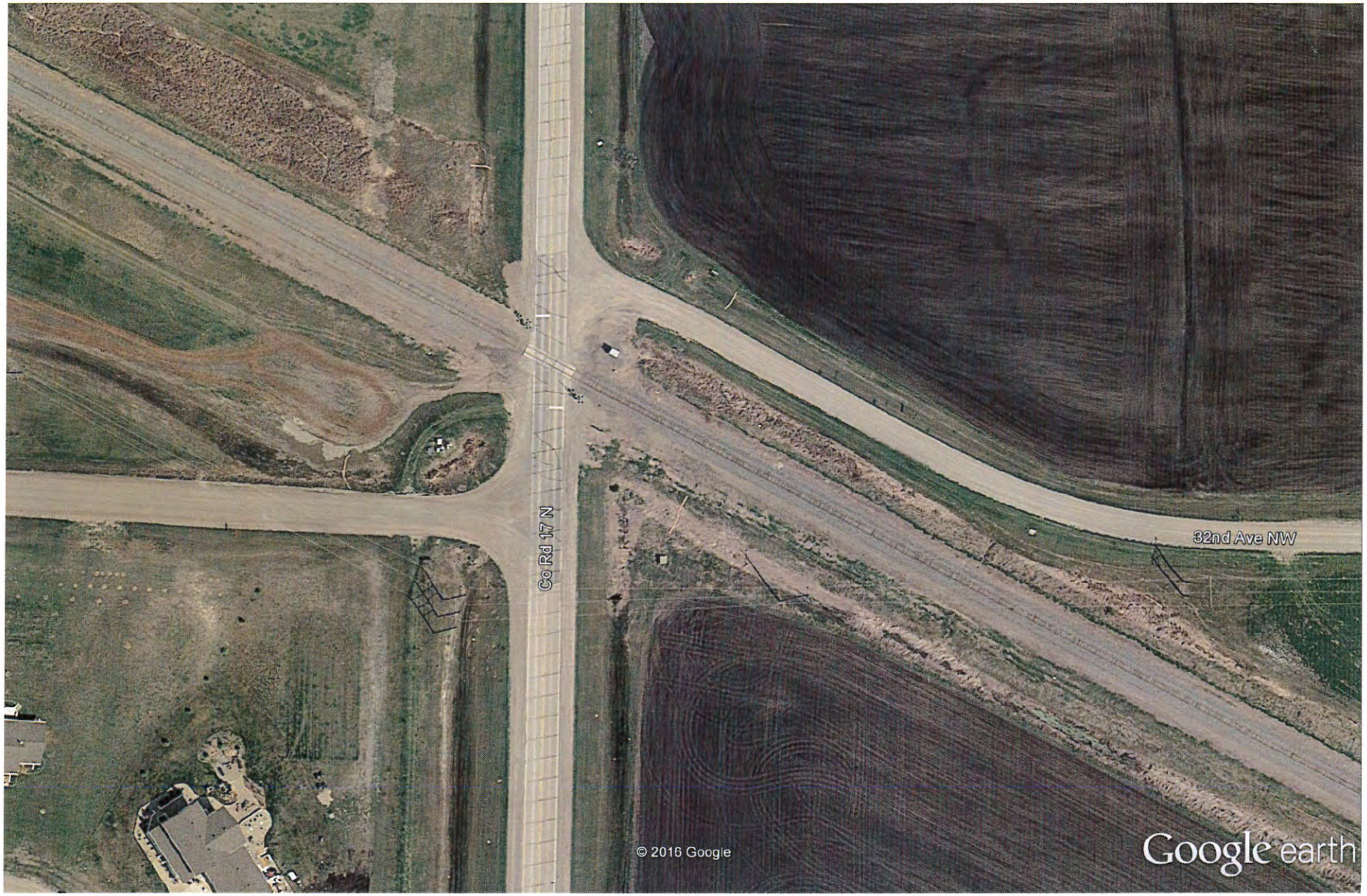
   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: ≈ 518
   b. Distance Observed Near (South or West): >518
   c. Distance Observed Far (North or East): >518

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:
   a. Stopping Sight Distance per Table Near:
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**



Google Earth Pro

feet 1000
meters 300

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 081743W

Road/Trail Crossing Name: 3RD ST

City/Jurisdiction: GARDNER/ARGUSVILLE

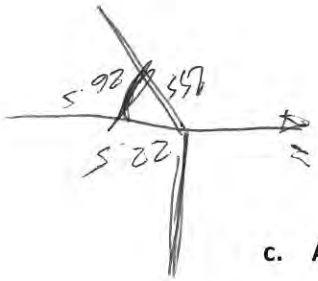
Train Speed: 70 Posted Speed Limit: 25

1. **Warning Devices:**

a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	✓
Other	—	—

b. **Passive**



	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other	—	—

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	—	—
Stop Bars	—	—
RXR Pavement Marking	—	—
Other	—	—

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	–	–
No. Thru Lanes	2	2
Turn Lanes	–	–
Bypass Lanes (School Bus/HazMat)	–	–
Shoulder Width	–	–
Bike/Share-o Lanes	–	–
Horizontal Road Geo	CURVE	LINE
Vertical Road Geo (grade %)	UP TO TRACKS →	
Road Surface (condition?)	GRAVEL	GRAVEL
Sidewalk	–	–
Street Lighting	–	–

24'

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	178 ~~NORTHERN~~ ~~500~~ DR	178 CENTENNIAL DR
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	Ø	Ø
Driveways/Mid-Block Approaches	2	–
Other	–	–

4. **Visual obstructions (land use type)**
   Double track? N (1)
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: ROW / EMPTY
   Northwest: ROW / HOUSING
   Southeast: ROW / EMPTY
   Southwest: ROW / EMPTY / HOUSING

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 178'
   b. Distance Observed Near (South or West): >178
   c. Distance Observed Far (North or East): >178

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:
   a. Stopping Sight Distance per Table Near:
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 081389S

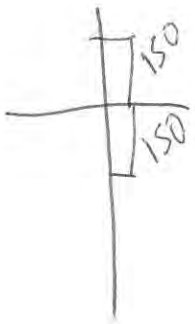
Road/Trail Crossing Name: 1ST STREET

City/Jurisdiction: GARDNER / ARGUSVILLE

Train Speed: 70 Posted Speed Limit: 40

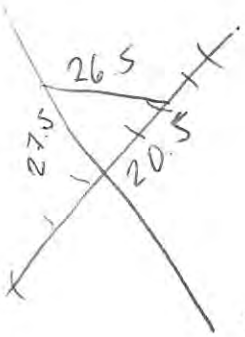
1. **Warning Devices:**

a. **Active**



	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	✓
Other	—	—

b. **Passive**



	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other	—	—

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	—	—
Stop Bars	✓	✓
RXR Pavement Marking	✓	✓
Other	STOP AHEAD	STOP

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit		
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	3'	3'
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAR ↔	
Vertical Road Geo (grade %)	FLAT	FLAT
Road Surface (condition?)	GOOD ↔	
Sidewalk	—	—
Street Lighting	—	—

24'

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	~~0~~ 362' NORTHERN DR	(239') & COUNTY
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	1 INTERSECTION — 1 WAY STOP	STOP
Driveways/Mid-Block Approaches	—	—
Other	—	—

387
1478
259

4. **Visual obstructions (land use type)**

   Double track? 1

   Identify the land use/visual or sight line Obstruction for each quadrant:

   Northeast: ROW / COMMERCIAL

   Northwest: ROW

   Southeast: ROW

   Southwest: ROW / FARM

5. **Vertical Curve or Humped Crossing**

   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 751
   b. Distance Observed Near (South or West): > 751
   c. Distance Observed Far (North or East): > 751

7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 70
   a. Stopping Sight Distance per Table Near:
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 70
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062912F

Road/Trail Crossing Name: 90TH STS

City/Jurisdiction: GLYNDON

Train Speed: 75 Posted Speed Limit: 55

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	—	—
Flashers	—	—
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	—
Other		

   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	✓	✓
Other		

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	—	—
Stop Bars	—	—
RXR Pavement Marking	—	—
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	—	—
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	—	—
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAL	LINEAL
Vertical Road Geo (grade %)	FLAT	FLAT
Road Surface (condition?)	GRAVEL	GRAVEL
Sidewalk	—	—
Street Lighting	—	—

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	>500	>500 HWY 10
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	—	STOP, YIELD
Driveways/Mid-Block Approaches	1	1
Other		

4. **Visual obstructions (land use type)**
   Double track? Y 2
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: FARM
   Northwest: " "
   Southeast: " "
   Southwest: " "

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): GRAVEL

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 518
   b. Distance Observed Near (South or West): > 518
   c. Distance Observed Far (North or East): > 518

7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 75
   a. Stopping Sight Distance per Table Near: 518
   b. Stopping Sight Distance per Table Far: 518
   c. Distance Along Tracks Required per Table: 1000
   d. Distance Along Tracks Observed-Near Right: " "
   e. Distance Along Tracks Observed-Near Left: " "
   f. Distance Along Tracks Observed-Far Right: " "
   g. Distance Along Tracks Observed-Far Left: " "

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 75
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062911Y

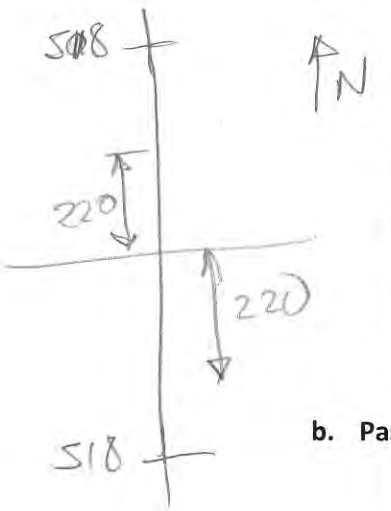
Road/Trail Crossing Name: 100TH ST S

City/Jurisdiction: GLYNDON

Train Speed: 75 Posted Speed Limit: 55

1. **Warning Devices:**

a. **Active**



	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	✓
Other		

b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other		

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	—	—
Stop Bars	✓	✓
RXR Pavement Marking	✓	✓
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	—	—
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	4	4
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAR ⟷	
Vertical Road Geo (grade %)	FLAT	FLAT
Road Surface (condition?)	GOOD	GOOD
Sidewalk	—	—
Street Lighting	—	—

241

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	> 500	> 500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	—	STOP AHEAD
Driveways/Mid-Block Approaches	—	SEVERAL
Other		

4. **Visual obstructions (land use type)**
   Double track? Y 12
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: INDUSTRIAL
   Northwest: INDUSTRIAL
   Southeast: FARM
   Southwest: FARM

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 518
   b. Distance Observed Near (South or West): > 518
   c. Distance Observed Far (North or East): > 518

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:
   a. Stopping Sight Distance per Table Near:
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062909X

Road/Trail Crossing Name: PARTRIDGE AVE

City/Jurisdiction: GLYNDON

Train Speed: 75 Posted Speed Limit: 30

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	✓
Other		

   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other	—	—

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	—	✓
No Train Horn	—	—
Stop Bars	—	—
RXR Pavement Marking	—	—
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit		
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	—	—
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAR	LINEAR
Vertical Road Geo (grade %)	S UP TO TRACKS ↔	
Road Surface (condition?)	OK	OK
Sidewalk	—	—
Street Lighting	—	—

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	4TH ST	3TH ST
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	2 WAY STOP	—
Driveways/Mid-Block Approaches	SEVERAL SOUTH OF 4TH	SEVERAL NORTH OF 3
Other	—	—

4. **Visual obstructions (land use type)**
   Double track? Y (3)
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: ROW HOUSING
   Northwest: "
   Southeast: "
   Southwest: ROW COMM/PARK

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: _____

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): _____

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 220 FT
   b. Distance Observed Near (South or West): >220
   c. Distance Observed Far (North or East): >220

7. **Approaching Sight Distance (Passive Only):**
   Train Speed: _____
   a. Stopping Sight Distance per Table Near: _____
   b. Stopping Sight Distance per Table Far: _____
   c. Distance Along Tracks Required per Table: _____
   d. Distance Along Tracks Observed-Near Right: _____
   e. Distance Along Tracks Observed-Near Left: _____
   f. Distance Along Tracks Observed-Far Right: _____
   g. Distance Along Tracks Observed-Far Left: _____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: _____
   a. Clearing Distance Required per Table: _____
   b. Distance Along Tracks Observed-Near Right: _____
   c. Distance Along Tracks Observed-Near Left: _____
   d. Distance Along Tracks Observed-Far Right: _____
   e. Distance Along Tracks Observed-Far Left: _____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

_____
_____
_____

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062920X

Road/Trail Crossing Name: PARK AVE S

City/Jurisdiction: GLYNDON

Train Speed: 75 MPH Posted Speed Limit: 30 MPH

1. **Warning Devices:**

a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	✓	
Bell	—	✓
Other		

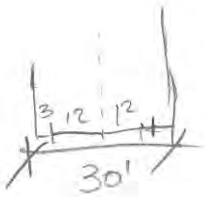
b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other		

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	—	—
Stop Bars	✓	✓
RXR Pavement Marking	✓	✓
Other		

2. **Roadway Information:**



	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	20 MPH SCHOOL ZONE	
No. Thru Lanes	1	1
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	3'	3'
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAR	LINEAR
Vertical Road Geo (grade %)	SLIGHTLY UP TO TRACKS ↔	
Road Surface (condition?)	OK	OK
Sidewalk	V	V
Street Lighting	—	—

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	122' (4TH ST SE)	XING 062922L (1121) (1911) 3rd ST SE
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	1 WAY STOP (TINT) SCHOOL	2 TRACK CROSSING (062922L)
Driveways/Mid-Block Approaches	—	—
Other		

4. **Visual obstructions (land use type)**

   Double track? Y (2)

   Identify the land use/visual or sight line Obstruction for each quadrant:

   Northeast: ROW HOUSING

   Northwest: ROW INDUSTRIAL

   Southeast: ROW PARK

   Southwest: " " "

5. **Vertical Curve or Humped Crossing**

   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 220
   b. Distance Observed Near (South or West): >220
   c. Distance Observed Far (North or East): >220

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:_____
   a. Stopping Sight Distance per Table Near:_____
   b. Stopping Sight Distance per Table Far: _____
   c. Distance Along Tracks Required per Table:_____
   d. Distance Along Tracks Observed-Near Right: _____
   e. Distance Along Tracks Observed-Near Left: _____
   f. Distance Along Tracks Observed-Far Right: _____
   g. Distance Along Tracks Observed-Far Left: _____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:_____
   a. Clearing Distance Required per Table: _____
   b. Distance Along Tracks Observed-Near Right: _____
   c. Distance Along Tracks Observed-Near Left: _____
   d. Distance Along Tracks Observed-Far Right: _____
   e. Distance Along Tracks Observed-Far Left: _____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 081388K

Road/Trail Crossing Name: 28TH ST SE

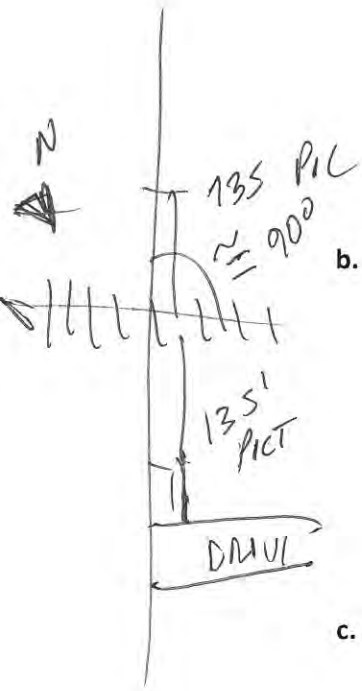
City/Jurisdiction: HARWOOD

Train Speed: 70 Posted Speed Limit: ~~55~~ 40

1. **Warning Devices:**

a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	✓	—
Other	—	—



b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	~~—~~	~~—~~ ✓
Stop	—	—
Other		

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	—	—
Stop Bars	✓	— (NEED TO BE REPLACED)
RXR Pavement Marking	✓	—
Other		STOP

2. Roadway Information:

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	40	40
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	—	—
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAR	LINEAR
Vertical Road Geo (grade %)	DOWN TO TRACK FROM ONE 66	UP TO TRACKS
Road Surface (condition?)	GOOD	GOOD
Sidewalk	—	—
Street Lighting	—	—

24

3. Roadway Intersections/Traffic

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	HWY 29	HWY 81 ~~>500 DEAD END~~
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)		DEAD END STOP
Driveways/Mid-Block Approaches	1	—
Other	—	—

4. **Visual obstructions (land use type)**

   Double track? N (1)

   Identify the land use/visual or sight line Obstruction for each quadrant:

   Northeast: ROW / ~~HWY 209~~ COUNTY RD 81

   Northwest: ROW / HWY 29

   Southeast: ROW / COUNTY RD 81

   Southwest: ROW / HWY 29

5. **Vertical Curve or Humped Crossing**

   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 324
   b. Distance Observed Near (South or West): >324
   c. Distance Observed Far (North or East): >324

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:
   a. Stopping Sight Distance per Table Near:
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062901T

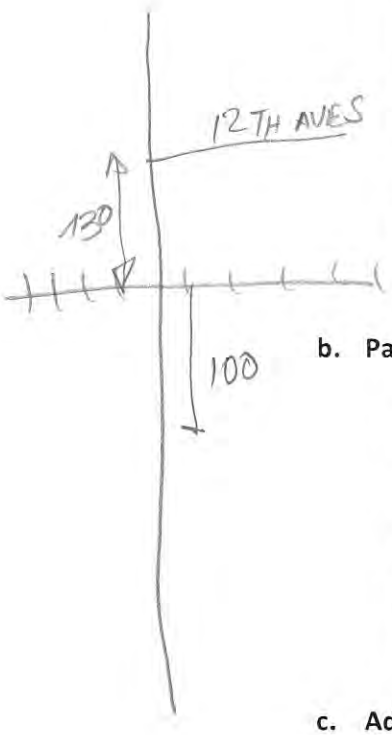
Road/Trail Crossing Name: 190TH ST S

City/Jurisdiction: HAWLEY

Train Speed: 79 MPH Posted Speed Limit: 55

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	✓
Other		



   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other		

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	—	—
Stop Bars	✓	✓
RXR Pavement Marking	✓ (ALMOST GONE)	✓
Other		

2. Roadway Information:

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit		
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	7-24-7	7-24-7
Bike/Share-o Lanes	—	—
Horizontal Road Geo	~~UP TO~~ LINEAL	LINEAL
Vertical Road Geo (grade %)	UP TO	UP TO
Road Surface (condition?)	OK	OK
Sidewalk	—	—
Street Lighting	—	—

3. Roadway Intersections/Traffic

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	>500	>500 ~~>500~~
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	NO PASSING	NO PASSING
Driveways/Mid-Block Approaches	≥ 1	>500
Other		

4. **Visual obstructions (land use type)**

   Double track? Y 2

   Identify the land use/visual or sight line Obstruction for each quadrant:

   Northeast: BNSF ROW / Woods

   Northwest: " "

   Southeast: " "

   Southwest: " "

5. **Vertical Curve or Humped Crossing**

   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 518
   b. Distance Observed Near (South or West): > 518
   c. Distance Observed Far (North or East): > 518

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:_____
   a. Stopping Sight Distance per Table Near:_____
   b. Stopping Sight Distance per Table Far:_____
   c. Distance Along Tracks Required per Table:_____
   d. Distance Along Tracks Observed-Near Right:_____
   e. Distance Along Tracks Observed-Near Left:_____
   f. Distance Along Tracks Observed-Far Right:_____
   g. Distance Along Tracks Observed-Far Left:_____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:_____
   a. Clearing Distance Required per Table:_____
   b. Distance Along Tracks Observed-Near Right:_____
   c. Distance Along Tracks Observed-Near Left:_____
   d. Distance Along Tracks Observed-Far Right:_____
   e. Distance Along Tracks Observed-Far Left:_____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

CITY 30MPH

FRA Rail Crossing Number: 062894K

Road/Trail Crossing Name: PEDESTRIAN PATHWAY

City/Jurisdiction: HAWLEY

Train Speed: 75 Posted Speed Limit:

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	—	—
Flashers	—	—
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	—
Other		

   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other	—	—

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	—
No Train Horn	—	—
Stop Bars	—	—
RXR Pavement Marking	—	—
Other	—	—

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	PEDESTRIAN XING	
No. Thru Lanes	—	—
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	—	—
Bike/Share-o Lanes	—	—
Horizontal Road Geo		
Vertical Road Geo (grade %)		
Road Surface (condition?)	GRAVEL/[illegible]	GRAVEL/CONCRETE
Sidewalk	—	—
Street Lighting	✓	—

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	47' (5TH ST)	501
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	—	—
Driveways/Mid-Block Approaches	—	—
Other	3 TRACKS	3 TRACK

4. **Visual obstructions (land use type)**
   Double track? Y (3)
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: HOUSING
   Northwest: COMERCIAL
   Southeast: HOUSING
   Southwest: HOUSING / COMERCIAL

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

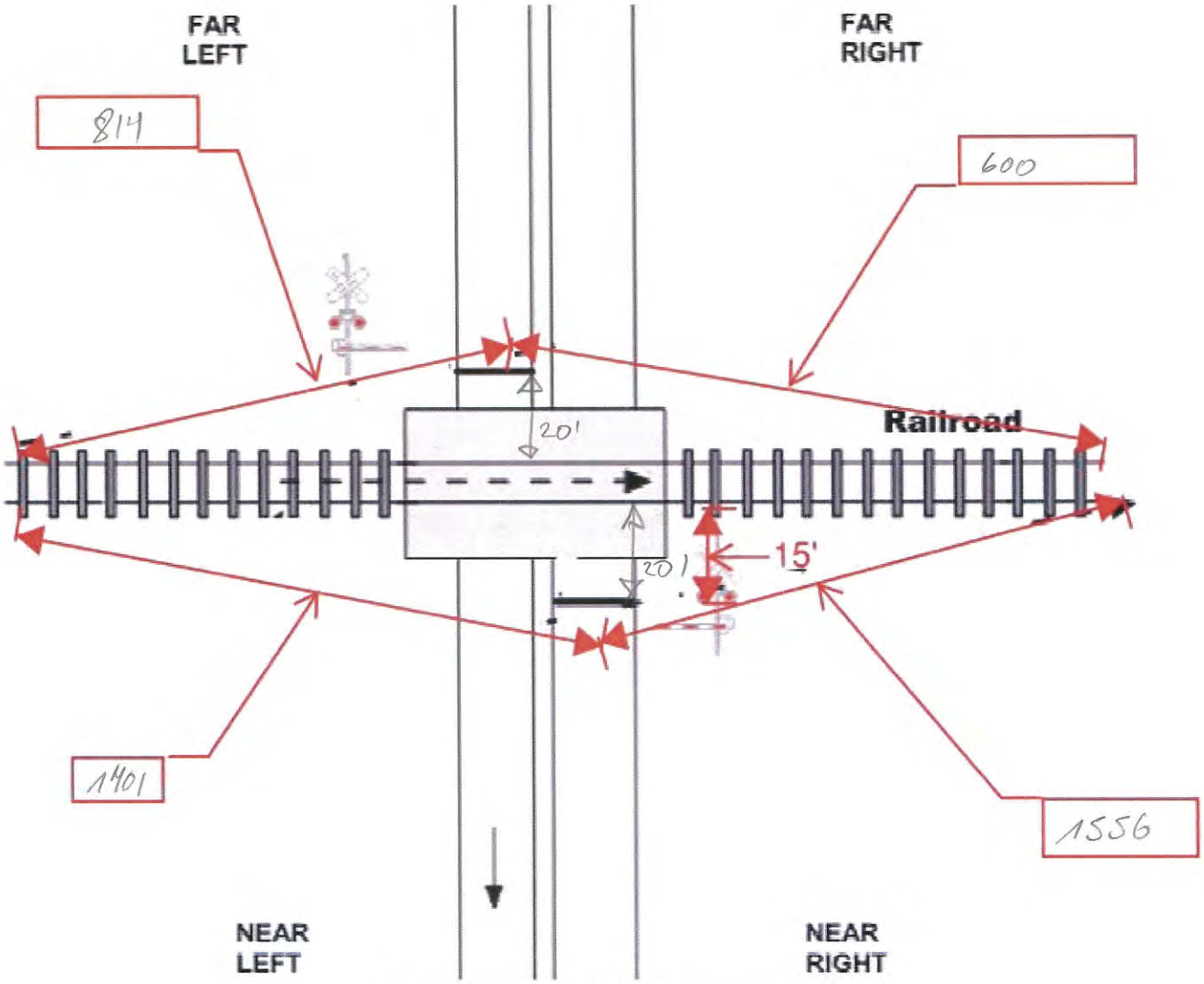
   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): GRAVEL / WOOD

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: —
   b. Distance Observed Near (South or West): 433
   c. Distance Observed Far (North or East): 500

7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 75
   a. Stopping Sight Distance per Table Near:
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 75
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right: 1556
   c. Distance Along Tracks Observed-Near Left: 1401
   d. Distance Along Tracks Observed-Far Right: 600
   e. Distance Along Tracks Observed-Far Left: 814

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**



CLEARING SIGHT DISTANCE

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062898M

Road/Trail Crossing Name: 230TH ST S

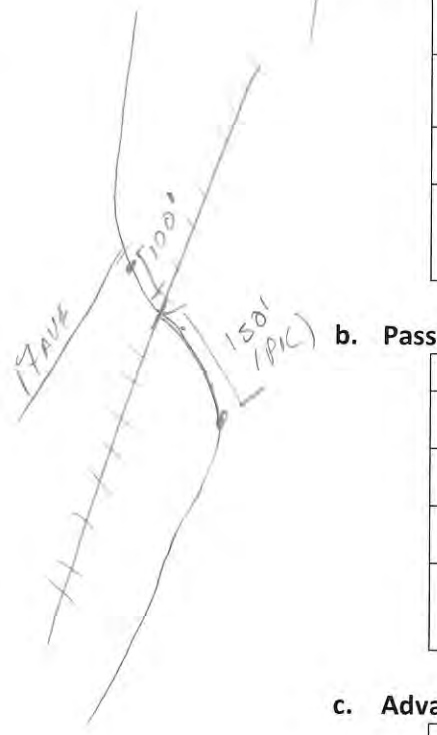
City/Jurisdiction: HAWLEY

Train Speed: 75 Posted Speed Limit: 55

1. **Warning Devices:**

a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	–	–
Non-Mountable Medians (length)	–	–
Ped Devices (Gates, Maze, Signage, etc)	–	–
Bell	–	–
Other		

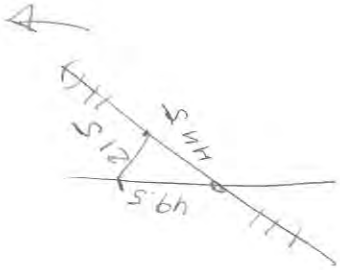


b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	–	–
Stop	–	–
Other		

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	–	–
Stop Bars	✓	✓
RXR Pavement Marking	✓ (789' TO XING)	✓ (800' TO XING)
Other	NO PASSING ZONE	



2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	✓	✓
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	4	4
Bike/Share-o Lanes	STRIPED —	—
Horizontal Road Geo	FLAT GRADE	FLAT GRADE
Vertical Road Geo (grade %)	FLAT	FLAT
Road Surface (condition?)	GOOD	GOOD
Sidewalk	—	—
Street Lighting	—	—

ROAD 24'

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	> 500	100' (17TH AVES)
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)		1 WAY STOP
Driveways/Mid-Block Approaches	—	—
Other		

4. **Visual obstructions (land use type)**
   Double track? 1 (2)
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: FARM
   Northwest: FARM
   Southeast: FARM
   Southwest: FARM

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 518'
   b. Distance Observed Near (South or West): > 518
   c. Distance Observed Far (North or East): > 518

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:
   a. Stopping Sight Distance per Table Near:
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062716Y

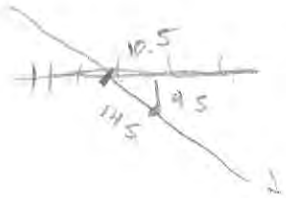
Road/Trail Crossing Name: 163RD AVE SE

City/Jurisdiction: KINDRED

Train Speed: 25 ~~55~~ Posted Speed Limit: 55

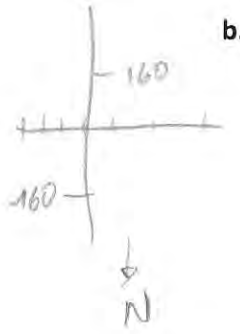
1. **Warning Devices:**

a. **Active**



	Near (South or West) Side	Far (North or East) Side
Gates	—	—
Flashers	—	—
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	—
Other	—	—

b. **Passive**



	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other	—	—

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	—	—
No Train Horn	—	—
Stop Bars	—	—
RXR Pavement Marking	—	—
Other	—	—

2. **Roadway Information:**

ROAD WIDTH 12'

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	—	—
No. Thru Lanes	1	1
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	—	—
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAL	LINEAL
Vertical Road Geo (grade %)	UP TO TRACK	UP TO TRACK
Road Surface (condition?)	EARTH	EARTH
Sidewalk	—	—
Street Lighting	—	—

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	50TH ST SE	50TH ST SE
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	—	—
Driveways/Mid-Block Approaches	—	—
Other	—	—

4. **Visual obstructions (land use type)**
   Double track? N (1)
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: FARM
   Northwest: " "
   Southeast: " "
   Southwest: " "

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 518
   b. Distance Observed Near (South or West): > 518
   c. Distance Observed Far (North or East): > 518

7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 25
   a. Stopping Sight Distance per Table Near: 518
   b. Stopping Sight Distance per Table Far: 518
   c. Distance Along Tracks Required per Table: 333
   d. Distance Along Tracks Observed-Near Right: >333
   e. Distance Along Tracks Observed-Near Left: >333
   f. Distance Along Tracks Observed-Far Right: >333
   g. Distance Along Tracks Observed-Far Left: >333

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 25
   a. Clearing Distance Required per Table: ≅ 721
   b. Distance Along Tracks Observed-Near Right: >721
   c. Distance Along Tracks Observed-Near Left: >721
   d. Distance Along Tracks Observed-Far Right: >720
   e. Distance Along Tracks Observed-Far Left: >721

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**
   EL XING LOCATED IN MIDDLE OF FARMS.
   NOT HEAVY ~~[illegible]~~ ROADWAY 12' WIDE

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 071095E

Road/Trail Crossing Name: 161ST AVE SE

City/Jurisdiction: MAPLETON

Train Speed: 60 Posted Speed Limit: 55

1. **Warning Devices:**

a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	✓	✓
Ped Devices (Gates, Maze, Signage, etc)	✓	✓
Bell	✓	✓
Other		

b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other		

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	✓	✓
Stop Bars	✓	✓
RXR Pavement Marking	✓	—
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	—	—
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	~~TYP~~	~~TYP~~
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAR	LINEAR
Vertical Road Geo (grade %)	~~FLAT~~ UP TO XING	~~FLAT~~ UP TO XING
Road Surface (condition?)	GRAVEL ~~GOOD~~	GRAVEL ~~GOOD~~
Sidewalk	~~N~~	~~N~~
Street Lighting	—	—

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	~~1ST (MAIN ST)~~ >500	>500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	—	—
Driveways/Mid-Block Approaches	~~SEVERAL~~ SOUTH OF MAIN	—
Other		

4. **Visual obstructions (land use type)**
   Double track? Y (2)
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: RW / COMMERCIAL HOUSING FARM
   Northwest: RW HOUSING " FARM
   Southeast: RW / COMMERCIAL FARM
   Southwest: RW / FARM FARM

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

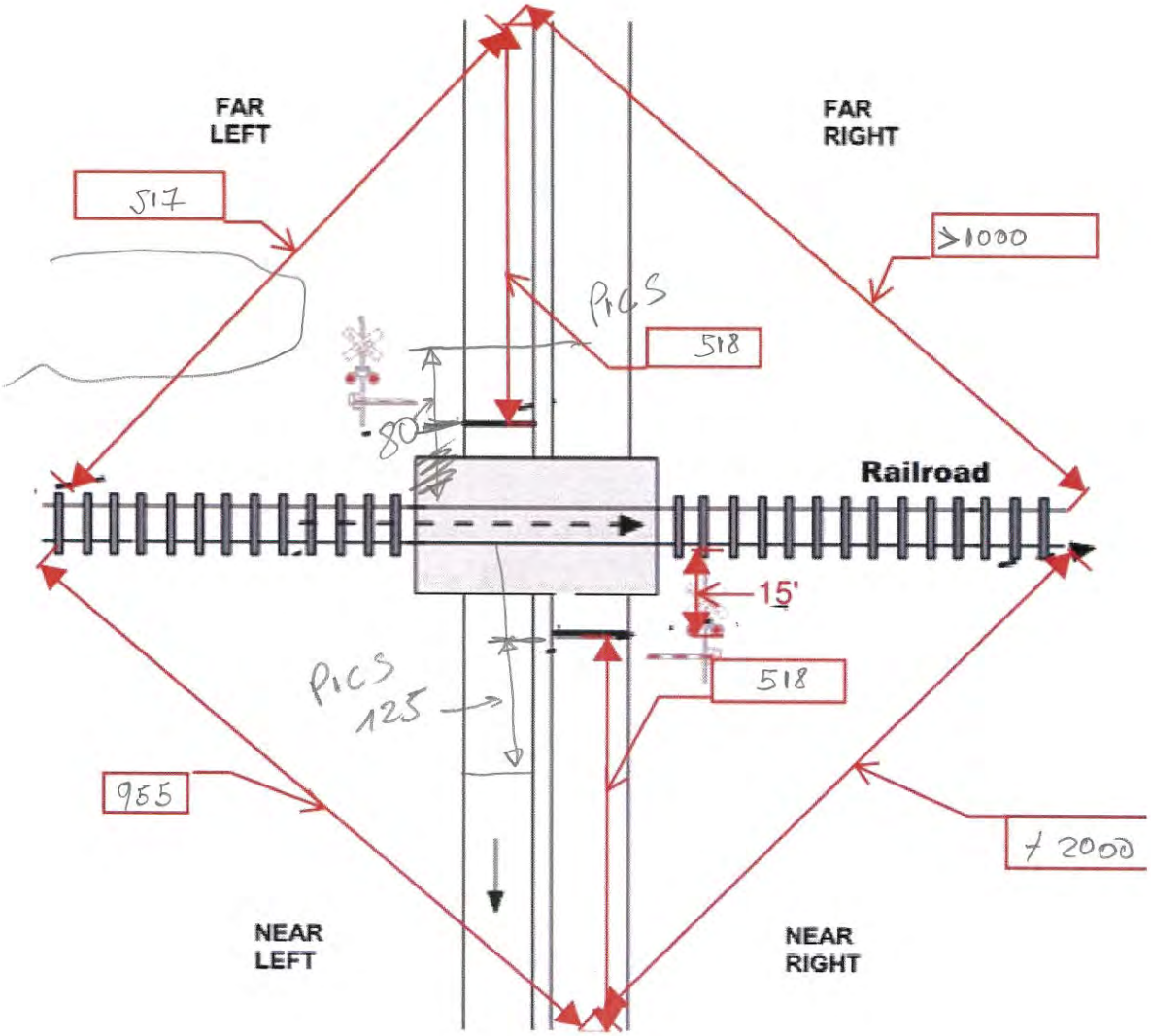
   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 518
   b. Distance Observed Near (South or West): > 518
   c. Distance Observed Far (North or East): > 518

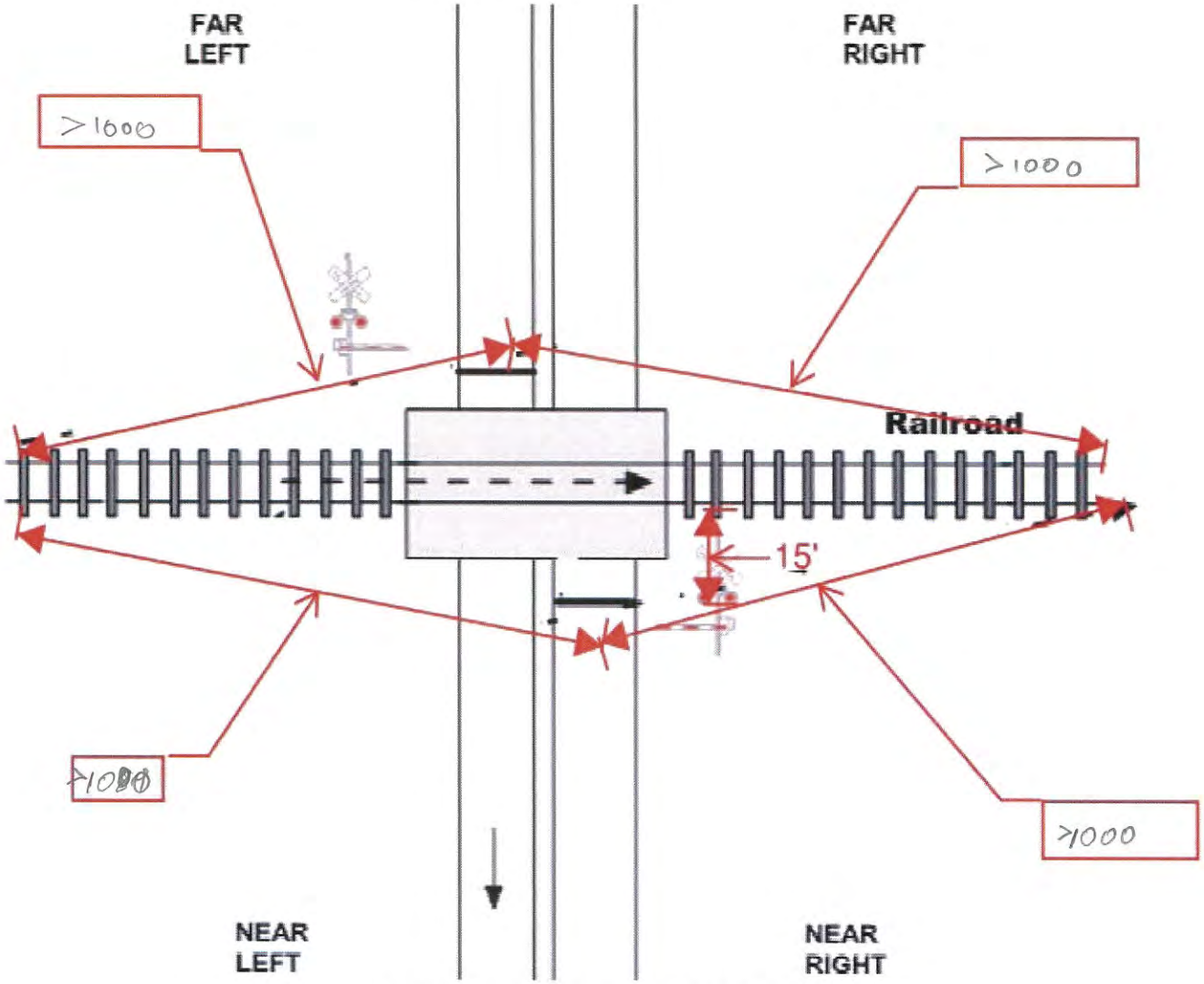
7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 60
   a. Stopping Sight Distance per Table Near: 650
   b. Stopping Sight Distance per Table Far: 650
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 1441 FT
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**



APPROACHING SIGHT DISTANCE



CLEARING SIGHT DISTANCE

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SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062582C

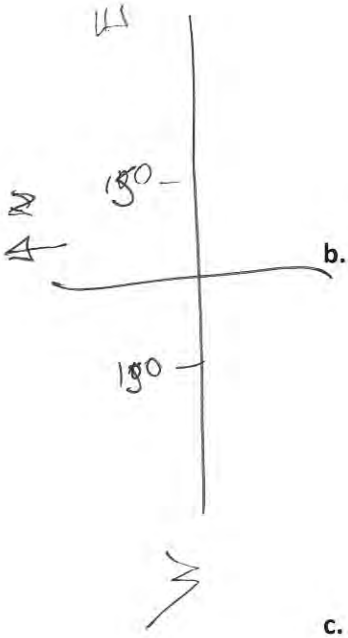
Road/Trail Crossing Name: 60TH AVE S

City/Jurisdiction: MOORHEAD

Train Speed: 60 MPH Posted Speed Limit: 55 MPH

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	✓
Other		



   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other		

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	— ✓	— ✓
No Train Horn	—	—
Stop Bars	— ✓	— ✓
RXR Pavement Marking	—	—
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	55	55
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	~~8~~ 7	8'
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAL	LINEAL
Vertical Road Geo (grade %)	FLAT	FLAT
Road Surface (condition?)	GOOD	GOOD
Sidewalk	— —	—
Street Lighting	✓	✓

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3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	>500	>500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	—	—
Driveways/Mid-Block Approaches	—	—
Other		

4. **Visual obstructions (land use type)**

   Double track? N

   Identify the land use/visual or sight line Obstruction for each quadrant:

   Northeast: farm

   Northwest: " "

   Southeast: farm

   Southwest: " "

5. **Vertical Curve or Humped Crossing**

   Identify Vertical Curves on track alignment: N

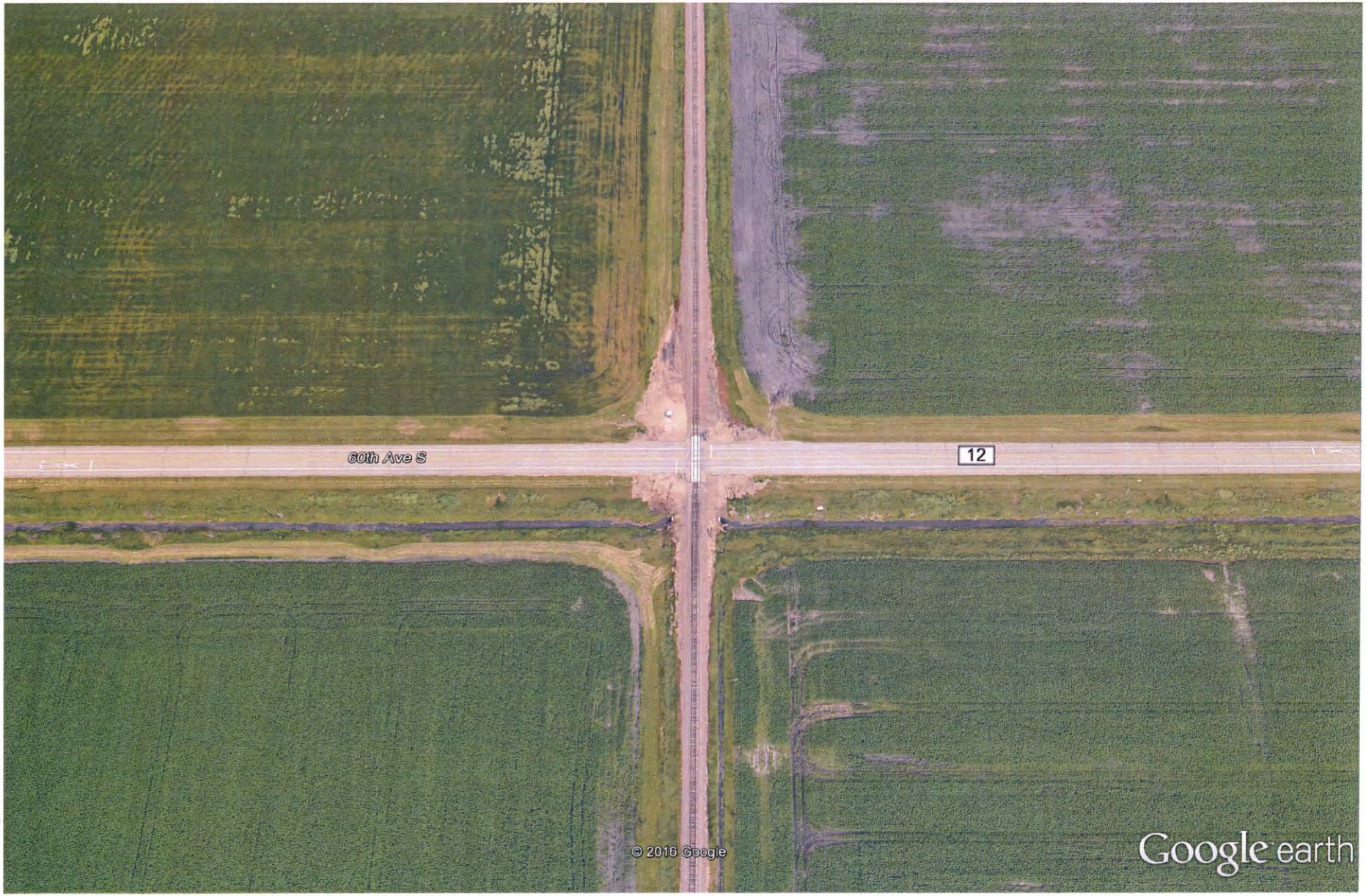
   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: ≥ 518'
   b. Distance Observed Near (South or West): > 518'
   c. Distance Observed Far (North or East): > 518

7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 60 MPH
   a. Stopping Sight Distance per Table Near: ~~518'~~
   b. Stopping Sight Distance per Table Far: ~~518'~~
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:
   a. Clearing Distance Required per Table: —
   b. Distance Along Tracks Observed-Near Right: —
   c. Distance Along Tracks Observed-Near Left: —
   d. Distance Along Tracks Observed-Far Right: —
   e. Distance Along Tracks Observed-Far Left: —

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**



Google Earth Pro

feet 700
meters 200

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062576Y

Road/Trail Crossing Name: East of 12th Ave S & 20th St intersection

City/Jurisdiction: Moorhead

Train Speed: 25 mph

Posted Speed Limit: 30 MPH both ways

1. **Warning Devices:**

   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	Y	Y
Flashers	Y	Y
Cantilever	N	N
Non-Mountable Medians (length)	N	N
Ped Devices (Gates, Maze, Signage, etc)	N	N
Bell	Y	Y
Other	60 Feet Between Tracks + Highway	

   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck		
Yield		
Stop		
Other		

   c. **Advanced Signage/Pavement Markings**

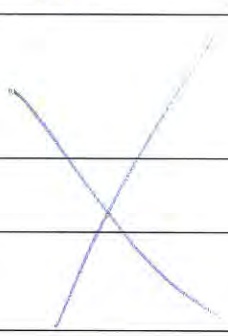
	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	Y	Y
No Train Horn		
Stop Bars	Y	Y
RXR Pavement Marking	Y	Y
Other	W10-11	W10-11

Cars under train horn N

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	30 mph	30 mph
No. Thru Lanes	1	1
Turn Lanes	1 left, 1 right	1 left turn
Bypass Lanes (School Bus/HazMat)	N	N
Shoulder Width	Bike Lane 5'	Bike Lane 5'
Bike/Share-o Lanes	Y	Y
Horizontal Road Geo	N	N
Vertical Road Geo (grade %)	Slight uphill grade no slopes	
Road Surface (condition?)	Fair	Fair
Sidewalk	N	N
Street Lighting	Y	N

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	120'	NA
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	Signalized	
Driveways/Mid-Block Approaches		
Other		

4. **Visual obstructions (land use type)**
   Double track? 5 Tracks
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: Tank Farm
   Northwest: 20th St & Residential
   Southeast: Light Industrial
   Southwest: 20th St & Residential

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: None

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): None

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 220'
   b. Distance Observed Near (South or West): > 220'
   c. Distance Observed Far (North or East): > 220'

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:_____
   a. Stopping Sight Distance per Table Near:_____
   b. Stopping Sight Distance per Table Far:_____
   c. Distance Along Tracks Required per Table:_____
   d. Distance Along Tracks Observed-Near Right:_____
   e. Distance Along Tracks Observed-Near Left:_____
   f. Distance Along Tracks Observed-Far Right:_____
   g. Distance Along Tracks Observed-Far Left:_____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:_____
   a. Clearing Distance Required per Table:_____
   b. Distance Along Tracks Observed-Near Right:_____
   c. Distance Along Tracks Observed-Near Left:_____
   d. Distance Along Tracks Observed-Far Right:_____
   e. Distance Along Tracks Observed-Far Left:_____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):** Gravel covering bike lanes near crossing

FRA Crossing #: 062576Y

Train timetable speed: 25 mph

Data Hwy speed: 30 mph

2

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 062576Y

Road/Trail Crossing Name: 12TH AV S

City/Jurisdiction: MOORHEAD

Train Speed: 60 Posted Speed Limit: ~~55~~ 30

1. **Warning Devices:**

a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	✓	✓
Flashers	✓	✓
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	✓	✓
Other		

b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other	—	—

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	✓	✓
No Train Horn	—	~~✓~~
Stop Bars	✓	✓
RXR Pavement Marking	✓	✓
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit		30
No. Thru Lanes	2	2
Turn Lanes	2	2
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	4	4
Bike/Share-o Lanes	✓	✓
Horizontal Road Geo	LINEAL	LINEAL
Vertical Road Geo (grade %)	UP TO TRACKS ↔	
Road Surface (condition?)	OK	OK
Sidewalk	—	—
Street Lighting	—	—

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	60' TO 20TH STS	>500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	R	
Driveways/Mid-Block Approaches		
Other		

4. **Visual obstructions (land use type)**

   Double track? Y 5

   Identify the land use/visual or sight line Obstruction for each quadrant:

   Northeast: RW / PATH / HOUSING RW INDUSTRIAL

   Northwest: _____

   Southeast: RW INDUSTRIAL

   Southwest: RW / HWY 5T / HOUSING

5. **Vertical Curve or Humped Crossing**

   Identify Vertical Curves on track alignment: N

   _____

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 518 / 220
   b. Distance Observed Near (South or West): > 518
   c. Distance Observed Far (North or East): > 220

7. **Approaching Sight Distance (Passive Only):**
   Train Speed:_____
   a. Stopping Sight Distance per Table Near: _____
   b. Stopping Sight Distance per Table Far: _____
   c. Distance Along Tracks Required per Table: _____
   d. Distance Along Tracks Observed-Near Right: _____
   e. Distance Along Tracks Observed-Near Left: _____
   f. Distance Along Tracks Observed-Far Right: _____
   g. Distance Along Tracks Observed-Far Left: _____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:_____
   a. Clearing Distance Required per Table: _____
   b. Distance Along Tracks Observed-Near Right: _____
   c. Distance Along Tracks Observed-Near Left: _____
   d. Distance Along Tracks Observed-Far Right: _____
   e. Distance Along Tracks Observed-Far Left: _____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

_____

_____

_____

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 080738W

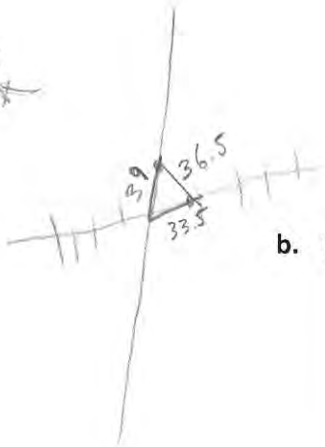
Road/Trail Crossing Name: 1ST ST SD

City/Jurisdiction: SABIN

Train Speed: 40 Posted Speed Limit: 30

1. **Warning Devices:**
   a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	—	—
Flashers	—	—
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	—
Other	—	—



   b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	✓	✓
Other	—	—

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	—	✓
No Train Horn	—	—
Stop Bars	—	—
RXR Pavement Marking	—	—
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	30	30
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width		
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAL	LINEAL
Vertical Road Geo (grade %)	UP TO XING	UP TO XING
Road Surface (condition?)	GOOD (ASPHALT) ~~GRAVEL~~	GRAVEL
Sidewalk	—	—
Street Lighting	—	—

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	140' HWY 52	>500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	STOP	
Driveways/Mid-Block Approaches	SEVERAL	2
Other		

4. **Visual obstructions (land use type)**
   Double track? N (1)
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: ROW / ~~HWY~~ / MOW FARM
   Northwest: ROW / HWY
   Southeast: ROW / MOW BNS
   Southwest: ROW / HOUSES

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

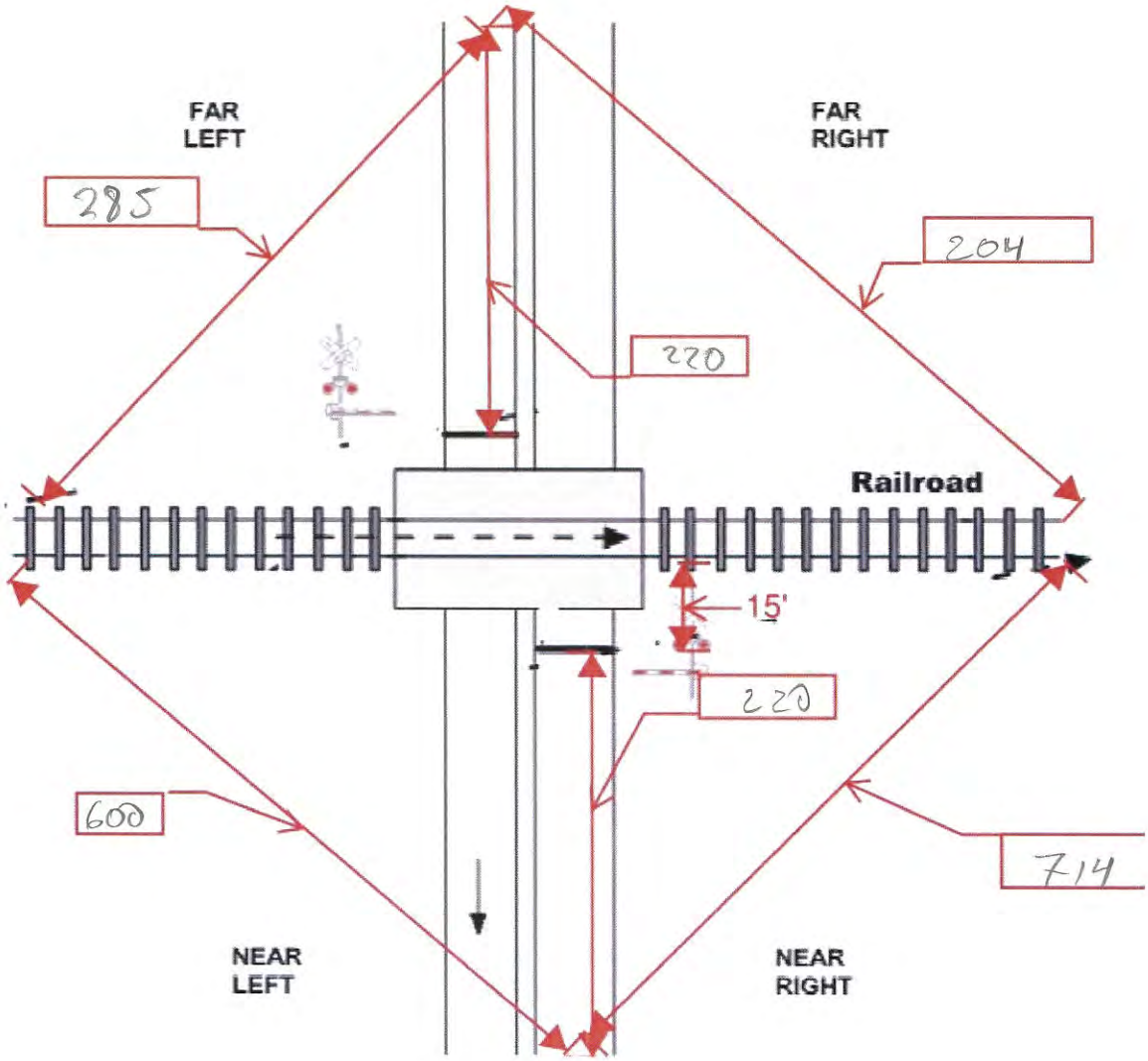
   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 220
   b. Distance Observed Near (South or West): >220
   c. Distance Observed Far (North or East): >220

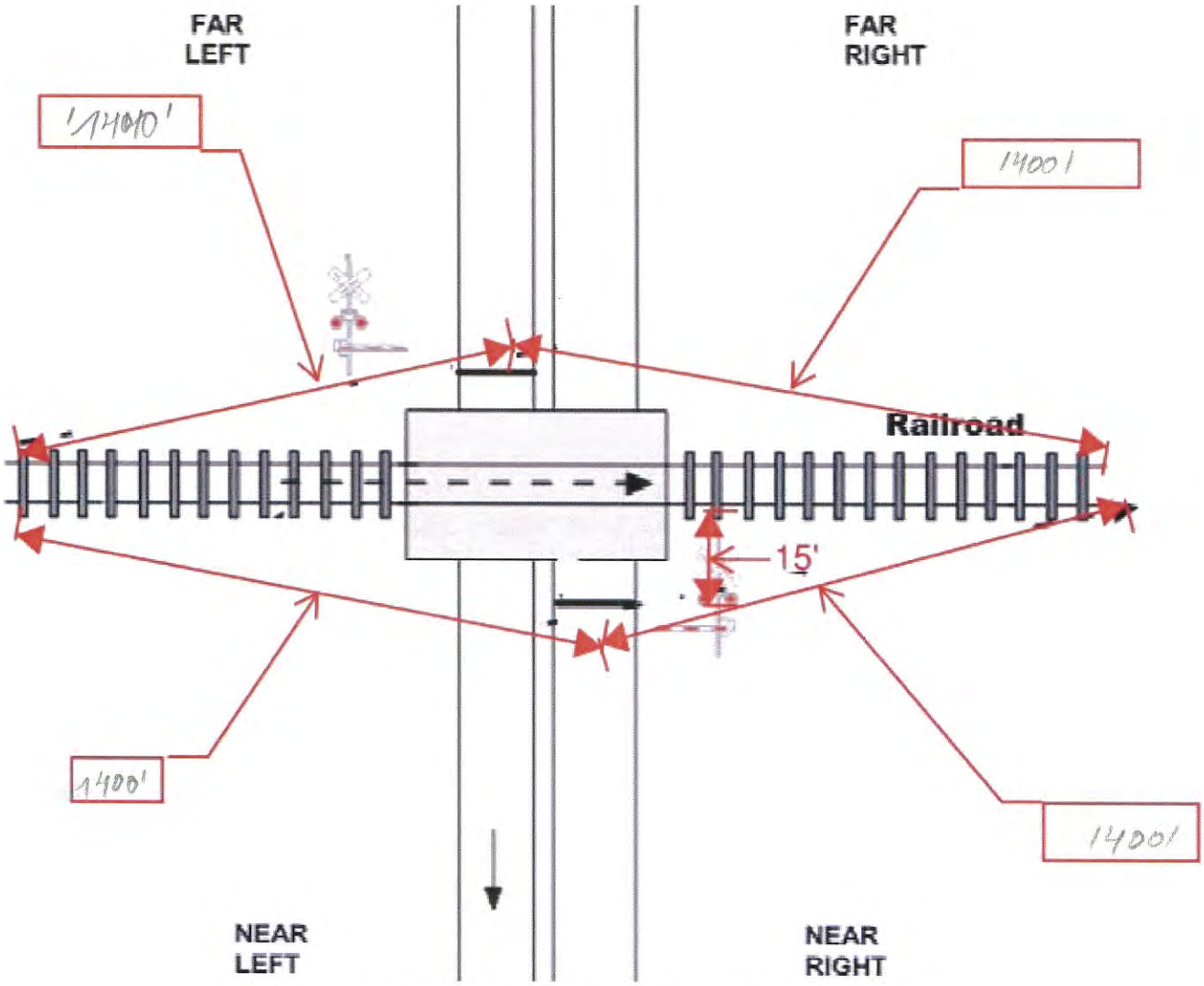
7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 40
   a. Stopping Sight Distance per Table Near: ~~500~~ 220
   b. Stopping Sight Distance per Table Far: 220
   c. Distance Along Tracks Required per Table:
   d. Distance Along Tracks Observed-Near Right:
   e. Distance Along Tracks Observed-Near Left:
   f. Distance Along Tracks Observed-Far Right:
   g. Distance Along Tracks Observed-Far Left:

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 40
   a. Clearing Distance Required per Table: 961'
   b. Distance Along Tracks Observed-Near Right:
   c. Distance Along Tracks Observed-Near Left:
   d. Distance Along Tracks Observed-Far Right:
   e. Distance Along Tracks Observed-Far Left:

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**



APPROACHING SIGHT DISTANCE



CLEARING SIGHT DISTANCE

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 080740X

Road/Trail Crossing Name: 90TH AVE SO

City/Jurisdiction: SABIN

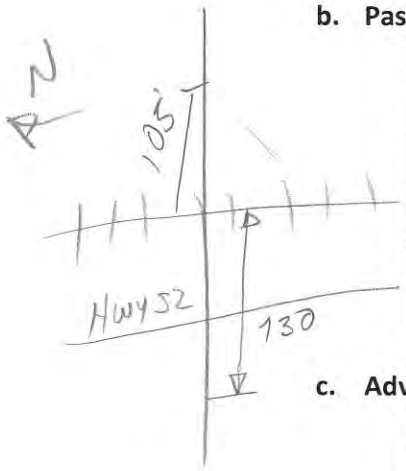
Train Speed: 40 Posted Speed Limit: 55

1. **Warning Devices:**

a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	—	—
Flashers	—	—
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	—
Other		

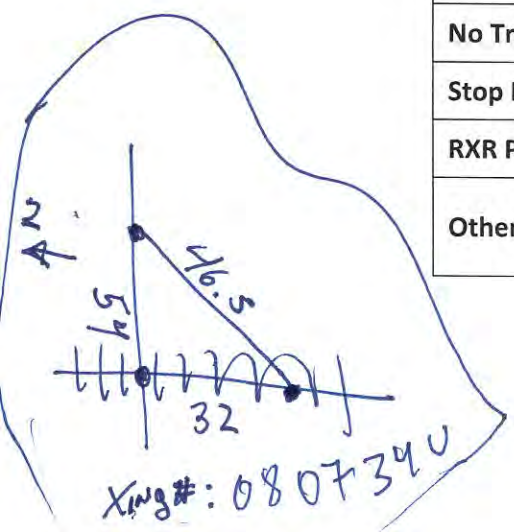
b. **Passive**



	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	✓	✓
Stop	—	—
Other		

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	—	✓
No Train Horn	—	—
Stop Bars	N	Y
RXR Pavement Marking	—	—
Other	—	



2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	55	55
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	7	7
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAL	LINEAL
Vertical Road Geo (grade %)	FLAT	FLAT
Road Surface (condition?)	GOOD	GOOD
Sidewalk	—	—
Street Lighting	—	—

24

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	130 HWY 52	>500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	STOP	
Driveways/Mid-Block Approaches	1	—
Other		

4. **Visual obstructions (land use type)**
   Double track? N 1
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: FARM
   Northwest: DOW / HWY
   Southeast: FARM
   Southwest: DOW / HWY

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

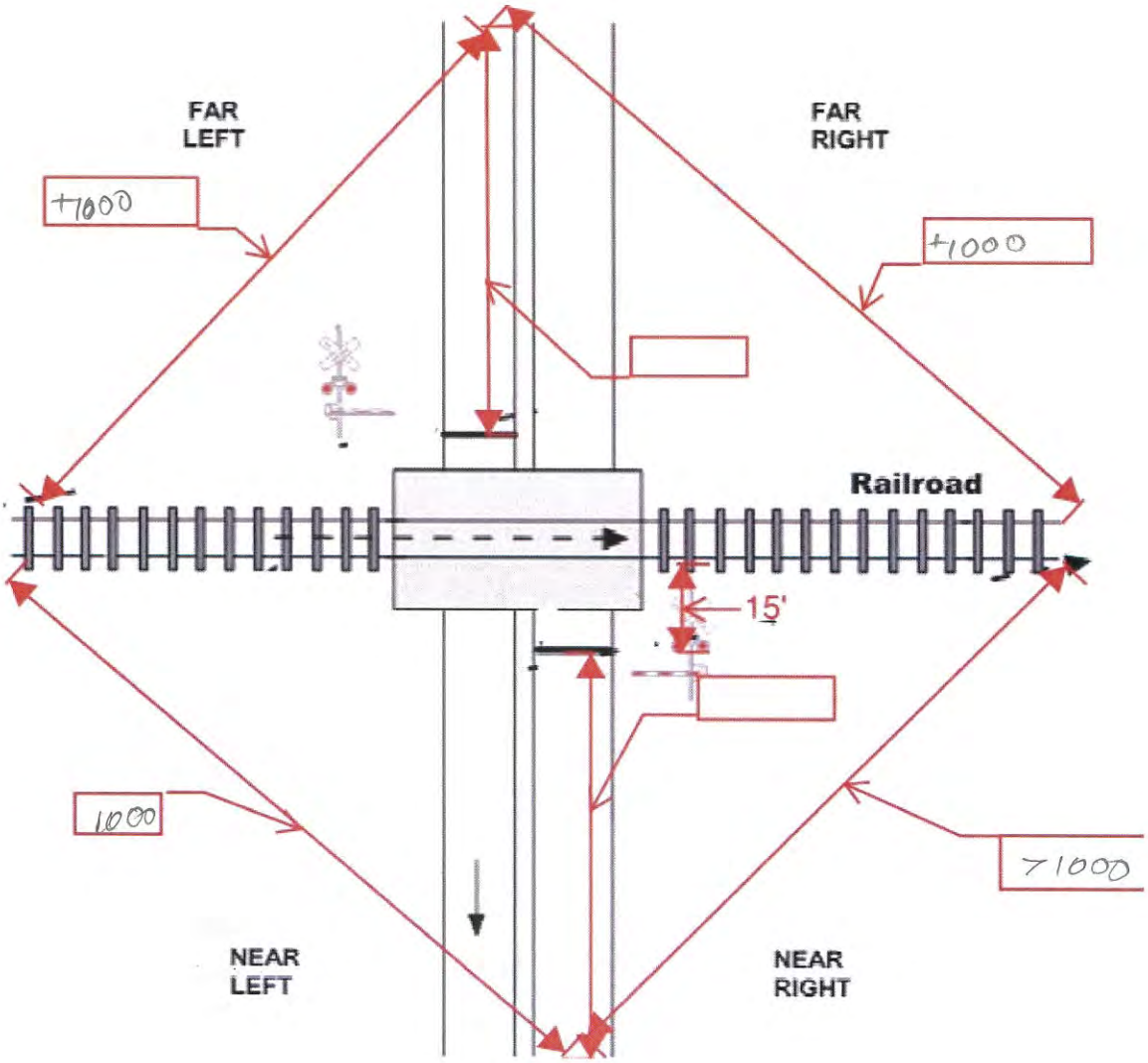
   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: 518
   b. Distance Observed Near (South or West): _____
   c. Distance Observed Far (North or East): _____

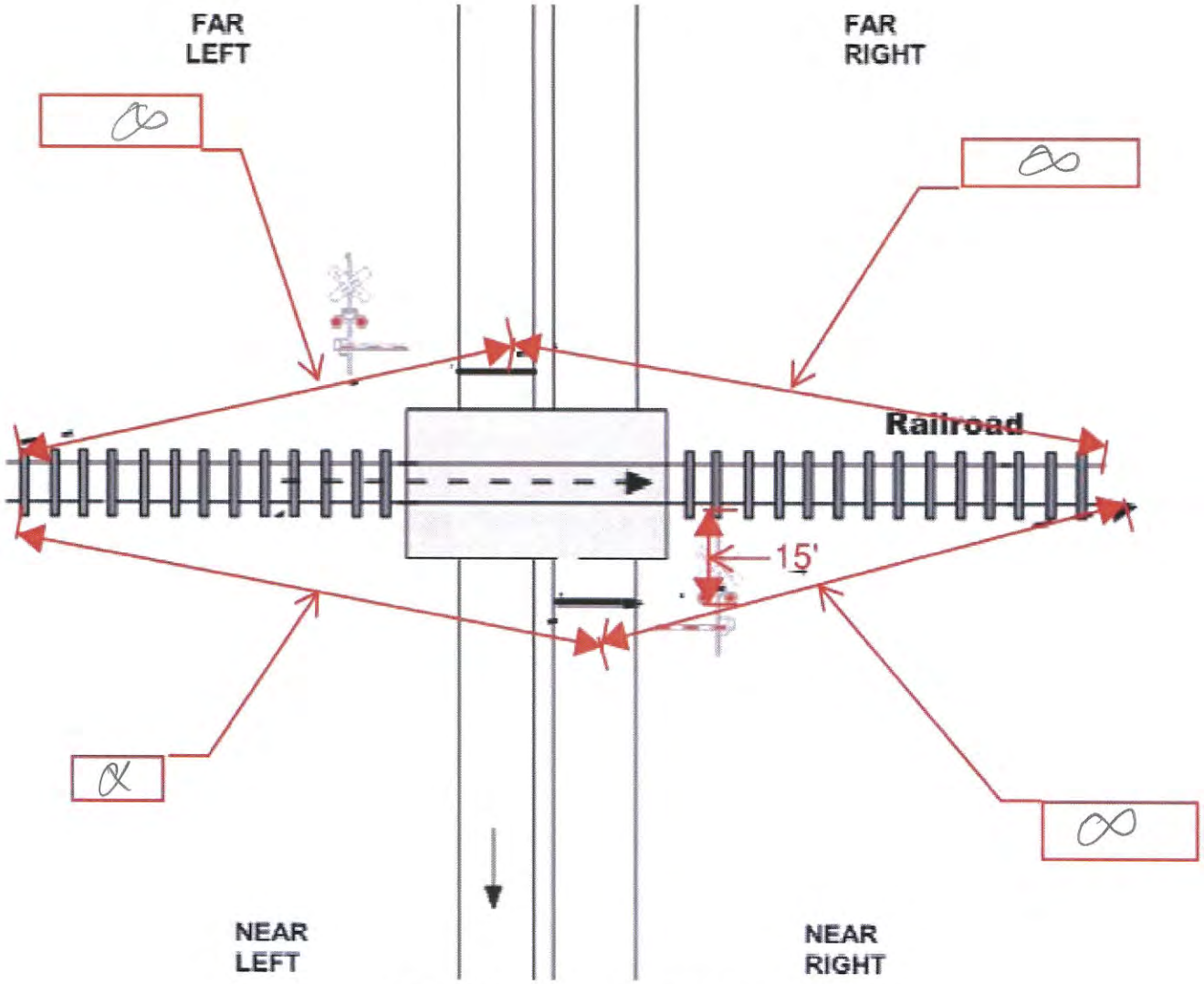
7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 40 MPH
   a. Stopping Sight Distance per Table Near: 518
   b. Stopping Sight Distance per Table Far: 518
   c. Distance Along Tracks Required per Table: _____
   d. Distance Along Tracks Observed-Near Right: _____
   e. Distance Along Tracks Observed-Near Left: _____
   f. Distance Along Tracks Observed-Far Right: _____
   g. Distance Along Tracks Observed-Far Left: _____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 40 MPH
   a. Clearing Distance Required per Table: 961
   b. Distance Along Tracks Observed-Near Right: _____
   c. Distance Along Tracks Observed-Near Left: _____
   d. Distance Along Tracks Observed-Far Right: _____
   e. Distance Along Tracks Observed-Far Left: _____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**



APPROACHING SIGHT DISTANCE



CLEARING SIGHT DISTANCE

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

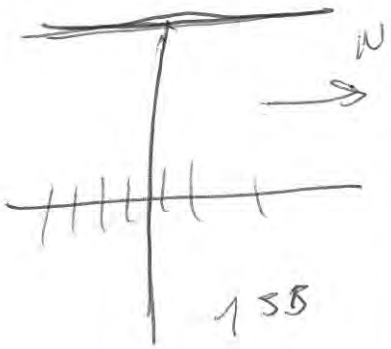
FRA Rail Crossing Number: 080732F

Road/Trail Crossing Name: 50TH AVE S

City/Jurisdiction: SABIN

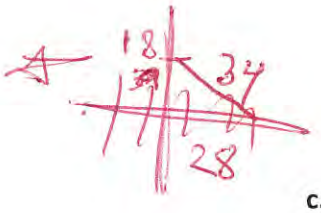
Train Speed: 40 Posted Speed Limit: 55

1. **Warning Devices:**
   a. **Active**



	Near (South or West) Side	Far (North or East) Side
Gates	—	—
Flashers	—	—
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	—
Other		

   b. **Passive**



	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	—	—
Other		

   c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	—	✓
No Train Horn	—	—
Stop Bars	—	—
RXR Pavement Marking	—	—
Other		

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	—	—
No. Thru Lanes	2	2
Turn Lanes	1	1
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	—	—
Bike/Share-o Lanes	—	—
Horizontal Road Geo	—	—
Vertical Road Geo (grade %)	FLAT	FLAT
Road Surface (condition?)	GOOD	GOOD
Sidewalk	—	—
Street Lighting	—	—

35'

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	(721') HWY 52	>500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	—	—
Driveways/Mid-Block Approaches	—	2
Other		

4. **Visual obstructions (land use type)**
   Double track? N (1)
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: ROW / FARM
   Northwest: ROW / HWY SR
   Southeast: ROW / FARM
   Southwest: ROW / HWY 52

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

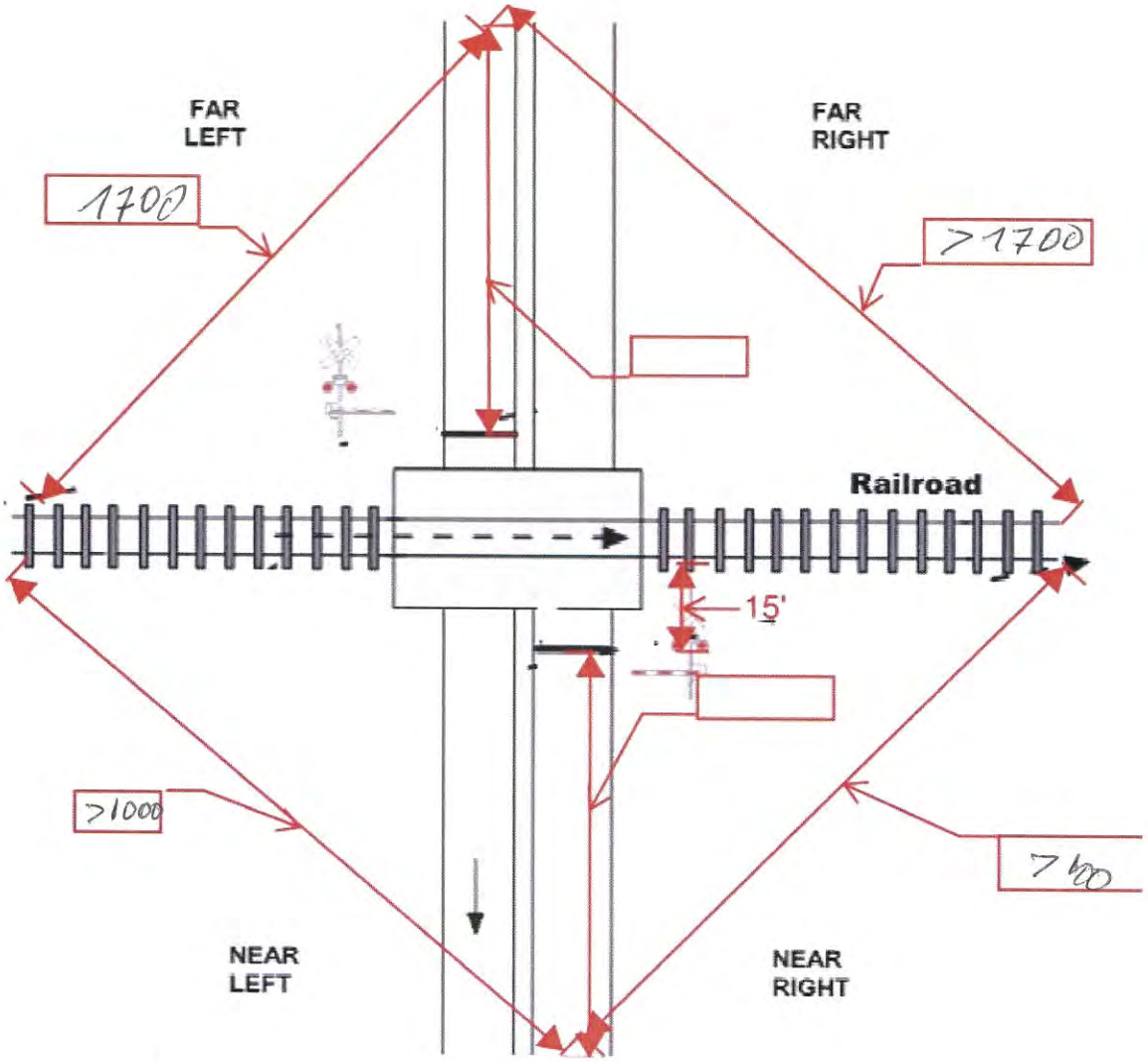
   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: ≥ 518 FT
   b. Distance Observed Near (South or West): _____
   c. Distance Observed Far (North or East): _____

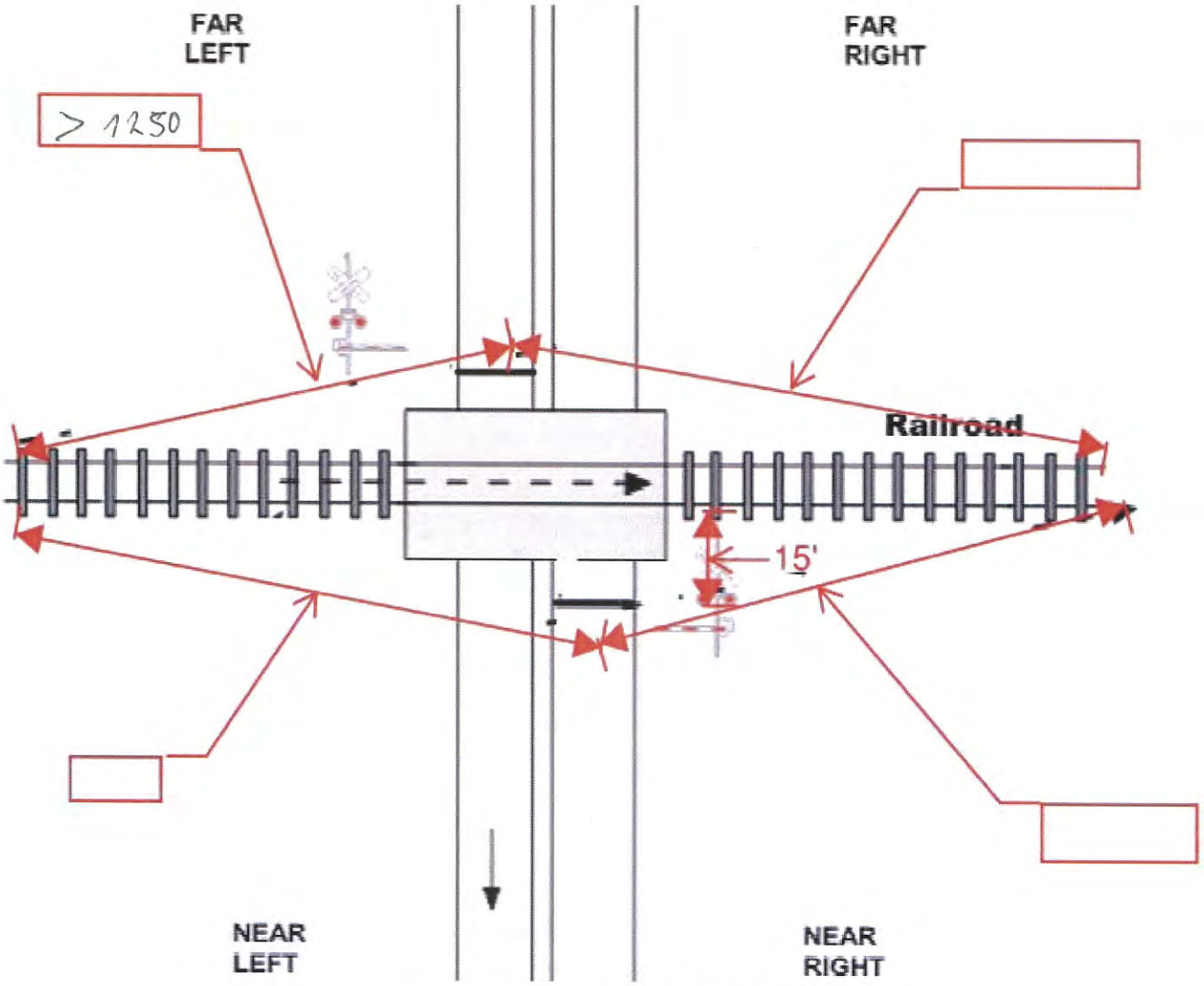
7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 40
   a. Stopping Sight Distance per Table Near: 518 FT
   b. Stopping Sight Distance per Table Far: 518
   c. Distance Along Tracks Required per Table: 431 5
   d. Distance Along Tracks Observed-Near Right: _____
   e. Distance Along Tracks Observed-Near Left: _____
   f. Distance Along Tracks Observed-Far Right: _____
   g. Distance Along Tracks Observed-Far Left: _____

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed: 40
   a. Clearing Distance Required per Table: 961 FT
   b. Distance Along Tracks Observed-Near Right: _____
   c. Distance Along Tracks Observed-Near Left: _____
   d. Distance Along Tracks Observed-Far Right: _____
   e. Distance Along Tracks Observed-Far Left: _____

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**



APPROACHING SIGHT DISTANCE



CLEARING SIGHT DISTANCE

Google Earth Pro

feet 1000

meters 400

SECOND LEVEL SCREENING – FIELD DATA COLLECTION

FRA Rail Crossing Number: 080734 U

Road/Trail Crossing Name: 60TH AVE SO

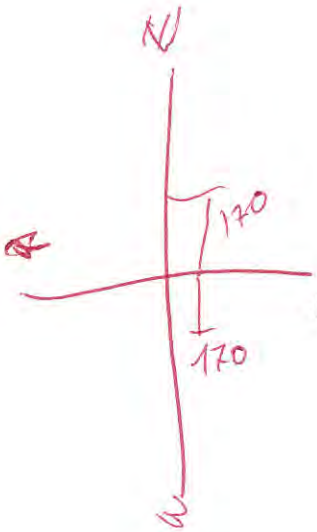
City/Jurisdiction: SABIN

Train Speed: 40 Posted Speed Limit: 55

1. **Warning Devices:**

a. **Active**

	Near (South or West) Side	Far (North or East) Side
Gates	—	—
Flashers	—	—
Cantilever	—	—
Non-Mountable Medians (length)	—	—
Ped Devices (Gates, Maze, Signage, etc)	—	—
Bell	—	—
Other	—	—



b. **Passive**

	Near (South or West) Side	Far (North or East) Side
X-Buck	✓	✓
Yield	—	—
Stop	✓	✓
Other	—	—

c. **Advanced Signage/Pavement Markings**

	Near (South or West) Side	Far (North or East) Side
W10-1 (RXR)	—	✓
No Train Horn	—	—
Stop Bars	—	—
RXR Pavement Marking	—	—
Other	—	—

2. **Roadway Information:**

	Near (South or West) Side	Far (North or East) Side
Posted Speed Limit	—	—
No. Thru Lanes	2	2
Turn Lanes	—	—
Bypass Lanes (School Bus/HazMat)	—	—
Shoulder Width	~~7~~ 24	7
Bike/Share-o Lanes	—	—
Horizontal Road Geo	LINEAR	LINAL
Vertical Road Geo (grade %)	UP TO	FLAT
Road Surface (condition?)	GOOD	GOOD
Sidewalk	—	—
Street Lighting	—	—

3. **Roadway Intersections/Traffic**

	Near (South or West) Side	Far (North or East) Side
Nearest Roadway Intersection (500' max)	1101 52 CLAY COUNTY	>500
Traffic Control (signalized, All-Way Stops, Two-Way Stops (Thru/Stop), Roundabout)	STOP AHEAD	STOP AHEAD
Driveways/Mid-Block Approaches	—	—
Other	—	—

4. **Visual obstructions (land use type)**
   Double track? N 1
   Identify the land use/visual or sight line Obstruction for each quadrant:
   Northeast: farm
   Northwest: " "
   Southeast: " "
   Southwest: " "

5. **Vertical Curve or Humped Crossing**
   Identify Vertical Curves on track alignment: N

   Identify Visual Indication of Humped Crossing (scraps on road surface, tire marks on approaches): N

6. **Stopping Sight Distance to Warning Devices:**
   a. Distance Required per Table: @ 518
   b. Distance Observed Near (South or West): > 518
   c. Distance Observed Far (North or East): > 518

7. **Approaching Sight Distance (Passive Only):**
   Train Speed: 40
   a. Stopping Sight Distance per Table Near: ~~2000~~
   b. Stopping Sight Distance per Table Far:
   c. Distance Along Tracks Required per Table: > 2000
   d. Distance Along Tracks Observed-Near Right: " "
   e. Distance Along Tracks Observed-Near Left: " "
   f. Distance Along Tracks Observed-Far Right: " "
   g. Distance Along Tracks Observed-Far Left: " "

8. **Clearing Sight Distance (All non-gates, Observed ~20' from near rail):**
   Train Speed:
   a. Clearing Distance Required per Table:
   b. Distance Along Tracks Observed-Near Right: > 7000
   c. Distance Along Tracks Observed-Near Left: " "
   d. Distance Along Tracks Observed-Far Right: " "
   e. Distance Along Tracks Observed-Far Left: " "

9. **Additional observations/local issues or concerns (non-controlled walking paths, high ped use areas/parks, etc):**

6.4 Appendix D – School Bus Crossing Regulations and Guidelines

49 CFR 392.10 - Railroad grade crossings; stopping required.

(a) Except as provided in paragraph (b) of this section, the driver of a commercial motor vehicle specified in paragraphs (a) (1) through (6) of this section shall not cross a railroad track or tracks at grade unless he/she first: Stops the commercial motor vehicle within 50 feet of, and not closer than 15 feet to, the tracks; thereafter listens and looks in each direction along the tracks for an approaching train; and ascertains that no train is approaching. When it is safe to do so, the driver may drive the commercial motor vehicle across the tracks in a gear that permits the commercial motor vehicle to complete the crossing without a change of gears. The driver must not shift gears while crossing the tracks.

ND Century Code 39-10-43. Certain vehicles must stop at all railroad grade crossings.

The driver of a bus carrying passengers, or of any school bus...before crossing at grade any track or tracks of a railroad, shall stop such vehicle within fifty feet [15.24 meters] but not less than fifteen feet [4.57 meters] from the nearest rail of such railroad and while so stopped shall listen and look in both directions along such track for any approaching train, and for signals indicating the approach of a train and may not proceed until the driver can do so safely. After stopping as required herein and upon proceeding when it is safe to do so, the driver of any said vehicle shall cross only in such gear of the vehicle that there will be no necessity for manually changing gears while traversing such crossing and the driver may not manually shift gears while crossing the track or tracks.

The state of North Dakota further provides guidance to school bus drivers with a School Bus Driver’s Guide issued by the Department of Public Instruction, State Superintendent.

Railroad Crossings — The following regulations shall apply to all school buses, either loaded or unloaded, during the process of approaching and crossing railroad tracks except at any such crossing where a police officer or a traffic control flagman directs traffic to proceed:

• Decelerate, brake smoothly, and shift gears as necessary.

• Look and listen for the presence of trains.

• Check traffic in all directions. Do not stop, change gears, pass another vehicle, or change lanes while any part of your vehicle is in the crossing.

• As the vehicle approaches a railroad crossing, activate the four-way flashers.

• Stop the vehicle within 50 feet but not less than 15 feet from the nearest rail.

• Listen and look in both directions along the track for an approaching train and for signals indicating the approach of a train.

• Open the door prior to crossing tracks.

• Keep hands on the steering wheel as the vehicle crosses the tracks.

• Do not stop, change gears, or change lanes while any part of your vehicle is proceeding across the tracks.

• Four-way flashers should be deactivated after the vehicle crosses the tracks. • Continue to check mirrors and traffic.

The state of Minnesota provides regulations governing school busses through statute 169.28.

169.28 CERTAIN VEHICLES TO STOP AT RAILROAD CROSSING.

§Subdivision 1.Requirements. (a) The driver of any motor vehicle carrying passengers for hire, or of any school bus whether carrying passengers or not, or of any Head Start bus whether carrying passengers or not, or of any vehicle that is required to stop at railroad grade crossings under Code of Federal Regulations, title 49, section 392.10, before crossing at grade any track or tracks of a railroad, shall stop the vehicle not less than 15 feet nor more than 50 feet from the nearest rail of the railroad and while so stopped shall listen and look in both directions along the track for any approaching train, and for signals indicating the approach of a train, except as hereinafter provided, and shall not proceed until safe to do so and until the roadway is clear of traffic so that the vehicle can proceed without stopping until the rear of the vehicle is at least ten feet past the farthest railroad track. The driver must not shift gears while crossing the railroad tracks.

6.5 Appendix E – Second Level Screening Results

FM Metro COG Regional Railroad Crossing Safety Study
Second Level Screening Results

							Possible Points											
							5-25	10	5-25	5-20	10-20	10-20	5-30	10-40	5-20	25-100		
Rank	Crossing ID	Railroad	Street	City	State	Existing Warning Device (from FRA)	J, School Bus Crossings	K, Designated Bike Trail	L, Hazardous Materials Route	M, Expected Growth	N, Urban Area	O, Special Use Area	P, Local Issue / Concern	Q, Vertical Curve / Humped Crossing	R, Visual Obstruction (Gated)	S, Visual Obstruction (Non-Gated)	T, First Level Screening Result	Second Level Screening Result
PED	**062894K**	BNSF	PEDESTRIAN PATH	HAWLEY	MN	**No Signs/Signals**	-	-	5	15	-	-	30	NA	NA	NA	**NA (45)**	**NA (95)**
1	**062920X**	BNSF	PARKE AVE S	GLYNDON	MN	**Gates**	25	-	5	5	-	-	15	-	-	-	**122**	**172**
2	**062576Y**	BNSF	12TH AVE S	MOORHEAD	MN	**Gates**	15	10	10	10	10	-	-	-	-	-	**88**	**143**
3	**071415C**	BNSF	1ST AVE NORTH	MOORHEAD	MN	**Flashing Lights w/Medians**	20	-	-	5	15	-	-	-	-	-	**100**	**140**
4	**080732F**	OTVR	50TH AVE S	SABIN	MN	**Crossbucks**	5	10	-	5	-	-	-	-	-	50	**64**	**134**
5	**062943E**	BNSF	S. MAIN ST	DILWORTH	MN	**Gates**	5	10	5	10	-	-	10	-	-	-	**93**	**133**
6	**080738W**	OTVR	1ST ST SO	SABIN	MN	**Crossbucks**	5	-	-	-	-	-	-	-	-	50	**73**	**128**
7	**062909X**	BNSF	PARTRIDGE AVE	GLYNDON	MN	**Gates**	5	-	-	5	-	-	-	-	-	-	**118**	**128**
8	**062898M**	BNSF	230TH ST S	HAWLEY	MN	**Gates**	-	-	-	10	-	-	-	-	10	-	**105**	**125**
9	**092950W**	BNSF	CR-17	FARGO	ND	**Gates**	20	10	-	-	-	-	20	-	-	-	**65**	**115**
The crossings above this row have been specifically selected for evaluation of mitigation options.																		
10	**071009F**	BNSF	9TH ST EAST	WEST FARGO	ND	**Gates**	5	-	5	-	-	-	-	-	-	-	**104**	**114**
11	**070859S**	BNSF	BOLLEY DRIVE	FARGO	ND	**Crossbucks**	-	-	-	-	-	20	-	-	-	25	**66**	**111**
12	**062901T**	BNSF	190TH ST S	HAWLEY	MN	**Gates**	5	-	5	5	-	-	-	-	20	-	**76**	**111**
13	**062925G**	BNSF	1ST AVE S	MOORHEAD	MN	**Gates**	5	-	-	5	10	-	-	-	5	-	**84**	**109**
14	**080730S**	OTVR	40TH AVE S	MOORHEAD	MN	**Crossbucks**	10	-	-	10	-	-	-	-	-	25	**62**	**107**
15	**071108D**	BNSF	3RD AVE	CASSELTON	ND	**Gates**	-	-	-	-	-	-	-	-	5	-	**101**	**106**
16	**080734U**	OTVR	60TH AVE SO	SABIN	MN	**Stop Signs**	5	-	-	5	-	-	-	-	-	25	**71**	**106**
17	**071095E**	BNSF	161ST AVE SE	MAPLETON	ND	**Crossbucks**	-	-	-	-	-	-	-	-	-	25	**80**	**105**
18	**062577F**	BNSF	28TH AVE SO	MOORHEAD	MN	**Gates**	15	10	10	5	-	-	-	-	-	-	**63**	**103**
19	**080740X**	OTVR	90TH AVE SO	SABIN	MN	**Crossbucks**	5	-	-	-	-	-	-	-	-	25	**70**	**100**
20	**070868R**	BNSF	MAIN AVE	FARGO	ND	**Flashing Lights**	-	-	-	5	20	-	-	-	-	-	**74**	**99**
21	**062589A**	BNSF	110 AVE S	COMSTOCK	MN	**Stop Signs**	5	-	-	-	-	-	-	-	-	25	**65**	**95**
22	**070828T**	BNSF	27TH ST N	FARGO	ND	**Gates**	-	-	5	-	-	-	10	-	-	-	**74**	**89**
23	**080759P**	OTVR	150TH AVE SO	BARNESVILLE	MN	**Crossbucks**	-	-	-	-	-	-	-	-	-	25	**62**	**87**
24	**062911Y**	BNSF	100TH ST S	GLYNDON	MN	**Gates**	10	-	5	-	-	-	-	-	-	-	**69**	**84**
25	**062582C**	BNSF	60TH AVE S	MOORHEAD	MN	**Gates**	5	-	-	5	-	-	-	-	-	-	**74**	**84**
26	**081388K**	BNSF	28TH ST SE	HARWOOD	ND	**Gates**	5	-	-	-	-	-	-	-	-	-	**75**	**80**
27	**081743W**	BNSF	3RD ST	ARGUSVILLE	ND	**Gates**	-	-	-	-	-	-	-	-	-	-	**78**	**78**
28	**092956M**	BNSF	CR-20	FARGO	ND	**Gates**	5	-	-	-	-	-	-	-	-	-	**68**	**73**
29	**062939P**	BNSF	70TH ST S	DILWORTH	MN	**Gates**	5	-	5	-	-	-	-	-	-	-	**63**	**73**
30	**071101F**	BNSF	15TH AVE	CASSELTON	ND	**Gates**	-	-	10	5	-	-	-	-	-	-	**58**	**73**
31	**062912F**	BNSF	90TH ST S	GLYNDON	MN	**Stop Signs**	-	-	5	-	-	-	-	-	-	-	**67**	**72**
32	**062716Y**	RRVW	163RD AVE SE	KINDRED	ND	**Crossbucks**	-	-	-	5	-	-	-	-	-	-	**64**	**69**
33	**081389S**	BNSF	1ST STREET	ARGUSVILLE	ND	**Gates**	-	-	-	-	-	-	-	-	-	-	**68**	**68**

6.6 Appendix F – City of Moorhead Preemption Documentation

MOORHEAD
MINNESOTA
500 Center Avenue, Box 779 • Moorhead, MN 56561
(218) 299-5166 • TDD/Relay 711
www.ci.moorhead.mn.us

January 2, 2008

Mr. Thomas A. Swenson
District Traffic Engineer
Minnesota Department of Transportation
District 4
1000 Highway 10 West
Detroit Lakes, MN 56501

RE: Request to Modify Traffic Signal Operations during Railroad Preemption

Dear Tom:

Attached please find a memorandum from Richard G. Lane, P.E. of SRF Consulting Group documenting the operational recommendations developed from two on-site reviews of traffic signal operations during railroad preemption in downtown Moorhead. The City respectfully requests that Mn/DOT implement the recommendations in the attached memorandum at the earliest possible date.

Thank you for your timely consideration of this request.

Sincerely,

Robert A. Zimmerman, Ph.D., P.E.
City Engineer

C: Spencer Arndt, BNSF Railway

SRF CONSULTING GROUP, INC.

Transportation • Civil • Structural • Environmental • Planning • Traffic • Landscape Architecture • Parking • Right of Way

SRF No. 5496

MEMORANDUM

TO: Robert Zimmerman, PhD, P.E.
Moorhead City Engineer

FROM: Richard G. Lane, P.E. RGL
Principal

DATE: December 28, 2007

SUBJECT: Railroad Pre-emption Signal Operation

Following the implementation of Moorhead's railroad signal pre-emption installed in conjunction with the quiet zone the City began receiving several complaints related to traffic signal operations. When the railroad signal pre-emption was activated the signal timings were set based on MnDOT Guidelines. As a result excessive delay has been encountered by north-south traffic at most of the pre-empted intersections. Due to these delays, not only have there been complaints to the City and MnDOT district 4, observation has shown that many drivers are either using private property (parking lots) to circumvent the traffic signals or have blatantly violated the red indication. Because the delays are so long for the north-south movements many drivers assume that the signal has malfunctioned. In the City's opinion this has resulted in a very dangerous situation.

Moorhead's railroad pre-emption system is unusual in the fact that the total length of time that the system is in pre-emption is longer than most standard systems. This is due to the operation of the 4-quadrant gate systems and the length of the advanced pre-empt signal provided by BNSF. Because a 4-quadrant gate system needs additional time to operate the exit gates additional time is included prior to the train occupying the crossing. Also, because of the proximity of the two rail lines (KO subdivision and Prosper subdivision), and the fact that some of the intersections are pre-empted by both, the advanced pre-empt signal from BNSF is longer at some locations to account for the worst case scenario. The combination of these two factors creates excessive side street delays, which have not only led to citizen complaints, but have also precipitated red light running at several locations.

The City requested that MnDOT review the operation of the signal systems to determine if other modes of operation could be implemented to reduce the delays. Two on-site field reviews were conducted on December 6, 2007 and December 18, 2007 which included representation from Moorhead, BNSF, MnDOT, and SRF. The review team visited all the signalized intersections currently under MnDOT's jurisdiction and some of those operated by the City.

The review team observed the operations of the signal systems under railroad pre-emption, and discussed several options. Key factors reviewed included; storage between the pre-empted intersection

and the railroad gate arms; intersection configuration/channelization; driver behavior; signal timing; signal system configuration/type & number of heads, etc.

Based on the field reviews the following operational recommendations were developed.

Main Avenue and 4th Street
Maintain the current signal pre-emption operation.

Due to the configuration of 4th Street south of Main Avenue, the north bound movement is minimal; therefore the current operation does not create excessive delays. This intersection will continue to be monitored to determine if future changes are necessary.

Main Avenue and 5th Street
Following the track clear allow this signal to return to its normal operation.

There is a very heavy north bound double left turn at this intersection which is the dominant movement. Also, there is adequate storage between Main Avenue and the railroad to store north bound traffic.

Main Avenue and 8th Street
Maintain the current signal pre-emption operation until the improvements discussed below can be implemented.

The current pre-empt signal operation provides a north bound left turn arrow during pre-empt cycling. However, because this signal is not actuated, this phase can not be extended to allow sufficient time to serve the volume of north bound left turns. In addition, the south bound movements (movements away from the tracks) are not cycled because of the lack of detection. Because there are commercial access points located between the tracks and Main Avenue the City would like to see the south bound phases actuated so that they can be cycled.

A two phased approach was recommended. The first phase would be to actuate the north and south legs of the intersection to allow for more efficient operation of the north bound left and south bound thru and left. The second phase would be to fully actuate all phases of this location to improve the overall efficiency of the signal operation. In addition, a south bound left turn lane should be added. It appears that adequate street width is available such that restriping is all that is necessary to implement this turn lane. Full actuation is preferred if funds are available but at least phase one should be implemented.

Main Avenue and 11th Street
Following the track clear allow this signal to return to its normal operation.

There is only one north bound lane to store traffic south of Main Ave; therefore long queues develop at this location. Between Main Avenue and the tracks, 11th Street has two north bound lanes which provide adequate storage to allow this signal to cycle.

Main Avenue and 14th Street
Following the track clear allow this signal to return to its normal operation.

14th Street is a one-way north south of Main Avenue; therefore there is a heavy north bound left turn movement at this intersection. Also, between Main Avenue and the tracks there is adequate storage to allow this signal to cycle.

Center Avenue and 14th Street
Maintain the current signal pre-emption operation until the improvements discussed below can be implemented.

The signal at this location is pre-empted by both the KO track and the Prosper track. The current pre-emption signal operation includes a north bound left turn arrow that cycles during pre-empt. The south bound 4 section head should be replaced with a 5 section head to provide for a south bound left turn phase which would cycle concurrently with the north bound left turn. No other movements should be allowed at this location due to the lack of storage space between Center Avenue and the Prosper track. In addition, because of the extremely short storage, south bound traffic should be required to stop for the Center Avenue signal north of the Prosper tracks. A stop here on red should be installed on the north side of the tracks.

Center Avenue and 11th Street
Following the track clear allow this signal to return to its normal operation.

This signal is also pre-empted by both the KO and Prosper tracks. However there is adequate storage between both sets of tracks to allow this signal to cycle.

Center Avenue and 8th Street
Maintain the current signal pre-emption operation.

This intersection currently allows the north bound thru and left turn arrow; and the south bound left turn arrow to cycle during the pre-empt. Although there is significant storage, the traffic volumes are much higher at this location; therefore the current operation should be maintained as is.

The review team discussed how the recommended changes would be viewed by BNSF. As a partner in the quiet zone project it will be important to communicate to them that signal operations will be modified. It's important to note that that advanced pre-empt and the track clear green phases will not be changed as part of these modifications. All the modifications discussed above will occur after the track clear interval and after the railroad gates are down. On December 20, 2007, Bob Zimmerman and I met with Del Kastner and Lennie Facklam from BNSF to discuss the railroad pre-emption operation. Mr. Facklam's primary responsibility with BNSF is the design and operation of their pre-emption systems. We specifically discussed the traffic signal operations and the proposed changes. Mr. Facklam concurred with the proposed changes and commented that he had observed that the current operational mode was causing unnecessary delay.

Based on the review's team field observations I recommend that the above recommendation be forwarded to MnDOT for concurrence and implementation.